



European
Commission

ISSN 2443-8014 (online)

Debt Sustainability Monitor

2019

INSTITUTIONAL PAPER 120 | JANUARY 2020

EUROPEAN ECONOMY



*Economic and
Financial Affairs*

European Economy Institutional Papers are important reports analysing the economic situation and economic developments prepared by the European Commission's Directorate-General for Economic and Financial Affairs, which serve to underpin economic policy-making by the European Commission, the Council of the European Union and the European Parliament.

Views expressed in unofficial documents do not necessarily represent the views of the European Commission.

LEGAL NOTICE

Neither the European Commission nor any person acting on behalf of the European Commission is responsible for the use that might be made of the information contained in this publication.

This paper exists in English only and can be downloaded from https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en.

Luxembourg: Publications Office of the European Union, 2020

PDF ISBN 978-92-79-98867-7 ISSN 2443-8014 doi:10.2765/33470 KC-BC-19-027-EN-N

© European Union, 2020

Reuse is authorised provided the source is acknowledged. The reuse policy of European Commission documents is regulated by Decision 2011/833/EU (OJ L 330, 14.12.2011, p. 39). For any use or reproduction of material that is not under the EU copyright, permission must be sought directly from the copyright holders.

CREDIT

Cover photography: © iStock.com/jxfzsy

European Commission
Directorate-General for Economic and Financial Affairs

Debt Sustainability Monitor 2019

ACKNOWLEDGEMENTS

This report was prepared in the Directorate-General for Economic and Financial Affairs under the direction of Declan Costello (acting Director-General), and the supervision of Lucio Pench (Director for Fiscal Policy) and Giuseppe Carone (Head of Unit).

Stéphanie Pamies was the coordinator of the report. Main contributors to the report were Pedro Arevalo, Narcissa Balta, Per Eckefeldt, Nicola Gagliardi, Fabrice Orlandi, Stéphanie Pamies and Anda Patarau. Andras Hudecz (DG ECFIN) contributed to Chapter 3 (Box 3.3). Section 3.1.1 and Annex A8 benefited from comments by Henk Van Noten (DG ECFIN). Vitor Martins and Stefan Zeugner (DG ECFIN) contributed to section 5.1. Contributions to Sections 5.2.4 and Annex A11 were provided by Mario Bellia (DG JRC), Francesca Di Girolamo (DG JRC), Andrea Pagano (DG JRC), Marco Petracco Giudici (DG JRC) and Heynderickx Wouter (SRB). Section 5.2.4 and Annex A11 benefited from comments by DG FISMA D1, D3 and E.RTF staff and Sven Langedijk (DG ECFIN). Elva Bova (DG ECFIN) contributed to Chapter 5 (Box 5.3). Box 5.3 benefited from comments by Caroline Lambert (DG CLIMA), Sven Langedijk (DG ECFIN), Asa Johannesson Linden (DG ECFIN) and Arnaud Mercier (DG ECFIN). Chapter 5 further benefited from comments by Ingrid Toming (DG ECFIN) and Vassil Georgiev (DG ESTAT).

Statistical support was provided by Pedro Arevalo and Nicola Gagliardi. Secretarial support and layout was provided by Laura Crapanzano.

Comments on the report would be gratefully received and may be sent to:

DG ECFIN – Unit C2

European Commission, Directorate-General for Economic and Financial Affairs,

Directorate C: Fiscal policy, Unit C2: Sustainability of public finances

Office CHAR 12/053 B-1049 Brussels

E-mail: ECFIN-Secretariat-C2@ec.europa.eu

or

Giuseppe Carone

European Commission, Directorate-General for Economic and Financial Affairs

Directorate C: Fiscal policy, Unit C2: Sustainability of public finances

Office CHAR 12/048

B-1049 Brussels

E-mail: Giuseppe.Carone@ec.europa.eu

CONTENTS

Executive summary	7
1. Introduction	15
1.1. Recent debt developments in the EU	15
1.2. The Commission framework to assess fiscal sustainability	15
1.3. Novelties of the report	16
2. Short-term fiscal sustainability analysis	23
2.1. Short-term fiscal sustainability indicator: the S0 indicator	23
2.2. Short-term financing needs	27
2.3. Financial markets information	30
3. Medium-term fiscal sustainability analysis	35
3.1. Debt sustainability analysis	35
3.2. Medium-term financing needs	55
3.3. Medium-term fiscal sustainability indicator: the S1 indicator	57
4. Long-term fiscal sustainability analysis	80
4.1. The economic and budgetary implications of ageing: latest update	80
4.2. Long-term fiscal sustainability indicator: the S2 indicator	81
4.3. Sensitivity analysis of the S2 indicator	85
5. Additional risks and mitigating factors for fiscal sustainability	95
5.1. Risks related to the government debt structure	95
5.2. Looking beyond 'government debt': risks related to government other direct and contingent liabilities	98
5.3. Government assets and net debt	107
6. Overall assessment of fiscal sustainability challenges	125
6.1. Preliminary remarks	125
6.2. Approach used in the assessment of short-, medium- and long-term fiscal sustainability challenges	125
6.3. Main results	129
Statistical Annex	137
A1. Cross-country tables	137
A1.1. Short-term fiscal sustainability challenges	138
A1.2. Medium-term fiscal sustainability challenges	145

A1.3. Long-term fiscal sustainability challenges	147
A2. Country fiches	149
Belgium	149
Bulgaria	153
Czechia	157
Denmark	161
Germany	165
Estonia	169
Ireland	173
Spain	177
France	181
Croatia	185
Italy	189
Cyprus	193
Latvia	197
Lithuania	201
Luxembourg	205
Hungary	209
Malta	213
Netherlands	217
Austria	221
Poland	225
Portugal	229
Romania	233
Slovenia	237
Slovakia	241
Finland	245
Sweden	249
United-Kingdom	253
A3. Data sources and information	257
Methodological Annex	261
A4. The early-detection indicator of fiscal stress risk (S0)	261
A4.1. The methodology for the calculation of the thresholds	261
A4.2. The calculation of the composite indicator S0	262
A5. The medium- and long-term fiscal sustainability indicators (S1, S2)	263
A5.1. Notation	263

A5.2. Debt dynamics	263
A5.3. Derivation of the S1 indicator	263
A5.4. Derivation of the S2 indicator	264
A6. Decomposing debt dynamics, projecting the interest rate on government debt and property incomes	269
A6.1. Decomposing the debt dynamics	269
A6.2. Projecting the implicit interest rate on government debt	270
A7. Stochastic debt projections based on a historical variance-covariance matrix	273
A7.1. The method to obtain (annual) stochastic shocks to macroeconomic variables	273
A7.2. Applying stochastic shocks to the central scenario	274
A7.3. The debt evolution equation	274
A7.4. The data used	275
A8. The Stability and Growth Pact scenario	277
A9. Assessment of fiscal sustainability challenges: criteria used and decision trees	279
A9.1. The overall approach followed in fiscal sustainability risk assessment	279
A9.2. The approach used in the assessment of medium-term fiscal sustainability risks	279
A9.3. The approach used in the assessment of long-term fiscal sustainability risks	282
A9.4. A summary overview of thresholds used in fiscal sustainability risk assessment	284
A10. Signalling approach for the analysis of government debt structure, sovereign yield spreads and banking sector vulnerabilities	287
A11. Estimating the potential impact of simulated bank losses on public finances based on the SYMBOL model	289
References	296

LIST OF BOXES

1.1. Deterministic debt projection scenarios: main assumptions	18
2.1. The identification of short-term fiscal risks through early-warning indicators: recent insights based on the S0 indicator	33
3.1. Revision of interest rate assumptions: rationale, description and impact	65
3.2. Understanding interest rates' differentials across the EU/EA and implications for the debt dynamic	72
3.3. Medium-term fiscal sustainability challenges for Greece	78

4.1.	Fiscal sustainability, intertemporal and intergenerational imbalances	88
5.1.	Government liabilities: scope and definitions	110
5.2.	SYMBOL stress test scenarios	114
5.3.	Including climate change risks in the DSA: concepts and definitions	116

EXECUTIVE SUMMARY

MONITORING FISCAL SUSTAINABILITY RISKS HAS TO TAKE INTO ACCOUNT THE CURRENT LOW INTEREST RATE ENVIRONMENT

The economic outlook weakened last year and interest rates further declined

The European and world economies weakened last year, notably given the unfavourable external environment. Many features of the global slowdown are expected to be persistent (including trade policy uncertainty, deceleration in China, low productivity trends). Based on the latest available Commission forecast (Autumn forecast 2019), growth is not expected to rebound significantly in the next two years. In response to these developments, most central banks across the world have recently implemented more accommodative policies. Government bonds have rallied remarkably in recent months, leading to lower yields along the entire yield curve, but more importantly for the long-term part (observed compression in term premia). In the EU, a large share of sovereign bonds is currently trading at negative yields.

Interest rates: 'low for long'?

The global fall of interest rates has fuelled intense debates among academics, about its causes and future developments. Some scholars argue that the decrease of interest rates is not a new phenomenon, reflecting the decrease of the equilibrium (or 'neutral') interest rate – caused by structural factors (Rachel and Summers, 2019; Blanchard et al. 2019). Other economists associate these developments to a greater scarcity of safe assets, as a result of the persistent post-crisis deleveraging, financial (re-) regulation and higher demand for reserves by emerging market countries (Gourinchas and Rey, 2017) ⁽¹⁾. Most of these underlying factors are unlikely to turn around rapidly. At the same time, large uncertainties exist going forward. In this context, the interest – growth rate differential (the so called 'r – g') has recently become negative in most advanced economies, including most EU countries.

These developments have potential important implications for debt sustainability analysis and fiscal policy

In the context of the EU/EA, ensuring debt sustainability is a core principle of the Union's coordination of economic policies. This motivated the introduction of fiscal rules, as a cornerstone to the EMU, notably to address debt externalities (e.g. as sovereign debt distress may induce negative spillover effects in other countries). Lower interest rates have important implications for debt sustainability, especially if sustained over a long period of time. They have already enabled a significant reduction of the interest bill paid by governments. *All else equal*, a prolonged period of low interest rates, and a durably negative 'r - g' differential ⁽²⁾, would support a reduction in debt levels. This in turn could overall reduce debt sustainability concerns and make debt externalities less acute. In some Member States, where the analysis points to low sustainability risks, the current economic context of low growth and constrained monetary policy creates a stronger case for increasing investment and other productive spending, with a view to support growth and the transition towards a green economy. However, in several highly indebted countries, government debt has little reduced over the past

⁽¹⁾ Another set of explanations relates the decrease of interest rates to shifts in monetary policy regimes over time (Borio et al., 2017).

⁽²⁾ Blanchard (2019) argues that, in the case of the United States and based on market interest rates, this situation is in fact more the historical norm than the exception. By contrast, the ECB (2019) finds that, when the interest rate is defined as the implicit interest rate that governments effectively pay on their debt, this differential has been positive for advanced mature economies, including the largest EU countries, over extended periods of time. This last empirical finding is supported by Fuest and Gros (2019).

years. In these cases, where sustainability risks remain a concern, prudent fiscal policies should be pursued in order to put debt on a downward path, reduce vulnerability to shocks, and allow for the full functioning of automatic stabilisers in the event of an economic downturn. Therefore, there is a diversity of situations across Member States, requiring different policy priorities, in line with the euro area recommendation (as part of the European Semester; see also European Commission, 2019d).

Lessons from history (EA sovereign debt crisis) and challenges lying ahead should not be forgotten

Despite the current favourable financial environment, the debt sustainability arithmetic may be more complex than sometimes stated: first, in the face of increasing ageing costs and / or future expenditure linked to climate change costs, the primary deficit may be subject to continuous upward pressures ⁽³⁾. In that case, under unchanged policies, the debt to GDP ratio may exhibit an increasing path even if interest rates are durably lower than growth rates. Then, it is in fact likely that higher debt will result in a higher interest rate, eventually inverting the negative interest – growth rate differential. Moreover, even if the global ‘risk-free’ interest rate has declined over time, significant sovereign spreads, accounting for credit risk, can be clearly observed across countries, especially in the EU/EA, reflecting in part the state of public finances (see Box 3.2 of this report). The lessons learnt from the euro area sovereign debt crisis, and the recent reminder of debt market tensions mid-2018, should not be forgotten. Financial markets’ perceptions and investors’ behaviour can be subject to rapid changes, in the face of unexpected shocks or policy announcements. In the euro area, risks of ‘sudden stops’ events in sovereigns perceived as less safe, and contagion effects in times of economic turmoil prevail. Hence, rollover and liquidity risks, especially in highly indebted countries, are still tangible and represent a key dimension of debt sustainability risks.

Assessing fiscal sustainability risks remains critical

In this context, and while public debt to GDP ratios remain elevated in several Member States (including large economies), assessing fiscal sustainability risks is still critical, for the identification of potential vulnerabilities (and conversely fiscal space), and for designing appropriate policy responses.

DSM 2019: METHODOLOGY, NOVELTIES AND USE

This report provides an update of fiscal sustainability risks compared to the FSR 2018

This edition of the Debt Sustainability Monitor (DSM) provides an update of fiscal sustainability risks faced by Member States, previously assessed in the 2018 Fiscal Sustainability Report (FSR). It offers a snapshot of the situation, based on results from the latest available macroeconomic forecasts (European Commission’s Autumn 2019 forecast). The projections also rely on the Economic Policy Committee (EPC) agreed long-term economic and budgetary projections from the joint European Commission - EPC 2018 Ageing Report (in particular those related to ageing costs). In a limited number of cases, long-term budgetary projections have been updated, to reflect recent pension reforms.

⁽³⁾ For instance, if insufficient pension reforms don’t allow curbing future ageing costs, or if too limited policies to mitigate the climate change phenomenon results in more frequent disruptive natural disasters necessitating very costly adaptation policies.

It relies on the same methodological approach as the one used in the FSR 2018

Fiscal sustainability risks faced by Member States are assessed according to the comprehensive horizontal fiscal sustainability framework used in the FSR 2018. This framework brings together in a synthetic way results on debt sustainability analysis (DSA) and fiscal sustainability indicators ⁽⁴⁾. It allows gaining a horizontally consistent overview of fiscal sustainability risks across time horizons (short, medium and long term) and across countries, based on a set of transparent criteria.

The methodology underpinning interest rate projections has been revised, to reflect financial markets' expectations

The DSM 2019 brings one main methodological revision related to interest rates' assumptions over the medium term. In particular, the methodology underpinning these projections has been revised to reflect financial markets' expectations. This approach aims at enhancing the plausibility of interest rates' assumptions, differentiating targets for each country and allowing to reflect the evolving interest rate environment (see Box 3.1). In almost all countries, this methodological change implies lower projected interest rates and government debt ratios over the medium term. At the same time, given the relative slow transmission to *effective* (implicit) interest rates, this revision has limited impacts on the overall risk classification.

The report also explores new themes, such as risks associated to climate change

The report also explores new themes, and in particular, fiscal risks associated with the climate change phenomenon. Given the potentially high macroeconomic and fiscal costs linked to climate change – related to more frequent extreme weather events and to the gradual transformation of the environment - a growing number of institutions are considering integrating a climate change dimension into their fiscal sustainability framework (e.g. the UK Office for Budget Responsibility, 2019; IMF, 2018). Given the complexity of the exercise, and important data gaps, this report provides only a first contribution, focusing on conceptual and practical considerations, based on the existing rich literature (see Box 5.3).

It also deepens previous editions in different manners

As in the FSR 2018, this report provides a dedicated analysis of debt sustainability challenges for Greece, taking into account the specificities of the Greek public debt financing (see Box 3.3). The DSM 2019 also deepens the analysis of contingent liabilities' risks linked to the banking sector, on the basis of an enhanced set of alternative scenarios (see Box 5.2). Last, an analysis based on an intergenerational accounting model provides new insights into the long-term intertemporal and intergenerational fiscal sustainability challenge (see Box 4.1).

These results are critically used in the context of EU regular surveillance, ranging from standard monitoring to financial assistance

The Commission analysis of public finances sustainability presented in this report contributes to the monitoring and coordination of Member States' fiscal policies, as well as of the aggregate fiscal stance for the euro area. It plays a key role notably in the context of the Stability and Growth Pact and of the European Semester, the EU integrated surveillance framework. These results are also pivotal in the assessment of debt sustainability prior to financial assistance requests, during programme design and in post-programme surveillance.

⁽⁴⁾ The DSA tool and fiscal sustainability indicators (the so-called S0, S1 and S2 indicators) are presented in details in the report. Hence, their definition is not extensively exposed in this executive summary.

KEY RESULTS ⁽⁵⁾

Overall projected trends are favourable, and the gap to the debt-stabilising primary balance slightly negative

Despite an overall less favourable short-term fiscal outlook, projected debt to GDP ratios for the EU/EA as a whole should continue declining over the next decade (reaching 70% and 75% of GDP respectively by 2030). The persistent favourable financial environment (as reflected by financial markets' expectations) should enable further reducing aggregate debt ratios, even under unchanged policies. When taking into account a large range of possible temporary shocks to macroeconomic variables (through stochastic projections), the EA public debt ratio is found to have a high probability to decline in the next 5 years (probability close to 90%). Moreover, the gap to the debt-stabilising primary balance appears slightly negative for the EU/EA (at -0.4 pps. of GDP), meaning that a slight overall fiscal deconsolidation would still be consistent with a stable debt to GDP ratio.

At the same time, aggregate results hide important cross-countries differences, and risks remain heterogeneous across the EU and over different time dimensions. As fiscal policies are largely under national responsibility, this country – specific analysis of fiscal sustainability risks is essential.

Short-term risks are contained, yet some vulnerabilities remain

Short-term risks of fiscal stress remain overall contained across the EU (with no country found to face such risks - according to the early-warning indicator used by the European Commission, the S0 indicator). Specific vulnerabilities are nonetheless identified in a number of cases, either linked to macro-financial imbalances (Cyprus), or to public finances (Spain, France, Italy, Hungary and the United Kingdom). Public gross financing needs for the year 2020 appear quite high in some Member States (e.g. Italy, Croatia), or increasing in others (e.g. Romania). In the latter case, sovereign bond spreads have also significantly increased. In a context where financial market sentiments can change rapidly, these vulnerabilities deserve particular attention ⁽⁶⁾.

Medium-term risks remain high in some large economies

Significant risks in the medium-term are found in eight countries (Belgium, Spain, France, Italy, Portugal, Romania and the United Kingdom – found to be at high risk – and Finland – found to be at medium risk), including four large economies. These results are driven by the high level of the stock of debt (e.g. Belgium, Italy and Portugal), coupled in a number of cases with a weak fiscal position. Under unchanged policies, the public debt to GDP ratio is expected to be on a particularly fast-increasing path in Romania. In the case of Italy, unfavourable snowball effects (due to a positive interest - growth rate differential) throughout the projection horizon also contribute to the increase of the debt to GDP ratio. Importantly, the interest – growth rate differential has remained positive in Italy over the recent years (whatever the definition of the interest rate used). The medium term fiscal gap indicator (the S1 indicator) is particularly large in these last two countries, illustrating the magnitude of the sustainability challenge under current policies. In Portugal and the United Kingdom, the high risk classification is driven by

⁽⁵⁾ Only key results, notably those driving the risk classification, are commented in this section. The rest of the report presents a large number of additional sensitivity tests and extensive analysis of complementary aggravating / mitigating risk factors. Furthermore, given the specificities of the Greek public debt financing, the results are presented in a dedicated Box for this country and not recalled in this section.

⁽⁶⁾ Box 2.1 of the report presents an analysis of the evolution of the S0 indicator and its drivers in the specific cases of Cyprus and Italy, and confront it to actual (past) public finances and financial markets' developments.

high sensitivity to unfavourable shocks (while the baseline – and the S1 indicator - points to more contained risks).

The remaining nineteen Member States are classified at low medium term risk. In some cases however, stochastic projections, featuring the uncertainty surrounding baseline projections, point to some vulnerabilities – due to the historical volatility of the main debt drivers in these countries (Bulgaria, Croatia, Cyprus, Latvia, Hungary and Slovakia). In the case of Ireland, when scaling government debt with GNI, a more accurate measure of repayment capacity in this country, medium term vulnerabilities appear more important than suggested according to the standard GDP metric.

Adherence to fiscal rules would allow a more benign risk assessment in vulnerable countries

Adherence to the SGP would bring the debt to GDP ratio to lower levels over the projection period in the majority of countries, especially in those found to be at high risk over the medium term (including Belgium, Spain, France, Portugal, Romania and the United Kingdom). Nonetheless, the debt to GDP ratio would remain well above 90% of GDP in the case of Italy.

Long-term risks: ageing population still a critical issue

Over the long term, five countries appear to be at high risk (Belgium, Italy, Luxembourg, Romania and the United Kingdom). In some cases (Belgium, Italy and the United Kingdom), the significant level of the long-term fiscal gap indicator (the S2 indicator), combined with high risk according to the DSA classification, drive this result. The substantial long-term fiscal gap is largely explained by the projected increase in ageing costs (Belgium, United Kingdom), or by the unfavourable initial budgetary position (Italy). For Luxembourg, high long term risks are driven by the fast increasing costs of ageing. For Romania, all the main components (costs of ageing, initial budgetary position and DSA risk classification) contribute to the high risk category. Thirteen countries are deemed to be at medium risk over the long term (Czech Republic, Germany, Ireland, Spain, France, Hungary, Malta, the Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland). These results are driven in most cases by a significant long term fiscal sustainability gap, fuelled by the projected increase in ageing costs.

A comparison with the FSR 2018 shows mixed developments

Over the short term, only one (favourable) change is observed in the risk classification, namely for Cyprus. This improvement is explained by the recovery of public finances, on the back of a fast growing economy (and past the effect of temporary measures to support the banking sector). Over the medium term, four countries improve their risk classification (Croatia, Cyprus, Hungary and Slovenia), due to a more favourable initial budgetary position, compounded by the revision of the interest rate assumption (for Croatia). Two countries (Romania and Finland) exhibit on the other hand a downgrading of their risk category, due to a less favourable initial budgetary position and, in the case of Romania, higher projected ageing cost, as a result of the recent pension reform. In the long term, five countries are deemed to face less acute risks compared to the FSR 2018 (Spain, Hungary, Croatia, Cyprus and Poland), while two countries (Germany and Romania) see their risk category deteriorate (from low to medium risk for Germany and from medium to high risk for Romania). In most cases, changes in the initial budgetary position drive these developments (on top of revised long-term budgetary projections for Romania).

Additional mitigating and aggravating risk factors are considered in this report

Some risks related to the structure of government debt financing prevail in some countries, either linked to the maturity of debt (e.g. Sweden and Hungary), to the share of debt held in foreign currency (e.g. Bulgaria and Croatia), or to the nature of debt holders (e.g. Poland and Romania). Yet, an overall trend of lengthening of debt maturity can be observed in most countries, partially protecting them - in the short term - from potential rapid changes in market interest rates. Moreover, a significant share of government debt is still held by the official sector or Central Banks in some countries (e.g. Cyprus, Portugal and Ireland), bringing stability in terms of sources of financing ⁽⁷⁾.

Fiscal risks due to contingent liabilities linked to the banking sector are still present, although some risk reduction is taking place. A reduction in the level of non-performing loans (NPLs) ratios is observed in most countries, although this ratio remains high in a number of countries . Under the assumption of a rigorous application of the regulatory framework and of a further reduction of NPLs in the medium term, the simulated impact of a systemic banking crisis on public finances would have a potential high effect only in a limited subset of countries and in the short term. Less strict assumptions point however to some prevailing vulnerabilities in a large number of cases.

⁽⁷⁾ Incidentally, some papers highlight the role of the ECB asset purchase programmes in sovereign spreads' reduction in euro area countries (see European Commission, 2020).

Table 1: Fiscal sustainability risk classification by Member State (in brackets, risk classification in the FSR 2018, whenever the risk category has changed)

	Overall SHORT-TERM risk category	Overall MEDIUM-TERM risk category	S1 indicator - overall risk category	Debt sustainability analysis - overall risk category	S2 indicator - overall risk category	Overall LONG-TERM risk category
BE	LOW	HIGH	HIGH	HIGH	MEDIUM	HIGH
BG	LOW	LOW	LOW	LOW	LOW	LOW
CZ	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
DK	LOW	LOW	LOW	LOW	LOW	LOW
DE	LOW	LOW	LOW	LOW	MEDIUM (LOW)	MEDIUM (LOW)
EE	LOW	LOW	LOW	LOW	LOW	LOW
IE	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
ES	LOW	HIGH	HIGH	HIGH	LOW (MEDIUM)	MEDIUM (HIGH)
FR	LOW	HIGH	HIGH	HIGH	LOW	MEDIUM
HR	LOW	LOW (MEDIUM)	LOW (MEDIUM)	LOW (MEDIUM)	LOW	LOW (MEDIUM)
IT	LOW	HIGH	HIGH	HIGH	MEDIUM	HIGH
CY	LOW (HIGH)	LOW (MEDIUM)	LOW	LOW (MEDIUM)	LOW	LOW (MEDIUM)
LV	LOW	LOW	LOW	LOW	LOW	LOW
LT	LOW	LOW	LOW	LOW	LOW	LOW
LU	LOW	LOW	LOW	LOW	HIGH	HIGH
HU	LOW	LOW (HIGH)	LOW (MEDIUM)	LOW (HIGH)	MEDIUM	MEDIUM (HIGH)
MT	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
NL	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
AT	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
PL	LOW	LOW	LOW	LOW	LOW (MEDIUM)	LOW (MEDIUM)
PT	LOW	HIGH	MEDIUM (HIGH)	HIGH	LOW	MEDIUM
RO	LOW	HIGH (MEDIUM)	HIGH (MEDIUM)	HIGH (MEDIUM)	HIGH (MEDIUM)	HIGH (MEDIUM)
SI	LOW	LOW (MEDIUM)	LOW (MEDIUM)	LOW	MEDIUM	MEDIUM
SK	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
FI	LOW	MEDIUM (LOW)	MEDIUM (LOW)	MEDIUM (LOW)	MEDIUM	MEDIUM
SE	LOW	LOW	LOW	LOW	LOW	LOW
UK	LOW	HIGH	MEDIUM	HIGH	MEDIUM	HIGH

Source: Commission services.

Table 2: Final DSA risk classification: detail of the classification

HIGH RISK	MEDIUM RISK	LOW RISK
Baseline scenario at high risk	Baseline scenario at medium risk	Baseline scenario at low risk (confirmed by other scenarios)
BE, ES, FR, IT, RO	FI	BG, CZ, DK, DE, EE, IE, HR, CY, LV, LT, LU, HU, MT, NL, AT, PL, SI, SK, SE
Baseline scenario at medium risk (At least one) other scenario at high risk due to:		
Debt level at high risk: PT, UK		

Source: Commission services.

Table 3: Summary heat map on fiscal sustainability challenges

	Heat map for short-term risks in EU countries																											
	S1 indicator in the EU countries																											
	BE	BG	CZ	DK	DE	EE	ES	FR	HR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK		
S0 overall index	0.17	0.21	0.22	0.20	0.08	0.20	0.14	0.37	0.36	0.24	0.33	0.45	0.24	0.21	0.19	0.29	0.06	0.16	0.10	0.26	0.33	0.37	0.05	0.27	0.26	0.24	0.45	
Overall SHORT-TERM risk category	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	
S1 indicator - Baseline scenario	4.1	-5.4	-2.9	-5.6	-2.4	-5.3	-2.6	3.8	3.9	-2.0	8.8	-2.4	-3.3	-2.7	-5.7	-4.4	-3.2	-2.3	-2.2	2.3	5.7	-1.0	-1.8	0.5	-5.4	1.9		
S1 indicator - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM	HIGH	LOW	LOW	MEDIUM	LOW	MEDIUM		
Baseline no-policy change scenario	Sovereign-debt sustainability risks in EU countries																											
Debt level (2030)	97.4	9.3	28.3	15.4	39.8	8.4	37.6	95.7	96.8	50.4	140.2	48.1	29.0	29.8	7.3	41.3	9.7	32.4	43.1	38.3	89.2	91.2	46.7	44.1	62.1	15.4	78.6	
Debt peak year	2021	2019	2019	2019	2019	2019	2024	2023	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	
Average Structural Primary Balance (2021-2030) Percentile rank	67%	36%	52%	43%	35%	66%	34%	73%	77%	39%	55%	22%	64%	57%	36%	41%	20%	43%	30%	65%	21%	96%	45%	70%	72%	36%	61%	
Historical SPB scenario	Sovereign-debt sustainability risks in EU countries																											
Debt level (2030)	89.9	13.6	34.9	5.5	36.2	11.4	56.2	94.1	97.1	63.1	128.9	51.5	35.2	36.7	-1.0	47.7	18.1	33.9	47.4	45.9	104.4	73.4	53.0	50.7	47.2	11.7	91.6	
Debt peak year	2021	2019	2030	2019	2030	2019	2023	2019	2023	2019	2022	2019	2019	2030	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	
Average Structural Primary Balance (2021-2030) Percentile rank	51%	46%	65%	25%	30%	70%	72%	71%	77%	66%	31%	27%	73%	70%	24%	55%	31%	48%	38%	75%	47%	88%	59%	78%	43%	30%	80%	
Negative shock (-0.5p.p.) on nominal GDP growth	Sovereign-debt sustainability risks in EU countries																											
Debt level (2030)	102.5	10.0	29.8	16.7	42.2	8.8	39.8	100.7	101.8	53.6	148.0	51.6	30.5	31.3	7.9	44.0	10.9	34.5	45.9	40.2	94.8	94.2	49.2	46.3	65.1	16.7	92.8	
Debt peak year	2030	2019	2019	2019	2019	2030	2019	2025	2019	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	
Positive shock (+1p.p.) to the short- and long-term interest rates on newly issued debt level (2030)	102.4	9.6	30.1	16.4	42.4	8.7	39.9	101.0	102.1	53.8	148.9	50.8	30.5	31.2	7.6	44.4	10.4	34.2	45.3	40.2	93.7	96.1	48.9	45.7	64.5	16.2	82.9	
Debt peak year	2030	2019	2019	2019	2030	2019	2020	2019	2030	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	
Negative shock on the PB equal to 50% of the forecasted cumulative change over the debt level (2030)	99.1	10.7	29.0	24.8	43.0	13.6	40.8	96.3	98.1	52.1	145.8	55.5	32.2	33.7	10.5	49.4	12.5	35.4	43.3	40.7	90.5	102.9	46.8	45.7	63.4	17.3	78.7	
Debt peak year	2021	2019	2019	2021	2019	2030	2019	2024	2024	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	
Stochastic projections	Sovereign-debt sustainability risks in EU countries																											
Probability of debt in 2024 greater than in 2019 (%)	45%	29%	36%	15%	5%	37%	8%	51%	51%	26%	60%	7%	34%	33%	14%	22%	3%	11%	10%	19%	18%	96%	6%	42%	60%	5%	37%	
Difference of the 10th and 90th percentile in 2024 (p.p. of GDP)	27.2	29.2	23.6	15.3	15.2	3.3	22.9	20.9	13.5	37.7	25.2	38.2	26.9	26.1	12.7	36.9	20.3	14.8	24.9	16.3	36.7	35.0	22.2	27.3	18.9	11.4	18.5	
Debt sustainability analysis - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	HIGH	
Overall MEDIUM-TERM risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	HIGH	
S2 indicator - Baseline scenario	4.8	1.6	4.8	0.4	2.2	0.8	2.9	1.8	0.2	-2.1	2.1	-0.7	0.3	0.5	8.6	2.7	3.0	2.8	2.3	1.9	-0.3	8.8	5.4	3.8	3.6	1.2	4.3	
Debt sustainability analysis - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	HIGH	
Overall LONG-TERM risk category	HIGH	LOW	MEDIUM	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	LOW	LOW	HIGH	LOW	LOW	LOW	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	LOW	HIGH	

(1) In this table, only the relevant information used for the risk classification is included. The report contains more detailed information. The thresholds used are presented in Annex A9.

Source: Commission services.

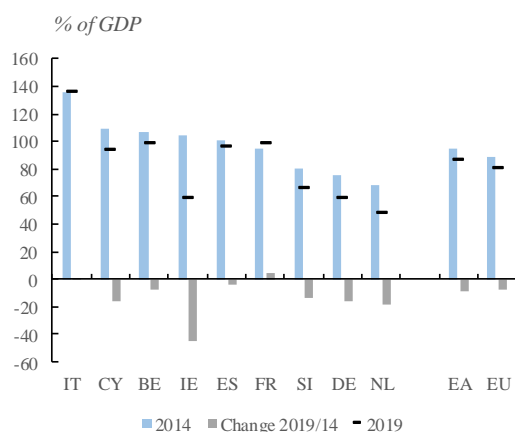
1. INTRODUCTION

1.1. RECENT DEBT DEVELOPMENTS IN THE EU

The aggregate government debt to GDP ratio of the EU (EA) has been on a declining path since 2014, when it reached a peak of 88.7% of GDP (95.1%). In 2019, this ratio fell to 80.6% of GDP (86.4%), and is forecasted to continue reducing by 2021. The deleveraging of the public sector is supported by the historically low levels of interest rates paid on debt, which, combined with nominal GDP growth, imply a negative snowball effect.

Over the period 2015-19, almost all Member States reduced their debt to GDP ratios, with some countries recording substantial decreases (Ireland, Malta, the Netherlands and Germany; see Graph 1.1). Further debt reductions are forecasted in most countries by 2021. Ireland, Germany and Slovenia are projected to reduce their debt ratio below 60% of GDP. By contrast, among highly indebted countries, the public debt to GDP ratio is expected to increase in Italy, also due to a positive interest – growth rate differential, and in France, due to primary deficits. The debt-to-GDP ratio should remain at or above 100% in several Member States in 2021 (including Belgium, Italy and Portugal), and above 90% of GDP in Spain and France.

Graph 1.1: Government debt to GDP ratio, level in 2014 and 2019, and change over the period, by selected Member States



Source: Commission services, Eurostat.

1.2. THE COMMISSION FRAMEWORK TO ASSESS FISCAL SUSTAINABILITY

This edition of the Debt Sustainability Monitor (DSM) provides an update of fiscal sustainability risks faced by Member States, previously assessed in the 2018 Fiscal Sustainability Report (FSR)⁽⁸⁾. It offers a snapshot of the situation, based on results from the latest available macroeconomic forecasts (European Commission's Autumn 2019 forecast). The projections also rely on the Economic Policy Committee (EPC) agreed long-term economic and budgetary projections from the joint European Commission - EPC 2018 Ageing Report (in particular those related to ageing costs). In a limited number of cases, long-term budgetary projections have been updated, to reflect recent pension reforms⁽⁹⁾.

A multi-dimensional approach is used to assess and differentiate fiscal sustainability risks in the short, medium and long term. Fiscal sustainability risks faced by Member States are assessed according to the comprehensive horizontal fiscal sustainability framework used in the FSR 2018. This framework brings together in a synthetic way results on debt sustainability analysis (DSA) and fiscal sustainability indicators. It allows gaining a horizontally consistent overview of fiscal sustainability risks across time horizons (short, medium and long term) and across countries, based on a set of transparent criteria. In particular, key results are summarised in an overall summary heat map of fiscal sustainability risks per time dimension. This framework is meant to allow identifying the scale, nature and timing of fiscal sustainability challenges. Such a comprehensive and multidimensional assessment framework is key to design appropriate policy responses.

A wealth of tools and scenarios are used to support the assessment along the different time dimensions. The short-term dimension is assessed by the SO indicator, which allows for an early detection of short-term risks of fiscal stress (within the upcoming year) stemming from the fiscal and /

⁽⁸⁾ European Commission (2019c).

⁽⁹⁾ This concerns notably Croatia, Romania and Italy. The cut-off date for the preparation of the report was 7 November 2019. It does not integrate developments that may have occurred since this date.

or the macro-financial and competitiveness sides of the economy. Fiscal sustainability challenges over *the medium term* are captured through the joint use of the medium-term fiscal sustainability indicator S1⁽¹⁰⁾ and the debt sustainability analysis (DSA). The latter ensures due consideration to medium-term public debt dynamics (for which the DSA is the reference toolkit). Challenges over *the long term* are identified through the joint use of the long-term fiscal sustainability indicator S2⁽¹¹⁾ and the DSA. The joint use of these two tools allows for an identification of long-term challenges deriving from population ageing (mostly through the S2 indicator that is particularly suited to this purpose), while capturing potential vulnerabilities stemming from high debt levels (through the DSA tool).⁽¹²⁾

Given important uncertainties surrounding any medium to long-term projection exercise, the Commission fiscal (debt) sustainability analysis relies on a large set of scenarios. For the DSA, a wealth of deterministic scenarios is performed to complement the traditional baseline (central) no-fiscal policy change scenario, including for instance the assumption of reversal to historical average for different macro - fiscal variables, or more stringent economic and financial conditions. Additionally, other projections assume a path in line with the main provisions of the Stability and Growth Pact, and a path in line with Member States' Stability and Convergence Programmes. A detailed description of the different scenarios and sensitivity tests performed in this report is provided in Box 1.1. Stochastic projections are an important complement to this analysis, whereby a very large number of shocks are jointly simulated, based on the historical volatility of each economy and correlation of shocks. Furthermore, some alternative calculations – to the baseline - are also computed for the *fiscal sustainability indicators*. For example, the ‘AWG risk scenario’ assumes less favourable developments of future healthcare costs for the S1 and S2 indicators. These additional

⁽¹⁰⁾ The S1 indicator shows the additional fiscal adjustment effort required (in terms of improvement in the government structural primary balance) over five post-forecast years to reach the 60% of GDP debt ratio target in fifteen years.

⁽¹¹⁾ The S2 indicator shows the upfront fiscal adjustment (to the government structural primary balance) required to stabilise the debt ratio over the infinite horizon.

⁽¹²⁾ A thorough description of the Commission multi-dimensional approach can also be found in the Chapter 1 of the FSR 2018.

scenarios are meant to allow further qualifying the fiscal sustainability assessment.

The quantitative results and ensuing risk classifications based on this horizontal framework need to be complemented with a broader reading and interpretation of results to give due account to country-specific contexts.

For instance, some relevant qualitative factors – such as structural and institutional features – cannot be fully captured through this quantitative analysis (see FSR 2018, Box 1.2). Hence, the prudent application of judgement, as a complement to model-based mechanical results, is essential for the final assessment of fiscal sustainability risks. In particular, when a country is deemed to be at high risk in the short, medium or long term, it does not necessarily mean that fiscal stress is inevitable (in the short-term) or that debt is unsustainable (in the medium to long-term), but rather that there are significant fiscal sustainability vulnerabilities that need to be carefully monitored and addressed by appropriate policy responses.

With this aim, in addition to the elements already mentioned, this fiscal sustainability framework provides an analysis of additional mitigating and aggravating risk factors. These additional factors are considered in the overall assessment i) for each time dimension; and ii) horizontally for those that may materialize in the short, medium or long term (see Chapter 5).

1.3. NOVELTIES OF THE REPORT

The DSM 2019 brings one main methodological revision related to the interest rates' assumptions over the medium term. In particular, the methodology underpinning these projections has been revised to reflect financial markets' expectations. This approach aims at enhancing the plausibility of interest rates' assumptions, differentiating targets for each country and allowing to reflect the evolving interest rate environment (see Box 3.1 in Chapter 3).

The report also explores new themes, and in particular, fiscal risks associated to the climate change phenomenon. Given the potential high macroeconomic and fiscal costs linked to climate change – related to more frequent extreme weather

events and to the gradual transformation of the environment - a growing number of institutions are considering integrating a climate change dimension into their fiscal sustainability framework (e.g. the UK Office for Budget Responsibility, 2019; IMF, 2018). Given the complexity of the exercise, and important data gaps, this report only provides a first contribution, focusing on conceptual and practical considerations, based on the existing rich literature (see Box 5.3). Also, the intertemporal and intergenerational fiscal challenges due to population ageing are analysed (see Box 4.1).

As in the FSR 2018, this report provides a dedicated analysis of medium term fiscal sustainability challenges for Greece, taking into account the specificities of the Greek public debt financing. Given the unique composition of the Greek public debt and the debt relief measures adopted by the Eurogroup in June 2018, the analysis provided in this report is based on country-specific assumptions. The results, which are notably based on the elements presented in the enhanced surveillance report published in November 2019, are presented in Box 3.3 (see Chapter 3).

The remainder of the report is organised as follows. Chapter 2 presents the short-term fiscal sustainability analysis. Chapter 3 covers the medium-term fiscal sustainability analysis - including DSA results. Chapter 4 discusses ageing issues and long-term fiscal sustainability analysis. Chapter 5 reviews additional aggravating and mitigating risk factors. Finally, chapter 6 sums up the main results in an overall assessment of fiscal sustainability risks. Several statistical and methodological annexes are also provided at the end of the report, including statistical country fiches (see Annex A2).

Box 1.1: Deterministic debt projection scenarios: main assumptions

Government debt projections are a stylised set of trajectories a country's government debt may follow in the next 10 years (currently until 2030). Debt projections rely on assumptions about the key macroeconomic, financial and fiscal variables that underpin the debt ratio, with the realism of macro assumptions intrinsically affecting the realism of debt projections themselves. Importantly, the Commission *baseline* debt projections are based on assumptions and methodologies agreed with EU Member States represented in different Council formations⁽¹⁾. This ensures that the results are comparable across countries and consistent with other EU processes (European Semester, Stability and Growth Pact (SGP)).

The baseline scenario

The baseline scenario constitutes the starting point for DSA risk assessment and the central scenario around which debt paths for alternative and sensitivity test scenarios are built. The assumptions used in the baseline scenario for the variables entering the debt dynamics⁽²⁾ are the following:

- **Real GDP growth rates** are: i) the European Commission forecasts for the first two years of the projections (until t+2, currently 2021); ii) the so-called EPC /

OGWG 't+10 methodology' projections between t+3 and t+10⁽³⁾.

- **Inflation (the GDP deflator)** converges from current country-specific levels to 2% (the ECB target rate) by t+5⁽⁴⁾, that is, by the same year by which the output gap is assumed to close, and it remains constant thereafter.
- The **primary balance** is projected as follows:
 - Assuming 'no-fiscal-policy change', the **structural primary balance** (SPB) *before costs of ageing* is supposed to remain constant at its last forecast year value (currently 2021) over the remaining projection period⁽⁵⁾. **Ageing-related expenditures** (pension, health-care, long-term care, education and unemployment benefits) projected in the joint Commission - Council *Ageing Report 2018*⁽⁶⁾, as well as **property income** on state financial and non-financial assets⁽⁷⁾ are added to the former to obtain the overall **SPB**.
 - The **cyclical component** reflecting the effect of automatic stabilisers is calculated as the product of the output gap and country specific budget balance semi-elasticities

⁽¹⁾ Notably the Economic Policy Committee (EPC)'s technical Output gap working group (OGWG) and Ageing working group (AWG).

⁽²⁾ For a detailed description of the debt dynamic equation and the impact of macro variables on the debt ratio projections, see Annex A6 in this report. 'Decomposing debt dynamics, projecting the interest rate on government debt and property incomes'.

⁽³⁾ The estimates of potential GDP growth and output gaps are based on a production function methodology agreed with the Member States in OGWG (see: http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp535_en.pdf for more details). The output gap, if any, is assumed to close after 5 years, after which 'actual' GDP and potential GDP growth coincide.

⁽⁴⁾ For non-EA countries targeting inflation, national central bank targets are used instead, i.e.: CZ, SE, UK: 2%; PL, RO: 2.5%; HU: 3%.

⁽⁵⁾ This assumption differs from the 'no policy change' used in the Commission forecast (T+2), where primary balances may not be constant over the forecast period.

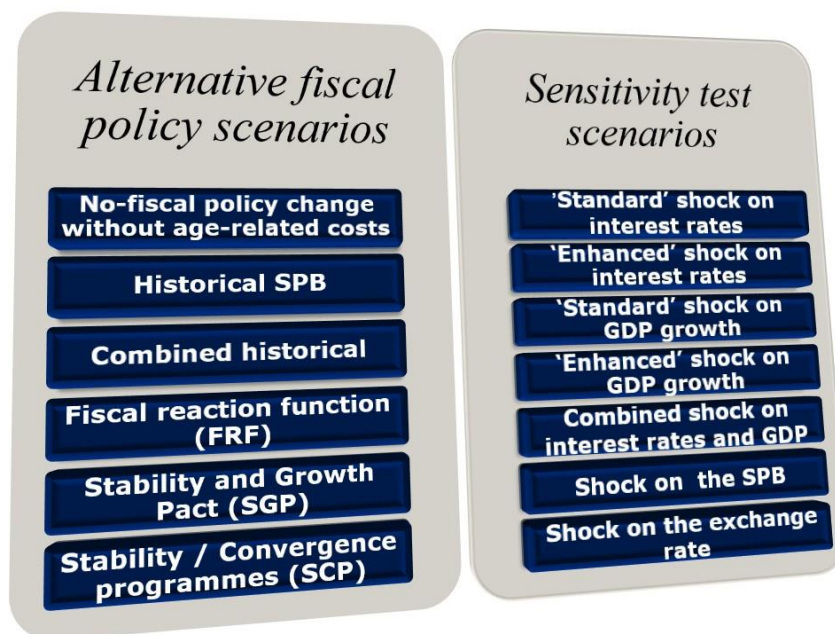
⁽⁶⁾ For countries having reformed their pension systems in the past two years, ageing costs have been updated to the latest projections presented and validated at the EPC. This is the case for Croatia, Romania and Italy.

⁽⁷⁾ For details see Annex A8 of the Fiscal Sustainability Report 2015.

(Continued on the next page)

Box (continued)

Map 1: Deterministic debt projections scenarios: alternative and sensitivity test scenarios



(for taxes and expenditure) agreed with the Member States and used in standard EU budgetary surveillance (SGP)⁽⁸⁾. The cyclical component is by construction equal to zero once the output gap closes in t+5.

- **One-off and other temporary measures** are set to zero beyond the t+2 forecast.

- **Interest rates** projections assume that:
 - **Long-term interest rates** on new and rolled over debt converge linearly from country-specific current values to country-specific market-based forward (nominal) rates by t+10⁽⁹⁾;
 - **Short-term interest rates** on new and rolled over debt converge linearly from

current values to market-based forward (nominal) rates by t+10⁽¹⁰⁾;

- **Implicit interest rates** are derived endogenously in the debt projection model based on the above assumptions on market interest rates, on the maturity structure of government debt and on projected financing needs⁽¹¹⁾.

- **The exchange rate** for non-EA countries is the European Commission forecast for t+2, with no appreciation or depreciation thereafter.
- The **stock-flow adjustment (SFA)** is set to zero after the forecast.

⁽⁸⁾ The budget semi-elasticities are those reported in: https://ec.europa.eu/info/sites/info/files/economy-finance/dp098_en.pdf.

⁽⁹⁾ This approach is similar to that used in the Commission Forecasts.

⁽¹⁰⁾ For more details on the new and previous interest rate assumptions, the rationale of the change and the impact on debt ratio projections see Box 3.1. This Box also discusses interest rate assumptions beyond t+10.

⁽¹¹⁾ For a detailed discussion see Annex A6.

(Continued on the next page)

Box (continued)

The factors conditioning a government's debt path are of two main sorts: fiscal policy decisions on one hand, and changes in macroeconomic conditions due to internal policies or external shocks, on the other hand. For an array of options, this report proposes different debt projection scenarios (Figure 1).

Alternative fiscal policy scenarios

Fiscal policy decisions are often an essential driver of the debt path. Several fiscal policy scenarios presented in this report show debt trajectories associated to different policy options in EU countries, being therefore useful for analysis. Among the scenarios described below, those assuming fiscal consolidation (fiscal expansion, respectively) incorporate a feedback effect on GDP growth whereby a 1 pp. of GDP consolidation effort (expansion, respectively) impacts negatively (positively, respectively) baseline GDP growth by 0.75 pp. in the same year⁽¹²⁾.

- 1. The no-fiscal policy change scenario without ageing-related costs** is similar to the baseline scenario, but uses instead a primary balance unaffected by the cost of ageing. This deviation from baseline can inform about the impact of reforms addressing the ageing costs.
- 2. The historical SPB scenario** uses the European Commission forecasts until t+2, after which it assumes that the SPB converges gradually to its historical average (last 15 years) in 4 years. This scenario helps understanding whether the baseline scenario (or other policy scenarios) is realistic, given a country's past performance.
- 3. The combined historical scenario** uses, in addition to the assumptions in the historical SPB, macro-financial variables that are set at their historical averages.

⁽¹²⁾ Carnot and de Castro (2015).

4. The Fiscal reaction function (FRF) scenario uses European Commission forecasts until t+2; thereafter, the primary balance is determined based on estimated (country-specific) FRFs until t+10. This scenario essentially indicates whether primary balances are responsive enough to ensure sustainable debt paths.

5. The Stability and Growth Pact (SGP) scenario assumes that EU countries comply with the main provisions of the preventive and corrective arms of the SGP (following excessive deficit procedure recommendations)⁽¹³⁾. Under the former, it is assumed that EU countries' structural balances converge to the medium term objective (MTO) according to the matrix of required fiscal adjustment⁽¹⁴⁾. Once the MTO is reached, the structural balance is assumed to remain constant in structural terms until the end of the projections (t+10)⁽¹⁵⁾.

6. The Stability or Convergence Programme (SCP) scenario uses macro-fiscal variables projected to reflect the Members States' fiscal plans submitted to the European Commission each April and covering generally three years beyond forecasts. Thereafter, fiscal policy is assumed unchanged until t+10, with SPB fixed at the last programme year value. This scenario too reflects SGP rules, but depending on the degree of ambition in each jurisdiction, SCP outcomes may appear more or less rigorous than under the SGP.

⁽¹³⁾ Currently, all EU countries are under the preventive arm.

⁽¹⁴⁾ European Commission (2019e), COM(2015) 12 final, 13/01/2015, and ECOFIN commonly agreed position on flexibility, as confirmed by the ECOFIN Council of 12 February 2016. (Council document number 14345/15). See also Annex 7.

⁽¹⁵⁾ See Annex A8 for a detailed description.

(Continued on the next page)

Box (continued)

Sensitivity test scenarios

Significant as it is, discretionary fiscal policy is not the only element susceptible to influence a government's debt trajectory.

Exogenous shocks, mainly to macro-financial variables, as well as non-discretionary changes in fiscal policy may swing the debt ratio off the expected path. To portray the response of a government's debt trajectory to such shocks, a set of 'standard' and 'enhanced' sensitivity test scenarios run around the baseline no-fiscal policy change is used:

1. **'Standard' sensitivity tests on short- and long-term interest rates:** -1p.p./+1p.p. on short- and long-term interest rates on new and rolled over debt over whole projection period, 2020-30).
2. **'Enhanced' sensitivity test on short- and long-term interest rates:** +2p.p. on short- and long-term interest rates on new and rolled over debt for the first three projection years, followed by +1p.p. over the remaining projection period until 2030.
3. **'Standard' sensitivity tests on nominal GDP growth:** -0.5/+0.5 p.p. on nominal GDP growth over the entire projection period, 2020-30.
4. **'Enhanced' sensitivity tests on nominal GDP growth:** -1 standard deviation / +1 standard deviation on nominal GDP growth for first two projection years, followed by -0.5/+0.5 p.p. over the remaining projection period until 2030. The standard deviation is that of the distribution of a country's GDP growth rates over the last 5 years.
5. **Combined negative/positive shock on interest rates and nominal GDP growth:** +1p.p./-1p.p. on short- and long-term interest rates on new and rolled over debt and -0.5/+0.5 p.p. on nominal GDP growth over the entire projection period, 2020-30.
6. **Sensitivity test on the structural primary balance:** the structural primary balance

worsens by half of the forecasted cumulative change over the two forecast years i.e., with the shock, a forecast surplus will be smaller, while a forecast deficit will be larger; the structural primary balance is then kept constant at the lower last forecast year level over the remaining projection period until 2030. This scenario incorporates a feedback effect on GDP growth (see previous page).

7. **Sensitivity test on nominal exchange rate:** shock equal to maximum annual change in the country's exchange rate, observed over the last 10 years, applied for first two projection years, after which the baseline assumption prevails.

Additionally to this set of deterministic debt projections, stochastic debt projections are run, whereby 2000 shocks affecting the primary balance, GDP growth, interest rates and the exchange rate, are jointly simulated, based on the historical volatility of each Member State's economy and correlation of shocks (see related section of this report).

2. SHORT-TERM FISCAL SUSTAINABILITY ANALYSIS

This chapter presents results for the short-term fiscal sustainability analysis. As in the Fiscal Sustainability Report 2018, the short-term fiscal risk classification is based on the Commission early-detection indicator of fiscal stress, the S0 indicator (section 2.1). These results are complemented by a more thorough analysis of short-term government gross financing needs, one component of the S0 indicator that is of particular importance (section 2.2). Finally, this chapter provides an analysis of the ease of (re-)financing government debt, based on different indicators of financial markets' perceptions of sovereign risk (section 2.3).

2.1. SHORT-TERM FISCAL SUSTAINABILITY INDICATOR: THE S0 INDICATOR

2.1.1. The S0 indicator: conceptual elements

The S0 indicator allows an identification of risks of potential fiscal stress in the upcoming year, based on a number of fiscal and structural variables. S0 is more precisely an early - detection indicator of fiscal stress over a one year horizon (Berti et al., 2012). Fiscal stress designates situations ranging from a credit event, a request of large official financing, to an implicit domestic government default (when high inflation) and a loss of market confidence (the latter has been the most common situation of fiscal stress during the global financial crisis in the case of European countries, see Pamies Sumner and Berti, 2017).

The S0 indicator is a composite indicator of fiscal stress stemming from fiscal variables and structural features of the economy. It is based on a wide range of variables that have proven to perform well in the past in detecting situations of upcoming fiscal stress. Thus, unlike the traditional medium- and long-term fiscal sustainability indicators (the S1 and S2 indicators presented in Chapters 3 and 4), the S0 indicator is not a fiscal gap indicator (i.e. it does not quantify the required fiscal adjustment to ensure sustainable public finances over a specific time horizon). The S0 indicator is neither a financial markets' based indicator of sovereign risk (see section 2.3 for an analysis of the latter).

More precisely, the measurement of S0 is based on 25 fiscal and financial-competitiveness variables. Table 2.1 provides the list of the 12 fiscal and 13 financial-competitiveness variables that are used to construct the S0 indicator. Most of the financial-competitiveness variables are also used as part of the scoreboard for the surveillance of macroeconomic imbalances in the context of the Macroeconomic Imbalances Procedure (European Commission, 2016). This reflects the existing rich evidence, also from recent experience in the EU, of the role played by developments in the financial sector and the competitiveness of the economy in generating fiscal risks (Cerovic et al., 2018; Pamies Sumner and Berti, 2017; Bruns and Poghosyan, 2016; Berti et al., 2012).

The S0 indicator is computed based on an empirical method, the so-called signalling approach. This method involves setting out endogenously critical risk thresholds, by analysing the behaviour of a large number of variables ahead of fiscal stress events. More precisely, these critical thresholds are determined for each individual variable entering the S0 indicator, by minimising the proportion of missed crises and false alarms (or by maximising the 'signalling power'). Then, S0 is computed as the weighted proportion of variables that have reached their critical thresholds, with weights given by their 'signalling power', and the critical threshold for S0 itself endogenously derived. The same method applies for the two thematic sub-indices that reflect either the fiscal or the financial-competitiveness sides of the economy. The higher the proportion of individual variables with values at or above their specific threshold, the higher the value of S0 (and the sub-indices). The predictive performance of the S0 indicator fares well compared to other studies (Cerovic et al., 2018).

S0's identification of short-term fiscal risks is threefold. First, S0 is a measure of overall short-term risks to fiscal sustainability. Secondly, the fiscal and financial-competitiveness sub-indices help identifying vulnerabilities coming from one of the two thematic areas, though not necessarily at the aggregate level. Additionally, they also give insights into specific areas for those countries where high values of S0 already flag overall sustainability risks. Finally, individual variables of S0 allow for identifying specific sources of

Table 2.1: **Thresholds and signalling power of S0 indicator, fiscal and financial-competitiveness sub-indices and individual variables**

Variables	safety	threshold	signalling power	type I error	type II error	crisis number	no-crisis number
Balance, % GDP	>	-9.61	0.07	0.04	0.89	44	1080
Primary balance, % GDP	>	0.23	0.13	0.47	0.40	43	1058
Cyclically adjusted balance, % GDP	>	-2.50	0.23	0.52	0.25	40	981
Stabilizing primary balance, % GDP	<	2.34	0.08	0.13	0.79	38	983
Gross debt, % GDP	<	68.44	0.12	0.23	0.65	40	1047
Change in gross debt, % GDP	<	8.06	0.12	0.06	0.82	39	1018
Short-term debt gen. gov., % GDP	<	13.20	0.20	0.14	0.67	21	430
Net debt, % GDP	<	59.51	0.20	0.18	0.62	26	586
Gross financing need, % GDP	<	15.95	0.26	0.24	0.50	26	621
Interest rate-growth rate differential	<	4.80	0.08	0.11	0.82	38	977
Change in expenditure of gen. government, % GDP	<	1.90	0.11	0.13	0.76	41	1051
Change in final consumption expend. of gen. government	<	0.61	0.07	0.17	0.76	38	972
<i>Fiscal index</i>	<	0.36	0.28	0.30	0.42	45	1083
L1.net international investment position, % GDP	>	-19.80	0.29	0.47	0.24	25	500
L1.net savings of households, % GDP	>	2.61	0.33	0.42	0.25	28	699
L1.private sector debt, % GDP	<	164.70	0.18	0.22	0.60	20	418
L1.private sector credit flow, % GDP	<	11.70	0.37	0.28	0.35	20	409
L1.short-term debt, non-financial corporations, %	<	15.40	0.20	0.54	0.26	19	403
L1.short-term debt, households, % GDP	<	2.90	0.21	0.52	0.26	19	403
L1.construction, % value added	<	7.46	0.22	0.27	0.51	43	1006
L1.current account, 3-year backward MA, % GDP	>	-2.50	0.34	0.35	0.31	42	983
L1.change (3 years) of real eff. exchange rate, based on	<	9.67	0.11	0.18	0.71	24	460
L1.change (3 years) in nominal unit labour costs	<	7.00	0.18	0.64	0.18	38	967
Yield curve	>	0.59	0.37	0.34	0.29	35	813
Real GDP growth	>	-0.67	0.10	0.09	0.81	48	1124
GDP per capita in PPP, % of US level	>	72.70	0.22	0.44	0.33	51	1129
<i>Financial-competitiveness index</i>	<	0.49	0.55	0.32	0.13	52	1158
<i>Overall index</i>	<	0.46	0.55	0.22	0.23	52	1158

(1) Variable names preceded by L1 are taken in lagged value.

(2) The signalling power is defined as $(1 - \text{type I error} - \text{type II error})$. See Annex A4 for more details.

Source: Commission services.

vulnerability. Overall, this detailed identification of sources of short-term fiscal risk enables identifying precise areas calling for policy action.

The interpretation of risk assessment results based on the S0 analysis should be made with some caution:

- First, although the framework described above is rather comprehensive, additional dimensions that are relevant for the analysis of short-term sustainability risks are necessarily left aside. For instance, factors of a more qualitative nature or variables for which data availability is limited are not reflected by S0.
- Then, the S0 indicator is based on yearly outturn values of the different variables. This reflects the fiscal stress identification approach underpinning the S0 indicator (whereby the build-up of fiscal and structural imbalances in the past and current years can lead to fiscal stress in the next year). While it allows complementing the traditional forward-looking perspective of the DSA, it can present some

limitations in cases where real-time or foreseen developments change rapidly.

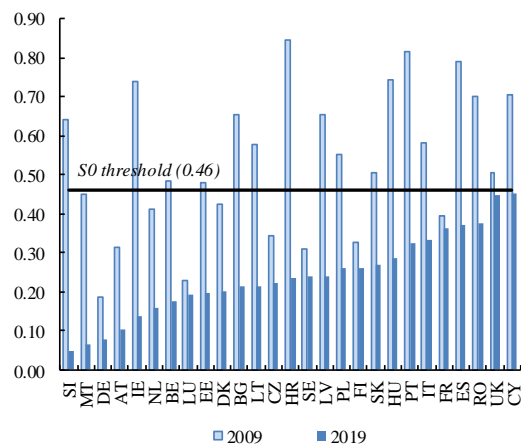
Hence, a broader analysis of country-specific contexts should supplement the interpretation of S0 results.

2.1.2. Results of the S0 indicator

Overall, short-term risks of fiscal stress have declined for EU countries since 2009, although some vulnerabilities are still present in a number of countries. In 2009, more than half of the Member States had values of S0 above its critical threshold, signalling risks of fiscal stress in the upcoming year. In 2019, no EU country is found to be at risk of facing short-term risks of fiscal stress, based on this indicator (see Graph 2.1). However, two countries exhibit S0 values close to the critical threshold (Cyprus and the United-Kingdom), while short-term challenges are identified in a number of countries on either the macro - competitiveness side (Cyprus) or on the fiscal side (Spain, France, Italy, Hungary and the United Kingdom). These vulnerabilities are not acute enough to lead to overall risks of fiscal stress

in the short term. Yet, they deserve particular attention, in a context where financial market sentiments can change rapidly. Italy is particularly exposed to sudden changes in financial market perceptions, notably in the light of its still sizeable government financing needs⁽¹³⁾,⁽¹⁴⁾.

Graph 2.1: **The S0 indicator for EU countries, 2009 and 2019**



(1) For more methodological explanations, see Berti et al. (2012).

Source: Commission services.

More in details, the thematic sub-indices allow identifying specific vulnerabilities on the fiscal side in some countries. In 2019, vulnerabilities are identified on the fiscal side in five Member States (Spain, France, Italy, Hungary and the United Kingdom, see Graph 2.2). In all five countries, the high level of debt contributes to this assessment, coupled with important financing needs (Hungary, Italy, Spain and France), a weak fiscal position (France, Spain, Hungary, and to a lesser extent the United Kingdom) and the weight of short-term government debt as a share of GDP (Italy and the United Kingdom, see Table 2.2). Yet, the overall S0 indicator does not point to short-term risks of fiscal stress for these five countries, in light with more limited macroeconomic imbalances.

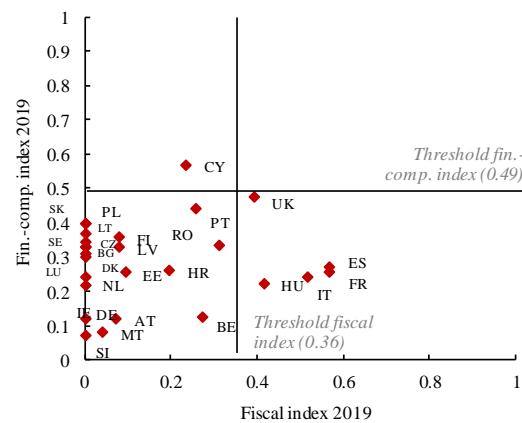
⁽¹³⁾ Furthermore, although the S0 indicator and sub-indices remain below their critical thresholds for Romania (based on 2019 data), this country exhibits a relatively high value of S0 compared with other EU countries. Under unchanged policies, an increase in government financing needs is foreseen in 2020, in a context where financial markets' perceptions recently deteriorated (see sections 2.2 and 2.3).

⁽¹⁴⁾ Box 2.1 provides a comparative analysis of the change in the S0 indicator over time in the cases of Italy and Cyprus.

The thematic sub-indices also highlight the importance of vulnerabilities coming from the financial-competitiveness side in Cyprus.

Indeed, Cyprus is the only country identified as facing high short-term risks stemming from the macro-financial side of the economy (a financial-competitiveness sub-index above its critical threshold, see Graph 2.2). The current account deficit, the large negative net international investment position, and the negative level of households' saving rate contribute to this result, as well as some financial variables (short-term debt of households and non-financial corporations, as well as the private debt, see Table 2.3). Yet, the overall S0 indicator does not point to short-term risks of fiscal stress due to the improvement of the fiscal position observed in 2019.

Graph 2.2: **Fiscal and financial-competitiveness sub-indices, 2019**



Source: Commission services.

The analysis of individual variables allows tracking down specific sources of short-term risks, and identifying potential vulnerabilities even in Member States that are not at overall risk. On the fiscal side, government debt remains above its critical thresholds in 9 Member States, while financing needs appear on the whole more rarely flagging risks (only in 4 cases), thanks to the overall still improving budgetary balances, given the current favourable interest – growth rate differential in most countries⁽¹⁵⁾, and the lengthening of the maturity structure of government debt in several countries with respect

⁽¹⁵⁾ A notable exception is Italy.

Table 2.2: Fiscal variables used in the S0 indicator, 2019

	Balance (%GDP)	Primary balance (%GDP)	Cycl. adj. balance (%GDP)	Stabil. primary balance (%GDP)	Gross debt (%GDP)	Change gross debt (%GDP)	Short-term debt (%GDP)	Net debt (%GDP)	Gross financing need (%GDP)	Interest growth rate diff.	Change expend. gen. govt (%GDP)	Change consumpt. gen. govt (%GDP)
BE	-1.7	0.2	-2.0	-0.7	99.5	-0.5	7.6	87.7	14.8	-0.7	0.1	0.1
BG	1.1	1.7	1.0	-1.1	21.1	-1.1	0.0	8.5	-0.2	-5.5	1.6	0.4
CZ	0.2	0.9	-0.3	-0.9	31.5	-1.1	1.2	19.0	4.8	-2.8	1.0	0.5
DK	2.2	2.9	2.1	-0.4	33.0	-1.1	3.9	13.2	2.0	-1.2	-0.7	-0.2
DE	1.2	2.1	1.1	-0.6	59.2	-2.7	4.2	40.1	7.3	-1.1	0.7	0.4
EE	-0.2	-0.2	-1.7	-0.5	8.7	0.3	0.3	0.3	.	-6.3	0.1	0.0
IE	0.2	1.6	-0.8	-2.5	59.0	-4.6	7.8	53.0	5.1	-4.2	-0.3	0.2
ES	-2.3	-0.1	-3.3	-0.9	96.7	-0.9	6.5	82.8	17.0	-0.9	-0.1	0.1
FR	-3.1	-1.6	-3.6	-1.1	98.9	0.6	8.3	90.4	16.1	-1.1	-0.5	-0.4
HR	0.1	2.3	-0.8	-1.3	71.3	-3.6	3.5	61.1	12.9	-1.8	0.9	0.4
IT	-2.2	1.3	-2.1	2.6	136.2	1.4	20.3	121.3	19.6	1.9	0.5	0.1
CY	3.7	6.0	1.8	-2.0	93.8	-6.7	1.9	74.9	13.2	-2.0	-5.7	1.4
LV	-0.6	0.1	-1.5	-1.2	36.0	-0.4	1.1	28.5	2.0	-3.6	-0.9	0.0
LT	0.0	0.8	-1.6	-1.6	36.3	2.2	0.6	25.6	1.7	-5.1	0.9	0.2
LU	2.3	2.6	1.7	-0.7	19.6	-1.4	1.5	-9.6	-2.0	-3.4	1.2	0.5
HU	-1.8	0.6	-3.6	-3.4	68.2	-2.0	12.7	60.4	20.8	-5.3	-0.8	-0.7
MT	1.2	2.5	0.5	-1.8	43.3	-2.5	4.8	31.9	5.2	-4.2	1.4	0.4
NL	1.5	2.2	0.9	-1.3	48.9	-3.5	5.0	42.0	5.5	-2.6	0.2	0.3
AT	0.4	1.9	0.0	-1.0	69.9	-4.0	2.6	48.2	8.8	-1.4	-0.3	0.0
PL	-1.0	0.3	-2.3	-1.9	47.4	-1.5	0.6	43.0	5.2	-4.1	0.3	0.1
PT	-0.1	3.0	-1.0	-0.9	119.5	-2.7	22.3	112.1	13.1	-0.8	-0.1	0.3
RO	-3.6	-2.4	-3.7	-2.5	35.5	0.5	1.1	29.1	8.1	-7.9	0.6	0.6
SI	0.5	2.1	-1.1	-1.9	66.7	-3.8	2.0	43.1	6.1	-2.8	0.0	0.2
SK	-0.9	0.3	-1.6	-1.2	48.1	-1.3	1.5	.	3.9	-2.6	-0.1	0.6
FI	-1.1	-0.3	-1.3	-0.8	59.2	0.2	4.7	24.1	7.7	-1.4	0.0	0.3
SE	0.3	0.8	0.2	-0.8	34.6	-4.1	7.9	5.1	5.6	-2.0	-0.1	-0.1
UK	-2.2	0.0	-2.4	-0.5	85.2	-0.7	13.4	76.1	10.8	-0.6	0.1	0.3

Source: Commission services.

Table 2.3: Financial-competitiveness variables used in the S0 indicator, 2019

	Yield Curve (pps.)	Real GDP growth (%)	GDP per capita PPP (% US level)	L. Net intern. invest. position (% GDP)	L. Net savings households (% GDP)	L.Private debt (% GDP)	L.Private credit flow (% GDP)	L.Short-term debt non-fin. corp. (% GDP)	L.Short-term debt households (% GDP)	L.Construction (% value added)	L.Current account (% GDP)	L.Change real eff. exchange rate (pps.)	L.Change nom. unit labour costs (pps.)
BE	0.62	1.1	81.2	41.3	2.6	178.5	0.8	32.6	1.7	5.3	0.3	3.4	3.7
BG	0.68	3.6	36.5	-35.2	-0.2	95.0	3.9	14.3	1.9	4.2	4.0	8.1	18.3
CZ	-0.46	2.5	63.6	-23.5	3.0	70.7	5.3	9.0	1.2	5.6	1.2	2.1	13.5
DK	0.22	2.0	87.7	48.5	3.3	199.4	2.4	22.3	3.1	5.8	7.5	-0.5	4.0
DE	0.13	0.4	83.3	62.0	6.4	102.1	6.5	12.1	1.8	5.1	8.0	2.4	5.6
EE	.	3.2	58.1	-27.7	4.6	101.5	3.7	6.3	1.0	7.3	2.1	5.6	14.3
IE	0.77	5.6	135.9	-165.0	2.7	223.2	-7.8	33.0	1.0	2.8	2.3	-0.3	-2.8
ES	1.11	1.9	63.0	-80.4	0.9	133.5	0.4	8.3	2.5	6.2	2.6	2.6	0.7
FR	0.53	1.3	71.5	-16.4	4.9	148.9	7.9	24.8	1.4	5.6	-0.6	0.4	2.4
HR	1.19	2.9	44.4	-57.9	.	94.0	2.3	7.7	3.0	5.4	2.4	5.5	-2.4
IT	2.54	0.1	65.6	-4.7	1.5	107.0	1.6	15.8	2.8	4.2	2.6	3.1	2.7
CY	1.58	2.9	61.6	-120.8	-2.5	282.6	8.4	25.6	6.4	6.2	-4.6	1.2	-0.4
LV	0.77	2.5	49.1	-49.0	-1.5	70.3	-0.2	7.6	1.3	6.7	0.6	4.1	14.7
LT	0.65	3.8	57.8	-31.0	-3.0	56.4	4.3	4.2	0.7	7.0	-0.1	4.7	16.5
LU	0.28	2.6	178.0	59.8	5.7	306.5	-0.5	75.3	2.1	6.0	4.9	5.9	7.9
HU	2.53	4.6	51.0	-52.0	3.6	69.3	4.3	9.9	2.0	5.3	2.1	-1.1	12.4
MT	1.12	5.0	68.5	62.7	.	129.8	7.5	14.8	2.6	3.6	8.9	7.6	3.2
NL	0.32	1.7	89.2	70.7	4.0	241.6	4.5	40.4	2.3	4.8	9.9	2.0	3.0
AT	0.46	1.5	87.9	3.7	4.3	121.0	3.9	12.7	2.7	6.7	2.2	2.3	4.7
PT	0.79	4.1	50.5	-55.8	0.2	76.1	3.4	8.0	2.5	7.7	-0.5	1.2	8.1
PT	1.25	2.0	53.4	-105.6	-1.5	154.3	-0.1	19.7	2.4	4.2	0.9	3.2	5.3
RO	1.66	4.1	46.3	-44.1	-5.1	47.8	1.9	9.8	0.8	6.0	-3.3	-2.8	33.6
SI	0.67	2.7	60.6	-18.9	2.7	72.8	1.3	8.3	2.1	5.7	5.5	2.6	6.1
SK	0.72	2.6	54.2	-68.1	1.5	90.9	2.0	14.8	1.9	7.9	-2.4	2.0	10.9
FI	0.47	1.4	76.8	-2.0	-0.6	142.1	1.6	15.5	3.8	7.3	-1.4	4.9	-2.6
SE	0.10	1.1	83.6	10.3	8.1	200.0	9.0	39.6	15.0	6.8	2.8	-3.5	7.4
UK	0.61	1.3	72.6	-10.5	0.3	163.6	4.4	27.2	10.4	6.1	-4.3	-8.2	7.8

(1) Variable names preceded by L are taken in lagged values.
Source: Commission services.

to the past⁽¹⁶⁾. On the financial - competitiveness side, net international investment positions are still largely negative in many Member States (as many as 14). Households net savings are below safety levels in 12 countries, while non-financial corporations short-term debt as a share of GDP is

above its critical threshold in 12 countries (see Table 2.3). Last, nominal unit labour costs exhibit fast increases in 12 countries⁽¹⁷⁾.

⁽¹⁶⁾ In particular, in the case of Portugal and Cyprus, the moderate level of financing needs is in particular explained by the significant share of government debt contracted at concessional terms (through official loans with longer maturities).

⁽¹⁷⁾ In several countries, the yield curve has considerably flattened in 2019, putting it into a shape that is usually associated with recessions. Yet, there are strong arguments why this interpretation may not hold at the current juncture, most notably the absence of inflationary pressures (see European Commission, 2019a).

2.2. SHORT-TERM FINANCING NEEDS

Among the S0 fiscal variables, government gross financing needs (GFN) are the strongest predictor of fiscal stress events. This property warrants closer examination of this variable.

2.2.1. Definition and measurement issues

While debt stock indicators capture *solvency* risks, GFN is primarily a flow concept informing mainly⁽¹⁸⁾ about the liquidity of government finances in the short to medium term. A given debt stock may be associated to very different schedules of repayment flows and financing needs, depending on the specific borrowing terms such as term-to-maturity structure, amortisation schedules for principal and interest (see Graph 2.3). GFN are usually defined as the flow of payment or financing obligations the government faces to service its debt and cover its budget deficit, if any, over the next period:

$$GFN = \text{Headline deficit} + \text{Debt principal amortisation} (+ \text{SFA or other net flows})$$

or

$$GFN = \text{Primary deficit} + \text{Interest payments} + \text{Debt principal amortisation} (+ \text{SFA or other net flows})^{(19)}$$

GFN may be measured using different sources and approaches in both backward- and forward-looking manner. Contrary to government debt, which in the EU is an indicator well defined and measured by national statisticians using harmonised definitions set by Eurostat, GFN is an indicator built for practical or analytical purposes, which falls outside of the scope of government finance statistics⁽²⁰⁾. For outturn data,

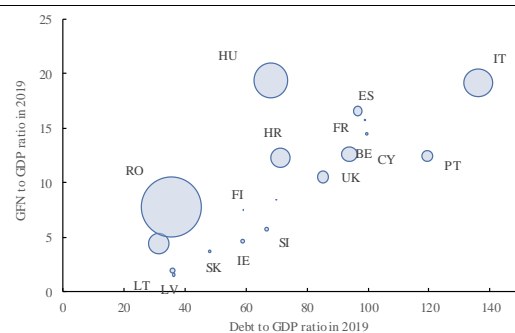
⁽¹⁸⁾ GFN's mixed nature notably in terms of potential adjustments from contingent liabilities' realizations or variation of assets makes it also informative about solvency-related risks.

⁽¹⁹⁾ To capture additionally government balance sheet changes such as privatizations (- assets) or bank recapitalizations (+ assets) which may not be reflected in the primary balance, stock flow adjustments (SFA) may also enter the formula.

⁽²⁰⁾ See for example Eurostat, ESA 2010, "Chapter 20 – The government accounts", where no mention is made of this indicator.

such as the GFN used under S0, different input sources exist to estimate them, among them national statistical institutes (NSIs), national central banks (NCBs), national authorities (ministries), debt management offices (DMOs) or large data providers such as Bloomberg. For forward-looking data, a few institutions provide GFN projections, among them the European Commission and the IMF⁽²¹⁾.

Graph 2.3: Government debt stocks and flows, selected countries, 2019 (% of GDP)



(1) GFN series are the S0 short-term GFN defined as described in Table 2.4. The size of the bubble represents the average 10-year government bond yield for 2019 (calculated over Jan- end-Sept 2019).

Source: ECB, Commission services.

GFN are, therefore, versatile metrics, useful for a variety of analytical purposes. GFN estimates are a particularly valuable concept in the case of programme countries to define accurately the financing requirements and the necessary sources to cover those needs, including when calibrating the size of the programme. They are also useful in regular fiscal surveillance to monitor potential market roll-over risks in the short to medium term.

GFN are a measure increasingly used by international institutions and creditors in their appraisal of fiscal risks. One and the same institution may use multiple GFN definitions, depending on the purpose of the analysis. For example, in their current DSA frameworks, the European Commission and the IMF use both a narrow definition of GFN to monitor short-term risks as well as a broader indicator of GFN based on their respective medium-term debt projection models. Different financial instruments may be considered to delineate the universe of GFN. Experts generally agree that a broader definition of

⁽²¹⁾ The ESM (Gabriele et al. 2017) and the ECB (2017) also provided outturn estimations.

Table 2.4: **GFN definitions used in this report: short- versus medium-term**
(Components and instruments included, depending on the scope)

Components - Balance sheet items or financing instruments included in the definition	Short-term (S0), 'Market-reliant', financing needs	Medium-term, 'Overall', financing needs
Budget (Headline) deficit	x	x
Currency and deposits		
Debt securities	x*	x
Maturing Debt		
Commercial loans		x
Official loans	x	x
Other debt creating flows (SFA)		x

* non-consolidated data

(1) Short-term, S0 or 'market-reliant' GFN are outturn data or estimates based on the redemption profile of all debt securities issued by the general government and maturing within the year of analysis (i.e. for this report, all debt securities maturing until 31 December 2019 are considered). For ex-programme countries (Portugal, Ireland and Cyprus) official loans (ECFIN internal sources) are additionally included, as they were granted as a substitute to market financing.

(2) Medium-term, 'overall', GFN are projections based on the DSM model.

Source: Commission services.

GFN flows in line with the components of Maastricht debt stocks seems appropriate, thus including in the demarcation currency and deposits, debt securities and loans, but the scope may vary depending on the purpose of the analysis.

In the European Commission's Fiscal Sustainability Reports and Debt Sustainability Monitors, GFN are regularly examined in the short- and medium-term fiscal sustainability sections. For the medium-term chapter 3.3 shows GFN projections up to t+10.

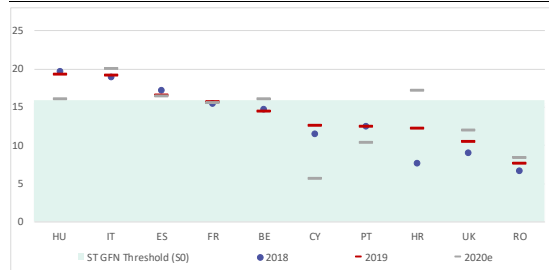
For the purpose of short-term analysis performed through S0, narrowly defined GFNs are a better proxy for market refinancing risks. To disentangle better liquidity pressures that are market-related, short-term GFN under S0 are defined more narrowly to include, besides the headline deficit, only liabilities in tradable instruments such as debt securities maturing within one year. For three ex-programme countries - Portugal, Ireland and Cyprus - short-term GFN include, in addition, official loans, since such resources were granted to these countries as a substitute to market financing and, when maturing, should be largely rolled-over by market sources. This definition is in line with the approach used by other institutions for short-term GFN ⁽²²⁾. For a comparison of GFN definitions in the short (S0) and medium term (chapter 3.3), see Table 2.4.

2.2.2. Short-term GFN results

Short-term GFNs, as defined under S0, appear in check in all but four EU countries in 2019. Concretely, in Hungary, Italy, Spain and France, short-term GFNs flag risks, with levels above the respective threshold). In Hungary and to a lesser extent in Spain, liquidity risks are expected to diminish in 2020, as short-term GFNs estimates decrease towards the critical threshold. In Italy, however, risks are set to widen in 2020, while remaining similar in France. In two other countries, Portugal and Belgium, short-term GFN were flashing close to or above the threshold in 2017-2018. In Portugal, risks have abated in 2019 and GFN are expected to remain below the critical threshold in 2020. In Belgium, short-term GFNs are expected to turn out marginally above the risk threshold in 2020. In Croatia, short-term GFN have been in check recently, but are expected to exceed the threshold in 2020 (see Graph 2.4).

⁽²²⁾ See for example the ECB (2017) and the IMF (2019).

Graph 2.4: Short-term (S0) 'Market-reliant' GFN – selected EU countries (%GDP)



S0 GFN outturn values and estimates are based on all debt securities issued by the general government and their redemption profile. 2020 GFN estimates are partial data, limited to information available on securities with redemption by end-October 2020. The threshold used has been derived based on the signalling approach (see section 2.1)

Source: ECB Government Finance Statistics and Commission services.

Weak fiscal performance and, in some cases, shorter maturity structures than in other EU countries are behind the high current values of short-term GFN. On the one hand, weak fiscal performance implies higher financing needs as fiscal deficits must be financed; in 2019, this was the case of e.g. Romania⁽²³⁾, France, Spain, the United Kingdom, Italy and Hungary, and the situation is set to persist in 2020 for all of these countries. On the other hand, debt maturity structure and, in particular low average maturity resulting from a high share of debt with maturity under one year in new debt issuances and a high share of existing debt maturing and to be rolled over, amplify GFN. In 2019 and 2020, this is the case for instance of Hungary and Croatia.

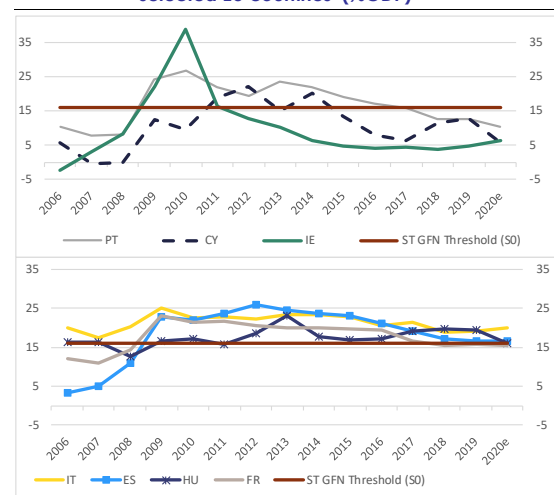
Conversely, market-reliant GFN may be low in some countries, despite their government debt ratios being high. In 2019, under the S0, around ten countries present medium or high risks from the stock of government debt perspective. However, only Hungary, Italy, Spain and France post short-term GFN above the respective S0 threshold in 2019. Such a situation may occur when countries rely less on short-term market funding and benefit, instead, from longer-term financing and/or official loans – see also for example, Cyprus and the UK.

⁽²³⁾ The fiscal deficit is forecasted to further increase in 2021 to 6.1% of GDP, which would bring the GFN to a high level by historical standards for this country.

Yet, financing sources with very long maturities are not typical for all countries⁽²⁴⁾. It is therefore important to monitor closely the evolution of financial market conditions.

Although liquidity needs have appeased after the crisis, they remain high in countries with weak fiscal performance. Liquidity needs spiked up in several economies during the European sovereign debt crisis, being visibly pressing in countries under an economic adjustment programme (Spain, Portugal, Cyprus and Ireland). In some of these cases (Spain and Portugal), as well as in countries with high debt stocks (such as Italy or Hungary), short-term GFN breached the S0 threshold more systematically (Graph 2.5). Since 2014, liquidity pressures have generally appeased, especially in Portugal, Spain and Ireland, resurging only sporadically during episodes such as government support to the banking sector (the case of Cyprus in 2018). In other cases, the liquidity position remains weak due to the poor fiscal performance, as mentioned above (Hungary, Italy, Spain and France).

Graph 2.5: Liquidity pressures over time – Short-term (S0) 'Market-reliant' GFN in selected EU countries (%GDP)



(1) S0 GFN outturn values and estimates are based on all debt securities issued by the general government and their redemption profile. 2020 GFN estimates are partial data, limited to information available on securities with redemption by end-October 2020.

Source: ECB Government Finance Statistics and Commission services.

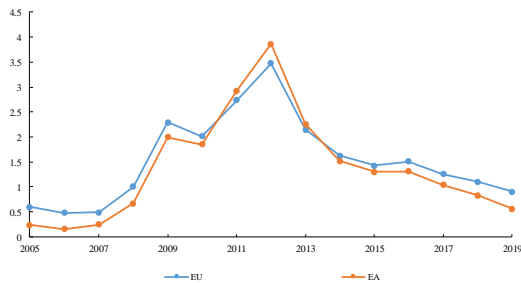
⁽²⁴⁾ See ECB (2019).

2.3. FINANCIAL MARKETS INFORMATION

This section provides an analysis of the ease of (re-)financing government debt, based on different indicators of financial markets' perceptions of sovereign risk. Such information complements debt projection based DSA results, notably to identify, early on, signs of sustainability risks over the short term. In practice, high frequency financial data allows monitoring emergence of potentially self-reinforcing adverse fiscal sustainability developments ⁽²⁵⁾. While assessing the nature of such developments in real-time calls for caution, financial data provide an important source of information to monitor market's perception, a driver of short-term debt dynamics and, potentially, of self-reinforcing debt dynamics.

Sovereign yield conditions have remained benign in the EU. Reflecting perceived creditworthiness but also the low interest rate environment, low financing costs for a number of countries continue to contribute to mitigating rollover risks across the EU, which continues to post low sovereign yield spread development (see Chart 2.6). However, some countries face higher financing costs (see Chart 2.7), such as Romania. Other countries, such as Italy, which experienced some financial stress in 2018, have instead recently benefited from a decrease in spreads.

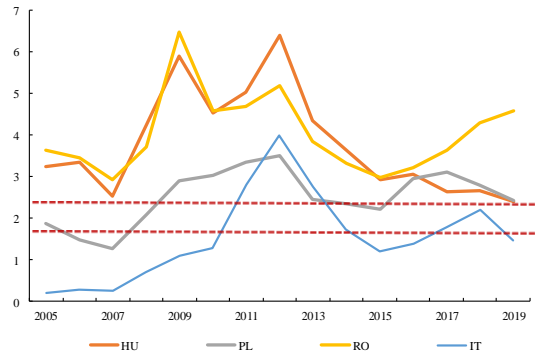
Graph 2.6: 10-year government bond yield spreads to the German bund - EU and EA aggregates



(1) Yield spreads are as of October 2019.
(2) Aggregates represent unweighted averages.
Source: ECB LTIR database, Commission services.

⁽²⁵⁾ For discussion of the market expectations on sovereign debt default and risks of self-fulfilling crisis channel, see Calvo (1988). For an application of the EU sovereign crisis event see Miller and Zhang (2014).

Graph 2.7: 10-year government bond yield spreads to the German bund - Selected countries



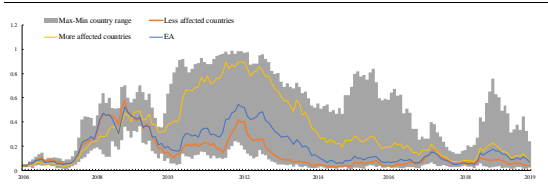
(1) Countries are those whose spreads are (or have recently been) above the lower risk threshold: 184.8 bps. Upper threshold: 231 bps.

Source: ECB LTIR database, Commission services

The SovCISS indicator ⁽²⁶⁾ shows that stress remained subdued in euro area sovereign debt markets and divergence in trends has declined following in 2018. This indicator of systemic stress for euro area sovereign bond markets continues to post a moderate average level but the gap between countries with the lowest and the highest score remains somewhat large, notably compared to the degree of divergence seen by the end of 2017 (see Chart 2.8). At the country level, notable developments include a decline in the indicator for Italy following a peak in October 2018, which had also caused the sharp increase in the gap between the minimum and maximum values for that indicator.

⁽²⁶⁾ The SovCISS (Composite Indicator of Systemic Sovereign Stress) measures the level of stress in euro area sovereign bond markets, following the CISS (Composite Indicator of Systemic Stress) methodology developed in Hollo et al. (2012). In the SovCISS, stress symptoms are measured along three dimensions: (i) risk spreads; (ii) yield volatilities; and (iii) bid-ask spreads. For details, see Garcia-de-Andoain and Kremer (2018).

Graph 2.8: **Composite indicator of Systemic Stress (SovCISS) in euro area sovereign bond markets**

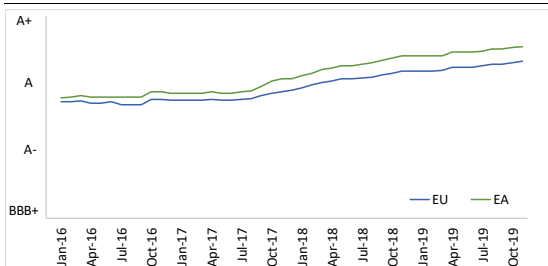


(1) The SovCISS focuses on stress in sovereign bond markets. It is available for the euro area and for 11 euro area countries (AT, BE, FI, FR, DE, EL, IE, IT, NL, PT, ES). Countries more affected by the crisis include EL, IE, IT, PT, ES. Less affected countries include AT, BE, FI, FR, DE, NL.

Source: ECB, Commission services

The EU and EA average sovereign ratings are high and keep improving further (see Graph 2.9). This reflects stable or improving ratings in most countries, with some exceptions (see Graph 2.10). Notably, Italy is the only country among those with lowest current rating that posted a deterioration of its rating compared to the start of 2016 (see Graph 2.11 and Table 2.5).

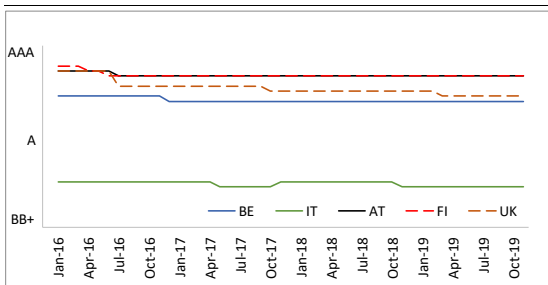
Graph 2.9: **Sovereign debt ratings - EU and EA aggregates**



(1) Ratings are computed as simple average (using an alphanumeric conversion table) of long-term foreign currency ratings, assigned by the major rating agencies.

Source: Commission services, based on Bloomberg data.

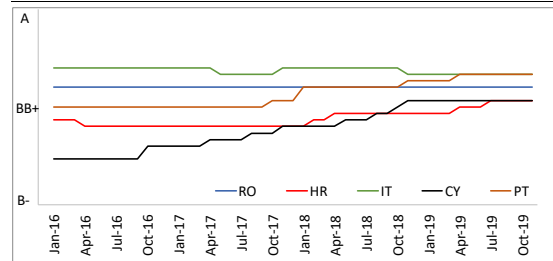
Graph 2.10: **Countries posting a rating deterioration compared to January 2016.**



(1) Ratings are computed as simple average (using an alphanumeric conversion table) of long-term foreign currency ratings, assigned by the major rating agencies.

Source: Commission services, based on Bloomberg data.

Graph 2.11: **Countries with the lowest ratings as of November 2019**



(1) Ratings are computed as simple average (using an alphanumeric conversion table) of long-term foreign currency ratings, assigned by the major rating agencies.

Source: Commission services, based on Bloomberg data.

In sum, markets' perception of EU sovereign risks remains overall benign, contributing to favourable short-term debt dynamics. However, fiscal sustainability risks in a number of countries expose these to the danger of sudden sovereign risk repricing by market participants, potentially setting in motion less favourable self-reinforcing short-term debt dynamics.

Table 2.5: Long-term foreign currency sovereign ratings (at November 5, 2019)

	Moody's			S&P			Fitch		
	Rating	Since	Outlook	Rating	Since	Outlook	Rating	Since	Outlook
Euro area MS									
AT	Aa1	24-06-2016	STABLE	AA+	13-01-2012	STABLE	AA+	13-02-2015	POS
BE	Aa3	16-12-2011	STABLE	Aau	13-01-2012	STABLE	AA-	23-12-2016	STABLE
CY	Ba2	27-07-2018	POS	BBB-	14-09-2018	STABLE	BBB-	19-10-2018	STABLE
EE	A1	23-04-2009	STABLE	AA-	13-01-2012	STABLE	AA-	05-10-2018	STABLE
FI	Aa1	03-06-2016	STABLE	AA+	10-10-2014	STABLE	AA+	11-03-2016	POS
FR	Aa2	18-09-2015	POS	AAu	08-11-2013	STABLE	AA	12-12-2014	STABLE
DE	Aaa	05-07-2000	STABLE	AAAu	13-01-2012	STABLE	AAA	10-08-1994	STABLE
IE	A2	15-09-2017	STABLE	A+	05-06-2015	STABLE	A+	15-12-2017	STABLE
IT	Baa3	19-10-2018	STABLE	BBBu	27-10-2017	NEG	BBB	21-04-2017	NEG
LV	A3	13-02-2015	STABLE	A	21-09-2018	STABLE	A-	20-06-2014	STABLE
LT	A3	08-05-2015	POS	A	02-03-2018	STABLE	A-	25-06-2014	POS
LU	Aaa	20-09-1989	STABLE	AAA	13-01-2012	STABLE	AAA	10-08-1994	STABLE
MT	A2	19-07-2019	STABLE	A-	14-10-2016	POS	A+	11-08-2017	POS
NL	Aaa	20-07-1999	STABLE	AAAu	20-11-2015	STABLE	AAA	10-08-1994	STABLE
PT	Baa3	12-10-2018	POS	BBBu	15-03-2019	POS	BBB	15-12-2017	POS
SK	A2	13-02-2012	STABLE	A+	31-07-2015	STABLE	A+	08-07-2008	STABLE
SI	Baa1	08-09-2017	POS	AA-	14-06-2019	STABLE	A	19-07-2019	STABLE
ES	Baa1	13-04-2018	STABLE	Au	20-09-2019	STABLE	A-	19-01-2018	STABLE
Non-euro area MS									
BG	Baa2	22-07-2011	POS	BBB-	01-12-2017	POS	BBB	01-12-2017	POS
HR	Ba2	11-03-2016	POS	BBB-	22-03-2019	STABLE	BBB-	07-06-2019	POS
CZ	A1	12-11-2002	POS	AA-	24-08-2011	STABLE	AA-	03-08-2018	STABLE
DK	Aaa	23-08-1999	STABLE	AAAu	27-02-2001	STABLE	AAA	10-11-2003	STABLE
HU	Baa3	04-11-2016	STABLE	BBB	15-02-2019	STABLE	BBB	22-02-2019	STABLE
PL	A2	12-11-2002	STABLE	A-	12-10-2018	STABLE	A-	18-01-2007	STABLE
RO	Baa3	06-10-2006	STABLE	BBB-	16-05-2014	STABLE	BBB-	04-07-2011	STABLE
SE	Aaa	04-04-2002	STABLE	AAAu	23-01-2014	STABLE	AAA	08-03-2004	STABLE
UK	Aa2	22-09-2017	STABLE	AAu	27-06-2016	NEG	AA*-	20-02-2019	#N/A N/A

Source: Commission services, based on Bloomberg data.

Box 2.1: The identification of short-term fiscal risks through early-warning indicators: recent insights based on the S0 indicator

Context

The S0 indicator has been introduced in the European Commission fiscal sustainability framework in 2012 in order to assess short-term risks (in the upcoming year) of fiscal stress. Based on outturn data (past and current years) of a broad range of variables, it provides a useful complement to the traditional debt sustainability analysis approach, based on a range of projections - conditional to underlying assumptions on fiscal policy and macro-financial developments. The S0 indicator predictive performance overall fares well when comparing similar approaches used in the literature (Cerovic et al., 2018).

Evolution of S0 in selected countries versus fiscal stress events

Since 2012, the S0 indicator has been signalling risks in a number of countries. These countries include Ireland, Portugal, Italy, Spain and Cyprus, all having experienced either some stress on financial markets (measured by the size and evolution of spreads), or macroeconomic adjustment programmes in the cases of Ireland, Portugal, Spain and Cyprus ⁽¹⁾.

Over the recent years, only Cyprus has been found to be at risk of fiscal stress (in 2017 and 2018, see Graph 1). In 2018, the country experienced a sharp increase of its government deficit and debt to GDP ratios (the latter rose by close to 7 pps. of GDP), on the back of important public measures to support the banking sector. Yet, the fiscal situation largely improved in 2019, notably driven by the robust economic growth, ⁽²⁾ while - being held by official lenders - a large proportion of Cyprus government debt is immune to swings in financial markets' perceptions. At the same time, macro-financial vulnerabilities remain, in particular linked to the external position of the country and to its banking sector.

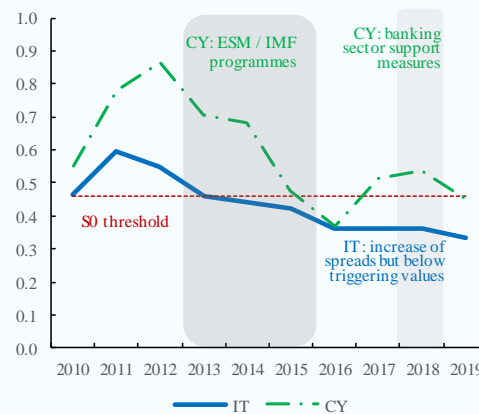
⁽¹⁾ See various editions of the FSR and the DSM since 2012.

⁽²⁾ The joint effect of the cyclical component and of the nominal growth contributed to a decline of the debt to GDP ratio of more than 6 pps. of GDP in 2019 (while the structural balance and other flows further reduced this ratio by 0.6 pp. of GDP).

Despite a high government debt to GDP ratio, the S0 indicator shows mixed signals for Italy.

Italy experienced some financial markets' tensions in spring 2018, triggered by policy announcements, potentially conducive to a significant increase of the budgetary deficit, in a context where the government debt remains high by European standards. ⁽³⁾ Since then, tensions eased up, ⁽⁴⁾ and the budgetary deficit to GDP ratio actually reduced in 2018 (and stabilised in 2019) compared to 2017. Moreover, the country experiences a relatively comfortable current account surplus, and a limited net external debt (the net international investment position has moved closer to balance over the last years). The S0 indicator evolution, and its sub-components, reflects this mixed situation with an overall value for Italy below its critical threshold, while the fiscal sub-index has been continuously flagging risks since 2009.

Graph 1: S0 indicator evolution over time, Italy and Cyprus



Source: Commission services

⁽³⁾ The significant increase of Italy sovereign spreads was however smaller than the triggering value used to identify fiscal stress events (computed as the average of Italian spreads since 1999 plus two standard deviation; see Pamies Sumner and Berti, 2017).

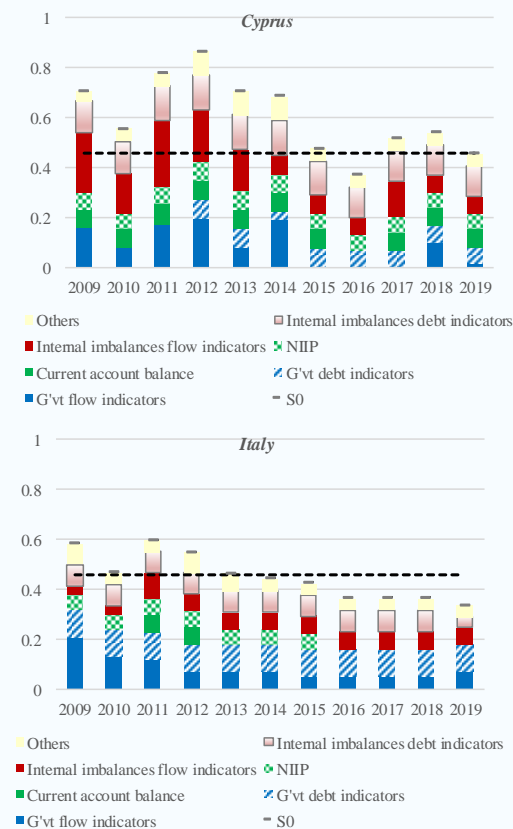
⁽⁴⁾ Although Italian sovereign spreads remain non negligible compared to other EU countries, leading to a still positive interest - growth rate differential on public debt (while it has become negative in most EU countries).

(Continued on the next page)

Box (continued)

These different sources of vulnerabilities and their evolution over time can be illustrated by looking at the composition of the S0 indicator for the two countries and how it developed during the last decade (see Graph 2).

Graph 2: **S0 decomposition and evolution over time, Cyprus and Italy**



(1) The contribution of each group of indicators correspond to the weight of the corresponding indicators (whenever they flag risks). The weight is given by the signalling power of each group of variables.
Source: Commission services

Ways forward

Several improvements could be envisaged. Early warning indicators have gained popularity since the last crisis, notably those relying on the signalling approach (Baldacci et al., 2011).⁽⁵⁾ The latter presents advantages, notably in terms of ability to cater for large unbalanced datasets and of relative simplicity of its reading. At the same time, recent studies put forward alternative methods, in particular enabling to cater for non-linearities and interdependencies between the different underlying variables (Zigraiova et al., 2019; Cerovic et al., 2018; Berg et al., 2014). Looking forward, different ways of improvement should be pursued: first, an improvement of the definition and the identification of fiscal crises should be done, as important discrepancies exist between the different datasets available (Gerling et al., 2017). This is particularly important in the case of the EU where fiscal crises remain rare events compared with other regions. Secondly, the reading and interpretation of such composite indicators should be complemented by the analysis of other variables of quantitative and qualitative nature, as countries may take mitigating action as they see growing vulnerabilities. Notably, this is done in the report with the complementary analysis of government financing needs and financial markets indicators. Furthermore, the Commission's Country Reports, published every year in the context of the European Semester, provide additional country-specific insights when discussing short-term fiscal risks.

(5) This approach is also the basis of the IMF current DSA framework for market-access countries (IMF, 2013).

3. MEDIUM-TERM FISCAL SUSTAINABILITY ANALYSIS

The medium-term fiscal sustainability analysis is based on two main tools. It consists, on one hand, of debt sustainability analysis (DSA), which deploys a rich analytical toolkit to identify fiscal risks associated, essentially, to EU countries' debt ratio level and trajectory (see section 3.1). DSA projections cover a period of 10 years. Medium-term gross financing needs' projections are additionally presented (section 3.2). On the other hand, the DSA is complemented by estimates of the fiscal sustainability gap indicator S1, whereby medium-term fiscal gaps in EU countries are analysed (see section 3.3). DSA and S1 outcomes matter equally towards the overall assessment of medium-term fiscal risks.

Some specific issues are also explored in this Chapter. In particular, the revision of interest rate assumptions is presented (see Box 3.1). Debt dynamics in the presence of feedback effects on interest rates, based on an econometric analysis, are explored (see Box 3.2). This Chapter also contains a Box dedicated to the analysis of debt sustainability challenges for Greece (see Box 3.3).

3.1. DEBT SUSTAINABILITY ANALYSIS

The two most important components of the DSA toolkit are the deterministic and stochastic debt projections (results follow in sections 3.1.1. and 3.1.2). The former approach is to project a single outcome or debt trajectory for a set of scenarios. The latter proposes a probabilistic approach, whereby the results constitute a distribution of debt projections resulting from shocks to the baseline value of the debt drivers. Gross financing needs projections are also discussed (see section 3.2).

3.1.1. Deterministic debt projections

Deterministic government debt projections presented in this report are of two main kinds: policy scenarios, including the baseline and a set of alternative policy scenarios, and sensitivity tests around the baseline ⁽²⁷⁾.

⁽²⁷⁾ See Box 1.1 in Chapter 1 for an overview and definition of the different deterministic scenarios.

Among these projection scenarios, five are more relevant as their results determine the DSA risk classification. These are the baseline no-policy change scenario, the historical structural primary balance (SPB) scenario (see section 3.1.1.1), as well as three sensitivity tests, including a positive shock to interest rates, a negative shock to GDP growth and a negative shock to the SPB (see section 3.1.1.2). These scenarios appear first in this section. The remainder of deterministic debt projection scenarios constitute additional information useful in qualifying DSA risks, yet they do not influence the risk classification. These include the Stability and Growth Pact scenario (see section 3.1.1.3), the Stability and Convergence Program scenario (see section 3.1.1.4) and the fiscal reaction function scenario (see section 3.1.1.5). Section 3.1.1.6 provides a comparison of the baseline and historical scenarios with the FSR 2018 results.

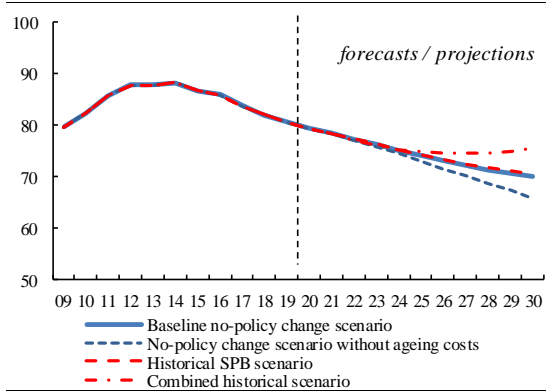
3.1.1.1. Baseline and historical scenarios

EU and EA aggregate results

Under the baseline no-fiscal policy change scenario, the EU debt ratio would gradually decline in the next decade. On the basis of budgetary positions from the European Commission's Autumn 2019 forecasts, and under the assumption of unchanged fiscal policy beyond the forecast period, the EU-28 debt ratio would gradually decline from a peak of 88% of GDP in 2014 to 70% of GDP in 2030 (see Graph 3.1) ⁽²⁸⁾. For the EA, the same projection scenario shows a similar decline, from 95% of GDP in 2014 to 75% of GDP in 2030 (see Graph 3.2). Despite this overall downward trend, in 10 years' time the debt ratio would remain above its pre-crisis level (58% and 66% of GDP in 2007, respectively, in the EU-28 and the EA), and above the 60% of GDP Treaty reference threshold.

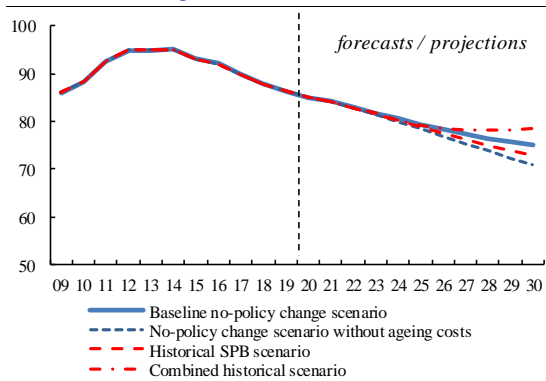
⁽²⁸⁾ The no-fiscal policy change scenario assumes that the government primary balance (in structural terms and before ageing costs) remains constant at its last forecast value (2021) for the remainder of the 10-year projection period.

Graph 3.1: **Gross government debt projections (% of GDP), European Union 28: baseline no-fiscal policy change and historical scenarios**



(1) The historical SPB scenario includes a feedback effect from the fiscal balance to growth.
Source: Commission services.

Graph 3.2: **Gross government debt projections (% of GDP), Euro area: baseline no-fiscal policy change and historical scenarios**



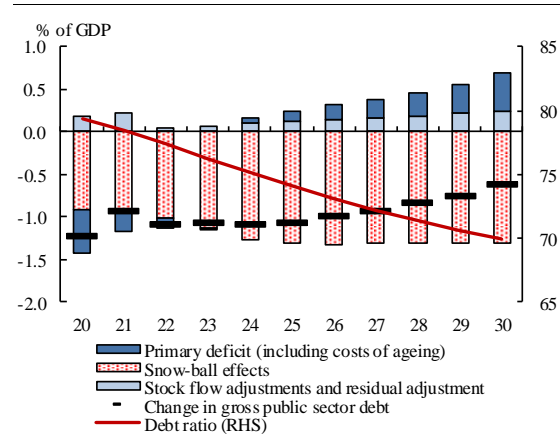
(1) The historical SPB scenario includes a feedback effect from the fiscal balance to growth.
Source: Commission services.

Favourable snowball effects drive the aggregate debt ratio decline ⁽²⁹⁾. The primary balance would contribute to reduce projected debt only up until 2022 (2024 in the EA), assuming a structural primary balance *before costs of ageing* held constant at 0.1% and 0.2% of GDP, respectively, in the EU-28 and the EA, over the projection period. Favourable interest rate – growth rate differentials (snowball effects) would contribute to the decrease of the debt ratio all throughout the projection period, given the projected low level of interest rates, current and projected over the

⁽²⁹⁾ Snowball effects refer to the net impact of the counter-acting effects of interest rates, inflation and real GDP growth (as well as exchange rates in some countries) on the evolution of the debt ratio (see Annex A6 for more details).

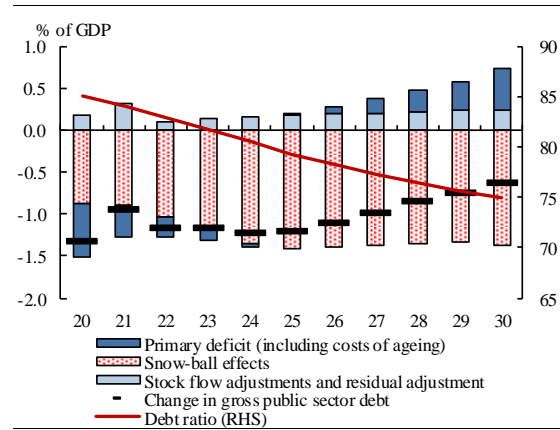
horizon (see Tables 3.1 – 3.2 and Graphs 3.3 – 3.4) ⁽³⁰⁾. Implicit liabilities related to population ageing (the growing impact of ageing costs) is visible in Graphs 3.1–3.2 when comparing the no-fiscal policy change scenario with and without ageing costs.

Graph 3.3: **Gross government debt ratio variation breakdown (% of GDP), European Union 28 - Baseline no-fiscal policy change scenario**



(1) Reading note: In 2020, a forecast primary surplus of 0.5% of GDP contributes to reduce the government debt ratio.
Source: Commission services.

Graph 3.4: **Gross government debt ratio variation breakdown (% of GDP), Euro area - Baseline no-fiscal policy change scenario**



(1) Reading note: In 2020, a forecast primary surplus of 0.6% of GDP contributes to reduce the government debt ratio.
Source: Commission services.

⁽³⁰⁾ See Box 3.1, discussing the revision of the interest rate assumption, now set in line with financial markets' expectations.

Table 3.1: Gross government debt projections (% of GDP) and underlying macro-fiscal assumptions, European Union 28 - Baseline no-fiscal policy change

	2019	2020	2021	2022	2023	2024	2027	2030
Gross debt ratio	80.6	79.4	78.4	77.4	76.3	75.2	72.2	70.0
<i>of which</i> Outstanding (non maturing) debt	64.4	63.3	62.4	61.7	60.9	60.0	57.7	55.8
Rolled-over short-term debt	8.0	7.8	7.7	7.6	7.4	7.3	6.9	6.6
Rolled-over long-term debt	6.8	6.8	6.8	6.6	6.5	6.3	6.1	5.8
New short-term debt	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
New long-term debt	1.3	1.3	1.4	1.3	1.3	1.4	1.4	1.6
Changes in the debt ratio (-1+2+3)	-1.5	-1.2	-0.9	-1.1	-1.1	-1.1	-0.9	-0.6
<i>of which</i> (1) Overall primary balance (1.1+1.2+1.3)	0.7	0.5	0.3	0.1	0.0	-0.1	-0.2	-0.5
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.5	0.3	0.1	0.0	0.0	-0.1	-0.2	-0.5
(1.1.1) Structural primary balance (before CoA)	0.5	0.3	0.1	0.1	0.1	0.1	0.1	0.1
(1.1.2) Cost of ageing (incl. revenues pensions tax)				0.1	0.2	0.2	0.5	0.7
(1.1.3) Property incomes				0.0	0.0	0.1	0.1	0.2
(1.2) Cyclical component	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (interest rate/growth differential) (2.1+2.2+2.3)	-0.9	-0.9	-0.9	-1.0	-1.1	-1.3	-1.3	-1.3
(2.1) Interest expenditure	1.6	1.5	1.5	1.3	1.3	1.2	1.0	1.0
(2.2) Growth effect (real)	-1.1	-1.1	-1.1	-1.0	-0.9	-0.9	-0.9	-0.9
(2.3) Inflation effect	-1.4	-1.4	-1.3	-1.4	-1.4	-1.5	-1.4	-1.4
(3) Stock flow adjustments	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
PM : Structural balance	-1.1	-1.3	-1.4	-1.4	-1.4	-1.4	-1.4	-1.7
Key macroeconomic assumptions								
Actual GDP growth (real)	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3
Potential GDP growth (real)	1.6	1.6	1.6	1.4	1.3	1.3	1.3	1.3
Inflation (GDP deflator)	1.8	1.8	1.7	1.8	1.9	2.0	2.0	2.0
Implicit interest rate (nominal)	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4

(1) Given that the drivers of the EU28 change in the government debt ratio are calculated as GDP-weighted averages of country-specific debt projections, small differences may exist between the total change in the government debt ratio and the sum of its drivers.

Source: Commission services.

Table 3.2: Gross government debt projections (% of GDP) and underlying macro-fiscal assumptions, Euro area - Baseline no-fiscal policy change

	2019	2020	2021	2022	2023	2024	2027	2030
Gross debt ratio	86.4	85.1	84.1	83.0	81.8	80.6	77.2	75.0
<i>of which</i> Outstanding (non maturing) debt	69.7	68.5	67.6	66.8	65.8	64.8	62.1	60.1
Rolled-over short-term debt	7.7	7.5	7.4	7.3	7.1	7.0	6.6	6.4
Rolled-over long-term debt	7.7	7.8	7.8	7.6	7.5	7.3	7.0	6.9
New short-term debt	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
New long-term debt	1.2	1.2	1.3	1.2	1.2	1.3	1.3	1.4
Changes in the debt ratio (-1+2+3)	-1.5	-1.3	-0.9	-1.2	-1.2	-1.2	-1.0	-0.6
<i>of which</i> (1) Overall primary balance (1.1+1.2+1.3)	0.9	0.6	0.4	0.2	0.1	0.0	-0.2	-0.5
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.7	0.4	0.2	0.1	0.1	0.0	-0.2	-0.5
(1.1.1) Structural primary balance (before CoA)	0.7	0.4	0.2	0.2	0.2	0.2	0.2	0.2
(1.1.2) Cost of ageing (incl. revenues pensions tax)				0.1	0.2	0.2	0.5	0.9
(1.1.3) Property incomes				0.0	0.0	0.1	0.1	0.2
(1.2) Cyclical component	0.3	0.2	0.2	0.1	0.1	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (interest rate/growth differential) (2.1+2.2+2.3)	-0.7	-0.9	-0.9	-1.0	-1.2	-1.4	-1.4	-1.4
(2.1) Interest expenditure	1.6	1.4	1.3	1.2	1.1	1.0	0.9	0.8
(2.2) Growth effect (real)	-1.0	-1.0	-1.0	-0.9	-0.8	-0.8	-0.7	-0.7
(2.3) Inflation effect	-1.3	-1.3	-1.2	-1.3	-1.5	-1.6	-1.5	-1.5
(3) Stock flow adjustments	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0
PM : Structural balance	-0.9	-1.1	-1.2	-1.2	-1.2	-1.2	-1.3	-1.5
Key macroeconomic assumptions								
Actual GDP growth (real)	1.2	1.2	1.2	1.1	1.0	1.0	1.0	1.0
Potential GDP growth (real)	1.4	1.4	1.4	1.2	1.1	1.1	1.0	1.0
Inflation (GDP deflator)	1.6	1.5	1.5	1.6	1.8	2.0	2.0	2.0
Implicit interest rate (nominal)	1.8	1.7	1.6	1.5	1.4	1.3	1.1	1.1

(1) Given that the drivers of the EA change in the government debt ratio are calculated as GDP-weighted averages of country-specific debt projections, small differences may exist between the total change in the government debt ratio and the sum of its drivers.

Source: Commission services.

Fiscal and economic conditions assumed for the EU aggregate in the baseline resemble historical trends (see Graphs 3.1 – 3.2). Very similar trajectories under the historical and baseline scenarios (government debt ratios decreasing under both scenarios by around 10 pps. of GDP in the EU-28 over 2019–2030, and by some 11-13 pps. of GDP in the EA over the same period) are essentially explained by a baseline structural primary balance (before ageing costs) that reverts close to its historical average beyond the forecast (to a lesser extent in the EA). Concretely, this means an average structural primary balance of 0.0% / 0.5% of GDP, respectively, for the EU-28 / EA in the historical SPB scenario (averages over the period 2005-19). If, in addition, real interest rates and real GDP growth were reverting to their historical averages such as in the combined historical scenario, the EU-28 debt ratio would decrease less than in the baseline over 2019-2030. In this scenario, the EU-28 debt ratio would stand

at some 6 pps. of GDP above the baseline scenario debt ratio in 2030 (see also Table 3.3). This result illustrates the particularly favourable interest rate – growth rate differential, current and projected over the next ten years (see also Graph 3.5). The gap between the baseline and combined historical scenario is found to be lower at the EA aggregate level than for the EU (around 3 ^{1/2} pps. of GDP). In this case, on one hand a higher historical SPB contributes to lower the projected debt ratio; on the other hand, a greater historical interest rate implies larger debt dynamics (see Table 3.4).

The aggregate structural primary balance assumed in the baseline projections appears plausible by historical standards, lying nearly in the middle of the distribution of EU primary balances observed in the past. At both the EU-28 and the EA aggregate levels, the structural primary balance forecast for 2021, on which the baseline scenario is grounded, appears plausible by the

Table 3.3: **Gross government debt projections (% of GDP) - Baseline no-fiscal policy change and historical scenarios, by country**

	Debt in 2021	(A) Debt in 2030 - Baseline no-policy change scenario	(B) Debt in 2030 using the Historical last 15 years average (05-19) on the following variables:				(B - A)			
			SPB	IIR	potential GDP growth	all variables combined	for SPB	for IIR	for potential GDP growth	for all variables combined
BE	100.0	97.4	89.9	105.3	94.2	93.6	-7.6	7.9	-3.3	-3.9
BG	18.6	9.3	13.6	9.4	7.9	12.3	4.3	0.1	-1.4	3.1
CZ	30.1	28.3	34.9	30.1	27.1	35.6	6.6	1.8	-1.2	7.3
DK	31.7	15.4	5.5	17.3	15.6	6.4	-9.9	1.9	0.2	-9.1
DE	55.0	39.8	36.2	44.6	39.0	39.7	-3.6	4.8	-0.8	-0.1
EE	8.2	8.4	11.4	8.3	8.5	11.2	3.0	-0.2	0.0	2.7
IE	52.6	37.6	56.2	42.1	32.1	55.4	18.5	4.5	-5.5	17.7
ES	96.0	95.7	94.1	104.4	92.7	99.5	-1.6	8.8	-3.0	3.8
FR	99.2	96.8	97.1	105.2	95.0	103.4	0.2	8.3	-1.8	6.6
HR	64.4	50.4	63.1	56.3	48.0	67.6	12.7	5.9	-2.4	17.2
IT	137.4	140.2	128.9	150.6	142.3	140.8	-11.3	10.4	2.1	0.6
CY	81.8	48.1	51.5	52.0	46.3	53.8	3.4	4.0	-1.8	5.8
LV	32.9	29.0	35.2	29.8	27.9	34.8	6.2	0.7	-1.2	5.8
LT	34.8	29.8	36.7	31.0	27.6	35.6	6.9	1.1	-2.2	5.8
LU	18.6	7.3	-1.0	7.3	7.0	-1.2	-8.3	0.0	-0.3	-8.5
HU	64.4	41.3	47.7	43.3	45.5	54.6	6.4	2.0	4.2	13.2
MT	38.7	9.7	18.1	10.1	10.2	19.6	8.3	0.4	0.5	9.8
NL	45.6	32.4	33.9	36.4	30.8	36.2	1.5	4.0	-1.6	3.8
AT	64.6	43.1	47.4	46.1	43.4	51.0	4.3	3.0	0.2	7.9
PL	44.3	38.3	45.9	40.4	36.9	46.9	7.6	2.1	-1.4	8.7
PT	113.7	89.2	104.4	95.9	90.4	114.0	15.2	6.7	1.3	24.8
RO	40.6	91.2	73.4	81.4	87.6	62.5	-17.8	-9.9	-3.6	-28.7
SI	59.5	46.7	53.0	51.4	48.8	60.9	6.3	4.8	2.1	14.3
SK	46.9	44.1	50.7	47.3	40.2	50.4	6.6	3.2	-3.9	6.3
FI	59.8	62.1	47.2	64.9	62.1	48.6	-14.9	2.7	0.0	-13.6
SE	32.0	15.4	11.7	16.0	15.7	12.4	-3.7	0.6	0.3	-3.1
UK	84.2	78.6	91.6	84.7	79.3	99.5	13.0	6.0	0.6	20.9
EU-28	78.4	70.0	70.6	75.5	69.3	75.6	0.6	5.6	-0.6	5.6
EA	84.1	75.0	73.1	81.5	74.1	78.4	-1.9	6.6	-0.9	3.5

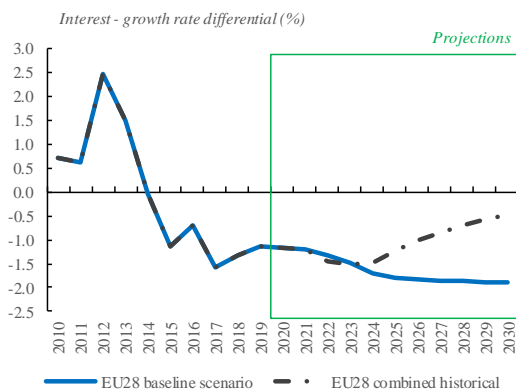
(1) The historical SPB scenario includes a feedback effect from the fiscal balance to growth.

(2) The combined historical scenario assumes that the SPB, interest rate and GDP growth rate revert to their historical averages (calculated over the period 2005-19).

Source: Commission services.

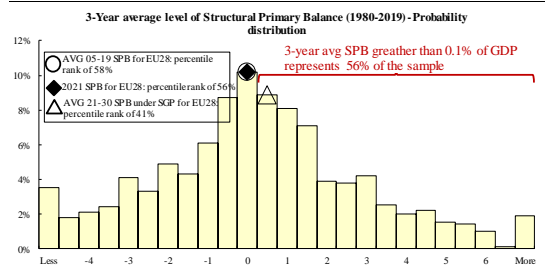
European historical track record (see Graphs 3.6–3.7). For example, the structural primary balance assumed in the EU-28 projections, 0.1% of GDP, corresponds to a percentile rank of 56% in the historical distribution. In other words, looking at all EU countries' structural primary balances over the period 1980 – 2019, outturn structural primary balances were in 56% of cases at or above 0.1% of GDP. This means that, by historical standards, there is a sizeable (56%) probability that the EU as a whole would achieve such structural primary surplus over the next decade.

Graph 3.5: **Interest rate - growth rate differential(%), outturn and projected values in the baseline and combined historical scenarios (based on the implicit interest rate)**



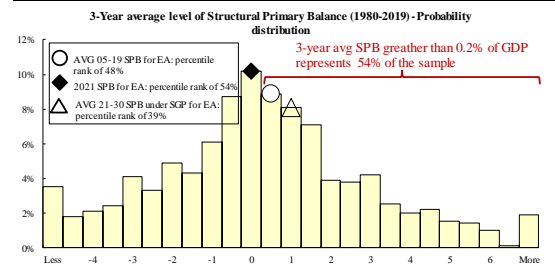
Source: Commission services.

Graph 3.6: **EU 28 projected structural primary balance (SPB) level and percentile rank in different scenarios against the distribution of EU countries' outturn SPBs over 1980 – 2019**



(1) The distribution (yellow histograms) is calculated over a dataset of all EU countries for the period 1980 - 2019. Vertical axis: % sample; horizontal axis: SPB values as % GDP. Source: Commission services.

Graph 3.7: **EA projected structural primary balance (SPB) level and percentile rank in different scenarios against the distribution of EU countries' outturn SPBs over 1980 – 2019**



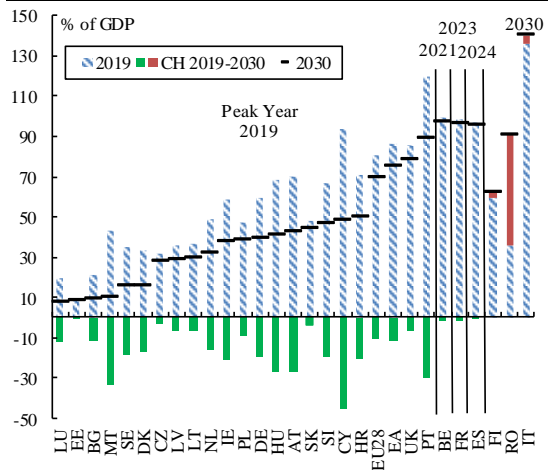
(1) The distribution (yellow histograms) is calculated over a dataset of all EU countries for the period 1980 - 2019. Vertical axis: % sample; horizontal axis: SPB values as % GDP. Source: Commission services.

Cross-country main results ⁽³¹⁾

The baseline no-fiscal policy change scenario projects a decline in government debt ratios in most EU Member States. Debt ratios are expected to decrease in 24 countries with particularly large reductions foreseen in CY, MT, PT, HU, and AT (by at least 25 pps. of GDP between 2019 and 2030). In these 5 countries, the substantial projected decrease of government debt ratios is largely explained by high forecasted structural primary surpluses in 2021 (above 2.0% of GDP in MT, PT, and CY and at 1.6% of GDP in AT) and favourable snowball effects. On the other hand, government debt ratios would increase in 3 other countries, namely RO, IT, and FI. In Romania, debt is set to be on a particularly fast-increasing path, raising to above 90% of GDP in 2030, from currently low levels (less than 40% of GDP in 2019). The projected increase is much milder in the case of Italy, from a current high level nonetheless (it would reach 140% of GDP in 2030 under unchanged policies) (see Graph 3.8).

⁽³¹⁾ See detailed results by country in the fiches presented in the Statistical Annex 2 of this report.

Graph 3.8: **Peak year of gross government debt in 2019 and 2030 (% of GDP) over the 2019-2030 projections, under the baseline no-fiscal policy change scenario, by country**



Source: Commission services.

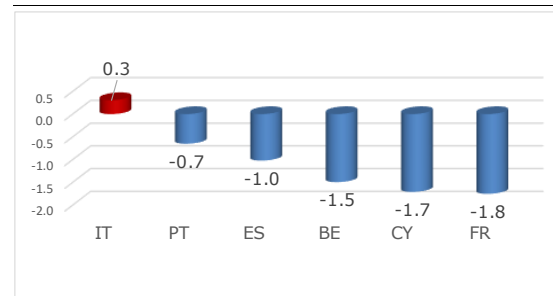
In some highly indebted countries, government debt burdens are therefore projected to only marginally decline or even increase. In Spain, Belgium and France, the debt ratio would decline marginally in the coming decade compared to 2019, while in Italy government debt would increase even further. Therefore, in these four countries, debt would remain (well) above 90% of GDP in 2030. Weak fiscal positions (a structural primary deficit in France, Spain and Belgium and a small structural primary surplus in Italy) contribute to these unfavourable trends. A positive interest rate - growth rate differential (unfavourable snowball effects) would also be an important driver in Italy, given the initial debt burden (Graph 3.9; see also section 3.1.1.2 for an illustration of interest rate shocks).

In two other highly indebted countries, Portugal and Cyprus, debt burden would ease more markedly (by some 30 pps. and 45 pps. of GDP, respectively), falling just below 90% and 50% of GDP, respectively, in 2030.

The outlook would be overall less favourable in many countries if future fiscal policy and macroeconomic variables replicated historical performance. If the structural primary balance (before ageing costs) were reverting, after 2021, to its historical average, government debt ratios in 2030 would be higher than in the baseline scenario in a large number of countries (18). The largest gaps would be recorded in 2030 in IE, PT, the UK

and HR (more than 12 pps. of GDP; see Table 3.3) given the important differences between recent and historical primary balances (see Table 3.4). In the combined historical scenario, a higher debt ratio in 2030 compared to the baseline is projected in 20 countries, with the highest differences in PT, the UK, IE, HR, SI, and HU (more than 10 pps. of GDP). Assuming that interest and growth rates were to evolve in line with historical averages would lead to higher debt ratios than in the historical SPB scenario in most country cases and in particular in IT, PT, SI, the UK, HU, FR, ES), given positive (unfavourable) or less favourable interest rate - growth rate differentials recorded historically.

Graph 3.9: **Interest rate - growth rate differentials (%) in the baseline scenario (based on the implicit interest rate), 2019-30 average, selected EU countries**



Source: Commission services.

In some cases, fiscal assumptions under the baseline scenario seem ambitious. In several countries, the forecasted structural primary balance in 2021 may appear high by historical EU standards: this is the case in MT, PT and CY (structural primary surpluses above 2% of GDP) and to a lower extent in AT and IE (structural primary surpluses of 1.6% and 1.3% of GDP, respectively) - see Table 3.4. In the cases of MT, PT and CY, only around 20% of the EU distribution displays a structural primary balance greater than the level assumed for these countries in the baseline scenario (around one third in the case of AT and IE). Moreover, in Ireland, the baseline SPB is a surplus, while the country's historical SPB average is a deficit, pointing that it may be less likely for the country to sustain a strong fiscal effort over a longer period. In other cases (e.g. PT and AT), risks of 'fiscal fatigue'

Table 3.4: Main macro-fiscal assumptions used in the baseline and historical scenarios, by country

	Baseline no-policy change scenario						Combined historical scenario - average (2021-30)			Percentile rank of 2021 SPB (1)	Percentile rank of AVG 05-19 SPB (2)
	2021			Average 2021-30			SPB (2)	Real IIR	Actual real GDP growth		
	SPB (1)	Real IIR	Real GDP growth	SPB	Real IIR	Real GDP growth					
BE	-0.5	-0.2	1.0	-0.5	-0.6	1.0	0.4	0.2	1.3	67%	46%
BG	1.2	0.5	2.9	1.2	0.7	1.9	0.7	0.8	3.1	36%	48%
CZ	0.3	0.6	2.1	0.3	0.2	2.0	-0.4	0.9	2.5	52%	69%
DK	0.8	0.2	1.6	0.8	-0.3	1.4	2.0	0.3	1.2	43%	21%
DE	1.2	-0.4	1.0	1.2	-1.2	1.1	1.7	-0.1	1.2	35%	28%
EE	-0.4	-2.6	2.4	-0.4	-1.8	2.7	-0.8	-2.1	2.7	66%	72%
IE	1.3	0.4	3.2	1.3	-0.5	2.5	-0.9	0.8	4.4	34%	79%
ES	-1.0	0.7	1.4	-1.0	-0.1	1.0	-0.8	0.8	1.3	73%	70%
FR	-1.4	0.0	1.2	-1.4	-0.9	1.0	-1.5	0.0	1.2	77%	77%
HR	1.0	0.3	2.4	1.0	-0.1	1.0	-0.5	1.0	1.6	39%	73%
IT	0.1	1.2	0.7	0.1	0.4	0.4	1.4	1.2	0.1	55%	27%
CY	2.2	0.4	2.3	2.2	0.0	1.6	1.9	0.7	1.9	22%	29%
LV	-0.3	-0.4	2.7	-0.3	-0.6	2.1	-1.0	-0.3	2.6	64%	75%
LT	0.1	-1.2	2.4	0.1	-1.0	1.9	-0.7	-0.5	2.9	57%	73%
LU	1.1	-0.7	2.6	1.1	-0.7	2.3	2.1	-0.7	2.5	36%	21%
HU	0.9	0.7	2.8	0.9	0.4	3.0	0.1	0.8	2.1	41%	60%
MT	2.5	1.0	3.8	2.5	0.8	4.3	1.5	1.1	4.2	20%	36%
NL	0.8	0.1	1.3	0.8	-0.9	0.8	0.6	0.2	1.3	43%	47%
AT	1.6	0.2	1.4	1.6	-0.5	1.4	1.1	0.2	1.4	30%	41%
PL	-0.3	-0.4	3.3	-0.3	-0.1	3.1	-1.2	0.6	3.6	65%	78%
PT	2.4	0.8	1.7	2.4	0.3	0.9	0.6	1.0	0.9	21%	59%
RO	-4.6	-0.6	3.3	-4.6	1.6	3.2	-2.7	0.1	3.5	96%	83%
SI	0.7	0.0	2.7	0.7	-0.3	2.5	0.0	0.8	2.1	45%	64%
SK	-0.8	0.2	2.7	-0.8	-0.1	2.3	-1.5	0.7	3.4	70%	81%
FI	-0.9	-0.7	1.0	-0.9	-0.9	1.0	0.8	-0.6	0.8	72%	32%
SE	1.2	0.0	1.4	1.2	-0.4	2.0	1.6	-0.1	1.8	36%	29%
UK	-0.2	0.8	1.4	-0.2	0.2	1.6	-1.7	1.0	1.6	61%	84%
EU-28	0.1	0.2	1.4	0.1	-0.4	1.3	0.0	0.4	1.5	56%	58%
EA	0.2	0.1	1.2	0.2	-0.6	1.0	0.4	0.3	1.2	54%	48%

(1) The historical SPB scenario includes a feedback effect from the fiscal balance to growth.

(2) The combined historical scenario assumes that the SPB, interest rate and GDP growth rate revert to their historical averages (calculated over the period 2005-19).

(3) Percentile ranks are calculated on the distribution of 3-year average SPB level over all EU countries for 1980 – 2019.

Source: Commission services.

cannot be excluded either over our 10-year projections⁽³²⁾.

In currently highly indebted countries, most fiscal positions appear, on the other hand, relatively weak compared to historical experience. Within the group of high-debt countries (IT, PT, BE, FR, ES and CY), fiscal positions appear relatively weak in some cases based on EU historical experience (e.g. France, Spain), national past trends (Italy) or both (Belgium). For example, in the case of Spain, 73% of the EU historical distribution is above the 1% of GDP structural primary deficit assumed in the baseline scenario⁽³³⁾. This latter value is however close to,

but still weaker than Spain's historical average SPB (-0.8% of GDP). Such results indicate that the supportive economic environment in the recent period has not been used to improve fiscal positions in these countries.

3.1.1.2. Sensitivity analysis on deterministic debt projections

A set of sensitivity tests around the baseline scenario adds to the information provided in the policy scenarios. These sensitivity tests introduce a change or a shock to key underlying assumptions of the baseline scenario i.e. on market interest rates, economic growth, the primary balance and exchange rates (see Graph 3.10 for example).

the more relevant become the results of the SPB historical scenario.

⁽³²⁾ A caveat to keep in mind when considering the percentile rank measures used in this chapter is that while each country's fiscal balance is analysed against the overall distribution of fiscal balances of all EU countries, history may prove that a certain country is more / less able to sustain stronger fiscal positions.

⁽³³⁾ The closer the percentile rank of the last forecast SPB of a given country is located to any of the tails of the distribution, the less plausible is the baseline scenario and

Table 3.5: Sensitivity tests on interest rates (+1 /-1 pp. on short- and long-term interest rates on newly issues and rolled-over debt) around the baseline no-fiscal policy change scenario, by country

	End forecast (2021)			2030								
				Baseline no-policy change scenario		Standardized (permanent) positive shock (+1p.p.) to market interest rates			Standardized (permanent) negative shock (-1p.p.) to market interest rates			
	SPB	Implicit interest rate	Debt	Implicit interest rate	Debt	Implicit interest rate	Debt	Debt (diff. with Baseline scenario)	Implicit interest rate	Debt	Debt (diff. with Baseline scenario)	
BE	-0.5	1.8	100.0	1.1	97.4	1.9	102.4	5.0	0.4	92.8	-4.6	
BG	1.2	3.1	18.6	2.6	9.3	2.9	9.6	0.3	2.3	9.0	-0.3	
CZ	0.3	2.4	30.1	2.0	28.3	2.9	30.1	1.8	1.2	26.7	-1.6	
DK	0.8	2.1	31.7	1.3	15.4	1.8	16.4	1.0	0.9	14.6	-0.9	
DE	1.2	1.3	55.0	0.4	39.8	1.2	42.4	2.6	-0.4	37.4	-2.4	
EE	-0.4	0.2	8.2	0.6	8.4	1.3	8.7	0.3	0.0	8.2	-0.3	
IE	1.3	1.9	52.6	1.2	37.6	1.9	39.9	2.3	0.4	35.6	-2.1	
ES	-1.0	2.1	96.0	1.6	95.7	2.4	101.0	5.3	0.8	90.7	-4.9	
FR	-1.4	1.2	99.2	0.9	96.8	1.6	102.1	5.3	0.1	91.9	-4.9	
HR	1.0	2.8	64.4	1.4	50.4	2.2	53.8	3.4	0.7	47.3	-3.1	
IT	0.1	2.3	137.4	2.3	140.2	3.1	148.9	8.8	1.5	132.1	-8.1	
CY	2.2	2.0	81.8	1.8	48.1	2.5	50.8	2.7	1.1	45.6	-2.5	
LV	-0.3	1.8	32.9	1.3	29.0	2.0	30.5	1.5	0.5	27.7	-1.4	
LT	0.1	1.2	34.8	1.2	29.8	1.9	31.2	1.4	0.5	28.5	-1.3	
LU	1.1	1.4	18.6	1.3	7.3	1.7	7.6	0.4	1.0	6.9	-0.3	
HU	0.9	3.8	64.4	3.2	41.3	4.0	44.4	3.1	2.5	38.5	-2.8	
MT	2.5	3.0	38.7	2.8	9.7	3.1	10.4	0.7	2.4	9.1	-0.7	
NL	0.8	1.3	45.6	0.6	32.4	1.3	34.2	1.8	0.0	30.7	-1.7	
AT	1.6	1.9	64.6	1.2	43.1	1.8	45.3	2.2	0.6	41.1	-2.0	
PL	-0.3	2.7	44.3	2.4	38.3	3.2	40.2	2.0	1.7	36.4	-1.8	
PT	2.4	2.4	113.7	2.0	89.2	2.6	93.7	4.5	1.4	85.1	-4.1	
RO	-4.6	3.8	40.6	5.0	91.2	5.9	96.1	4.8	4.0	86.7	-4.5	
SI	0.7	2.3	59.5	1.4	46.7	2.2	48.9	2.3	0.7	44.6	-2.1	
SK	-0.8	2.4	46.9	1.6	44.1	2.2	45.7	1.6	1.0	42.6	-1.5	
FI	-0.9	1.3	59.8	0.9	62.1	1.5	64.5	2.4	0.3	59.9	-2.2	
SE	1.2	1.7	32.0	1.6	15.4	1.9	16.2	0.8	1.2	14.7	-0.7	
UK	-0.2	2.6	84.2	1.8	78.6	2.5	82.9	4.2	1.1	74.7	-3.9	
EU-28	0.1	1.9	78.4	1.4	70.0	2.1	74.0	4.0	0.7	66.3	-3.7	
EA	0.2	1.6	84.1	1.1	75.0	1.8	79.3	4.3	0.4	71.0	-4.0	

Source: Commission services.

Main sensitivity tests

Three sensitivity tests – simulating, respectively, a positive shock to interest rates, a negative shock to GDP growth, and a negative shock to the SPB - are particularly important, since they

influence the DSA risk classification. These scenarios determine, alongside other factors, a country's level of risk – see Annex A9. The remainder of deterministic debt projection scenarios constitute additional information useful in qualifying DSA risks, but they do not influence the DSA risk classification.

A standard permanent shock on interest rates on newly and rolled-over debt (-1 / +1 pp.) would sizeably affect government debt dynamics by 2030, with some country

differences. Such a shock would lead to a difference between the most favourable and the least favourable scenarios of around 8 pps. of GDP in 2030 at the aggregate EU-28 / EA level (see Table 3.5). The impact would be particularly large in highly indebted countries such as IT, ES, FR, BE and PT or in countries with a large debt ratio projected in 2030, such as RO. For instance, 1 pp. permanently higher market interest rates would lead to a much higher debt ratio in Italy by 2030 (around +9 pps. of GDP compared to the baseline scenario) and in Spain, France, Belgium and Romania (around +5 pps. of GDP).

Countries' vulnerabilities to interest rate shocks differ, depending on the maturity of government debt. In some countries, the effect of market interest rate shocks on government debt is amplified by the relatively short maturity of

government debt (e.g. HU or HR), implying rapid transmission on the implicit interest rate. Other countries, such as AT and IE, where the average maturity of government debt is particularly high, seem less exposed to market interest rate shocks, despite similar or higher government debt levels.

Similarly, a permanent shock on nominal GDP growth would have large effects on debt ratios.

The gap between the two extreme standard scenarios (-0.5 / +0.5 pp.) would reach 7 – 8 pps. of GDP in the EU-28 / EA by 2030, with larger effects in highly indebted countries (e.g. IT, PT, ES, BE, FR, the UK and CY; see Table 3.6).

A mild 'fiscal fatigue' scenario⁽³⁴⁾ would increase the debt ratio compared to the baseline scenario by around 2 ½ - 3 pps. of GDP in the EU-28 / EA by 2030 (see Table 3.7). In this case, the negative effect of a looser fiscal position on government debt compared to the baseline scenario would be partly compensated by some positive feedback effects on growth. Larger gaps found in RO, DK, HU, CY and IT are explained by the design of the scenario (the structural primary balance drops by 50% of the forecasted SPB cumulated change). Indeed, in these countries, Commission forecasts show a high variation in the SPB over the period 2019-21 (further fiscal *deconsolidation* in Romania, Cyprus, Denmark and Italy, in the former case from an already loose fiscal position; lower fiscal *consolidation* in Hungary - see Table 3.7).

Additional sensitivity tests

A dual stress test of a +1/-1 pp. shock on short- and long-term interest rates coupled with, respectively, a -0.5/+0.5 pps. shock on nominal GDP growth for the adverse / favourable scenario shows the largest effects on debt ratios in 2030.

When considering such simultaneous changes in economic conditions, the gap between the debt ratios in the two extreme scenarios – adverse combined and favourable combined – would widen to as much as 15 - 16 pps. of GDP in the EU-28 / EA by 2030 (see Graph 3.10).

⁽³⁴⁾ This scenario assumes a negative shock on the SPB equivalent to a fall by half of the SPB cumulated change over the two forecast years (2019-2021).

Table 3.6: Sensitivity tests on the nominal GDP growth rate (+0.5 / -0.5 pp.) around the baseline no-fiscal policy change scenario, by country

	End forecast (2021)			Baseline no-policy change scenario		Standardized (permanent) positive shock (+0.5p.p.) on GDP growth			Standardized (permanent) negative shock (-0.5p.p.) on GDP growth		
	SPB	Actual GDP growth	Debt	Actual GDP growth (average 2021-30)	Debt 2030	Actual GDP growth (average 2021-30)	Debt 2030	Debt (diff. with Baseline scenario)	Actual GDP growth (average 2021-30)	Debt 2030	Debt (diff. with Baseline scenario)
BE	-0.5	1.0	100.0	1.0	97.4	1.5	92.7	-4.7	0.5	102.5	5.0
BG	1.2	2.9	18.6	1.9	9.3	2.4	8.6	-0.7	1.4	10.0	0.8
CZ	0.3	2.1	30.1	2.0	28.3	2.5	27.0	-1.4	1.5	29.8	1.4
DK	0.8	1.6	31.7	1.4	15.4	1.9	14.2	-1.2	0.9	16.7	1.3
DE	1.2	1.0	55.0	1.1	39.8	1.6	37.6	-2.2	0.6	42.2	2.4
EE	-0.4	2.4	8.2	2.7	8.4	3.2	8.1	-0.3	2.2	8.8	0.4
IE	1.3	3.2	52.6	2.5	37.6	3.0	35.6	-2.0	2.0	39.8	2.1
ES	-1.0	1.4	96.0	1.0	95.7	1.5	90.9	-4.7	0.5	100.7	5.0
FR	-1.4	1.2	99.2	1.0	96.8	1.5	92.2	-4.6	0.5	101.8	4.9
HR	1.0	2.4	64.4	1.0	50.4	1.5	47.5	-3.0	0.5	53.6	3.1
IT	0.1	0.7	137.4	0.4	140.2	0.9	132.8	-7.3	-0.1	148.0	7.8
CY	2.2	2.3	81.8	1.6	48.1	2.1	44.8	-3.3	1.1	51.6	3.5
LV	-0.3	2.7	32.9	2.1	29.0	2.6	27.6	-1.4	1.6	30.5	1.5
LT	0.1	2.4	34.8	1.9	29.8	2.4	28.4	-1.4	1.4	31.3	1.5
LU	1.1	2.6	18.6	2.3	7.3	2.8	6.7	-0.6	1.8	7.9	0.6
HU	0.9	2.8	64.4	3.0	41.3	3.5	38.9	-2.5	2.5	44.0	2.6
MT	2.5	3.8	38.7	4.3	9.7	4.8	8.6	-1.1	3.8	10.9	1.2
NL	0.8	1.3	45.6	0.8	32.4	1.3	30.5	-1.9	0.3	34.5	2.0
AT	1.6	1.4	64.6	1.4	43.1	1.9	40.5	-2.6	0.9	45.9	2.8
PL	-0.3	3.3	44.3	3.1	38.3	3.6	36.5	-1.8	2.6	40.2	1.9
PT	2.4	1.7	113.7	0.9	89.2	1.4	83.9	-5.3	0.4	94.8	5.6
RO	-4.6	3.3	40.6	3.2	91.2	3.7	88.4	-2.8	2.7	94.2	3.0
SI	0.7	2.7	59.5	2.5	46.7	3.0	44.3	-2.4	2.0	49.2	2.5
SK	-0.8	2.7	46.9	2.3	44.1	2.8	42.0	-2.1	1.8	46.3	2.2
FI	-0.9	1.0	59.8	1.0	62.1	1.5	59.3	-2.8	0.5	65.1	3.0
SE	1.2	1.4	32.0	2.0	15.4	2.5	14.3	-1.2	1.5	16.7	1.2
UK	-0.2	1.4	84.2	1.6	78.6	2.1	74.7	-4.0	1.1	82.8	4.2
EU-28	0.1	1.4	78.4	1.3	70.0	1.8	66.4	-3.6	0.8	73.8	3.8
EA	0.2	1.2	84.1	1.0	75.0	1.5	71.1	-3.9	0.5	79.1	4.1

Source: Commission services.

Table 3.7: Sensitivity test on the structural primary balance around the baseline no-fiscal policy change scenario (negative shock equivalent to a SPB reduction by 50% of the forecasted SPB cumulated change), by country

	SPB 2019	SPB 2021	SPB change 19- 21	Debt 2021	2030				
					Baseline no-policy change scenario		Standardized negative (permanent) shock on SPB (reduced by 50% of forecasted cumulated SPB change)		
					SPB	Debt	SPB	Debt	Debt (diff. with Baseline scenario)
BE	-0.1	-0.5	-0.4	100.0	-0.5	97.4	-0.7	99.1	1.6
BG	1.5	1.2	-0.3	18.6	1.2	9.3	1.0	10.7	1.5
CZ	0.5	0.3	-0.1	30.1	0.3	28.3	0.2	29.0	0.6
DK	2.9	0.8	-2.1	31.7	0.8	15.4	-0.2	24.8	9.4
DE	2.0	1.2	-0.7	55.0	1.2	39.8	0.9	43.0	3.2
EE	-1.6	-0.4	1.2	8.2	-0.4	8.4	-1.0	13.6	5.2
IE	0.5	1.3	0.7	52.6	1.3	37.6	0.9	40.8	3.1
ES	-0.8	-1.0	-0.2	96.0	-1.0	95.7	-1.1	96.3	0.7
FR	-1.2	-1.4	-0.3	99.2	-1.4	96.8	-1.6	98.1	1.3
HR	1.4	1.0	-0.4	64.4	1.0	50.4	0.8	52.1	1.7
IT	1.3	0.1	-1.2	137.4	0.1	140.2	-0.4	145.8	5.6
CY	4.0	2.2	-1.8	81.8	2.2	48.1	1.4	55.5	7.4
LV	-0.9	-0.3	0.7	32.9	-0.3	29.0	-0.6	32.2	3.2
LT	-0.8	0.1	0.9	34.8	0.1	29.8	-0.4	33.7	3.9
LU	1.9	1.1	-0.8	18.6	1.1	7.3	0.7	10.5	3.2
HU	-0.9	0.9	1.8	64.4	0.9	41.3	0.0	49.4	8.1
MT	1.8	2.5	0.7	38.7	2.5	9.7	2.1	12.5	2.7
NL	1.5	0.8	-0.7	45.6	0.8	32.4	0.4	35.4	3.0
AT	1.5	1.6	0.1	64.6	1.6	43.1	1.5	43.3	0.2
PL	-0.9	-0.3	0.6	44.3	-0.3	38.3	-0.6	40.7	2.4
PT	2.7	2.4	-0.3	113.7	2.4	89.2	2.2	90.5	1.3
RO	-2.3	-4.6	-2.3	40.6	-4.6	91.2	-5.8	102.9	11.6
SI	0.7	0.7	0.0	59.5	0.7	46.7	0.7	46.8	0.1
SK	-0.4	-0.8	-0.4	46.9	-0.8	44.1	-1.0	45.7	1.6
FI	-0.6	-0.9	-0.3	59.8	-0.9	62.1	-1.1	63.4	1.2
SE	0.7	1.2	0.4	32.0	1.2	15.4	0.9	17.3	1.9
UK	-0.2	-0.2	0.0	84.2	-0.2	78.6	-0.2	78.7	0.0
EU-28	0.5	0.1	-0.4	78.4	0.1	70.0	-0.2	72.6	2.6
EA	0.7	0.2	-0.6	84.1	0.2	75.0	-0.1	77.7	2.7

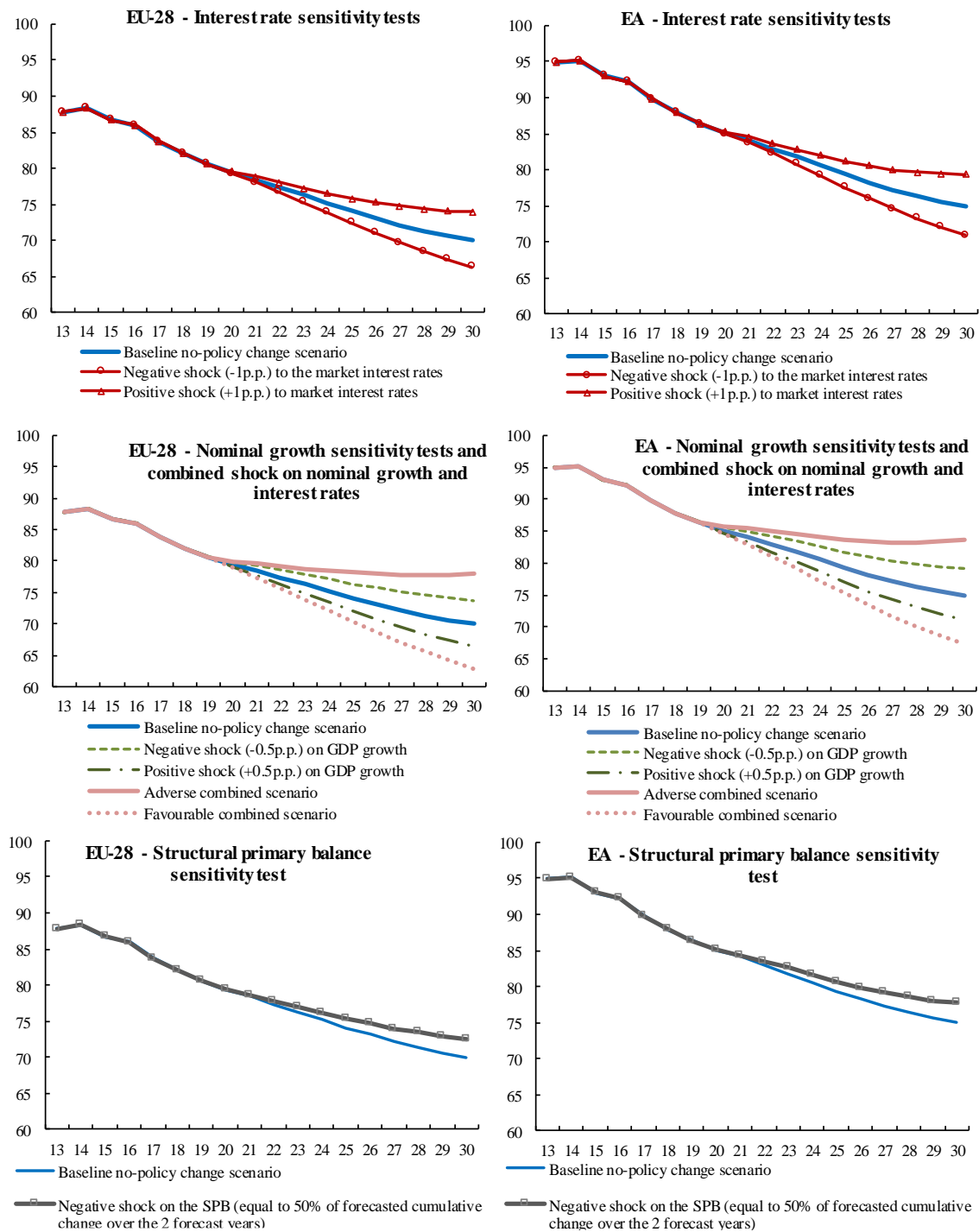
(1) This sensitivity test includes a feedback effect from the fiscal balance to growth.

Source: Commission services.

Several EU sovereigns are also exposed to foreign exchange risks. As several EU countries issue a non-negligible share of their government debt in a foreign currency (see chapter 5), exchange rate fluctuations may cause some fiscal risks in particular in countries with a floating exchange rate regime. Therefore, a sensitivity shock on the nominal exchange rate is also computed, with substantial effects in a number of countries (see country fiches in the Statistical Annex 2 of this report and Box 2.2 of the Debt Sustainability Monitor 2016 for more details).

Finally, enhanced scenarios on interest rates and growth are presented in the country-specific analysis (see the country fiches in the Statistical Annex 2).

Graph 3.10: Sensitivity tests around the baseline scenario on interest rates, nominal GDP growth and the structural primary balance, EU 28 and EA (% of GDP)



Source: Commission services.

Table 3.8: **Gross government debt projections and underlying structural fiscal efforts (% of GDP) under baseline no-fiscal policy change and SGP scenarios, by country**

	End forecast (2021)			Baseline scenario	SGP scenario						
	Structural balance	Structural primary balance	Debt	Debt 2030	Debt 2030	AVG 21-30 SPB (1)	AVG 21-30 SPB percentile rank (1)	AVG 21-30 change in SPB percentile rank (2)	Structural balance 2019	MTO	MTO reached in
BE	-2.2	-0.5	100.0	97.4	78.6	0.9	40%	45%	-2.5	0.0	2024
BG	0.6	1.2	18.6	9.3	8.0	1.0	39%	55%	0.2	-1.0	2020
CZ	-0.4	0.3	30.1	28.3	24.1	0.2	55%	53%	0.8	-0.8	2020
DK	0.2	0.8	31.7	15.4	11.6	1.8	27%	56%	0.6	-0.5	2020
DE	0.5	1.2	55.0	39.8	36.0	1.1	37%	57%	1.0	-0.5	2020
EE	-0.5	-0.4	8.2	8.4	8.9	-0.5	66%	48%	-0.5	-0.5	2021
IE	0.3	1.3	52.6	37.6	38.1	0.3	52%	55%	-2.1	-0.5	2020
ES	-3.0	-1.0	96.0	95.7	77.8	0.9	40%	39%	-3.2	0.0	2026
FR	-2.6	-1.4	99.2	96.8	81.2	0.2	54%	43%	-2.7	-0.4	2024
HR	-0.8	1.0	64.4	50.4	56.4	0.2	54%	58%	-0.6	-1.0	2020
IT	-2.9	0.1	137.4	140.2	113.0	2.8	17%	40%	-1.5	0.5	2025
CY	0.5	2.2	81.8	48.1	53.2	1.9	26%	60%	0.5	0.0	2020
LV	-0.9	-0.3	32.9	29.0	30.4	-0.5	68%	51%	-0.3	-1.0	2021
LT	-0.3	0.1	34.8	29.8	31.6	-0.5	68%	51%	-0.4	-1.0	2020
LU	0.9	1.1	18.6	7.3	6.4	0.9	40%	55%	1.4	0.5	2020
HU	-1.5	0.9	64.4	41.3	44.5	0.8	44%	50%	-2.0	-1.0	2022
MT	1.3	2.5	38.7	9.7	16.6	1.5	31%	56%	0.1	0.0	2020
NL	0.2	0.8	45.6	32.4	34.4	0.5	48%	56%	0.4	-0.5	2020
AT	0.3	1.6	64.6	43.1	47.4	0.8	43%	57%	-1.1	-0.5	2020
PL	-1.5	-0.3	44.3	38.3	33.8	-0.1	60%	49%	-2.1	-1.0	2022
PT	-0.4	2.4	113.7	89.2	87.5	2.2	22%	57%	-1.7	0.0	2021
RO	-5.9	-4.6	40.6	91.2	35.6	-0.3	64%	33%	-1.8	-1.0	2027
SI	-0.7	0.7	59.5	46.7	40.3	0.6	46%	55%	-1.1	-0.3	2022
SK	-1.8	-0.8	46.9	44.1	39.1	-0.2	63%	51%	-2.2	-1.0	2022
FI	-1.6	-0.9	59.8	62.1	49.6	0.0	58%	48%	-0.7	-0.5	2023
SE	0.6	1.2	32.0	15.4	19.4	0.8	43%	53%	0.7	-1.0	2020
UK	-2.3	-0.2	84.2	78.6	66.0	0.9	41%	47%	-3.6	-0.5	2024
EU-28	-1.4	0.1	78.4	70.0	59.3	1.0	40%	49%	-1.3	:	:
EA	-1.2	0.2	84.1	75.0	64.3	1.1	38%	49%	-1.0	:	:

(1) The SGP scenario includes a feedback effect from the fiscal balance to growth.

(2) In a number of countries, debt ratios projected under the SGP scenario are slightly higher than under the baseline. This is mostly the case for countries reaching their MTO during the forecast (2020 or 2021) after which the structural balance is assumed constant until the end of projections. In these cases, debt and interest payment dynamics may result in a higher projected debt path than in the baseline. These cases should not be over-interpreted.

Source: Commission services.

3.1.1.3. The Stability and Growth Pact (SGP) scenario

Under the Stability and Growth Pact scenario, countries are assumed to comply with the main provisions of European fiscal rules. In this scenario, changes in fiscal policy are projected during and beyond the forecast horizon. The scenario assumes strict compliance with respectively i) the main provisions of the preventive arm and ii) EDP (Excessive Deficit Procedure) recommendations for countries under the corrective arm of the SGP⁽³⁵⁾. Under the preventive arm, the structural balance is supposed

to converge to the country's Medium-Term Objective (MTO), following the adjustment path required by the 'matrix of requirements of the preventive arm' as defined in the European Commission 2015 Communication⁽³⁶⁾ and in the 'Commonly agreed position on Flexibility' endorsed by the ECOFIN⁽³⁷⁾⁽³⁸⁾. Moreover, as

⁽³⁶⁾ See at the following link: http://ec.europa.eu/economy_finance/economic_governance/sgp/pdf/2015-01-13_communication_sgp_flexibility_guidelines_en.pdf.

⁽³⁷⁾ The "Commonly agreed position on Flexibility" was endorsed by the ECOFIN Council of 12 February 2016 (Council document number 14345/15, available at <http://data.consilium.europa.eu/doc/document/ST-14345-2015-INIT/en/pdf>).

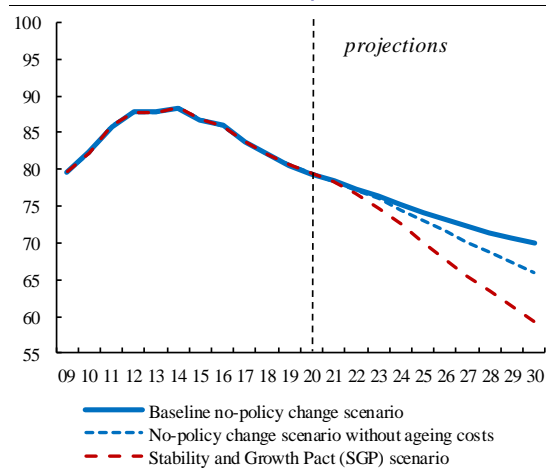
⁽³⁵⁾ Currently, there are no countries in EDP, so SGP scenario projections reflect the preventive arm provisions, in all cases.

⁽³⁸⁾ The SGP scenario does not take into account the possible further granting of flexibility (on top of the one already granted in the context of the European Semester) to temporarily deviate from the MTO or adjustment path

done in previous reports, this scenario is run by taking into account a feedback effect of fiscal consolidation on GDP growth (a 1 pp. of GDP consolidation effort impacting negatively on baseline GDP growth by 0.75 pps. in the same year ⁽³⁹⁾).

Adhering to European fiscal rules would allow gross government debt ratios to drop more than under a no-fiscal policy change assumption. The debt ratio would fall right below 60% of GDP in the EU-28 in 2030 (around 64% of GDP in the EA), a level about 11 pps. of GDP lower than in the baseline scenario (see Graphs 3.11 - 3.12). This substantial debt reduction compared to current levels would be achieved only through a sustained fiscal consolidation, with an average structural primary surplus of 1.0% of GDP in the EU-28 (1.1% of GDP in the EA) during the period 2021-30. This level appears achievable by EU historical standards with some 40% of outturn SPBs being even higher than this value (see Table 3.8).

Graph 3.11: Gross government debt projections (% of GDP), baseline no-fiscal policy change and SGP scenarios, European Union 28

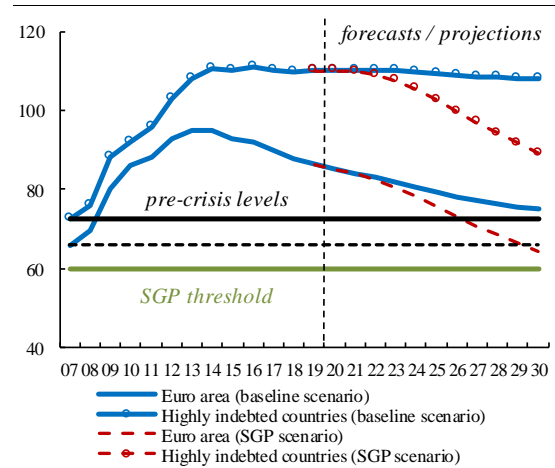


Source: Commission services.

towards it, under the structural reform and / or investment clause. Furthermore, the scenario only mirrors compliance with the adjustment path towards the MTO and does not explicitly incorporate the debt reduction benchmark. Nevertheless, one should keep in mind that in general, though not always, under normal economic circumstances, the convergence to the MTO under the preventive arm tends to ensure compliance with the debt reduction benchmark.

⁽³⁹⁾ See Annex A8 for more details on this scenario.

Graph 3.12: Gross government debt projections (% of GDP), baseline no-fiscal policy change and SGP scenarios, Euro area and highly indebted EA countries *



(1) (*) Highly indebted EA countries were considered to be those with debt ratios above 90% of GDP in 2019, except EL, that is: IT, PT, BE, FR, ES and CY.

Source: Commission services.

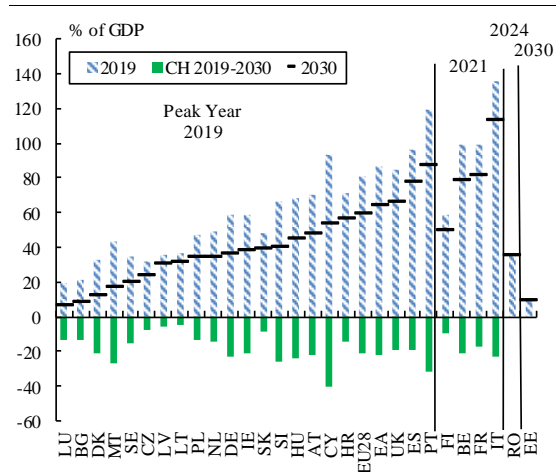
Government debt ratios would decrease in almost all Member States under the SGP scenario, with a strong decline in certain cases. Particularly large reductions are projected in CY, PT, MT and SI (by more than 25 pps. of GDP by 2030). For some countries (IT, FI and RO), the SGP scenario would ensure a reduction of the debt-to-GDP level by 2030, in contrast to what the baseline scenario implies. The smallest decreases are foreseen in Lithuania and Latvia, which already have low levels of government debt in 2019 (see Graph 3.13). More generally, a strong (negative) correlation between the initial level of debt and the required fiscal consolidation under the SGP scenario is observed, as can be expected ⁽⁴⁰⁾.

At the same time, even in this case of strict compliance with SGP rules, government debt in some countries with high debt burdens would still significantly exceed the Treaty reference value of 60% by 2030. Despite the assumed fiscal consolidation and decreasing debt ratios, government debt burdens would still linger at above 60% of GDP on average in the EA in 2030, above or close to 90% of GDP in Italy and Portugal and above 70% of GDP in France,

⁽⁴⁰⁾ The correlation is not perfect, however, since other factors are taken into account when defining the required fiscal adjustment, such as cyclical conditions in the definition of the MTO path or future ageing costs in the calculation of the MTO level.

Belgium and Spain (see Graph 3.13). These still high levels reflect crisis legacies and some negative feedback effects on growth in this scenario⁽⁴¹⁾.

Graph 3.13: **Peak year of gross government debt (% of GDP) over the 2019-2030 projections, Gross government debt projections (% of G,DP) under the SGP scenario, by country**



Source: Commission services.

The sustained fiscal consolidation implied in the SGP scenario would constitute a remarkable departure from historical patterns in a number of countries⁽⁴²⁾. This is particularly the case of Romania, Spain and France, where the fiscal position required under the SGP scenario would be substantially higher than both current policy reflected in the country-specific baseline scenario SPB forecast for 2021 (see Table 3.8) and past policy under the ‘country-specific historical averages’ (see Table 3.4). Additionally, in Italy and Portugal, the required SPB of 2.8% and, respectively, 2.2% of GDP under the SGP scenario are associated to a percentile rank of roughly 20%, that is, a rather ambitious level by EU historical

⁽⁴¹⁾ In a number of countries, debt ratios projected under the SGP scenario are slightly higher than under the baseline. This is mostly the case for countries reaching their MTO during the forecast (2020 or 2021) after which the structural balance is assumed constant until the end of projections. In these cases, debt and interest payment dynamics may result in a higher projected debt path than in the baseline. These cases should not be over-interpreted.

⁽⁴²⁾ Past debt reduction episodes show that key ingredients to successful government debt reduction were large sustained primary surpluses, an improving (external) growth environment, and mobilisation of different policy levers such as accommodative monetary policy and structural reforms (see for details Box 2.3 in the DSM 2017).

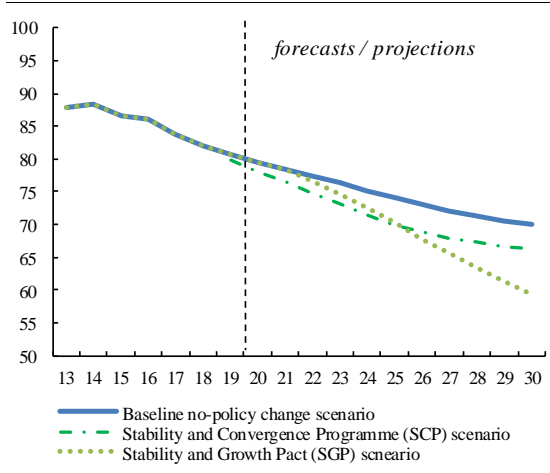
standards. In Portugal, this value is also ambitious by national historical standards. In the UK and Ireland, the lower SPB value of 0.9% and 0.3% of GDP required, respectively, under the SGP scenario, is rather plausible by EU standards (a percentile rank of 41% and 52%, respectively), but appears nevertheless ambitious considering these countries' track-records. The SGP scenario can also be deemed ambitious when it implies substantial fiscal consolidation over time, such as in Romania, Spain and Italy. Such important increases in the 2021-30 SPB can be considered more unlikely, having a low associated percentile rank (see Table 3.8).

3.1.1.4. The Stability and Convergence Programme (SCP) scenario

Debt projections based on Member States' April 2019 round of Stability and Convergence Programmes constitute specific policy scenarios. Economic governance rules under the Stability and Growth Pact require Member States to lay out in the SCPs their fiscal plans for the next *three years*. These programmes are updated once a year and submitted to the Commission and the Council (ECOFIN) in spring. In the SCP scenario, the baseline no-fiscal policy change assumptions apply beyond the programme and plan horizon.

The implementation of Stability and Convergence Programmes would lead to a substantial decline in debt ratios over the next decade, but this outcome would fall short of the results projected under the SGP scenario. According to the SCPs submitted in April 2019 by Member States, and assuming no-fiscal policy change after the programme horizon, the government debt ratio would substantially decline by 2030 in the EU-28 and the EA (by around 14 and 12 pps. of GDP, respectively, see Graphs 3.14 - 3.15). In 2030, the debt ratio would reach around 66% of GDP in the EU-28 (respectively 73% of GDP in the EA), a lower level than under the baseline scenario, by around 4 pps. of GDP (2 pps. of GDP for the EA). On the other hand, the projected government debt ratio in 2030 appears higher than the one projected in the SGP scenario (see section 3.1.1.3). Thus, overall, EU countries' consolidation plans embedded in the SCPs appear more ambitious than their current policies, but still fall short of the results (debt ratios) achievable in case of compliance with the SGP rules.

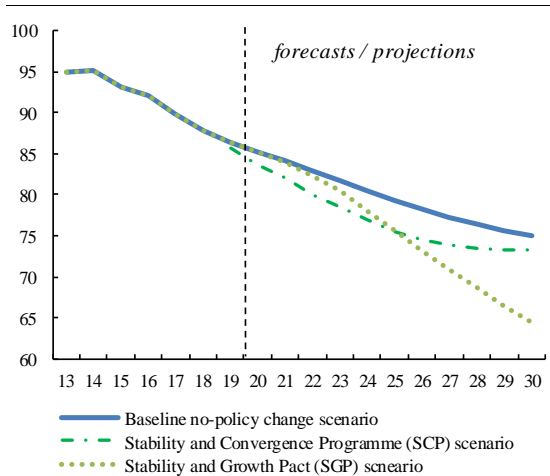
Graph 3.14: **Gross government debt ratio (% of GDP), European Union 28 - baseline no-fiscal policy change, and SCP and SGP scenarios**



(1) The SCP scenario is based, beyond the programme horizon, on Commission Spring 2019 assumptions.

Source: Commission services.

Graph 3.15: **Gross government debt ratio (% of GDP), Euro area - baseline no-fiscal policy change, SCP and SGP scenarios**



(1) The SCP scenario is based, beyond the programme horizon, on Commission Spring 2019 assumptions.

Source: Commission services.

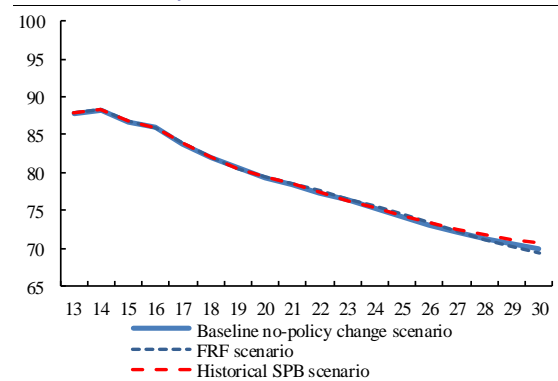
3.1.1.5. Debt projections based on estimated fiscal reaction functions

This section reports simulations based on behavioural fiscal reaction functions. Unprecedented high levels of government debt at both EU and OECD levels since WWII have inspired a rich literature about governments' responsiveness to raising government debt. For instance, Bohn's (1998) seminal paper, revisited by Gosh *et al* (2011), proposed to estimate fiscal

reaction functions (henceforth FRFs) as a prerequisite for assessing fiscal sustainability. This section presents a fiscal reaction function scenario as an alternative scenario to the standard baseline no-fiscal policy change scenario. Under this FRF scenario, fiscal policy is supposed to react, over the projection period, to the debt ratio in the previous period and to macroeconomic conditions (i.e. output gap, real interest rate, inflation) ⁽⁴³⁾.

Debt projections based on behavioural fiscal reaction functions are broadly in line with the baseline scenario and the 'mechanical' historical SPB scenario. Taking into account government primary balance reaction to changes in government debt (and macroeconomic conditions) would lead to similar levels of government debt ratio for EU-28 in 2030, compared to the baseline and historical SPB scenarios. At EA level, the gap between the FRF scenario and the historical SPB scenario would be also negligible in 2030, while the FRF scenario debt level would be some 3 pps of GDP lower than the baseline in 2030 (see Graphs 3.16 - 3.17). Indeed, the projected SPB under the FRF scenario would be very close to those assumed under the historical SPB scenario over the period 2022-2030.

Graph 3.16: **Gross government debt ratio (% of GDP), fiscal reaction function scenario compared to the baseline and historical SPB scenarios, European Union 28**



This scenario includes a feedback effect from the fiscal balance to growth.

Source: Commission services.

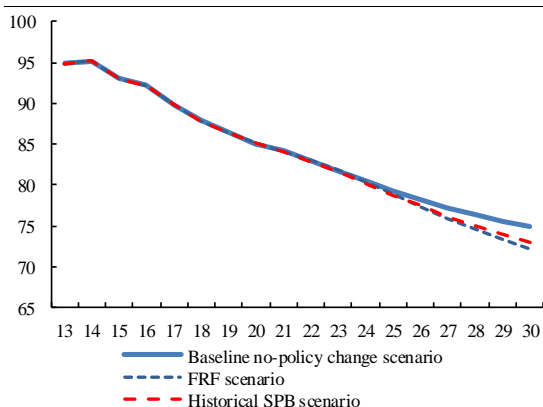
⁽⁴³⁾ For the behavioural equations and additional information on this scenario. See the FSR 2015 and Berti *et al.* (2016).

Table 3.9: Comparison of the Debt Sustainability Monitor (DSM) 2019 with the Fiscal Sustainability Report (FSR) 2018 (each based on the respective Autumn forecasts), baseline and SGP scenarios (all variables in differences between DSM 2019 - FSR 2018)

	End forecast (t+2)			Baseline scenario Debt			SGP scenario					
	Structural balance	Structural primary balance	Debt	t+3	t+5	End projection	Debt end projection	AVG projection period SPB	AVG SPB percentile rank	Structural balance last outturn year	MTO	MTO reached in
BE	-0.5	-0.9	1.3	1.8	1.8	-2.4	3.1	-1.2	17%	-0.2	0.0	1
BG	0.3	0.3	-0.9	-1.2	-1.6	-3.1	-2.2	0.1	-3%	-0.1	0.0	0
CZ	-0.6	-0.7	-1.1	-0.3	0.7	2.6	4.1	-0.8	15%	-0.1	0.3	0
DK	-0.7	-0.9	1.1	1.6	2.5	4.6	-4.3	0.2	-3%	0.4	0.0	0
DE	-0.6	-0.7	1.3	2.2	3.0	2.5	3.3	-0.8	12%	0.2	0.0	0
EE	0.4	0.4	0.7	1.0	0.6	-1.1	0.9	-0.1	0%	0.3	0.0	0
IE	0.6	0.3	-3.4	-3.6	-4.3	-9.1	-2.8	-0.5	9%	-1.1	0.0	0
ES	0.1	0.0	0.6	0.3	-1.3	-11.6	1.1	-1.0	16%	0.1	0.0	1
FR	-0.4	-1.1	2.0	2.5	2.4	-2.9	2.2	-1.4	24%	0.0	0.0	0
HR	0.3	-0.1	-3.8	-4.5	-6.2	-13.8	-1.5	-1.3	24%	0.1	0.8	0
IT	0.6	-0.3	6.3	6.3	4.2	-6.3	1.9	-0.8	5%	0.0	0.5	0
CY	-0.2	-0.7	-9.3	-9.5	-10.8	-13.8	-6.2	-1.4	12%	-0.8	0.0	0
LV	0.3	0.2	-2.8	-2.7	-3.1	-5.9	-1.6	-0.4	6%	-0.3	0.0	-1
LT	0.1	-0.2	-2.8	-2.5	-2.5	-3.5	1.2	-0.8	15%	0.0	0.0	0
LU	0.1	0.0	-2.0	-2.3	-2.3	-1.6	1.0	-0.4	6%	-0.1	1.0	0
HU	1.5	1.5	-4.2	-6.2	-11.6	-27.4	-13.2	0.0	0%	-0.2	0.5	-1
MT	0.4	0.3	-3.3	-4.0	-5.3	-8.0	-2.3	-0.4	6%	-0.2	0.0	0
NL	0.3	0.2	-1.3	-0.9	-1.7	-5.8	-2.9	-0.1	1%	-0.1	0.0	0
AT	0.5	0.3	-3.2	-3.3	-4.1	-8.1	-5.2	-0.2	4%	0.0	0.0	0
PL	0.3	0.1	-3.2	-3.5	-4.6	-9.8	-3.8	-0.5	10%	-0.2	0.0	0
PT	0.6	0.1	-3.1	-4.1	-6.6	-17.5	-2.9	-1.4	10%	0.4	-0.3	-1
RO	-1.4	-1.6	2.4	5.4	11.6	29.6	3.0	-0.4	6%	0.4	0.0	2
SI	0.3	0.1	-3.2	-3.1	-3.3	-6.9	2.2	-0.9	16%	0.0	-0.5	0
SK	-1.2	-1.2	2.7	4.2	6.8	12.1	7.1	-0.7	14%	-0.1	-0.5	1
FI	-1.0	-1.1	2.3	3.7	5.3	7.0	2.0	-0.4	8%	-0.2	0.0	2
SE	-0.4	-0.2	-1.4	-0.9	-0.5	-0.1	2.6	-0.4	8%	-0.1	0.0	0
UK	-1.2	-1.4	1.6	2.7	4.2	4.7	-0.6	-0.7	11%	-0.2	0.3	3
EU-28	-0.3	-0.6	0.9	1.4	1.4	-1.9	0.5	-0.8	13%	0.0	:	:
EA	-0.1	-0.5	1.3	1.7	1.5	-3.2	1.5	-0.9	14%	0.1	:	:

Source: Commission services.

Graph 3.17: Gross government debt ratio (% of GDP), fiscal reaction function scenario compared to the baseline and historical SPB scenarios, Euro area



This scenario includes a feedback effect from the fiscal balance to growth.

Source: Commission services.

3.1.1.6. Baseline and the SGP scenarios' results comparison with the FSR 2018

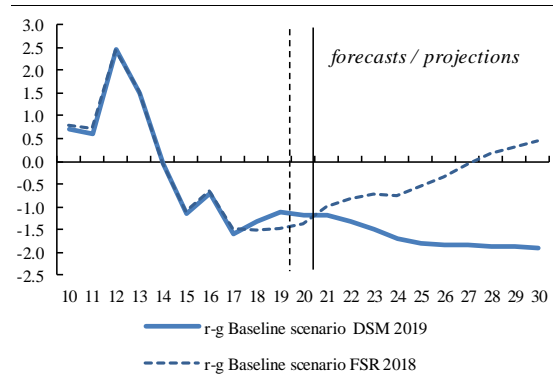
This round of projections shows a less favourable fiscal outlook in the short term compared to the Fiscal Sustainability Report (FSR) 2018. The structural primary balance at the end of the forecast period appears overall lower with this Autumn 2019 Commission forecast compared to the previous round (difference of -0.6 pp. and -0.5 pp. of GDP at the EU-28 and EA level, respectively, see Table 3.9). Such worsened fiscal position (expected in 14 countries) would be particularly important in RO, the UK, SK, FI, FR, DK, BE, CY, CZ, DE and IT (between -1.6 and -0.3 pps. of GDP difference). On the other hand, HU, EE, MT, AT, BG and IE are expected to have more favourable fiscal positions compared to Autumn 2018 forecast (+1.5 to 0.3 pps. of GDP). End-forecast government debt ratios are expected to be higher in IT, SK, RO, FI, FR, the UK, DE, BE, DK, EE and ES compared to the FSR 2018, in some cases by as much as 6 pps. of GDP, while in

the remaining EU-28 countries it would be lower. Overall, the 2021 debt aggregates are higher by some 1 pp of GDP for both the EU-28 and the EA compared to the FSR 2018. The less favourable aggregate fiscal outlook reflects the more challenging economic growth conditions expected now for the next two years, as opposed to one year ago.

End-projection debt ratios are expected to be lower in the baseline scenario, but higher in the SGP scenario, compared to one year ago.

Despite the less favourable short-term environment, in the baseline scenario, government debt ratios are expected to reach lower levels by the end of the projection period compared to the trends foreseen in the FSR 2018 (a difference of around -2.0 pps. and -3.0 pps of GDP at the EU-28 and EA level, respectively). This more favourable medium-term outlook is driven by the revision of the interest rate assumption, leading to a debt-reducing effect of the interest – growth rate differential throughout the projection period (see Graph 3.18). A few notable exceptions exist, namely RO, SK, FI, the UK, DK, CZ and DE, where end-of-projections debt ratios are higher than predicted in the FSR 2018, by values between 29.6 and 2.5 pps of GDP. These results are explained by the (strong) downward revision of the SPB, as well as for RO by the revision of ageing costs’ projections. Under the SGP scenario, government debt ratios are expected to reach higher values in most countries compared to the FSR 2018 (by +0.5 pp. of GDP on average in the EU-28 and +1.5 pps. of GDP in the EA) (see Table 3.9). In this case, the revision mainly reflects worse projections of the overall structural primary balance in this scenario (by nearly 1 pp. of GDP in both the EU-28 and the EA) versus the FSR 2018.

Graph 3.18: **EU-28 Interest rate - growth rate differentials (%)**, under the baseline scenario in the DSM 2019 and FSR 2018 (based on the implicit interest rate)



Source: Commission services.

3.1.2. Stochastic debt projections

Stochastic projections complement the deterministic government debt projections to highlight potential risks for the debt dynamics stemming from the uncertainty surrounding the macroeconomic and fiscal projections. Stochastic projections produce a distribution of debt paths, corresponding to a wide set of possible underlying macroeconomic conditions, obtained by applying shocks to the macroeconomic and fiscal variables (government primary balance, interest rates, economic growth and exchange rate)⁽⁴⁴⁾ of the baseline (i.e. the deterministic non-fiscal policy change scenario). Hence, stochastic projections capture in a more comprehensive way than standard deterministic projections the uncertainty surrounding the macroeconomic projections. The advantages of this approach are three-fold: i) running a very large number of sensitivity tests; ii) calibrating the shocks to past-observed country-specific volatility; iii) capturing the country-specific correlation between the different variables⁽⁴⁵⁾.

Results presented in the form of fan charts allow assessing the probability of reaching the minimum and maximum levels of government debt ratios under a large range of macroeconomic shocks. Stochastic projection results are generally presented in the form of fan

⁽⁴⁴⁾ Shocks to the exchange rate are simulated only for non-EA countries, for which the share of public debt denominated in foreign currency can be significant.

⁽⁴⁵⁾ See Berti (2013) and Annex 7 for more details on the methodology used.

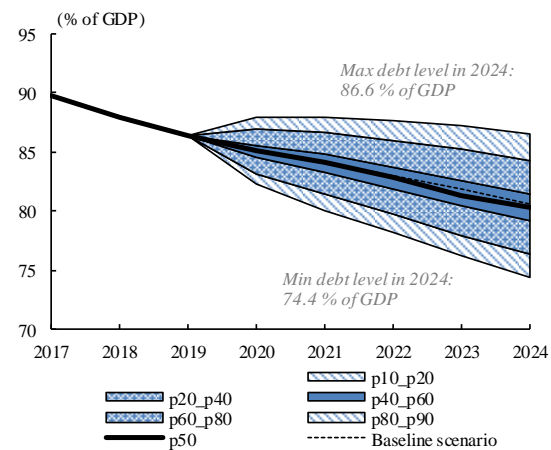
charts, featuring the cone of the debt-to-GDP ratio distribution over the 5-year projection horizon. In the fan charts, the projected debt path under the baseline (around which shocks apply) and the median of the debt ratio distribution are reported respectively (as a dashed and a solid black line at the centre of the cone) (see Graphs 3.19 and 3.20). The cone covers 80% of all possible debt paths obtained by simulating 2000 shocks to primary balance, nominal growth, interest rates and exchange rate (the lower and upper lines delimiting the cone represent respectively the 10th and the 90th distribution percentiles), thus excluding from the shaded area simulated debt paths (20% of the whole) that result from more extreme shocks, or “tail events”. The differently shaded areas within the cone represent different portions of the distribution of possible debt paths. The dark blue area (delimited by the 40th and the 60th percentiles) includes the 20% of all possible debt paths that are closer to the baseline.

In this update of the DSM, both symmetric and asymmetric fan charts are presented. In symmetric fan charts, upside and downside risks are treated as equally likely, while in the asymmetric ones, a higher likelihood is assumed for negative primary balances. More specifically, the asymmetric fan charts are produced by restricting the distribution of the upside shocks to the primary balance to one half standard deviation⁽⁴⁶⁾. This maximum positive shock to the primary balances aims at better capturing the risk associated with an environment of lower primary balances, given the relatively high primary balance of several countries under the baseline.

When considering symmetric shocks around the baseline, the government debt ratio in the EA remains on a declining path with high probability over the next 5 years. From 86.4% of GDP in 2019, the EA debt ratio is projected to lie between 74.4% and 86.6% of GDP in 2024 with an 80% probability (see Graph 3.19). In terms of debt dynamics, the probability that the EA debt ratio would rise in 2020 is about 30%, however, it is expected to decline afterwards with an 80% probability. Therefore, the probability that the EA

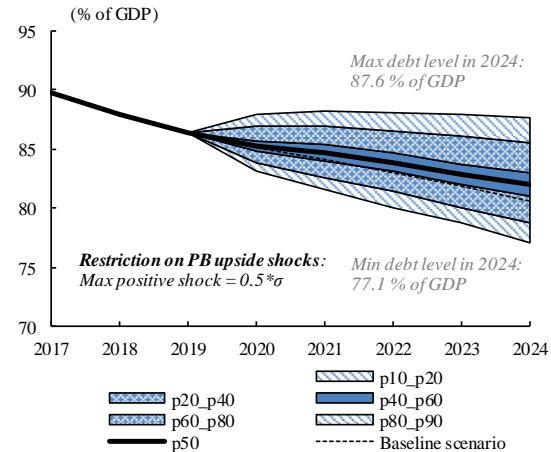
government debt ratio would be higher in 2024 than its current level is small (around 11%).

Graph 3.19: **Gross public debt (% of GDP) from symmetric stochastic projections (2019 - 24), Euro area**



Source: Commission services.

Graph 3.20: **Gross public debt (% of GDP) from asymmetric stochastic projections (2019 - 24), Euro area**



Source: Commission services.

When increasing the likelihood of more adverse shocks to the primary balance, the government debt ratio in the EA would remain on a declining path with high probability over the next 5 years. The debt ratio would be ranging from 77.1% to 87.6% of GDP in 2024 with an 80% probability (see Graph 3.20). The probability that the EA government debt ratio would be higher in 2024 than its current level would slightly increase, but remain rather small (around 15%). In both symmetric and asymmetric stochastic projections, the relatively low probability of higher EA

⁽⁴⁶⁾ The restriction imposed on the distribution of primary balance upside shocks is a one half standard deviation of the primary balance sample. As a result, the cone of the fan chart shifts asymmetrically upwards compared to the symmetric fan charts.

Table 3.10: Stochastic debt projections results by Member State (% of GDP)

Country	Debt ratio in 2019	Median debt ratio in 2024	10th percentile of debt ratio distribution in 2024	90th percentile of debt ratio distribution in 2024	Diff. btw. percentiles 90th and 10th of debt ratio distribution in 2024	Probability of debt ratio in 2024 greater than in 2019, symmetric (%)	Probability of debt ratio in 2024 greater than in 2019, asymmetric (%)
BE	99.5	97.9	84.9	112.2	27.2	45	69
BG	21.1	16.3	1.8	31.4	29.6	29	33
CZ	31.5	28.1	16.2	39.8	23.6	36	64
DK	33.0	26.8	19.2	34.5	15.3	15	25
DE	59.2	49.2	41.9	57.1	15.2	5	8
EE	8.7	8.3	6.9	10.2	3.3	37	37
IE	59.0	44.9	34.5	57.4	22.9	8	10
ES	96.7	96.9	86.9	107.8	20.9	51	71
FR	98.9	99.0	92.6	106.1	13.5	51	68
HR	71.2	61.5	45.3	83.1	37.7	26	26
IT	136.2	139.0	126.9	152.1	25.2	60	81
CY	93.8	71.2	53.1	91.3	38.2	7	12
LV	36.0	31.2	19.2	46.1	26.9	34	50
LT	36.3	31.9	21.1	47.2	26.1	33	45
LU	19.6	13.9	7.9	20.6	12.7	14	21
HU	68.2	56.8	38.5	75.4	36.9	22	36
MT	43.3	27.5	17.9	38.2	20.3	3	4
NL	48.9	41.4	34.4	49.2	14.8	11	15
AT	69.9	56.2	44.8	69.7	24.9	10	15
PL	47.4	41.8	33.8	50.1	16.3	19	32
PT	119.5	104.7	87.6	124.3	36.7	18	28
RO	35.5	56.8	40.5	75.6	35.0	96	100
SI	66.7	52.5	41.8	64.0	22.2	6	9
SK	48.1	46.0	33.4	60.7	27.3	42	67
FI	59.2	61.2	52.2	71.1	18.9	60	81
SE	34.6	27.2	21.3	32.7	11.4	5	8
UK	85.2	83.0	73.9	92.5	18.5	37	54
EA-19	86.4	80.3	74.4	86.6	12.2	11	15

(1) In the case of Estonia, due to the data limitations on historical primary balances, the asymmetric stochastic debt projections are in fact equivalent to the symmetric stochastic debt projections.

Source: Commission services.

government debt in 2024 than its current level reflects a probability of a debt decrease of more than 85% over the next five years in several countries, such as e.g. Germany, the Netherlands, and Austria. In the asymmetric shocks scenario, some of the highly indebted countries such as Belgium, France, Italy and Spain, have a lower probability of debt decrease, at around 20% to 30%, while others such as Portugal remain at more than 70%.

Cross-country differences in terms of width of the cone of the distribution reflect underlying heterogeneity of Member States business cycles.

In countries such as Sweden, France, the Netherlands and Germany, the distance between the upper and the lower tails of the debt ratio distribution is relatively limited (a difference

below 16 pps. of GDP). For instance, in Sweden, the debt ratio is projected to lie between 21.3% and 32.7% of GDP with an 80% probability. On the other hand, in countries such as CY, PT, HR, HU and RO, a higher historical volatility of macro-financial and fiscal conditions lead to much wider debt distribution cones (of around 35 to 38 pps. of GDP). This clearly points to higher uncertainty surrounding baseline projections for this latter group of countries, but also to some extent the fact that their historical past includes an episode of prolonged high volatility of macroeconomic conditions during the global financial crisis (see Table 3.10).

While the probability of a continuing rise of EA government debt over the next 5 years is limited, some countries are nevertheless more

likely to experience upward trends. Relatively high probabilities of increasing debt are in particular estimated in some medium to high debt countries in both symmetric and asymmetric debt projections such as France (51% and 68%), Spain (51% and 71%), Italy (60% and 81%), Belgium (45% and 69%), Finland (60% and 81%) and Romania (96% and 100%) (see Table 3.10). The result for Romania is explained by the particularly fast-increasing debt path under the baseline.

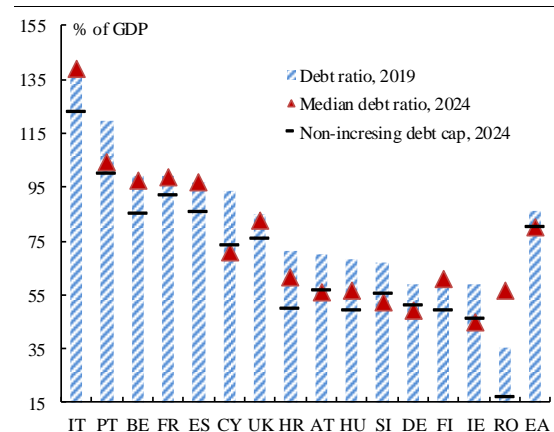
Stochastic debt projections can also be used to derive 'non-increasing debt caps'. Non-increasing debt caps are defined as the median level of public debt to target in 2024 to ensure that, even in the case of adverse shocks, public debt ratios will not increase relative to their current values with a 90% probability (see FSR 2015 and DSM 2017 for more details). These values may provide useful insights compared to conventional uniform targets used in fiscal rules, by taking into account country-specific economic features. In other words, countries, characterised by large uncertainties, such as the Baltics or Ireland, may need to target lower debt levels, than more stable economies.

Non-increasing debt caps largely differ between Member States depending on current debt levels, and country-specific economic volatility. The EA non-increasing debt cap is estimated at around 80% of GDP, with values ranging from 46.5% of GDP in Ireland to 123% of GDP in Italy among EA countries (see Graph 3.21). An illustration of the impact of uncertainties on non-increasing debt caps can be given by Austria and Croatia: despite similar debt levels in 2019 (around 70% of GDP), Austria could target a higher median debt value in 2024 (around 55% of GDP) than Croatia (that would need to target a value of about 50% of GDP), given the larger economic volatility in the latter.

For the vast majority of countries under examination, the debt ratio that is projected to be reached in 2024 under a no-fiscal policy change assumption would not be sufficient to contain debt trajectories in case of adverse shocks. Indeed, with the exception of Austria, Cyprus, Germany, Ireland and Slovenia, the median debt ratio projected in 2024 is above non-increasing debt caps. Therefore, pursuing current policies would not ensure that countries would be

immune to continuing debt increases (with a 90% probability) in case of negative shocks. This is particularly true for Romania, where despite a level of debt of 35.5% of GDP in 2019, the median debt ratio projected for 2024 is close to 60%, significantly higher than its non-increasing debt cap level (15% of GDP).

Graph 3.21: **Non-increasing debt caps and median debt ratio in 2024 in selected Member States**



Source: Commission services.

3.2. MEDIUM-TERM FINANCING NEEDS

As explained in Section 2.2, gross financing needs (GFN) are a measure able to serve a variety of fiscal analysis purposes, being also quantifiable from diverse sources and methods.

For the purposes of medium-term analysis, this section examines 'overall' financing needs, which differ from short-term GFN shown under S0 in three main ways. First, medium-term GFN include a broader range of government balance sheet instruments (see Table 2.4 in Section 2.2.) Second, while short-term GFN are mainly outturn data, medium-term GFN represent projections closely linked to the Commission's debt projection model, to which they are linked. Third, short-term financing needs are based on non-consolidated data, while the medium-term GFN use consolidated figures.

Medium-term GFN projections capture the maturity of government debt and thereby provide key complementary information on liquidity-related vulnerabilities. If the debt to GDP ratio remains a crucial metric to assess fiscal

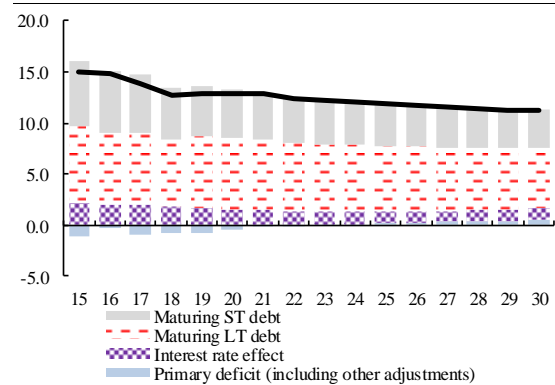
sustainability, the current environment of low interest rates and the extension of debt maturities call for a careful account of gross financing needs⁽⁴⁷⁾. Gross financing needs, calculated here as the sum of the budgetary deficit, debt amortisations and other flows⁽⁴⁸⁾, provide a measure of a government’s liquidity, or its facility to face upcoming financial obligations. Hence, the projected dynamics of gross financing needs usefully measures the extent to which governments might need to tap financial markets over the current and the coming years, thus enabling an assessment of rollover risks⁽⁴⁹⁾.

Based on the aforementioned medium-term definition, government gross financing needs are overall contained in the EU compared with the onset of the crisis. Medium-term gross financing needs are estimated at around 13% of GDP in 2019 at the EU-28 aggregate level (around 14% of GDP for the EA), down from around 20% of GDP in 2012 (respectively 23% of GDP). Important cross-country differences reflect the heterogeneity in terms of government debt stock, maturity structure, financing conditions and government primary balance (see Table 3.11).

GFN are foreseen to fall marginally in the EU over the next 10 years, with some Member States nevertheless projected to see their gross financing needs rising. Over the next 10 years, government gross financing needs are estimated to shrink slightly compared to their 2019 levels (by 1.6 pps. of GDP at the EU-28 level and 1.5 pps. of GDP in the EA). GFN reductions are expected in 19 countries, with the largest decreases projected in HU, CY, SE, MT, DK, AT and HR (by at least 4 pps. of GDP). However, some Member States should experience an increase in their borrowing requirements by 2030, the most sizeable one being RO (13 pps. of GDP), followed by IT (some 3 pps. of GDP). These trends are largely driven by the

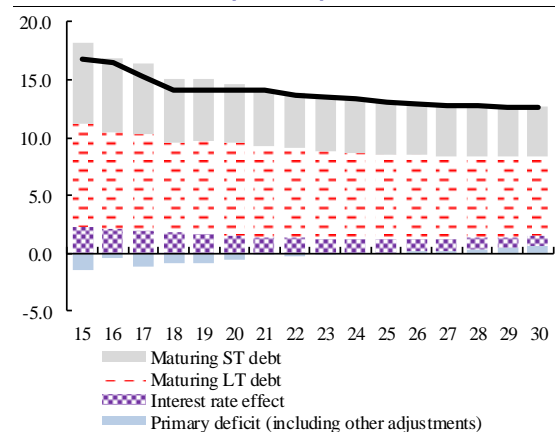
projected dynamics of the primary balance (in line with often increasing ageing costs), while the interest bill would remain contained, given the favourable financial conditions assumed over the projection period (see Graphs 3.22 and 3.23). In 2030, medium-term GFN values would remain below their 2012 peak in all countries except Romania.

Graph 3.22: **Government GFN projections breakdown, baseline no-fiscal policy change scenario, European Union 28 (% of GDP)**



Source: Commission services.

Graph 3.23: **Government GFN projections breakdown, baseline no-fiscal policy change scenario, Euro area (% of GDP)**



Source: Commission services.

⁽⁴⁷⁾ The indicator is also used by other institutions such as the IMF, the ECB and the ESM.

⁽⁴⁸⁾ Debt amortisations include both securities and loans, but not 'currency and deposits'- see also Section 2.2 Table 2.4 for the definition of medium-term government GFN. Other flows (i.e. stock-flow adjustments – SFA) include debt reducing / increasing items such as privatization revenues and valorisation effects.

⁽⁴⁹⁾ Medium-term GFN projections have been introduced with the DSM 2016. Outturn values for this variable have been used in the S0 indicator since 2012 (see chapter 2). More details on the calculations can be found in the DSM 2016.

Table 3.11: **Medium-term government gross financing needs (% of GDP) in the baseline no-fiscal policy change scenario, by country**

	2012	2019	2020	2021	2030	Average 2019-30
BE	26.3	16.6	17.4	17.8	17.7	17.3
BG	3.0	1.8	1.1	1.0	0.3	0.6
CZ	11.5	5.9	5.7	5.5	5.1	5.2
DK	8.0	5.7	4.5	4.7	0.4	2.9
DE	23.1	10.2	10.0	9.9	7.0	8.4
IE	18.8	6.4	6.3	8.3	3.8	5.2
ES	28.8	17.5	17.8	17.2	17.8	17.7
FR	21.9	18.2	17.7	18.0	17.7	17.8
HR	15.5	12.5	11.8	11.3	8.2	10.4
IT	27.5	21.2	21.5	22.1	23.9	22.6
CY	26.9	13.7	5.4	5.2	6.3	7.1
LV	3.9	4.8	4.2	2.8	3.8	3.7
LT	10.7	6.1	2.7	3.3	4.0	3.3
LU	4.7	0.5	5.5	1.0	0.2	0.4
HU	14.0	20.1	19.2	17.9	10.8	15.0
MT	9.8	5.5	4.9	4.4	-0.9	1.6
NL	20.4	7.0	7.4	7.1	4.3	5.8
AT	9.3	7.7	7.8	7.1	3.2	5.2
PL	8.9	5.9	5.2	5.7	5.1	5.3
PT	28.0	13.0	13.0	12.2	10.9	12.2
RO	12.9	8.1	8.9	10.8	21.1	15.0
SI	10.3	7.6	7.1	6.5	7.5	7.0
SK	13.9	3.5	3.8	4.2	3.9	3.9
FI	13.5	9.2	9.2	9.7	9.7	9.5
SE	10.1	6.3	6.2	5.8	-0.1	3.3
UK	12.5	11.6	11.8	11.5	10.2	11.0
EU-28	19.6	12.9	12.8	12.8	11.3	12.0
EA	22.6	14.2	14.1	14.1	12.6	13.3

(1) Medium-term government GFN are calculated as the sum of the government budgetary deficit (+) / surplus (-), debt amortizations and other debt decreasing / increasing flows (stock-flow adjustments – SFA) - see also Section 2.2 Table 2.4 for the definition of medium-term government GFN. Debt amortizations cover both debt securities and all types of loans, but not currency and deposits. The data sources used are Eurostat for the share of short-term and long-term public debt and the ECB (Centralised Securities Database) for the share of outstanding debt securities maturing within the year. For post-programme surveillance countries, official loans' repayments are taken into account. Discrepancies may appear with other institutions' estimations (e.g. ECB, IMF) due to differences in the scope and sources used. Forecasts and projections are based on the assumptions of the baseline no-fiscal policy change scenario. More information on these calculations can be found in the DSM 2016.

Source: Eurostat, ECB, Commission services.

3.3. MEDIUM-TERM FISCAL SUSTAINABILITY INDICATOR: THE S1 INDICATOR

Sustainability gap indicators measure the budgetary adjustment that would ensure sustainable public finances. Medium-term sustainability is captured by the S1 indicator. The latter measures the additional adjustment effort required, in terms of a cumulated gradual improvement in the structural primary balance over five years (starting from the year after the last forecast year, i.e. starting from 2022) ⁽⁵⁰⁾, to reach

a specific public debt-to-GDP ratio in fifteen years' time from now (currently 2034), including paying for any future additional expenditure (until the target date) arising from an ageing population. The debt target is set at 60% of GDP in the standard definition of the indicator, the Treaty reference threshold, or, alternatively, at the pre-crisis debt ratio or the end-of-forecast debt ratio. The timescale of the indicator has been chosen to be sufficiently long to allow the impact of ageing to be analysed in a meaningful way, while still remaining subject to influence from decisions by current taxpayers and policy makers.

⁽⁵⁰⁾ After 2026, the structural primary balance remains constant at its 2026 value, which incorporates the additional consolidation efforts made up to that year. This means that

no consolidation (or deconsolidation) is assumed to take place after 2026.

3.3.1. Results of the medium-term sustainability indicator

The S1 indicator captures medium-term fiscal sustainability risks linked to the capacity of the government to meet the SGP target debt ratio of 60% of GDP over the next 15 years, under the baseline assumptions. Under the baseline of no-fiscal policy change, Table 3.12 shows the updated results for S1 under the target debt ratio of 60% of GDP (in 2034). It also reports the indicator decomposition into: i) the gap to the debt-stabilising primary balance, which shows the additional required adjustment in the primary balance to stabilise debt at its current level; ii) the cost of delay, which shows the additional required adjustment due to the gradual improvement in the primary balance compared to an immediate adjustment; iii) the debt requirement to reach the 60% target debt; and, iv) the required adjustment to cover the ageing costs until 2034.

EU and EA aggregates

An improvement in the EU structural primary balance is necessary to achieve a government debt ratio of 60% of GDP by 2034. As shown in Table 3.12, the required improvement for the EU and the EA to achieve the debt-to-GDP ratio target of 60% by 2034 amounts, respectively, to a cumulative effort of 0.9 and 1.4 pps. of GDP over the period 2022-2026, i.e. an average budgetary consolidation effort of around 0.2 and 0.3 percentage points per year, respectively. In other words, the average structural primary balance for the EU would have to improve from a projected surplus of 0.1% of GDP in 2021 to 1.0% in 2026, while for the EA the structural primary balance would have to improve from a surplus of 0.2% of GDP in 2021 to 1.6% in 2026.

For the EU-28 and the EA, the main drivers pushing up the S1 sustainability gap indicator are the debt requirement component and the cost of ageing. The additional adjustment needed to meet the debt target of 60% of GDP by 2034 accounts for the largest positive component of S1 indicator in both the EU and the EA, respectively 1.3 and 1.8 pps. of GDP. The cost of ageing component accounts for 0.7 pps. of GDP of the S1 sustainability gap in the EU, and 0.8 pps. of GDP in the EA, respectively. On the other hand, the initial budgetary position overall contributes at

reducing the medium-term fiscal gap (by more than 1 pps. of GDP).

Stabilising debt at its current level, rather than bringing it to the 60% of GDP target, would be feasible even in absence of fiscal consolidation.

The estimated fiscal gap to stabilising the debt ratio at its current level can be derived by removing the debt requirement component from the level of the S1 indicator. For the EU and the EA, this would imply an S1 level of -0.4 pps. of GDP, which indicates that it is feasible to stabilise the debt ratios at current levels even in absence of fiscal consolidation, as the observed negative interest rate – growth differential in some countries would offset the adverse effect of the former on the debt trajectory. However, area aggregates hide important differences across Member States, as discussed in the following sub-section below.

Table 3.12: The medium-term sustainability indicator (S1) and its components, pps. of GDP

	S1	Due to			
		Initial Budgetary position		Debt requirement	Ageing costs
		Gap to the debt-stabilising primary balance	Cost of delaying adjustment		
BE	4.1	-1.1	0.6	3.4	1.1
BG	-5.4	-1.6	-0.7	-3.6	0.5
CZ	-2.9	-0.9	-0.4	-2.5	0.9
DK	-5.6	-2.3	-0.7	-2.6	0.0
DE	-2.4	-2.9	-0.3	-0.4	1.2
EE	-5.3	0.1	-0.7	-4.8	0.0
IE	-2.6	-2.9	-0.3	-0.7	1.3
ES	3.8	0.0	0.6	3.0	0.3
FR	3.9	-0.4	0.5	3.4	0.4
HR	-2.0	-1.9	-0.3	0.4	-0.2
IT	8.8	0.8	1.4	5.8	0.8
CY	-2.4	-3.7	-0.3	1.8	-0.2
LV	-3.3	-0.7	-0.4	-2.5	0.3
LT	-2.7	-0.9	-0.4	-2.1	0.7
LU	-5.7	-2.1	-0.7	-3.9	1.1
HU	-2.7	-2.5	-0.4	0.4	-0.2
MT	-6.4	-4.0	-0.8	-2.0	0.3
NL	-3.2	-1.9	-0.4	-1.3	0.4
AT	-2.3	-3.3	-0.3	0.4	0.8
PL	-2.2	-0.9	-0.3	-1.4	0.3
PT	2.3	-2.9	0.3	4.3	0.5
RO	5.7	4.5	0.9	-1.5	1.8
SI	-1.0	-2.3	-0.1	0.0	1.4
SK	-1.8	-0.5	-0.2	-1.2	0.1
FI	0.5	-0.8	0.1	0.0	1.3
SE	-5.4	-2.4	-0.7	-2.6	0.3
UK	1.9	-1.2	0.3	2.1	0.8
EU-28	0.9	-1.3	0.2	1.3	0.7
EA	1.4	-1.4	0.2	1.8	0.8

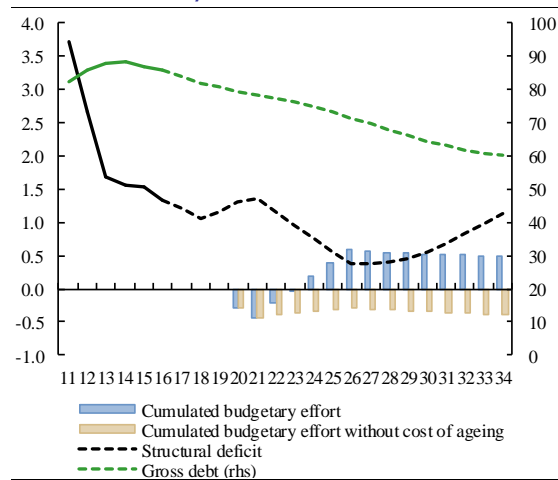
Source: Commission services.

For the EU as a whole, an additional fiscal effort is required to offset the effect of the rising cost of ageing on medium-term sustainability.

The consolidation to the structural primary balance implied by the S1 indicator in the EU is also shown in Graph 3.24, together with the resulting path of debt and the structural balance. When compared with the required consolidation without budgetary costs due to ageing populations, an additional fiscal effort of 0.7 pps. of GDP is

required in the medium term to compensate for the negative impact on sustainability of higher government expenditure as a result of population ageing. This also underlines the scope and importance for further structural reforms to contain ageing-related upward pressure on government spending in the medium term.

Graph 3.24: **Required fiscal adjustment (% of GDP) until t+5 in the EU to reach 60% public debt-to-GDP ratio by 2034**



Source: Commission services.

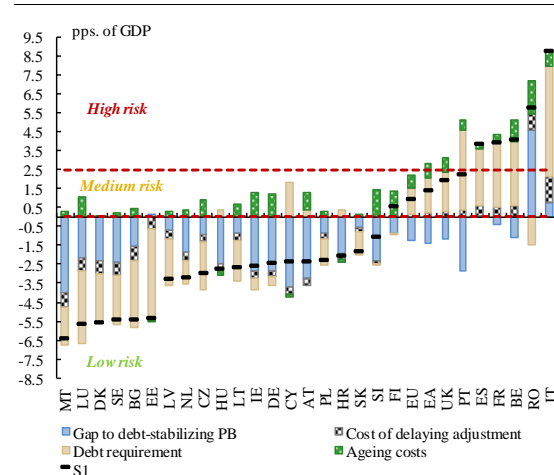
Cross-country results

Italy, Romania, Belgium, France and Spain are flagged by the S1 indicator to be high risk in the medium term. These five countries would require a significant fiscal adjustment to achieve the debt target of 60% of GDP in 2034. Another three Member States, PT, UK and FI, are flagged to be medium risk, requiring additional consolidation efforts, although not exceeding 0.5 pps. of GDP per year, to achieve the 60% of GDP debt target⁽⁵¹⁾. Finally, nineteen countries (MT, LU, DK, SE, BG, EE, LV, NL, CZ, HU, LT, IE, DE, CY, AT, PL, HR, SK and SI) have an S1 indicator with a negative value, indicating that under current policies these countries are expected to stay below the 60% of GDP threshold by 2034. All low risk

⁽⁵¹⁾ The thresholds used to assess the scale of the sustainability challenge based on the S1 indicator are as follows: 1) if S1 is less than zero, the country is assigned low risk; 2) if S1 is between 0 and 2.5 (thus requiring an adjustment in the structural primary balance of up to 0.5 pps. of GDP per year until 2025), the country is assigned medium risk; 3) if S1 is greater than 2.5 (implying an adjustment in the structural primary balance of more than 0.5 pps. of GDP per year), the country is assigned high risk.

countries, except CY, are expected to meet the debt target already by 2024 (under unchanged policies).

Graph 3.25: **The S1 sustainability indicator and its components**



Source: Commission services.

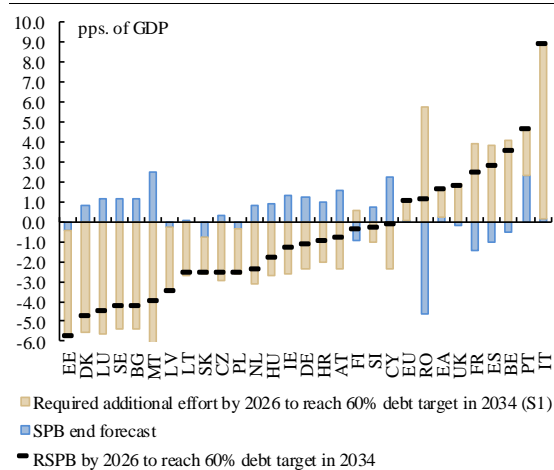
3.3.2. The required structural primary balance

The required structural primary balance (RSPB) is informative about the fiscal policy that needs to be sustained in order to achieve medium-term sustainability. The RSPB reflects the overall size of the structural primary balance required to close the medium-term sustainability gap, i.e. to reach a debt ratio of 60% of GDP by 2034. It is calculated as the total of the structural primary balance at the end of the forecast period and the required adjustment quantified by S1.

The overall required structural primary balance to ensure medium-term sustainability varies significantly across the EU Member States. Graph 3.26 shows the RSPB and its decomposition into the starting structural fiscal position at the end of the forecast period and the S1 sustainability gap for each EU country. For the EU and the EA, the RSPB reaches 1.0% and 1.6% of GDP, respectively. At the individual country level, the size of the RSPB varies substantially from -5.8% of GDP for Estonia to more than 3% or 4% of GDP for Belgium and Portugal, and respectively, to 8.9% for Italy. The latter is rather high by historical standards. During the past three decades, there have been 14 episodes in advanced economies and 26 episodes in emerging economies

when individual countries adjusted their structural primary balance by more than 7 pps. of GDP ⁽⁵²⁾.

Graph 3.26: **The required structural primary balance by 2026 to reach 60% debt target in 2034**



Source: Commission services.

Sensitivity to baseline fiscal assumptions

The S1 indicator is sensitive to changes to key assumptions underlying the fiscal projections under the baseline and the targeted debt ratio. Notably, fiscal projections under the baseline assume that current fiscal policies remain unchanged over the medium term, which can be subject to various degrees of uncertainty. The uncertainty surrounding this assumption can be assessed by comparing the current no-policy change assumption of the baseline with alternative paths for the structural primary balance. In particular, two scenarios are considered, one based on an alternative assumption for health-care and long-term care projections ('AWG risk scenario'), and the second one, on the historical path of the structural primary balance ('historical SPB scenario'). Furthermore, given large contributions from the debt requirement component of the S1 indicator in several countries, the sensitivity to alternative debt target assumptions is checked.

The 'AWG risk scenario' quantifies fiscal sustainability risks arising from potentially higher costs of health-care and long-term care spending. The scenario captures the sensitivity of

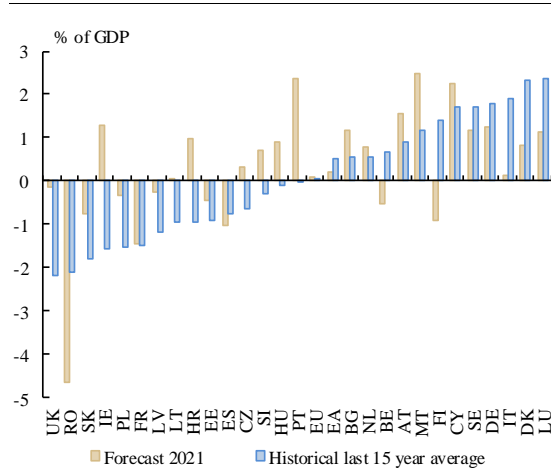
age-related spending to cost pressures arising from healthcare and long-term care costs in excess of those expected from purely demographic factors. The drivers of upward pressures on health and long-term care spending are typically associated with technological changes (e.g. development of new drugs and treatments) and institutional factors, see chapter 4 (e.g. widening of healthcare coverage).

The 'historical SPB scenario' can be seen as a realism tool for the baseline SPB medium-term projections that could flag potential optimism / pessimism of the baseline. The SPB projection beyond the last forecast year (2021) is assumed to converge gradually over a 4-year horizon to the 15-year historical average of the structural primary balance.

In several countries, a stronger fiscal position than the historical average is projected beyond the end of the forecast horizon (2021) (Graph 3.27). The structural primary balance at the last forecast year (2021) is significantly higher, by more than 1 percentage point, than the 15-year historical average for UK, SK, IE, PL, LV, LT, HR, CZ, SI, HU, PT, and MT. This suggests that fiscal sustainability risks might be greater than what is currently implied by the baseline fiscal sustainability gap, if the initial fiscal position proves difficult to maintain over the medium term. By contrast, for countries where the fiscal position is projected to be weaker beyond the forecast horizon than what would be implied by the 15-year historical SPB average, fiscal sustainability risks, as expressed by S1 indicator, may be overestimated. This could be the case of RO, FI, IT, DK, LU and BE. However, these results should be interpreted with caution, given that the historical path includes the global financial crisis period, when unprecedented fiscal adjustment was undertaken to avoid loss of market confidence in countries with increasing debt levels.

⁽⁵²⁾ See IMF (2010). The list includes the following countries (end date of episodes in parentheses): BE (1998), CY (2007), DK (1986), FI (2000), GR (1995), IE (1989), IT (1993), PT (1985), SE (1987, 2000), UK (2000).

Graph 3.27: The 15-year average of historical SPB average versus the SPB forecast in 2021

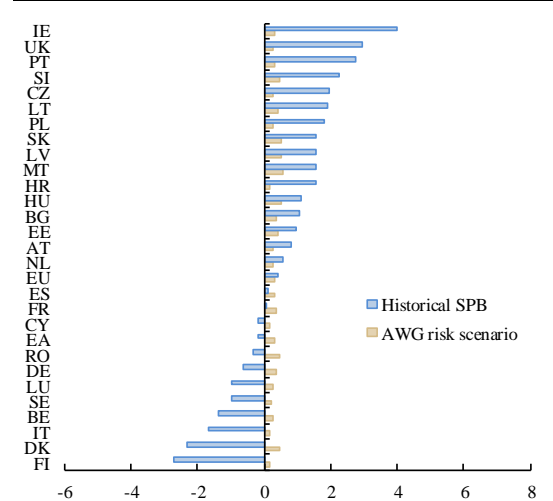


Source: Commission services.

Fiscal sustainability risks, as expressed by the S1 indicator⁽⁵³⁾, could be much higher than those implied under the baseline, if the SPB path would converge to its historical average over the medium-term, in several countries (Graph 3.28). While the sustainability gap would increase the most relative to the baseline for IE, UK and PT (above 2.5 pps.), the variation in the required fiscal adjustment would vary widely across the EU. It would deviate from the baseline by 0.3 and, respectively, by -0.2 pps. of GDP for the EU-28 and the EA as a whole, and it would deteriorate the risk category to high risk for two countries (UK and PT). A negative deviation is observed in several countries, including the EA as a whole, such as FI, DK, IT, BE, SE, LU, DE, and RO, which implies that the fiscal consolidation history of these countries would allow for a stronger fiscal position than currently projected under the baseline over the medium-term.

⁽⁵³⁾ When interpreting results of fiscal indicators calculated over the historical SPB scenario, two different effects must be taken into account: one is clearly related to the different paths of the historical SPB and the baseline; while the other one derives from the historical scenario's specific design (which implies delayed adjustment, after the 4-year convergence of the SPB toward its historical average).

Graph 3.28: S1 - Difference from the baseline (pps. of GDP)



Source: Commission services.

In the medium term, higher cost drivers for health-care and long-term care would lead, as expected, to a higher S1 sustainability gap in all the EU countries. For the EU-28 and the EA, the cumulated adjustment required by 2026 to reach a debt-to-GDP ratio of 60% in 2034 under the AWG risk scenario, is around 0.3 pp. of GDP higher than under the baseline. It would deteriorate the risk category to high risk only in one country, namely Portugal.

Sensitivity to debt targets and interest rates

A higher adjustment of the structural primary balance would be required to achieve pre-crisis debt levels or to offset higher interest rates (see Table 3.13). For the EU as a whole, the required adjustment to reach pre-crisis (2007) debt levels in 2034 would be higher than meeting the 60% of GDP debt target (Table 3.13 reports the cumulated adjustment needs for different debt end-points). This can be explained by the fact that several Member States had debt levels in 2007 that were well below 60% of GDP. Moreover, the structural primary balance adjustment required to stabilise the debt-to-GDP ratio at pre-crisis levels would be particularly demanding (a cumulated budgetary consolidation effort between 4 pps. and 10 pps. or more) for ES, IT, and RO. Moreover, if an additional one percentage point increase in the interest rate on new and rolled over debt is considered, the required fiscal adjustment to achieve a debt ratio of 60% of GDP by 2034

increases by 0.5% of GDP for BE, ES, FR, HR, PT and RO, and by 0.7% of GDP for IT⁽⁵⁴⁾.

Table 3.13: **The required adjustment of primary balances until 2026 to reach a given target for the public debt-to-GDP ratio by 2034 (all data as % of GDP)**

	Budgetary effort by 2026 (cumulated SPB)		Difference in budgetary effort by 2026 (cumulated SPB)	
	60 percent of GDP (S1)	Pre-crisis levels (2007)	60 percent of GDP (S1)	Pre-crisis levels (2007)
BE	4.1	1.1	0.5	0.6
BG	-5.4	-0.9	0.3	0.1
CZ	-2.9	0.3	0.4	0.2
DK	-5.6	-2.0	0.3	0.2
DE	-2.4	-2.8	0.4	0.4
EE	-5.3	0.6	0.3	0.0
IE	-2.6	1.3	0.4	0.2
ES	3.8	6.4	0.5	0.4
FR	3.9	3.4	0.5	0.5
HR	-2.0	0.4	0.5	0.4
IT	8.8	4.3	0.7	0.9
CY	-2.4	-1.8	0.4	0.4
LV	-3.3	2.3	0.3	0.1
LT	-2.7	1.7	0.3	0.1
LU	-5.7	0.0	0.3	0.0
HU	-2.7	-3.3	0.4	0.5
MT	-6.4	-6.7	0.3	0.3
NL	-3.2	-1.4	0.4	0.3
AT	-2.3	-2.9	0.3	0.4
PL	-2.2	-0.6	0.4	0.3
PT	2.3	0.9	0.5	0.5
RO	5.7	10.2	0.5	0.3
SI	-1.0	2.9	0.4	0.2
SK	-1.8	1.4	0.3	0.2
FI	0.5	3.3	0.3	0.2
SE	-5.4	-3.2	0.3	0.2
UK	1.9	3.9	0.4	0.3
EU-28	0.9	1.4	0.5	0.4
EA	1.4	1.1	0.6	0.5

Source: Commission services.

3.3.3. Comparison with results in the FSR 2018

This section compares the results of the S1 indicator with those presented in the Fiscal Sustainability Report 2018 (2018 FSR henceforth). The variation in the S1 sustainability gap is mainly driven by the changes in two components: the initial budgetary position and meeting the debt target requirement⁽⁵⁵⁾.

⁽⁵⁴⁾ The shock is implemented only on new and rolled over debt beyond the last year of the forecast (2021), and for this reason, it takes time to have significant large effects on the implicit interest rate.

⁽⁵⁵⁾ The positive changes mean that the fiscal indicators and/or their components have increased between the 2018 FSR and this report. This report includes the same costs of

Medium-term sustainability risks, as measured by the S1 indicator, have broadly decreased.

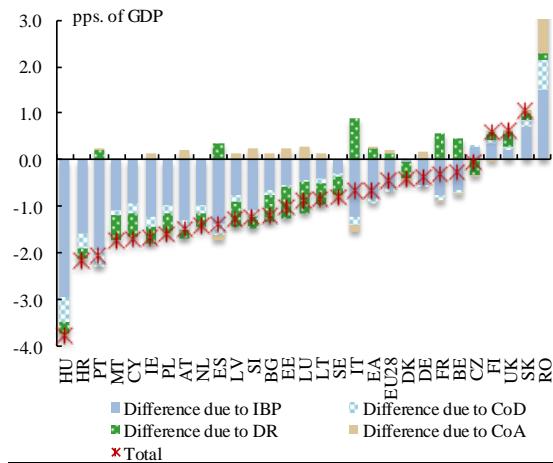
The S1 sustainability gap is lower by 0.5 pps. of GDP for the EU-28 and by 0.7 pps for the EA as a whole. As shown by Graph 3.30, most of the EU Member States have maintained their risk category, except for HU, HR, SI and PT, which have narrowed their sustainability gap, and improved their risk classification, and for FI and RO, which have deteriorated their risk classification, the latter significantly aggravating its sustainability position over the medium-term (moved to high risk). Although several Member States remain in the same risk categories, the S1 current update shows a lower fiscal adjustment needed to ensure medium-term sustainability (except for UK and SK). The Member States with a substantial drop in their required adjustment include HU, HR and PT (-3.8 pps. and -2.2/-2.1 pps. of GDP for the latter two countries) as well as IE, CY and MT (-1.7 pps. of GDP for these three countries).

The variation in the medium-term sustainability risks is mostly driven by changes in the initial budgetary position and the debt requirement components.

As shown in Graph 3.29, in the case of Finland, the significant increase in the additional adjustment required to ensure medium-term sustainability almost entirely reflects the worsening of the initial budgetary position, in terms of a deterioration in the structural primary balance in this new round of forecasts. In the case of Romania, both the deterioration in the initial budgetary position and the cost of ageing play an important role. For the six Member States with the highest drop in their required adjustment (HU, HR, PT, IE, CY, and MT), the improved S1 indicator reflects the improved initial budgetary position, but also a contribution from lower debt requirement (except for PT). As the interest rate projections have been revised to better reflect the currently low interest rate environment and financial markets' expectations over the medium-term, debt dynamics are more favourable, thus, improving the debt requirement component (mostly in HR, DE, NL, FR, DK, ES, and IE, see Box 3.1).

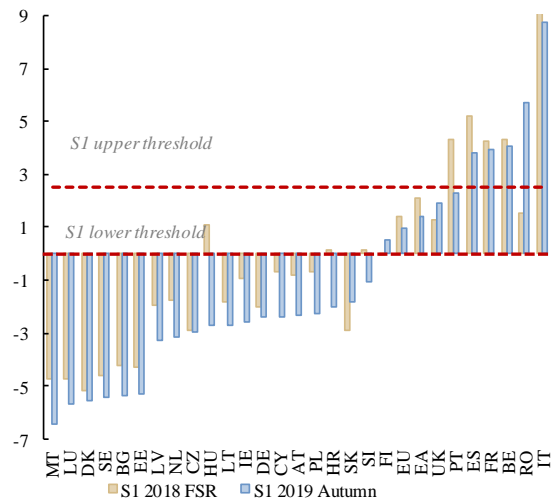
ageing from the Commission - EPC Ageing Report 2018, except for three countries (HR, IT and RO, see Chapter 4).

Graph 3.29: Components of change in S1 (DSM 2019 based on Commission 2019 Autumn forecast compared to FSR 2018 based on Commission 2018 Autumn forecast)



Source: Commission services.

Graph 3.30: S1 comparison with FSR 2018 (pps. of GDP)

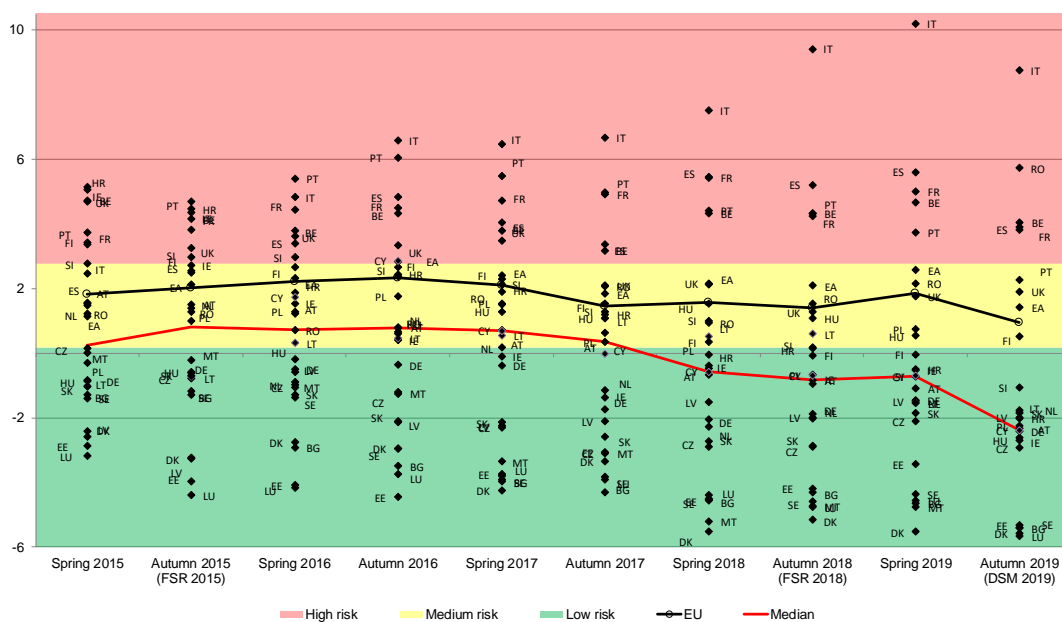


Source: Commission services.

The S1 indicator for the EU-28 and the EA stands at its lowest level of the past six years.

This may be seen from Graph 3.31, which shows a cross-country comparison by risk classification based on the S1 indicator along various waves of Commission forecasts. For the EU aggregate, the drop in the S1 indicator to 0.9 pps. of GDP on the basis of the Autumn 2019 forecast follows a period since 2012 when the indicator appeared to broadly stabilise at around 2.0 pps. of GDP. This reflects the impact of more favourable financing conditions (i.e. the interest rate projections reflect the currently low interest rate environment and financial markets’ expectations over the medium-term), but also the continued consolidation effort and structural reforms undertaken in the aftermath of the economic and financial crisis. The number of high-risk countries had widened from five to nine between 2012 and 2014, while only five countries (IT, FR, BE, ES, and RO) are still flagged by the S1 indicator as facing high risk in the medium term.

Graph 3.31: The S1 sustainability indicator across Commission forecast vintages (pps. of GDP)



Source: Commission services.

Box 3.1: Revision of interest rate assumptions: rationale, description and impact

Introduction

This box presents the new baseline interest rate projection assumption, used in this report ⁽¹⁾. This assumption relies on interest rate market expectations, reflected in forward rates, to set the projection path for the short- and long-term interest rates. The previous assumption relied on historical averages to set the interest rate paths. The box describes the rationale for reconsidering the interest rate assumption (part 1), the design of the new assumption (part 2) and the impact of this revision on debt projections and on the fiscal risk assessment (part 3).

In general, this revision leads to lower interest rates over the projection horizon. However, our DSA framework caters for the possibility of higher rates through a wide range of stress scenarios.

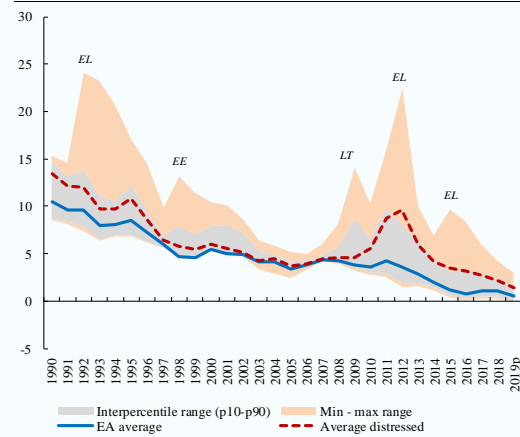
1. RATIONALE FOR RECONSIDERING THE INTEREST RATE ASSUMPTION

The previous interest rate assumption imposed convergence of the interest rates on new debt issuances to fix common levels, by T+10, for all countries. Specifically, short- and long-term rates for new debt issuances were assumed to converge, by T+10, to 4% and 5%, respectively. These convergence values were set in line with historical averages in selected EU countries ⁽²⁾. Under that assumption, prevailing market conditions were reflected at the start of the projection horizon, as the Commission DSA framework uses market rates to initiate the projection path. Assuming convergence to historical averages however failed to reflect any (persistent) change in the interest rate environment into the medium-term projection targets. This was particularly problematic in the current environment of persistent historically very low interest rates.

The observed persistent change in the interest rate environment thus undermines the use of such (static) historical averages to set the interest rate projection path. Interest rates have

been “low for long” and cross-country spreads have tended to resume (see Graph 1), with such spreads partly reflecting exchange rate premia in non-euro area countries (e.g. HU, PL and BG) but also re-emergence of risk premia among euro area countries (e.g. PT, CY, IT and ES). Such developments are at odds with the previously assumed convergence of rates to common interest rate historical averages for all countries over a 10-year horizon.

Graph 1: Evolution of long-term interest rates, across the euro area countries, %



(1) Limited timespan for some countries: EE 1998-10, EL 1992-19, CY 1997-19, LV 2001-19, LT 2001-19, MT 2000-19, SI 2002-17, SK 2000-17;

(2) 2019: available months average.

(3) Distressed: IE, ES, IT and PT.

Source: Commission services.

2. DESCRIPTION OF THE NEW INTEREST RATE ASSUMPTION

The new interest rate assumption relies on market expectations reflected in forward rates. This allows setting medium-term projection targets that reflect perceived persistent changes in the interest rate environment, including differences across countries. Other DSA frameworks, such as the ECB's, similarly rely on forward rates to set their interest rate convergence targets ⁽³⁾. The IMF projects country-specific interest rate paths relying

⁽³⁾ See Bouabdallah et al. (2017).

⁽¹⁾ For related earlier analysis, see Box 2.3 in the 2018 Fiscal Sustainability Report and Box 2.3 in the 2016 Debt Sustainability Monitor.

⁽²⁾ For details, see the 2018 Ageing Report (in chapter 4 of the volume on Underlying Assumptions & Projections Methodologies).

(Continued on the next page)

Box (continued)

on expert judgment, to account for all relevant information ⁽⁴⁾.

Specifically, the new interest rate assumption in the DSM uses forward rates on the short- and long-term interest rates, for all countries, to set T+10 targets (i.e. medium-term targets) for the short- and long-term interest rates on new debt issuances. These forward rates refer to quotes (available from Bloomberg) on traded future contracts. Beyond T+10, the short- and the long-term interest rates are assumed to converge to historical averages by T+30, hence still retaining common *long-term* projection targets for the short- and long-term rates, while market data are now used to set differentiated *medium-term* targets, to better reflect the interest rate environment expected to prevail over that horizon.

The long-term T+10 forward rate, which is used to set the medium-term target for the long-term rate, refers to the trading data on the 10-year interest rate on sovereign bonds in 10 years. This is a natural candidate to substitute the previously used conventional 5% by T+10 medium-term target for the long-term rate. Bloomberg provides quotes for such future contracts for all countries, except CY, BG, LT, EE, LU and MT. Missing forward rate data are handled as follows: (i) for CY, LT and EE, the spread vis-a-vis the German Bond rate is assumed to follow the same evolution, over the T+10 horizon, as that observed on average across the euro area countries; (ii) the same approach is used for BG but relying on the average evolution for the spread seen among the non-euro area countries; (iii) for LU and MT, instead, as the 20-year sovereign rate data is available, an implicit (T+10) forward 10-year sovereign rate is computed, relying on the standard pure expectation hypothesis formula ⁽⁵⁾.

The short-term T+10 forward rate, which is used to set the medium-term target for the short-term rate, refers to the trading data on the

⁽⁴⁾ See IMF (2013).

⁽⁵⁾ The pure expectation hypothesis formula is as follows:

$$(1 + lti_{10,t+10})^{10} = \frac{(1 + lti_{20,t})^{20}}{(1 + lti_{10,t})^{10}}$$

where $lti_{20,t}$ and $lti_{10,t}$ stand for the 10 and 20 years maturity spot government bonds yields, used to compute the 10 years maturity yield (forward) at $t+10$: $lti_{10,t+10}$.

3-month interbank rate in 10 years. This is consistent with the fact that 3-month interbank rates are used as historical data for the short-term rate in the DSA framework. Specifically, the euribor rate is used for the euro area countries and similar interbank rates are used for non-euro area countries ⁽⁶⁾. The use of interbank rates, rather than sovereign rates, reflects the fact that these short-term rates are very similar, both largely driven by monetary policy conditions. Moreover, 3-month interbank rates and corresponding forward rates are more readily available for EU countries. Bloomberg provides quotes for 3-month Euribor T+10 forward rate and provides similar forward interbank rates for non-euro area countries' rates, except for BG, HR and RO. Missing forward rate data are handled as follows: for BG, HR and RO, a simple spread approach is used, whereby the spread vis-a-vis the Euribor rate over the T+10 horizon follows the evolution observed for that spread, on average, across non-euro area countries.

Some caveats should however be borne in mind when relying on forward interest rates to set interest rate projection targets. The market for such financial instruments may be less liquid, occasionally, in some countries, causing such data to sometimes feature noise. Also, note that interest rate market expectations reflect underlying market expectations on other related variables such as future inflation, real GDP growth and debt developments. This may generate some inconsistency in the DSA framework if such market expectations do not coincide with corresponding assumptions for those variables in the DSA framework ⁽⁷⁾. Efforts to address such inconsistencies (or others in any DSA framework) should however account for the trade-off that this would imply in terms of keeping the framework sufficiently simple to be transparent and tractable

⁽⁶⁾ Note that these rates are also those reported for the short-term interest rate variable in AMECO (code: ISN).

⁽⁷⁾ In particular, the low yield on traded forward rates is likely to be partly driven by weaker expected inflation developments than the one assumed under the DSA framework (i.e. DSA assumes generally convergence to 2% inflation for all EA countries by T+5, corresponding to the year of the output gap closure).

(Continued on the next page)

Box (continued)

(⁸). Finally, as regards the risk of market data (i.e. forward rates) volatility generating instability in the fiscal sustainability assessment, note that simulations (not reported here) show that the new market-based interest rate assumption does not generate increased volatility of the risk assessment across past Commission forecast vintages (⁹).

3. IMPLICATIONS ON INTEREST RATE AND DEBT-TO-GDP PROJECTIONS AND ON FISCAL SUSTAINABILITY RISK ASSESSMENT

The new interest rate assumption implies a more benign interest rate medium-term projection path for all countries, except Romania. New targets for the short- and long-term rates are below the formerly assumed 4% and 5% targets, respectively, in all countries, except Romania (see Table 1). The new targets also imply substantial cross-country diversity in 2030 (T+10), contrary to the formerly assumed common targets and, in some cases, the new (market-based) T+10 targets remain relatively high. This is the case for Italy and Hungary, where the new long-term T+10 target stand at around 3%, while in Romania the new T+10 target for the long-term rate is even slightly higher than previously assumed at 5.3%. Noteworthy, market data also imply a relatively flat T+10 forward yield curve, as short- and long-term forward yields are broadly similar in a number of countries. A forward yield curve inversion is even observed in some cases, whereby the short-term forward rate is higher than the long-term forward rate, namely in DK, DE, and NL, the countries benefiting from a ‘safe-asset’ status. Overall, this reflects the current monetary policy circumstances, with the prolonged period of very accommodative monetary policy, the perception of a deteriorating outlook, leading to a demand for safe assets

(⁸) Indeed, traditional DSA frameworks rest on a partial equilibrium approach and are not based on a fully integrated macroeconomic model. Inclusion of some feedback effects between variables (for example between the evolution of the primary balance and GDP growth, under some scenarios, as done in the Commission framework) ensures consistent treatment of specific channels.

(⁹) As such, it appears preferable not to smooth the market data and rather rely on latest readings to reflect up-to-date market expectations, while also avoiding conflicting signals that arise when latest data and smoothed data point in opposite directions.

outpacing the supply, putting downward pressures on long-term rates (¹⁰).

Importantly, from a policy perspective, the change in the interest rate assumption has limited impact on the fiscal risk classification.

Table 1 shows limited impact on the risk classification for the baseline scenario and for the S1 and S2 indicators. Risk categories change only in the case of Spain (for the S2), Portugal (for the baseline projected debt and the S1) and for the UK (for the S1). Yet, for these countries the slight change in the risk category reflects a threshold effect and, except for Spain, would not translate in a change of the overall medium-term or long-term risk classification, as the risk classification under other scenarios (not reported here) remains unchanged under the new (market-based) interest rate assumption (¹¹). For Spain, the overall long-term risk classification moves from high to medium risk under the new assumption. For all the other countries, the overall (medium- and long-term) risk classification remains unchanged. A similar limited impact on the risk classification emerges when testing the change in assumption on previous vintages (not reported here).

This limited impact on the risk classification reflects the dampening effect provided by the maturity structure of debt and the relatively large threshold intervals used for the risk classification. In most countries, all else being equal, a change in market interest rate conditions gets fully reflected in the implicit interest rate, and hence in the debt dynamic, with a lag ranging from 10 to 20 years, depending on the average maturity of debt (see Box 2.2 of the DSM 2017). Furthermore, except for borderline cases, the relatively large threshold intervals used in the fiscal sustainability framework also contribute to the stability of the risk classification (¹²). Note that the impact on the S2 indicator is also relatively small, reflecting the fact that this indicator relies on a substantially longer horizon, beyond T+10,

(¹⁰) See European Commission, 2019d.

(¹¹) The overall risk assessment is based on deterministic debt projections under both the baseline and alternative scenarios, and on stochastic projections. For further details see Chapter 6.

(¹²) Debt thresholds’ intervals used are 60%-90% of GDP, and S1 / S2 indicators’ thresholds’ intervals used are 0-2.5 and 2-6 pps. of GDP, respectively.

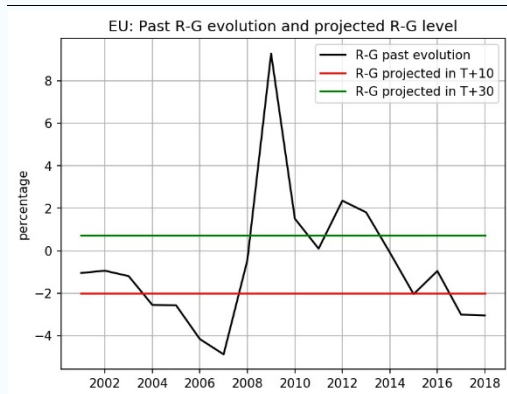
(Continued on the next page)

Box (continued)

dampening the impact of this change in assumption that only affects data up to T+10 ⁽¹³⁾.

Graph 3 shows that the impact of the new interest rate assumption on the profile of debt-to-GDP projections is however not negligible. This is also relevant from a policy perspective, notably the fact that the market-based interest rate assumption leads to the EU debt-to-GDP ratio being on a downward path by T+10, driven by continuing favourable snowball effects, with the average EU interest-growth differential projected to gradually turn positive only by T+30 (see Graph 2). Under the previous assumption, an increasing debt-to-GDP ratio would be projected as from 2026, with favourable snow-ball effects fading out more quickly, compounded with growing ageing costs.

Graph 2: **Recent and projected interest – growth rate differential for the EU, %**

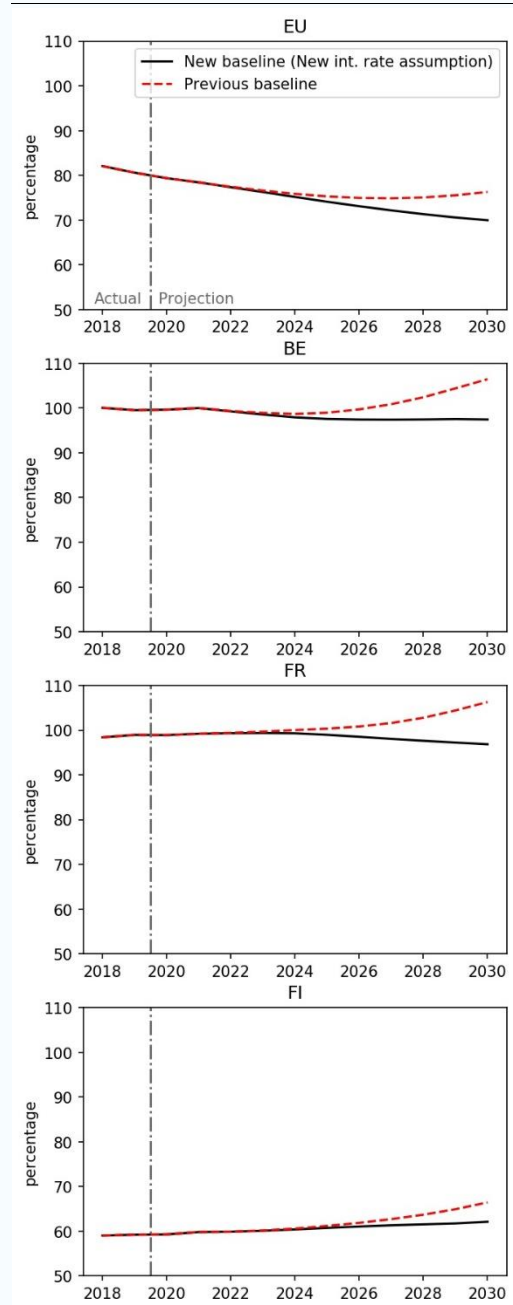


(1) R-G past evolution over 2002-2018 (black), projected (baseline) R-G level in T+10 (red) and projected (baseline) R-G level in T+30 (green);
(2) R stands for implicit interest rate;
(3) G stands for nominal GDP growth.

Source: Commission services.

⁽¹³⁾ The impact on the S2 indicator is also ambiguous as opposing effect are at play. While a lower interest rate assumption reduces the burden of the debt, it also reduces the discounting of the future cost of ageing, an important component in the S2 computations. Additionally, the level at which debt-to-GDP stabilises differs under the two interest rate assumptions. Overall, this suggests the need for caution when interpreting the small changes in the S2 indicator reported here.

Graph 3: **Government debt-to-GDP projections for the EU and selected countries, comparing the profile under the new and the old baseline scenario, %**



Source: Commission services.

At the country level, a significant impact of the change in the interest rate assumption on the debt-to-GDP profile (implying a reversal of the

(Continued on the next page)

Box (continued)

Table 1: Impact of new interest rate assumption on risk classification of baseline projected debt, S1 and S2 and T+10 market based targets for the short- and long-term interest rates

	Debt-to-GDP (in T+10)			S1 indicator			S2 indicator			Market-based ST interest rate (T+10) targets	Market-based LT interest rate (T+10) targets	
	Old	Current	Impact	Old	Current	Impact	Old	Current	Impact			
BE	106	97	-9.0	5.2	4.1	-1.1	4.9	4.8	-0.2	0.4	1.0	BE
BG	10	9	-0.3	-4.6	-5.4	-0.8	1.5	1.6	0.1	0.3	1.2	BG
CZ	31	28	-2.4	-2.2	-2.9	-0.8	4.7	4.8	0.1	1.2	2.1	CZ
DK	17	15	-1.7	-4.3	-5.6	-1.2	0.4	0.4	0.0	0.5	0.0	DK
DE	46	40	-5.9	-1.0	-2.4	-1.4	2.3	2.2	-0.1	0.4	0.2	DE
EE	9	8	-0.5	-4.5	-5.3	-0.8	0.8	0.8	0.0	0.4	1.4	EE
IE	42	38	-3.9	-1.5	-2.6	-1.1	2.9	2.9	0.0	0.4	0.9	IE
ES	104	96	-8.3	4.9	3.8	-1.1	2.1	1.8	-0.3	0.4	1.7	ES
FR	106	97	-9.4	5.2	3.9	-1.3	0.8	0.2	-0.6	0.4	0.9	FR
HR	57	50	-6.4	-0.6	-2.0	-1.4	-1.6	-2.1	-0.5	0.9	0.7	HR
IT	151	140	-10.5	9.8	8.8	-1.0	2.6	2.1	-0.6	0.4	2.7	IT
CY	52	48	-3.8	-1.4	-2.4	-1.0	-0.5	-0.7	-0.2	0.4	1.7	CY
LV	32	29	-2.6	-2.3	-3.3	-1.0	0.5	0.3	-0.2	0.4	1.2	LV
LT	32	30	-2.1	-1.9	-2.7	-0.8	0.7	0.5	-0.2	0.4	1.6	LT
LU	7	7	0.0	-4.8	-5.7	-0.9	8.2	8.6	0.4	0.4	0.9	LU
HU	44	41	-2.5	-2.1	-2.7	-0.6	2.7	2.7	0.0	2.2	3.0	HU
MT	10	10	-0.5	-5.6	-6.4	-0.8	2.9	3.0	0.1	0.4	1.7	MT
NL	37	32	-4.7	-1.9	-3.2	-1.3	2.8	2.8	0.0	0.4	0.3	NL
AT	47	43	-3.8	-1.3	-2.3	-1.0	2.3	2.3	0.0	0.4	0.6	AT
PL	41	38	-2.5	-1.5	-2.2	-0.7	2.0	1.9	-0.1	1.8	2.3	PL
PT	96	89	-6.6	3.2	2.3	-0.9	0.3	-0.3	-0.6	0.4	1.9	PT
RO	91	91	0.5	5.7	5.7	0.1	8.8	8.8	0.0	3.4	5.3	RO
SI	51	47	-4.1	-0.1	-1.0	-1.0	5.4	5.4	0.0	0.4	1.2	SI
SK	47	44	-2.9	-1.0	-1.8	-0.8	3.8	3.8	0.0	0.4	1.2	SK
FI	66	62	-4.3	1.3	0.5	-0.8	3.6	3.6	0.0	0.4	0.5	FI
SE	16	15	-1.0	-4.5	-5.4	-0.9	1.2	1.2	0.0	0.8	0.8	SE
UK	85	79	-6.6	2.9	1.9	-0.9	4.3	4.3	-0.1	0.8	1.5	UK

(1) Colours in the table correspond to fiscal sustainability risk categories: low (green), medium (yellow) and high (red).
Source: Commission services.

dynamic), is observed for BE, FR and FI under the new interest rate assumption. For the other countries, instead, the impact is a sharper decline or a softer increase in the debt-to-GDP ratio over the projection horizon, or a limited impact on the debt-to-GDP projection (see also Table 1 for country impacts). Only Romania witnesses slightly more adverse debt-to-GDP developments under the new interest rate assumption (+0.5 pp. by T+10). Overall, the impact on debt-to-GDP projections (and the S1 indicator) is especially large for high debt countries (e.g. BE, ES, FR, IT, PT) and for those for which the market expectation entails targets substantially lower than the previously assumed ones (4% and 5% for the short- and long-term interest rate, respectively) ⁽¹⁴⁾. In some countries both aspects matter (e.g. BE, FR).

⁽¹⁴⁾ Countries with shorter maturities are also more sensitive to interest rate changes. For further discussions on differentiated sensitivities vis-à-vis interest rate changes, see also Box 2.2 entitled “The sensitivity of public debt to a rise in interest rates in EU countries”, in *The 2017 Debt Sustainability Monitor*.

Conclusion

The new assumption lowers the interest rate projection path of all countries, except Romania. The impact on the risk assessment is however limited. The overall medium- and long-term risk assessment remains unchanged for almost all countries, notably due to the dampening effect of the maturity structure of debt (implying a slow transmission of a change of interest rates on newly issued debt to the implicit interest rates) and to the features of the fiscal sustainability framework.

Still, the impact on the profile of the projected debt-to-GDP ratio is significant. Under the new assumption, the debt-to-GDP ratio for the EU is on decreasing path by T+10, while it would be on an increasing path as from 2026 under the previous interest rate assumption. This significant debt-to-GDP ratio profile reversal is also observed for a few countries (i.e. BE, FR, and FI). The latter are those that tend to have higher debt, shorter average maturity and for which market expectations substantially deviate from the previously assumed convergence, by the end of the horizon, to a common interest rate target level.

Box 3.2: Understanding interest rates' differentials across the EU/EA and implications for the debt dynamic

Interest rates have globally weakened around the world, yet cross-country differences remain, in particular in the EU/EA. In advanced economies, the fall in interest rates from their peaks in the early 1980s has triggered an intense debate about the origins of this phenomenon. Researchers have focused on different sets of explanations, including global and more country - specific factors. Understanding the factors behind the decline in interest rates and differences between countries is key to get a sense of future developments. The latter have in turn important implications for debt sustainability analysis and for fiscal policy, as the interest rate is a critical driver of the debt dynamics.

The rest of this Box is organised as follows: the first part provides a short survey of the literature, the second part presents an econometric analysis of interest rates' differentials across the EU/EA. Finally, the last part discusses the implications of introducing debt – interest rate feedback effects on debt sustainability analysis.

1. INTEREST RATE DRIVERS: A SHORT SURVEY OF THE LITERATURE

A large amount of research discusses different possible drivers of the weakening of interest rates, with a strong focus on global factors. Some scholars argue that the decrease in ('risk free') interest rates reflects the decline of the equilibrium (or 'neutral') interest rate, caused by structural factors - saving and investment determinants - such as population ageing, lower productivity growth and higher inequality⁽¹⁾. Other economists associate these developments to a greater scarcity of safe assets, as a result of the slow post-crisis deleveraging, financial (re-) regulation and higher demand for reserves by emerging market countries⁽²⁾. Another set of explanations relates the decrease in interest rates to the different shifts in monetary policy regimes over

⁽¹⁾ Rachel and Summers (2019); Rachel and Smith (2015); Summers (2015). These authors defend the idea of a 'secular stagnation'.
⁽²⁾ Gourinchas and Rey (2019); Aksoy et al. (2016); Bernanke (2005). Some of these authors highlight the presence of a 'global saving glut'.

time⁽³⁾. Whatever the relevant factors, important global determinants seem at play⁽⁴⁾, and the forces behind this trend decline are unlikely to turn around rapidly⁽⁵⁾.

At the same time, interest rate differentials (or spreads⁽⁶⁾) remain across countries, in particular in the EU/EA, reflecting more country-specific factors, as examined by a rich empirical literature. In the EU/EA, spreads re-emerged since the global financial crisis, and can be related to the fundamental conditions of the economy (henceforth, the fundamentals). In the literature, three main types of fundamentals affecting spreads (related to the sovereign risk component) are generally put forward, including *fiscal variables* (government debt, sometimes in a non-linear form, primary balance, gross financing needs)⁽⁷⁾; *macro/external imbalances' variables* (net international investment position, current account balance)⁽⁸⁾; and *variables reflecting countries' earning and repayment capacity* (actual or potential real GDP growth, sometimes unemployment rate)⁽⁹⁾. More recently, some papers have also explored the use of *qualitative factors such as institutional features* (broad governance indicators, political factors, economic policy uncertainty, quality of government institutions), as an indication of governments'

⁽³⁾ Borio et al. (2017). Rawdanowicz, et al. (2017) also consider the role of monetary policy.

⁽⁴⁾ IMF (2014).

⁽⁵⁾ Blanchard et al. (2019).

⁽⁶⁾ Spreads are typically measured as the difference between a country's interest rate (on 10-year sovereign bonds) and the US or German interest rate (a proxy of the 'risk free' rate). They essentially capture the risk premium demanded by investors relative to what can be considered a safe asset. This risk premium usually contains three main components: credit (default) risk, liquidity risk and international risk aversion.

⁽⁷⁾ Capelle-Blancard et al. (2019); Gabriele et al. (2017); Afonso et al. (2015); De Grauwe and Ji, 2012.

⁽⁸⁾ Ben Salem and Font (2016); Capelle-Blancard et al. (2019); De Grauwe and Ji (2012).

⁽⁹⁾ Gomez-Puig et al. (2014); D'Agostino and Ehrmann (2014); Poghosyan (2012).

(Continued on the next page)

Box (continued)

ability to collect and use tax revenue or of their willingness to repay their debt) ⁽¹⁰⁾.

Beside fundamentals, some of these papers also factor in financial market conditions in the analysis, although with some limitations. As a way to capture the liquidity risk and international risk components of spreads, some studies account for financial market conditions – through variables such as the level or outlook of ratings, bid-ask spreads, the relative size of the economy (as a proxy for liquidity risk), or VIX and VSTOXX indicators (to capture international risk aversion) ⁽¹¹⁾. Yet, there is no clear evidence that such additions improve the ‘fundamental’ model, given endogeneity issues with interest rate spreads ⁽¹²⁾, ⁽¹³⁾.

Generally, the literature suggests that interest rate spreads effectively depend on fundamentals, with some important differences however ⁽¹⁴⁾. First, the reaction of spreads to fundamentals varies over time and across countries, possibly linked to some financial markets overshooting / mispricing, or to institutional features ⁽¹⁵⁾. For instance, spreads were exceptionally low during the first decade of the EA, then increased sharply during the crisis, reacting more strongly to fiscal fundamentals ⁽¹⁶⁾, and have somehow reduced since, despite still high debt levels in some countries. The important variability across countries of the relationship between spreads

and macro-fiscal conditions could also relate to institutional features, often not or imperfectly captured in regressions ⁽¹⁷⁾. Last, the relationship between spreads and fiscal variables appears relatively robust in the empirical literature, and some papers suggest the presence of non-linearities ⁽¹⁸⁾.

2. AN EMPIRICAL ANALYSIS OF INTEREST RATES’ DIFFERENTIALS IN THE EU/EA

In light of the findings of this survey of the literature, interest rate spreads are modelled using more recent data, and focusing on fundamentals, in particular fiscal variables. A standard panel data approach, including country fixed effects, is used. The analysis covers up to 27 EU countries and 20 years, using annual data from 1999 to 2018. Following the empirical strategy of De Haan et al. (2014), several alternative specifications are tested, with a specific focus on fiscal variables and the presence of non - linearities ⁽¹⁹⁾. Institutional variables, whose influence is less explored in the existing literature for advanced economies, are also considered.

As a first step, the following benchmark specification is estimated ⁽²⁰⁾:

$$spr_{it} = \alpha + \beta \cdot NIIP_{it} + \gamma \cdot GDPp_{it} + \delta \cdot g\text{eff}_{it} + \varepsilon_1 \cdot D_{it} + \alpha_i + u_{it} \quad (1)$$

Nominal spreads on 10-year government bonds (vis-à-vis German government bonds, spr_{it}) are regressed on key fundamental variables, namely country net international investment position to GDP ratio ($NIIP_{it}$), potential real GDP growth ($GDPp_{it}$), general government gross debt to GDP

⁽¹⁰⁾ Capelle-Blancard et al. (2019); Presbitero et al., (2015); Eichler (2014).

⁽¹¹⁾ VIX / VSTOXX are financial markets volatility indexes. They are a widely used measures of uncertainty in equity markets, covering the macroeconomic environment and some political risks. VSTOXX refers to European markets (EURO STOXX 50), VIX to the US (S&P 500). See Monteiro and Vasicek (2019); Afonso et al. (2015); Gomez-Puig et al. (2014).

⁽¹²⁾ De Grauwe and Ji (2012) argue that the introduction of such variables, while improving the fit of the regressions, is unlikely to add to the explanation, and eventually risks blurring the fundamental model.

⁽¹³⁾ More recent papers additionally investigate the role of unconventional monetary policy on spreads (Monteiros and Vasicek, 2019; Afonso et al., 2019; Afonso and Kazemi, 2018).

⁽¹⁴⁾ Capelle-Blancard et al. (2019) and De Haan et al. (2014) include extensive surveys of this literature.

⁽¹⁵⁾ Pogoshyan (2012); Giordano et al. (2013); Morgan Stanley (2018).

⁽¹⁶⁾ Monteiro and Vasicek, 2019; D’Agostino and Ehrmann, 2014

⁽¹⁷⁾ De Haan et al. (2014).

⁽¹⁸⁾ De Grauwe and Ji (2012).

⁽¹⁹⁾ As stressed by these authors, empirical findings are largely influenced by modelling choices. A more extensive presentation of the results here presented, including a broader range of specifications can be found in Carnot et al. (2020), *forthcoming*. These include in particular error-correction models, regressions with financial and monetary policy variables, specifications with time-varying coefficients to account for the ‘structural break’ implied by the last crisis, and robustness checks for the inclusion of certain countries.

⁽²⁰⁾ This regression is estimated through two-stage least squares whereby the government debt to GDP ratio is instrumented by its lag.

(Continued on the next page)

Box (continued)

ratio (D_{it}), and government effectiveness index ($geff_{it}$). This specification also includes country-fixed effects (α_i), while u_{it} represents an error term.

As a second step, the benchmark regression is augmented to further analyse the potential presence of non-linearities in the relationship between government debt and spreads, also in interaction with institutional factors ⁽²¹⁾. The potential non-linear reaction of interest rate spreads to debt levels has been notably examined in the literature on ‘debt limits’ ⁽²²⁾. Relatedly, a vast empirical literature discusses debt thresholds beyond which risks of fiscal stress - identified by a surge in interest rate spreads - might arise ⁽²³⁾. Different form of non-linearities are tested, starting from a quadratic debt term, a debt-threshold term, ⁽²⁴⁾ or an interactive term with government effectiveness ⁽²⁵⁾. This alternative specification can be presented as follows:

$$spr_{it} = \alpha + \beta \cdot NIIP_{it} + \gamma \cdot GDPp_{it} + \delta \cdot geff_{it} + \varepsilon_1 \cdot D_{it} + \varepsilon_2 \cdot nl(D_{it}) + \alpha_i + u_{it} \quad (2)-(5)$$

where $nl(D_{it})$ represents either a quadratic term, an excess of debt to the debt threshold tested and an

⁽²¹⁾ The latter has also been tested in the context of public investment by the European Commission (2018b).

⁽²²⁾ Fournier and Fall (2017); Gosh et al., (2011).

⁽²³⁾ Cerovic et al. (2018); Berti et al. (2012).

⁽²⁴⁾ This type of specification is most often found in the literature on fiscal reaction functions (see Celasun et al. (2006)). In the case of interest rate spreads, it can also be justified by Afonso et al. (2019), which show that spreads are sensitive to the Commission releases of the excessive deficit procedure (and releases of higher debt forecasts). Hence, we expect an (additional) sensitivity of spreads when the debt ratio crosses the Stability and Growth Pact reference value of 60% of GDP. As the 90% of GDP threshold is used as a reference value, notably in the Commission DSA framework, this level is also tested. These values are not ‘debt limits’ as defined by Gosh et al. (2011), but debt levels beyond which spreads are expected to be more reactive to changes in debt levels.

⁽²⁵⁾ In Carnot et al. (2020), an interactive term with public gross financing needs is also tested.

interactive term between government debt and government effectiveness ⁽²⁶⁾.

In line with the literature, the empirical analysis points to a significant impact of government debt on interest rate spreads, with evidence of some non-linear effects (see Table 1). Whatever the specification tested, a rise in government debt tends to increase spreads significantly. For example, according to the benchmark regression, a 1 pp. increase of the debt to GDP ratio would lead to an increase of around 2 basis points in spreads ⁽²⁷⁾. Furthermore, the regressions confirm previous findings that non-linearities are present. For instance, the quadratic form suggests a positive reaction of spreads to government debt only for debt ratios above 55% of GDP ⁽²⁸⁾, while a higher marginal impact (than in the benchmark regression) is found for debt ratios beyond around 80% of GDP. Last, strong government effectiveness is found to mitigate the impact from government debt on spreads. For example, for countries with the highest government effectiveness index value (e.g. FI, DK and SE), the marginal effect of government debt on spreads would be close to zero according to regression (5) ⁽²⁹⁾.

Other macroeconomic variables are also found to have a significant impact on interest rate spreads. In particular, the NIIP variable appears robust across specifications, suggesting that investors take concerns about private sector solvency into account. This result is notably in line with Ben-Salem and Castelletti Font (2017). Larger

⁽²⁶⁾ The data source generally used is Ameco and Eurostat. The *government effectiveness* index comes from the Worldwide Governance Indicators (WGI). It captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Its values range from -2.5 (weak government effectiveness) for 2.5 (strong) – see Kaufmann et al. (2011).

⁽²⁷⁾ This estimation is in a lower range of 2 - 7 basis points estimates found in previous papers (Poghosyan, 2012).

⁽²⁸⁾ This level is obtained by calculating the partial derivative of spreads to debt ($\varepsilon_1 + 2 \cdot \varepsilon_1 \cdot D$) from equation (2).

⁽²⁹⁾ The direct impact of this variable on spreads seems less robust, also given the relatively low variability of government effectiveness in the EU/EA compared to other parts of the World (see Box 1.2 of the FSR 2018).

(Continued on the next page)

Box (continued)

private sector net foreign liabilities are associated with an increase of the default risk of the latter. This evolution may in turn dampen the government soundness directly through negative effects on economic activity, tax revenue and (higher) public spending, and indirectly if the government has to eventually bailout some entities. A higher potential GDP growth, positively associated with debt sustainability, also seems to trigger lower interest rate spreads.

Table 1: **Regression results,**
Dependent variable: nominal interest rate
spreads on 10-year government bond yields
vs. the German 10-year bund

	(1)	(2)	(3)	(4)	(5)
	Benchmark	Debt quadratic	Debt spline (60)	Debt spline (90)	Debt & gov. effectiveness
Net intern. investment position (NIIP) (-)	-0.0102*** (0.00243)	-0.00808** (0.00398)	-0.00824** (0.00394)	-0.00892** (0.00358)	-0.0160*** (0.00353)
Real potential GDP (GDP _{pp}) (-)	-0.326*** (0.0917)	-0.343*** (0.121)	-0.353*** (0.128)	-0.325*** (0.108)	-0.325*** (0.0871)
Govt effectiveness (gee) (-)	-1.178* (0.699)	-0.528 (0.362)	-0.549 (0.398)	-0.926** (0.436)	-0.154 (1.047)
Govt debt (D) (+, linear)	0.0235* (0.0134)	-0.0557*** (0.0160)	-0.0265 (0.0183)	-0.00398 (0.00900)	0.0438** (0.0200)
Govt debt square (D ²) (+)		0.000505*** (7.88e-05)			
Govt debt spline (D - 60) (+)			0.0752** (0.0304)		
Govt debt spline (D - 90) (+)				0.0829*** (0.0203)	
Govt debt interacted with effectiveness (D x gee) (-)					-0.0219** (0.00981)
Constant	1.887* (1.053)	3.573*** (1.086)	3.254*** (1.218)	2.888*** (1.034)	0.702 (1.635)
Observations	421	421	421	421	377
Number of countries	26	26	26	26	25
R-squared	0.379	0.456	0.420	0.468	0.421
RMSE	1.325	1.240	1.281	1.225	1.294

(1) Equations (1)-(5) are estimated through two-stage least squares, with debt instrumented by its lag, given the likely endogeneity of this variable. Robust standard errors. ***, ** and * denote p-values less than or equal to 1%, 5% and 10%, respectively. Countries included are all EU except Germany (benchmark country) and Slovakia (government effectiveness not available).

Source: European Commission

3. INTRODUCING FEEDBACK EFFECTS ON INTEREST RATES IN THE DSA

DSA frameworks need to account for feedback effects, while remaining tractable. As discussed in Corsetti (2018) and Alcidi and Gros (2018), all the variables underpinning the standard debt accumulation equation are susceptible to respond to each other endogenously. Some of these endogenous feedback effects are already taken into account in the Commission DSA framework (e.g. feedback effects on growth, endogenous development of the implicit interest rate, combined stress test scenario, stochastic scenarios). At the same time, an appropriate balance between the

need to account for these potentially complex effects and tractability needs to be found ⁽³⁰⁾.

Based on the results presented in part 2, a simulation is conducted for a high debt country.

In particular, a negative shock on the primary balance (raising the debt to GDP ratio) is combined with a negative feedback effect on interest rate spreads, according to specification (4) – whereby an increase of 1 pp. of the debt to GDP ratio in excess of 90% of GDP is associated to a rise of 8 basis points of sovereign spreads ⁽³¹⁾. In this simulation, it is realistically assumed that only about 15% of debt is renewed every year (in line with the current average maturity of debt in the EA), resulting in a relatively slow response of the effective interest rate paid by governments on their debt.

Given the current relatively long maturity structure of debt, introducing feedback effects on the interest rate would have material impacts on the debt dynamic only over a long term horizon. By T+10, the additional impact on the debt to GDP ratio (compared to a scenario where only the adverse effect of the primary balance reduction is taken into account) would be limited (less than 2 pps. of GDP). Over a longer horizon however, the effect would be quite sizeable (around 15 pps. of GDP by T+20). In countries where the maturity structure of debt is shorter and / or a fraction of debt is issued at variable rates, the pass-through to the effective interest rate and hence the debt dynamic could be faster ⁽³²⁾.

⁽³⁰⁾ Debrun et al. (2019).

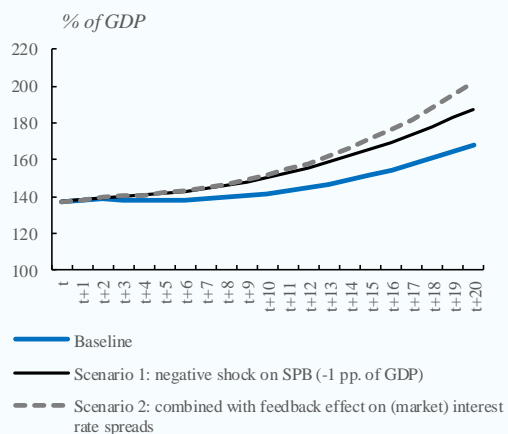
⁽³¹⁾ In this report, interest rate assumptions are set, *in the baseline*, in line with financial market expectations.

⁽³²⁾ Alcidi and Gros (2018), when carrying a similar simulation, found a faster impact, as they assume an immediate pass through from market to implicit interest rates (implying a roll-over of all debt in year T+1).

(Continued on the next page)

Box (continued)

Graph 1: **Government debt to GDP projections over t+20 (including a feedback effect on interest rate spreads)**



(1) In the scenario 2, it is assumed that (market) interest rate spreads increase by 8 bps. for every 1 pp. increase of the debt to GDP ratio. Furthermore, in line with the current average maturity in the EA, around 15% of debt is assumed to be renewed every year.

Source: Commission services

Box 3.3: Medium-term fiscal sustainability challenges for Greece

Greece successfully completed its European Stability Mechanism (ESM) stability support programme on 20 August 2018. Following the end of the programme, Greece has been integrated into the regular economic surveillance framework for EU Member States under the European Semester for economic policy co-ordination. In order to cater for the specific needs and challenges of Greece, the Commission has activated enhanced surveillance for Greece under Regulation (EU) No 472/20131, effective as from 21 August 2018. The last Enhanced Surveillance Report was issued in November 2019 ⁽¹⁾ – alongside the 2019 autumn European Semester package – including an update of the debt sustainability analysis (DSA) and capacity to repay.

Following the integration of Greece into the EU regular surveillance framework, this edition of the Debt Sustainability Monitor provides an analysis of Greece debt sustainability challenges. Given the specificities of the Greek debt structure, notably the large share of official sector lending, the analysis differs somehow from the standardised horizontal approach followed in the rest of this report. This Box presents: i) the revisions of the DSA baseline and underlying macro assumptions since the 2018 European Semester package; and ii) the standard Commission alternative scenarios and sensitivity tests for assessing medium-term fiscal sustainability risks ⁽²⁾. These calculations are in-line with post-programme commitments.

Debt sustainability analysis

The DSA update ⁽³⁾ published with the 2019 autumn Semester package (henceforth, the 2019 DSA) shows that the current low-interest rate

environment has reduced debt sustainability risks relative to the previous update of the 2018 autumn Semester package (henceforth, the 2018 DSA). The changes in the 2019 DSA update are due to revised macroeconomic projections (mainly, revised medium-term inflation projections), and assumptions on government refinancing market interest rates (see Table 1).

Table 1: Main macro assumptions underlying the baseline (2019 DSA vs. 2018 DSA update)

	2019	2020	2030	2040	2050	2059	2060	Average 2020-60
Primary surplus (% of GDP)	2019 DSA	3.5	3.5	2.2	2.2	2.2	2.2	2.3
	2018 DSA	3.5	3.5	2.2	2.2	2.2	2.2	2.3
Real growth (%)	2019 DSA	1.8	2.3	1.0	1.0	1.0	1.0	1.1
	2018 DSA	2.2	2.3	1.0	1.0	1.0	1.0	1.1
Nominal growth (%)	2019 DSA	2.6	3.2	3.0	3.0	3.0	3.0	3.0
	2018 DSA	3.4	3.6	3.0	3.0	3.0	3.0	3.0
Re-financing rates (%)	2019 DSA	2.4	2.7	4.6	4.3	3.9	3.5	3.4
	2018 DSA	3.8	4.0	5.1	4.7	4.3	4.0	3.9

Source: Commission services

Note: The primary surplus figures until 2022 reflect post-programme commitments.

The market interest rates assumptions build on the same methodology, as presented in the 2018 Compliance Report ⁽⁴⁾, which gives less favourable assumptions than the current market pricing of forward rates. As the Greek debt structure is expected to continue to exhibit a large share of official sector holdings over the next decades, which in turn has a significant impact on market perceptions of rollover risks, the current market expectations (forward rates) may be a poor guide to anchor future financing costs developments in a

⁽⁴⁾ For details see Compliance Report, ESM Stability Support Programme for Greece, Third Review, March 2018, available online. https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/which-eu-countries-have-received-assistance/financial-assistance-greece_en#esm-stability-support-programme

⁽¹⁾ European Commission (2019b).

⁽²⁾ The revisions of the DSA baseline and underlying macro assumptions are taken from the November 2019, and respectively, November 2018 Enhanced Surveillance Reports.

⁽³⁾ The 2019 DSA update includes: updated debt data for 2018, updated macroeconomic projections, updated assumptions on risk free rates, interest and amortization payments on Greek Loan Facility (GLF) as well as other loans, new bond issuance, and an updated privatisation schedule. The partial early repayment of the IMF loan is also taken into account. The income equivalents from the SMP-ANFA profits are assumed to be disbursed and used for debt service purposes only.

(Continued on the next page)

Box (continued)

central scenario for Greece ⁽⁵⁾. As the official debt holdings are expected to be gradually replaced with market financing, market expectations are also expected to adjust to the changes in the debt structure and reflect new rollover risks. It is currently difficult to reflect in the baseline the timing of such expected revisions in market expectations in a consistent way.

Under the macroeconomic assumptions of the baseline, a declining trend for the government debt ratio is projected, yet remaining at high levels until mid-2040. Assuming under the baseline the full implementation of all the medium term measures agreed in June 2018 ⁽⁶⁾, the government debt-to-GDP ratio is expected to be firmly anchored on a downward path until 2060. However, it would remain at high levels, above 100% of GDP, until 2040, which reflects improved debt dynamics when compared with the previous 2018 DSA update, where the debt ratio was expected to hover above 100% until 2050 ⁽⁷⁾. By

⁽⁵⁾ Given the specificities of the Greek debt structure, the interest rate assumptions, as well as the assumption on the path for the primary balance, differ from the standardised horizontal approach presented in Box 1.1, Chapter 1. The significant official lending provided to Greece has led to a more favourable maturity structure of debt than what could be expected for a euro area economy under market financing. The euro area average residual maturity on debt securities was about 7.5 years in October 2019 (October ECB Monthly Data Note on Debt securities issuance and service by EU governments, 2019), compared to the average residual maturity on Greek medium and long-term debt of about 23 years (in nominal terms).

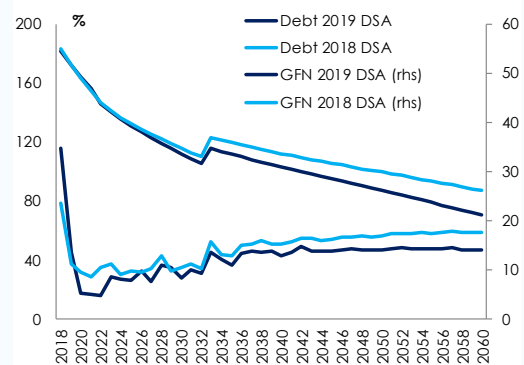
⁽⁶⁾ The abolition of the step-up interest rate margin related to the debt buy-back tranche of the 2nd Greek programme as of 2018; the use of 2014 SMP profits from the ESM segregated account and the restoration of the transfer of ANFA and SMP income equivalent amounts to Greece (as of budget year 2017); a further deferral of EFSF interest and amortization by 10 years and an extension of the maximum weighted average maturity (WAM) by 10 years, respecting the programme authorized amount.

⁽⁷⁾ In 2033, there is a hike in the debt ratio when the deferred interest payments are capitalised and included in the EDP debt. Under the EDP definition of debt, deferred interest should be added only once, when the entire deferral period is over. In programme documents, the deferred interest has been added to the debt stock in the year of their deferral. Given that market rates are assumed the same under the two approaches, they result in identical outcomes for GFN-to-GDP, over the horizon, and debt-to-GDP figures, at the end of the deferral period.

2060, the debt ratio is expected to be about 18 pps. of GDP lower than in the previous 2018 DSA update (see Graph 1). The debt projections under the baseline reflect very favourable snowball effects (implicit interest rate – growth rate differential) throughout the projection period (see Table thereafter).

Government gross financing needs (GFNs) remain moderate, hovering around 10% of GDP until 2032. Thereafter, GFNs would start to gradually increase and reach 14% of GDP by the end of the projection horizon (2060), which reflects lower financing pressures than the previous update, where GFNs were expected to increase to about 18% of GDP by 2060 (see Graph 1).

Graph 1: Government debt-to-GDP ratio and GFNs projections, baseline (2019 DSA vs. 2018 DSA)



Source: Commission services

Commission standard alternative scenarios and sensitivity tests

Given reduced financing needs (i.e. GFN below 10 % of GDP) and small rollover risks over the next 10 years, negative shocks to growth or interest rates do not have a sizable impact on the debt ratio over the medium-term. On the back of limited new issuance needs, the overall implicit interest rate is expected not to be very responsive to changes in market interest rates over the next 10 years, while shocks to GDP growth, while deteriorating the debt trajectory, would not change the downward trend. A very large set of jointly simulated shocks to growth, interest rates and the primary balance, based on the historical volatility of the Greek economy, points to a low probability, of about 3%,

(Continued on the next page)

Box (continued)

of the debt ratio in 2024 being greater than in 2019, entailing, however, non-negligible risks given the high starting level. Moreover, the relatively wide cone of the debt paths distribution points to high uncertainty surrounding the baseline projections ⁽⁸⁾.

If fiscal policy were to revert to historical pattern (with the SPB gradually converging to its last 15-year historical average, a deficit of -1.8% of GDP), the Greek debt ratio in 2030 would be as much as 32.3 pps. of GDP higher (at 144.2% of GDP in 2030) than in the baseline. When increasing the likelihood of more adverse shocks to the primary balance, the debt ratio would remain on a declining path over the medium term ⁽⁹⁾. The debt ratio would be ranging from 127.3 % of GDP to 166.3% of GDP in 2024, with an 80% probability. The probability that the Greek government debt ratio would be higher in 2024 than its current level would slightly increase, but remain rather small (around 6%). Nevertheless, the baseline would fall within the 20th and the 40th percentile of the debt distribution cone, reflecting a weak resilience of the pace of debt reduction assumed under the baseline to a relatively more adverse shock scenario.

In addition to the updated 2019 DSA, the standard Commission medium-term fiscal sustainability indicator (S1) highlights even more the significant debt challenge of Greece ⁽¹⁰⁾. Given the very high debt burden, the S1 indicator reaches a value well above the upper threshold, at 5.5 pps. of GDP (corresponding to an additional annual budgetary effort of 1.1. pps of GDP between 2022 and 2026). While the solid initial budgetary position moderates

⁽⁸⁾ The difference between the 10th and 90th percentile in 2024 is of around 48.6 pps. of GDP.

⁽⁹⁾ The restriction on the primary balance upside shock is defined as ½ standard deviation of the historical primary balance sample. As a result, the cone of the fan chart shifts asymmetrically upwards compared to the symmetric fan chart.

⁽¹⁰⁾ The S1 indicator is calculated based on the baseline assumptions underlying the 2019 DSA update, which differ somewhat from the common methodologies applied in the report. For instance, the standardized approach would assume that the structural primary balance of the last forecast year (2021) is maintained in the following years, and modified only by adding the expected changes in the cost of ageing. In the case of Greece, the costs of ageing are already included in the primary balances projections over the medium- and long-term in line with post-programme commitments, and therefore, the S1 indicator is calculated directly using the baseline primary balance projections.

this value, it also points to a very challenging fiscal position to be sustained in order to bring the debt-to-GDP ratio to the SGP reference threshold of 60% of GDP within 15 years.

Additional mitigating and aggravating risk factors exist. The structure of the Greek government debt, in terms of maturity structure and currency denomination helps mitigating vulnerabilities. As official lenders hold the majority of government debt, Greece is in principle largely immune to risks of fiscal distress in the short-term; notably, to rollover risks associated with high debt levels ⁽¹¹⁾. Furthermore, risks stemming from a high share of short-term debt are more than offset by the existing substantial cash buffer. State cash reserves remained high at around €20.3 billion as of end-September 2019. The available cash reserves are sufficient to cover financing needs of more than two years ahead, even after the IMF early repayment. By contrast, the large negative international investment position could be an aggravating factor ⁽¹²⁾, as well as the share of non-performing loans in the banking sector, which points to non-negligible contingent liability risks.

⁽¹¹⁾ This is also reflected by the value of the Commission early-warning indicator, *the S0 indicator*, which stays at 0.26 well below the critical threshold.

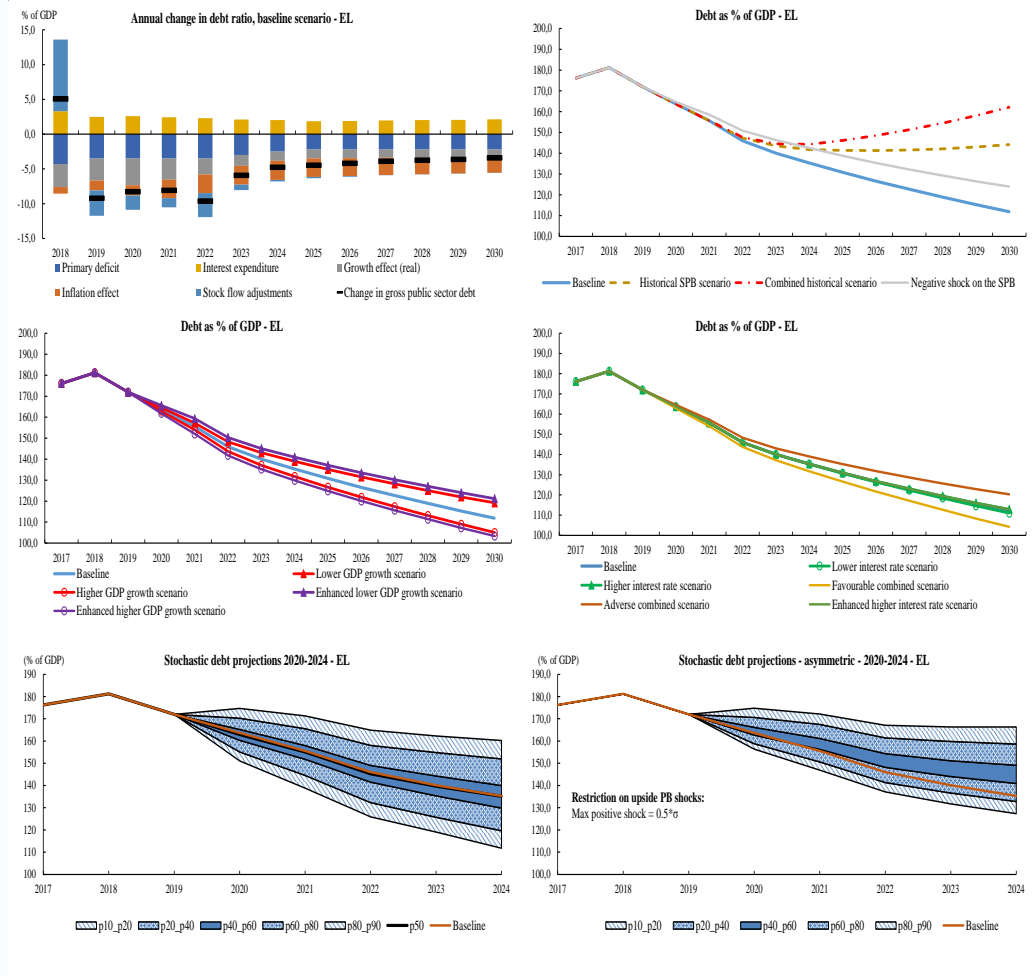
⁽¹²⁾ The share of government debt held by the non-resident external official lenders is currently above 80% for Greece. Given the large weight of the external official sector in total outstanding debt, market perception of rollover risks is negligible. The recent new issuances of medium- and long-term government debt securities represent currently only about 10% of total government debt, of which, on average, only 10% were placed with domestic Greek investors, the bulk being bought by UK-based Fund Managers (on average, about 45%).

(Continued on the next page)

Box (continued)

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

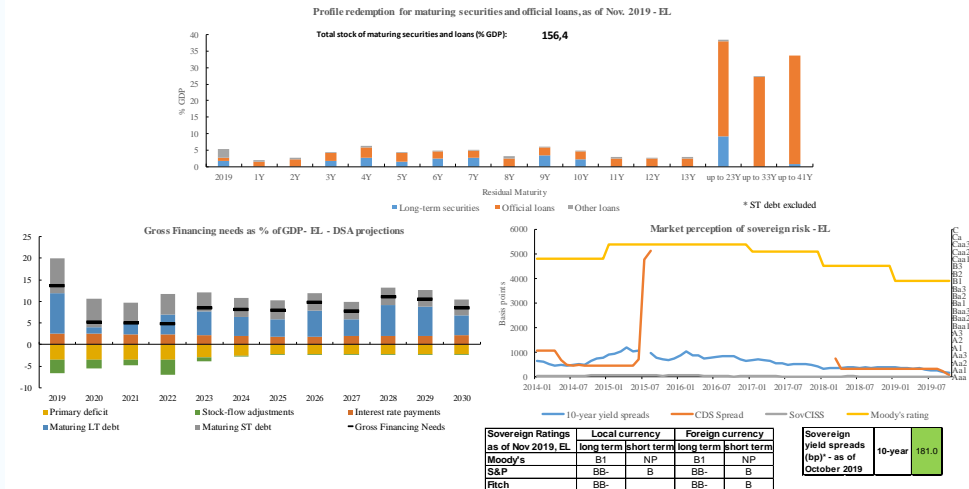
EL - Debt projections baseline scenario	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	181,2	172,0	163,7	155,6	146,0	140,1	135,3	130,8	126,6	122,7	118,9	115,3	111,9
Changes in the ratio (-1+2+3) of which	5,0	-9,2	-8,3	-8,1	-9,6	-5,9	-4,8	-4,5	-4,2	-3,9	-3,7	-3,6	-3,4
(1) Primary balance	4,3	3,5	3,5	3,5	3,5	3,0	2,5	2,2	2,2	2,2	2,2	2,2	2,2
(2) Snowball effect (2.1+2.2+2.3)	-1,0	-2,1	-2,7	-3,2	-2,7	-2,1	-2,1	-2,1	-1,9	-1,7	-1,5	-1,4	-1,2
(2.1) Interest expenditure	3,3	2,5	2,6	2,4	2,3	2,1	2,0	1,9	1,9	2,0	2,0	2,1	2,1
(2.2) Growth effect	-3,3	-3,2	-3,8	-3,1	-2,3	-1,6	-1,3	-1,3	-1,2	-1,2	-1,2	-1,1	-1,1
(2.3) Inflation effect	-1,0	-1,4	-1,5	-2,6	-2,7	-2,7	-2,7	-2,7	-2,6	-2,5	-2,4	-2,3	-2,3
(3) Stock-flow adjustments	10,3	-3,6	-2,0	-1,3	-3,5	-0,8	-0,2	-0,2	-0,1	0,0	0,0	0,0	0,0



(Continued on the next page)

Box (continued)

2. Financing needs and financial information



3. Risks related to the structure of public debt financing and net International Investment Position

Public debt structure - EL (2018)	Share of short-term government debt (p.p.): 5,8	Share of government debt in foreign currency (%): 2,2	Share of government debt by non-residents (%): 0,8*	Net International Investment Position (IIP) - EL (2018)	Net IIP (% GDP): -143,3
-----------------------------------	---	---	---	---	-------------------------

*The share of government debt held by the non-resident external official lenders is currently above 80% for Greece. Given the large weight of the external official sector in total outstanding debt, the signal provided by this indicator becomes less relevant.

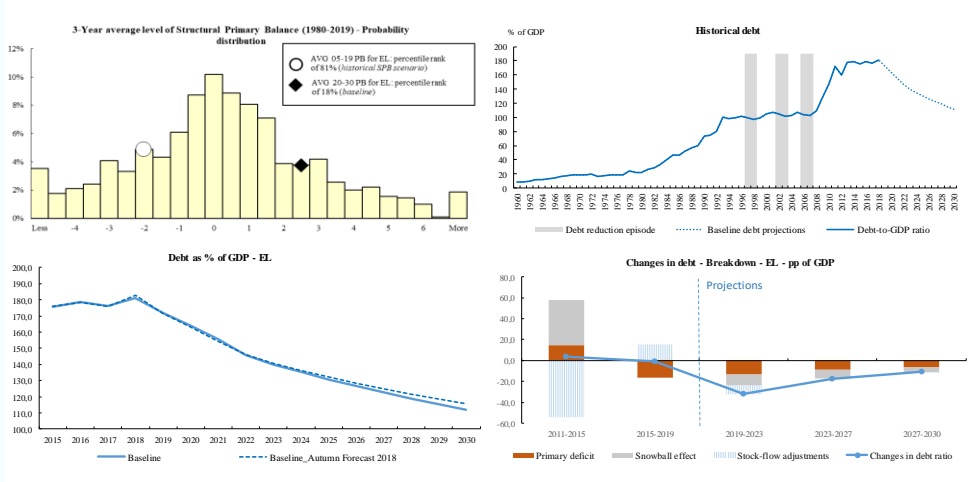
4. Risks related to government's contingent liabilities

General government contingent liabilities		EL					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		35,6	30,7	27,6	6,2	3,8	6,3
of which	One-off guarantees	35,1	30,6	27,6	6,2	3,8	5,8
	Standardised guarantees	0,6	0,1	0,0	0,0	0,0	0,4
Public-private partnerships (PPPs) (% GDP)		0,0	0,0	0,1	0,1	0,1	0,4
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)		2011	2013	2015	2017	2018	2018
	Liabilities and assets outside gen. gov. under guarantee	31,4	27,0	24,0	0,2	0,2	0,7
	Securities issued under liquidity schemes	1,3	1,3	1,2	0,0	0,0	0,0
	Special purpose entity	0,0	0,0	0,0	0,0	0,0	0,1
	Total	32,7	28,3	25,2	0,2	0,2	0,8

Government's contingent liability risks from banking sector - EL (2018)	Private sector credit flow (GDP) (%)	Change in nominal house price index	Bank loans-to-deposits ratio (p.p.):	Share of non-performing loans (%):	Change in share of non-performing loans (p.p.):	NPL coverage ratio
	-1,1	1,6	94,6	39,2	-5,6	47,1

*The bank loans-to-deposits ratio, the share of non-performing loans, and the NPL coverage ratio refer to June 2019.

5. Realism of baseline assumptions



4. LONG-TERM FISCAL SUSTAINABILITY ANALYSIS

4.1. THE ECONOMIC AND BUDGETARY IMPLICATIONS OF AGEING: LATEST UPDATE

As in the Fiscal Sustainability Report 2018, the long-term economic and budgetary projections rely for most Member States on the Ageing Report 2018. Yet, in a number of countries, significant pension reforms took place last year that lead to a revision of their cost of ageing projections. This section presents these revised projections.

A number of Member States have carried out pension reforms in the last year, leading to an update of long-term fiscal sustainability risks. The Economic Policy Committee (EPC), through its technical Ageing working group (AWG), have carried out a peer review of the new reforms measures in Croatia, Romania, Greece and Italy (see table 4.1 for an overview of the main measures affecting expenditure) ⁽⁵⁶⁾.

In all these pension reform cases, pension expenditure is now projected to rise more than what was the case in the 2018 Ageing Report. By 2070, the highest upward revision occurs in Romania (by 3.9 pps of GDP, while in Italy it is unchanged) (see Graph 4.1). For Croatia and Italy, an adverse scenario was prepared, to take account of possible upward risks to pension spending. In this case, the increase would be even higher up to 2040 for Italy and throughout the projection horizon for Croatia (see graph 4.1).

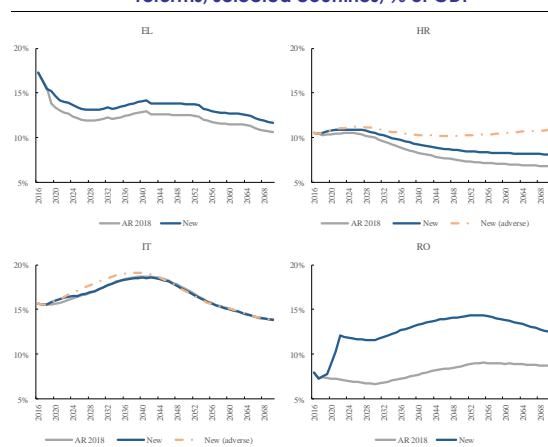
⁽⁵⁶⁾ The impact of these reforms measures are included in the sustainability analysis in this report.

Table 4.1: Main pension reform measures

Main measures	
Croatia	Extension of pension supplement options to all second pillar participants, advancing the already adopted increase in the retirement age (planned to be abolished since the law was passed)
Romania	Ad hoc increases of pension indexation until 2021, subsequent changes of pension indexation and valorisation, shortening of the contributory period for benefit calculation
Italy	Temporary introduction of early retirement, 'Quota 100' (62+38), temporary suspension of the planned increase in the early retirement age
Greece	Abolition of the reduction of main and auxiliary pensions as of 2019, introduction of a 13th pension, abolition of age limits for survivor pensions

Source: AWG, EPC, Commission services.

Graph 4.1: Projected pension spending before and after reforms, selected countries, % of GDP



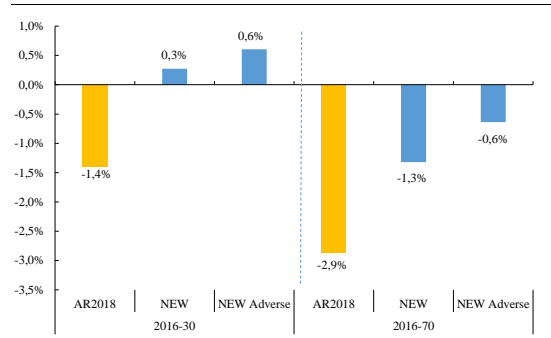
(1) The adverse scenario for Croatia assumes valorisation and indexation of pensions fully to wages instead of a combination of wages and prices, in view of the sharp projected decline of the pension benefit ratio. The adverse scenario for Italy assumes that the temporary measures (until 2021 and 2026, respectively) would become permanent.

Source: AWG, EPC, Commission services.

Taken together, this latest set of reforms have led to an upward revision of pension spending, which would be even more pronounced if additional upside risks were to materialise (adverse scenario). In the updated baseline considered in this report, long-term budgetary projections of pension expenditure are revised upward by 1.7 pps of GDP by 2030, and 1.6 pps of GDP by 2070 on average (in the four countries considered) - compared to the previous projections (as of the Ageing Report 2018) - thus worsening the fiscal sustainability prospect. Considering further upward risks, as depicted by the adverse scenario, the upward revision of pension spending would be as much as 2 pps of GDP by 2030 and

2.3 pps of GDP by 2070 – compared to the Ageing Report 2018 projections (see Graph 4.2).

Graph 4.2: **Average projected pension spending changes, before and after reforms, pps of GDP (average over Croatia, Romania, Italy and Greece)**



(1) The graph shows the simple average of the projected change in pension spending for the reform countries (Croatia, Romania, Greece and Italy).

Source: AWG, EPC, Commission services.

4.2. LONG-TERM FISCAL SUSTAINABILITY INDICATOR: THE S2 INDICATOR

4.2.1. Baseline results of the S2 indicator

Fiscal sustainability in the long term relates to the achievement of the government's intertemporal budget constraint. This constraint, which is also known as the solvency condition, refers to the capacity of a country to meet its debt obligations, over an infinite horizon, with a stream of future primary surpluses. This condition requires that the government debt stabilizes over the long term (i.e. by 2070). Other things equal, the greater the projected cost of ageing, the more difficult it is to fulfil the intertemporal budget constraint, as higher revenue (in present terms) is required to cover these additional costs, in addition to other expenditure, including the cost of servicing the outstanding debt.

The S2 indicator is the central element of the long-term sustainability analysis. Using the infinite version of the government budget constraint, the S2 fiscal sustainability gap indicator measures the budgetary adjustment that would ensure sustainable public finances in the long term. Specifically, this indicator shows the upfront adjustment to the current structural primary balance (subsequently kept constant at the adjusted

value forever) that is required to stabilise debt-to-GDP ratio over the infinite horizon, taking into account any additional expenditure arising from an ageing population ⁽⁵⁷⁾.

Table 4.2: **Results of the S2 long-term sustainability indicator**

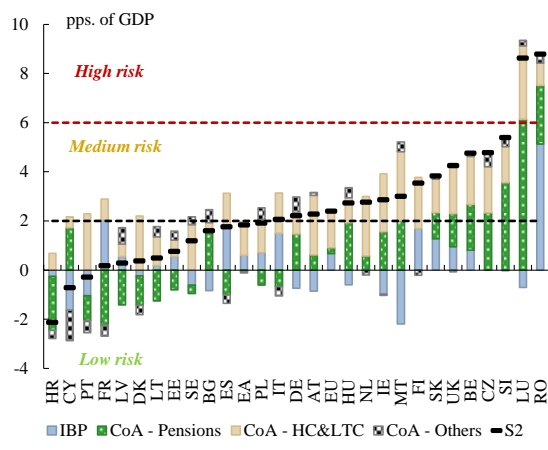
	S2			CoA			
	S2	IBP	CoA	Pensions	HC	LTC	Others
BE	4,8	0,8	4,0	1,9	0,4	1,6	0,1
BG	1,6	-0,8	2,4	1,6	0,2	0,1	0,5
CZ	4,8	0,0	4,8	2,3	0,8	1,1	0,6
DK	0,4	-0,2	0,6	-1,2	0,7	1,5	-0,4
DE	2,2	-0,8	3,0	1,5	0,5	0,4	0,6
EE	0,8	0,5	0,2	-0,8	0,3	0,3	0,4
IE	2,9	-1,0	3,9	1,6	0,8	1,6	-0,1
ES	1,8	1,7	0,1	-1,0	0,4	1,0	-0,3
FR	0,2	2,0	-1,9	-2,2	0,3	0,5	-0,5
HR	-2,1	-0,3	-1,9	-2,2	0,5	0,2	-0,3
IT	2,1	1,5	0,6	-0,7	0,7	0,9	-0,4
CY	-0,7	-1,6	0,9	1,7	0,3	0,2	-1,2
LV	0,3	0,5	-0,3	-1,4	0,4	0,1	0,7
LT	0,5	0,2	0,3	-1,3	0,3	0,9	0,4
LU	8,6	-0,7	9,4	6,1	0,9	2,1	0,2
HU	2,7	-0,6	3,3	1,9	0,6	0,4	0,4
MT	3,0	-2,2	5,2	2,0	1,8	1,0	0,4
NL	2,8	0,0	2,8	0,6	0,5	1,9	-0,2
AT	2,3	-0,9	3,2	0,6	1,0	1,4	0,1
PL	1,9	0,7	1,2	-0,6	0,7	0,6	0,5
PT	-0,3	-1,0	0,8	-1,0	1,7	0,6	-0,5
RO	8,8	5,1	3,7	2,4	0,7	0,2	0,4
SI	5,4	0,0	5,4	3,6	0,8	0,7	0,4
SK	3,8	1,3	2,6	1,1	0,9	0,4	0,1
FI	3,6	1,7	1,9	0,0	0,5	1,6	-0,2
SE	1,2	-0,6	1,8	-0,3	0,5	1,3	0,3
UK	4,3	0,9	3,3	1,4	1,1	1,0	-0,1
EU-28	2,4	0,7	1,7	0,2	0,7	0,8	0,0
EA	1,8	0,6	1,2	-0,1	0,5	0,8	0,0

Source: Commission services.

The S2 indicator points to fifteen Member States at high or medium fiscal risk in the long term. The upfront adjustment to the primary structural primary balance implied by the S2 indicator in the EU is shown in Table 4.2 and Graph 4.3. Romania, with the highest value of the S2 indicator (8.8 pps. of GDP), faces substantial long-term sustainability challenges, related in particular to an unfavourable initial budgetary position (IBR) and projected pressure stemming from an ageing population, especially related to pension spending. Luxembourg is the country with the second highest long-term sustainability gap in the EU (at 8.6 pps. of GDP) and the only other country for which the level of the S2 indicator stands above the high risk threshold. The other countries with fiscal gaps pointing to medium risk are SI, CZ, BE, UK, SK, FI, MT, IE, NL, HU, AT, DE and IT.

⁽⁵⁷⁾ The upfront adjustment to the structural primary balance is assumed to take place in 2022, which is the first year of the projection horizon after the last forecast year (see annex A5 for further details).

Graph 4.3: The S2 sustainability indicator and its components



(1) For the long-term sustainability indicator S_2 , the following thresholds are used to assess the scale of the sustainability challenge: 1) if S_2 is lower than 2, the country is assigned low risk; 2) if S_2 is between 2 and 6, the country is assigned medium risk; 3) if S_2 is greater than 6, the country is assigned high risk (see European Commission, 2012 and 2016a).
Source: Commission services.

Government spending on health and long-term care contributes to widening the fiscal sustainability gap in all the Member States. Graph 4.3 shows for each Member State a disaggregation of the S_2 indicator in terms of the initial budgetary position (IBP)⁽⁵⁸⁾ and the three components of the long-term cost of ageing (CoA)⁽⁵⁹⁾, namely pensions, healthcare, long-term care, and other determinants (education expenditure and unemployment benefits, see also Table 4.2). The contribution of government spending on health and long-term care to the sustainability gap is particularly high (greater than or equal to 2.0 pps. of GDP) for LU, MT, AT, NL, IE, PT, DK, FI, the UK and BE. Expenditure on pensions is estimated to widen the sustainability gap in fifteen countries, especially in LU, SI, RO, CZ, MT, HU, BE, CY, BG, IE and DE (greater than or equal to 1.5 pps. of GDP). Overall, the contribution of the total cost of ageing to long-term sustainability risks is expected to be very significant, exceeding 2 pps. of GDP in LU, SI,

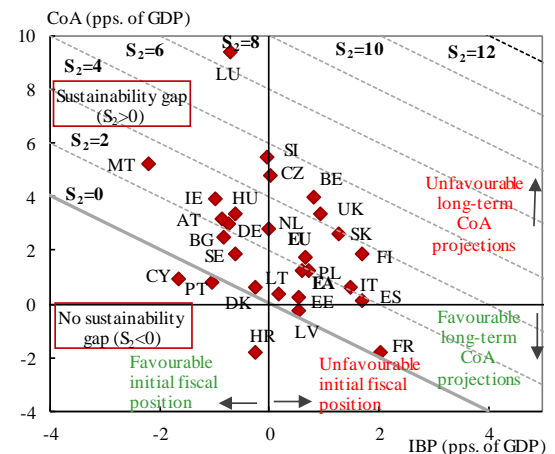
⁽⁵⁸⁾ More specifically, this component of S_2 is given by the gap between the initial structural primary balance, and the debt-stabilising primary balance, and thus abstracting from future changes due to the cost of ageing.

⁽⁵⁹⁾ The long-term budgetary projections (incorporated in the calculation of the sustainability indicators presented here) have been published in European Commission (2018c). For Croatia, Romania and Italy pension expenditure projections are updated as per section 4.1.

MT, CZ, BE, IE, RO, HU, the UK, AT, DE, NL, SK and BG.

The sustainability gap in around half of the Member States is due to both an unfavourable initial fiscal position and the cost of ageing. This is reflected in the position of a significant number of countries in the top right quadrant in Graph 4.4, which maps the Member States according to their respective values for the S_2 indicator and the two components (costs of ageing and IBP).

Graph 4.4: The EU countries mapped across the S2 components ()



Source: Commission services.

Almost all Member States have an unfavourable initial fiscal position and/or adverse expected developments in the cost of ageing. Only HR has both a favourable initial fiscal position and a favourable impact from the projected budgetary cost of population ageing. Among the twelve Member States that have a low long-term sustainability risk (S_2 less or equal than 2.0 pps. of GDP), Croatia, Cyprus, and Portugal are the only Member States that have a negative S_2 sustainability gap (lying in the area south-west of the solid diagonal line). AT, BG, CY, DE, DK, HU, IE, LU, MT, PT and SE enjoy a favourable initial budgetary position in 2021 but an unfavourable impact of projected age-related costs (located in the top left quadrant). With the exception of Cyprus and Portugal, the favourable initial budgetary position in these countries (under the assumption of no-fiscal policy change) is not sufficient to guarantee long-term sustainability, given the expected long-term increase in ageing-related expenditure. Other countries (Latvia and

France) face favourable developments in long-term age-related spending but an unfavourable initial budgetary position (lying in the bottom right quadrant). However, for these two countries the drop in age-related spending does not offset the unfavourable initial fiscal position, thereby leading to a positive reading for the S2 indicator, though at a low level.

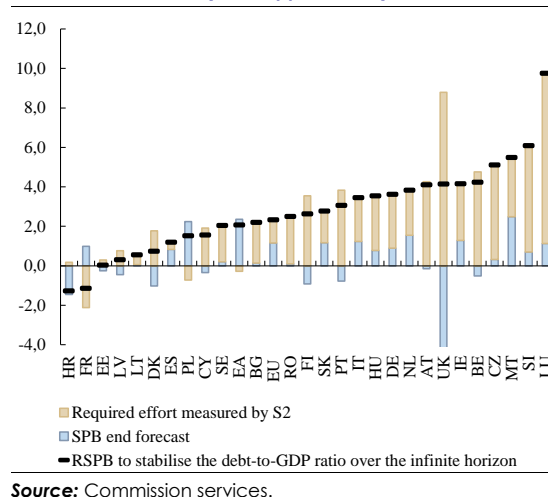
Besides the S2 indicator, the overall long-term sustainability risk takes into account the overall results of DSA. The results of the overall long-term sustainability risks are presented in chapter 6, while the methodology used is presented in Annex A9 ⁽⁶⁰⁾.

4.2.2. The required structural primary balance

The overall size of the required structural primary balance (RSPB) is informative about the overall fiscal policy that needs to be sustained to close the sustainability gap. The RSPB is the sum of the structural primary balance in 2021 (i.e. end of forecast period) and the required additional effort measured by S2 to stabilise the debt ratio in the long term. The RSPB is estimated at 9.8% of GDP for Luxembourg, 6.1% of GDP for Slovenia and at or slightly more than 5.0% of GDP for Czech Republic and Malta. Graph 4.5 shows that for seventeen Member States the structural primary surplus required to stabilise debt in the long term exceeds 2.0% of GDP.

⁽⁶⁰⁾ Box 4.1 of the Fiscal Sustainability Report 2018 also discusses more extensively the approach used to assess long-term sustainability challenges.

Graph 4.5: **The required structural primary balance to stabilise debt-to-GDP ratio over the infinite horizon (% and pps. of GDP)**



Source: Commission services.

The percentile rank of the RSPB implied by the S2 indicator gives an indication of the degree of the plausibility of the implied adjustment. The RSPB can be benchmarked to the history of primary balances in the EU, hence allowing an assessment of how common (or uncommon) the fiscal position assumed in the projections is, relative to the structural primary balance distribution for all EU countries over 1980-2019. In particular, it indicates where a very large primary balance implied by the S2 is unlikely to be sustained in the long term. The required structural primary balances appear particularly large in LU, SI, MT, CZ, BE, IE, RO, the UK, AT, HU, NL, DE, SK, BG and FI (see Table 4.3) – with a associated percentile rank below 20%.

Table 4.3: **Plausibility of the S2 implied fiscal adjustment**

	Initial SPB	S2	RSPB (% of GDP)	RSPB Percentile rank
BE	-0,5	4,8	4,2	9%
BG	1,2	1,6	2,8	17%
CZ	0,3	4,8	5,1	5%
DK	0,8	0,4	1,2	36%
DE	1,2	2,2	3,5	13%
EE	-0,4	0,8	0,3	52%
IE	1,3	2,9	4,2	9%
ES	-1,0	1,8	0,8	44%
FR	-1,4	0,2	-1,3	76%
HR	1,0	-2,1	-1,1	75%
IT	0,1	2,1	2,2	22%
CY	2,2	-0,7	1,5	31%
LV	-0,3	0,3	0,0	58%
LT	0,1	0,5	0,6	47%
LU	1,1	8,6	9,8	0%
HU	0,9	2,7	3,6	12%
MT	2,5	3,0	5,5	4%
NL	0,8	2,8	3,6	12%
AT	1,6	2,3	3,8	11%
PL	-0,3	1,9	1,6	30%
PT	2,4	-0,3	2,1	24%
RO	-4,6	8,8	4,2	9%
SI	0,7	5,4	6,1	2%
SK	-0,8	3,8	3,1	16%
FI	-0,9	3,6	2,6	19%
SE	1,2	1,2	2,3	21%
UK	-0,2	4,3	4,1	9%
EU28	0,1	2,4	2,5	20%
EA	0,2	1,8	2,0	24%

Source: Commission services.

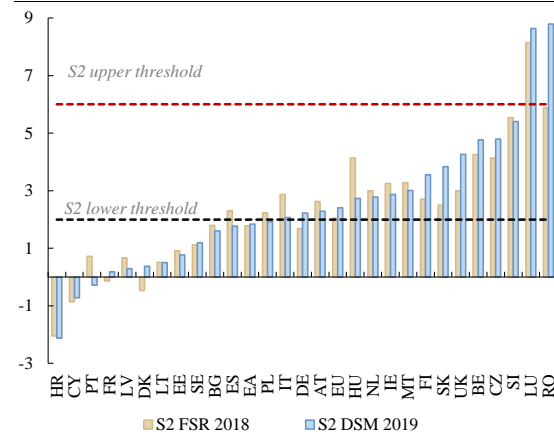
4.2.3. Comparison with previous results

This section compares the results of the S2 indicator with those presented in the Fiscal Sustainability Report 2018 (FSR 2018 henceforth). As in the FSR 2018, the cost of ageing in this report refers to the long-term projections reported in the Ageing Report 2018 for most countries. Therefore, the variation in the fiscal sustainability indicators generally reflects the change in the initial budgetary position, although the ageing costs of IT, HR and RO have been revised (see section 4.1), while the impact of the revision to the interest rate assumption on the S2 indicator is limited (see Box 3.1).

Long-term fiscal sustainability gaps have increased in many Member States. Compared to the FSR 2018, the S2 sustainability gap has increased by 0.4 pps. of GDP for the EU but has remained unchanged for the EA. The required permanent fiscal adjustment to ensure long-term sustainability is higher in twelve Member States. As Graph 4.6 shows, Germany is the only country for which the risk category according to the S2 indicator changes from low to medium, while Romania is the only country for which the category moves from medium to high risk. The risk category improved in ES and PL from medium to low risk. Among countries at medium and high

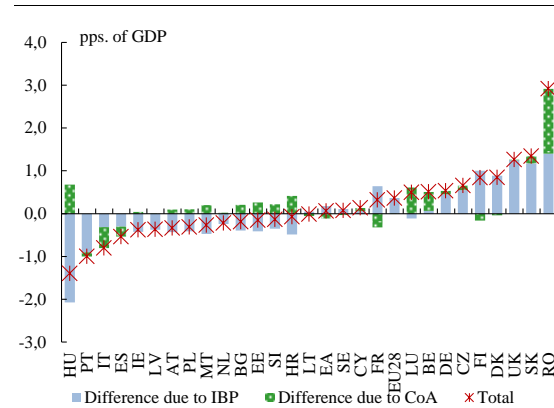
risk, the latest S2 results indicate greater long-term sustainability challenges by more than 0.5 pps. of GDP compared to FSR 2018 for RO, SK, the UK, FI and CZ.

Graph 4.6: **S2 comparison with FSR 2018 (pps. of GDP)**



Source: Commission services.

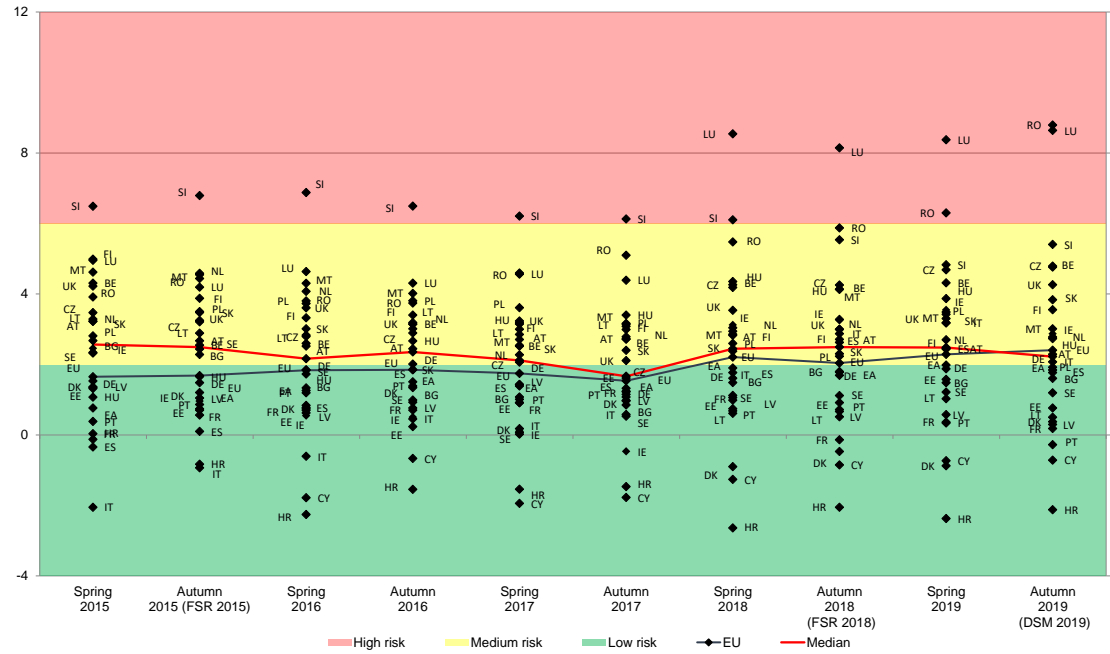
Graph 4.7: **Components of change in S2 (2019 Autumn Forecast compared to FSR 2018 based on 2018 Autumn Forecast)**



Source: Commission services.

According to the S2 indicator, the number of Member States with a low risk for long-term sustainability increased from seven in 2014 to twelve in autumn 2019. This can be seen in Graph 4.8, which allows a comparison between values of the S2 indicator across consecutive Commission forecast vintages (from spring 2015 to autumn 2019). The S2 sustainability gap for the EU as a whole, after reaching a low risk level in 2015, returned to medium risk in 2018. The low risk level of the S2 indicator between 2015 and 2017 reflects the fiscal consolidation undertaken following the economic and financial crisis, as

Graph 4.8: The S2 sustainability indicator across the Commission forecast vintages (pps. of GDP)



Source: Commission services.

well as general improvement in pension projections in the 2015 Ageing Report as a result of more favourable demographic assumptions and the impact of enacted pensions reforms. Higher long-term sustainability challenges in the EU as a whole since 2018 reflect the slight increase in age-related spending of about 0.6 pps. of GDP in the long term in the 2018 Ageing Report compared to the 2015 Ageing Report. In the case of Ireland, Spain and Latvia, the volatility of the long-term fiscal sustainability gap across forecast vintages reflects an initial weak budgetary position around the years of the economic and financial crisis, followed by a substantial consolidation after. The recent increases in the S2 sustainability gap for Belgium, Czech Republic, Ireland, Luxembourg and Romania, are driven largely by higher projected age-related costs in the long term, and the deterioration in the initial budgetary position in some cases, while the increase in the S2 indicator level seen in the latest vintage for Slovakia, the UK and Finland is driven by less a favourable initial budgetary position.

4.3. SENSITIVITY ANALYSIS OF THE S2 INDICATOR

The S2 indicator is sensitive to changes in key assumptions of the baseline no-policy change scenario. Fiscal projections under the baseline scenario, which assumes that current fiscal policies remain unchanged in the long term, are surrounded by uncertainties over a longer horizon. Given these uncertainties, risks can be assessed by comparing the baseline scenario with alternative scenarios. The five alternative scenarios considered in this section include (i) the historical SPB scenario, (ii) the AWG risk scenario, (iii) the population (life expectancy) scenario, (iv) the TFP risk scenario and (v) the interest rate scenario ⁽⁶¹⁾. The S2

⁽⁶¹⁾ The alternative scenarios are specified as follows: (i) the 'AWG risk scenario' assumes higher age-related spending due to non-demographic costs, such as healthcare and long-term care costs in excess of costs expected from purely demographic factors due to technological changes (e.g. development of new drugs) and institutional factors (e.g. widening of long-term care coverage); (ii) the 'historical SPB scenario' assumes that fiscal policy reverts back to historical behaviours (e.g. gradual convergence of the structural primary balance beyond forecast years to its historical average); (iii) the 'population scenario', assumes higher demographic driven costs due to a two-year additional increase in life expectancy at birth in the long term; (iv) the 'TFP risk scenario' assumes a negative shock

results of each sensitivity scenario are reported in Table 4.4.

The S2 fiscal gap varies widely across Member States and sensitivity scenarios. In some countries, the S2 fiscal gap indicator appears overall more sensitive to underlying assumptions than others. This reflects mainly differences in structural and institutional factors, such as the size and volatility of the fiscal position, the presence of automatic adjustment mechanisms in social security systems, the degree of maturity of the social security systems, and indexation rules of social benefits.

The historical SPB scenario depends on the size and the volatility of the fiscal position. Since the last financial and economic crisis, several EU countries have substantially tightened their fiscal stance. In Member States where fiscal policy was historically 'looser', converging back to past behaviours would imply a larger fiscal gap to ensure long-term fiscal solvency (e.g. PL, SI, SK, CZ, IE, PT and the UK).

The outcomes of the 'historical SPB scenario' point to higher sustainability challenges in many Member States. Sustainability risks based on the past pattern of structural primary balances can be much higher or lower than those highlighted by the baseline scenario. The required fiscal adjustment in the long term under the 'historical SPB scenario' would remain above the high-risk threshold for Luxembourg and Romania, and cross that threshold in the case of Slovenia and the UK. Negative deviations from the baseline in the case of BE, DK, DE, ES, IT, LU, RO, FI and SE reflect a more favourable history of fiscal balances, which require a lower fiscal adjustment in order to ensure long-term sustainability.

to the long-term economic outlook in the form of a lower total factor productivity (e.g. TFP growth converges to 0.8% in the long term instead of 1%); and (v) the 'interest rate scenario' tests the impact of a higher interest rate paid by the government on its newly issued debt over the long term - i.e. the real short- and long-term interest rate converging, by T+30, to 3% and 4%, respectively instead of 2% and 3% in the baseline.

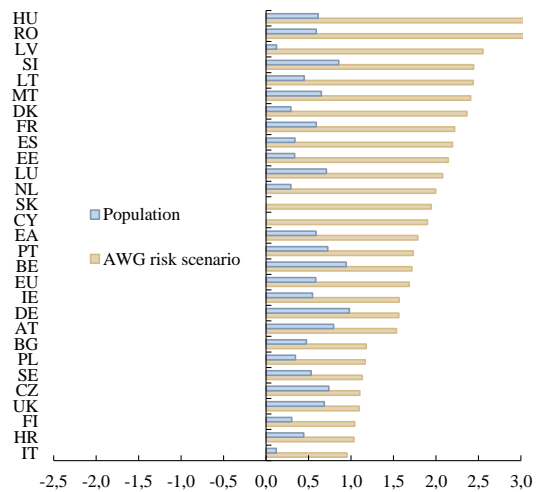
Table 4.4: **S2 results of sensitivity analysis and associated long-term risk**

	S2 baseline scenario	S2 alternative scenarios				
		Historical SPB	AWG risk	Population	TFP risk	Interest rate
BE	4,8	3,7	6,5	5,7	5,6	4,8
BG	1,6	2,3	2,8	2,1	1,8	1,5
CZ	4,8	6,0	5,9	5,5	4,8	4,4
DK	0,4	-1,1	2,7	0,7	0,2	0,2
DE	2,2	1,7	3,8	3,2	2,7	2,2
EE	0,8	1,2	2,9	1,1	0,9	0,8
IE	2,9	5,8	4,4	3,4	2,9	2,8
ES	1,8	1,6	4,0	2,1	2,2	2,5
FR	0,2	0,2	2,4	0,8	1,2	0,9
HR	-2,1	-0,2	-1,1	-1,7	-1,9	-1,8
IT	2,1	0,4	3,0	2,2	2,8	2,9
CY	-0,7	-0,2	1,2	-1,0	-0,5	-0,7
LV	0,3	1,3	2,8	0,4	0,5	0,6
LT	0,5	1,6	2,9	1,0	0,6	0,8
LU	8,6	7,6	10,7	9,3	8,5	7,2
HU	2,7	3,8	6,5	3,3	3,0	2,5
MT	3,0	4,4	5,4	3,7	3,1	2,2
NL	2,8	3,1	4,8	3,1	2,7	2,7
AT	2,3	3,0	3,8	3,1	3,2	2,2
PL	1,9	3,2	3,1	2,3	2,3	2,0
PT	-0,3	2,2	1,5	0,4	0,6	0,2
RO	8,8	6,6	12,3	9,4	9,8	9,0
SI	5,4	6,6	7,8	6,3	5,5	5,3
SK	3,8	5,0	5,8	3,8	4,1	3,6
FI	3,6	1,3	4,6	3,9	4,0	3,5
SE	1,2	0,6	2,3	1,7	1,1	0,9
UK	4,3	6,4	5,4	4,9	4,5	4,1
EU28	2,4	2,7	4,1	3,0	2,9	2,6
EA	1,8	1,6	3,6	2,4	2,4	2,2

Source: Commission services.

The fiscal sustainability gap under the AWG risk scenario tends to be higher. The long-term projections built around higher impact of non-demographic drivers on future health and long-term care costs (the 'AWG risk scenario') can imply a higher S2 sustainability gap compared to the baseline scenario. In particular, in countries with an upward convergence of coverage and costs in health care and long-term care to the EU averages, the AWG risk scenario has typically a higher impact on public spending (e.g. Latvia, Hungary, Romania and Slovenia). Compared to the baseline scenario, higher non-demographic costs require a higher permanent adjustment by around 1.7 pps. of GDP on average in the EU and 1.8 pps. of GDP in the EA. Across the Member States, this sustainability gap increase with respect to the baseline varies from 1.0 pps. in Italy, Croatia and Finland to 3.8 pps. of GDP in Hungary. Coping with future cost pressures from non-demographic drivers would be most challenging for HU, RO, LV, SI, LT, MT and DK.

Graph 4.9: **S2 – Difference between the AWG risk/population and baseline scenarios (pps. of GDP)**



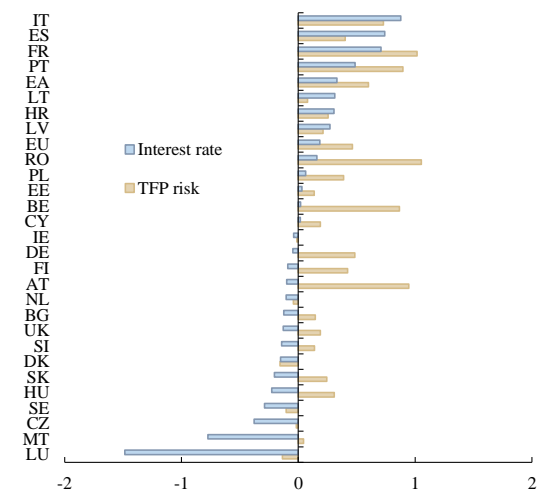
Source: Commission services.

Increases in life expectancy imply also higher sustainability gaps. Under the ‘population scenario’, higher demographic costs due to an additional two-year increase in life expectancy results in higher sustainability gaps compared to the baseline scenario, although lower than those of the ‘AWG risk scenario’. Relative to the baseline scenario, the sustainability gaps across Member States remain below 1 pp. of GDP (see Graph 4.9). Specifically, in countries with automatic adjustment mechanisms in the pension schemes, such as linkage of retirement age or pension benefits to life expectancy, sustainability factors, the impact of changes in life expectancy tends to be milder or even negligible (e.g. Italy, Spain, Cyprus, Latvia, Slovakia and the Netherlands).

The lower TFP growth and higher interest rate scenarios tend to have overall smaller – yet non-negligible - impacts on the long-term fiscal gap. The difference in the sustainability gaps of the TFP risk scenario (compared to the baseline) is highest for Romania and France, while remaining close or below 1.0 pp. of GDP for all Member States (see Graph 4.10). This reflects the fact that pension indexation rules in place tend to affect differently the magnitude of the sustainability gaps. When pension benefits are indexed to wages, the pension-to-GDP ratio is largely invariant to changes in labour productivity developments, compared to countries where they are linked to prices (e.g. France and Italy).

Similarly, the impact of a higher interest rate in the long term on the sustainability gaps would be small in most Member States. However, a higher interest rate would be more challenging for Italy, Spain, France and Portugal (see Graph 4.10). Under the interest rate scenario, the overall lower impact under the interest rate scenario is explained by two counter-acting effects: on one hand, higher interest rates increase future interest payments, entailing a higher fiscal adjustment needed to meet the IBC; on the other hand, as future ageing costs enter the S2 calculation in discounted terms, higher interest rates decrease their weight in present value.

Graph 4.10: **S2 – Difference between interest rate/TFP risk and baseline scenarios (pps. of GDP)**



Source: Commission services.

Box 4.1: Fiscal sustainability, intertemporal and intergenerational imbalances

Introduction

Most countries use public finances to redistribute resources from the working-age population to the old and the very young so as to smoothen resources over the life cycle of individuals. As the EU is confronted with population ageing, this societal model is facing challenges. This is particularly the case in light of public spending on pension and health care in the EU currently accounting for almost 20% of GDP and expected to remain major public spending items going forward. As such, and against the background of a rising dependency ratio, age-related public spending could lead to increasing tax burdens on future generations. This raises questions of intergenerational equity that cannot be measured by standard budgetary indicators, nor by traditional fiscal sustainability metrics. Generational accounting (GA) allows calculating the present value of total net tax payments to the government (taxes paid minus transfers received) over the remaining lifetime of a cohort born in a specific year. ⁽¹⁾

Relying on harmonised data and the long-term projections from the Ageing Report, we estimate the lifetime fiscal burden and its distribution between current and future-born generations for all EU countries. ⁽²⁾ Based on the generational accounts, two indicators measuring intertemporal and intergenerational imbalances are provided, the Intertemporal Budget Gap (IBG) and the Auerbach-Gokhale-Kotlikoff (AGK) indicator. ⁽³⁾

The model

The starting point for the GA approach is the government's intertemporal budget constraint (IBC), according to which current fiscal policies are considered sustainable if they generate a flow of current and future primary budget surpluses in

present value terms that covers the initial net debt. The IBC at year t can be written as follows:⁽⁴⁾

$$\sum_{k=t-L}^t N_{t,k} + \sum_{k=t+1}^{\infty} N_{t,k} = NG_t + \sum_{l=t+1}^{\infty} \frac{NG_l}{\prod_{s=t+1}^l (1+r_s)} + D_t \tag{1}$$

where $N_{t,k}$ = net present value of remaining lifetime net tax payments to the government of the generation born in year k discounted to year t ; L =maximum life length; NG_t = net government spending non-attributed to any generation in year t ; r_s = discount rate in year s . The first left-hand side term of equation (1) is the aggregate lifetime net taxes paid by all generations alive in the base year t , while the second left-hand side term aggregates the lifetime net tax payments made by future generations (born after the base year $(t+1)$). The right-hand side of the equation reports the present value of net government spending that is not distributed across generations, plus net debt outstanding in year t .

The term $N_{t,k}$ in equation (1) can also be expressed as:

$$N_{t,k} = \sum_{s=\max(t,k)}^{k+L} \left(\bar{T}_{s,k} \cdot P_{s,k} \cdot \prod_{j=t+1}^s \frac{1}{(1+r_j)} \right) \tag{2}$$

where $\bar{T}(s,k)$ = average net tax payment for the generation born in k calculated in year s ; $P_{s,k}$ = cohort size in year s of individuals born in year k ; r_j = the discount rate in year j . The generational accounts can be calculated by dividing the present value in year t of the aggregate remaining lifetime net tax payments of a generation born in year k ($N_{t,k}$) by the number of cohort members ($P_{s,k}$) alive in the base year, for currently living generations, or by the number of new born of the cohort, for future generations.

⁽¹⁾ See Auerbach, Gokhale and Kotlikoff, (1991, 1992, 1994).
⁽²⁾ See European Commission (2018c).
⁽³⁾ This Box draws upon the analysis in Arevalo et al. (2019).

⁽⁴⁾ The gender dimension is considered in the analysis but to ease notation, the gender subscripts are dropped from the equations.

(Continued on the next page)

Box (continued)

The term $N_{t,k}$ covers net payments to the government that account for distributed items only. Ideally though, all government spending should be allocated to generations in this exercise. There is nonetheless no straightforward way to distribute some of these spending items. One possible approach for the remaining items, followed in some of our calculations, consists in allocating them as lump-sum net of taxes to all generations, i.e. implementing a proportional allocation of non-distributed items.⁽⁵⁾

Computing the generational accounts enables to assess both intertemporal and intergenerational imbalances. Specifically, calculating the components of equation (1), allows assessing, in a traditional way, whether current fiscal policies are sustainable over the long run (in the sense that the left-hand side of the intertemporal budget constraint equals the right-hand side and the condition holds). It also, and more interestingly, allows evaluating how the fiscal burden is shared between current and future generations.

Government spending that is not financed by current generations must be paid at some point by future generations. In formal terms, holding the right-hand side of equation (1) fixed, a decrease in the present value of net taxes paid by existing generations (first left-hand side term) requires an increase in the present value of lifetime net taxes paid by future generations (second left-hand side term) for the budget constraint to be fulfilled.

The Intertemporal Budget Gap (IBG) is an indicator that take into account both explicit and implicit government liabilities - the latter stemming from commitments related to the social protection system (with spending projections based on current policies, expected demographic developments and a set of macroeconomic assumptions). Given current economic policies, the *IBG* indicates whether public finances are sustainable (i.e. the inter-temporal budget constraint of the government is fulfilled) and how the burden is shared by generation. It is calculated as follows:

⁽⁵⁾ See European Commission (1999).

$$IBG_t = \left[NG_t + \sum_{l=t+1}^{\infty} \frac{NG_l}{\prod_{s=t+1}^l (1+r_s)} + D_t - \sum_{k=t-L}^t N_{t,k} - \sum_{k=t+1}^{\infty} N_{t,k} \right] / GDP_t \quad (3)$$

If the *IBG* is greater than zero, current policies cannot ensure that all government's payments and obligations are covered (under projected demographic and macroeconomic developments, as indicated), highlighting the need for an adjustment at some point. In this case, the immediate and permanent change in taxes or expenditures for all generations such that the *IBG* is fulfilled can easily be computed.

Another indicator calculates the adjustment that future generations would need to make to rebalance the intertemporal budget constraint.

Once calculated what the government is projected to receive in revenues for a newborn in year t , its projected consumption expenditure and its current net wealth, one can estimate the amount that future newborns (generations) would need to pay for the government intertemporal budget constraint to be satisfied. This is the logic behind the *Auerbach-Gokhale-Kotlikoff (AGK)* indicator, which also allows assessing the impact of different policy reforms on future generations. In order to calculate a unique and simple indicator, a technical assumption is made that the generational account (the lifetime net tax) of a member of a future cohort rises, with respect to the one of a member of the previous cohort, in line with labour productivity growth (g). To calculate the *AGK* indicator, we then need to find the value of δ such that the following version of the *IBC* (equations 1 and 2) is fulfilled:

$$\sum_{k=t-L}^t N_{t,k} + \sum_{k=t+1}^{\infty} \frac{\delta \cdot \prod_{s=t+1}^k (1+g_s) \cdot P_{k,k}}{\prod_{s=t+1}^k (1+r_s)} = \frac{NG_t}{\prod_{s=t+1}^{\infty} (1+r_s)} + \sum_{l=t+1}^{\infty} \frac{NG_l}{\prod_{s=t+1}^l (1+r_s)} + D_t \quad (4)$$

After solving for δ , it is possible to compare the generational accounts of current and future newborns, as for both we can observe the whole lifetime net tax payments (while any comparison with any other current living cohorts is not

(Continued on the next page)

Box (continued)

consistent as the retrospective working history of individuals is often not known). For a given future generation j , its generational account, i.e. the present value lifetime net tax payments of a newborn of that generation, would be equal to:

$$N_{t,j} = \frac{\delta \cdot \prod_{s=t+1}^j (1 + g_s)}{\prod_{s=t+1}^j (1 + r_s)}$$

The *AGK* indicator is defined as the ratio between the growth-adjusted generational account, i.e. the lifetime net tax of future newborns and that of the current newborns in the base year:

$$AGK_t = \frac{\delta}{\left(\frac{N_{t,t}}{P_{t,t}}\right)} \quad (5)$$

where $\delta \cdot (1 + g_{t+1}) / (1 + r_{t+1})$ is the per-capita generational account of newborns of the cohort born in the year after the base year ($t+1$), and $\left(\frac{N_{t,t}}{P_{t,t}}\right)$ is the per-capita generational account of current newborns in the base year. Both terms include the complete lifetime net taxes and are fully comparable. For values greater than 1, there is a generational imbalance, whereby future generations face a larger fiscal burden.

Estimating generational accounts

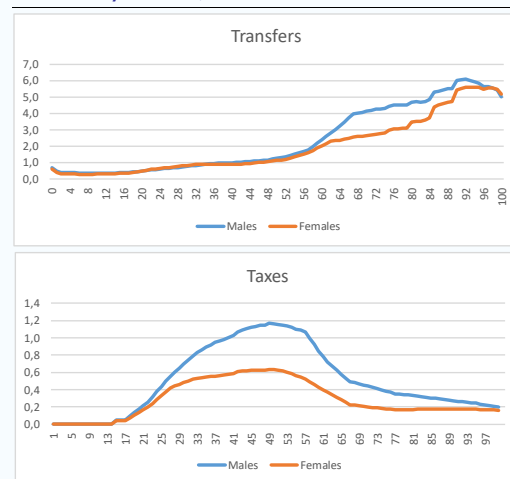
The estimation of generational accounts is made using multiple macro and micro data sources. It includes extracting the components included in the inter-temporal budget constraint (equation 1) from the National Accounts and identifying taxes and transfers by age and gender from the EU SILC. With this, average age/sex profiles of net tax payments (i.e. taxes paid and transfers received) for the base year is calculated (see Graph 1), and using Eurostat's population projection ⁽⁶⁾ and the long-term projections of the 2018 Ageing Report, the remaining lifetime net tax payments is calculated

⁽⁶⁾ See Eurostat (2017).

for all generations by discounting to the base year. ⁽⁷⁾

Tax payments are highest for those in their mid-40s, while transfer payments are increasing almost throughout the life span on average in the EU. Moreover, tax payments are on average higher for men than for women, and this trend is mimicked also for transfer payments from age 60 onwards, reflecting firstly higher salaries and secondly higher pensions for men compared with women.

Graph 1: Taxes and transfers by age and gender, base year 2016, EU



(1) Taxes consist of taxes on wealth, taxes on income employers and employees social contributions. Transfers consist of sickness and disability, survivors, family and children, unemployment, housing, social exclusion, education, old-age pension, health care, long-term care.

The taxes and transfers are expressed relative to that of a 40 year old man.

Source: Eurostat (National Accounts, COFOG, EU SILC), 2018 Ageing Report, Commission services.

Based on the age/cost profiles and the long-term projections, the present value of the total per capita net taxes that the current generation can

⁽⁷⁾ See Arevalo et al (2019) for the detailed assumptions. We use the implicit interest rate on government bonds as discount rate. The assumption is the same as described in the Fiscal Sustainability Report 2018, namely, it is assumed that the nominal long-term interest rate converge to 5% in ten years' time (by 2028), and the implicit interest rate is somewhat lower, due to lower rates at shorter maturities.

(Continued on the next page)

Box (continued)

expect to pay or receive (if negative) during their remaining lifetime for current generations and for future generations are calculated. From age 0 to +100, the generational accounts are shown (starting from the intercept on the left), i.e. the present value per capita net tax in 2016, for the cohort aged 100 still surviving in 2016 up to those born in the base year. We develop two main scenarios:

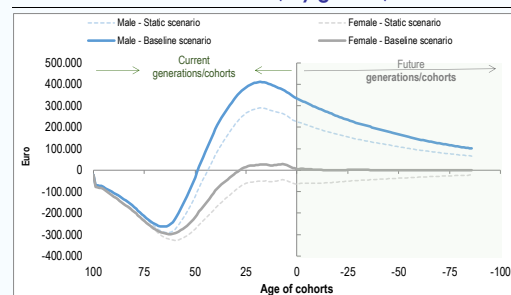
A static scenario, according to which all net taxes (revenue and expenditure) by cohort evolve in line with labour productivity growth. This scenario thus relies on a static assumption (which is commonly used in generational accounting) that net taxes per cohort follow a common trend. However, a drawback is that legislated institutional provisions, such as pension reforms taking effect in the future, are not taken into account. Most studies on generational accounting take nonetheless this approach.

A baseline scenario, according to which some expenditure items (old age and early pension, health care and long-term care) develop in line with the projections included in the 2018 Ageing Report. This scenario therefore includes current policies/legislation in place, such as the impact of pension reforms, and is therefore better suited to evaluate fiscal sustainability challenges and the intergenerational impact. ⁽⁸⁾

In the EU as a whole, we find that younger generations (up to age 42) who are relatively early into their working life, appear as net taxpayers in the baseline scenario. For older working-age cohorts (aged 43 to 65), for whom the remaining working life is shorter, the tax and contribution payments are offset by old-age pensions, health care, and other transfers from the public sector, which makes them net tax receivers (see Graph 2). Individuals around the age of 64 appear to be the highest net tax receivers according to our estimates, on the basis of the lower labour income taxation and higher reliance on public

spending programmes. Remaining lifetime net taxes are lower in the static scenario for currently active cohorts and for future cohorts (those to the right of the zero line), reflecting essentially lower benefits due to reforms in this scenario, which is the counterpart of a higher intertemporal budget gap. It is important to bear in mind that we measure *remaining* lifetime net taxes, which are naturally higher at younger age and lower (negative) at higher age. In addition, we find a noticeable gender gap, as net taxes for women remain negative or very small for all age cohorts (i.e. they are net tax receivers) and are generally lower than for men. This reflects generally lower income due to lower labour market participation and/or salaries, and additionally longer life spans leading to higher pension and health care benefits. Moreover, a similar trend is noted for future generations (to the right) (see Graph 2).

Graph 2: Remaining lifetime net taxes, static and baseline scenarios, by gender, EU



The analysis includes forecast data up to 2020 (autumn 2018 Commission forecast).

On the horizontal axis, 25 indicates a person 25 year old and -25 indicates a person that will be born in 25 years.

Source: Eurostat (National Accounts, COFOG, EU SILC, ESSPOP), 2018 Ageing Report, Commission services.

Overall, existing legislated pension reforms have ensured significant savings for governments at aggregate EU level, as remaining lifetime net taxes are higher in the baseline scenario compared with the static scenario. Nevertheless, these structural measures (pension reforms) appear to be primarily borne by current younger living cohorts and future generations, for whom remaining lifetime net taxes increase, and to a lesser extent to current older generations. However, some of those reforms have been reversed, see section 4.1 of this report for further details on recent reforms.

⁽⁸⁾ Balassone et al. (2009) also use detailed age-related expenditure projections for selected EU countries from a previous Ageing Report.

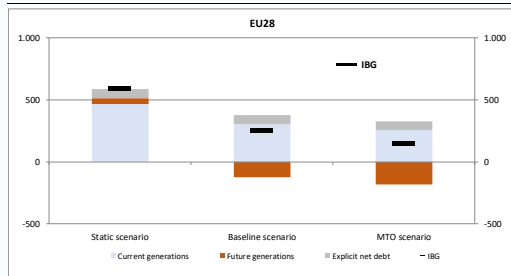
(Continued on the next page)

Box (continued)

Are current fiscal policies sustainable?

We find that public finances in the EU face fiscal sustainability challenges based on current policies, confirming findings from previous studies (see e.g. the 2018 Fiscal Sustainability Report), and this report.⁽⁹⁾ In the baseline scenario, under unchanged policies, the fiscal sustainability gap (as measured by the *IBG* indicator) is estimated at 251% of 2016 GDP.⁽¹⁰⁾ Current generations account for even more than this, 304%, while future generations contribute to reduce the imbalance (see Graph 3).

Graph 3: **Intertemporal budget gap, EU, different scenarios, % of 2016 GDP**



(1) The analysis includes forecast data up to 2020 (autumn 2018 Commission forecast).
Source: Eurostat (National Accounts, COFOG, EU SILC, ESSPOP), 2018 Ageing Report, Commission services.

Implemented pension reforms in particular contribute very significantly to limit the fiscal sustainability gap. If their impact had not been considered, the gap would be more than twice as

⁽⁹⁾ The sustainability analysis in this chapter (*S2* indicator) assumes an unchanged government revenue-to-GDP ratio (except for taxes on pensions and property income). In this Box, we also assess the impact of change in demographic structure on expenditure items other than age-related spending and revenue items, including labour income taxes. Overall in the EU, the change over time (up to 2070) in other net taxes contribute to the change in the primary balances for about 0.3 pps of GDP. However, at country level, the impact can be larger, depending on the composition of the change in population structure over time.

⁽¹⁰⁾ The calculations of the *IBG* here additionally assumes that all tax and transfer items that are not allocated by age and gender are treated as lump-sum net taxes distributed to all generations, i.e. a proportional allocation of non-distributed items. See equation (3) in Arevalo et al. (2019) for details.

high, amounting to 587% of GDP. Furthermore, if all EU countries were to adhere to the EU fiscal rules and reach their medium-term budgetary objectives (MTOs), the sustainability gap would be lower, amounting to 147% of GDP. Almost half of the imbalance would consist of the current explicit net debt, amounting to 70% of GDP.

Behind the aggregates, there is a large variation across EU countries. Under current fiscal policies, even with legislated pension reforms factored in (baseline scenario), generational imbalances remain in almost all EU countries, though to varying degrees. The sustainability gaps would become lower if Member States reached their medium-term budgetary objectives (MTOs), see Table 1.

Table 1: **Intertemporal budget gap, EU countries, different scenarios, % of 2016 GDP**

	Static scenario	Baseline scenario	MTO scenario
<i>IBG</i> <0		CY, SE	EE, FR, IT, CY, PL, PT, SE
0< <i>IBG</i> <100		DK, EE, HR, PL, PT	DK, HR, RO
100< <i>IBG</i> <200	CY	BG, DE, FR, LV, LT	BG, DE, ES, LV, LT, EA, EU28
<i>IBG</i> >200	BE, BG, CZ, DK, DE, EE, IE, EL, ES, FR, HR, IT, LV, LT, LU, HU, MT, NL, AT, PL, PT, RO, SI, SK, FI, SE, UK, EA, EU28	BE, CZ, IE, EL, ES, IT, LU, HU, MT, NL, AT, RO, SI, SK, FI, UK, EA, EU28	BE, CZ, IE, EL, LU, HU, MT, NL, AT, SI, SK, FI, UK

Source: Commission services.

Do current fiscal policies lead to intergenerational imbalances?

On average in the EU, we find that under current policies (baseline scenario), there is a small intergenerational imbalance according to the *AGK* indicator, see Graph 4. Current policies, as embedded in the baseline scenario, therefore contributes to reduce intergenerational imbalances. It should be borne in mind that we compare the additional adjustment burden of future newborns with that of a current newborn, and not with currently living generations.⁽¹¹⁾ Indeed, on current policies (baseline scenario) currently living generations contribute very significantly to the

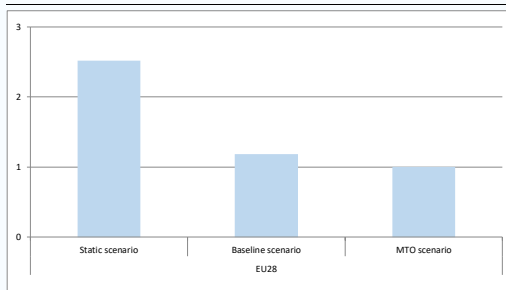
⁽¹¹⁾ The lifetime net taxes of current generations is not known since their past net tax history is not available, and a comparison with current or future newborns are therefore not consistent.

(Continued on the next page)

Box (continued)

intertemporal budget gap, while future generations (newborns as of $t+1$) in part offset it (see Graph 3). Moreover, due to projected longer life expectancy and based on the continuation of current policies into the future, postponing the adjustment needed to balance the intertemporal budget constraint would result in a larger intergenerational imbalance, thus imposing an even higher burden on future generations.

Graph 4: **Inter-generational imbalances according to the AGK indicator, different scenarios, EU**



Source: Commission services.

However, if structural reforms embedded in current policies, notably pension reforms, were undone (static scenario), a larger generational imbalance would emerge and future generations would face a much larger fiscal burden than the current newborn generation. Again, important differences are observed also in this respect across EU countries. Indeed, the intergenerational imbalances would become far greater in almost all countries in the event that pension reforms were reversed (see Table 2).

Table 2: **Inter-generational imbalances according to the AGK indicator, different scenarios, EU Member States**

	Static scenario	Baseline scenario	MTO scenario
AGK<1		BG, DK, DE, EE, CY, LV, AT, PL, PT, SE	BG, DK, DE, EE, FR, IT, CY, LV, AT, PL, PT, RO, SE, EA
1<AGK<2	BE, BG, CZ, DK, DE, EE, HR, CY, LV, LT, LU, HU, MT, SE	BE, CZ, EL, FR, HR, IT, LT, LU, HU, MT, NL, RO, SI, SK, FI, EA, EU28	BE, CZ, EL, ES, HR, LT, LU, HU, MT, NL, SI, SK, FI, EU28
AGK>2	EL, ES, FR, IT, NL, AT, PL, PT, RO, SI, SK, FI, SE, UK, IE, EA, EU28	IE, ES, UK	IE, UK

Source: Commission services.

5. ADDITIONAL RISKS AND MITIGATING FACTORS FOR FISCAL SUSTAINABILITY

Additional aggravating/mitigating risk factors are taken into account – as a complement to the quantitative results of the framework – in order to ensure a balanced overall assessment of fiscal sustainability challenges. The previous chapters presented quantitative results on the basis of (debt) projections (as summarised in the DSA risk assessment) and fiscal gap indicators. Yet, these quantitative results need to be interpreted against additional aggravating and/or mitigating risk factors that are only partially factored-in in the quantitative results of the framework.

A comprehensive list of potentially important fiscal risks, beyond simple (deficit and) debt aggregates, is considered. First, beyond the size of government debt, its composition may give an important indication of potential vulnerabilities. The debt composition, notably in terms of maturity and currency denomination, but also in terms of investor base, matters when projecting debt and financing needs, and assessing rollover risks. Other qualitative, namely institutional factors could also be deemed relevant, as stressed in the academic literature⁽⁶²⁾. Section 5.1 provides a more thorough analysis, by looking at the debt structure by debt holder's profile and country of residence. Additionally, implicit and contingent liabilities need to be carefully monitored, notably the potential impact on public finances of the banking sector (see section 5.2). Finally, government assets can be relevant, as a mitigating factor, when analysing sustainability issues (see section 5.3). These additional factors are treated horizontally in the overall assessment, insofar the identified vulnerabilities or supporting factors may materialize in the short, medium or long term.

This Chapter also contains a Box exploring how climate change related risks could be considered in our fiscal sustainability framework (see Box 5.3).

5.1. RISKS RELATED TO THE GOVERNMENT DEBT STRUCTURE

The structure of government debt can play an important role in ensuring sustainable public

finances in different ways. First, by determining the level and response of interest payments to changes in economic and financial conditions. Then, by influencing the degree of risks, notably refinancing and rollover risks. According to the IMF (2014), an optimal government debt portfolio should minimise interest payments subject to a prudent degree of refinancing and rollover risks (cost – risk trade-off).

The debt composition needs to be analysed along several dimensions. In this section, the analysis focuses on three aspects: the maturity structure, the currency denomination composition and the nature of the investors' base⁽⁶³⁾. With this aim, three main variables of debt structure are used: i) the share of short-term debt in total government debt (at original maturity); ii) the share of debt denominated in foreign currency in total government debt, and iii) the share of debt held by non-residents in total government debt.

A risk-based approach is used to capture additional vulnerabilities or mitigating capacity, stemming from the composition of government debt. The values of the three main selected variables are analysed against critical thresholds of fiscal risk obtained through the signalling approach - the same as in the computation of S0⁽⁶⁴⁾. Fiscal risk levels are determined accordingly: i) high risk (red), if the values are at or above the threshold of fiscal risk from the signals' approach; ii) medium risk (yellow), if the values are below the threshold obtained from the signals' approach, but at or above a benchmark of around 80% of the same threshold; iii) low risk (green) otherwise. The results are reported for all countries in the form of a joint heat map (see Table 5.1) and separately for each country in the statistical fiches in Annex A2.

⁽⁶³⁾ Other dimensions could also be considered such as the type of interest rates (fixed / variable), and relatedly the presence of indexation mechanisms (e.g. inflation-linked bonds), or state-contingent features, as well the nature of debt instruments (the latter is analysed to some extent in section 5.2 of this chapter).

⁽⁶⁴⁾ For details on the signals approach see Chapter 2. This methodology shows that, based on historical events, the three variables appear to be relatively good leading indicators of fiscal stress. See also Annex A7 for more details.

⁽⁶²⁾ See Box. 1.2, Chapter 1, 2018 Fiscal Sustainability Report.

The share of short-term government debt matters insofar it captures refinancing and rollover risks. In particular, with a high share of short-term debt, a government may be vulnerable to increases in monetary policy rate, and to rapid changes in financial markets' perceptions. From this angle, fiscal risks exist for several EU countries (see Table 5.1). The share of short-term debt is particularly high in Sweden (about 20% of total government debt), with the short-term debt ratio also exceeding 10% in Hungary, Portugal, Italy and Denmark. Yet, these results need to be further qualified. First, the availability of other liquid financial assets such as cash deposits could mitigate potential stress. Also, the weight of short-term debt as a share of GDP is worth considering in parallel (e.g. for Sweden, given the low level as a share of GDP, this ratio is limited) ⁽⁶⁵⁾. In the case of external short-term debt, the level of a country's international reserves equally deserves consideration ⁽⁶⁶⁾. Looking at historical trends, an overall reduction of the share of government short-term debt has been observed in most countries since the last financial crisis, with limited changes in debt composition since the 2018 Fiscal Sustainability Report ⁽⁶⁷⁾.

The share of debt denominated in foreign currency captures governments' exposure to exchange rate fluctuations. A domestic currency denomination traditionally protects governments against currency mismatches between a government's interest expenditure and tax revenue ⁽⁶⁸⁾. Yet, in some countries, the rationale behind foreign-currency denomination debt issuance is to attract foreign investors, not willing to bear the foreign currency risk. Ultimately, this may reduce funding costs for these governments (all else being equal) by reducing liquidity premia (Eller and

Holler, 2018). As advanced economies finance themselves overwhelmingly in their own currency, currency-related fiscal risks are largely absent for the EU countries that have adopted the euro (Table 5.1). Yet, foreign currency-denominated debt may pose risks in some Central and Eastern European countries (CEEC). This is the case of Bulgaria, Croatia and Romania (with a share well above 50% of total debt) ⁽⁶⁹⁾, which have a high exposure to exchange rate risks as well as to a lesser extent Poland, Sweden and Hungary. For these countries, hedging of foreign currency positions can mitigate such risks ⁽⁷⁰⁾, whereas pegs or currency boards also significantly reduce exposure to fiscal risks from the share of public debt in foreign currency ⁽⁷¹⁾. All of these countries are not part of the euro area and in most of them, the major share of their foreign currency issuances are denominated in euro. As stressed by Eller and Holler (2018), while the share of foreign-currency denominated debt has remained largely stable on average across CEEC since 2009, some governments have succeeded in reducing their reliance on foreign currency borrowing, e.g. in Czech Republic, Hungary, Poland and Romania.

Another important composition dimension to consider is the investor base, and in particular the share of debt held by non-residents. On one hand, the foreign investor base tends to be more volatile and prone to sudden stops in situations of heightened uncertainty. On the other hand, a large foreign investor base underlines a country's worthiness and thus contributes to lower funding costs in normal times. It may also be beneficial for financial and macroeconomic stability as a higher share of foreign investors reduces the risks of adverse loops between the sovereign and the national banking systems (Bouabdallah et al., 2017) ⁽⁷²⁾. In the heat map in Table 5.1, foreign held debt figures are shown against a double shading that blends the colour coding of volatility

⁽⁶⁵⁾ See S0 indicator table on fiscal variables.

⁽⁶⁶⁾ The extent to which international reserves are greater or equal than the country's stock of short-term external debt (the Greenspan-Guidotti rule) shows whether the country has enough resources to counter a sudden stop in capital flows and its capacity to service its short-term external debt.

⁽⁶⁷⁾ In the wake of major financial crises or large scale financial innovation (such as quantitative easing), changes in the debt composition can be large and sudden (see Abbas et al., 2014 and also Box 3.4 in Chapter 3 of the 2018 Fiscal Sustainability Report).

⁽⁶⁸⁾ Note that exchange rate fluctuations not only affect interest payments but also the valuation of the stock of debt. Therefore their impact on the debt dynamic may be particularly large (see European Commission (2017), Chapter 2, Box 2.2).

⁽⁶⁹⁾ Bulgaria has a currency board since 1997 and nearly all of its foreign currency debt is issued in euro. While the peg is maintained, shocks to debt in foreign currency are virtually zero. Croatia has tightly managed arrangements, also limiting exchange rate fluctuations.

⁽⁷⁰⁾ Hedging operations are not taken into account in the DSM.

⁽⁷¹⁾ On the idiosyncrasies of different exchange rate regimes and the extent to which exchange rate shocks could impact the public debt-to-GDP ratios see European Commission (2017) - Chapter 2, Box 2.2.

⁽⁷²⁾ Moreover, when government debt is traded on the secondary market, it is sometimes difficult to keep track of the residency of the creditors.

risks from non-resident tenure (left side of the shaded cells) with that of sovereign risk given by the average spread on 10-year government bonds vs. Germany (right side of the shaded cells). Several countries with large shares of foreign held public debt are at this juncture associated with creditor confidence (Belgium, Ireland, Cyprus, Latvia, Lithuania, Austria, Portugal, Slovenia, Slovakia and Finland), whereas for Poland, Romania and Hungary, the relatively large share of foreign held debt is more prone to volatility due to high sovereign risks and speculative investment.

Table 5.1: Risks related to the government debt structure, by country (2018)

	Short-term public debt (original maturity)	Public debt in foreign currency	Public debt held by non-residents
Shares of total debt (%):			
BE	7.6	0.0	52.7
BG	0.0	81.7	44.4
CZ	3.4	12.0	40.1
DK	11.6	0.2	27.2
DE	6.7	4.0	47.7
EE	2.8	0.0	57.2
IE	7.1	1.7	59.7
ES	6.6	0.0	45.4
FR	8.5	2.3	47.3
HR	4.6	75.1	36.7
IT	12.8	0.1	29.4
CY	1.8	3.3	76.5
LV	3.0	0.0	74.0
LT	0.7	0.0	72.5
LU	7.2	0.0	44.1
HU	17.9	22.8	36.5
MT	7.4	0.0	13.0
NL	9.5	0.2	40.0
AT	3.6	0.9	66.5
PL	1.0	31.0	50.2
PT	16.7	0.0	52.1
RO	3.3	50.4	47.8
SI	2.8	0.1	62.3
SK	3.0	5.0	57.5
FI	8.2	2.5	63.3
SE	20.5	24.7	22.7
UK	15.6	0.0	n.a.

(1) Upper and lower thresholds: (i) Share of short-term government debt: upper threshold 6.57%; lower threshold 5.3%; (ii) Share of government debt in foreign currency: upper threshold 31.58%; lower threshold 25%; (iii) Share of government debt held by non-residents: upper threshold 49.01%; lower threshold 40%. Spread on 10-year government bonds vs. Germany – 2019 last value - upper threshold 231; lower threshold 185 (see also Annex A8 and A9). (2) Share of short-term debt: based on partially missing information for Netherlands and the United-Kingdom.

Source: Eurostat, ECB.

However, certain international creditors pose no liquidity risks, this being the case for official lenders such as the IMF, ESM or other multilateral institutions associated to financial

assistance programmes. A more detailed breakdown of government debt by holder shows that a few countries, which are potentially at some risk according to the broader foreign creditor base indicated above (Cyprus, Ireland and Portugal), feature such stable sources of lending (see Graph 5.1). In other EU countries, debt mostly shifted in the past years either to domestic central banks (and the ECB) or to financial sector holders from the rest of the EA.

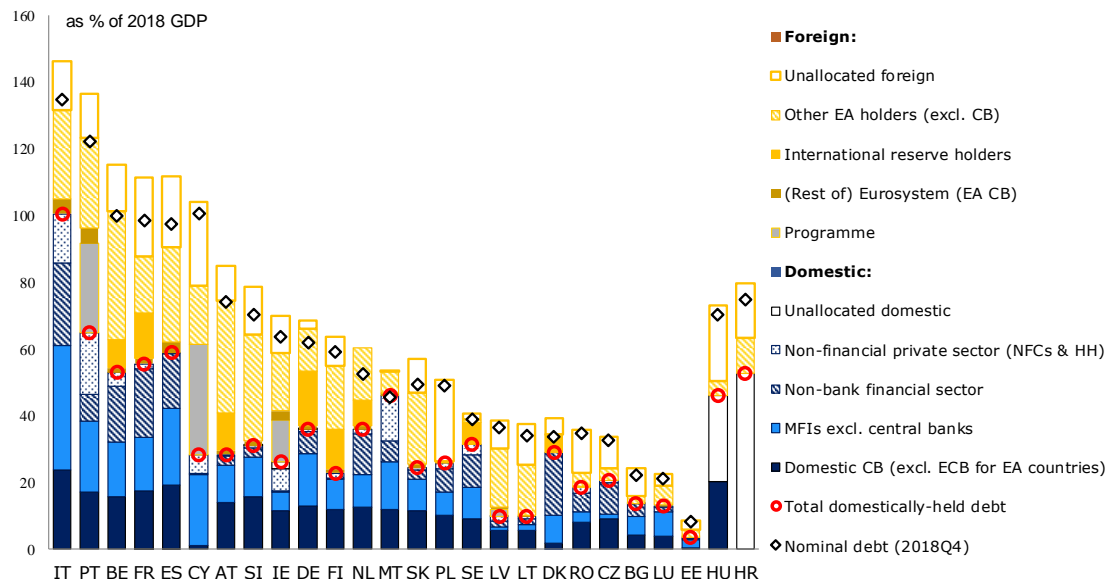
For almost all EA countries, the signals of investor confidence illustrated in Table 5.1 emerge also from the overview of government debt allocation to different holders (Graph 5.1).

For larger EA economies comparatively more significant shares of government debt are currently in the hands of non-EA central banks in the form of reserve assets (the case of German, French, and Dutch government debt). For smaller EA economies (e.g. Latvia, Lithuania, Slovenia and Slovakia), the rest of the EA financial sector has become a more important holder of government debt than these issuers' domestic financial sectors, suggesting that home bias here is disappearing or transforming as the EA grows more integrated financially and financial institutions follow harmonised prudential rules under the Single Rulebook.

While evidence of domestic versus foreign debt holdings is mixed, the latter is more likely to entail risks when the foreign tenure is not particularly safe or confidence-driven. In some countries, such as Italy, Netherlands and Malta, a relatively high share of government debt is domestically held. Conversely, in a few cases relatively larger shares of government debt held by foreign and / or unidentified investors outside the euro area that are not reserve asset holders ('unallocated') may reflect risks usually associated to this uncertain, potentially more volatile basis (Poland, Hungary, Croatia) - Graph 5.1.

The analysis of risks arising from the debt profile needs not be confined to these indicators and the associated benchmarks. Other factors, some of which mentioned above, such as the exchange rate regime, the role of the central bank in mitigating short-term liquidity needs, the capacity of the market to absorb debt, influence as well the results of the analysis. The underlying reasons for debt profile vulnerabilities, such as

Graph 5.1: Holders of government debt, 2018-Q4, market value (% of GDP)



(1) Debt refers to consolidated general government debt at market value, which for some countries differs from debt at nominal value (EDP debt) used in the rest of the report and represented here by white diamonds. For more details, see https://www.bis.org/publ/qtrpdf/r_qt1509g.htm and https://www.bis.org/statistics/totcredit/credgov_doc.pdf. (2) Only data for total MFIs (Monetary Financial Institutions) are reported. The split between commercial banks and central banks is an estimate based on annual nominal data. The category 'International reserve holders' represents holdings by international organisations and non-EA central banks as reserve assets. The category '(Rest of) Eurosystem' includes holdings by the ECB. The category 'Non-financial private sector' represents holdings by non-financial corporations (NFCs) and households (HH). (3) Figures are not shown for the UK given lack of detailed data.
Source: Commission services based on ECB, Eurostat, IMF.

contagion, incomplete credit markets, weak debt management practices, may also be important in this regard.

5.2. LOOKING BEYOND 'GOVERNMENT DEBT': RISKS RELATED TO GOVERNMENT OTHER DIRECT AND CONTINGENT LIABILITIES

This section provides an analysis of the size and, when possible, the evolution of government liabilities other than 'EDP (or Maastricht) debt' in the EU. Such a complementary analysis allows identifying additional risk factors compared to the results of the standard debt sustainability analysis provided in this report (see chapter 3). Together with the analysis of government assets and net debt (provided in section 5.3), it allows broadening the focus of standard DSA frameworks (see Box 5.1 for definitions). The rest of the section is organised as follows: sub-section 5.2.1 shows an analysis of government direct liabilities that are not included in the EDP debt, while sub-sections 5.2.2 to 5.2.4 discuss risks linked to contingent liabilities.

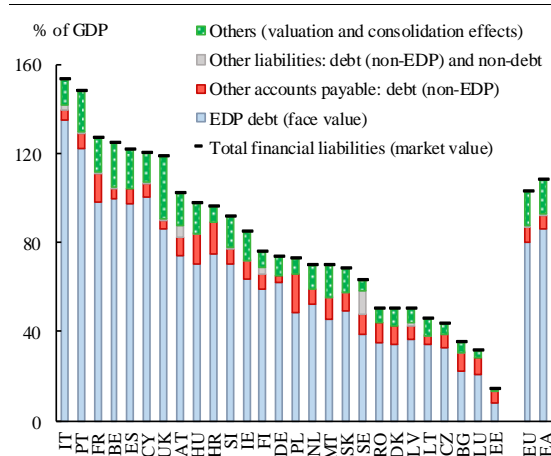
The analysis of contingent liability risk is in particular organised around three statistical tools or modules: i) statistics on explicit contingent liabilities (section 5.2.2); ii) statistics on potential triggers for contingent liabilities (section 5.2.3); and iii) model estimations of implicit contingent liabilities using bank stress scenarios (based on the SYMBOL model – section 5.2.4). These results are also reported in the statistical country fiches (see Annex A2).

5.2.1. EDP debt, other debt and non-debt financial instruments: a snapshot overview

The EDP debt liabilities were the main component of on-balance government gross liabilities in 2018 in all Member States. In the EU as a whole, the EDP debt was around 80% of GDP and accounted for more than three-quarters of total gross financial liabilities in 2018 (see Graph 5.2). In terms of instrument coverage, debt securities, commonly in the form of bills, commercial papers and bonds, account for more than two-thirds of the government gross debt in

most Member States. Contributions of loans, coins when issued by governments and deposits held by entities classified inside general government tend to be less significant across Member States ⁽⁷³⁾.

Graph 5.2: **Debt and non-debt financial liabilities in EU Member States in 2018**



Source: Commission services based on Eurostat data.

The difference between total gross liabilities and the EDP debt varies widely across Member States. In 2018, the portion of total gross government liabilities (at market value) not reflected in the EDP debt (measured at face value) ranged from 32% to 25% of GDP in the United Kingdom, France, Austria, Hungary, Portugal and Belgium and below or close to 10% of GDP in Luxembourg and Estonia. This difference, as shown in Graph 5.2, consists of other debt instruments (so-called non-EDP debt), non-debt financial instruments and a gap due to different valuation and consolidation methods applied to financial liabilities ⁽⁷⁴⁾.

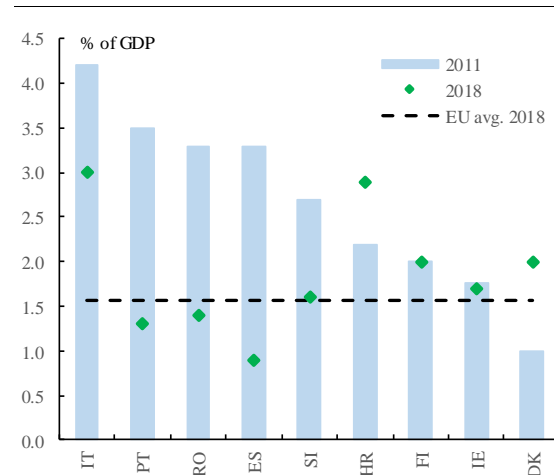
Among non-EDP debt liabilities, other accounts payable is the most significant component. Other accounts payable include trade credits and advances. These are in most cases outstanding short-term liabilities of the government from transactions of goods and services, and to a lesser

⁽⁷³⁾ The share of loans can nevertheless be significant in some Member States, in particular in those that have benefited over the past years from financial assistance in the form of official loans.

⁽⁷⁴⁾ The valuations of the EDP debt and ESA 2010 balance sheets are different. In particular, total gross EDP debt of the general government is valued at face value, while in ESA 2010, government gross liabilities are valued at market prices.

extent other timing differences in settling obligations. During periods of financial distress, this debt instrument can become an important government financing alternative. For instance, in few Member States, such as Italy, Portugal, Romania, Spain and Slovenia, government trade debt tended to be higher during the financial crisis. Over time, stocks of trade credits and advances have receded in these Member States, while increasing in others (e.g. Croatia, Hungary and Denmark). In 2018, as a share of GDP, these liabilities were highest in Italy (3.0%), Croatia (2.9%), Luxembourg (2.1%), Finland (2.0%) and Denmark (2.0%), compared to an EU average of 1.6% of GDP (see Graph 5.3) ⁽⁷⁵⁾.

Graph 5.3: **Trade credits and advances in selected Member States in 2011 and 2018**



Source: Commission services based on Eurostat data.

Other liabilities (debt and non-debt financial instruments) are typically a narrow set of total government liabilities. In 2018, these other liabilities were more relevant for Sweden (10% of GDP – of which mainly insurance, pensions and standardised guarantees), Austria (5% of GDP – of which mainly equity and investment fund shares) and Finland (3.1% of GDP – of which mainly financial derivatives and employee stock options), while accounting for less than 0.6% of GDP in the majority of other Member States.

The gap reflecting valuation and consolidation effects can be relatively large in some Member States. Ranging from 28% to 1.0% of GDP in 2018, this gap was highest in particular in the

⁽⁷⁵⁾ Eurostat (2015) and (2019a).

United Kingdom, Belgium, Portugal, Spain, and France. In most cases, the magnitude of this gap is affected largely by the impact of different valuation bases for the EDP debt (face value) and gross financial liabilities (market value) and to a lesser extent by the impact of the consolidation method (EDP debt is consolidated both within and between the subsectors of the general government, gross financial liabilities only within subsectors). The consolidation effects are in fact small in most Member States ⁽⁷⁶⁾.

5.2.2. Contingent liabilities in the EU

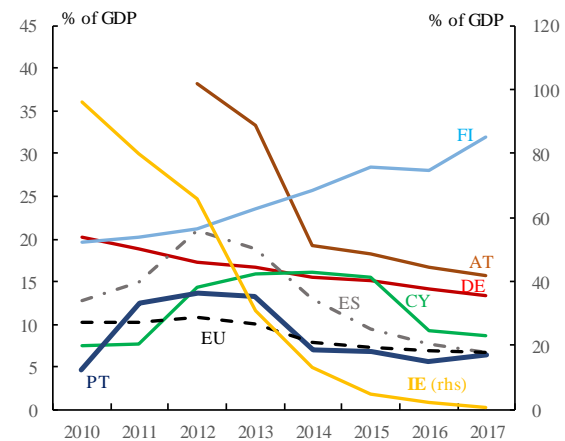
As part of the analysis of contingent liabilities proposed in this report, this section contains an overview of explicit contingent liabilities, as reported by Eurostat. These explicit contingent liabilities include government guarantees, liabilities related to off-balance PPPs (public - private partnerships) and contingent liabilities related to government interventions in the financial sector. This information can also be found in the statistical countries fiches (Annex A2). Note that some of this information may be overlapping, e.g. guarantees issued in the context of government interventions in the financial sector form a subset of total government guarantees. For this reason, evaluating the total risk by summing up the indicators could overestimate the potential impact.

Government guarantees and PPPs

Government guarantees represent a large source of potential fiscal cost in several Member States. Government guarantees are typically designed to reimburse a lender in case of possible losses linked to the debt that it had extended. Government guarantees are issued to promote economic stability or pursue other public policy objectives, with the examples of guarantees on student loans or on the losses incurred by exporters in case of non-payment by a trading partner. In 2017, the highest stocks of outstanding government guarantees were in Finland (32.0% of GDP) and Austria (15.8% of GDP) (see Graph 5.5). In Finland, a sizeable part of the guarantees are related to export guarantees, student loans and funds for supporting housing production ⁽⁷⁷⁾, and

have been overall increasing since 2010 (Graph 5.4). In Austria, guarantees were largely provided to nonfinancial private entities for export promotion, to public and private financial institutions during the crisis, and to non-financial public corporations such as road and rail infrastructure companies ⁽⁷⁸⁾. In the EU as a whole, public guarantees declined from around 10.0% of GDP in 2010 to 6.6% of GDP in 2017. This largely reflects a decline in the use of government guarantee schemes for financial institutions granted in the context of the financial crisis in number of EU Member States.

Graph 5.4: Developments in government guarantees in selected EU Member States, 2010-2017



Source: Commission services based on Eurostat data.

Government guarantees can be one-off (based on individual contracts for large amounts) or standardised (issued in large numbers for small amounts). In most Member States, the largest category of government guarantees relates to one-off guarantees granted under individual contractual arrangements, usually involving more sizeable amounts. In 2017, the stock of one-off guarantees ranged from more than 30.0% of GDP in Finland and 15.8% of GDP in Austria to less than 0.5% of GDP in Romania, Lithuania, Czech Republic, Bulgaria, United Kingdom and Slovakia (see Graph 5.5). On the other hand, the total amount committed in standardised guarantee schemes to support public policy objectives carries a modest risk for future public expenditure in most Member States. These schemes account for more than 1%

⁽⁷⁶⁾ Eurostat (2019b).

⁽⁷⁷⁾ http://www.treasuryfinland.fi/en-US/Statistics/State_guarantees

⁽⁷⁸⁾ See IMF (2018b).

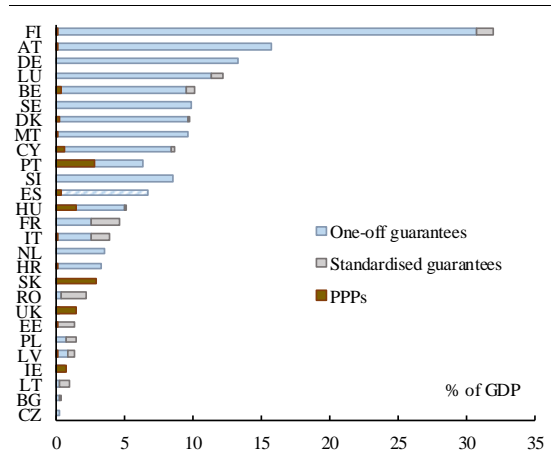
of GDP only in France (2.2%), Romania (1.8%), Italy (1.4%), Estonia (1.4%) and Finland (1.2%).

Contingent liabilities linked to off-balance public private partnerships (PPPs) are a modest source of risk for most Member States. The use of public private partnerships (PPPs) for economic and social infrastructure projects, such as for the development of transport infrastructures and hospitals, can generate additional liabilities for the government. Depending on the distribution of risks and rewards between private and public partner, assets and liabilities related to PPPs can be recorded either on government's balance sheet or on the private partner's balance sheet. The first ones (on-balance PPPs) affect government's debt directly. However, also those PPPs where the private partner is exposed to the majority of risks and rewards and which are therefore recorded off government's balance sheet, government may be contractually obliged to step in under certain circumstances (for example, failure of the private partner). For the EU as a whole, contingent liabilities related to off-balance PPPs have modestly accounted for no more than 0.4% of GDP since 2010 and are only affecting few Member States (see Graph 5.5). In 2017, more sizeable contingent liabilities related to off-balance PPPs were recorded in Slovakia (2.9% of GDP), Portugal (2.7% of GDP) and Hungary (1.5% of GDP).

Contingent liabilities related to government interventions to support financial institutions

A subset of contingent liabilities related to government interventions to support financial institutions have followed a downwards trend since 2013. Following an increase during and immediately after the financial crisis, the financial exposure of the government due to the financial stability schemes has been declining since 2013-14 in most Member States (see Graph 5.6). Government guarantees to the financial sector peaked in 2008 in Ireland (187.6% of GDP) and in 2009 in the United Kingdom (35.7% of GDP), Belgium (17.9% of GDP) and the Netherlands (12.7% of GDP)⁽⁷⁹⁾. In 2018, the contingent liabilities linked to financial stability schemes varied from 0.1% of GDP in Germany and 0.9% of GDP in Italy to 7.3% of GDP in Belgium, 3.3% of GDP in Luxembourg and 3.0% of GDP in Spain. Lower outstanding contingent liabilities in recent years reflect the fact that improved financial stability did not require a renewal of the expiring guarantees issued as part of support packages for financial institutions. Crystallisation of some government guarantees between 2008 and 2018 also contributed to a lower stock of outstanding guarantees, though it resulted in additional government expenditure, liabilities and debt increase⁽⁸⁰⁾. In particular, government guarantees were called upon in Belgium (2011), Germany (2011-12, 2014-17), Denmark (2011), Spain (2013-16), Latvia (2014), and Portugal (2010)⁽⁸¹⁾.

Graph 5.5: **Government guarantees and PPPs in EU Member States in 2017**



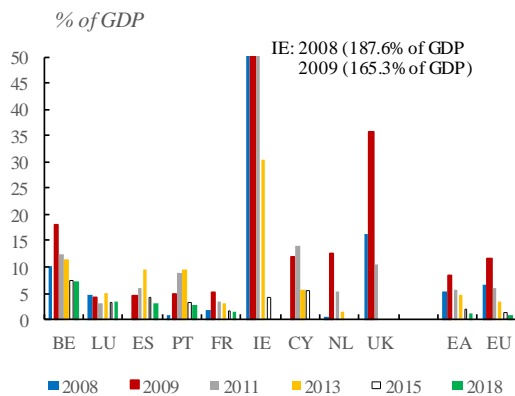
Source: Commission services based on Eurostat data.

⁽⁷⁹⁾ See Eurostat (2019c).

⁽⁸⁰⁾ See ECB (2018).

⁽⁸¹⁾ See Eurostat (2019c) for details about the impact of these guarantees on government finances.

Graph 5.6: **Contingent liabilities linked to the financial sector interventions in the EU, 2008-2018**



Source: Eurostat.

5.2.3. Risks from contingent (implicit) liabilities related to the banking sector

In order to complement the analysis of potential contingent liabilities specifically related to the banking sector, an additional ‘module’ is provided (as in the previous reports). This module consists of a heat map reporting values of variables that indirectly capture potential building risks in the banking sector. Indeed, as seen in the previous section, the banking sector is often an important trigger for government contingent liabilities. Adverse developments in terms of private sector credit flows, house prices, bank loan-to-deposit ratios and non-performing loans can represent substantial risks to the government’s financial position in the future and thus give rise to contingent liabilities. A set of six variables, which have proven in the past to be good leading indicators of banking – fiscal crises, is assessed against specific thresholds (see Table 5.2) ⁽⁸²⁾.

Fiscal risks due to contingent liabilities related to the banking sector are still present, although some risk-reduction is taking place. In 2019, the level of non-performing loans (NPLs) ratios is still high in a majority of Member States. However, an overall reduction is observed in most countries since 2014 (see also Graph 5.7). Between 2018 and 2019, NPLs ratios continued to decline in most

Member States, with more sizeable reductions in Cyprus (-12.6 pps), Portugal (-3.5 pps.), Slovenia (-3.3 pps.), Ireland (-2.5 pps.), Bulgaria (-2.1 pps.) and Hungary (-2.0 pps.) ⁽⁸³⁾. The NPL coverage ratio shows that in most countries, NPLs are provisioned for in proportions of at least one third. Only in few cases, NPLs appear both high as a share of total loans, and provisioned for a level lower than 33% (e.g. Ireland). Additional indicators point to contained vulnerabilities. Liquidity risks as indicated by the bank loan-to-deposit ratio are identified only in few Member States, e.g. in Denmark, Sweden, and Finland. Finally, developments of private sector credit flows and house prices flag low risks in most Member States.

Table 5.2: **Potential triggers for contingent liabilities from the banking sector, by country**

	Private sector credit flow (% GDP)	House price nominal index change (%)	Bank loan-to-deposit ratio (%)	NPL ratio (% of total gross loans)	NPL ratio change (pps) 2019 v 2018)	NPL coverage ratio (%)
BE	0.8	2.9	104.7	2.0	-0.4	40.7
BG	3.9	6.6	73.9	7.2	-2.1	52.6
CZ	5.3	8.6	84.1	1.3	-0.1	57.9
DK	2.4	4.4	349.2	1.7	-0.5	32.7
DE	6.5	6.7	132.6	1.3	-0.4	39.3
EE	3.7	5.9	121.4	1.8	0.3	28.4
IE	-7.8	10.2	99.0	4.6	-2.5	27.2
ES	0.4	6.7	111.2	3.5	-0.8	42.9
FR	7.9	3.0	115.8	2.6	-0.3	50.6
HR	2.3	6.1	77.5	6.1	-1.5	55.3
IT	1.6	-0.6	111.8	7.9	-1.8	53.0
CY	8.4	1.8	59.8	21.5	-12.6	45.9
LV	-0.2	9.6	84.0	2.3	-1.0	32.6
LT	4.3	7.3	87.4	1.8	-0.9	33.4
LU	-0.5	7.1	136.0	1.1	0.3	35.2
HU	4.3	14.4	79.5	5.6	-2.0	66.5
MT	7.5	5.8	52.1	3.0	-0.8	25.7
NL	4.5	9.5	126.0	1.9	-0.2	24.2
AT	3.9	4.7	107.3	2.5	-0.7	53.1
PL	3.4	6.6	99.6	4.8	-0.8	62.3
PT	-0.1	10.3	85.8	8.9	-3.5	51.4
RO	1.9	5.6	66.4	4.9	-1.1	66.7
SI	1.3	9.8	67.9	5.3	-3.3	59.7
SK	2.0	7.4	113.8	2.6	-0.4	63.6
FI	1.6	0.9	186.7	1.6	0.4	25.9
SE	9.0	-0.9	210.1	0.5	-0.5	33.3
UK	4.4	3.2	93.4	1.3	-0.2	31.4

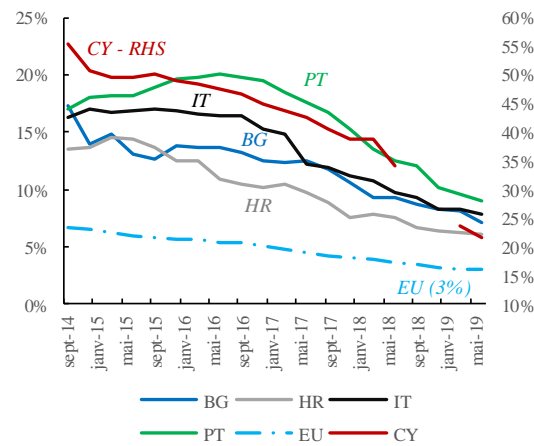
(1) Upper and lower thresholds (see Annex A7): (i) Private sector credit flow (% GDP): upper threshold 11.7%; lower threshold 9.4%; (ii). Nominal house price index (Y-o-Y Change): upper threshold 13.21%; lower threshold 11.0%; (iii) Bank loans-to-deposits ratio: upper threshold 133.4%; lower threshold 107.0%; (iv). NPL ratio: upper threshold 2.3%; lower threshold 1.8%; (v). NPL ratio (Change): upper threshold 0.3 pps; lower threshold 0.2 pps; (vi) NPL coverage ratio: lower threshold 66%; upper threshold 33%.

Source: Eurostat (2018 – for private sector credit flows and change in house price nominal index), EBA (June 2019 – for other variables reported).

⁽⁸³⁾ This overall declining trend is also confirmed by ECB data throughout 2019.

⁽⁸²⁾ The calculation of the specific thresholds for the six variables used in the fiscal risk heat map to assess the potential exposure of government finances to uncertainty over the banking sector relies on the signals’ approach. This approach is explained in detail in Chapter 2 and Annex A4 and Annex A10.

Graph 5.7: **Non-performing loans ratio (% of total loans), EU average and countries with a ratio above 6% in Q2 2019**



Source: EBA.

5.2.4. Implicit contingent liabilities from severe stress scenarios on the banking sector (SYMBOL model)

The analysis of potential contingent liabilities specifically related to the banking sector is completed by a ‘module’, based on model estimations of implicit contingent liabilities using bank stress scenarios (as in the previous reports).

To estimate the potential impact of banking losses on public finances ⁽⁸⁴⁾ SYMBOL (Systemic Model of Banking Originated Losses) is used. This model has been developed by the European Commission's Joint Research Centre (JRC) and the Directorate General Financial Stability, Financial Services and Capital Markets Union (DG FISMA). Similarly to previous exercises, the SYMBOL⁽⁸⁵⁾ uses unconsolidated

⁽⁸⁴⁾ Second-round effects, which would be linked to the fiscal consequences of possible bank failures, are not taken into account. As explained in European Commission (2016) Part 5.2.2 and in Part IV, Chapter 2 of European Commission (2011), the relationship between the government's budget and banks' balance sheets is not unidirectional but rather circular and dynamic. Dynamic effects are, however, beyond the scope of the analysis presented here. It is not taken into account, for instance, that a downgrading of sovereign bonds reduces the value of bank assets and can lead to higher funding costs and further bank downgrading.

⁽⁸⁵⁾ More details are reported in European Commission (2016). SYMBOL has been used by the European Commission for the ex-ante quantitative impact assessment of several legislative proposals (see Marchesi et al, 2012; European Commission, 2011b; Cariboni et al, 2012; Cannas et al,

balance sheet data to assess the individual banks' losses in excess of their capital and the recapitalisation necessary to allow banks to continue to operate in case of distress.

The model gauges the potential residual burden on government budgets after all cushioning layers of the legal safety net available to absorb shocks (capital, bail-in, resolution funds) have been deployed. The impact of a banking crisis is then split into that on the government deficit and that on gross public debt directly.

Implicit contingent liabilities from total funding needs, i.e. losses in excess of capital and recapitalization needs at 10.5% of Risk Weighted Assets (RWAs), are estimated for the short term (2020) and long term 2030 scenarios (see Table 5.3 and Table 5.4 for the results and Annex 10 for details on the methodology). Bank losses in excess of capital after the safety net are assumed to be covered by public injections of funds to the banking sector, affecting equally public deficit and gross and net debt. Conversely, recapitalization is deemed recoverable since capital injection is done in exchange of shares (partial government ownership of the bank) being recorded as a financial transaction affecting neither the deficit nor net debt, but only gross debt through the stock-flow adjustment ⁽⁸⁶⁾.

As in previous years, the model has been adapted to reflect risks banks face in relation to asset quality, taking into account a potential increases in the size of bank losses from non-performing loans ⁽⁸⁷⁾. The effect of non-performing loans (NPLs) on the banking sector is considered to be one whereby current stocks of NPLs entail risks in the short term, but not in the

2013; Cariboni et al, 2015), for the cumulative evaluation of the entire financial regulation agenda (ERFRA, European Commission, 2014a), and for the estimation of contingent liabilities linked to public support to the EU banking sector (European Commission, 2011a, 2012 and 2016; Benczur et al, 2015).

⁽⁸⁶⁾ Under the assumption that such recapitalisations meet the following criteria of the Eurostat's decisions on the statistical recording of public interventions to support financial institutions and markets: the financial instrument used ensures a sufficient non-contingent rate of return and the State Aid rules are complied with (see March 2013 Eurostat [Decision](#) and the earlier July 2009 Eurostat [Decision](#)).

⁽⁸⁷⁾ See European Commission 2019, "Fiscal Sustainability Report 2018", *European Economy* 094/2019- Section 5.3.5 and Annex 8.

long-term as their effect is assumed to become negligible. The initial 2020 scenario considers how insufficient provisioning of NPLs may lead to an overestimation of capital and to an underestimation of potential losses ⁽⁸⁸⁾. The baseline modelling assumption is that non-collateralised NPLs count as loan losses for the system, while the ones collateralised by immovable property are redeemable subject to a recovery rate. In some cases, this assumption may lead to certain bias, e.g. related to difficult foreclosure of household mortgages (leading to loss underestimation) or where household's mortgages result in better recovery rates than applicable to firms (leading to loss overestimates). Specifically, for each bank i and each country j , potential loans losses from NPLs are computed as follows:

$$NPLs\ Losses_{i,j} = (1 - CollShares_{i,j}) \times NPLs_{i,j} + CollShares_j \times NPLs_{i,j} \times (1 - RR_j) - Provisions_{i,j}$$

where RR is the recovery rate ⁽⁸⁹⁾. *CollShares* represents the proportion of total loans covered by collateral (i.e. implicitly assuming that this proportion is also representative for the subset of NPLs) ⁽⁹⁰⁾. Provisions and NPLs are, respectively, the amount of provisions and gross non-performing loans declared by banks in their balance sheet. Extra loan losses from NPLs calculated as per the above equation are then added to those coming from the SYMBOL simulation before the intervention of any safety net tools.

The following assumptions are made: first, results are calibrated to match the severity of the 2008-2012 crisis ⁽⁹¹⁾, i.e. a severe and systemic crisis event. Second, the impact of current stocks of non-performing loans is considered only in the short term and its effect is assumed to become

negligible in the long term. Third, a conservative assumption is used whereby all simulated banks' excess losses and recapitalisation needs that cannot be covered by the safety net fall on public finances. Fourth, the safety net is considered able to fully rule out contagion effects ⁽⁹²⁾. Finally, in the main scenario non-significant banks are liquidated, and significant banks might be recapitalised or liquidated. The model accounts for the possibility of liquidation of a significant entity even if directly supervised by the ECB. This assumption is consistent with the fact that significant entities do not go automatically into resolution, as the appointed resolution authority decides on a case-by-case basis whether the resolution of the bank would be in public interest. Until now, we have observed five banks that were declared failing or likely to fail by the ECB. In four out of the five cases, the SRB decided that resolution was not in the public interest and therefore did not take resolution action. To model the decision on public interest, we divide the banks in three groups: GSIBs, significant entities (excluding GSIBs) and non-significant entities. We associate every group with a probability of going into resolution if failing or likely to fail. For GSIBs and their subsidiaries this probability is set to 100% (i.e. GSIBs will be always resolved); for significant entities we take into account an 80% resolution probability and the remaining institutions will always go into insolvency when failing (i.e. with resolution probability equal to 0%) ⁽⁹³⁾.

Additional features are modelled in this edition of the report to provide a stress test scenario (Box 5.2 provides details and reports on two additional stressed scenarios):

- To mimic a fire sales mechanism, increased asset correlation is calibrated in line with the importance of common shocks. During a

⁽⁸⁸⁾ The new regulation on the prudential backstop for non performing exposures is not taken into account in the current set up.

⁽⁸⁹⁾ Based on country data provided by the World Banks in its Flagship Report "Doing Business 2019, Training for Reform" available here: www.openknowledge.worldbank.org/handle/10986/30438.

⁽⁹⁰⁾ Based on ECB available here: www.sdw.ecb.europa.eu/browse.do?node=9689685.

⁽⁹¹⁾ Bank losses and recapitalisation needs triggered by the last crisis are proxied by state aid data, in particular the total recapitalisation and asset relief provided to banks over 2008-12 (around 615 bn euro), see European Commission's DG Competition State Aid Scoreboard, European Commission (2014) and Benczur et al. (2015).

⁽⁹²⁾ Potential contagion across banks through bail-in (some of the losses absorbed by the safety net re-entering the banking system) was disregarded due to scarce data. Contagion across GSIBs due to the bail-in has been already addressed by the new banking package, where cross-holdings of TLAC instruments are to be deducted between G-SIBs.

⁽⁹³⁾ Up until last year, for DSA exercises, the standard assumptions were either that only significant institutions go into resolution, or that all banks go into resolution. The current set up is thus more favorable to resolution funds, because significant banks are now supposed to go into liquidation with a probability of 20%.

financial crisis, banks will sell assets to keep their liquidity positions. If many banks are exposed to the same shock, this will have a negative impact on the asset value (i.e. fire sales environment). The intensity of this mechanism is linked to size of the common shock, which underpins the degree of asset correlation.

- The SYMBOL inputs are adjusted to take into account the upcoming reform of the prudential requirements for banks. The effect of the new reform is proxied by an impact on Risk-Weighted Assets (RWAs), therefore we apply a correction coefficient to the amount of RWAs declared by the institutions leading to an increase of the RWAs. The corrections are based on the European Banking Authority's yearly exercise (Quantitative Impact Study, QIS) that monitors the impact of possible new standards on European banks' balance sheet data. Since the new regulation is still not in play, we apply approximate correction coefficients based on the QIS but not directly referring to specific regulatory changes. This will have an effect on the amount of RWAs and on amount of capital each bank will need to recapitalise in order to reach the target level.
- NPLs losses are modelled linking the level of recovery rates to the level of the common shock. This hypothesis takes into account that markets force banks to clean up their balance sheets during a financial crisis. NPLs are liquidated and the losses arising from this forced sale depends on the recovery rate for NPLs. The higher the common shock, the larger the markets pressure is to clean up balance sheets.

Under all scenarios, the required level of recapitalization is set to 10.5% of each bank's RWAs, representing the minimum level of capital and capital conservation buffer set by the capital requirement directive⁽⁹⁴⁾. The extra capital buffers built for Global Systemically Important Financial

⁽⁹⁴⁾ Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013.

Institutions (G-SIIs) are also to be recapitalised⁽⁹⁵⁾.

Table 5.3: **Implicit contingent liabilities from banks' excess losses and recapitalisation needs, under alternative scenarios (% GDP 2018)**

	Initial (2020) short term scenarios				Final (2030) long term scenarios			
	Baseline		Stress		Baseline		Stress	
	(a)		(b)		(a)		(b)	
	Excess losses	Recap needs 10.5%	Excess losses	Recap needs 10.5%	Excess losses	Recap needs 10.5%	Excess losses	Recap needs 10.5%
	To deficit and debt	Directly to debt	To deficit and debt	Directly to debt	To deficit and debt	Directly to debt	To deficit and debt	Directly to debt
BE	0.0%	0.1%	0.0%	1.5%	0.0%	0.1%	0.0%	1.3%
BG	0.0%	0.1%	0.0%	1.6%	0.0%	0.1%	0.0%	0.7%
CZ	0.0%	0.1%	0.0%	1.2%	0.0%	0.1%	0.0%	0.8%
DK	0.0%	0.1%	0.0%	0.4%	0.0%	0.1%	0.0%	0.3%
DE	0.0%	0.2%	0.0%	1.4%	0.0%	0.2%	0.0%	1.2%
EE	0.0%	0.1%	0.0%	0.5%	0.0%	0.0%	0.0%	0.3%
IE	0.0%	0.3%	0.0%	4.0%	0.0%	0.2%	0.0%	2.3%
ES	0.0%	0.9%	0.0%	5.9%	0.0%	0.9%	0.0%	4.3%
FR	0.0%	0.3%	0.0%	2.7%	0.0%	0.2%	0.0%	2.1%
HR	0.0%	0.1%	0.0%	1.0%	0.0%	0.0%	0.0%	0.2%
IT	0.0%	1.0%	0.1%	6.4%	0.0%	0.5%	0.0%	3.5%
CY	0.1%	2.7%	1.7%	15.6%	0.0%	0.2%	0.0%	3.3%
LV	0.0%	0.1%	0.1%	0.5%	0.0%	0.0%	0.0%	0.3%
LT	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.3%
LU	0.0%	0.5%	0.0%	8.7%	0.0%	0.4%	0.0%	6.9%
HU	0.0%	0.1%	0.0%	0.7%	0.0%	0.1%	0.0%	0.5%
MT	0.0%	0.5%	0.0%	5.2%	0.0%	0.2%	0.0%	2.3%
NL	0.0%	0.1%	0.0%	1.0%	0.0%	0.1%	0.0%	0.8%
AT	0.0%	0.2%	0.0%	1.6%	0.0%	0.1%	0.0%	1.2%
PL	0.0%	0.2%	0.0%	1.7%	0.0%	0.2%	0.0%	1.3%
PT	0.1%	1.8%	0.9%	7.0%	0.0%	0.4%	0.0%	3.6%
RO	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.4%
SI	0.0%	0.3%	0.0%	2.0%	0.0%	0.2%	0.0%	1.4%
SK	0.0%	0.5%	0.0%	1.9%	0.0%	0.2%	0.0%	1.6%
FI	0.0%	0.1%	0.0%	1.4%	0.0%	0.1%	0.0%	1.0%
SE	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%
UK	0.0%	0.1%	0.0%	0.7%	0.0%	0.1%	0.0%	0.4%

(1) Low sample ratio and/or low nbr. of banks may weaken sample representativeness in some countries (see Annex 11).
Source: Commission services.

Thanks to a cascade intervention of regulatory tools, the estimated budgetary impact⁽⁹⁶⁾ of a major crisis, under a baseline scenario, associated with excess bank losses and recapitalization needs is negligible in the short term (2020) for most countries (less than 1% of GDP), except for Cyprus and Portugal and, to a lesser extent, for Italy (see Table 5.3). In the long term (2030) this impact is in all cases almost zero. Under the short term scenario, when the effect of NPL is included, three countries would have final losses at or above 1% of GDP (CY, PT, IT). In the long-term scenario, where current NPL stocks' effects are assumed to be negligible, final losses under the baseline scenario are negligible in most cases. Hence, completing the implementation of the safety net implies a decrease of the estimated

⁽⁹⁵⁾ O-SIIs buffers are not taken into account due to unavailability of data and technical limitation in identifying the subsidiaries of all OSI.

⁽⁹⁶⁾ This round of SYMBOL results may differ in some cases from those of last year mainly due to changes in the banks' balance sheets.

overall risks at EU level over time. Simulations under the baseline scenario thus show that contingent liabilities have a high potential impact on public finances only for a very limited subset of countries and only in the short term.

Simulations under the more extreme stress scenario produce much higher potential losses, in the majority of countries exceeding 1% of GDP even in a long term, with Cyprus witnessing large losses at 17% of GDP in the short term and large effects also witnessed in Portugal and Italy (above 6% of GDP).

Table 5.4 presents the probability of having implicit contingent liabilities higher than 3% of GDP hitting public finances⁽⁹⁷⁾. The colour coding of the heat map reflects the relative magnitude of the theoretical probabilities of such an event (see Annex 10 for the details of heat map calculation and calibration). It is evident that contingent liabilities would have a potentially high impact on public finances under the baseline scenario only for a very limited subset of countries. In particular results for Cyprus and Portugal would point at some vulnerability. Under the more extreme stress scenario, substantially more countries experience a more significant theoretical probability of their public finances being hit to the tune of (at least) 3% of GDP (e.g. ES, IT, LU, MT and PT)⁽⁹⁸⁾.

Table 5.4: **Theoretical probabilities of public finances being hit by more than 3% of GDP, in the event of a severe crisis (i.e. involving excess losses and recapitalization needs in at least three different EU countries)**

	Initial (2020)		Final (2030)	
	short term scenarios		long term scenarios	
	Baseline	Stress	Baseline	Stress
	(a)	(b)	(a)	(b)
BE	0.0%	0.8%	0.0%	0.6%
BG	0.0%	0.5%	0.0%	0.2%
CZ	0.0%	0.6%	0.0%	0.4%
DK	0.1%	0.5%	0.1%	0.4%
DE	0.0%	0.6%	0.0%	0.5%
EE	0.0%	0.0%	0.0%	0.0%
IE	0.1%	3.3%	0.1%	1.6%
ES	0.4%	8.9%	0.3%	3.9%
FR	0.0%	1.7%	0.0%	1.2%
HR	0.0%	0.5%	0.0%	0.2%
IT	0.2%	14.0%	0.1%	2.7%
CY	1.8%	49.2%	0.2%	2.7%
LV	0.0%	0.0%	0.0%	0.0%
LT	0.0%	0.0%	0.0%	0.0%
LU	0.3%	5.9%	0.3%	4.2%
HU	0.0%	0.1%	0.0%	0.1%
MT	0.2%	4.7%	0.1%	1.5%
NL	0.1%	0.7%	0.0%	0.6%
AT	0.0%	0.6%	0.0%	0.4%
PL	0.0%	0.6%	0.0%	0.4%
PT	0.7%	32.0%	0.1%	2.9%
RO	0.0%	0.0%	0.0%	0.0%
SI	0.0%	0.8%	0.0%	0.4%
SK	0.0%	0.7%	0.0%	0.5%
FI	0.1%	1.1%	0.1%	0.8%
SE	0.0%	0.2%	0.0%	0.2%
UK	0.0%	0.4%	0.0%	0.3%

(1) Green: low risk (probability lower than 0.50%), Yellow: medium risk (probability between 0.50% and 1%); Red: high risk (probability higher than 1%).

(2) Low sample ratio and/or low nbr. of banks may weaken sample representativeness in some countries (see Annex 11).

Source: Commission services.

⁽⁹⁷⁾ The theoretical probability of public finances being hit by more than a certain share of GDP is directly linked with the magnitude of implicit contingent liabilities presented earlier, the results in the heat map are highly correlated with those in Table 5.2. However, other factors such as a high concentration of a banking sector may also increase the theoretical probabilities presented in the heat map.

⁽⁹⁸⁾ The results presented in the heat map are in line with those related to the losses as percentage of GDP. In particular, not considering Greece, we have a 0.8 correlation between the two measures.

5.3. GOVERNMENT ASSETS AND NET DEBT

The debt concept used in this report is general government debt, also referred to as ‘Maastricht debt’ or ‘EDP debt’⁽⁹⁹⁾. It comprises financial liabilities related to the following debt instruments: currency, deposits, debt securities and loans⁽¹⁰⁰⁾. The stock of *gross consolidated* debt at year-end is measured at *nominal* (face) value rather than at market value. Making use of gross debt means that government-owned assets vis-à-vis counterparts outside the general government are not netted out. The fact that figures are consolidated across the general government sector means that any liability of which the counterpart is another general government unit is netted out.

The use of gross government debt, which is central in the EU’s fiscal surveillance framework, has a number of advantages. The choice of gross debt as benchmark indicator was laid down in the Treaty⁽¹⁰¹⁾. It is a widely used concept, allowing for international comparison. When assessing risks of fiscal stress, gross debt is the obvious starting point considering that it summarises governments’ contractual financial obligations and reveals the magnitude of eventual refinancing needs.

Yet, government assets also impact public finances in several ways and might provide useful supplementary insights. On the one hand, government-held assets can become a source of fiscal risks. This is, for example, the case when state-owned companies run into financial difficulties. On the other hand, government assets generate revenue, such as interests or dividends, which are included in the structural balance calculations and thus accounted for in the S1 and S2 indicators. In addition, government assets can theoretically help to reduce debt when sold off. In practice however, effective control, marketability,

liquidity, earmarking of financial means and societal concerns can limit this possibility. In addition, the valuation of assets is intricate, in particular for non-financial assets (see Box 5.1 of the FSR 2018).

Net government debt offsets gross debt with certain types of financial assets. It is defined as “gross debt minus financial assets corresponding to debt instruments” (IMF, 2013). Net debt thus provides a measurement of how much gross debt would remain after liquidating financial assets to redeem part of the outstanding debt. It should be noted that financial assets are marked-to-market when possible. As a result, in the EU context, net debt entails adding up two items that are valued in a different way as EDP debt is valued at nominal value. This also means that valuation effects will be present only for the marked-to-market financial assets and will fluctuate along the economic cycle. Because of the differences in valuation of assets and liabilities, and, most importantly, given the conceptual shortcomings for policy use, Eurostat does not publish official net debt figures. However, Eurostat does publish total government liabilities, measured at market value, which are generally higher in percent of GDP than the Maastricht debt ratio due to both larger scope⁽¹⁰²⁾ and valuation effects included on the liabilities side (see Graph 5.8).

Net debt is found to have a significant effect on financing costs and the occurrence of fiscal crises, though the direct impact of assets is less clear. According to Gruber and Kamin (2012) there is a robust and significant effect of fiscal positions, including net debt, on long-term bond yields for OECD countries. Relatedly and in line with previous research, Berti et al. (2012) highlight that net debt is an important predictor of fiscal stress episodes (the European Commission’s S0 early-detection indicator of fiscal stress includes the variable). Ichiue and Shimizu (2015) confirm that net debt helps explain forward rates for a group of advanced economies but find that assets as such do not⁽¹⁰³⁾. Henao-Arbelaez and Sobrinho

⁽⁹⁹⁾ General government includes central government, state government, local government and social security.

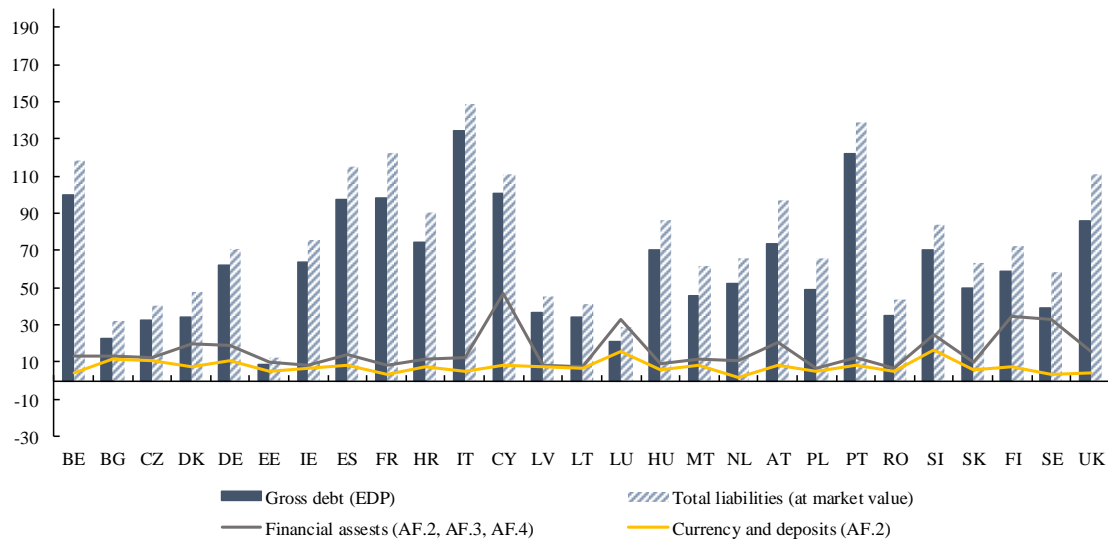
⁽¹⁰⁰⁾ Maastricht debt does thus exclude monetary gold and SDRs; equity and investment fund shares; insurance, pensions and standardised guarantee schemes; financial derivatives; and other accounts payable such as trade credits. See section 5.3 on the difference between Maastricht debt and total financial liabilities.

⁽¹⁰¹⁾ Art. 126 and Protocol 12 of the Treaty on the Functioning of the European Union.

⁽¹⁰²⁾ For more details on the differences in scope and definition between EDP debt (Maastricht definition) and total government liabilities, please see Box 5.1.

⁽¹⁰³⁾ Assets matter, however, for resilience during crisis episodes: IMF (2018a) found that countries that enter recessions with strong balance sheets seem to experience shallower and shorter recessions.

Graph 5.8: Gross debt, total liabilities and financial assets (%GDP; 2018)



(1) The following financial assets are considered: currency and deposits (AF.2), debt securities (AF.3) and loans (AF.4).
 (2) When using EDP debt at market value, rather than at face value, to calculate net government debt, the latter is 17 pps. of GDP higher for the EU on average. The difference is the largest for the UK (25 pps.), followed by SE, AT and FR (20-24 pps.).
Source: Commission services based on Eurostat data.

(2017) find that the presence of financial assets does not significantly reduce sovereign spreads and the probability of debt crises in advanced economies, contrary to what is the case for emerging economies.

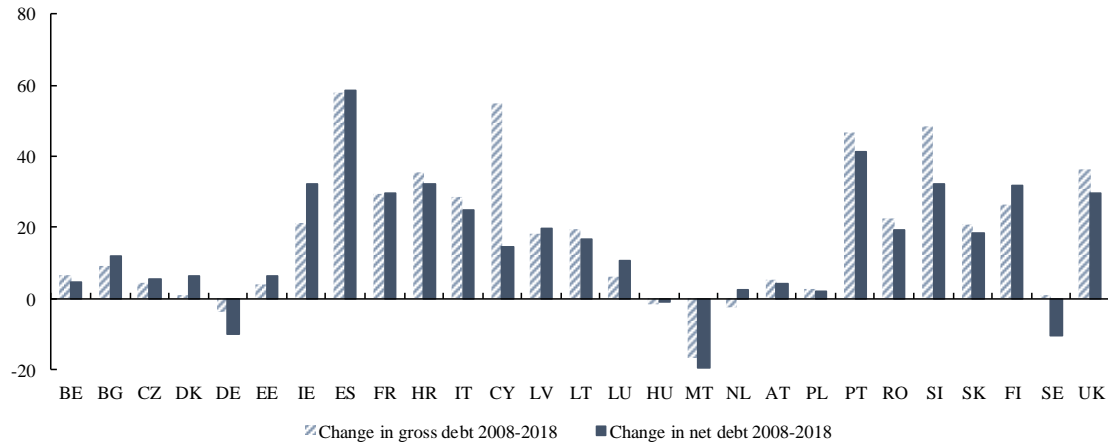
The difference between gross and net debt can be substantial. For instance, when governments sell financial assets, this may not immediately affect gross debt (Eurostat, 2014). Alternatively, when governments intervene to recapitalise financial institutions, gross debt rises but the parallel acquisition of a portfolio of financial assets might fully or partly neutralise the operation's impact on net debt⁽¹⁰⁴⁾. Evidently, asset quality could be an issue in such a scenario and the marketability of such assets would realistically be limited in the near term. Moreover, the valuation of financial assets is based on observed market values. As a result, their value might drop substantially in the event of rising

market pressures. The sale of large amounts of government assets might itself induce negative effects on market valuation. Also maturity mismatches between liabilities and assets need to be reckoned with. In sum, interpreting net debt indicators requires caution and case-by-case analysis.

Which financial assets should be considered to compute a concept of net debt that would be relevant for assessing debt sustainability, varies depending on their capacity to mitigate risks. In keeping with the Maastricht debt definition, the net debt concept discussed hereafter considers financial assets in the form of currency, deposits, debt securities and loans, i.e. the same categories that compose gross debt on the liability side, while debt is measured at nominal (face) value. A more risk-based approach would be to restrict assets to those that are considered highly liquid, such as currency and deposits and certain debt securities, which could be more relevant for determining the capacity to pay debt obligations in stressed situations and assessing liquidity position to honour high gross financing needs. The challenge of conducting the debt sustainability analysis based on a concept of net debt is in determining the

⁽¹⁰⁴⁾ Only the operations which are considered to take place at market price are recorded as financial transactions, resulting in acquisition of assets, whereas any excess paid by the government over the market price would require recording of government expenditure (capital transfer). Moreover, even when an operation is deemed to take place at market price, it would impact the net debt calculation used in this chapter when the underlying instruments are debt securities or loans, but not in the case of equity holdings.

Graph 5.9: Change in gross and net government debt (pps. of GDP; 2008-2018)



(1) The following financial assets are considered for the calculation of net debt: currency and deposits (AF.2), debt securities (AF.3) and loans (AF.4).

Source: Commission services based on Eurostat data.

appropriate scope and valuation of assets/liabilities⁽¹⁰⁵⁾.

In 2018, the average net debt⁽¹⁰⁶⁾ was 15 pps. of GDP lower than gross debt in the EU, with differences varying between 7 and 47 pps. of GDP for individual Member States. This essentially reflects the large variation of government financial assets across Member States, which might be due to the set-up of pension systems, the past materialisation of contingent events, or country-specific fiscal policies such as maintenance of large cash buffers. The difference between gross and net debt was more than 30 pps. of GDP for Finland, Sweden, Luxembourg and Cyprus (see Graph 5.8) and 21-27 pps. in the cases of Denmark, Austria and Slovenia. For Luxembourg and Estonia, the Member States with the lowest gross debt, net debt is even negative as the value of financial assets exceed the outstanding government debt at face value. The difference between gross and net debt is less than 10 pps. of GDP for Ireland, France, Latvia, Lithuania, Hungary, Poland, Romania and Slovakia. Among the Member States considered, for those with the highest government debt, i.e. Italy, Portugal and Belgium, net debt is 12-13 pps. of GDP lower than gross debt. Also in net terms, these countries have

the highest debt burden among EU Member States. Overall, country rankings for indebtedness are similar when comparing gross and net debt.

Some exceptions aside, gross and net debt rose synchronously over the past decade in the EU (see Graph 5.9). In Malta, both variables decreased between 2008 and 2018. Germany shows a decrease in gross government debt and even a larger decrease in net debt, while Sweden also shows a decrease in net debt, despite a slight increase in gross government debt. The decrease in net debt, of about 10 pps. of GDP, is driven by the increase in the value of their financial assets between 2008 and 2018. For all other Member States, debt increased under both gross and net terms. The largest differences between changes in gross and net debt are found for Cyprus and Slovenia. In both countries, gross debt rose by 55 and 49 pps. of GDP, respectively, between 2008 and 2018. In contrast, over the same period net debt rose by only 15 and 32 pps. of GDP, respectively. In Slovenia and Cyprus, the large-scale financial sector rescue operations led to higher deficits and debt but also involved the accumulation of financial assets. This example illustrates how net debt figures help interpret increases in gross debt that result from financial assistance to companies.

⁽¹⁰⁵⁾ See for a more detailed discussion, Box 5.1, Chapter 5, 2018 Fiscal Sustainability Report.

⁽¹⁰⁶⁾ Measured as the difference between, on the one hand, EDP debt and, on the other hand, financial assets in the form of currency and deposits (AF.2), debt securities (AF.3) and loans (AF.4).

Box 5.1: Government liabilities: scope and definitions

Government liabilities are of diverse nature and classification into clear-cut categories is not a straightforward exercise. A first important distinguishing feature of government liabilities relates to how they are recorded. Some liabilities are recorded on governments' balance sheets (and in general government sector for national accounts purposes), while others are recorded off-balance, and subject only to reporting as memorandum or analytical items. Another distinction can be made between i) direct versus contingent liabilities, and ii) implicit versus explicit liabilities (see Brixi and Mody, 2002; Cebotari, 2008 and OECD, 2015 for a detailed discussion of the classification of government liabilities). In particular:

- Government liabilities may be *direct* or *contingent* depending on the certainty of the payment obligation. *Direct* liabilities are payment obligations that will arise with certainty, while *contingent* liabilities may result in future expenditure only if a particular event occurs.
- Irrespective of the direct or contingent nature, government liabilities can be *explicit* or *implicit* depending on whether they are legally binding. *Explicit* liabilities arise from a law or contract, whereas *implicit* liabilities arise from the social or political obligations of a government to intervene in the event of a crisis to either stimulate parts of the economic activity or prevent public sector or market failures.

These different categories are however not mutually exclusive and may overlap, calling for caution when putting together and interpreting the results (see discussion below). Figure 1 provides a tentative categorisation of the gross liabilities of the general government. Based on the discussion above, the on-balance sheet liabilities illustrated in this figure are direct and explicit. In the case of the off-balance sheet liabilities, the split is between direct and contingent liabilities and, in turn, each category is decomposed further into explicit and implicit liabilities.

Conventional debt sustainability analysis focuses on on-balance sheet direct (explicit) liabilities. In the EU debt sustainability analysis, the headline indicator is the general government gross debt, more precisely the so-called EDP (or Maastricht) debt ⁽¹⁾. This measure of debt includes a sub-set of government liabilities, namely currency and deposits, debt securities and loans. Other debt instruments such as other accounts payable, insurance, pensions and standardised guarantee schemes, as well as non-debt financial instruments, such as shares, equity and derivative liabilities, are not included in the EDP measure of debt (see section 5.2.2). However, other definitions of gross debt (IMF, OECD) include all instruments that have a nature of debt liabilities.

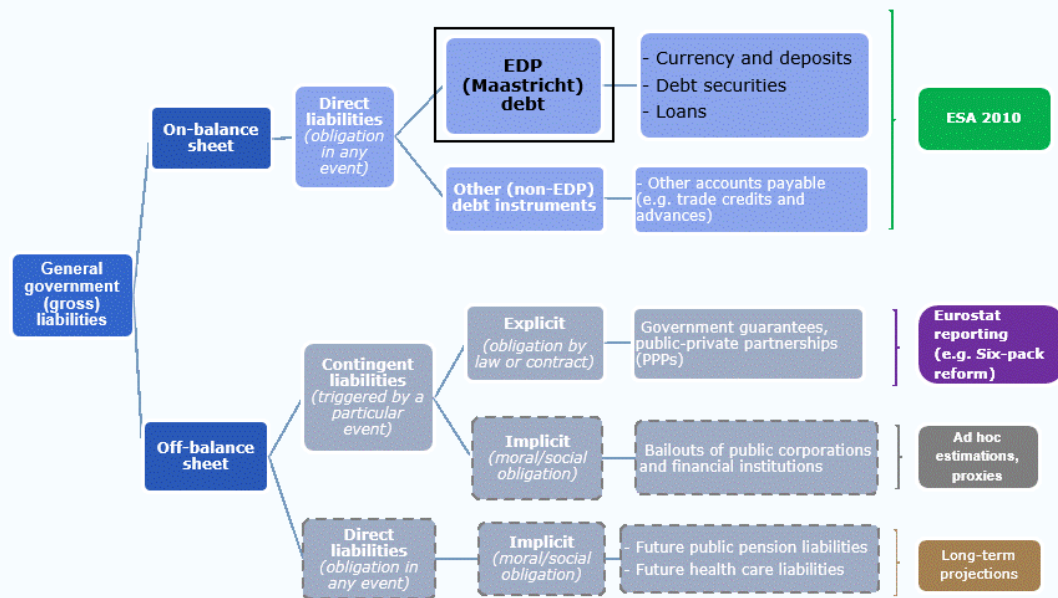
Contingent liabilities can be explicit or implicit depending on whether the government's involvement in case of contingency materialising arises from the existence of a formal arrangement. Explicit contingent liabilities are obligations of the government underpinned by contracts or laws. In most countries, they include: (1) one-off state guarantees to sub-national governments and public and private corporations; (2) standardised guarantees for different loan types granted to achieve public policy objectives (e.g. student loans, mortgage loans to support low-income borrowers, export credits); (3) state insurance schemes to cover bank deposits, pension savings, crops, floods, earthquakes and other natural disasters; (4) other financial guarantees linked to the public-private partnerships (PPPs), such as debt, revenue or exchange rate guarantees; (5) other explicit contingent liabilities. Unlike explicit liabilities, the implicit contingent liabilities are not defined in a formal arrangement. They typically include potential bailouts of public entities and private corporations that are strategically important for the economic activity (e.g. public and private

⁽¹⁾ The concept of Maastricht debt is used in the fiscal framework of the Stability and Growth Pact, namely for the Excessive Deficit Procedure (EDP) purposes and, due to this, is also known as the EDP debt. The EDP debt is measured in gross terms, which means that financial assets do not net out liabilities.

(Continued on the next page)

Box (continued)

Graph 1: Tentative categorization of gross financing liabilities of general government



(1) The debt sustainability analysis (DSA) is grounded on the EDP (Maastricht) debt. However, the long-term fiscal sustainability analysis accounts for categories of the off-balance sheet government liabilities, such as other implicit liabilities linked to the payment of future public pensions, health care and social security benefits, where a moral or social obligation of the government to intervene is expected. The long-term projections for these age-related public spending rely on assumptions about (i) the long-term path of the fiscal primary balance, which, for instance, embeds other direct explicit liabilities such as future civil service wages, and (ii) the ageing costs, such as public pensions, health care and long-term care (see the 2018 Ageing Report). Also, risks related to contingent liabilities arising from possible interventions to support the banking sector are estimated notably with the so-called SYMBOL methodology (see section 5.2.4).

Source: Commission services.

firms, financial institutions, or municipal sectors), environmental recovery liabilities or relief for natural disasters (see also Box 5.3 on climate change).

In the context of the so-called 2011 ‘six-pack’ reform to strengthen the EU economic governance, **the EU Member States publish supplementary information on contingent liabilities** that could have a sizeable impact on government finances (see section 5.2.2). Such liabilities, which go beyond the debt measure, can be a useful indication of potential fiscal risk in the future. In particular, several indicators are available: (i) government guarantees; (ii) liabilities related to off-balance public-private partnerships (PPPs); and (iii) liabilities of government controlled entities classified outside

general government (public corporations)⁽²⁾. In addition to reporting obligations introduced by the ‘six-pack’, information on actual and potential liabilities from government interventions to support financial institutions during the financial stress periods and the impact of the actual interventions on the government deficit and debt has been published since 2009. Data on government liabilities in relation to the financial sector interventions that are contingent on future events are further detailed as government guarantees on the liabilities and assets of financial institutions, government issued

⁽²⁾ Data on explicit contingent liabilities are collected and published by Eurostat and are also published nationally.

(Continued on the next page)

Box (continued)

securities under liquidity schemes, and liabilities of special purpose entities ⁽³⁾ .

Potential implications of contingent liabilities for government finances should be interpreted cautiously. First, the contingent liability indicators discussed earlier are not mutually exclusive. Risks reflected by one indicator may also be captured by another indicator. For instance, a government guarantee for liabilities of a public corporation classified outside the general government may be reflected by two indicators, respectively the guarantees and the liabilities of government controlled entities classified outside general government indicators. This implies that a summation of the contingent liability indicators may overestimate the fiscal cost of contingent liabilities. Second, in the reporting of contingent liability data, gross liabilities of government controlled entities that are classified outside the general government are not matched by assets. High levels of liabilities of these entities typically reflect the existence of government controlled financial institutions and is driven, for example, by deposits of households and companies in public banks, while disregarding high levels of assets on their balance sheet. By looking only at the liability side, the financial vulnerability of the government with respect to contingent liabilities can be therefore overstated ⁽⁴⁾.

Furthermore, the Commission has developed over the last decade additional original tools to estimate implicit liabilities, notably those arising from an ageing population and those related to the banking sector. The long-term budgetary projections for ageing costs have been regularly prepared by the Commission and the Council and published in the Ageing Report editions since 2009. These projections indicate to what extent a changing demographic structure affects future public spending on pensions, healthcare and long-term care across the EU Member States. Also, implicit contingent liabilities linked to the exposure of public finances to the banking sector in the event of financial instability are estimated with the SYMBOL model (Systematic Model of Banking Originated Losses). Based on severe test scenarios for the banking sector, SYMBOL provides estimates for the residual fiscal burden of banking losses after the legal safety net such as capital, bail-in, and resolution funds has been used. A detailed discussion of the latter is provided in section 5.2.4.

⁽³⁾ Guarantees extended to financial institutions are a sub-set of guarantees reported under the ‘six-pack’ obligations.

⁽⁴⁾ See Eurostat (2018).

Box 5.2: SYMBOL stress test scenarios

This box provides additional details on SYMBOL stress scenario aspects. It highlights key stress elements comprised under the main stress scenario presented in the text (part 1) and reports on two additional stress scenarios (part 2). All results refer to impact on excess losses plus recapitalization needs, allowing direct comparison of the relative impact of the different stress aspects.

1. DETAILS ON THE MAIN STRESS SCENARIO

The stress scenario in the main text comprises a series of stress factors. These are reviewed here, to highlight their respective impact.

1.1. Impact of fire sales

The main stress scenario comprises a stress aspect consisting in mimicking a fire sales mechanism. In the event of a large common shock – i.e. a financial crisis – banks sell assets to keep their liquidity positions. As many banks jointly engage in such selling activity asset value tends to deteriorate – i.e. fire sales environment. The model reflects this mechanism by reducing the value of assets in proportion to how correlated the situation across banks is in the simulation. A larger common shock implies a more severe fire sales mechanism.

Table 1 shows that the impact of accounting for the fire sales stress mechanism is on average an additional 0.6pps and 0.8pps impact, under the short-term the long-term scenario, respectively, compared to the baseline.

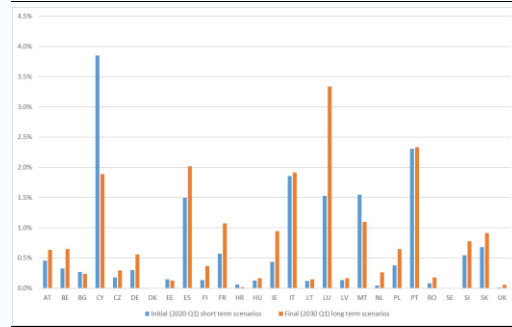
Graph 1 reveals that the impact of accounting for a fire sales mechanism varies across countries and is large in some cases, with an almost 4pps additional impact, under the short-term scenario, in the case of Cyprus.

Table 1: Excess losses plus recapitalization needs (10.5% RWAs): impact under the baseline and a scenario featuring the fire sales mechanism, (in % of GDP)

EU28		
Short term scenario	Baseline (no fire sales mechanism)	0.34%
	Adding the fire sales mechanism (part of stress scenario)	0.92%
Long term scenario	Baseline (no fire sales mechanism)	0.25%
	Adding the fire sales mechanism (part of stress scenario)	1.06%

Source: Commission services.

Graph 1: Excess losses plus recapitalization needs (10.5% RWAs): additional impact in scenario featuring the fire sales mechanism compared to baseline, (in pps of GDP)



Source: Commission services.

1.2. Impact of upcoming revised prudential assessment

The main stressed scenario also incorporates the impact of the upcoming revision of prudential requirements for banks. The model reflects such changes under the main stress scenario, notably by increasing RWAs levels and thus the extra amount of capital each bank will need to reach the recapitalization level. To reflect these changes we rely on European Banking Authority’s yearly (Quantitative Impact Study, QIS) review of impact of anticipated new standards on European banks’ balance sheet data.

Table 2 shows the impact of such revised settings under the new regulation, pointing at an additional 2.0pps and 1.5pps impact, under the short-term the long-term scenario, respectively, compared to the baseline.

Graph 2 reveals that the impact of accounting for such revised settings varies across countries. In some cases, the impact is large (7pps to 8pps) under the short-term scenario (i.e. CY, LU).

(Continued on the next page)

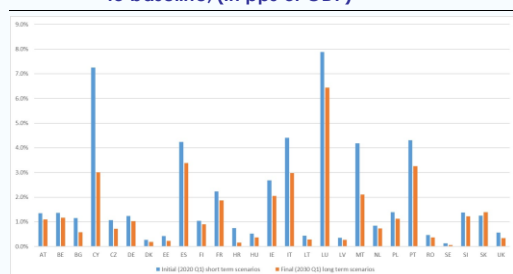
Box (continued)

Table 2: **Excess losses plus recapitalization needs (10.5% RWAs): impact under the baseline and a scenario featuring new regulation settings, (in % of GDP)**

EU28		
Short term scenario	Baseline (current prudential assessment)	0.35%
	Assuming revised prudential assessment (part of stress scenario)	2.23%
Long term scenario	Baseline (current prudential assessment)	0.25%
	Assuming revised prudential assessment (part of stress scenario)	1.69%

Source: Commission services.

Graph 2: **Excess losses plus recapitalization needs (10.5% RWAs): additional impact in scenario featuring new regulation settings compared to baseline, (in pps of GDP)**



Source: Commission services.

2. TWO ADDITIONAL STRESS SCENARIOS

Two additional scenarios are reported to illustrate the sensitivity of SYMBOL results to other specific stress factors. First, the impact of assuming a more severe crisis and, second, the impact of having more banks going into resolution, than under the baseline.

2.1. Scenario of a more severe crisis

Table 3 and Graph 3 shows the impact of assuming a more severe crisis, which is defined as an event further out in the tail of the probability distribution of events, namely at the 99.99th percentile instead of at the 99.95th percentile, which is assumed in all other scenarios.

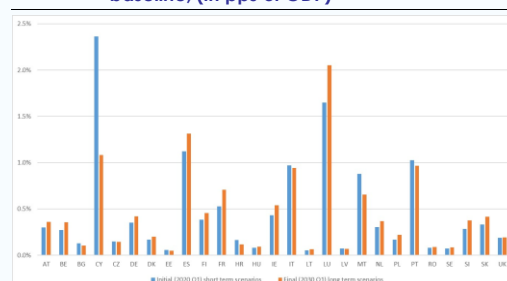
Such crisis would double the short-term impact and triple the long-term impact (Table 3) causing a more severe impact especially in some countries (see Graph 3, e.g. CY, LU, ES, IT, PT).

Table 3: **Excess losses plus recapitalization needs (10.5% RWAs): impact under the baseline and a scenario featuring a more severe crisis, (in % of GDP)**

EU28		
Short term scenario	Baseline crisis severity: 99.95% event	0.35%
	Stressed crisis severity: at 99.99% event	0.81%
Long term scenario	Baseline crisis severity: 99.95% event	0.25%
	Stressed crisis severity: at 99.99% event	0.78%

Source: Commission services.

Graph 3: **Excess losses plus recapitalization needs (10.5% RWAs): additional impact in scenario featuring a more severe crisis compared to baseline, (in pps of GDP)**



Source: Commission services.

2.2. Scenario of all banks going into resolution

Table 4 and Graph 4 shows the impact of considering all banks going into resolution, instead of the baseline assumption of considering a tiered probability of going into resolution⁽¹⁾. This stressed scenario should be seen as a conservative upper bound for the estimated losses, given that this assumption is deliberately not realistic.

Assuming all banks go into resolution would add 0.23pps to the short-term impact and double the long-term impact (Table 4) causing more severe impact especially in some countries (see Graph 4, e.g. CY, MT, PT).

⁽¹⁾ In the baseline scenario, for GSIBs and their subsidiaries resolution is always assumed, for significant non-GSIB entities an 80% probability is assumed, and for other banks liquidation is always assumed.

(Continued on the next page)

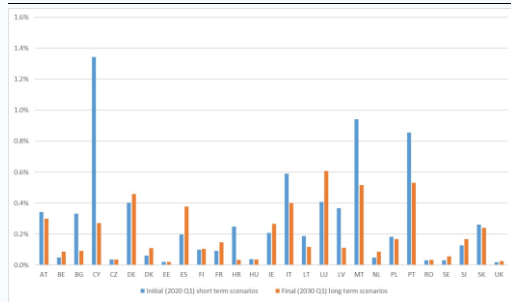
Box (continued)

Table 4: **Excess losses plus recapitalization needs (10.5% RWAs): and a scenario featuring all banks go into resolution, (in % of GDP)**

EU28		
Short term scenario	Baseline 80% of significant banks to resolution	0.35%
	Sending all institution to resolution	0.58%
Long term scenario	Baseline 80% of significant banks to resolution	0.25%
	Sending all institution to resolution	0.49%

Source: Commission services.

Graph 4: **Excess losses plus recapitalization needs (10.5% RWAs): additional impact in scenario featuring all banks going into resolutions compared to baseline, (in pps of GDP)**



Source: Commission services.

Box 5.3: Including climate change risks in the DSA: concepts and definitions

Climate change is a major challenge for the decades to come, associated with major ecological, social and economic transformations. In Europe, the Commission has stated the ambition for the EU to lead the transition to a “climate-neutral and healthy planet” through a European Green Deal presented in December 2019. Public finances are also expected to be subject to significant challenges on account of climate change. Risks to the sustainability of public finances may increase as a result of the surge in losses associated with more frequent extreme weather events, while substantial public investments and accompanying structural policies will be required to adapt to and mitigate climate change. In that context, a growing number of national and international institutions are considering integrating climate change related risks into their debt (or fiscal) sustainability analysis frameworks.

This Box proposes to discuss how the climate change dimension could be considered in the Commission debt sustainability analysis framework, while stressing the many conceptual and practical challenges involved (e.g. numerous transmission channels, limitations of existing economic modelling tools, data gaps).

1. INTRODUCTION

According to the scientific community, the rise in greenhouse gases (GHGs) concentrations is increasing climate change risks beyond acceptable levels (i.e. catastrophic climate change cannot be excluded in absence of action) ⁽¹⁾. The global average temperature has increased from pre-industrial levels with rising GHGs

⁽¹⁾ It is important to note that there is large uncertainty surrounding climate change projections. However, the possibility of tail-events (i.e. probability that catastrophic climate change can occur), which is present under such large uncertainty, is driving the scientific community call to international fora for stronger mitigation actions to reduce CO₂ emissions and adaptation to build capacity to absorb significant climate shocks (i.e. United Nations Conventions on Climate Change COP meetings). While natural factors explain some of the warming over the past century, according to the International Panel for Climate Change (IPCC), more than half of the temperature increase since 1950 can be attributed to human activity (IPCC 2014).

concentrations (i.e. mainly, caused by fossil fuel CO₂ emissions, but also land-use changes such as deforestation, and other non-CO₂ GHGs). This has led to physical changes of climate either under the form of gradual transformation of the environment (e.g. changed precipitation patterns, sea level rise, destruction in marine food chain from ocean acidification, changes in ocean circulation) or more intense, extreme weather events (e.g. floods, droughts, heat waves, wildfires, natural disasters).

Climate change is expected to be heterogeneous across regions and sectors, with greater impact for regions with higher initial temperature. The rise in GHGs concentrations represents a global negative externality of the consumption of carbon-intensive goods ⁽²⁾. In Europe, the exposure has not been (so far) as large as in other parts of the world, but output effects differ across regions with a potential positive impact in the north slightly offsetting expected losses ⁽³⁾ in other regions (IMF, 2016). However, according to some researchers, most aggregate studies may underestimate effects of climate change due to simplifying underlying assumptions and exclusion of the possibility of catastrophic outcomes (Stern, 2013). Studies focusing on specific sectors (agriculture, forestry, coastal real estate, tourism) tend to show relative larger negative effects (e.g. JRC / PESETA, 2018).

There is broad consensus in the scientific community that overall expected damages ⁽⁴⁾ caused by unmitigated climate change would be high and the probability of catastrophic tail-

⁽²⁾ Externalities can be seen as effects of production or consumption of goods on agents who do not participate in the production or consumption decision of those respective goods (Solow, 1971). In that sense, the market price of carbon-intensive goods does not reflect the social cost of carbon, resulting in substantial negative externalities from GHGs emissions (Pigato, ed., 2019).

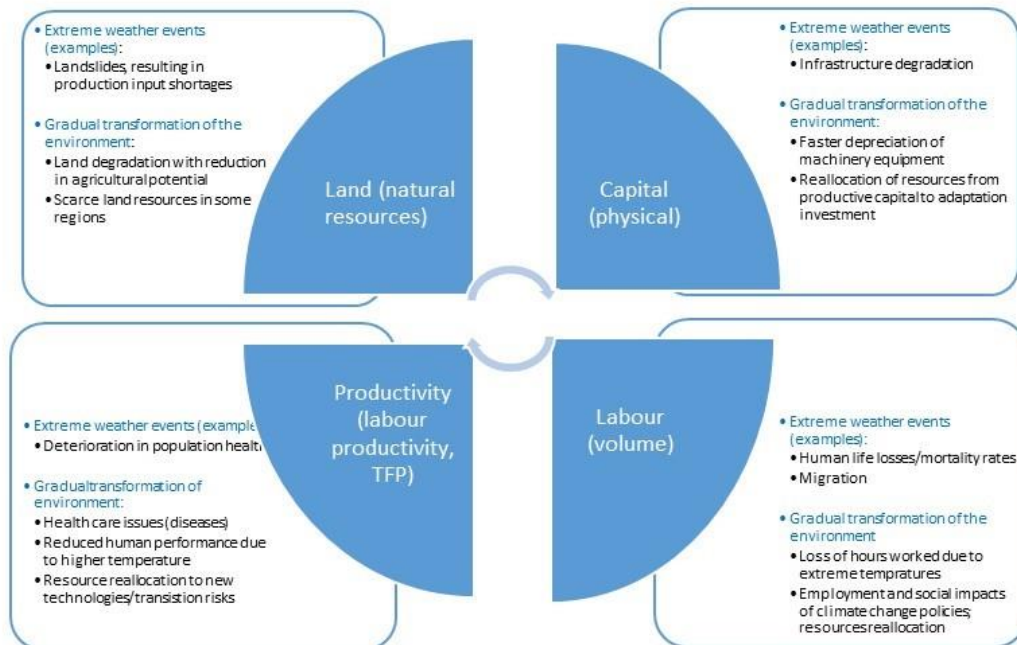
⁽³⁾ Losses are the foregone economic flows resulting from the temporary absence of the damaged assets and / or due to any other disruption of economic activity caused by climate change such as adverse effects on agriculture, tourism, labour productivity (GFDRR, 2017).

⁽⁴⁾ In the literature, the concept of damage refers to the replacement value of physical assets wholly or partly destroyed, built to the same standards that prevailed prior to the disaster (GFDRR, 2017).

(Continued on the next page)

Box (continued)

Graph 1: **Transmission channels to the supply side, in terms of vulnerabilities.**



(1) The list of vulnerabilities is non-exhaustive, and meant only as an illustration. The gradual transformation of the environment could also have positive supply side effects in some regions, which are not presented here.

Source: Commission services.

events non-negligible ⁽⁵⁾. Mean projected warming in absence of mitigation is expected to reach about 3–4°C by 2100. This estimate is subject to downside risks, as actual warming may be substantially greater than projections due to poorly understood feedback effects in the climate system. Furthermore, given presence of non-linearities, tipping points, beyond which catastrophic outcomes can occur, are likely to be present. There is broad agreement in the literature that tail-risks are real and the risk of catastrophic and irreversible disaster is rising (IPCC 2014, 2018), implying potentially infinite costs of unmitigated climate change (Weitzman, 2011), with no backstop in the event of catastrophic climate change (Aglietta et al., 2018).

To limit the impact of climate change on a country's economy, an array of mitigation and adaptation policies can be undertaken. More precisely, while *mitigation* refers explicitly to efforts to contain or prevent greenhouse gas emissions, *adaptation* means anticipating the

adverse effects of climate change and taking appropriate action to prevent or minimise the damage ⁽⁶⁾. Examples of mitigation policies include carbon taxation, emission trading schemes, specific regulations or tax incentives that promote the use of clean energy, (e.g. renewable energy or zero-emission transport), or more efficient energy use (i.e. scaling up the energy efficiency of domestic appliances or buildings). Examples of adaptation measures include modifying construction regulation for making buildings resilient to higher temperature and/or extreme weather events, developing drought-tolerant crops, promoting forestry practices that could reduce vulnerability to storms and fires.

2. TRANSMISSION CHANNELS TO THE MACRO-ECONOMY

Climate-related phenomena are expected to have substantial economic (affecting GDP level and/or growth) and fiscal impacts, via several transmission channels. Such effects can be either

⁽⁵⁾ IMF (2019).

⁽⁶⁾ https://ec.europa.eu/clima/policies/adaptation_en

(Continued on the next page)

Box (continued)

Table 1: Fiscal impacts: non-discretionary vs. discretionary measures

Non-discretionary (exogenously driven, by climate change phenomenon)	Discretionary impact (endogenously driven, through policy measures)
<p><i>Direct (examples):</i></p> <ul style="list-style-type: none"> • Public spending to replace damaged infrastructure/buildings • Social transfers to households affected by the weather event • Materialization of <i>explicit</i> contingent liabilities (e.g. insurance schemes backed by state guarantees) <p><i>Indirect (examples):</i></p> <ul style="list-style-type: none"> • Reduction of tax revenue due to a reduction in economic activity • Increase of health care spending due to more diseases • Materialization of <i>implicit</i> contingent liabilities (e.g. to support financial institutions in distress) • Impact on the sovereign capacity to pay debt payment obligations over the medium-term (due to budgetary funds reallocation towards recovery/reconstruction) 	<p><i>Adaptation policies (examples):</i></p> <ul style="list-style-type: none"> • Public investment in climate-proofing infrastructure, water management • Subsidies to support changing crop varieties, or relocation from coastal areas • “Rainy day” funds <p><i>Mitigation policies (examples):</i></p> <ul style="list-style-type: none"> • Carbon taxes (e.g. on fossil fuels, and other carbon taxes). Adverse impact on economic activity in the short term, with uncertain net impact on the overall tax revenues in the medium and long-term • Emission trading schemes (ETS) revenues • Public subsidies for clean energy transition • Redistribution effects on the tax base

(1) This table presents a number of possible climate change related impacts on public finances - due to the physical effects of climate change (either extreme weather events, or gradual transformation of the environment), or to active policies aimed at either mitigating climate change or adapting to it. It does not necessarily cover all possible impacts.

(2) The decomposition between direct and indirect impacts relates to the fact that in some cases, public finances will be directly affected by climate change events (e.g. in cases where public infrastructures are damaged and need replacing), while in other cases, the impact on public finances will materialise via indirect channels (e.g. in case of disruption of economic activity, implying a reduced tax base).

Source: Commission services.

temporary (e.g. adverse weather events tend to cause immediate damage, which may last over the medium-term, but may be reversed, depending on country-specificities) or more persistent, reflecting the gradual transformation of the environment (e.g. permanent losses due to the gradual changes in temperature, or permanent transformation due to adaptation and mitigation policies). The transmission, can be illustrated, based on economic theory (see Graph 1), as affecting the main growth drivers through the supply side vulnerabilities (impacts on productivity, land, capital and labour) and/or the demand side (consumption, investment and trade effects) ⁽⁷⁾. The demand effects could be persistent (e.g. protracted demand for climate-resilient durable goods and investment) with negative effects on consumption offsetting potential positive effects on output driven by the investment increase. The supply side effects could also be positive in some regions, where the rise in temperature could lead to an increase in the availability of resources (e.g. increase in agricultural land, warmer climates more appropriate to human life, innovation stimulated by

new climate-resilient technologies). Equally, impacts on public finances would also be expected to materialise via several channels (see Table 1), either directly (e.g. increase of public spending to replace damaged infrastructures) and/or indirectly (e.g. due to disruption of economic activity). In case of risks to financial stability, when public support to distressed financial institutions is called for, public finances would also be significantly affected (i.e. through the materialisation of contingent liabilities).

Climate change policies are expected to have a non-negligible impact on public finances.

Besides exerting different pressures on climate or on resilience to climate, the different range of policy options, on the mitigation and adaptation sides, would also have an impact on the economy and more visibly on public finances:

- *Adaptation policies*, which are likely to increase public expenditure (including investment) and possibly public debt in the short-term, could increase resilience to adverse weather effects in the long-term, and reduce the severity of damage to more moderate effects.

⁽⁷⁾ See Batten (2018) for more detail decomposition of macro-economic impact of climate change.

(Continued on the next page)

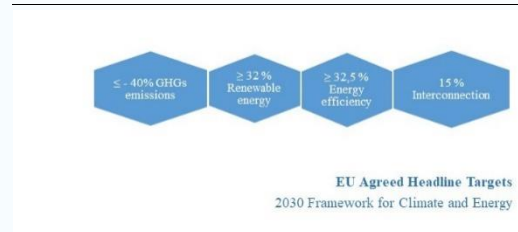
Box (continued)

Estimating their impact on long-term growth would include a certain degree of uncertainty, but would need to be considered when developing the medium and long-term macro-fiscal projections underlying the baseline.

- *Mitigation policies* also need to be considered in the medium and long-term macro-fiscal projections. Several studies show sizeable emissions reduction could come from pricing carbon, e.g. through taxes or through phasing out large fossil fuel subsidies. By comparing major mitigation measures, a recent IMF study (2019 IMF Fiscal Monitor) identifies carbon taxation as the most powerful and efficient, whereby carbon taxes are levied on the supply of fossil fuels in proportion to their carbon content (e.g. at the oil refinery, coal mine, processing plant). In the EU, mitigation policies are reflected in the so-called Energy Union objectives (see Graph 2), which set targets in four policy areas – GHG emissions reductions, renewable energy, energy efficiency and interconnection – for 2030 for the EU as a whole. A cornerstone of the EU policy for reducing GHG emissions cost-effectively is its emissions trading system (EU ETS). The system has been revised early 2018 for the period 2021-2030. The GHG emission reduction targets for the non-ETS sectors are broken down into national targets for the Member States. The 2019 December Commission’s proposal for a European Green Deal ⁽⁸⁾ includes an increase of the EU’s climate ambition in terms of reduction in GHG emissions by 2030, from 40% to 50/55 %, with the aim of achieving climate-neutrality by 2050 in continental Europe. At Member States level, countries present their policies and measures to achieve these targets in their National Energy and Climate Plans (2021-2030), which are due by the end of 2019 with an update scheduled in 2023.

⁽⁸⁾ European Commission (2019f).

Graph 2: EU Agreed Headline Targets for 2030



(1) The EC has proposed, as part of its European Green Deal announced in December 2019, to revise the headline target for the reduction in GHG emissions by 2030 from 40% to 50/55 %. Emissions from cars are to be reduced by over 30%, and fluorinated f-gases emissions by two thirds (by 2030 compared to 2021).

Source: Commission services.

3. DESIGN OF CLIMATE CHANGE 'MODULES' IN THE COMMISSION DSA FRAMEWORK

3.1. Several other institutions have started to assess climate-related fiscal risks ⁽⁹⁾

Climate-related fiscal risks are often absent from fiscal sustainability frameworks of official institutions, notably due to the current inherent difficulty in quantifying such aspects. The UK OBR summarizes the challenge by noting that ‘climate change is [...] a pervasive phenomenon that [...] potentially affects almost every aspect of the public finances’, and points at ‘the difficulty in seeing through to the full systemic consequences of significant global warming’ (UK OBR, 2019) ⁽¹⁰⁾.

Notwithstanding these difficulties, several institutions have recently started to develop in their fiscal sustainability frameworks modules that look at climate-related fiscal risks. Some institutions (e.g. UK Office for Budget Responsibility (OBR), Swiss Federal Finance Administration) have taken first steps toward integrating climate change into their fiscal sustainability framework, essentially by starting to develop concepts and definitions. The UK OBR, building on Bank of England taxonomy for assessing climate-related financial stability risks, distinguishes between: i) extreme weather events risks, as unexpected shocks with short-term impact, and ii) transition risks, related to fiscal

⁽⁹⁾ This section presents a selected number of examples.

⁽¹⁰⁾ The US OMB / CEA also stressed that ‘our current understanding of the fiscal risks of climate change is nascent, limited in scope, and subject to significant uncertainty’ (US OMB / CEA, 2016).

(Continued on the next page)

Box (continued)

consequences of adaptation and mitigation policies, which are foreseeable and building slowly over the medium-term. Other national and international institutions are increasingly integrating the climate change dimension into their fiscal risk analysis, with first quantifications focusing on natural disasters. The IMF and World Bank recently introduced in their revised Joint Debt Sustainability Framework for Low-Income Countries (IMF/WB LIC DSF) a tailored stress test for natural disasters (see Joint IMF/WB LIC DSF, 2017). Their ‘natural disaster’ stress test is only triggered for countries vulnerable to such risks ⁽¹¹⁾ and tailored to the country-specific history ⁽¹²⁾, while not being directly linked to future expected effects of climate change. Such stress tests have already been performed starting with 2018 for all low-income countries that meet the exposure criteria, in the context of IMF Article IV surveillance, and have been announced to be introduced also for advanced and emerging economies with the forthcoming review of the IMF DSA for market access countries. The OECD & World Bank (2019) also highlight a number of additional examples of countries providing an economic and fiscal analysis of natural disasters risks as part of their regular fiscal management (e.g. New-Zealand, Australia, Mexico and Japan). The US Congressional Budget Office (CBO) has published several studies on the economic and fiscal impacts of specific extreme weather events (e.g. CBO (2019) on hurricanes

⁽¹¹⁾ Exposure defined as: i) small states vulnerable to natural disasters; and/or ii) countries with frequent events (i.e. 2 disasters every 3 years) and significant economic losses (above 5% of GDP per year).

⁽¹²⁾ The default calibration of the shocks are based on evidence from historical data from the Emergency Events (EM-DAT) database over the period 1950-2018. It includes a direct shock on debt defined as a one-off shock of 10 pps. to the debt-to-GDP ratio in the second year of the projection period, and interactions with other macro variables in the year of impact that capture indirect effects on growth and exports (i.e. real GDP growth and exports are lowered by 1.5 and 3.5 pps., respectively). While the default values of the shocks are calibrated based on an event analysis of past episodes with measured economic losses of at least 5% of GDP, they can be customized to country-specific history.

winds and storm-related flooding) ⁽¹³⁾, and explored the effects on growth and public finances of different policies to limit emissions of greenhouse gases (e.g. carbon taxes and emission trading schemes).

Moreover, central banks, in their supervisory role, and financial regulators have also started to consider climate-related risks from a financial stability perspective. Building on event studies, some central banks and financial regulators have developed specific approaches to evaluate climate change related risks. For example, the Bank of England, along with the insurance industry, recently proposed a broad framework for assessing financial stability impacts of climate change aimed at being used by insurance companies (Bank of England, 2019) ⁽¹⁴⁾. The regulator EIOPA has also introduced a ‘natural catastrophe’ scenario, as part of its regular stress test analysis (EIOPA, 2018). This scenario reflects the risk of an increasing frequency in natural disasters, partly triggered by extreme weather events due to climate change ⁽¹⁵⁾. Their experience can provide valuable lessons in terms of methodology for designing a framework to manage climate change-related fiscal risks.

⁽¹³⁾ The US OMB / CEA (2016) additionally provided an assessment of five US programmes directly influenced by climate change (crop insurance, air quality - health care, wildland fire suppression, hurricane-related disaster relief and federal facility flood risk) and found significant impacts on public expenditures (yet ranging from no more than 0.05 to 0.15% of US GDP per year in today’s terms by the end of the century) and public revenue (a revenue loss of around 0.3 to 0.6% of GDP in today’s term by the end of the century).

⁽¹⁴⁾ This is part of a broad range of activities initiated by the Bank of England over the last years on climate change (see <https://www.bankofengland.co.uk/climate-change>).

⁽¹⁵⁾ For this scenario, EIOPA uses data on catastrophe events provided by two private companies (Risk Management Solutions and Air Worldwide Corporation). The scenario encompasses a series of four European windstorms, two Central and Eastern European floods and two Italian earthquakes, which are supposed to materialise over a short period of time. The simulations show resilience to the shocks, mainly due to the reinsurance coverages in place, which absorb more than half of the gross aggregated losses.

(Continued on the next page)

Box (continued)

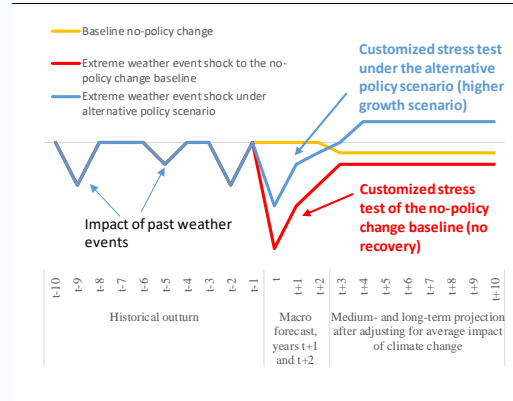
3.2. Climate change 'modules' in the EC DSA framework: conceptual framework

Translating the physical changes of climate and impacts of climate-related policy into economic and fiscal shocks in the DSA could be done by distinguishing between unanticipated shocks (such as extreme weather events) and gradual transformation of the environment (under alternative scenarios for policy strategies):

i. The impact of extreme weather events could be evaluated by including in the DSA a *customized stress test scenario*, where the impact on growth and public finances, including on debt and the capacity to pay, would be calibrated to country-specific characteristics (e.g. past history of weather events, degree of adaptation policies implemented, insurance protection). It could be based on a probabilistic approach, whereby the simulated shock would correspond to a tail event (e.g. severe event with a low probability of occurrence). The event impact can be directly affecting the government accounts and the debt trajectory (e.g. spending to replace damaged public infrastructure) or indirectly, for example, through GDP effects (e.g. lower tax revenue due to economic slowdown). Such a customized scenario could be designed as a triggered stress test of the baseline, only for country-specific risk exposures such as vulnerabilities to natural disasters with significant macro-fiscal impact⁽¹⁶⁾. In presence of adaptation and mitigation measures, different scenarios could be envisaged, also including periods of faster growth, in the aftermath of an extreme weather event, which could put the economy on a higher growth path than before due to higher investment stimulated by the event (see Graph 3).

⁽¹⁶⁾ For example, the EC Joint Research Centre (JRC) has provided quantifications of possible consequences of climate change in the EU in selected vulnerable sectors, in absence of adaptation and mitigation policies (i.e. PESETA project). While the absolute estimates may be surrounded by large uncertainty, the results could be used as an indication of the relative exposure of the different sectors and regions in EU, and therefore, provide a useful signal that can be used as a trigger for eligibility of the regions with large exposure (in relative terms) to customized stress test scenarios.

Graph 3: **Illustrative possible impact of an extreme weather event under a no-policy change baseline vs. an alternative policy scenario**



(1) Building on IMF (2016) and Batten (2018), including an alternative to the no-policy change baseline that includes more ambitious adaptation and mitigation measures, i.e. an alternative policy scenario.

Source: Commission services.

ii. The impact of the gradual transformation of the environment could be included in the DSA in the baseline macro-fiscal projections together with the legislated policy measures, while the policy commitments could be considered in *alternative policy scenarios*, where the implications of climate risks and policies would be incorporated in alternative macro-fiscal projections (e.g. GDP effects and fiscal costs). Such customized scenarios of gradual transformation of the environment for different paths of GHG emissions (contingent also on all other countries' international commitments) could be seen as alternative policy scenarios to the baseline. Such scenarios would require macro-economic impact assessment of the planned policies and measures at Member State level (e.g. from their National Energy and Climate Plans (2021-2030), when such quantifications are reported).

iii. Other aggravating / mitigating factors to consider in stress tests and policy scenarios:

- **The potential impact of contingent liabilities linked explicitly to government guarantees or, implicitly, to the (lack of) resilience of the financial sector to climate change risks.** Existing insurance schemes backed by state guarantees may require governments to step in case of major disasters (*explicit liabilities*, e.g. the natural disasters insurance scheme in

(Continued on the next page)

Box (continued)

France, CATNAT). A potential materialisation of a set of catastrophic events could also create losses and recapitalisation needs for banks and insurers that might pose a risk to public finance (*implicit liabilities*).

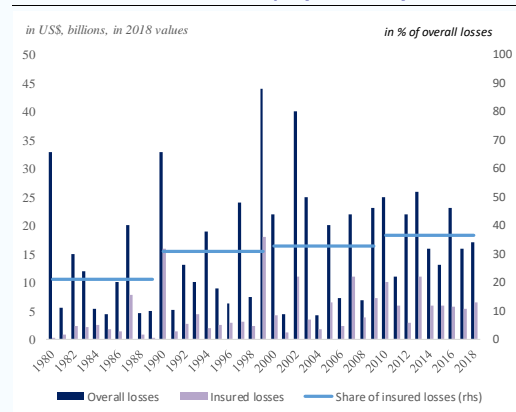
- **The risk sharing of climate-related events between private and public sector – through specific climate related financial instruments** ⁽¹⁷⁾. The presence of insurance and climate-resilient debt instruments that provide financial resilience to climate change and dampen the fiscal impact of climate-related events can reduce the debt sustainability risks, either, directly, by providing fiscal space to the sovereign in case of an extreme event, and/or indirectly, by dampening the impact of contingent liabilities ⁽¹⁸⁾. Over the last four decades, in Europe, the share of insured losses in overall losses in relevant natural loss events has increased from about 21 percent on average in the 1980s to about 36.5 percent on average in the last decade (see Graph 4).
- **Other macro-economic policies could matter too, such as regulatory measures, financial and monetary policy tools** (IMF, 2019). The literature highlights the need of determining an adequate policy mix for climate change mitigation, which brings together fiscal, financial and monetary policy tools, possibly for longer medium-term forecast horizons. Therefore, the realism of the macroeconomic policy framework can play a key role as a mitigating factor when assessing the fiscal sustainability risks.

⁽¹⁷⁾ The OECD / Worldbank (2019) find that practices and explicit commitments by government on disaster financial assistance and risk sharing vary widely.

⁽¹⁸⁾ The use of such instruments has heightened over the last years, but mostly outside the European Union. Such instruments can take a range of forms from self-insurance funds, contingent credit lines, “hurricane clauses” in debt instruments to parametric insurance through a regional pooling mechanism. Existing examples are: the World Bank support to set up a Caribbean Catastrophic Risk Insurance Facility (CCRIF, 2007); the issuance of the Pacific Alliance cat bond in 2017 to optimize ex ante protection against disasters and support deepening of the sovereign cat bond market (World Bank’s CAT-DDO), Grenada and Barbados successful issuances of sovereign bonds with “hurricane clauses”. (See for more details, 2017 IMF Board Paper on State-Contingent Debt Instruments).

Tipping points, beyond which catastrophic outcomes can occur, will likely remain below a certain probability threshold, when constrained by coordinated policy action at global level. The DSA baseline, stress tests and policy scenario analysis can include different assumptions on the path for GHGs emissions, yet, assuming policy action will contain the risk of catastrophic irreversible climate change. The extreme complexity and uncertainty around a scenario, where rising temperatures create tipping points, beyond which climate change could generate entirely new climates, biophysical, and socio-economic systems (IPCC, 2018, WWF, 2018, IPBES, 2019), limit the feasibility of incorporating such catastrophic assumptions into the central scenario of the baseline.

Graph 4: Overall and insured losses for relevant natural loss events in Europe (1980-2018)



Source: Commission services based on MunichRe NatCatService database.

4. CHALLENGES AHEAD

Building customized stress test and alternative scenarios in the DSA for the different climate change risks and policies will require both datasets on past natural events and macro-economic impact assessments of the planned policies and measures at country level. In the context of the DSA, such quantified elements are notably needed to calibrate the shocks and the economic response to different policy scenarios. Moreover, a longer forecast horizon for the baseline macro-fiscal projections could be required. Yet, current data collection, modelling tools and fiscal frameworks present important limitations for

(Continued on the next page)

Box (continued)

that purpose. These practical challenges are presented in turn in this section.

4.1. Data availability

Data availability appears as a key challenge for future developments of fiscal risk analysis linked to climate change. The existing international datasets recording extreme weather events are not (fully) publicly available, and / or sometimes provide a partial reporting of such events (see Table 2). The latter can be explained by the different objectives pursued by the entities doing such data collection (e.g. insurance in the case of MunichRe, humanitarian action in the case of the CRED) ⁽¹⁹⁾. Importantly, such data are by definition backward looking, while the frequency and the severity of natural disasters may increase in the future. Furthermore, the economic modelling of the gradual transformation of the environment (*without policy effects*) provides results subject to large uncertainties, and estimates are more often either sector-specific or only available over large regions (e.g. PESETA).

4.2. Existing modelling tools and budgetary frameworks

Several modelling approaches of climate change and policy responses exist, with important caveats. For example, cost-benefit models (Integrated Assessment Models, IAMs) - in which climate policy is set by balancing costs and benefits - suffer from several limitations (e.g. adequate common metric for costing different elements, choice of the discount rate). Hence, while they provide qualitative indications on how complex systems behave, accurate quantitative predictions are not yet available. Economic dynamic models, taking policy as exogenous (i.e. based on climate objectives/targets), are an alternative approach to understanding the economic impacts of climate change mitigation policies. Yet, results from the different economic dynamic models fall within broad intervals ⁽²⁰⁾.

Current budgetary frameworks often present limitations for the purpose of assessing fiscal risks associated to climate change. For instance, an initial review of practices carried by the Commission (European Commission, 2020) points to very limited use of green budgeting ⁽²¹⁾ in the EU, with information found only for France, Ireland, Italy and Sweden. Current practices also show a wide diversity in terms of scope of budgetary items considered. A broader use of “green budgeting” could be a way to bridge current data gaps. Furthermore, in the first draft of NECPs provided by Member States end 2018, estimates of the total costs of climate commitments for the economy and government finances were not available for many Member States. Where estimates exist, uncertainty appears very large, especially in the medium and long run. The current reporting under the Stability and Convergence Programmes also does not include a commonly

Table 2: **Reporting extreme weather events: the example of two datasets**

Dataset	Provider	Coverage	Events reported	Availability
NatCat	MunichRe	Worldwide including EU countries, 1980-current	Relevant* natural loss events: number of events, overall/insured loss, fatalities (including for each event)	Limited (e.g. no excel dataset available, limited methodological information)
EM-DAT	CRED (Centre for Research on the Epidemiology of Disasters)	Worldwide including EU countries, 1900-current	Relevant* disasters including natural disasters: total estimated economic damage, insured loss, fatalities, etc. (including detailed information for each event)	Upon registration, free downloads of a limited number of entries, many supporting methodological / analytical documents

(1) *Only events with a significant magnitude in terms of people affected and / or economic loss are reported. The criteria used by the CRED are more restrictive (e.g. more fatalities) than the ones used by MunichRe. Other datasets are available either supported by international institutions as part of crisis management and prevention (e.g. DesInvar, notably supported by the UN agencies), or provided by the private sector for businesses' risk management (e.g. Risk Management Solutions (RMS), AIR Worldwide Corporation (AIR)). The latter are however not freely accessible.
Source: Commission services.

⁽¹⁹⁾ When looking at natural disasters over Europe, 2944 events are recorded by MunichRe over 1980-2018 against 1879 events by EM-DAT since 1900.

⁽²⁰⁾ Nordhaus (2014), Pindyck (2013, 2017), European Commission (2018d), “In-depth analysis to support the European Commission COM (2018) 773 on A Clean Planet for All”.

⁽²¹⁾ The OECD (2018) defines ‘green budgeting’ as follows: ‘Green budgeting means using the tools of budgetary policy-making to help achieve environmental goals. This includes evaluating the environmental impact of budgetary or fiscal policies and assessing their coherence towards the delivery of national and international commitments. Green budgeting can also contribute to informed, evidence-based debate and discussion on sustainable growth.’

(Continued on the next page)

Box (continued)

agreed framework and a “green” taxonomy for estimates of climate-related fiscal cost.

5. CONCLUSION

Overall, the assessment of fiscal risks associated to climate change appears both a critical and challenging issue. A growing number of national and international institutions are considering including this dimension in their debt (fiscal) sustainability analysis framework. However, in practice, few have already done so, and more frequently presented event studies. Climate change risks could be integrated into the Commission DSA framework via stress test analysis, alternative policy scenarios and the consideration of additional mitigating / aggravating risk factors. At the same time, many conceptual and practical challenges exist. Going forward, an important prerequisite for developing such ‘modules’ on a broad basis will be an improvement of data collection (e.g. through harmonised definitions, methodologies and tools such as “green budgeting”). Hence, a step-by-step approach appears warranted, starting by performing case studies in EU countries for which exposure to climate change is particularly severe (e.g. higher frequency and / or magnitude of climate related events), and / or where information is available (including national data sources). First results could be presented in the next update of the Debt Sustainability Monitor.

6. OVERALL ASSESSMENT OF FISCAL SUSTAINABILITY CHALLENGES

6.1. PRELIMINARY REMARKS

This chapter summarises the main results of the fiscal sustainability analysis presented in this report. The main results (based on the Autumn 2019 Commission forecast and on the EPC / European Commission Ageing Report 2018) ⁽¹⁰⁷⁾, ⁽¹⁰⁸⁾ are presented in an overall summary heat map of fiscal sustainability risks per time dimension (short, medium and long term), using a horizontal assessment framework as in previous reports (see for example the FSR 2018). Additional aggravating and mitigating risk factors are also presented and discussed throughout the report. The framework is meant to allow identifying the scale, nature and timing of fiscal sustainability challenges. It therefore aims at ensuring a comprehensive and multidimensional assessment of fiscal sustainability risks, which is key to devise appropriate policy responses. This is all the more important as these results are used in the context of the EU integrated system of fiscal and economic surveillance (the SGP and the European Semester).

However, the quantitative results and ensuing risk assessments based on this horizontal framework need to be complemented with a broader reading and interpretation of results, notably to give due account to country-specific contexts. For instance, some relevant qualitative factors – such as structural and institutional features – cannot be fully captured through this quantitative analysis. Hence, the prudent application of judgement, as a complement to model-based mechanical results, is essential for the final assessment of fiscal sustainability risks. In particular, when a country is deemed to be at high risk in the short, medium or long term, it does not mean that fiscal stress is inevitable (in the short term) or that debt is unsustainable (in the medium to long term), but rather that there are significant

⁽¹⁰⁷⁾ The cut-off date for the preparation of the report was 7 November 2019 (publication date of the Commission Autumn forecast 2019). Therefore, it does not integrate developments that may have occurred since this date.

⁽¹⁰⁸⁾ For 3 countries (HR, IT and RO), ageing costs projections have been updated compared with the Ageing Report 2018, due to enacted pension reforms. These revised projections have been formally endorsed by the EPC in November 2019.

fiscal sustainability vulnerabilities that need to be addressed by appropriate policy responses.

6.2. APPROACH USED IN THE ASSESSMENT OF SHORT-, MEDIUM- AND LONG-TERM FISCAL SUSTAINABILITY CHALLENGES

6.2.1. Assessment of short-term fiscal sustainability challenges

The fiscal stress risk indicator S0 is used to evaluate fiscal sustainability challenges over the short term (the upcoming year) ⁽¹⁰⁹⁾. These challenges can capture situations ranging from a credit event, a large financial assistance programme, to an implicit domestic default (e.g. through high inflation) or (relevant in the EU context) a loss of market confidence. In particular, countries are deemed to face high short-term risks of fiscal stress whenever the S0 indicator is above its critical threshold. In all other cases, countries are deemed to be at low short-term risk ⁽¹¹⁰⁾.

Beyond the S0 indicator used to reach an overall short-term risk assessment, additional indicators / variables are considered in the analysis. These indicators / variables are reported in cross-country tables and country by country fiches (see statistical annexes), including i) values of the two fiscal and financial-competitiveness sub-indexes (incorporating only fiscal and macro-financial variables respectively), and ii) the individual variables incorporated in the composite indicator S0 (see also Chapter 2). These variables are meant to support the reading and interpretation of S0 results on a country by country basis.

Finally, complementary analysis is provided, related to short-term financing needs and financial markets' perceptions of sovereign risk. Short-term financing needs, a particularly important indicator of short-term risks (one component of the S0 indicator) are given particular attention in this report. The analysis of short-term fiscal risks is also complemented by financial

⁽¹⁰⁹⁾ The results of the S0 indicator are presented in Chapter 2; the methodology used is presented in Annex A1 and Berti et al. (2012).

⁽¹¹⁰⁾ The threshold for S0, calculated using the "signal approach" is 0.46.

markets' information on the ease of (re-)financing government debt (see Chapter 2, as well as the statistical country fiches).

6.2.2. Overall assessment of medium-term fiscal sustainability challenges

Approach used in the overall assessment of medium-term challenges

Medium-term fiscal sustainability challenges are assessed based on both the S1 indicator and the debt sustainability analysis (DSA). The joint use of the S1 indicator and the DSA, introduced with the FSR 2015, allows capturing medium-term sustainability challenges in a more comprehensive way than the assessment based only on the medium-term fiscal gap indicator S1. In particular, the integration of DSA results in medium-term risk assessments enables taking into account the impact of different economic, financial and fiscal assumptions (notably more adverse circumstances than the baseline no-fiscal policy change scenario) on the projected evolution of public debt over the next 10 years. On the other hand, the S1 indicator appears relatively more suited to capture risks for public finances stemming from population ageing. ⁽¹¹¹⁾

A prudent approach is used to determine the overall medium-term risk category. The horizontal assessment framework for fiscal sustainability challenges sets at potential high medium-term sustainability risk countries that are deemed to be either at high risk based on the S1 indicator and / or at overall high risk based on DSA results. In other words, a country is considered to face high sustainability challenges in the medium term if either its baseline S1 or DSA or both point in that direction. For the attribution of a medium risk level, the criterion applies the same way: a country is considered to be at medium sustainability risk in the medium term if either its S1 or DSA points in that direction (while none of the two indicates high risks).

⁽¹¹¹⁾ S1 is a particularly suited tool to assess the impact of ageing, through the decomposition of the indicator that allows singling out the cost of ageing contribution to the fiscal gap.

Approach used in the assessment of medium-term challenges based on the S1 indicator

The medium-term fiscal sustainability S1 indicator measures the size of the fiscal gap that needs to be closed to bring debt ratios to 60% of GDP. More precisely, the S1 indicator measures the fiscal adjustment required (in terms of structural primary balance) to bring debt ratios to 60% of GDP in 15 years (currently in 2034). For the S1 indicator, the identification of medium-term sustainability challenges relies on calculations grounded on the baseline scenario. Countries are deemed to face potential high / medium / low sustainability risks in the medium term, according to S1, depending on the value taken by the indicator under the aforementioned scenario. As in previous reports, the values of the S1 indicator are gauged with regard to the benchmark structural fiscal adjustment required in the SGP (a structural adjustment of up to 0.5 pps. of GDP per year). ⁽¹¹²⁾

Additional calculations are provided in order to measure the sensitivity of this indicator to underlying assumptions. S1 calculations under two alternative scenarios are provided in the statistical cross-country tables and country fiches (and commented in Chapter 3): i) the historical SPB scenario and ii) the AWG risk scenario (incorporating less favourable ageing cost projections). These alternative calculations aim at supporting the reading and interpretation of the reference S1 results. For each of the scenarios mentioned, S1 values are accompanied by the indication of the relative position (in the SPB distribution for all EU-28 countries over 1980-2019) of the related required structural primary balance (RSPB). This allows grasping more easily how common / uncommon the implied fiscal position is. ⁽¹¹³⁾ Thresholds used for the S1 sub-components and the percentile rank of the RSPB

⁽¹¹²⁾ Given that the adjustment is assumed to take place over 5 years, according to the S1 standard definition, the upper threshold of risk is therefore set at 2.5 pps. of GDP, while the lower threshold is at 0 pps. of GDP. Countries are considered at high risk when the S1 value is above 2.5 pps. of GDP, and at medium risk when S1 is between 0 and 2.5 pps. of GDP.

⁽¹¹³⁾ As pointed by Blanchard et al. (1990), what a given fiscal gap value (such as S1 or S2) implies will vary across countries, depending in particular on the initial level of the primary balance. A positive S1 (or S2) value may indeed be considered more worrisome in cases where this initial value is already high (meaning for example limited room to increase tax pressure or reduce spending). The RSPB reported in this report allows considering this aspect.

are reported in Annex A6. Additionally, S1 calculations under alternative debt targets and interest rates' assumptions are presented in Chapter 3.

Approach used in the overall DSA assessment

The overall DSA assessment is based on both deterministic debt projections under a set of scenarios and on stochastic debt projections. In particular, two main scenarios are used for the DSA assessment: i) the baseline no-fiscal policy change scenario, and ii) the historical structural primary balance (SPB) scenario. Additionally, the overall DSA assessment relies on results for three adverse sensitivity tests (on nominal growth, interest rates and the government primary balance), as well as stochastic projections, a tool that allows assessing the impact of individual and joint macroeconomic shocks around baseline projections. Finally, due account to the results of the Stability and Growth Pact (SGP) scenario is also made in the DSA section (see Chapter 3). This scenario assumes compliance with the main provisions of the SGP (see Annex A5 for detailed explanations).

The approach used allows for a transparent and comprehensive risk assessment mapping, from individual scenarios to an overall DSA assessment. Practically, for each of the DSA scenarios, sensitivity tests, and stochastic projections, individual assessments are made (in terms of high / medium / low risk for the country under examination) that are then combined into an overall DSA assessment per country. A country is assessed to be at high risk if the baseline no-fiscal policy change projections point to such a high level of risk, or alternatively if they point to an overall medium risk assessment but potential high risks are highlighted by alternative scenarios (historical SPB scenario; sensitivity tests on macro-fiscal assumptions) or the stochastic projections. This second criterion for a high-risk assessment allows prudentially capturing upward risks around baseline projections in cases where the latter appear to entail medium risks. The economic rationale followed to reach the overall DSA assessment is explained in detail through decision trees in Annex A6.

The DSA assessment takes into account debt levels, debt paths, and the plausibility of

underlying fiscal assumptions. Variables used in the DSA assessment are: i) the level of gross public debt over GDP *at the end of projections* (currently 2030); ii) the year at which the debt ratio peaks over the 10-year projection horizon (which provides a synthetic indication of debt dynamics); and iii) the country's position of the average SPB (in the overall SPB distribution for all EU-28 countries over 1980-2019) assumed over the projection period under the specific scenario⁽¹¹⁴⁾. The first two variables (end-of-projection debt ratio and debt peak year) are used also in the assessment of each of the sensitivity tests.

Due account is also given to macro-financial uncertainties through stochastic projections.

The stochastic projection results are evaluated based on the following two indicators: i) the probability of a debt ratio at the end of the 5-year stochastic projection horizon (currently 2024) greater than the initial debt ratio (in 2019), which captures the probability of a higher debt ratio due to the joint effects of macroeconomic shocks; ii) the difference between the 90th and the 10th debt distribution percentiles, measuring the width of the stochastic projection cone, i.e. the estimated degree of uncertainty surrounding baseline projections. Annex A6 reports all upper and lower thresholds used for each of the individual variables and indicators mentioned above.

Beyond these projections, other scenarios are run to complement the analysis of medium-term fiscal sustainability challenges.

These additional scenarios are reported in Chapter 3, and in the statistical country fiches, and are used to complement the analysis of medium-term challenges. These scenarios include the Stability and Growth Pact (SGP) scenario, the Stability and Convergence Programme scenario, the fiscal reaction function scenario, combined historical scenarios, enhanced / combined sensitivity tests on interest rates and growth, as well as sensitivity tests on exchange rates for relevant countries.

⁽¹¹⁴⁾As summarised by its percentile rank, which gives a sense of how common / uncommon the assumed fiscal stance is relative to cross-country historical record.

6.2.3. Overall assessment of long-term fiscal sustainability challenges

Approach used in the overall assessment of long-term challenges

Long-term fiscal sustainability challenges are assessed based on both the S2 indicator and the DSA. The joint use of the S2 indicator and the DSA, introduced in the FSR 2018, allows capturing long-term sustainability challenges in a more comprehensive way than the assessment based only on the long-term fiscal gap indicator S2. In particular, the inclusion of the overall DSA results in the long-term risk assessment framework aims at prudently capturing risks linked to medium to high debt-to-GDP ratios. ⁽¹¹⁵⁾ On the other hand, the S2 indicator is particularly well suited to capture risks for public finances stemming from population ageing.

A prudent approach is used to determine the overall long-term risk category. If the DSA indicates a higher risk category as compared to the risk indicated by the S2 indicator, the overall sustainability risk is revised upward by one category. If the opposite applies, such as lower DSA risk than the S2 indicator, the risk category associated with the S2 indicator prevails. A country is assessed to be at a potential high risk if (i) the S2 indicator flags high risk irrespective of the risk category implied by the overall DSA results or (ii) the S2 indicator is medium risk, but the overall DSA is high risk. In turn, a country is assessed at medium risk instead of low risk in the long term if, for instance, the S2 indicator flags low risk and the overall DSA either medium or high risk (see Annex A6). If both the S2 value and the overall DSA point to low risk, the long-term sustainability challenges are assessed as low risk.

⁽¹¹⁵⁾ Such an integrated approach allows addressing one of the flaws of the S2 indicator, namely that it abstracts from risks related to the level of the stock of debt. Indeed, the S2 indicator, grounded on the inter-temporal budgetary constraint, does not require that the debt-to-GDP ratio stabilises at a specific value and the adjustment implied by the S2 indicator might in fact lead to debt-to-GDP ratio stabilising at relatively high levels (see Box 4.1 in the FSR 2018).

Approach used in the assessment of long-term challenges based on the S2 indicator

The long-term fiscal sustainability S2 indicator allows measuring the fiscal gap to meet the inter-temporal budgetary constraint. The S2 indicator measures the fiscal adjustment required (in terms of structural primary balance) in order to meet the inter-temporal budget constraint over an infinite horizon (including to cover future costs of ageing). Countries are considered at high / medium / low sustainability risk in the long run depending on the S2 indicator value, calculated on the basis of the baseline scenario. These values are considered against a set of relevant thresholds, based on empirical evidence looking at past episodes of fiscal consolidations. ⁽¹¹⁶⁾

Furthermore, additional calculations are provided in order to stress test the sensitivity of this indicator to alternative assumptions. Such a sensitivity analysis is all the more needed since any long-term projection exercise is surrounded by important uncertainties. In particular, an extensive sensitivity analysis is provided, including five alternative scenarios: i) the ‘historical SPB scenario’; ii) the ‘AWG risk scenario’ iii) the ‘population scenario’; iv) the ‘TFP risk scenario’ and v) the ‘interest rate scenario’. These projections are also meant to support the reading and interpretation of S2 results. Similarly to S1, S2 values under all scenarios are accompanied by an indication of the relative position of the related required structural primary balance (in relation to the SPB distribution for all EU 28 countries over 1980-2019).

6.2.4. Other mitigating and aggravating risk factors considered

In addition to the elements already mentioned, the Commission fiscal sustainability framework provides an analysis of additional mitigating and aggravating risk factors. Some of these additional factors are particularly relevant for the specific time dimension considered (e.g. gross financing needs in the upcoming year and financial markets’ perceptions of sovereign risk when

⁽¹¹⁶⁾ Lower and upper thresholds of risk for S2 are set at 2 and 6 pps. of GDP respectively, as in previous reports. Countries with S2 above 6 pps. of GDP are therefore deemed to be at high risk, while being at medium risk if S2 is between 2 and 6 pps. of GDP.

analysing short-term risks). Other additional factors are considered horizontally in the overall assessment insofar the identified vulnerabilities or supporting factors may materialize in the short, medium or long term (see Chapter 5). Their consideration is needed to arrive at a balanced assessment of fiscal sustainability challenges.

In this latter additional analysis, three main components are considered: i) the structure of government debt financing, in terms of maturity, currency and debt holders; ii) additional government liabilities (beyond EDP debt) – including contingent liabilities linked to the banking sector and implicit liabilities linked to population ageing – and iii) government assets – notably to derive estimations of net debt.

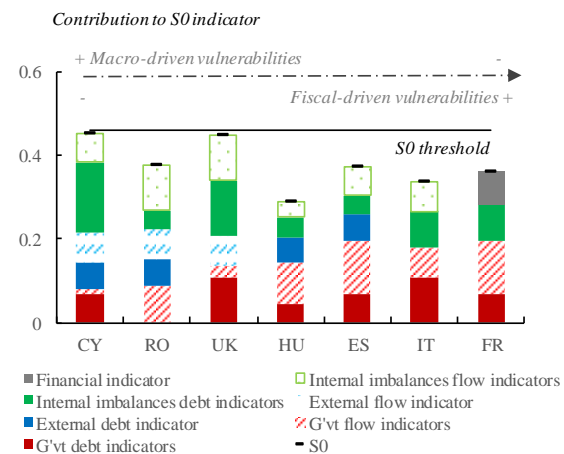
6.3. MAIN RESULTS

6.3.1. Short-term fiscal sustainability challenges

Overall, short-term risks of fiscal stress have declined for EU countries since 2009, although some risks appear still present in a number of countries. In 2009, more than half of the Member States had values of S0 above its critical threshold, signalling risks of fiscal stress in the upcoming year. In 2019, no EU country was found to be at risk of facing short-term risks of fiscal stress, based on this indicator (see Chapter 2). Short-term challenges are nonetheless identified in a number of countries on either the macro - competitiveness side (in Cyprus) or on the fiscal side (in Spain, France, Italy, Hungary and the United Kingdom, see Graph 6.1). These vulnerabilities are not deemed acute enough to lead to overall risks of fiscal stress in the short term. Yet, they deserve particular attention, in a context where financial market sentiments can change rapidly. Italy is particularly exposed to sudden changes in financial market perceptions, notably in the light of its still sizeable government financing needs.⁽¹¹⁷⁾

⁽¹¹⁷⁾ Although the S0 indicator and sub-indexes remain below their critical thresholds for Romania (based on 2019 data), results are also reported for this country in Graph 6.1, given the relatively high value of S0 compared with other EU countries. Furthermore, under unchanged policies, a notable increase in government financing needs is foreseen in 2020, in a context where financial markets' perceptions recently deteriorated.

Graph 6.1: **S0 indicator, contribution of underlying variables (by main types), selected countries**



(1) The contribution is calculated as the weight of each group of variables whenever these variables flag risks (i.e. are above their critical thresholds). The weight is given by the signalling power. The countries represented are those where either the fiscal sub-index or the macroeconomic sub-index flags risks (CY, UK, HU, ES, IT and FR), or the overall value of the S0 indicator is among the highest across the EU (RO).

Source: Commission services

6.3.2. Medium-term fiscal sustainability challenges

Seven countries are deemed at high fiscal sustainability risk in the medium term, as a result of inherited high post-crisis debt burdens, weak forecasted fiscal positions in some cases and / or sensitivity to unfavourable shocks. This concerns Belgium, Spain, France, Italy, Portugal, Romania and the United Kingdom (see Chapter 3). In particular:

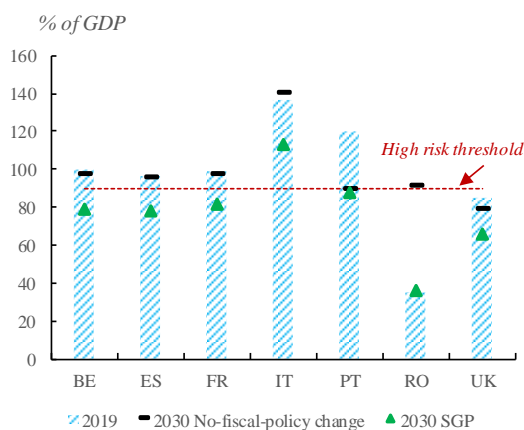
- In five of these countries (Belgium, Spain, France, Italy and Romania), both the DSA and the S1 indicator point to high risks. In these five countries, the DSA high risk classification is driven by the high level of projected debt by 2030 (above 90% of GDP) in the baseline no-fiscal policy change scenario, reflecting the inherited elevated post-crisis debt burdens in some cases (see Chapter 3). An increasing projected trend of the debt to GDP ratio also contributes to this classification for Italy and Romania, due to a weak forecasted fiscal position (measured by the structural primary

balance), compounded in the case of Italy by unfavourable snowball effects. ⁽¹¹⁸⁾

- In Portugal and the United Kingdom, the high risk category in the medium term is driven by the overall DSA assessment, while the S1 indicator signals medium risks. In these countries, the DSA result is driven by a debt ratio at the end of projections, under the baseline no-fiscal policy change scenario, above the 60% of GDP Treaty reference value, accompanied by high risks highlighted by one or more of the alternative debt projection scenarios or sensitivity tests (see Table 6.3 and Table 6.4).

Adherence to fiscal rules would bring a lower projected level of debt in these countries, yet remaining above safety levels in one case. For the countries deemed to be at high fiscal sustainability risk in the medium term, adherence to the SGP fiscal rules would bring the debt to GDP ratio below the upper threshold for high risk of 90% in Belgium, Spain, France, Portugal, Romania and the United Kingdom. Nevertheless, the debt burden would remain above this safety level in the case of Italy (see Graph 6.2).

Graph 6.2: **Government debt to GDP ratio, projected value in the baseline no-fiscal policy change and in the SGP scenarios, selected countries**



(1) Countries reported in this graph are the ones classified at high risk based on the DSA overall risk assessment.

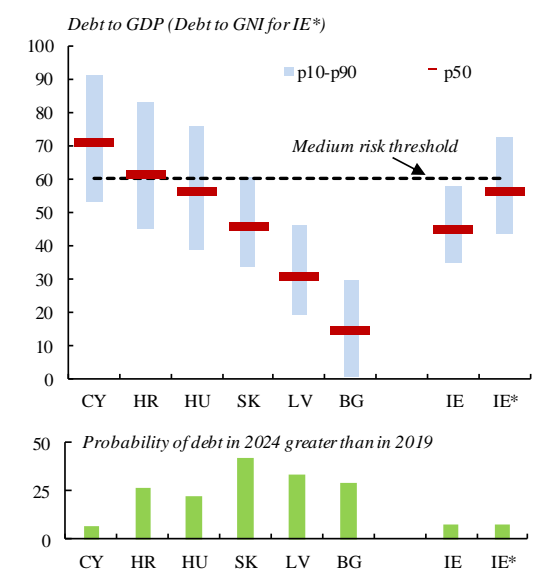
Source: Commission services

In one country, medium-term fiscal sustainability risks are deemed medium. Both the DSA and the S1 indicator point to medium risks for Finland. In particular, the medium DSA risk assessment is due to a debt ratio still above 60% of GDP by 2030 in the baseline no-fiscal policy change scenario and other alternative scenarios and sensitivity tests. An increasing projected trend of the debt to GDP ratio also contributes to this classification, pointing to a weak forecasted fiscal position (measured by the structural primary balance).

The remaining nineteen EU countries are found to be at low risk in the medium term. These countries include Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Croatia, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Slovenia, Slovakia and Sweden. In six cases however (Bulgaria, Croatia, Cyprus, Latvia, Hungary and Slovakia), stochastic projections point to some vulnerabilities due to the important underlying volatility of these economies (see Graph 6.3). Furthermore, in the case of Ireland, government debt as a share of GNI, rather than GDP, which can be considered as a more accurate measure of repayment capacity for this country, medium-term vulnerabilities appear more important than suggested according to the standard GDP metric used in this report (see Graph 6.3).

⁽¹¹⁸⁾ Snowball effects correspond to the effects of the interest – growth rate differential on the debt dynamic.

Graph 6.3: Stochastic projections results (T+5), selected countries



(1) In the top panel graph, the median value (p50) and inter-percentile value (p10 - p90) of the debt to GDP ratio in 2024 are provided. In the bottom panel graph, the probability of the debt ratio in 2024 to be greater than in 2019 is reported. The countries represented are the ones where risks are deemed medium based on these metrics (but low according to the overall DSA risk classification).

Source: Commission services

6.3.3. Long-term fiscal sustainability challenges

In the long term, five countries appear to be at high fiscal sustainability risk. This concerns Belgium, Italy, Luxembourg, Romania and the United Kingdom. In particular (see Chapter 4):

- In three of these countries (Belgium, Italy, and the United Kingdom), the significant level of the S2 indicator (pointing to medium risk), combined with high risk according to the DSA classification, drive this risk assessment (see Table 6.1). The substantial fiscal sustainability gap is, in some cases (Belgium and the United Kingdom), mainly due to the projected increase in ageing costs. In Italy, it is the unfavourable initial budgetary position that contributes to a large extent to the S2 indicator.
- In the case of Luxembourg, the high fiscal sustainability gap (S2 indicator), due to fast-increasing projected costs of ageing, explains the high long-term risk category, while vulnerabilities linked to the limited debt burden - captured by the DSA risk classification - are low.

- In the case of Romania, the high fiscal sustainability gap (S2 indicator), due both to the unfavourable budgetary position and fast-increasing projected costs of ageing, drives the high risk classification. Additional debt vulnerabilities, captured by the DSA risk classification, reinforce this result.

Table 6.1: Decomposition of the long-term risk classification, selected countries

	Overall long-term risk classification	Main contribution		
		Gap to the debt-stabilising primary balance	Costs of ageing	DSA vulnerabilities
BE	HIGH		xx	x
ES	MEDIUM	x		x
FR	MEDIUM	x		x
IT	HIGH	x		x
PT	MEDIUM			x
UK	HIGH		xx	x

(1) This table reports the countries for which the long-term risk classification differs from the one of the S2 indicator. For the gap to the debt-stabilising primary balance and the costs of ageing (the two components of the S2 indicator), xx indicates a contribution greater than 2 pps. of GDP, x a contribution between 1 and 2 pps. of GDP and a blank a contribution less than 1 pp. of GDP.

Source: Commission services

In thirteen countries, long-term fiscal sustainability risks are deemed medium, namely in Czech Republic, Germany, Ireland, Spain, France, Hungary, Malta, the Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland. More precisely:

- In ten countries (Czech Republic, Germany, Ireland, Hungary, Malta, the Netherlands, Austria, Slovenia, Slovakia and Finland), the medium risk category is explained by the S2 indicator, with no additional debt vulnerabilities flagged by the DSA. In most cases, the significant long-term fiscal gap is driven by the projected increase of ageing costs (Czech Republic, Germany, Ireland, Hungary, Malta, the Netherlands, Austria and Slovenia). In Slovakia and Finland, the unfavourable budgetary position also adds to the sustainability challenge.
- In Spain, France and Portugal, despite a limited (or even negative) fiscal gap indicator, due to the expected contained cost of ageing over the long term in some cases (Spain and France)⁽¹¹⁹⁾ or the favourable initial budgetary position

⁽¹¹⁹⁾ Costs of ageing are even projected to decrease over the long-term in France, mainly due to the effect of past pension reforms.

(Portugal), the vulnerabilities linked to the substantial debt burden – captured by the DSA risk assessment – lead to a medium long-term risk category (see Table 6.1).

The remaining nine countries are deemed at low long-term fiscal sustainability risks. This concerns Bulgaria, Denmark, Estonia, Croatia, Cyprus, Latvia, Lithuania, Poland and Sweden. In some countries (Bulgaria, Poland, Sweden, and to a lesser extent Cyprus), the low level of the S2 indicator is however conditional on maintaining a relatively high structural primary balance in the long term, and can be deemed ambitious by historical EU standards (a low percentile rank associated to the required SPB).

Under more adverse fiscal, demographic or macro-financial assumptions, long-term fiscal challenges would be more acute in most countries. For instance, under the AWG risk scenario (with more dynamic projected health-care costs), the S2 indicator would be substantially increased in most countries, to values above the upper threshold in two countries (Hungary and Slovenia) and above the lower threshold in another eight countries (e.g. Spain, France, Poland and Sweden). If gains in life expectancy were higher than what is assumed in the baseline scenario, long-term fiscal gaps would also be higher in a large number of countries, although the presence of links to life expectancy in the parameters of the pension systems would limit such increases in several of them (see Table 4.4 in Chapter 4).

6.3.4. Comparison with the FSR 2018 results

The short-term risk classification has changed in one country compared to last year. In the FSR 2018, one country (Cyprus) was found to be at risk of fiscal stress in the short term, according to the S0 indicator. In this report, no EU country is identified to be at such risk (see Table 6.2). The favourable change in the risk classification for Cyprus is driven by the significant improvement of fiscal variables (that substantially deteriorated in 2018 as the result of public support measures to the banking sector). Vulnerabilities coming strictly from the fiscal side are identified in the same set of countries as last year (Hungary, Spain, Italy and France), with the addition of the United Kingdom.

A limited number of changes in the medium-term risk classification are found:

- In four countries (Croatia, Cyprus, Hungary and Slovenia), the risk classification has improved from medium (or high in the case of Hungary) to low risk. In Hungary, the large improvement in the forecasted structural primary balance largely explains the change in the risk category, while in Cyprus, the significantly lower forecasted debt ratio drives to a great extent the upgrading. A slightly better initial budgetary position also explains an improved risk classification in Croatia and Slovenia (the latter country was borderline low – medium risk last year). In the case of Croatia, the revision of the interest rate assumption also contributes to this result.
- In two additional countries (Romania and Finland), the risk classification has deteriorated, from medium to high risk in the case of Romania, and from low to medium risk in the case of Finland. In Romania, the deterioration is notably driven by the strong downward revision of the forecasted structural primary balance, compounded with the deterioration of projected ageing costs compared to the FSR 2018 (updated since the Ageing Report 2018).⁽¹²⁰⁾ In Finland, the change in the risk classification is due to the worse initial budgetary position.

In the long term, the risk classification has changed for seven countries. In most cases, the updated risk classification points to less important long-term risks, while in few cases more acute risks are identified. In particular:

- In five countries, the long-term risk classification improves, from high to medium risk (Spain, Hungary), and from medium to low risk (Croatia, Cyprus and Poland). In the cases of Spain and Poland, this change is driven by the improvement in the initial budgetary position (both countries had borderline low – medium values of S2 last year). For Croatia,

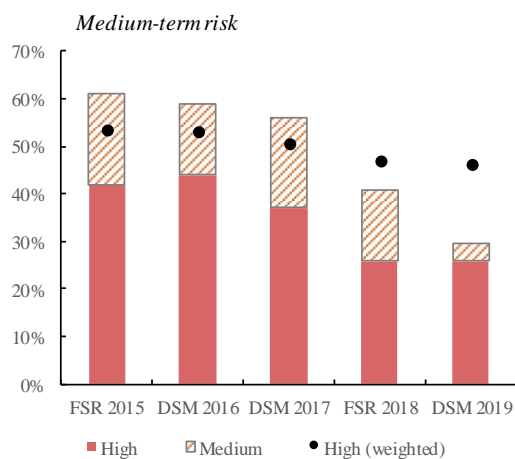
⁽¹²⁰⁾ Indeed, following the adoption of pension measures, Romania submitted new and significantly higher ageing costs' projections to the EPC, formally endorsed in November 2019.

Cyprus and Hungary, this upgrading reflects the improvement in the DSA risk classification.

- In two countries, the long-term risk classification deteriorates, from low to medium risk (Germany) ⁽¹²¹⁾, and from medium to high risk (Romania). In both cases, a less favourable initial budgetary position explains this development, compounded in Romania by the unfavourable revision of projected ageing costs.

Looking at the evolution of the risk classification across the last editions of the FSR and the DSM, mixed signals emerge. In the short term, in this edition, no country is at high risk, though there are some signs of vulnerabilities in several cases. *In the medium term*, the proportion of countries at high or medium risk has further declined. Yet, high risks identified in some large economies are not receding (see Graph 6.4). *In the long term*, sustainability challenges prevail in an important number of countries, despite a slight reduction of the countries classified at medium / high risk in this current edition of the DSM compared with the FSR 2018 (see Graph 6.5).

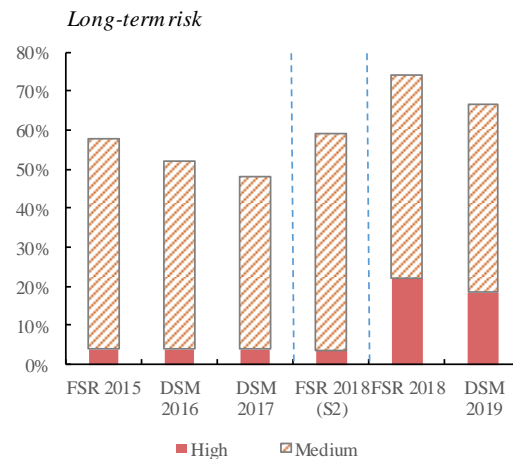
Graph 6.4: **Medium-term risk classification: proportion of countries classified at medium and high risk across reports**



(1) 'High' and 'medium' refer to the (unweighted) proportion of countries classified in these categories. 'High (weighted)' corresponds to the GDP-weighted proportion of countries classified at high risk.

Source: Commission services

Graph 6.5: **Long-term risk classification: proportion of countries classified at medium and high risk across reports**



(1) 'FSR 2018 (S2)' refers to the FSR 2018 long-term risk classification results - solely based on the S2 indicator, while 'FSR 2018' refers to the FSR 2018 overall long-term risk classification results, also catering for risks linked to medium/high debt burdens (captured through the DSA assessment).

Source: Commission services

6.3.5. Additional mitigating and aggravating risk factors

Overall, some risks related to the structure of government debt financing prevail in some countries, either linked to the maturity of debt (e.g. Sweden and Hungary), to the share of debt held in foreign currency (e.g. Bulgaria and Croatia), or to the nature of debt holders (e.g. Poland and Romania). Yet, an overall trend of lengthening of debt maturity can be observed in most countries, partially protecting them - in the short term - from potential rapid changes in market interest rates. Moreover, an important share of government debt is still held by the official sector or Central Banks in some countries (e.g. Cyprus, Portugal and Ireland), bringing also stability in terms of sources of financing (see section 5.1 in Chapter 5).

⁽¹²¹⁾ With a value of the S2 indicator close to its threshold, the risk category is borderline between low and medium risk.

- Fiscal risks due to contingent liabilities linked to the banking sector are still present, although some risk-reduction is taking place. The level of non-performing loans (NPLs) ratios is still high in a number of countries, yet an overall reduction is observed in most countries. Under the assumption of a rigorous application of the regulatory framework and of a further reduction of NPLs in the medium term, the simulated impact of a systemic banking crisis on public finances would have a potential high effect only in a limited subset of countries and in the short term (in particular in Cyprus and in Portugal). Less strict assumptions point however to some prevailing vulnerabilities in more cases (see section 5.2 in Chapter 5).

Table 6.2: Fiscal sustainability risk classification by Member State (in brackets, risk classification in the FSR 2018, whenever the risk category has changed)

	Overall SHORT-TERM risk category	Overall MEDIUM-TERM risk category	S1 indicator - overall risk category	Debt sustainability analysis - overall risk category	S2 indicator - overall risk category	Overall LONG-TERM risk category
BE	LOW	HIGH	HIGH	HIGH	MEDIUM	HIGH
BG	LOW	LOW	LOW	LOW	LOW	LOW
CZ	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
DK	LOW	LOW	LOW	LOW	LOW	LOW
DE	LOW	LOW	LOW	LOW	MEDIUM (LOW)	MEDIUM (LOW)
EE	LOW	LOW	LOW	LOW	LOW	LOW
IE	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
ES	LOW	HIGH	HIGH	HIGH	LOW (MEDIUM)	MEDIUM (HIGH)
FR	LOW	HIGH	HIGH	HIGH	LOW	MEDIUM
HR	LOW	LOW (MEDIUM)	LOW (MEDIUM)	LOW (MEDIUM)	LOW	LOW (MEDIUM)
IT	LOW	HIGH	HIGH	HIGH	MEDIUM	HIGH
CY	LOW (HIGH)	LOW (MEDIUM)	LOW	LOW (MEDIUM)	LOW	LOW (MEDIUM)
LV	LOW	LOW	LOW	LOW	LOW	LOW
LT	LOW	LOW	LOW	LOW	LOW	LOW
LU	LOW	LOW	LOW	LOW	HIGH	HIGH
HU	LOW	LOW (HIGH)	LOW (MEDIUM)	LOW (HIGH)	MEDIUM	MEDIUM (HIGH)
MT	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
NL	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
AT	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
PL	LOW	LOW	LOW	LOW	LOW (MEDIUM)	LOW (MEDIUM)
PT	LOW	HIGH	MEDIUM (HIGH)	HIGH	LOW	MEDIUM
RO	LOW	HIGH (MEDIUM)	HIGH (MEDIUM)	HIGH (MEDIUM)	HIGH (MEDIUM)	HIGH (MEDIUM)
SI	LOW	LOW (MEDIUM)	LOW (MEDIUM)	LOW	MEDIUM	MEDIUM
SK	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM
FI	LOW	MEDIUM (LOW)	MEDIUM (LOW)	MEDIUM (LOW)	MEDIUM	MEDIUM
SE	LOW	LOW	LOW	LOW	LOW	LOW
UK	LOW	HIGH	MEDIUM	HIGH	MEDIUM	HIGH

Source: Commission services

Table 6.3: Final DSA risk classification: detail of the classification

HIGH RISK	MEDIUM RISK	LOW RISK
Baseline scenario at high risk	Baseline scenario at medium risk	Baseline scenario at low risk (confirmed by other scenarios)
BE, ES, FR, IT, RO	FI	BG, CZ, DK, DE, EE, IE, HR, CY, LV, LT, LU, HU, MT, NL, AT, PL, SI, SK, SE
Baseline scenario at medium risk		
(At least one) other scenario at high risk due to:		
Debt level at high risk: PT, UK		

Source: Commission services

Table 6.4: Summary heat map on fiscal sustainability challenges

	Heat map for short-term risks in EU countries																											
	S1 indicator in the EU countries																											
	BE	BG	CZ	DK	DE	EE	IE	ES	FR	HR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	
S0 overall index	0.17	0.21	0.22	0.20	0.08	0.20	0.14	0.37	0.36	0.24	0.33	0.45	0.24	0.21	0.19	0.29	0.06	0.16	0.10	0.26	0.33	0.37	0.05	0.27	0.26	0.24	0.45	
Overall SHORT-TERM risk category	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	
S1 indicator - Baseline scenario	4.1	-5.4	-2.9	-5.6	-2.4	-5.3	-2.6	3.8	3.9	-2.0	8.8	-2.4	-3.3	-2.7	-5.7	-4.4	-3.2	-2.3	-2.2	2.3	5.7	-1.0	-1.8	0.5	-5.4	1.9		
S1 indicator - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM	HIGH	LOW	LOW	LOW	MEDIUM	LOW	MEDIUM	
Baseline no-policy change scenario	Sovereign-debt sustainability risks in EU countries																											
Debt level (2030)	97.4	9.3	28.3	15.4	39.8	8.4	37.6	95.7	96.8	50.4	140.2	48.1	29.0	29.8	7.3	41.3	9.7	32.4	43.1	38.3	89.2	91.2	46.7	44.1	62.1	15.4	78.6	
Debt peak year	2021	2019	2019	2019	2019	2019	2024	2023	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2020	2019	2019
Average Structural Primary Balance (2021-2030) Percentile rank	67%	36%	52%	43%	35%	66%	34%	73%	77%	39%	55%	22%	64%	57%	36%	41%	20%	43%	30%	65%	21%	96%	45%	70%	72%	36%	61%	
Historical SPB scenario	S2 indicator in the EU countries																											
Debt level (2030)	89.9	13.6	34.9	5.5	36.2	11.4	56.2	94.1	97.1	63.1	128.9	51.5	35.2	36.7	-1.0	47.7	18.1	33.9	47.4	45.9	104.4	73.4	53.0	50.7	47.2	11.7	91.6	
Debt peak year	2021	2019	2030	2019	2030	2019	2023	2019	2023	2019	2022	2019	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2021	2019	2030
Average Structural Primary Balance (2021-2030) Percentile rank	51%	45%	65%	25%	30%	70%	72%	71%	77%	66%	31%	27%	73%	70%	24%	55%	31%	48%	38%	75%	47%	88%	59%	78%	43%	30%	80%	
Negative shock (-0.5p.p.) on nominal GDP growth	S3 indicator in the EU countries																											
Debt level (2030)	102.5	10.0	29.8	16.7	42.2	8.8	39.8	100.7	101.8	53.6	148.0	51.6	30.5	31.3	7.9	44.0	10.9	34.5	45.9	40.2	94.8	94.2	49.2	46.3	65.1	16.7	82.8	
Debt peak year	2030	2019	2019	2019	2019	2030	2019	2030	2025	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019
Positive shock (+1p.p.) to the short- and long-term interest rates on newly issued debt level (2030)	102.4	9.6	30.1	16.4	42.4	8.7	39.9	101.0	102.1	53.8	148.9	50.8	30.5	31.2	7.6	44.4	10.4	34.2	45.3	40.2	93.7	96.1	48.9	45.7	64.5	16.2	82.9	
Debt peak year	2030	2019	2019	2019	2019	2030	2019	2030	2030	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019
Negative shock on the PB equal to 50% of the forecasted cumulative change over the debt level (2030)	99.1	10.7	29.0	24.8	43.0	13.6	40.8	96.3	98.1	52.1	145.8	55.5	32.2	33.7	10.5	49.4	12.5	35.4	43.3	40.7	90.5	102.9	46.8	45.7	63.4	17.3	78.7	
Debt peak year	2021	2019	2019	2021	2019	2030	2019	2024	2024	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019
Stochastic projections	S4 indicator in the EU countries																											
Probability of debt in 2024 greater than in 2019 (%)	45%	29%	36%	15%	5%	37%	8%	51%	51%	26%	60%	7%	34%	33%	14%	22%	3%	11%	10%	19%	18%	96%	6%	42%	60%	5%	37%	
Difference of the 10th and 90th percentile in 2024 (p.p. of GDP)	27.2	29.2	23.6	15.3	15.2	3.3	22.9	20.9	13.5	37.7	25.2	38.2	26.9	26.1	12.7	36.9	20.3	14.8	24.9	16.3	36.7	35.0	22.2	27.3	18.9	11.4	18.5	
Debt sustainability analysis - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW	HIGH
Overall MEDIUM-TERM risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW	HIGH
S2 indicator - Baseline scenario	4.8	1.6	4.8	0.4	2.2	0.8	2.9	1.8	0.2	-2.1	2.1	-0.7	0.3	0.5	8.6	2.7	3.0	2.8	2.3	1.9	-0.3	8.8	5.4	3.8	3.6	1.2	4.3	
Debt sustainability analysis - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW	HIGH
Overall LONG-TERM risk category	HIGH	LOW	MEDIUM	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM	LOW	HIGH	

(1) In this table, only the relevant information used for the risk classification is included. The report contains more detailed information. The thresholds used are presented in Annex A9.

Source: Commission services

ANNEX A1

Cross-country tables

A1.1. SHORT-TERM FISCAL SUSTAINABILITY CHALLENGES

Table A1.1: S0 and sub-indexes heat map

	S0 overall index			Overall SHORT- TERM risk category
	S0 Fiscal sub-index	S0 Financial competitiv- eness sub- index		
BE	0.17	0.27	0.12	LOW
BG	0.21	0.00	0.33	LOW
CZ	0.22	0.00	0.34	LOW
DK	0.20	0.00	0.31	LOW
DE	0.08	0.00	0.12	LOW
EE	0.20	0.09	0.25	LOW
IE	0.14	0.00	0.21	LOW
ES	0.37	0.57	0.27	LOW
FR	0.36	0.57	0.25	LOW
HR	0.24	0.19	0.26	LOW
IT	0.33	0.52	0.24	LOW
CY	0.45	0.23	0.57	LOW
LV	0.24	0.08	0.33	LOW
LT	0.21	0.00	0.33	LOW
LU	0.19	0.00	0.30	LOW
HU	0.29	0.41	0.22	LOW
MT	0.06	0.04	0.08	LOW
NL	0.16	0.00	0.24	LOW
AT	0.10	0.07	0.12	LOW
PL	0.26	0.00	0.40	LOW
PT	0.33	0.31	0.33	LOW
RO	0.37	0.26	0.44	LOW
SI	0.05	0.00	0.07	LOW
SK	0.27	0.00	0.40	LOW
FI	0.26	0.08	0.36	LOW
SE	0.24	0.00	0.37	LOW
UK	0.45	0.39	0.47	LOW

(1) The following thresholds are used to identify countries at risk of fiscal stress: 0.46 for the S0; 0.36 for the fiscal sub-index and 0.49 for the financial-competitiveness sub-index. They have been derived using the signals' approach (see chapter 2).

Source: Commission services.

Table A1.2: Fiscal variables used in the S0 indicator, 2019

	Balance (%GDP)	Primary balance (%GDP)	Cycl. adj. balance (%GDP)	Stabil. primary balance (%GDP)	Gross debt (%GDP)	Change gross debt (%GDP)	Short-term debt (%GDP)	Net debt (%GDP)	Gross financing need (%GDP)	Interest growth rate diff.	Change expend. gen. govt (%GDP)	Change consumpt. gen. govt (%GDP)
BE	-1.7	0.2	-2.0	-0.7	99.5	-0.5	7.6	87.7	14.8	-0.7	0.1	0.1
BG	1.1	1.7	1.0	-1.1	21.1	-1.1	0.0	8.5	-0.2	-5.5	1.6	0.4
CZ	0.2	0.9	-0.3	-0.9	31.5	-1.1	1.2	19.0	4.8	-2.8	1.0	0.5
DK	2.2	2.9	2.1	-0.4	33.0	-1.1	3.9	13.2	2.0	-1.2	-0.7	-0.2
DE	1.2	2.1	1.1	-0.6	59.2	-2.7	4.2	40.1	7.3	-1.1	0.7	0.4
EE	-0.2	-0.2	-1.7	-0.5	8.7	0.3	0.3	0.3	:	-6.3	0.1	0.0
IE	0.2	1.6	-0.8	-2.5	59.0	-4.6	7.8	53.0	5.1	-4.2	-0.3	0.2
ES	-2.3	-0.1	-3.3	-0.9	96.7	-0.9	6.5	82.8	17.0	-0.9	-0.1	0.1
FR	-3.1	-1.6	-3.6	-1.1	98.9	0.6	8.3	90.4	16.1	-1.1	-0.5	-0.4
HR	0.1	2.3	-0.8	-1.3	71.3	-3.6	3.5	61.1	12.9	-1.8	0.9	0.4
IT	-2.2	1.3	-2.1	2.6	136.2	1.4	20.3	121.3	19.6	1.9	0.5	0.1
CY	3.7	6.0	1.8	-2.0	93.8	-6.7	1.9	74.9	13.2	-2.0	-5.7	1.4
LV	-0.6	0.1	-1.5	-1.2	36.0	-0.4	1.1	28.5	2.0	-3.6	-0.9	0.0
LT	0.0	0.8	-1.6	-1.6	36.3	2.2	0.6	25.6	1.7	-5.1	0.9	0.2
LU	2.3	2.6	1.7	-0.7	19.6	-1.4	1.5	-9.6	-2.0	-3.4	1.2	0.5
HU	-1.8	0.6	-3.6	-3.4	68.2	-2.0	12.7	60.4	20.8	-5.3	-0.8	-0.7
MT	1.2	2.5	0.5	-1.8	43.3	-2.5	4.8	31.9	5.2	-4.2	1.4	1.4
NL	1.5	2.2	0.9	-1.3	48.9	-3.5	5.0	42.0	5.5	-2.6	0.2	0.3
AT	0.4	1.9	0.0	-1.0	69.9	-4.0	2.6	48.2	8.8	-1.4	-0.3	0.0
PL	-1.0	0.3	-2.3	-1.9	47.4	-1.5	0.6	43.0	5.2	-4.1	0.3	0.1
PT	-0.1	3.0	-1.0	-0.9	119.5	-2.7	22.3	112.1	13.1	-0.8	-0.1	0.3
RO	-3.6	-2.4	-3.7	-2.5	35.5	0.5	1.1	29.1	8.1	-7.9	0.6	0.6
SI	0.5	2.1	-1.1	-1.9	66.7	-3.8	2.0	43.1	6.1	-2.8	0.0	0.2
SK	-0.9	0.3	-1.6	-1.2	48.1	-1.3	1.5	:	3.9	-2.6	-0.1	0.6
FI	-1.1	-0.3	-1.3	-0.8	59.2	0.2	4.7	24.1	7.7	-1.4	0.0	0.3
SE	0.3	0.8	0.2	-0.8	34.6	-4.1	7.9	5.1	5.6	-2.0	-0.1	-0.1
UK	-2.2	0.0	-2.4	-0.5	85.2	-0.7	13.4	76.1	10.8	-0.6	0.1	0.3

(1) The upper thresholds used for each variable have been derived using the signals' approach (see chapter 2). The lower thresholds have been set at 80% of the original signals' approach thresholds, for prudential reasons.

Source: Commission services.

Table A1.3: **Financial-competitiveness variables used in the S0 indicator, 2019**

	Yield curve	Real GDP growth	GDP per capita in PPP (%US level)	L.Net intern. Invest. position (%GDP)	L.Net savings households (%GDP)	L.Private debt (%GDP)	L.Private credit flow (%GDP)	L.Short-term debt nonfin. corp. (%GDP)	L.Short-term debt households (%GDP)	L.Construction (%value added)	L.Current account (%GDP)	L.Change real eff. exchange rate	L.Change nom. unit labour costs
BE	0.6	1.1	81.2	41.3	2.6	178.5	0.8	32.6	1.7	5.3	0.3	3.4	3.7
BG	0.7	3.6	36.5	-35.2	-0.2	95.0	3.9	14.3	1.9	4.2	4.0	8.1	18.3
CZ	-0.5	2.5	63.6	-23.5	3.0	70.7	5.3	9.0	1.2	5.6	1.2	2.1	13.5
DK	0.2	2.0	87.7	48.5	3.3	199.4	2.4	22.3	3.1	5.8	7.5	-0.5	4.0
DE	0.1	0.4	83.3	62.0	6.4	102.1	6.5	12.1	1.8	5.1	8.0	2.4	5.6
EE	:	3.2	58.1	-27.7	4.6	101.5	3.7	6.3	1.0	7.3	2.1	5.6	14.3
IE	0.8	5.6	135.9	-165.0	2.7	223.2	-7.8	33.0	1.0	2.8	2.3	-0.3	-2.8
ES	1.1	1.9	63.0	-80.4	0.9	133.5	0.4	8.3	2.5	6.2	2.6	2.6	0.7
FR	0.5	1.3	71.5	-16.4	4.9	148.9	7.9	24.8	1.4	5.6	-0.6	0.4	2.4
HR	1.2	2.9	44.4	-57.9	:	94.0	2.3	7.7	3.0	5.4	2.4	5.5	-2.4
IT	2.5	0.1	65.6	-4.7	1.5	107.0	1.6	15.8	2.8	4.2	2.6	3.1	2.7
CY	1.6	2.9	61.6	-120.8	-2.5	282.6	8.4	25.6	6.4	6.2	-4.6	1.2	-0.4
LV	0.8	2.5	49.1	-49.0	-1.5	70.3	-0.2	7.6	1.3	6.7	0.6	4.1	14.7
LT	0.7	3.8	57.8	-31.0	-3.0	56.4	4.3	4.2	0.7	7.0	-0.1	4.7	16.5
LU	0.3	2.6	178.0	59.8	5.7	306.5	-0.5	75.3	2.1	6.0	4.9	5.9	7.9
HU	2.5	4.6	51.0	-52.0	3.6	69.3	4.3	9.9	2.0	5.3	2.1	-1.1	12.4
MT	1.1	5.0	68.5	62.7	:	129.8	7.5	14.8	2.6	3.6	8.9	7.6	3.2
NL	0.3	1.7	89.2	70.7	4.0	241.6	4.5	40.4	2.3	4.8	9.9	2.0	3.0
AT	0.5	1.5	87.9	3.7	4.3	121.0	3.9	12.7	2.7	6.7	2.2	2.3	4.7
PL	0.8	4.1	50.5	-55.8	0.2	76.1	3.4	8.0	2.5	7.7	-0.5	1.2	8.1
PT	1.3	2.0	53.4	-105.6	-1.5	154.3	-0.1	19.7	2.4	4.2	0.9	3.2	5.3
RO	1.7	4.1	46.3	-44.1	-5.1	47.8	1.9	9.8	0.8	6.0	-3.3	-2.8	33.6
SI	0.7	2.6	60.6	-18.9	2.7	72.8	1.3	8.3	2.1	5.7	5.5	2.6	6.1
SK	0.7	2.7	54.2	-68.1	1.5	90.9	2.0	14.8	1.9	7.9	-2.4	2.0	10.9
FI	0.5	1.4	76.8	-2.0	-0.6	142.1	1.6	15.5	3.8	7.3	-1.4	4.9	-2.6
SE	0.1	1.1	83.6	10.3	8.1	200.0	9.0	39.6	15.0	6.8	2.8	-3.5	7.4
UK	0.6	1.3	72.6	-10.5	0.3	163.6	4.4	27.2	10.4	6.1	-4.3	-8.2	7.8

(1) The upper thresholds used for each variable have been derived using the signals' approach (see chapter 2). The lower thresholds have been set at 80% of the original signals' approach thresholds, for prudential reasons.

Source: Commission services.

Additional indicators

Table A1.4: Risks related to the structure of public debt financing, by country (2018)

	Short-term public debt (original maturity)	Public debt in foreign currency	Public debt held by non-residents
Shares of total debt (%):			
BE	7.6	0.0	52.7
BG	0.0	81.7	44.4
CZ	3.4	12.0	40.1
DK	11.6	0.2	27.2
DE	6.7	4.0	47.7
EE	2.8	0.0	57.2
IE	7.1	1.7	59.7
ES	6.6	0.0	45.4
FR	8.5	2.3	47.3
HR	4.6	75.1	36.7
IT	12.8	0.1	29.4
CY	1.8	3.3	76.5
LV	3.0	0.0	74.0
LT	0.7	0.0	72.5
LU	7.2	0.0	44.1
HU	17.9	22.8	36.5
MT	7.4	0.0	13.0
NL	9.5	0.2	40.0
AT	3.6	0.9	66.5
PL	1.0	31.0	50.2
PT	16.7	0.0	52.1
RO	3.3	50.4	47.8
SI	2.8	0.1	62.3
SK	3.0	5.0	57.5
FI	8.2	2.5	63.3
SE	20.5	24.7	22.7
UK	15.6	0.0	n.a.

(1) The upper thresholds used for each variable have been derived using the signals' approach; the lower thresholds have been set at 80% of the original signals' approach thresholds, for prudential reasons (see Annex A9).

Source: Eurostat, ECB.

Table A1.5: Potential triggers for governments' contingent liability from the banking sector, by country

	Private sector credit flow (% GDP)	Bank loan-to-deposit ratio (%)	NPL ratio (% of total gross loans)	NPL ratio change (pps 2019 v 2018)	NPL coverage ratio (%)	House price nominal index change (%)
BE	0.8	104.7	2.0	-0.4	40.7	2.9
BG	3.9	73.9	7.2	-2.1	52.6	6.6
CZ	5.3	84.1	1.3	-0.1	57.9	8.6
DK	2.4	349.2	1.7	-0.5	32.7	4.4
DE	6.5	132.6	1.3	-0.4	39.3	6.7
EE	3.7	121.4	1.8	0.3	28.4	5.9
IE	-7.8	99.0	4.6	-2.5	27.2	10.2
ES	0.4	111.2	3.5	-0.8	42.9	6.7
FR	7.9	115.8	2.6	-0.3	50.6	3.0
HR	2.3	77.5	6.1	-1.5	55.3	6.1
IT	1.6	111.8	7.9	-1.8	53.0	-0.6
CY	8.4	59.8	21.5	-12.6	45.9	1.8
LV	-0.2	84.0	2.3	-1.0	32.6	9.6
LT	4.3	87.4	1.8	-0.9	33.4	7.3
LU	-0.5	136.0	1.1	0.3	35.2	7.1
HU	4.3	79.5	5.6	-2.0	66.5	14.4
MT	7.5	52.1	3.0	-0.8	25.7	5.8
NL	4.5	126.0	1.9	-0.2	24.2	9.5
AT	3.9	107.3	2.5	-0.7	53.1	4.7
PL	3.4	99.6	4.8	-0.8	62.3	6.6
PT	-0.1	85.8	8.9	-3.5	51.4	10.3
RO	1.9	66.4	4.9	-1.1	66.7	5.6
SI	1.3	67.9	5.3	-3.3	59.7	9.8
SK	2.0	113.8	2.6	-0.4	63.6	7.4
FI	1.6	186.7	1.6	0.4	25.9	0.9
SE	9.0	210.1	0.5	-0.5	33.3	-0.9
UK	4.4	93.4	1.3	-0.2	31.4	3.2

(1) The upper thresholds used for each variable have been derived using the signals' approach, except for the NPL coverage ratio; the lower thresholds have been set at 80% of the upper thresholds, for prudential reasons (see Annex A9 and chapter 5).
Source: Eurostat (2018), EBA (June 2019).

Table A1.6: Theoretical probabilities of public finances being hit by more than 3% of GDP, in the event of a severe crisis (i.e. involving excess losses and recapitalization needs in at least three different EU countries)

	Initial (2020)		Final (2030)	
	short term scenarios		long term scenarios	
	Baseline (a)	Stress (b)	Baseline (a)	Stress (b)
BE	0.0%	0.8%	0.0%	0.6%
BG	0.0%	0.5%	0.0%	0.2%
CZ	0.0%	0.6%	0.0%	0.4%
DK	0.1%	0.5%	0.1%	0.4%
DE	0.0%	0.6%	0.0%	0.5%
EE	0.0%	0.0%	0.0%	0.0%
IE	0.1%	3.3%	0.1%	1.6%
ES	0.4%	8.9%	0.3%	3.9%
FR	0.0%	1.7%	0.0%	1.2%
HR	0.0%	0.5%	0.0%	0.2%
IT	0.2%	14.0%	0.1%	2.7%
CY	1.8%	49.2%	0.2%	2.7%
LV	0.0%	0.0%	0.0%	0.0%
LT	0.0%	0.0%	0.0%	0.0%
LU	0.3%	5.9%	0.3%	4.2%
HU	0.0%	0.1%	0.0%	0.1%
MT	0.2%	4.7%	0.1%	1.5%
NL	0.1%	0.7%	0.0%	0.6%
AT	0.0%	0.6%	0.0%	0.4%
PL	0.0%	0.6%	0.0%	0.4%
PT	0.7%	32.0%	0.1%	2.9%
RO	0.0%	0.0%	0.0%	0.0%
SI	0.0%	0.8%	0.0%	0.4%
SK	0.0%	0.7%	0.0%	0.5%
FI	0.1%	1.1%	0.1%	0.8%
SE	0.0%	0.2%	0.0%	0.2%
UK	0.0%	0.4%	0.0%	0.3%

(1) Green: low risk (probability lower than 0.50%), Yellow: medium risk (probability between 0.50% and 1%); Red: high risk (probability higher than 1%).

Source: Commission services.

Table A1.7: **Financial market information**

Sovereign yield spreads (bp.) - 10 year - Oct 2019	
BE	31
BG	72
CZ	179
DK	4
DE	0
EE	:
IE	49
ES	67
FR	31
HR	94
IT	147
CY	98
LV	47
LT	78
LU	7
HU	241
MT	73
NL	16
AT	27
PL	243
PT	66
RO	459
SI	38
SK	27
FI	26
SE	31
UK	108

(1) The upper thresholds used for each variable have been derived using the signals' approach; the lower thresholds have been set at 80% of the original signals' approach thresholds, for prudential reasons (see Annex A9).
Source: ECB.

A1.2. MEDIUM-TERM FISCAL SUSTAINABILITY CHALLENGES

Table A1.8: S1 indicator, cost of ageing sub-component and required SPB related to S1, baseline and alternative scenarios, by country (pps. and % of GDP)

	S1 indicator - Baseline scenario			S1 indicator - AWG risk scenario			S1 indicator - Historical SPB scenario		
	of wich		Required SPB related to S1 - Percentile rank	of wich		Required SPB related to S1 - Percentile rank	of wich		Required SPB related to S1 - Percentile rank
	Cost of ageing			Cost of ageing			Cost of ageing		
BE	4.1	1.1	12%	4.3	1.3	11%	2.7	1.7	14%
BG	-5.4	0.5	95%	-5.0	0.8	94%	-4.4	0.8	94%
CZ	-2.9	0.9	87%	-2.7	1.2	84%	-1.0	1.4	79%
DK	-5.6	0.0	97%	-5.1	0.4	95%	-7.9	0.1	98%
DE	-2.4	1.2	75%	-2.1	1.5	71%	-3.1	1.8	76%
EE	-5.3	0.0	98%	-4.9	0.3	98%	-4.4	0.0	98%
IE	-2.6	1.3	76%	-2.3	1.5	73%	1.4	1.8	62%
ES	3.8	0.3	17%	4.1	0.5	15%	3.9	0.6	15%
FR	3.9	0.4	20%	4.3	0.7	17%	3.9	0.5	21%
HR	-2.0	-0.2	73%	-1.8	0.0	72%	-0.5	-0.5	77%
IT	8.8	0.8	0%	8.9	0.9	0%	7.1	1.4	0%
CY	-2.4	-0.2	60%	-2.2	0.0	58%	-2.5	0.0	71%
LV	-3.3	0.3	92%	-2.7	0.8	90%	-1.7	0.6	89%
LT	-2.7	0.7	87%	-2.3	1.0	84%	-0.8	1.1	80%
LU	-5.7	1.1	96%	-5.4	1.3	95%	-6.6	1.8	95%
HU	-2.7	-0.2	81%	-2.2	0.2	76%	-1.6	0.0	80%
MT	-6.4	0.3	94%	-5.9	0.8	92%	-4.9	0.7	93%
NL	-3.2	0.4	85%	-2.9	0.6	83%	-2.6	1.0	83%
AT	-2.3	0.8	70%	-2.0	1.1	67%	-1.5	1.5	69%
PL	-2.2	0.3	87%	-2.0	0.5	84%	-0.4	0.4	82%
PT	2.3	0.5	7%	2.6	0.8	6%	5.0	0.9	6%
RO	5.7	1.8	37%	6.2	2.2	30%	5.4	2.3	14%
SI	-1.0	1.4	65%	-0.6	1.8	55%	1.2	2.4	41%
SK	-1.8	0.1	87%	-1.3	0.6	83%	-0.3	0.3	83%
FI	0.5	1.3	65%	0.7	1.5	63%	-2.2	1.7	70%
SE	-5.4	0.3	95%	-5.2	0.4	94%	-6.4	0.4	96%
UK	1.9	0.8	28%	2.2	1.0	24%	4.9	1.2	18%

(1) The upper and lower thresholds used for S1 are 0 and 2.5. The threshold used for the cost of ageing sub-component corresponds to the EU average. The upper and lower thresholds used for the required SPB are 15% and 30%.

Source: Commission services.

Table A1.9: DSA heat map, by country

	Sovereign-debt sustainability risks in EU countries																											
	BE	BG	CZ	DK	DE	EE	IE	ES	FR	HR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	
Baseline no-policy change scenario	HIGH	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM	HIGH	LOW	LOW	LOW	LOW	LOW	MEDIUM
Debt level (2030)	97.4	9.3	28.3	15.4	39.8	8.4	37.6	95.7	96.8	50.4	140.2	48.1	29.0	29.8	7.3	41.3	9.7	32.4	43.1	38.3	89.2	91.2	46.7	44.1	62.1	15.4	78.6	
Debt peak year	2021	2019	2019	2019	2019	2019	2019	2024	2023	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019	2030	2019	2019	2019
Average Structural Primary Balance (2021-2030) Percentile rank	67%	36%	52%	43%	35%	66%	34%	73%	77%	38%	55%	22%	64%	57%	36%	41%	20%	43%	30%	65%	21%	96%	45%	70%	72%	36%	61%	
Historical SPB scenario	MEDIUM	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	MEDIUM	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	MEDIUM	LOW	LOW	LOW	LOW	LOW	HIGH
Debt level (2030)	89.9	13.6	34.9	5.5	36.2	11.4	56.2	94.1	97.1	63.1	128.9	51.5	35.2	36.7	-1.0	47.7	18.1	33.9	47.4	45.9	104.4	73.4	53.0	50.7	47.2	11.7	91.6	
Debt peak year	2021	2019	2030	2019	2019	2030	2019	2019	2023	2019	2022	2019	2019	2030	2019	2019	2019	2019	2019	2019	2019	2030	2019	2030	2021	2019	2030	
Average Structural Primary Balance (2021-2030) Percentile rank	51%	45%	65%	25%	30%	70%	72%	71%	77%	68%	31%	27%	73%	70%	24%	55%	31%	46%	38%	75%	47%	88%	59%	78%	49%	30%	80%	
Stability and Growth Pact (SGP) institutional scenario	MEDIUM	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM
Debt level (2030)	78.6	8.0	24.1	11.6	36.0	8.9	38.1	77.8	81.2	56.4	113.0	53.2	30.4	31.6	6.4	44.5	16.6	34.4	47.4	33.8	87.5	35.6	40.3	39.1	49.6	19.4	66.0	
Debt peak year	2021	2019	2019	2019	2019	2030	2019	2021	2021	2019	2021	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2024	2019	2019	2019	2021	2019	2019
Average Structural Primary Balance (2021-2030) Percentile rank	40%	39%	55%	27%	37%	66%	52%	40%	54%	54%	17%	26%	65%	68%	40%	44%	31%	48%	43%	60%	22%	64%	46%	63%	58%	43%	41%	
Negative shock (-0.5p.p.) on nominal GDP growth	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW	MEDIUM
Debt level (2030)	102.5	10.0	29.8	16.7	42.2	8.8	39.8	100.7	101.8	53.6	148.0	51.6	30.5	31.3	7.9	44.0	10.9	34.5	45.9	40.2	94.8	94.2	49.2	46.3	65.1	16.7	82.8	
Debt peak year	2030	2019	2019	2019	2019	2030	2019	2030	2025	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019	2019	2030	2019	2019
Positive shock (+1p.p.) to the short- and long-term interest rates on newly issued debt (2030)	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW	MEDIUM
Debt level (2030)	102.4	9.6	30.1	16.4	42.4	8.7	39.9	101.0	102.1	53.8	148.9	50.8	30.5	31.2	7.6	44.4	10.4	34.2	45.3	40.2	93.7	96.1	48.9	45.7	64.5	16.2	82.9	
Debt peak year	2030	2019	2019	2019	2019	2030	2019	2030	2030	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019	2019	2030	2019	2019
Negative shock on the PB equal to 50% of the forecasted cumulative change	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW	MEDIUM
Debt level (2030)	99.1	10.7	29.0	24.8	43.0	13.6	40.8	96.3	98.1	52.1	145.8	55.5	32.2	33.7	10.5	49.4	12.5	35.4	43.3	40.7	90.5	102.9	46.8	45.7	63.4	17.3	78.7	
Debt peak year	2021	2019	2019	2021	2019	2030	2019	2024	2024	2019	2030	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2030	2019	2019	2019	2030	2019	2019
Stochastic projections	HIGH	MEDIUM	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW	LOW
Probability of debt in 2024 greater than in 2019 (%)	45%	29%	36%	15%	5%	37%	8%	51%	51%	26%	60%	7%	34%	33%	14%	22%	3%	11%	10%	19%	16%	96%	6%	42%	60%	5%	37%	
Difference between the 10th and 90th percentile in 2024 (p.p. of GDP)	27.2	29.2	23.6	15.3	15.2	3.3	22.9	20.9	13.5	37.7	25.2	38.2	26.9	26.1	12.7	36.9	20.3	14.8	24.9	16.3	36.7	35.0	22.2	27.3	18.9	11.4	18.5	
Debt sustainability analysis - overall risk category	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	MEDIUM	LOW	HIGH

(1) All thresholds used and decision trees to derive the DSA risk assessment are presented in the Annex A9.

Source: Commission services.

A1.3. LONG-TERM FISCAL SUSTAINABILITY CHALLENGES

Table A1.10: S2, cost of ageing sub-components and required SPB related to S2, baseline and alternative scenarios, by country (pps. and % of GDP)

	S2 indicator - Baseline		S2 indicator - AWG risk		S2 indicator - TFP risk		S2 indicator - Historical SPB		S2 indicator - High life expectancy		S2 indicator - Interest rate	
		Required SPB related to S2 - Percentile rank		Required SPB related to S2 - Percentile rank		Required SPB related to S2 - Percentile rank		Required SPB related to S2 - Percentile rank		Required SPB related to S2 - Percentile rank		Required SPB related to S2 - Percentile rank
BE	4.8	9%	6.5	3%	5.6	5%	3.7	10%	5.7	5%	4.8	9%
BG	1.6	17%	2.8	10%	1.8	17%	2.3	16%	2.1	14%	1.5	19%
CZ	4.8	5%	5.9	2%	4.8	5%	6.0	4%	5.5	3%	4.4	7%
DK	0.4	36%	2.7	12%	0.2	38%	-1.1	43%	0.7	31%	0.2	38%
DE	2.2	13%	3.8	5%	2.7	10%	1.7	13%	3.2	8%	2.2	13%
EE	0.8	52%	2.9	20%	0.9	49%	1.2	49%	1.1	46%	0.8	51%
IE	2.9	9%	4.4	3%	2.9	9%	5.8	6%	3.4	7%	2.8	9%
ES	1.8	44%	4.0	17%	2.2	36%	1.6	45%	2.1	37%	2.5	31%
FR	0.2	76%	2.4	40%	1.2	64%	0.2	76%	0.8	69%	0.9	68%
HR	-2.1	75%	-1.1	60%	-1.9	72%	-0.2	69%	-1.7	69%	-1.8	71%
IT	2.1	22%	3.0	15%	2.8	17%	0.4	27%	2.2	21%	2.9	16%
CY	-0.7	31%	1.2	13%	-0.5	29%	-0.2	30%	-1.0	34%	-0.7	31%
LV	0.3	58%	2.8	19%	0.5	53%	1.3	52%	0.4	55%	0.6	52%
LT	0.5	47%	2.9	16%	0.6	46%	1.6	42%	1.0	39%	0.8	41%
LU	8.6	0%	10.7	0%	8.5	0%	7.6	0%	9.3	0%	7.2	0%
HU	2.7	12%	6.5	1%	3.0	10%	3.8	10%	3.3	9%	2.5	13%
MT	3.0	4%	5.4	0%	3.1	4%	4.4	3%	3.7	2%	2.2	7%
NL	2.8	12%	4.8	4%	2.7	12%	3.1	11%	3.1	11%	2.7	13%
AT	2.3	11%	3.8	4%	3.2	7%	3.0	10%	3.1	7%	2.2	11%
PL	1.9	30%	3.1	18%	2.3	25%	3.2	25%	2.3	26%	2.0	30%
PT	-0.3	24%	1.5	11%	0.6	16%	2.2	18%	0.4	17%	0.2	19%
RO	8.8	9%	12.3	0%	9.8	5%	6.6	11%	9.4	7%	9.0	8%
SI	5.4	2%	7.8	0%	5.5	2%	6.6	1%	6.3	1%	5.3	3%
SK	3.8	16%	5.8	5%	4.1	14%	5.0	13%	3.8	16%	3.6	17%
FI	3.6	19%	4.6	11%	4.0	16%	1.3	23%	3.9	17%	3.5	20%
SE	1.2	21%	2.3	13%	1.1	22%	0.6	22%	1.7	17%	0.9	24%
UK	4.3	9%	5.4	5%	4.5	8%	6.4	7%	4.9	7%	4.1	10%

(1) The upper and lower thresholds used for S2 are 2 and 6. The thresholds used for the cost of ageing sub-components correspond to the EU average. The upper and lower thresholds used for the required SPB are 15% and 30%.

Source: Commission services.

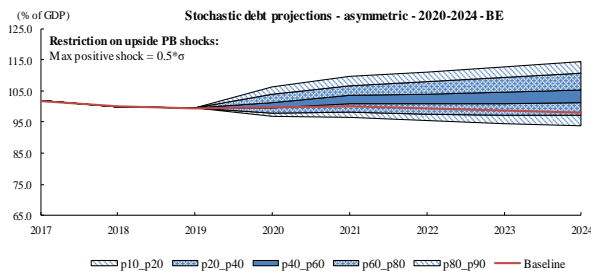
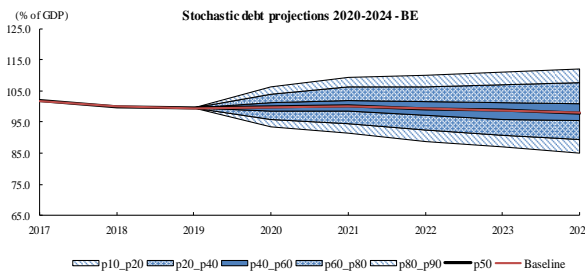
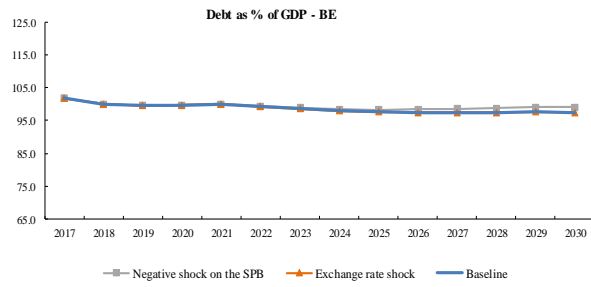
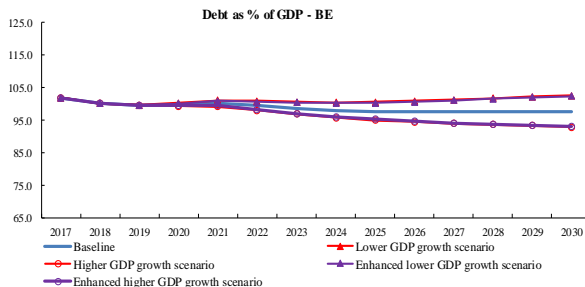
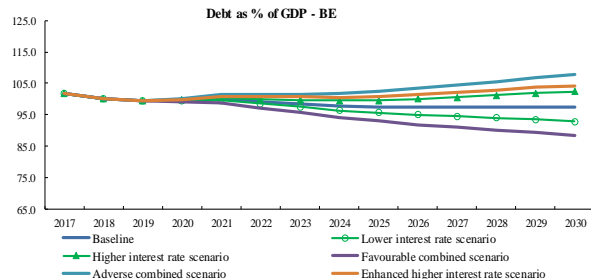
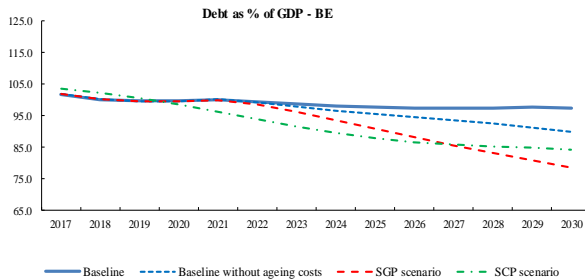
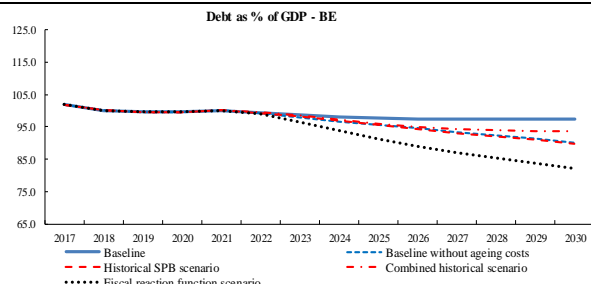
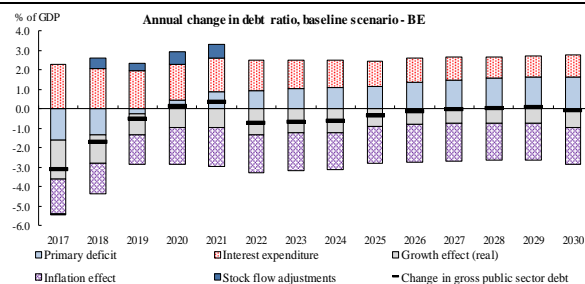
ANNEX A2

Country fiches

Belgium

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

BE - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	101.8	100.0	99.5	99.6	100.0	99.2	98.6	97.9	97.6	97.4	97.4	97.4	97.5	97.4
Changes in the ratio (-1+2+3)	-3.1	-1.7	-0.5	0.1	0.4	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	0.0	0.1	-0.1
of which														
(1) Primary balance (1.1+1.2+1.3)	1.6	1.4	0.2	-0.4	-0.9	-0.9	-1.0	-1.1	-1.2	-1.4	-1.5	-1.6	-1.6	-1.7
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.6	0.3	-0.1	-0.5	-0.5	-0.7	-0.9	-1.1	-1.2	-1.4	-1.5	-1.6	-1.6	-1.7
(1.1.1) Structural primary balance (bef. CoA)	0.6	0.3	-0.1	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
(1.1.2) Cost of ageing						0.2	0.5	0.8	0.8	1.1	1.2	1.3	1.5	1.5
(1.1.3) Others (taxes and property incomes)						0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3
(1.2) Cyclical component	0.5	0.5	0.2	-0.1	-0.4	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.4	0.5	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.5	-0.9	-0.7	-1.0	-1.2	-1.7	-1.7	-1.8	-1.5	-1.5	-1.5	-1.5	-1.6	-1.8
(2.1) Interest expenditure	2.3	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.1
(2.2) Growth effect	-2.0	-1.4	-1.1	-0.9	-1.0	-1.3	-1.2	-1.2	-0.9	-0.8	-0.8	-0.7	-0.7	-0.9
(2.3) Inflation effect	-1.8	-1.5	-1.5	-1.9	-2.0	-2.0	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-0.1	0.5	0.4	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-0.1	0.5	0.4	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-1.7	-1.8	-2.1	-2.4	-2.2	-2.3	-2.4	-2.5	-2.4	-2.6	-2.6	-2.7	-2.7	-2.7



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	HIGH	HIGH (S1 = 4.1)	HIGH	MEDIUM	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	
			97.4	89.9	102.5	102.4	99.1				
			2021	2021	2030	2030	2021				
			67.0%	51.0%							
								44.7%			
								27.2			

2.2. Sustainability indicators

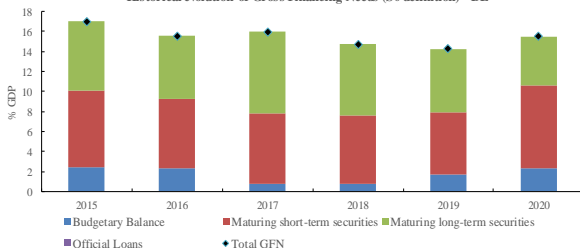
S0 indicator	2009	2019	Critical threshold
Overall index	0.48	0.17	0.46
Fiscal sub-index	0.88	0.27	0.36
Financial competitiveness sub-index	0.27	0.12	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	4.3	4.1	2.7	4.3
of which Gap to the debt-stabilizing primary balance	-0.4	-1.1	-2.4	-1.1
Cost of delaying adjustment	0.7	0.6	0.4	0.6
Debt requirement	3.0	3.4	3.1	3.4
Ageing costs	1.2	1.1	1.7	1.3
Required structural primary balance related to S1	4.7	3.5	3.4	3.8

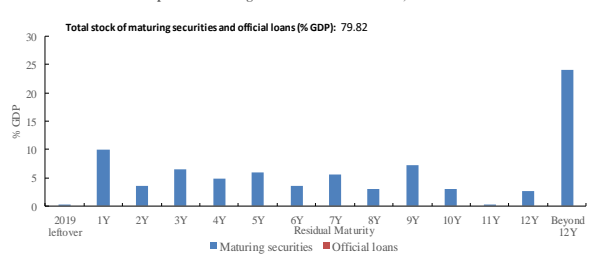
S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	4.3	4.8	3.7	6.5	5.6	5.7	4.8
of which Initial Budgetary position	0.7	0.8	0.0	1.4	1.4	1.3	1.2
Ageing costs	3.5	4.0	3.7	5.1	4.2	4.4	3.6
of which Pensions	1.8	1.9	1.8	1.7	2.5	2.3	1.7
Health care	0.3	0.4	0.4	0.7	0.3	0.3	0.4
Long-term care	1.3	1.6	1.4	2.6	1.3	1.6	1.4
Others	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Required structural primary balance related to S2	4.6	4.2	4.3	6.0	5.1	5.2	4.3

3. Financing needs and financial information

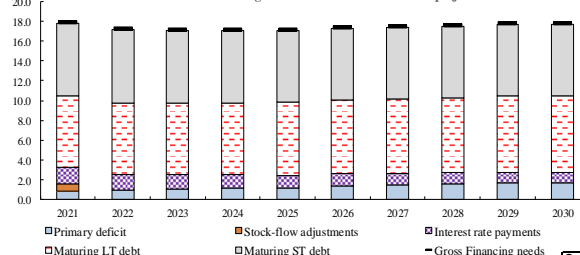
Historical evolution of Gross Financing Needs (S0 definition) - BE



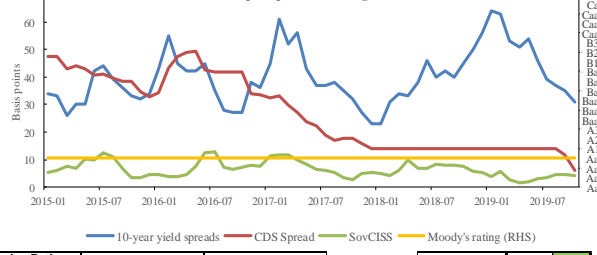
Profile redemption for existing securities and official loans, as of Nov. 2019 - BE



Gross Financing needs as % of GDP - BE - DSA projections



Market perception of sovereign risk - BE



Sovereign Ratings as of Nov 2019, BE	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Aa3	P-1	Aa3	
S&P	AAU	A-1+U	AAU	A-1+U
Fitch	AA-		AA-	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	31.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

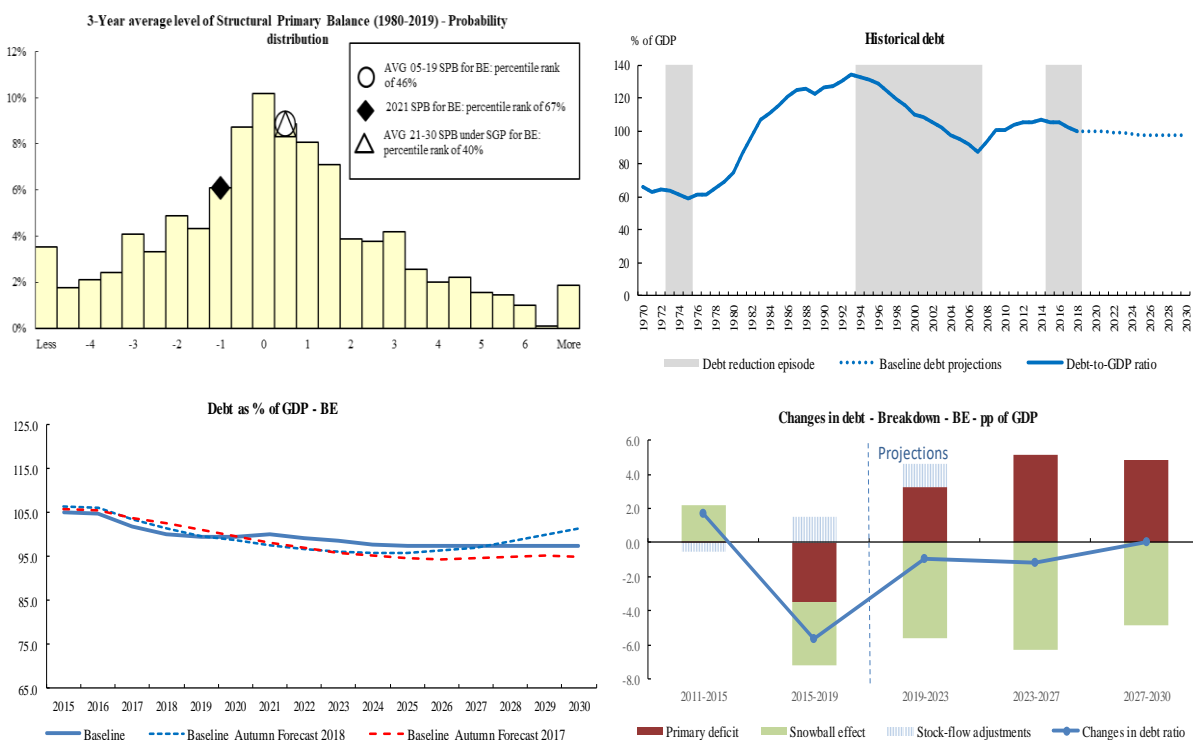
Public debt structure - BE (2018)	Share of short-term government debt (p.p.): 7.6	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents 52.7	Net International Investment Position (IIP) - BE (2018)	Net IIP (% GDP): 41.3
--	---	---	--	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		BE					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		15.1	14.0	9.9	10.9	10.1	6.3
of which	One-off guarantees	14.4	13.4	9.3	10.3	9.5	5.8
	Standardised guarantees	0.6	0.6	0.6	0.6	0.6	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.1	0.3	0.3	0.3	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	12.4	11.6	7.7	7.9	7.5	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	12.4	11.6	7.7	7.9	7.5	0.8

Government's contingent liability risks from banking sector - BE (2018)	Private sector credit flow (% GDP): 0.8	Change in nominal house price index: 2.9	Bank loans-to-deposits ratio (p.p.): 104.7	Share of non-performing loans (%): 2.0	Change in share of non-performing loans (p.p.): -0.4	NPL coverage ratio 40.7	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.8%

6. Realism of baseline assumptions



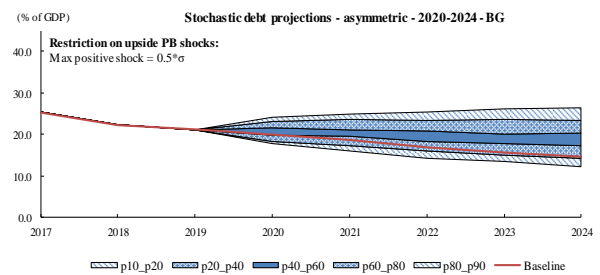
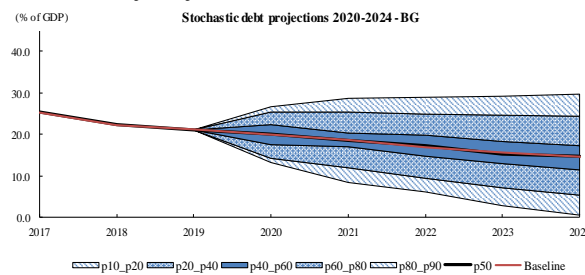
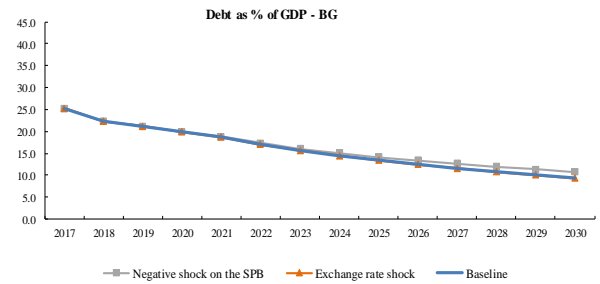
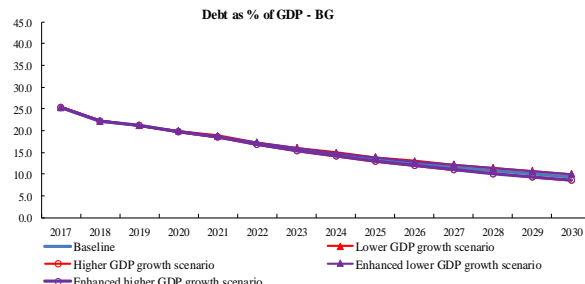
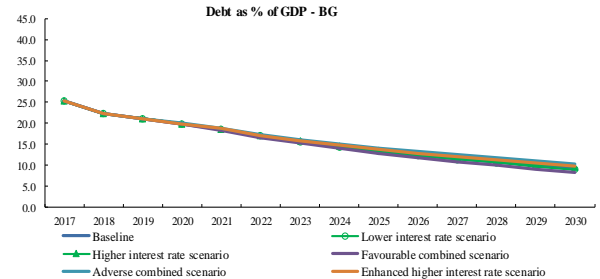
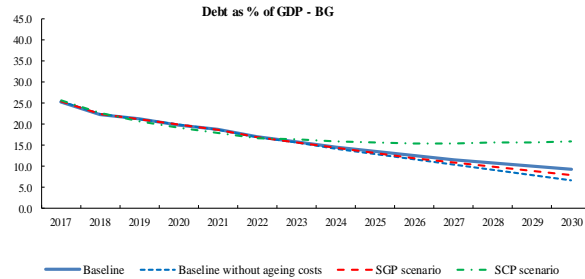
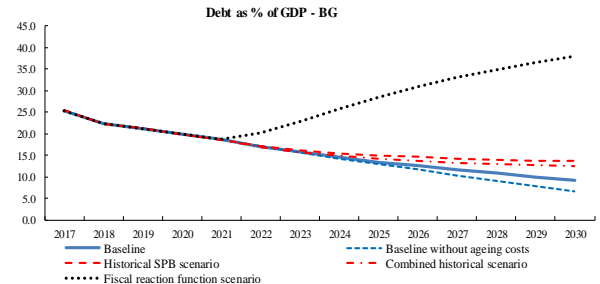
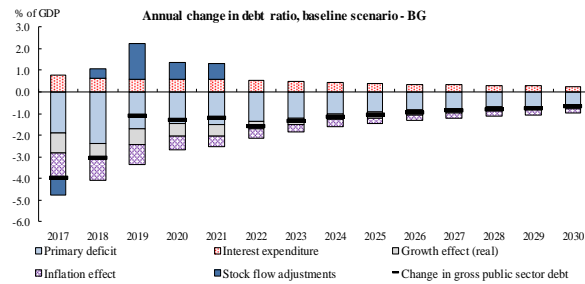
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Belgium									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	99.5	99.6	100.0	97.4	97.4	97.4	99.7	97.8	98.3
Primary balance	0.2	-0.4	-0.9	-1.4	-1.6	-1.7	-0.4	-1.3	-1.1
Structural primary balance (before CoA)	-0.1	-0.5	-0.5	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5
Real GDP growth	1.1	1.0	1.0	0.9	0.8	1.0	1.0	1.0	1.0
Potential GDP growth	1.5	1.5	1.5	0.9	0.8	1.0	1.5	0.9	1.1
Inflation rate	1.6	1.9	2.0	2.0	2.0	2.0	1.8	2.0	2.0
Implicit interest rate (nominal)	2.0	1.9	1.8	1.3	1.2	1.1	1.9	1.3	1.5
2. Fiscal reaction function scenario									
Gross public debt	99.5	99.6	100.0	89.1	85.2	82.0	99.7	89.7	92.2
Primary balance	0.2	-0.4	-0.9	0.9	0.4	0.1	-0.4	0.7	0.4
Structural primary balance (before CoA)	-0.1	-0.5	-0.5	1.7	1.5	1.2	-0.4	1.5	1.0
Real GDP growth	1.1	1.0	1.0	0.9	0.9	1.1	1.0	0.9	0.9
3. SGP scenario									
Gross public debt	99.5	99.6	99.9	88.1	83.3	78.6	99.7	88.4	91.2
Primary balance	0.2	-0.4	-0.4	1.2	1.1	1.0	-0.2	1.0	0.7
Structural primary balance	-0.1	-0.5	0.0	1.2	1.1	1.0	-0.2	1.0	0.7
Real GDP growth	1.1	1.0	0.6	0.9	0.8	1.0	0.9	0.9	0.9
4. SCP scenario									
Gross public debt	100.6	98.5	96.2	86.6	85.2	84.3	98.4	87.7	90.4
Primary balance	1.3	1.8	1.9	1.0	0.8	0.7	1.7	1.1	1.3
Structural primary balance (before CoA)	1.2	1.6	1.7	1.7	1.7	1.7	1.5	1.7	1.6
Real GDP growth	1.3	1.4	1.4	0.9	0.9	1.2	1.4	1.0	1.1
Potential GDP growth	1.3	1.4	1.4	0.9	0.9	1.2	1.4	1.0	1.1
Inflation rate	1.7	1.6	1.6	2.0	2.0	2.0	1.6	2.0	1.9
Implicit interest rate (nominal)	2.1	2.0	1.9	2.7	3.2	3.6	2.0	2.7	2.5
5. Historical SPB scenario									
Gross public debt	99.5	99.6	100.0	94.2	92.0	89.9	99.7	94.4	95.7
Primary balance	0.2	-0.4	-0.9	-0.2	-0.4	-0.5	-0.4	-0.3	-0.3
Structural primary balance (before CoA)	-0.1	-0.5	-0.5	0.7	0.7	0.7	-0.4	0.5	0.3
Real GDP growth	1.1	1.0	1.0	0.9	0.8	1.0	1.0	0.9	0.9
6. Combined historical scenario									
Gross public debt	99.5	99.6	100.0	95.0	93.8	93.6	99.7	95.7	96.7
Primary balance	0.2	-0.4	-0.9	-0.2	-0.4	-0.5	-0.4	-0.3	-0.3
Structural primary balance (before CoA)	-0.1	-0.5	-0.5	0.7	0.7	0.7	-0.4	0.5	0.3
Real GDP growth	1.1	1.0	1.0	1.5	1.5	1.5	1.0	1.3	1.2
Implicit interest rate (nominal)	2.0	1.9	1.8	2.2	2.6	2.9	1.9	2.2	2.1
7. Higher IR scenario (standard DSA)									
Gross public debt	99.5	99.8	100.4	100.0	101.2	102.4	99.9	100.5	100.4
Implicit interest rate (nominal)	2.0	2.1	2.0	1.9	1.9	1.9	2.0	1.9	1.9
8. Lower IR scenario (standard DSA)									
Gross public debt	99.5	99.5	99.6	95.0	94.0	92.8	99.5	95.3	96.4
Implicit interest rate (nominal)	2.0	1.7	1.5	0.7	0.6	0.4	1.8	0.8	1.0
9. Higher IR scenario (enhanced DSA)									
Gross public debt	99.5	100.0	100.8	101.4	102.9	104.3	100.1	101.9	101.5
Implicit interest rate (nominal)	2.0	2.2	2.3	2.0	2.0	2.0	2.2	2.1	2.1
10. Higher growth scenario (standard DSA)									
Gross public debt	99.5	99.1	99.0	94.3	93.5	92.7	99.2	94.7	95.8
Real GDP growth	1.1	1.5	1.5	1.4	1.3	1.5	1.4	1.5	1.5
11. Lower growth scenario (standard DSA)									
Gross public debt	99.5	100.1	101.0	100.7	101.6	102.5	100.2	101.1	100.9
Real GDP growth	1.1	0.5	0.5	0.4	0.3	0.5	0.7	0.5	0.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	99.5	99.3	99.3	94.5	93.7	92.9	99.4	94.9	96.0
Real GDP growth	1.1	1.3	1.4	1.4	1.3	1.5	1.3	1.5	1.4
13. Lower growth scenario (enhanced DSA)									
Gross public debt	99.5	100.0	100.7	100.5	101.4	102.2	100.1	100.9	100.7
Real GDP growth	1.1	0.6	0.6	0.4	0.3	0.5	0.8	0.5	0.6
14. Lower SPB scenario									
Gross public debt	99.5	99.6	99.9	98.4	98.7	99.1	99.7	98.7	99.0
Primary balance	0.2	-0.3	-1.1	-1.6	-1.8	-1.9	-0.4	-1.5	-1.2
Structural primary balance (before CoA)	-0.1	-0.4	-0.7	-0.7	-0.7	-0.7	-0.4	-0.7	-0.6
Real GDP growth	1.1	0.9	1.2	0.9	0.8	1.0	1.1	1.0	1.0
15. Exchange rate depreciation scenario									
Gross public debt	99.5	99.6	100.0	97.4	97.4	97.4	99.7	97.8	98.3
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	99.5	99.0	98.6	91.9	90.1	88.3	99.0	92.3	94.0
Implicit interest rate (nominal)	2.0	1.7	1.5	0.7	0.5	0.4	1.8	0.8	1.0
Real GDP growth	1.1	1.5	1.5	1.4	1.3	1.5	1.4	1.5	1.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	99.5	100.3	101.4	103.3	105.5	107.7	100.4	103.9	103.0
Implicit interest rate (nominal)	2.0	2.1	2.0	1.9	1.9	1.9	2.0	1.9	1.9
Real GDP growth	1.1	0.5	0.5	0.4	0.3	0.5	0.7	0.5	0.6

Bulgaria

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

BG - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	25.3	22.3	21.1	19.9	18.6	17.0	15.6	14.5	13.4	12.5	11.6	10.8	10.0	9.3
Changes in the ratio (-1+2+3) of which	-4.0	-3.1	-1.1	-1.3	-1.2	-1.6	-1.4	-1.1	-1.1	-1.0	-0.9	-0.8	-0.8	-0.7
(1) Primary balance (1.1+1.2+1.3)	1.9	2.4	1.7	1.4	1.5	1.4	1.2	1.0	0.9	0.8	0.8	0.7	0.7	0.6
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.9	2.4	1.5	1.2	1.2	1.2	1.1	1.0	0.9	0.8	0.8	0.7	0.7	0.6
(1.1.1) Structural primary balance (bef. CoA)	1.9	2.4	1.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
(1.1.2) Cost of ageing (1.1.3) Others (taxes and property incomes)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.6
(1.2) Cyclical component (1.3) One-off and other temporary measures	0.0	0.0	0.2	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.3	-1.1	-1.1	-0.6	-0.5	-0.2	-0.2	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
(2.1) Interest expenditure (2.2) Growth effect (2.3) Inflation effect (2.4) Exchange rate effect linked to the interest rate	0.8 -1.0 -1.1 0.0	0.6 -0.7 -1.0 0.0	0.6 -0.7 -1.0 0.0	0.6 -0.6 -0.6 0.0	0.6 -0.5 -0.5 0.0	0.5 -0.3 -0.4 0.0	0.5 -0.3 -0.4 0.0	0.4 -0.3 -0.3 0.0	0.4 -0.3 -0.3 0.0	0.4 -0.2 -0.3 0.0	0.4 -0.2 -0.2 0.0	0.3 -0.2 -0.2 0.0	0.3 -0.2 -0.2 0.0	0.3 -0.1 -0.2 0.0
(3) Stock-flow adjustments	-0.8	0.4	1.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base (3.2) Adjustment due to the exchange rate effect	-0.8 0.0	0.4 0.0	1.7 0.0	0.8 0.0	0.8 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0
Pro memoria														
Structural balance	1.1	1.8	1.0	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -5.4)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = 1.6)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	MEDIUM			
Debt level (2030)			9.3	13.6	10.0	9.6	10.7				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			36.0%	45.0%							
Probability debt higher									29.1%		
Dif. between percentiles									29.2		

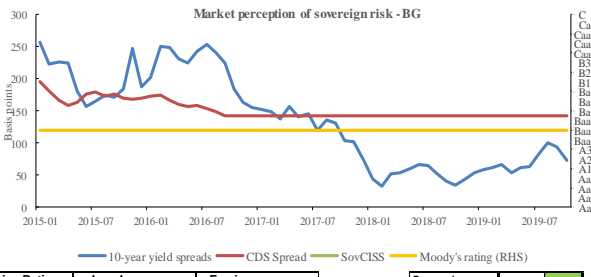
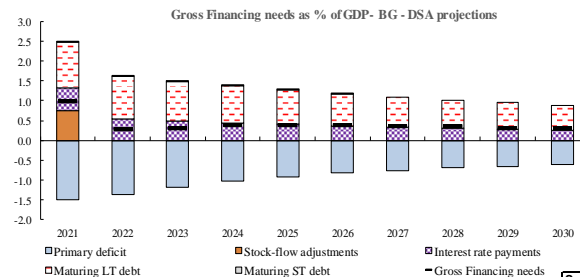
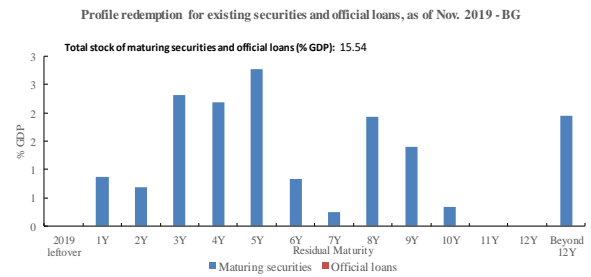
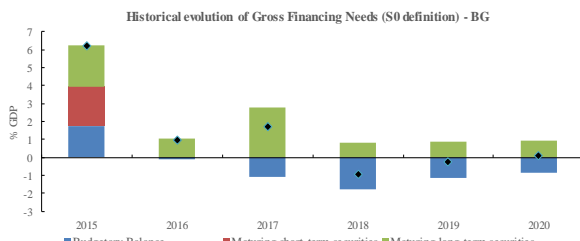
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.65	0.21	0.46
Fiscal sub-index	0.33	0.00	0.36
Financial competitiveness sub-index	0.82	0.33	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-4.2	-5.4	-4.4	-5.0
of which Gap to the debt-stabilizing primary balance	-0.9	-1.6	-0.8	-1.6
Cost of delaying adjustment	-0.6	-0.7	-0.6	-0.7
Debt requirement	-3.0	-3.6	-3.8	-3.6
Ageing costs	0.4	0.5	0.8	0.8
Required structural primary balance related to S1	-3.3	-4.2	-3.8	-3.9

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	1.8	1.6	2.3	2.8	1.8	2.1	1.5
of which Initial Budgetary position	-0.4	-0.8	-0.2	-0.8	-0.8	-0.8	-0.8
Ageing costs	2.2	2.4	2.6	3.6	2.6	2.9	2.3
of which Pensions	1.4	1.6	1.7	1.6	1.8	2.1	1.4
Health care	0.3	0.2	0.2	0.9	0.2	0.2	0.3
Long-term care	0.1	0.1	0.1	0.6	0.1	0.1	0.1
Others	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Required structural primary balance related to S2	2.7	2.8	2.9	4.0	2.9	3.3	2.7

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, BG	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Baa2	A-3	Baa2	A-3
S&P	BBB-	A-3	BBB-	A-3
Fitch	BBB		BBB	F2

Sovereign yield spreads (bp) - as of October 2019	10-year	72.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

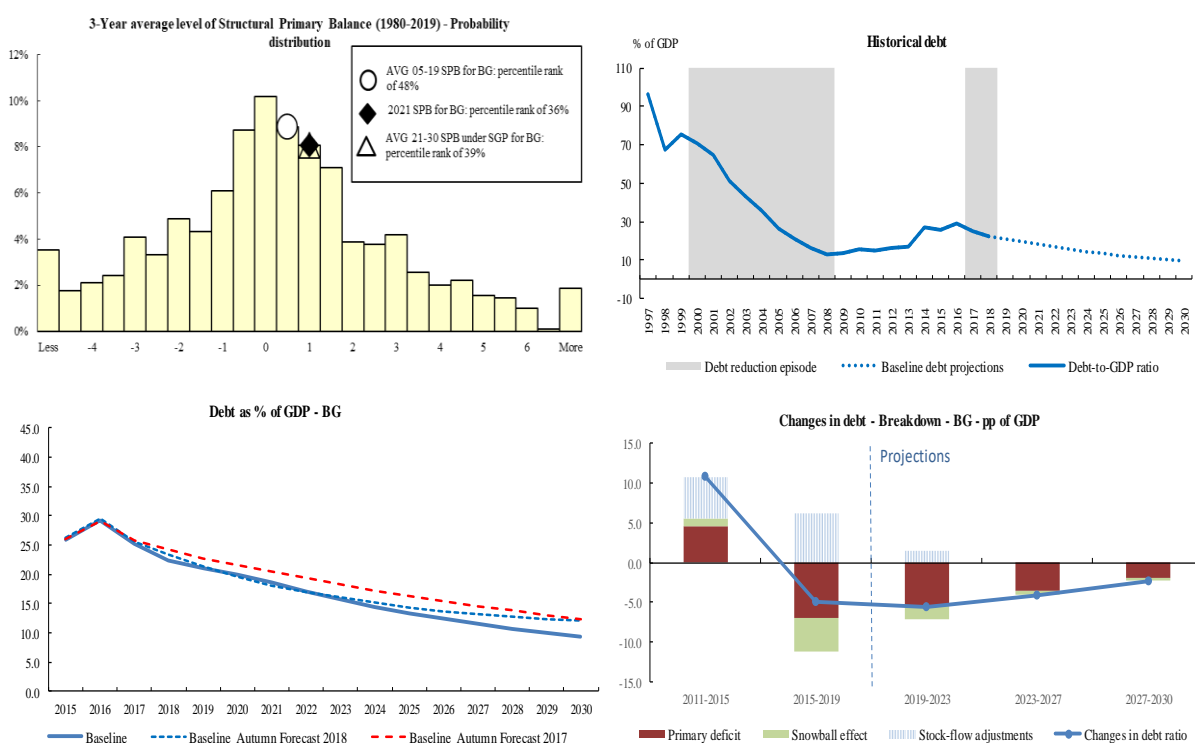
Public debt structure - BG (2018)	Share of short-term government debt (p.p.): 0.0	Share of government debt in foreign currency 81.7	Share of government debt by non-residents (%): 44.4	Net International Investment Position (IIP) - BG (2018)	Net IIP (% GDP): -35.2
--	--	---	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		BG					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		1.1	0.7	0.5	0.4	0.3	6.3
of which	One-off guarantees	1.1	0.7	0.4	0.3	0.2	5.8
	Standardised guarantees	0.0	0.0	0.1	0.1	0.1	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - BG (2018)	Private sector credit flow (% GDP): 3.9	Change in nominal house price index: 6.6	Bank loans-to-deposits ratio (p.p.): 73.9	Share of non-performing loans (%): 7.2	Change in share of non-performing loans (p.p.): -2.1	NPL coverage ratio 52.6	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.5%

6. Realism of baseline assumptions

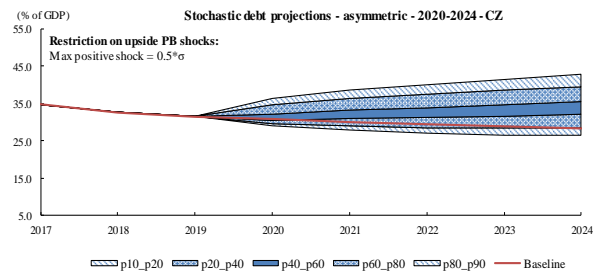
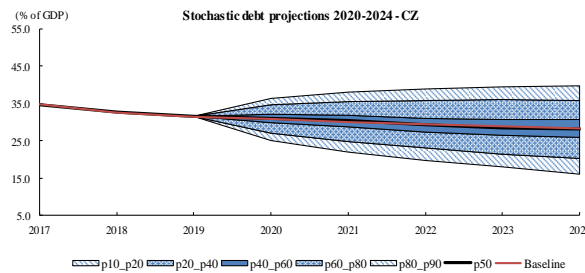
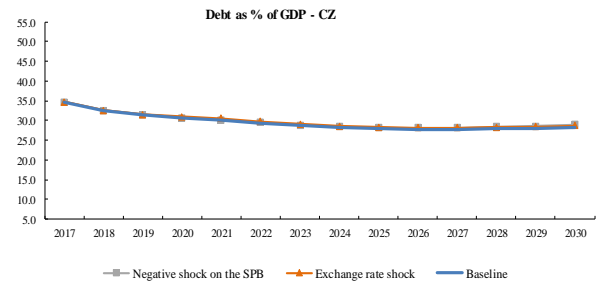
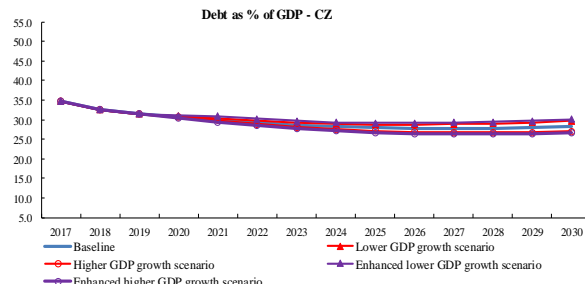
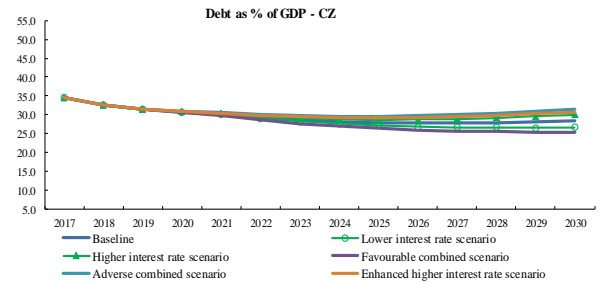
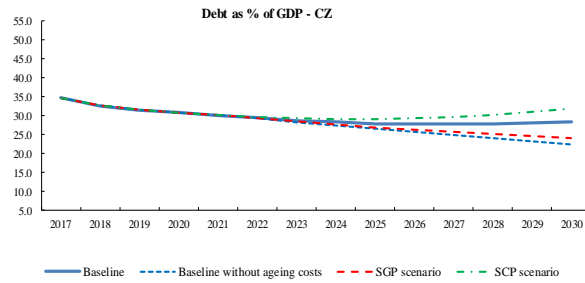
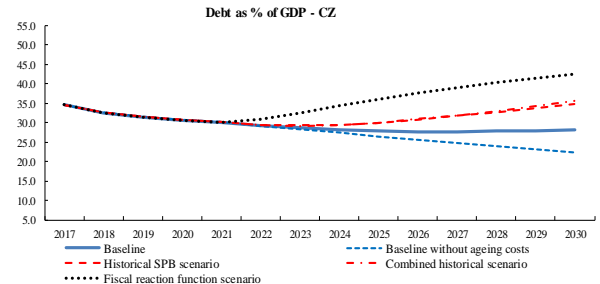
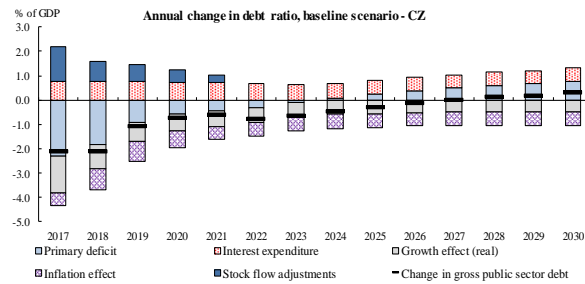


7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Bulgaria									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	21.1	19.9	18.6	12.5	10.8	9.3	19.9	12.7	14.5
Primary balance	1.7	1.4	1.5	0.8	0.7	0.6	1.5	0.9	1.1
Structural primary balance (before CoA)	1.5	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.2
Real GDP growth	3.6	3.0	2.9	1.8	1.7	1.5	3.1	1.7	2.1
Potential GDP growth	3.0	2.8	2.5	1.8	1.7	1.5	2.8	1.9	2.1
Inflation rate	4.5	3.0	2.6	2.0	2.0	2.0	3.4	2.1	2.4
Implicit interest rate (nominal)	2.7	2.9	3.1	2.8	2.7	2.6	2.9	2.8	2.8
2. Fiscal reaction function scenario									
Gross public debt	21.1	19.9	18.6	30.8	34.9	38.0	19.9	30.0	27.5
Primary balance	1.7	1.4	1.5	-3.0	-2.5	-2.2	1.5	-2.7	-1.6
Structural primary balance (before CoA)	1.5	1.2	1.2	-2.6	-2.0	-1.6	1.3	-2.4	-1.5
Real GDP growth	3.6	3.0	2.9	1.6	1.5	1.4	3.1	2.0	2.3
3. SGP scenario									
Gross public debt	21.1	19.9	18.6	12.0	9.9	8.0	19.9	12.2	14.1
Primary balance	1.7	1.4	1.6	1.0	0.9	0.9	1.6	1.0	1.2
Structural primary balance	1.5	1.2	1.2	1.0	0.9	0.9	1.3	1.0	1.1
Real GDP growth	3.6	3.0	2.8	1.8	1.7	1.6	3.1	1.8	2.1
4. SCP scenario									
Gross public debt	20.6	19.1	17.8	15.5	15.6	16.0	19.2	15.9	16.7
Primary balance	0.3	1.0	0.7	0.0	-0.1	-0.2	0.7	0.1	0.2
Structural primary balance (before CoA)	0.2	0.9	0.5	0.4	0.4	0.4	0.5	0.4	0.4
Real GDP growth	3.4	3.3	3.3	1.6	1.5	1.5	3.3	1.8	2.2
Potential GDP growth	3.4	3.3	3.2	1.6	1.5	1.5	3.3	1.8	2.2
Inflation rate	3.4	3.0	2.8	2.0	2.0	2.0	3.1	2.1	2.3
Implicit interest rate (nominal)	2.5	2.7	2.7	3.2	3.5	3.9	2.6	3.3	3.1
5. Historical SPB scenario									
Gross public debt	21.1	19.9	18.6	14.5	14.0	13.6	19.9	14.9	16.1
Primary balance	1.7	1.4	1.5	0.2	0.1	0.0	1.5	0.4	0.7
Structural primary balance (before CoA)	1.5	1.2	1.2	0.5	0.5	0.5	1.3	0.6	0.8
Real GDP growth	3.6	3.0	2.9	1.8	1.7	1.5	3.1	1.8	2.1
6. Combined historical scenario									
Gross public debt	21.1	19.9	18.6	13.7	12.9	12.3	19.9	14.1	15.5
Primary balance	1.7	1.4	1.5	0.2	0.1	0.0	1.5	0.4	0.7
Structural primary balance (before CoA)	1.5	1.2	1.2	0.5	0.5	0.5	1.3	0.6	0.8
Real GDP growth	3.6	3.0	2.9	3.1	3.1	3.1	3.1	3.1	3.1
Implicit interest rate (nominal)	2.7	2.9	3.1	2.8	2.8	2.7	2.9	2.8	2.9
7. Higher IR scenario (standard DSA)									
Gross public debt	21.1	19.9	18.7	12.7	11.0	9.6	19.9	12.9	14.7
Implicit interest rate (nominal)	2.7	3.0	3.2	3.0	3.0	2.9	3.0	3.0	3.0
8. Lower IR scenario (standard DSA)									
Gross public debt	21.1	19.8	18.6	12.3	10.5	9.0	19.9	12.6	14.4
Implicit interest rate (nominal)	2.7	2.8	3.0	2.6	2.5	2.3	2.8	2.6	2.6
9. Higher IR scenario (enhanced DSA)									
Gross public debt	21.1	19.9	18.7	12.8	11.2	9.8	19.9	13.1	14.8
Implicit interest rate (nominal)	2.7	3.1	3.4	3.2	3.1	3.0	3.1	3.2	3.2
10. Higher growth scenario (standard DSA)									
Gross public debt	21.1	19.8	18.4	11.9	10.1	8.6	19.8	12.2	14.1
Real GDP growth	3.6	3.5	3.4	2.3	2.2	2.0	3.5	2.2	2.6
11. Lower growth scenario (standard DSA)									
Gross public debt	21.1	20.0	18.8	13.0	11.4	10.0	20.0	13.3	15.0
Real GDP growth	3.6	2.5	2.4	1.3	1.2	1.0	2.8	1.2	1.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	21.1	19.8	18.5	12.0	10.2	8.6	19.8	12.3	14.2
Real GDP growth	3.6	3.3	3.2	2.3	2.2	2.0	3.4	2.2	2.5
13. Lower growth scenario (enhanced DSA)									
Gross public debt	21.1	19.9	18.8	13.0	11.4	10.0	19.9	13.2	14.9
Real GDP growth	3.6	2.7	2.5	1.3	1.2	1.0	2.9	1.2	1.7
14. Lower SPB scenario									
Gross public debt	21.1	19.8	18.7	13.4	12.0	10.7	19.9	13.6	15.2
Primary balance	1.7	1.5	1.3	0.6	0.5	0.4	1.5	0.7	0.9
Structural primary balance (before CoA)	1.5	1.3	1.0	1.0	1.0	1.0	1.3	1.0	1.1
Real GDP growth	3.6	3.0	3.0	1.8	1.7	1.5	3.2	1.7	2.1
15. Exchange rate depreciation scenario									
Gross public debt	21.1	19.9	18.6	12.5	10.8	9.3	19.9	12.7	14.5
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	21.1	19.7	18.4	11.7	9.9	8.3	19.8	12.0	14.0
Implicit interest rate (nominal)	2.7	2.8	3.0	2.6	2.5	2.4	2.8	2.6	2.7
Real GDP growth	3.6	3.5	3.4	2.3	2.2	2.0	3.5	2.2	2.6
17. Adverse combined scenario (GDP & IR)									
Gross public debt	21.1	20.0	18.9	13.2	11.7	10.4	20.0	13.5	15.1
Implicit interest rate (nominal)	2.7	3.0	3.2	3.0	3.0	2.9	3.0	3.0	3.0
Real GDP growth	3.6	2.5	2.4	1.3	1.2	1.0	2.8	1.2	1.6

Czechia

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests																
CZ - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Gross debt ratio	34.7	32.6	31.5	30.7	30.1	29.3	28.7	28.2	27.9	27.8	27.8	27.9	28.0	28.3		
Changes in the ratio (-1+2+3) of which	-2.1	-2.1	-1.1	-0.7	-0.6	-0.8	-0.6	-0.5	-0.3	-0.1	0.0	0.1	0.2	0.3		
(1) Primary balance (1.1+1.2+1.3)	2.3	1.8	0.9	0.6	0.4	0.3	0.1	-0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.8		
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.8	1.3	0.5	0.3	0.3	0.2	0.1	-0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.8		
(1.1.1) Structural primary balance (bef. CoA)	1.8	1.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
(1.1.2) Cost of ageing						0.1	0.3	0.4	0.6	0.7	0.9	1.0	1.0	1.1		
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(1.2) Cyclical component	0.5	0.5	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.3	-1.1	-0.9	-0.6	-0.5	-0.5	-0.5	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		
(2.1) Interest expenditure	0.7	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5		
(2.2) Growth effect	-1.5	-1.0	-0.8	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5		
(2.3) Inflation effect	-0.5	-0.9	-0.8	-0.7	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5		
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(3) Stock-flow adjustments	1.5	0.8	0.7	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(3.1) Base	1.6	0.9	0.7	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(3.2) Adjustment due to the exchange rate effect	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Pro memoria																
Structural balance	1.1	0.6	-0.3	-0.4	-0.4	-0.4	-0.6	-0.7	-0.8	-0.9	-1.0	-1.1	-1.2	-1.3		



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -2.9)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 4.8)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			28.3	34.9	29.8	30.1	29.0				
Debt peak year			2019	2030	2019	2019	2019				
Percentile rank			52.0%	65.0%							
Probability debt higher									36.1%		
Dif. between percentiles									23.6		

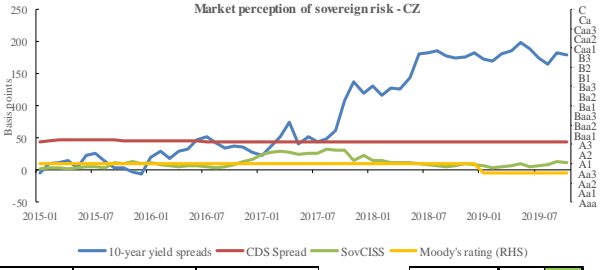
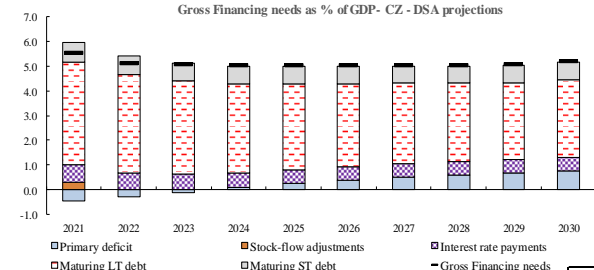
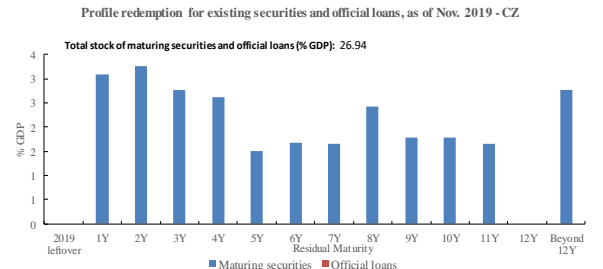
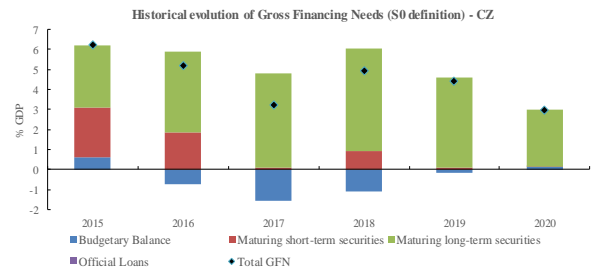
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.34	0.22	0.46
Fiscal sub-index	0.42	0.00	0.36
Financial competitiveness sub-index	0.31	0.34	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-2.9	-2.9	-1.0	-2.7
of which Gap to the debt-stabilizing primary balance	-1.2	-0.9	0.2	-0.9
Cost of delaying adjustment	-0.4	-0.4	-0.1	-0.4
Debt requirement	-2.2	-2.5	-2.5	-2.5
Ageing costs	0.9	0.9	1.4	1.2
Required structural primary balance related to S1	-1.9	-2.6	-1.6	-2.3

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	4.1	4.8	6.0	5.9	4.8	5.5	4.4
of which Initial Budgetary position	-0.5	0.0	1.0	0.0	0.1	0.0	0.1
Ageing costs	4.7	4.8	5.0	5.9	4.7	5.5	4.3
of which Pensions	2.2	2.3	2.4	2.3	2.4	2.8	2.1
Health care	0.8	0.8	0.8	1.4	0.7	0.8	0.7
Long-term care	1.1	1.1	1.1	1.6	1.0	1.3	1.0
Others	0.6	0.6	0.6	0.6	0.6	0.6	0.5
Required structural primary balance related to S2	5.1	5.1	5.3	6.2	5.1	5.9	4.7

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, CZ	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Aa3	A-1+	Aa3	P-1
S&P	AA	A-1+	AA	A-1+
Fitch	AA-	A-	AA-	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	179.0
---	---------	-------

4. Risks related to the structure of public debt financing and net International Investment Position

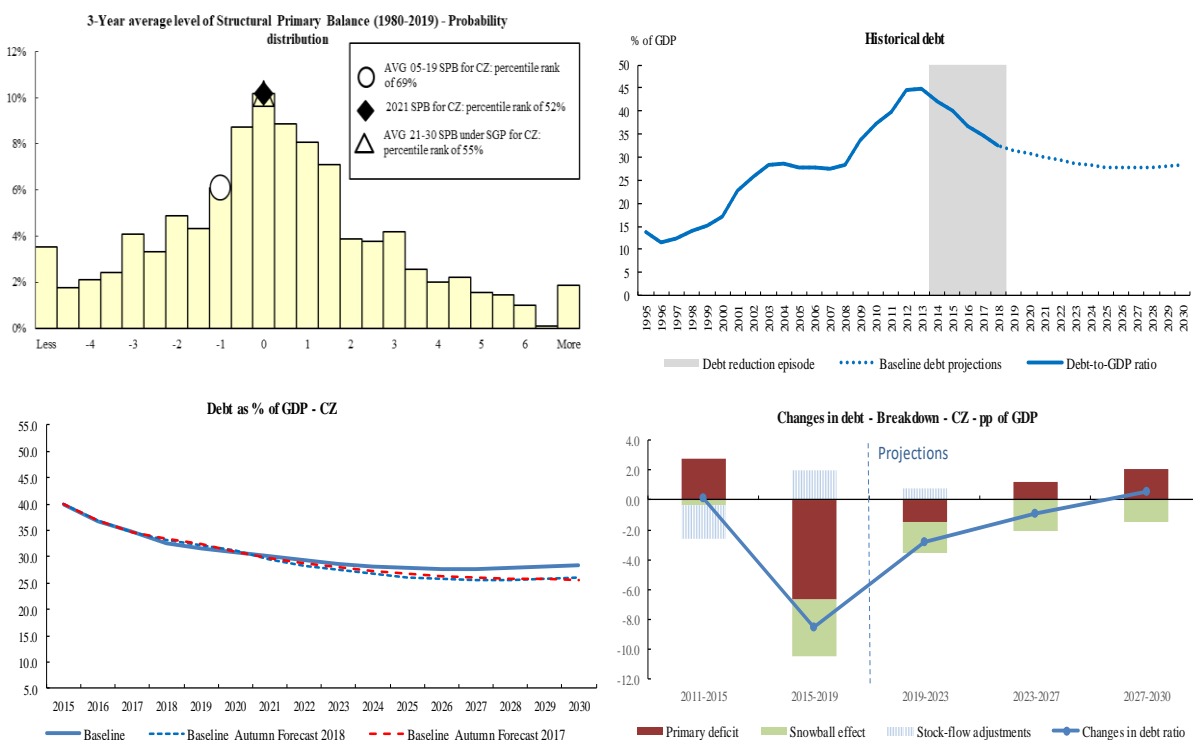
Public debt structure - CZ (2018)	Share of short-term government debt (p.p.): 3.4	Share of government debt in foreign currency (%): 12.0	Share of government debt by non-residents (%): 40.1	Net International Investment Position (IIP) - CZ (2018)	Net IIP (% GDP): -23.5
--	--	---	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		CZ					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		0.5	0.6	0.3	0.3	0.2	6.3
of which	One-off guarantees	0.5	0.6	0.3	0.3	0.2	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - CZ (2018)	Private sector credit flow (% GDP): 5.3	Change in nominal house price index: 8.6	Bank loans-to-deposits ratio (p.p.): 84.1	Share of non-performing loans (%): 1.3	Change in share of non-performing loans (p.p.): -0.1	NPL coverage ratio 57.9	Probability of gov't cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.6%

6. Realism of baseline assumptions



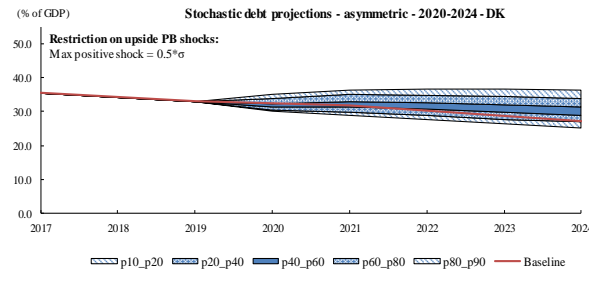
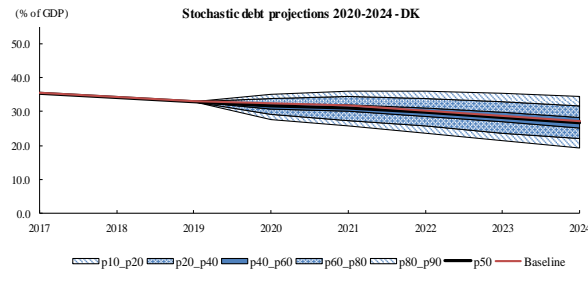
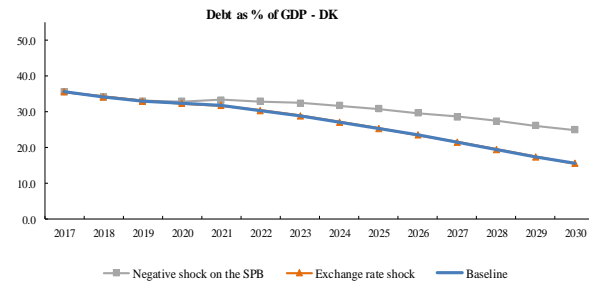
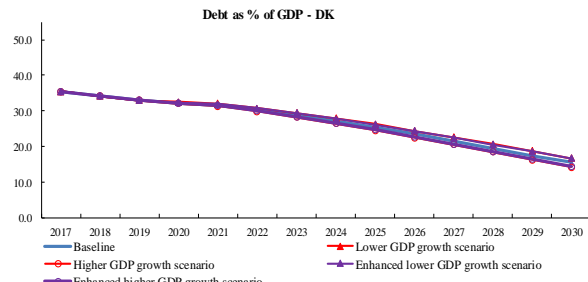
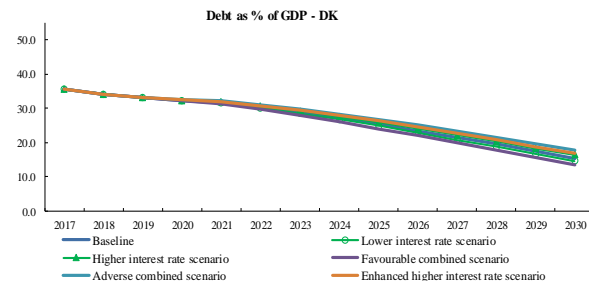
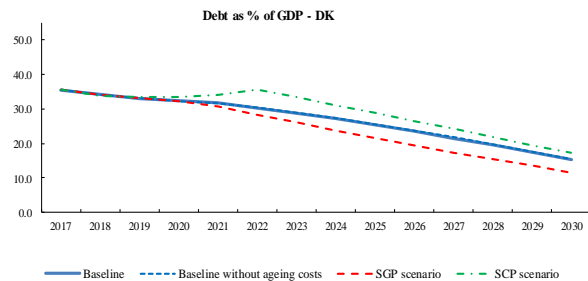
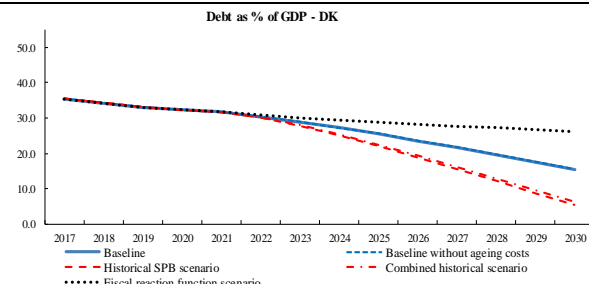
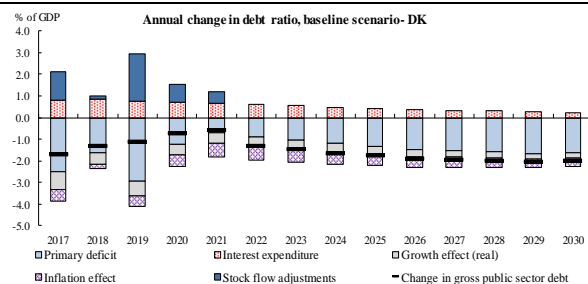
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Czech Republic									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	31.5	30.7	30.1	27.8	27.9	28.3	30.8	28.2	28.8
Primary balance	0.9	0.6	0.4	-0.4	-0.6	-0.8	0.7	-0.3	-0.1
Structural primary balance (before CoA)	0.5	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
Real GDP growth	2.5	2.2	2.1	1.9	1.8	1.8	2.3	2.0	2.1
Potential GDP growth	2.8	2.7	2.5	1.9	1.8	1.8	2.6	2.0	2.2
Inflation rate	2.6	2.3	1.8	2.0	2.0	2.0	2.2	2.0	2.0
Implicit interest rate (nominal)	2.4	2.4	2.4	2.1	2.0	2.0	2.4	2.1	2.2
2. Fiscal reaction function scenario									
Gross public debt	31.5	30.7	30.1	37.7	40.4	42.5	30.8	37.3	35.6
Primary balance	0.9	0.6	0.4	-2.2	-1.9	-1.7	0.7	-2.1	-1.4
Structural primary balance (before CoA)	0.5	0.3	0.3	-1.5	-1.0	-0.6	0.4	-1.4	-1.0
Real GDP growth	2.5	2.2	2.1	1.7	1.6	1.6	2.3	2.1	2.1
3. SGP scenario									
Gross public debt	31.5	30.7	30.1	26.3	25.1	24.1	30.8	26.5	27.5
Primary balance	0.9	0.6	0.4	0.1	0.1	0.1	0.7	0.2	0.3
Structural primary balance	0.5	0.3	0.3	0.1	0.1	0.1	0.4	0.2	0.2
Real GDP growth	2.5	2.2	2.1	1.9	1.8	1.8	2.3	2.0	2.1
4. SCP scenario									
Gross public debt	31.5	30.8	30.2	29.2	30.2	31.8	30.8	29.8	30.1
Primary balance	1.1	0.6	0.4	-0.4	-0.6	-0.8	0.7	-0.3	-0.1
Structural primary balance (before CoA)	0.8	0.5	0.3	0.2	0.2	0.2	0.5	0.2	0.3
Real GDP growth	2.4	2.4	2.3	1.8	1.8	1.8	2.4	1.9	2.0
Potential GDP growth	2.9	2.8	2.7	1.8	1.8	1.8	2.8	1.9	2.2
Inflation rate	3.0	1.9	1.9	2.0	2.0	2.0	2.3	2.0	2.1
Implicit interest rate (nominal)	2.4	2.5	2.5	3.3	3.8	4.1	2.5	3.3	3.1
5. Historical SPB scenario									
Gross public debt	31.5	30.7	30.1	30.8	32.7	34.9	30.8	31.4	31.2
Primary balance	0.9	0.6	0.4	-1.3	-1.6	-1.7	0.7	-1.1	-0.7
Structural primary balance (before CoA)	0.5	0.3	0.3	-0.6	-0.6	-0.6	0.4	-0.5	-0.3
Real GDP growth	2.5	2.2	2.1	1.9	1.8	1.8	2.3	2.1	2.1
6. Combined historical scenario									
Gross public debt	31.5	30.7	30.1	30.9	33.0	35.6	30.8	31.5	31.4
Primary balance	0.9	0.6	0.4	-1.3	-1.6	-1.7	0.7	-1.1	-0.7
Structural primary balance (before CoA)	0.5	0.3	0.3	-0.6	-0.6	-0.6	0.4	-0.5	-0.3
Real GDP growth	2.5	2.2	2.1	2.6	2.6	2.6	2.3	2.6	2.5
Implicit interest rate (nominal)	2.4	2.4	2.4	2.9	3.2	3.4	2.4	2.9	2.8
7. Higher IR scenario (standard DSA)									
Gross public debt	31.5	30.8	30.3	28.7	29.2	30.1	30.8	29.2	29.6
Implicit interest rate (nominal)	2.4	2.6	2.7	2.8	2.8	2.9	2.6	2.8	2.7
8. Lower IR scenario (standard DSA)									
Gross public debt	31.5	30.7	30.0	26.9	26.6	26.7	30.7	27.3	28.1
Implicit interest rate (nominal)	2.4	2.2	2.1	1.4	1.2	1.2	2.2	1.4	1.6
9. Higher IR scenario (enhanced DSA)									
Gross public debt	31.5	30.8	30.4	29.3	29.8	30.8	30.9	29.7	30.0
Implicit interest rate (nominal)	2.4	2.8	3.1	3.0	3.0	3.0	2.8	3.0	3.0
10. Higher growth scenario (standard DSA)									
Gross public debt	31.5	30.6	29.8	26.8	26.7	27.0	30.6	27.3	28.1
Real GDP growth	2.5	2.7	2.6	2.4	2.3	2.3	2.6	2.5	2.5
11. Lower growth scenario (standard DSA)									
Gross public debt	31.5	30.9	30.4	28.7	29.1	29.8	30.9	29.2	29.6
Real GDP growth	2.5	1.7	1.6	1.4	1.3	1.3	1.9	1.5	1.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	31.5	30.4	29.4	26.5	26.4	26.6	30.4	26.9	27.8
Real GDP growth	2.5	3.4	3.4	2.4	2.3	2.3	3.1	2.5	2.6
13. Lower growth scenario (enhanced DSA)									
Gross public debt	31.5	31.1	30.9	29.2	29.5	30.2	31.2	29.6	30.0
Real GDP growth	2.5	0.9	0.9	1.4	1.3	1.3	1.4	1.5	1.5
14. Lower SPB scenario									
Gross public debt	31.5	30.7	30.2	28.1	28.4	29.0	30.8	28.6	29.1
Primary balance	0.9	0.6	0.4	-0.5	-0.7	-0.9	0.6	-0.4	-0.1
Structural primary balance (before CoA)	0.5	0.4	0.2	0.2	0.2	0.2	0.4	0.2	0.3
Real GDP growth	2.5	2.2	2.2	1.9	1.8	1.8	2.3	2.0	2.1
15. Exchange rate depreciation scenario									
Gross public debt	31.5	30.9	30.6	28.2	28.2	28.7	31.0	28.6	29.2
Exchange rate depreciation	0.0%	6.0%	6.0%	0.0%	0.0%	0.0%	4.0%	0.0%	1.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	31.5	30.5	29.7	26.0	25.5	25.4	30.6	26.4	27.5
Implicit interest rate (nominal)	2.4	2.2	2.1	1.4	1.2	1.2	2.2	1.4	1.6
Real GDP growth	2.5	2.7	2.6	2.4	2.3	2.3	2.6	2.5	2.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	31.5	30.9	30.6	29.7	30.5	31.6	31.0	30.2	30.4
Implicit interest rate (nominal)	2.4	2.6	2.7	2.8	2.8	2.9	2.6	2.8	2.7
Real GDP growth	2.5	1.7	1.6	1.4	1.3	1.3	1.9	1.5	1.6

Denmark

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

DK - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	35.5	34.2	33.0	32.3	31.7	30.3	28.8	27.2	25.4	23.5	21.5	19.5	17.5	15.4
Changes in the ratio (-1+2+3) of which	-1.7	-1.3	-1.1	-0.7	-0.6	-1.4	-1.5	-1.7	-1.8	-1.9	-2.0	-2.0	-2.0	-2.0
(1) Primary balance (1.1+1.2+1.3)	2.5	1.6	2.9	1.2	0.7	0.9	1.0	1.2	1.3	1.5	1.5	1.6	1.7	1.6
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	2.5	1.8	2.9	2.1	0.8	1.0	1.1	1.2	1.3	1.5	1.5	1.6	1.7	1.6
(1.1.1) Structural primary balance (bef. CoA)	2.5	1.8	2.9	2.1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
(1.1.2) Cost of ageing						-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.6
(1.2) Cyclical component	0.0	-0.2	0.0	-0.1	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.5	0.1	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
(2.1) Interest expenditure	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2
(2.2) Growth effect	-0.8	-0.5	-0.7	-0.5	-0.5	-0.5	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2
(2.3) Inflation effect	-0.5	-0.2	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4	-0.4	-0.3
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	1.3	0.2	2.2	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	1.3	0.2	2.2	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	1.7	1.0	2.1	1.4	0.2	0.4	0.5	0.7	0.9	1.1	1.2	1.3	1.4	1.4



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -5.6)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = 0.4)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			15.4	5.5	16.7	16.4	24.8				
Debt peak year			2019	2019	2019	2019	2021				
Percentile rank			43.0%	25.0%							
Probability debt higher							15.3%				
Dif. between percentiles							15.3				

2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.42	0.20	0.46
Fiscal sub-index	0.28	0.00	0.36
Financial competitiveness sub-index	0.50	0.31	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-5.1	-5.6	-7.9	-5.1
of which Gap to the debt-stabilizing primary balance	-2.2	-2.3	-3.5	-2.3
Cost of delaying adjustment	-0.8	-0.7	-1.0	-0.7
Debt requirement	-2.2	-2.6	-3.4	-2.6
Ageing costs	0.1	0.0	0.1	0.4
Required structural primary balance related to S1	-3.4	-4.7	-5.6	-4.3

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	-0.5	0.4	-1.1	2.7	0.2	0.7	0.2
of which Initial Budgetary position	-1.1	-0.2	-1.8	-0.2	-0.2	-0.2	-0.3
Ageing costs	0.7	0.6	0.6	3.0	0.5	0.9	0.5
of which Pensions	-1.2	-1.2	-1.2	-1.2	-1.2	-1.1	-1.1
Health care	0.7	0.7	0.7	1.2	0.6	0.7	0.6
Long-term care	1.6	1.5	1.6	3.3	1.5	1.8	1.4
Others	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.4
Required structural primary balance related to S2	1.3	1.2	1.2	3.6	1.0	1.5	1.1

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

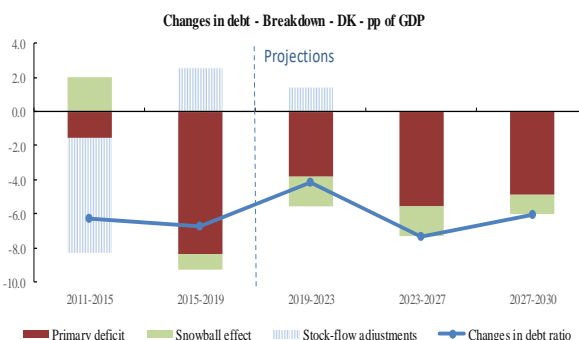
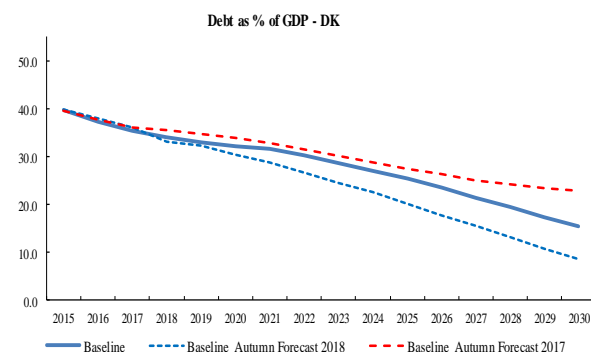
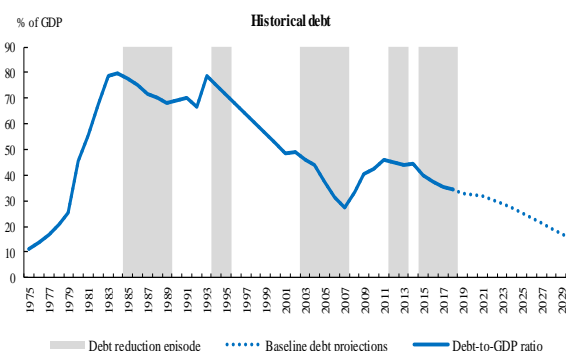
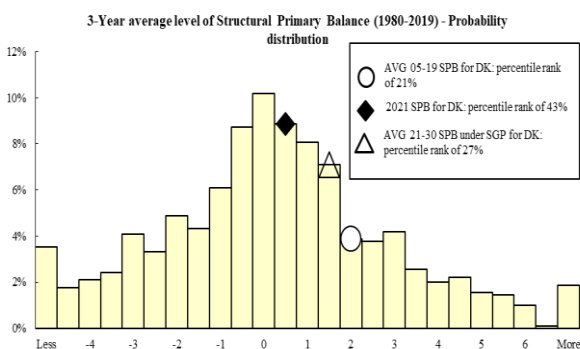
Public debt structure - DK (2018)	Share of short-term government debt (p.p.): 11.6	Share of government debt in foreign currency (%): 0.2	Share of government debt by non-residents (%): 27.2	Net International Investment Position (IIP) - DK (2018)	Net IIP (% GDP): 48.5
--	--	--	--	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		DK					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		12.9	9.9	9.9	9.9	9.7	6.3
of which	One-off guarantees	12.8	9.8	9.9	9.9	9.6	5.8
	Standardised guarantees	0.1	0.1	0.1	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		:	0.1	0.2	0.2	0.2	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	8.8	0.3	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.2	0.2	0.0	0.0	0.0	0.1
	Total	9.0	0.5	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - DK (2018)	Private sector credit flow (% GDP): 2.4	Change in nominal house price index: 4.4	Bank loans-to-deposits ratio (p.p.): 349.2	Share of non-performing loans (%): 1.7	Change in share of non-performing loans (p.p.): -0.5	NPL coverage ratio 32.7	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.1%
							Stress 0.5%

6. Realism of baseline assumptions



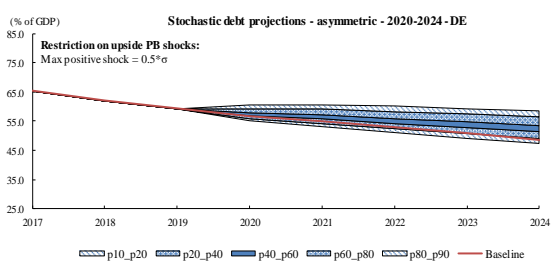
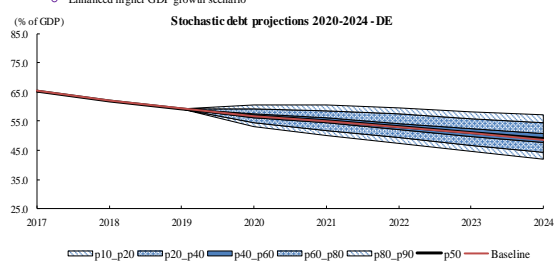
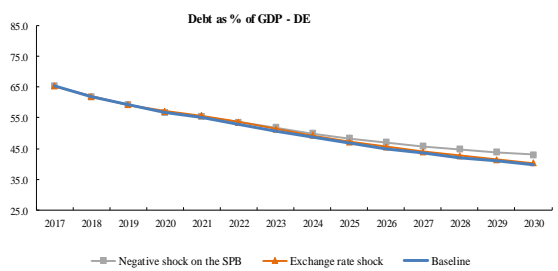
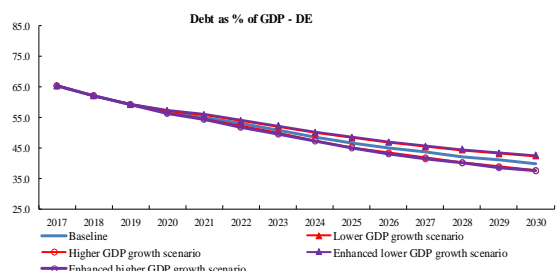
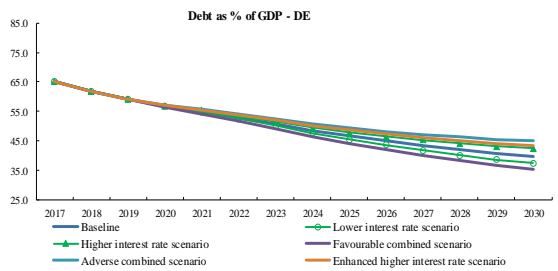
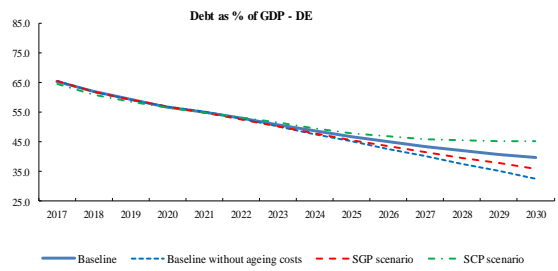
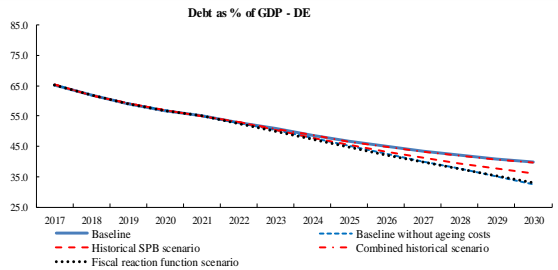
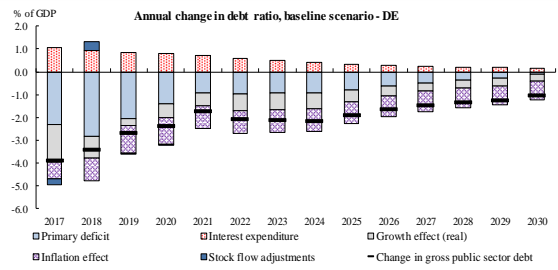
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Denmark									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	33.0	32.3	31.7	23.5	19.5	15.4	32.3	23.2	25.5
Primary balance	2.9	1.2	0.7	1.5	1.6	1.6	1.6	1.4	1.4
Structural primary balance (before CoA)	2.9	2.1	0.8	0.8	0.8	0.8	1.9	0.8	1.1
Real GDP growth	2.0	1.5	1.6	1.4	1.4	1.5	1.7	1.4	1.5
Potential GDP growth	1.7	1.7	1.7	1.4	1.4	1.5	1.7	1.4	1.5
Inflation rate	1.5	1.8	1.9	2.0	2.0	2.0	1.7	2.0	1.9
Implicit interest rate (nominal)	2.3	2.2	2.1	1.6	1.4	1.3	2.2	1.6	1.8
2. Fiscal reaction function scenario									
Gross public debt	33.0	32.3	31.7	28.3	27.2	26.1	32.3	28.4	29.3
Primary balance	2.9	1.2	0.7	0.0	-0.1	-0.1	1.6	0.0	0.4
Structural primary balance (before CoA)	2.9	2.1	0.8	-0.6	-0.8	-0.9	1.9	-0.5	0.1
Real GDP growth	2.0	1.5	1.6	1.5	1.5	1.5	1.7	1.5	1.6
3. SGP scenario									
Gross public debt	33.0	32.3	30.7	19.5	15.4	11.6	32.0	19.7	22.8
Primary balance	2.9	1.2	1.9	1.8	1.7	1.6	2.0	1.8	1.8
Structural primary balance	2.9	2.1	2.1	1.8	1.7	1.6	2.4	1.8	1.9
Real GDP growth	2.0	1.5	0.7	1.4	1.4	1.5	1.4	1.4	1.4
4. SCP scenario									
Gross public debt	33.4	33.4	34.0	26.6	22.0	17.2	33.6	26.5	28.3
Primary balance	1.7	1.1	1.8	2.2	2.3	2.4	1.5	2.1	1.9
Structural primary balance (before CoA)	1.9	1.9	1.8	1.7	1.7	1.7	1.9	1.7	1.8
Real GDP growth	1.7	1.6	1.5	1.5	1.4	1.6	1.6	1.5	1.5
Potential GDP growth	1.0	1.4	2.2	1.5	1.4	1.6	1.5	1.5	1.5
Inflation rate	1.6	2.0	1.7	2.0	2.0	2.0	1.8	2.0	1.9
Implicit interest rate (nominal)	2.8	2.6	2.6	3.1	3.4	3.5	2.7	3.0	3.0
5. Historical SPB scenario									
Gross public debt	33.0	32.3	31.7	18.8	12.1	5.5	32.3	18.4	21.9
Primary balance	2.9	1.2	0.7	3.0	3.1	3.1	1.6	2.6	2.4
Structural primary balance (before CoA)	2.9	2.1	0.8	2.3	2.3	2.3	1.9	2.1	2.0
Real GDP growth	2.0	1.5	1.6	1.4	1.4	1.5	1.7	1.3	1.4
6. Combined historical scenario									
Gross public debt	33.0	32.3	31.7	19.3	12.9	6.4	32.3	18.9	22.2
Primary balance	2.9	1.2	0.7	3.0	3.1	3.1	1.6	2.6	2.4
Structural primary balance (before CoA)	2.9	2.1	0.8	2.3	2.3	2.3	1.9	2.1	2.0
Real GDP growth	2.0	1.5	1.6	1.2	1.2	1.2	1.7	1.2	1.3
Implicit interest rate (nominal)	2.3	2.2	2.1	2.4	2.3	2.3	2.2	2.3	2.3
7. Higher IR scenario (standard DSA)									
Gross public debt	33.0	32.3	31.8	24.1	20.3	16.4	32.4	23.8	26.0
Implicit interest rate (nominal)	2.3	2.4	2.4	2.0	1.9	1.8	2.4	2.0	2.1
8. Lower IR scenario (standard DSA)									
Gross public debt	33.0	32.2	31.5	22.9	18.7	14.6	32.2	22.6	25.0
Implicit interest rate (nominal)	2.3	2.0	1.9	1.2	1.0	0.9	2.1	1.2	1.4
9. Higher IR scenario (enhanced DSA)									
Gross public debt	33.0	32.4	31.9	24.5	20.8	16.9	32.5	24.2	26.3
Implicit interest rate (nominal)	2.3	2.6	2.6	2.2	2.0	1.9	2.5	2.2	2.3
10. Higher growth scenario (standard DSA)									
Gross public debt	33.0	32.1	31.4	22.5	18.4	14.2	32.2	22.3	24.8
Real GDP growth	2.0	2.0	2.1	1.9	1.9	2.0	2.1	1.9	1.9
11. Lower growth scenario (standard DSA)									
Gross public debt	33.0	32.4	32.0	24.4	20.7	16.7	32.5	24.2	26.2
Real GDP growth	2.0	1.0	1.1	0.9	0.9	1.0	1.4	0.9	1.0
12. Higher growth scenario (enhanced DSA)									
Gross public debt	33.0	32.2	31.4	22.6	18.5	14.3	32.2	22.4	24.8
Real GDP growth	2.0	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.9
13. Lower growth scenario (enhanced DSA)									
Gross public debt	33.0	32.4	31.9	24.4	20.6	16.7	32.4	24.1	26.2
Real GDP growth	2.0	1.1	1.3	0.9	0.9	1.0	1.5	0.9	1.0
14. Lower SPB scenario									
Gross public debt	33.0	32.8	33.2	29.6	27.3	24.8	33.0	29.3	30.2
Primary balance	2.9	0.5	-0.4	0.4	0.6	0.6	1.0	0.3	0.5
Structural primary balance (before CoA)	2.9	1.3	-0.2	-0.2	-0.2	-0.2	1.3	-0.2	0.2
Real GDP growth	2.0	2.1	1.8	1.4	1.4	1.5	2.0	1.4	1.5
15. Exchange rate depreciation scenario									
Gross public debt	33.0	32.3	31.7	23.5	19.5	15.4	32.3	23.2	25.5
Exchange rate depreciation	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	33.0	32.0	31.2	21.9	17.7	13.4	32.1	21.8	24.4
Implicit interest rate (nominal)	2.3	2.0	1.9	1.2	1.0	0.9	2.1	1.2	1.4
Real GDP growth	2.0	2.0	2.1	1.9	1.9	2.0	2.1	1.9	1.9
17. Adverse combined scenario (GDP & IR)									
Gross public debt	33.0	32.5	32.1	25.1	21.5	17.8	32.5	24.8	26.7
Implicit interest rate (nominal)	2.3	2.4	2.4	2.0	1.9	1.8	2.4	2.0	2.1
Real GDP growth	2.0	1.0	1.1	0.9	0.9	1.0	1.4	0.9	1.0

Germany

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

DE - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	65.3	61.9	59.2	56.8	55.0	52.9	50.8	48.6	46.7	45.0	43.5	42.1	40.9	39.8
Changes in the ratio (-1+2+3)	-3.9	-3.4	-2.7	-2.4	-1.7	-2.1	-2.1	-2.2	-1.9	-1.7	-1.5	-1.4	-1.3	-1.1
of which														
(1) Primary balance (1.1+1.2+1.3)	2.3	2.8	2.1	1.4	0.9	0.9	0.9	0.8	0.8	0.6	0.5	0.4	0.3	0.1
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.9	2.4	2.0	1.5	1.2	1.1	1.0	0.9	0.8	0.6	0.5	0.4	0.3	0.1
(1.1.1) Structural primary balance (bef. CoA)	1.9	2.4	2.0	1.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
(1.1.2) Cost of ageing						0.2	0.4	0.5	0.7	1.0	1.2	1.4	1.6	1.7
(1.1.3) Others (taxes and property incomes)						0.1	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.6
(1.2) Cyclical component	0.6	0.6	0.1	-0.1	-0.3	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	-0.2	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.3	-1.0	-0.6	-1.0	-0.8	-1.2	-1.2	-1.3	-1.1	-1.1	-1.0	-1.0	-1.0	-1.0
(2.1) Interest expenditure	1.1	0.9	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2
(2.2) Growth effect	-1.6	-1.0	-0.3	-0.6	-0.6	-0.8	-0.7	-0.7	-0.5	-0.4	-0.4	-0.3	-0.3	-0.3
(2.3) Inflation effect	-0.7	-1.0	-1.2	-1.2	-1.0	-1.0	-1.0	-1.0	-1.0	-0.9	-0.9	-0.9	-0.8	-0.8
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-0.3	0.5	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	-0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	0.9	1.4	1.1	0.7	0.5	0.6	0.5	0.5	0.5	0.3	0.2	0.2	0.1	-0.1



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.1)	LOW	LOW (S1 = -2.4)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 2.2)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			39.8	36.2	42.2	42.4	43.0				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			35.0%	30.0%							
Probability debt higher							4.6%				
Dif. between percentiles							15.2				

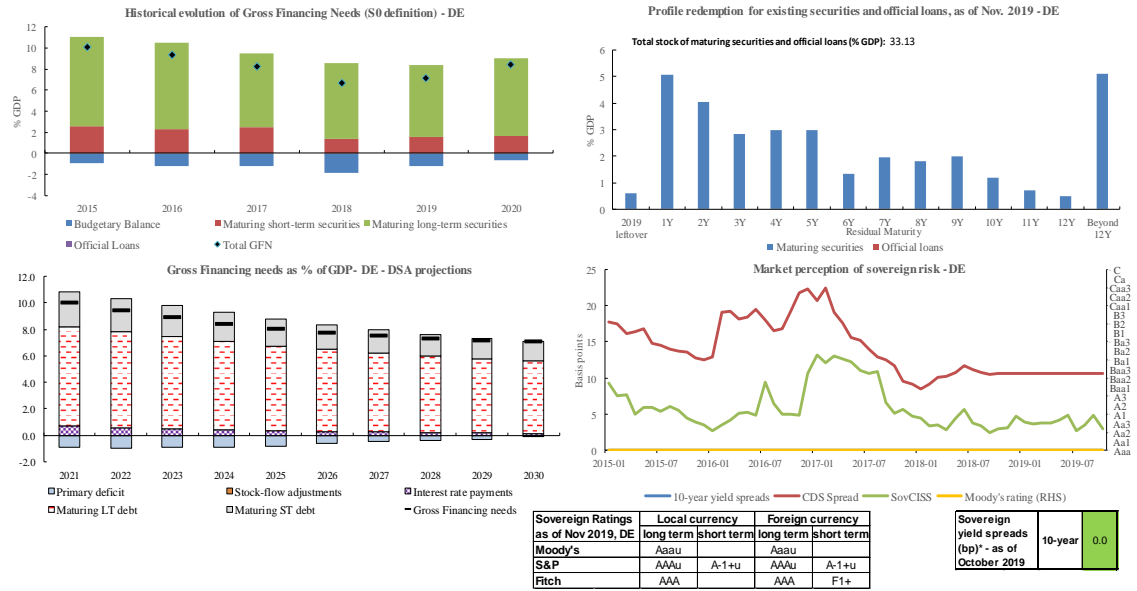
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.19	0.08	0.46	
Fiscal sub-index	0.35	0.00	0.36	
Financial competitiveness sub-index	0.10	0.12	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-2.0	-2.4	-3.1	-2.1
of which Gap to the debt-stabilizing primary balance	-2.3	-2.9	-3.2	-2.9
Cost of delaying adjustment	-0.3	-0.3	-0.4	-0.3
Debt requirement	-0.5	-0.4	-1.3	-0.4
Ageing costs	1.1	1.2	1.8	1.5
Required structural primary balance related to S1	-0.1	-1.2	-1.3	-0.8

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	1.7	2.2	1.7	3.8	2.7	3.2	2.2
of which Initial Budgetary position	-1.2	-0.8	-1.4	-0.7	-0.7	-0.7	-0.6
Ageing costs	2.9	3.0	3.1	4.5	3.4	3.9	2.8
of which Pensions	1.4	1.5	1.5	1.4	1.5	1.7	1.4
Health care	0.5	0.5	0.5	1.0	0.5	0.5	0.5
Long-term care	0.4	0.4	0.4	1.4	0.8	1.1	0.3
Others	0.6	0.6	0.7	0.6	0.6	0.6	0.6
Required structural primary balance related to S2	3.6	3.5	3.5	5.0	3.9	4.4	3.4

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

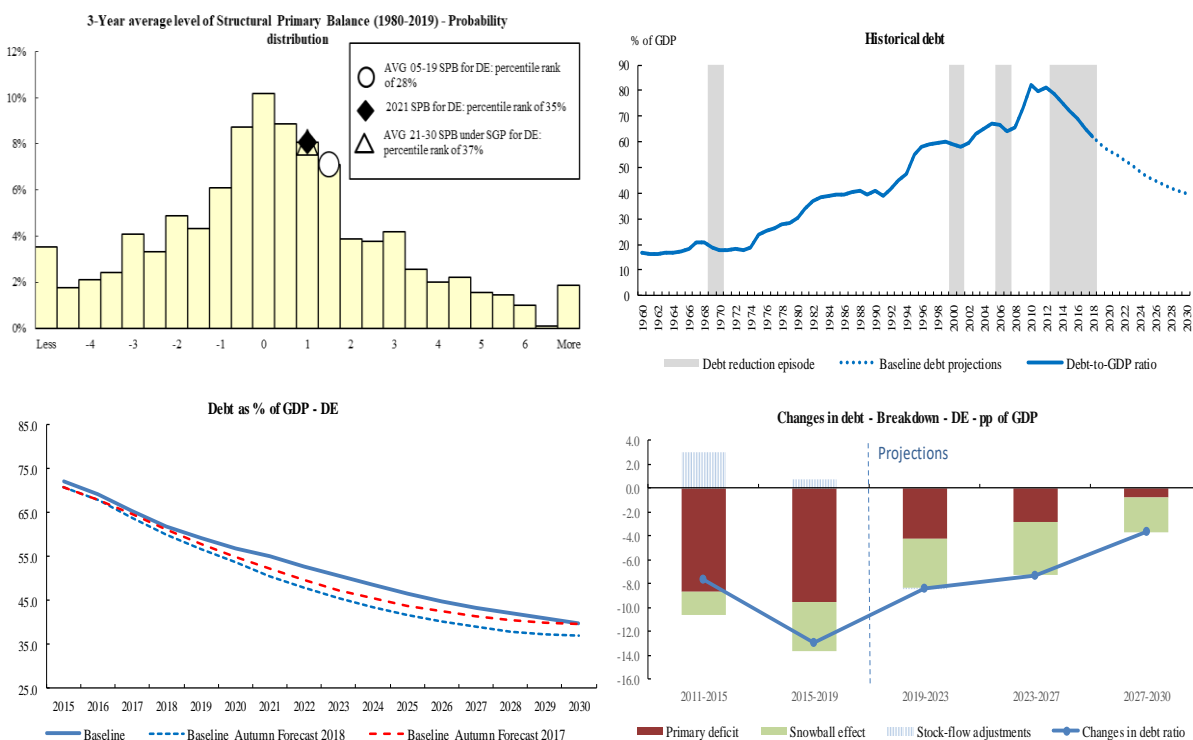
Public debt structure - DE (2018)	Share of short-term government debt (p.p.): 6.7	Share of government debt in foreign currency (%): 4.0	Share of government debt by non-residents (%): 47.7	Net International Investment Position (IIP) - DE (2018)	Net IIP (% GDP): 62.0
--	---	---	---	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		DE					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		18.7	16.7	15.2	14.2	13.3	6.3
of which	One-off guarantees	18.7	16.7	15.2	14.2	13.3	5.8
	Standardised guarantees	:	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		:	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	1.6	0.6	0.3	0.2	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	2.3	1.3	0.7	0.3	0.1	0.8

Government's contingent liability risks from banking sector - DE (2018)	Private sector credit flow (% GDP): 6.5	Change in nominal house price index: 6.7	Bank loans-to-deposits ratio (p.p.): 132.6	Share of non-performing loans (%): 1.3	Change in share of non-performing loans (p.p.): -0.4	NPL coverage ratio 39.3	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.6%

6. Realism of baseline assumptions

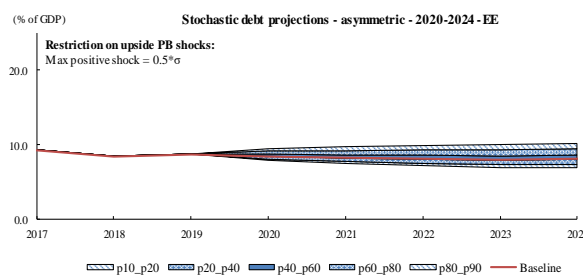
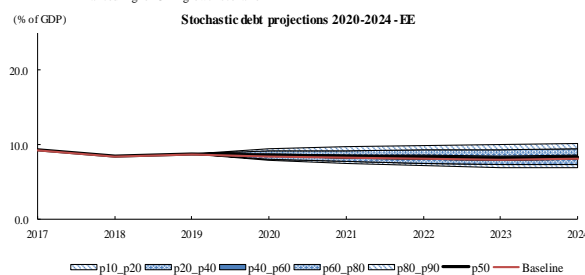
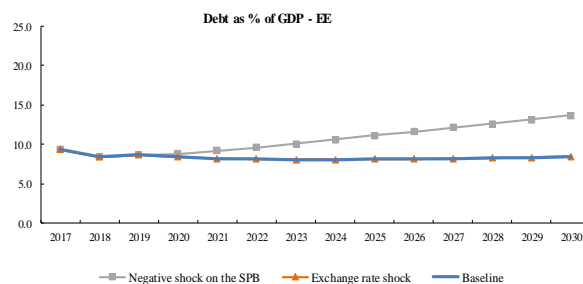
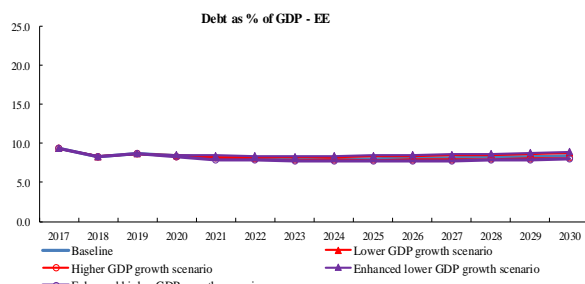
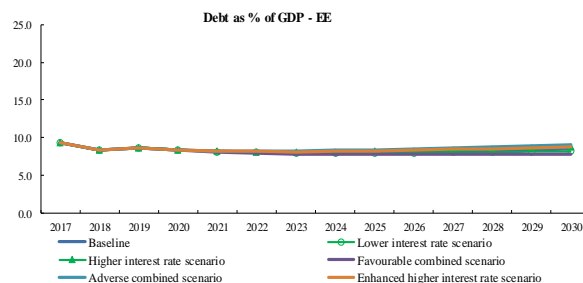
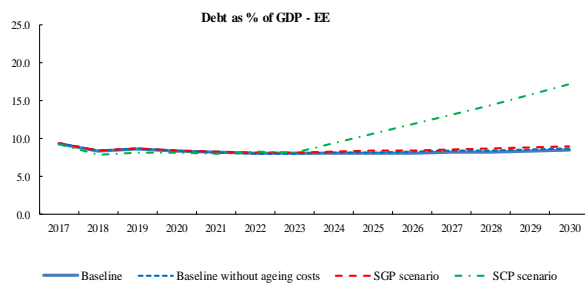
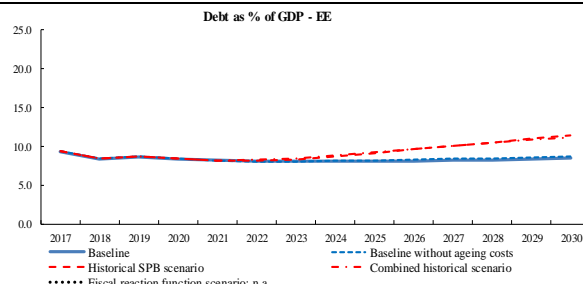
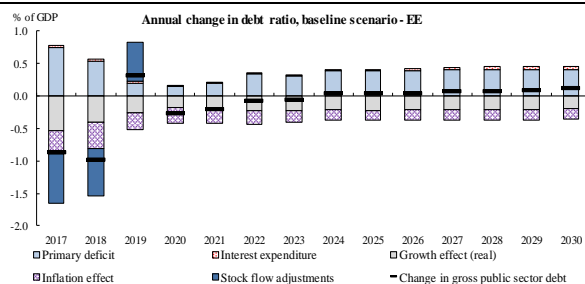


7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Germany									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	59.2	56.8	55.0	45.0	42.1	39.8	57.0	45.6	48.4
Primary balance	2.1	1.4	0.9	0.6	0.4	0.1	1.5	0.6	0.8
Structural primary balance (before CoA)	2.0	1.5	1.2	1.2	1.2	1.2	1.6	1.2	1.3
Real GDP growth	0.4	1.0	1.0	1.0	0.8	0.9	0.8	1.1	1.0
Potential GDP growth	1.4	1.4	1.4	1.0	0.8	0.9	1.4	1.0	1.1
Inflation rate	2.0	2.0	1.7	2.0	2.0	2.0	1.9	2.0	2.0
Implicit interest rate (nominal)	1.4	1.4	1.3	0.6	0.5	0.4	1.4	0.7	0.9
2. Fiscal reaction function scenario									
Gross public debt	59.2	56.8	55.0	42.2	37.5	33.1	57.0	42.5	46.1
Primary balance	2.1	1.4	0.9	1.5	1.4	1.4	1.5	1.5	1.5
Structural primary balance (before CoA)	2.0	1.5	1.2	2.1	2.3	2.5	1.6	2.1	2.0
Real GDP growth	0.4	1.0	1.0	0.8	0.7	0.7	0.8	1.0	0.9
3. SGP scenario									
Gross public debt	59.2	56.8	54.9	43.5	39.7	36.0	56.9	43.9	47.1
Primary balance	2.1	1.4	1.2	1.0	0.9	0.9	1.5	1.0	1.2
Structural primary balance	2.0	1.5	1.5	1.0	0.9	0.9	1.6	1.1	1.2
Real GDP growth	0.4	1.0	0.9	1.0	0.8	0.9	0.8	1.1	1.0
4. SCP scenario									
Gross public debt	58.6	56.5	54.8	46.7	45.5	45.1	56.6	47.8	50.0
Primary balance	1.7	1.5	1.2	1.0	0.7	0.4	1.5	1.0	1.1
Structural primary balance (before CoA)	1.7	1.4	1.2	1.4	1.4	1.4	1.4	1.4	1.4
Real GDP growth	1.0	1.6	1.1	0.8	0.6	0.9	1.2	0.9	1.0
Potential GDP growth	1.5	1.5	1.4	0.8	0.6	0.9	1.4	0.9	1.0
Inflation rate	2.1	2.0	1.8	2.0	2.0	2.0	2.0	2.0	2.0
Implicit interest rate (nominal)	1.4	1.4	1.4	2.5	3.2	3.7	1.4	2.5	2.2
5. Historical SPB scenario									
Gross public debt	59.2	56.8	55.0	43.3	39.4	36.2	57.0	43.8	47.1
Primary balance	2.1	1.4	0.9	1.2	0.9	0.6	1.5	1.1	1.2
Structural primary balance (before CoA)	2.0	1.5	1.2	1.8	1.8	1.8	1.6	1.7	1.7
Real GDP growth	0.4	1.0	1.0	1.0	0.8	0.9	0.8	1.0	1.0
6. Combined historical scenario									
Gross public debt	59.2	56.8	55.0	44.7	41.8	39.7	57.0	45.5	48.3
Primary balance	2.1	1.4	0.9	1.2	0.9	0.6	1.5	1.1	1.2
Structural primary balance (before CoA)	2.0	1.5	1.2	1.8	1.8	1.8	1.6	1.7	1.7
Real GDP growth	0.4	1.0	1.0	1.3	1.3	1.3	0.8	1.2	1.1
Implicit interest rate (nominal)	1.4	1.4	1.3	2.0	2.3	2.7	1.4	1.9	1.8
7. Higher IR scenario (standard DSA)									
Gross public debt	59.2	56.9	55.3	46.5	44.2	42.4	57.1	47.1	49.6
Implicit interest rate (nominal)	1.4	1.5	1.6	1.3	1.2	1.2	1.5	1.3	1.4
8. Lower IR scenario (standard DSA)									
Gross public debt	59.2	56.7	54.8	43.6	40.2	37.4	56.9	44.2	47.3
Implicit interest rate (nominal)	1.4	1.2	1.0	0.0	-0.2	-0.4	1.2	0.1	0.4
9. Higher IR scenario (enhanced DSA)									
Gross public debt	59.2	57.0	55.5	47.3	45.2	43.5	57.2	47.9	50.2
Implicit interest rate (nominal)	1.4	1.7	1.9	1.5	1.4	1.3	1.7	1.5	1.6
10. Higher growth scenario (standard DSA)									
Gross public debt	59.2	56.5	54.5	43.3	40.2	37.6	56.7	44.0	47.2
Real GDP growth	0.4	1.5	1.5	1.5	1.3	1.4	1.2	1.6	1.5
11. Lower growth scenario (standard DSA)									
Gross public debt	59.2	57.1	55.6	46.7	44.2	42.2	57.3	47.2	49.7
Real GDP growth	0.4	0.5	0.5	0.5	0.3	0.4	0.5	0.6	0.5
12. Higher growth scenario (enhanced DSA)									
Gross public debt	59.2	56.3	54.2	43.1	39.9	37.3	56.5	43.7	46.9
Real GDP growth	0.4	1.8	1.8	1.5	1.3	1.4	1.3	1.6	1.5
13. Lower growth scenario (enhanced DSA)									
Gross public debt	59.2	57.2	55.9	47.0	44.5	42.5	57.4	47.5	50.0
Real GDP growth	0.4	0.2	0.2	0.5	0.3	0.4	0.3	0.6	0.5
14. Lower SPB scenario									
Gross public debt	59.2	56.8	55.3	47.0	44.7	43.0	57.1	47.5	49.9
Primary balance	2.1	1.3	0.6	0.2	0.0	-0.3	1.3	0.2	0.5
Structural primary balance (before CoA)	2.0	1.4	0.9	0.9	0.9	0.9	1.4	0.9	1.0
Real GDP growth	0.4	1.1	1.2	1.0	0.8	0.9	0.9	1.1	1.0
15. Exchange rate depreciation scenario									
Gross public debt	59.2	57.1	55.7	45.6	42.7	40.3	57.3	46.1	48.9
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	59.2	56.4	54.2	42.0	38.3	35.3	56.6	42.6	46.1
Implicit interest rate (nominal)	1.4	1.2	1.0	0.0	-0.2	-0.4	1.2	0.1	0.4
Real GDP growth	0.4	1.5	1.5	1.5	1.3	1.4	1.2	1.6	1.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	59.2	57.2	55.9	48.2	46.3	45.0	57.4	48.8	51.0
Implicit interest rate (nominal)	1.4	1.5	1.6	1.3	1.2	1.2	1.5	1.3	1.4
Real GDP growth	0.4	0.5	0.5	0.5	0.3	0.4	0.5	0.6	0.5

Estonia

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests																
EE - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Gross debt ratio	9.3	8.4	8.7	8.4	8.2	8.1	8.0	8.1	8.1	8.1	8.2	8.3	8.3	8.4		
Changes in the ratio (-1+2+3) of which	-0.9	-1.0	0.3	-0.3	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
(1) Primary balance (1.1+1.2+1.3)	-0.7	-0.5	-0.2	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-1.8	-2.2	-1.6	-0.9	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		
(1.1.1) Structural primary balance (bef. CoA)	-1.8	-2.2	-1.6	-0.9	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		
(1.1.2) Cost of ageing						0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0		
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(1.2) Cyclical component	1.1	1.7	1.4	0.7	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.9	-0.8	-0.5	-0.4	-0.4	-0.4	-0.4	-0.3	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3		
(2.1) Interest expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(2.2) Growth effect	-0.5	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2		
(2.3) Inflation effect	-0.4	-0.4	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2		
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(3) Stock-flow adjustments	-0.8	-0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(3.1) Base	-0.8	-0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Pro memoria																
Structural balance	-1.8	-2.2	-1.6	-0.9	-0.5	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5		



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -5.3)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = 0.8)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			8.4	11.4	8.8	8.7	13.6				
Debt peak year			2019	2030	2030	2030	2030				
Percentile rank			66.0%	70.0%							
Probability debt higher								37.4%			
Dif. between percentiles								3.3			

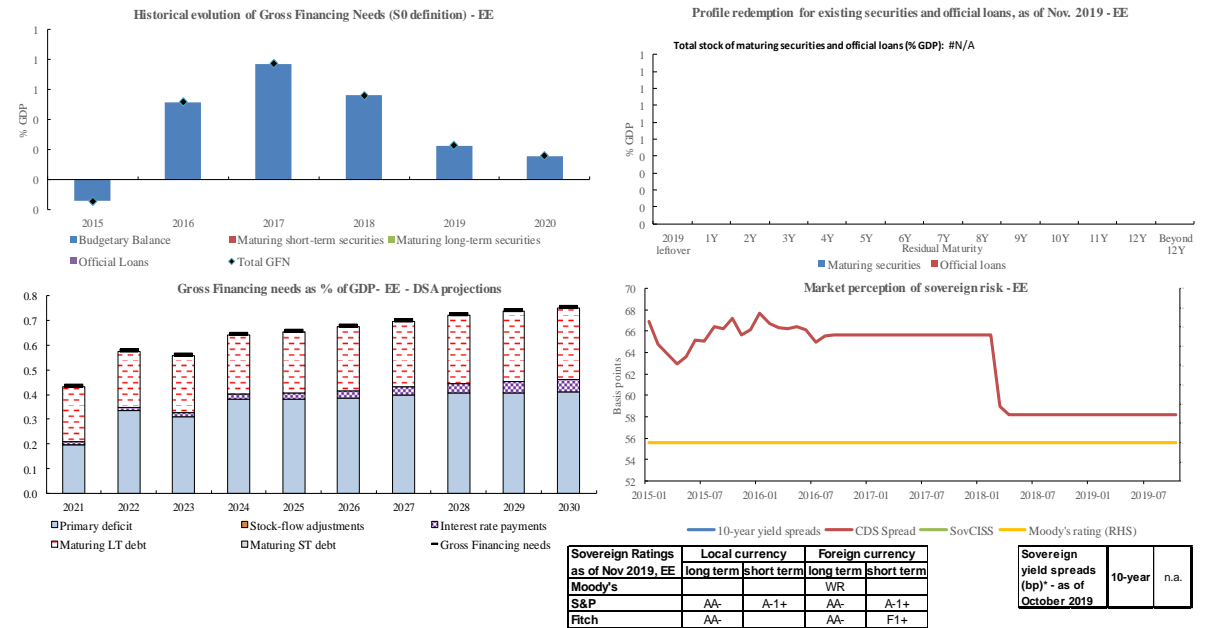
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.48	0.20	0.46	
Fiscal sub-index	0.27	0.09	0.36	
Financial competitiveness sub-index	0.57	0.25	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-4.3	-5.3	-4.4	-4.9
of which <i>Gap to the debt-stabilizing primary balance</i>	0.7	0.1	0.6	0.1
<i>Cost of delaying adjustment</i>	-0.6	-0.7	-0.6	-0.6
<i>Debt requirement</i>	-4.1	-4.8	-4.4	-4.8
<i>Ageing costs</i>	-0.3	0.0	0.0	0.3
Required structural primary balance related to S1	-5.1	-5.8	-5.3	-5.4

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	0.9	0.8	1.2	2.9	0.9	1.1	0.8
of which <i>Initial Budgetary position</i>	1.0	0.5	1.0	0.6	0.6	0.5	0.6
<i>Ageing costs</i>	0.0	0.2	0.2	2.4	0.3	0.6	0.2
of which <i>Pensions</i>	-1.0	-0.8	-0.9	-0.8	-0.6	-0.5	-0.7
<i>Health care</i>	0.3	0.3	0.4	0.9	0.3	0.3	0.3
<i>Long-term care</i>	0.3	0.3	0.4	1.9	0.3	0.4	0.3
<i>Others</i>	0.3	0.4	0.4	0.4	0.3	0.4	0.3
Required structural primary balance related to S2	0.1	0.3	0.3	2.5	0.5	0.7	0.4

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

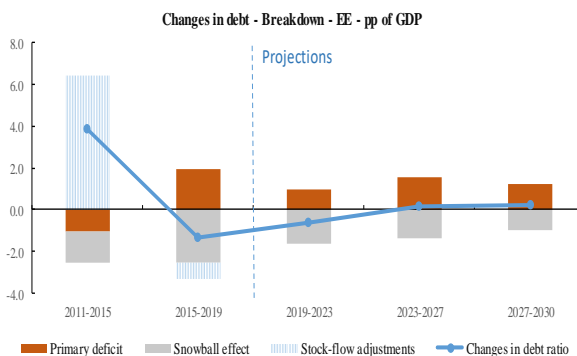
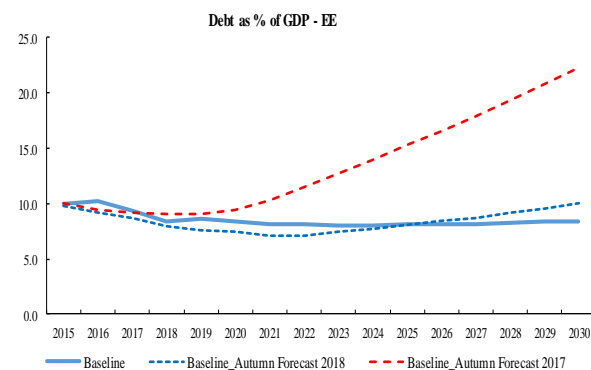
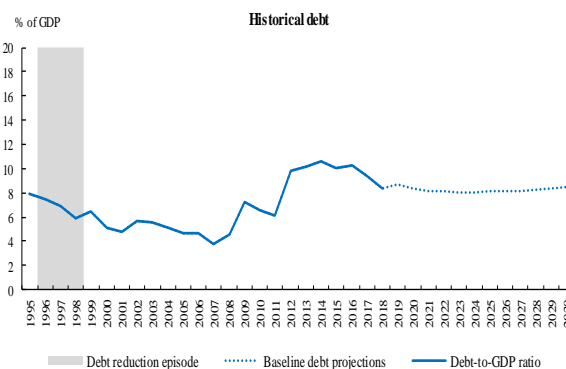
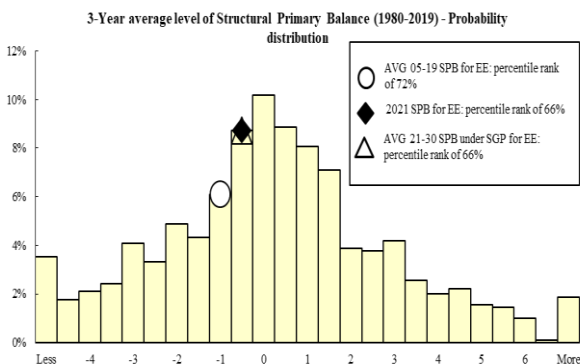
Public debt structure - EE (2018)	Share of short-term government debt (p.p.): 2.8	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents 57.2	Net International Investment Position (IIP) - EE (2018)	Net IIP (% GDP): -27.7
-----------------------------------	--	--	--	---	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		EE					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		2.2	1.7	1.5	1.5	1.4	6.3
of which	One-off guarantees	0.0	0.0	0.0	0.0	0.0	5.8
	Standardised guarantees	2.2	1.7	1.5	1.5	1.4	0.4
Public-private partnerships (PPPs) (% GDP)		:	0.2	0.2	0.2	0.1	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	n.a.	n.a.	n.a.	n.a.	n.a.	0.7
	Securities issued under liquidity schemes	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
	Special purpose entity	n.a.	n.a.	n.a.	n.a.	n.a.	0.1
	Total	n.a.	n.a.	n.a.	n.a.	n.a.	0.8

Government's contingent liability risks from banking sector - EE (2018)	Private sector credit flow (% GDP): 3.7	Change in nominal house price index: 5.9	Bank loans-to-deposits ratio (p.p.): 121.4	Share of non-performing loans (%): 1.8	Change in share of non-performing loans (p.p.): 0.3	NPL coverage ratio 28.4	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.0%

6. Realism of baseline assumptions



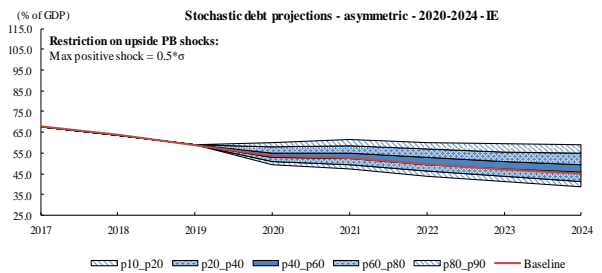
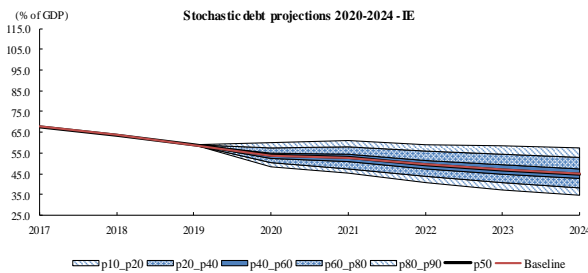
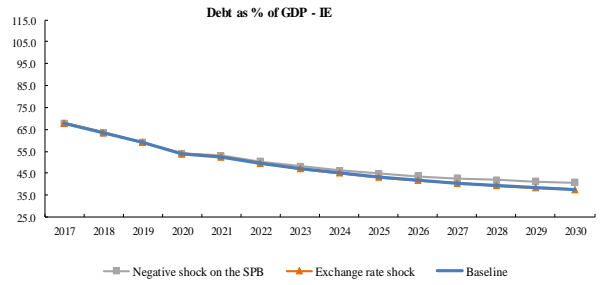
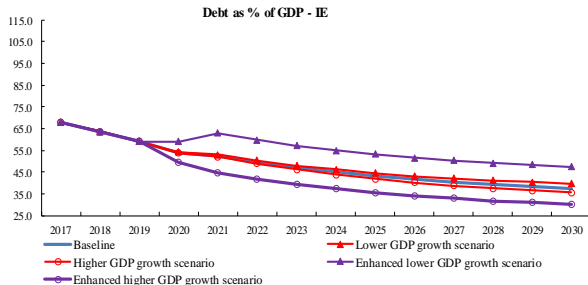
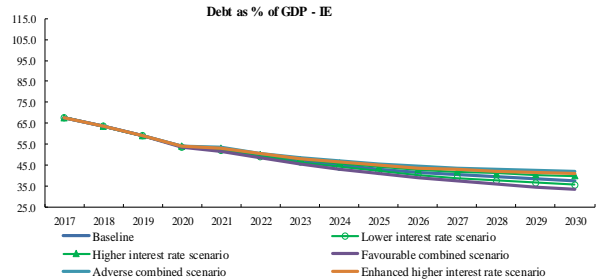
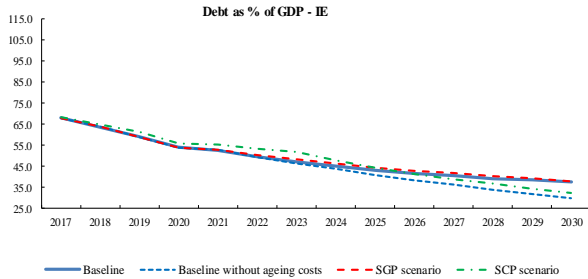
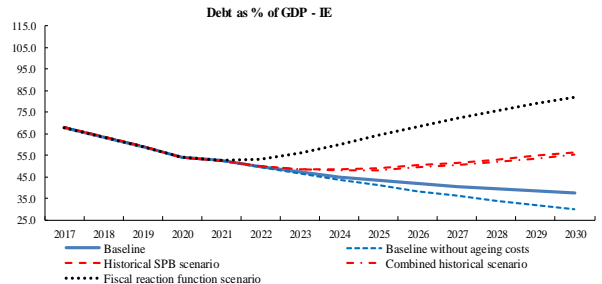
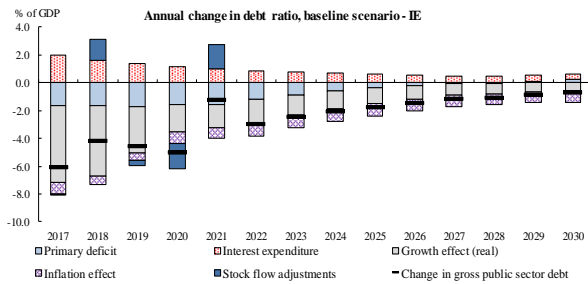
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Estonia									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	8.7	8.4	8.2	8.1	8.3	8.4	8.4	8.2	8.2
Primary balance	-0.2	-0.1	-0.2	-0.4	-0.4	-0.4	-0.2	-0.4	-0.3
Structural primary balance (before CoA)	-1.6	-0.9	-0.4	-0.4	-0.4	-0.4	-1.0	-0.4	-0.6
Real GDP growth	3.2	2.1	2.4	2.8	2.7	2.4	2.6	2.8	2.7
Potential GDP growth	3.8	3.5	3.4	2.8	2.7	2.4	3.6	2.8	3.0
Inflation rate	3.4	3.0	2.7	2.0	2.0	2.0	3.0	2.1	2.3
Implicit interest rate (nominal)	0.3	0.1	0.2	0.4	0.5	0.6	0.2	0.4	0.4
2. Fiscal reaction function scenario									
Gross public debt	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Primary balance	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Structural primary balance (before CoA)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Real GDP growth	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
3. SGP scenario									
Gross public debt	8.7	8.4	8.2	8.5	8.7	8.9	8.4	8.5	8.5
Primary balance	-0.2	-0.1	-0.2	-0.5	-0.5	-0.4	-0.2	-0.4	-0.4
Structural primary balance (before CoA)	-1.6	-0.9	-0.5	-0.5	-0.5	-0.4	-1.0	-0.5	-0.6
Real GDP growth	3.2	2.1	2.4	2.8	2.7	2.4	2.6	2.8	2.7
4. SCP scenario									
Gross public debt	8.2	8.1	8.0	11.8	14.4	17.2	8.1	12.1	11.1
Primary balance	-0.1	-0.3	-0.4	-1.4	-1.5	-1.5	-0.3	-1.2	-1.0
Structural primary balance (before CoA)	-1.5	-1.6	-1.7	-1.4	-1.4	-1.4	-1.6	-1.5	-1.5
Real GDP growth	3.1	2.7	2.7	2.3	2.3	1.9	2.8	2.3	2.4
Potential GDP growth	3.6	3.3	3.1	2.3	2.3	1.9	3.3	2.4	2.6
Inflation rate	2.8	2.7	2.6	2.0	2.0	2.0	2.7	2.1	2.2
Implicit interest rate (nominal)	0.4	0.5	0.7	2.3	3.2	3.7	0.5	2.3	1.9
5. Historical SPB scenario									
Gross public debt	8.7	8.4	8.2	9.6	10.5	11.4	8.4	9.7	9.3
Primary balance	-0.2	-0.1	-0.2	-0.8	-0.9	-0.9	-0.2	-0.8	-0.6
Structural primary balance (before CoA)	-1.6	-0.9	-0.4	-0.9	-0.9	-0.9	-1.0	-0.8	-0.9
Real GDP growth	3.2	2.1	2.4	2.8	2.7	2.4	2.6	2.8	2.8
6. Combined historical scenario									
Gross public debt	8.7	8.4	8.2	9.6	10.4	11.2	8.4	9.6	9.3
Primary balance	-0.2	-0.1	-0.2	-0.8	-0.9	-0.9	-0.2	-0.8	-0.6
Structural primary balance (before CoA)	-1.6	-0.9	-0.4	-0.9	-0.9	-0.9	-1.0	-0.8	-0.9
Real GDP growth	3.2	2.1	2.4	2.7	2.7	2.7	2.6	2.7	2.7
Implicit interest rate (nominal)	0.3	0.1	0.2	0.1	0.0	-0.1	0.2	0.1	0.1
7. Higher IR scenario (standard DSA)									
Gross public debt	8.7	8.4	8.2	8.3	8.5	8.7	8.4	8.3	8.3
Implicit interest rate (nominal)	0.3	0.3	0.3	0.8	1.0	1.3	0.3	0.8	0.7
8. Lower IR scenario (standard DSA)									
Gross public debt	8.7	8.4	8.2	8.0	8.1	8.2	8.4	8.0	8.1
Implicit interest rate (nominal)	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
9. Higher IR scenario (enhanced DSA)									
Gross public debt	8.7	8.4	8.2	8.3	8.6	8.8	8.4	8.4	8.4
Implicit interest rate (nominal)	0.3	0.4	0.5	1.0	1.2	1.4	0.4	1.0	0.8
10. Higher growth scenario (standard DSA)									
Gross public debt	8.7	8.3	8.1	7.9	8.0	8.1	8.4	8.0	8.1
Real GDP growth	3.2	2.6	2.9	3.3	3.2	2.9	2.9	3.3	3.2
11. Lower growth scenario (standard DSA)									
Gross public debt	8.7	8.4	8.3	8.4	8.5	8.8	8.4	8.4	8.4
Real GDP growth	3.2	1.6	1.9	2.3	2.2	1.9	2.3	2.3	2.3
12. Higher growth scenario (enhanced DSA)									
Gross public debt	8.7	8.3	7.9	7.8	7.9	8.0	8.3	7.8	7.9
Real GDP growth	3.2	3.7	4.0	3.3	3.2	2.9	3.7	3.3	3.4
13. Lower growth scenario (enhanced DSA)									
Gross public debt	8.7	8.5	8.4	8.5	8.7	8.9	8.5	8.6	8.5
Real GDP growth	3.2	0.6	0.8	2.3	2.2	1.9	1.5	2.3	2.1
14. Lower SPB scenario									
Gross public debt	8.7	8.8	9.1	11.6	12.6	13.6	8.9	11.6	10.9
Primary balance	-0.2	-0.6	-0.8	-1.0	-1.0	-1.0	-0.5	-1.0	-0.8
Structural primary balance (before CoA)	-1.6	-1.3	-1.0	-1.0	-1.0	-1.0	-1.3	-1.0	-1.1
Real GDP growth	3.2	2.5	2.5	2.8	2.7	2.4	2.7	2.8	2.8
15. Exchange rate depreciation scenario									
Gross public debt	8.7	8.4	8.2	8.1	8.3	8.4	8.4	8.2	8.2
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	8.7	8.3	8.1	7.8	7.8	7.8	8.4	7.8	7.9
Implicit interest rate (nominal)	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Real GDP growth	3.2	2.6	2.9	3.3	3.2	2.9	2.9	3.3	3.2
17. Adverse combined scenario (GDP & IR)									
Gross public debt	8.7	8.4	8.3	8.5	8.8	9.1	8.5	8.6	8.5
Implicit interest rate (nominal)	0.3	0.3	0.3	0.8	1.0	1.3	0.3	0.8	0.7
Real GDP growth	3.2	1.6	1.9	2.3	2.2	1.9	2.3	2.3	2.3

Ireland

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

IE - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	67.8	63.6	59.0	53.9	52.6	49.6	47.1	45.0	43.1	41.7	40.4	39.3	38.4	37.6
Changes in the ratio (-1+2+3) of which	-6.1	-4.2	-4.6	-5.1	-1.3	-3.0	-2.5	-2.1	-1.8	-1.5	-1.2	-1.1	-0.9	-0.8
(1) Primary balance (1.1+1.2+1.3)	1.7	1.7	1.7	1.5	1.6	1.2	0.9	0.6	0.4	0.2	0.1	0.1	-0.1	-0.2
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.6	1.0	0.5	0.8	1.3	1.0	0.8	0.6	0.4	0.2	0.1	0.1	-0.1	-0.2
(1.1.1) Structural primary balance (bef. CoA)	0.6	1.0	0.5	0.8	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
(1.1.2) Cost of ageing						0.2	0.5	0.7	0.9	1.1	1.2	1.2	1.4	1.5
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.8	0.7	1.2	0.8	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-4.4	-4.0	-2.5	-1.7	-1.5	-1.8	-1.6	-1.5	-1.4	-1.3	-1.2	-1.1	-1.0	-1.0
(2.1) Interest expenditure	2.0	1.6	1.4	1.1	1.0	0.8	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.4
(2.2) Growth effect	-5.5	-5.1	-3.4	-2.0	-1.7	-1.8	-1.4	-1.2	-1.1	-1.0	-0.8	-0.7	-0.7	-0.7
(2.3) Inflation effect	-0.8	-0.6	-0.5	-0.9	-0.8	-0.9	-0.9	-0.9	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-0.1	1.5	-0.4	-1.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-0.1	1.5	-0.4	-1.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-1.4	-0.6	-0.8	-0.3	0.3	0.2	0.1	-0.1	-0.2	-0.3	-0.4	-0.4	-0.5	-0.6



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.1)	LOW	LOW (S1 = -2.6)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 2.9)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			37.6	56.2	39.8	39.9	40.8				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			34.0%	72.0%							
Probability debt higher									7.7%		
Dif. between percentiles									22.9		

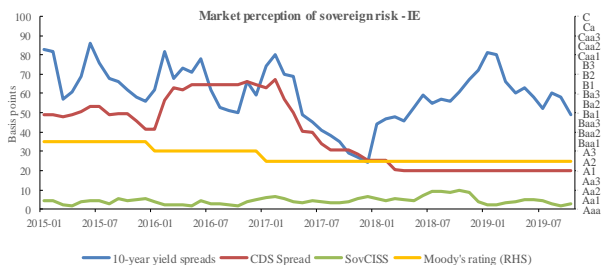
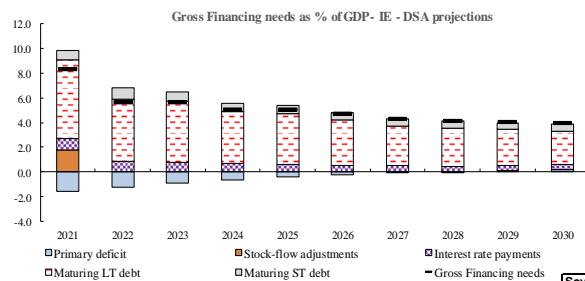
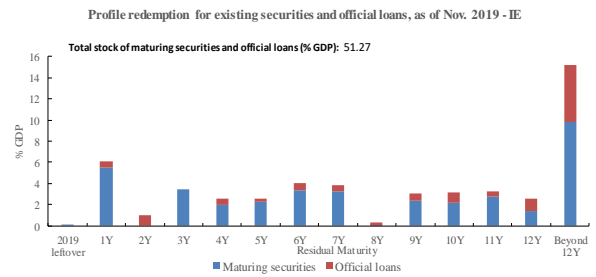
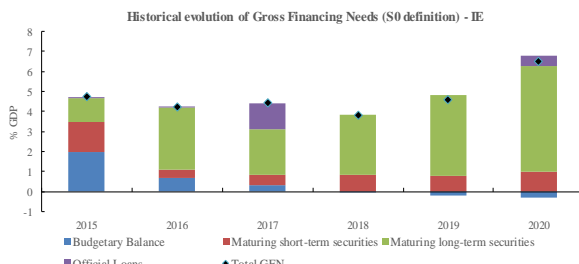
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.74	0.14	0.46
Fiscal sub-index	0.81	0.00	0.36
Financial competitiveness sub-index	0.70	0.21	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-0.9	-2.6	1.4	-2.3
of which Gap to the debt-stabilizing primary balance	-1.6	-2.9	0.4	-2.9
Cost of delaying adjustment	-0.1	-0.3	0.2	-0.3
Debt requirement	-0.3	-0.7	-1.0	-0.7
Ageing costs	1.1	1.3	1.8	1.5
Required structural primary balance related to S1	0.1	-1.3	-0.2	-1.0

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	3.3	2.9	5.8	4.4	2.9	3.4	2.8
of which Initial Budgetary position	-0.6	-1.0	1.9	-1.0	-0.9	-1.0	-0.8
Ageing costs	3.8	3.9	4.0	5.4	3.8	4.4	3.6
of which Pensions	1.5	1.6	1.6	1.6	1.5	1.8	1.6
Health care	0.8	0.8	0.8	1.2	0.8	0.8	0.7
Long-term care	1.6	1.6	1.6	2.7	1.5	1.8	1.4
Others	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0
Required structural primary balance related to S2	4.3	4.2	4.3	5.7	4.2	4.7	4.1

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, IE	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	A2	A-1	A2	P-1
S&P	A+	A-1	A+	A-1
Fitch	A+	A+	A+	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	49.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

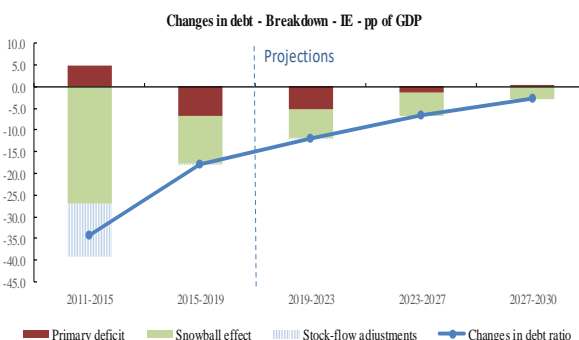
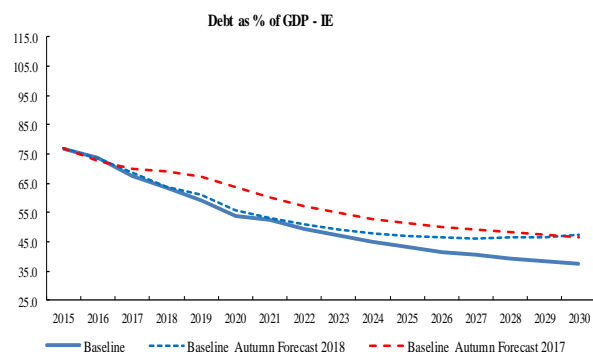
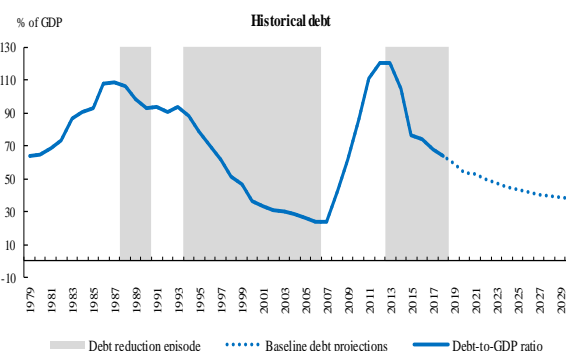
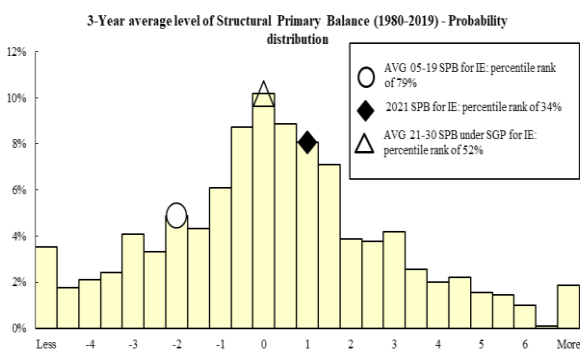
Public debt structure - IE (2018)	Share of short-term government debt (p.p.): 7.1	Share of government debt in foreign currency (%): 1.7	Share of government debt by non-residents 59.7	Net International Investment Position (IIP) - IE (2018)	Net IIP (% GDP): -165.0
--	---	---	--	--	-----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		IE					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		79.8	31.1	4.8	1.9	0.5	6.3
of which	One-off guarantees	79.8	31.1	4.8	1.9	0.5	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		:	0.7	0.6	0.7	0.8	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	63.4	17.7	1.2	0.1	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	17.0	12.7	3.1	0.0	0.0	0.1
	Total	80.4	30.5	4.3	0.1	0.0	0.8

Government's contingent liability risks from banking sector - IE (2018)	Private sector credit flow (% GDP): -7.8	Change in nominal house price index: 10.2	Bank loans-to-deposits ratio (p.p.): 99.0	Share of non-performing loans (%): 4.6	Change in share of non-performing loans (p.p.): -2.5	NPL coverage ratio 27.2	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.1% Stress 3.3%

6. Realism of baseline assumptions



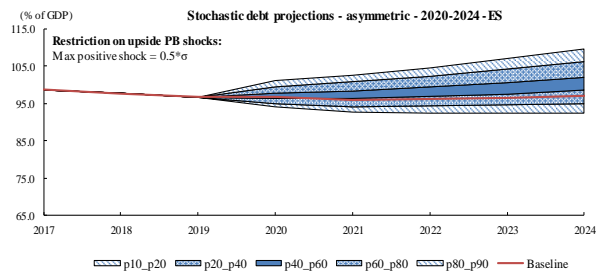
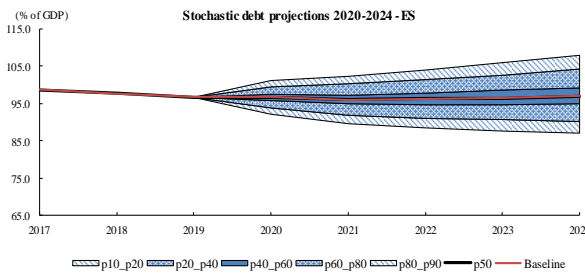
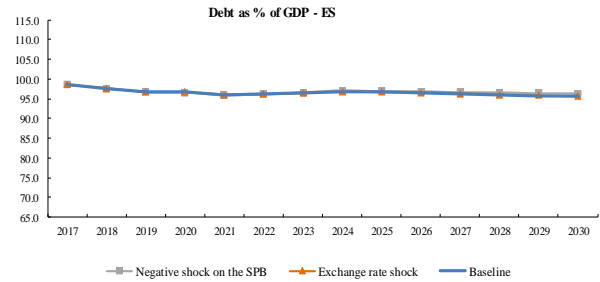
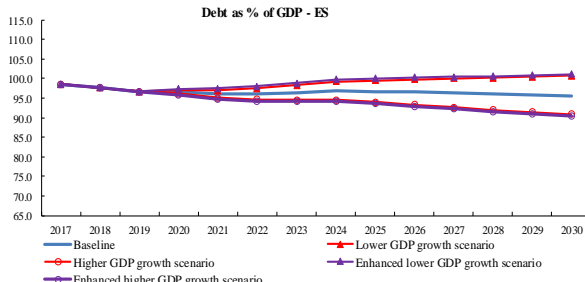
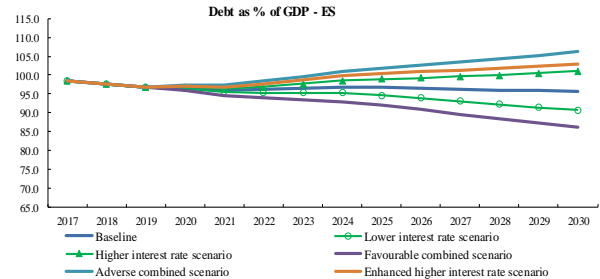
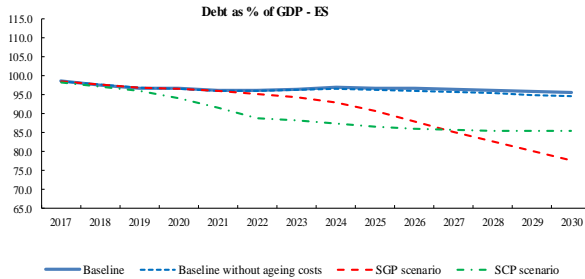
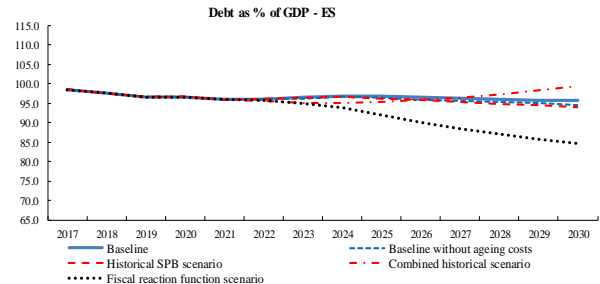
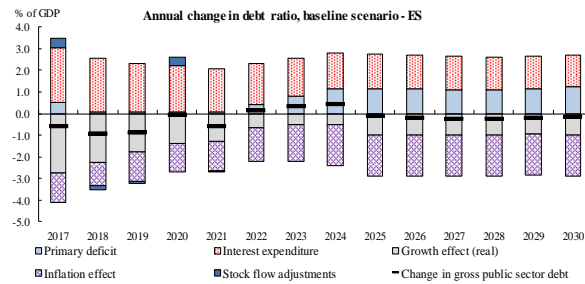
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Ireland									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	59.0	53.9	52.6	41.7	39.3	37.6	55.2	42.5	45.6
Primary balance	1.7	1.5	1.6	0.2	0.1	-0.2	1.6	0.4	0.7
Structural primary balance (before CoA)	0.5	0.8	1.3	1.3	1.3	1.3	0.9	1.3	1.2
Real GDP growth	5.6	3.5	3.2	2.3	1.9	1.8	4.1	2.4	2.9
Potential GDP growth	4.8	4.3	4.2	2.3	1.9	1.8	4.4	2.5	3.0
Inflation rate	0.8	1.5	1.5	2.0	2.0	2.0	1.3	1.9	1.8
Implicit interest rate (nominal)	2.3	2.0	1.9	1.3	1.2	1.2	2.1	1.4	1.5
2. Fiscal reaction function scenario									
Gross public debt	59.0	53.9	52.6	68.2	75.7	81.9	55.2	67.8	64.6
Primary balance	1.7	1.5	1.6	-6.0	-5.5	-4.8	1.6	-5.4	-3.6
Structural primary balance (before CoA)	0.5	0.8	1.3	-4.9	-4.2	-3.3	0.9	-4.5	-3.1
Real GDP growth	5.6	3.5	3.2	2.1	1.7	1.4	4.1	2.8	3.1
3. SGP scenario									
Gross public debt	59.0	53.9	53.0	43.0	40.4	38.1	55.3	43.6	46.5
Primary balance	1.7	1.5	0.9	0.2	0.2	0.1	1.4	0.3	0.6
Structural primary balance	0.5	0.8	0.6	0.2	0.2	0.1	0.7	0.3	0.4
Real GDP growth	5.6	3.5	3.7	2.4	1.9	1.8	4.3	2.5	2.9
4. SCP scenario									
Gross public debt	61.1	55.8	55.4	41.5	36.7	32.5	57.4	42.3	46.1
Primary balance	1.6	1.6	1.8	2.3	2.1	1.9	1.7	2.3	2.1
Structural primary balance (before CoA)	0.4	0.7	1.5	2.9	2.9	2.9	0.9	2.8	2.3
Real GDP growth	3.9	3.3	2.4	2.2	1.5	1.7	3.2	2.1	2.4
Potential GDP growth	4.7	4.4	3.5	2.2	1.5	1.7	4.2	2.3	2.8
Inflation rate	1.5	1.7	1.7	2.0	2.0	2.0	1.6	1.9	1.8
Implicit interest rate (nominal)	2.3	2.1	2.1	2.8	3.1	3.3	2.2	2.8	2.6
5. Historical SPB scenario									
Gross public debt	59.0	53.9	52.6	50.3	53.0	56.2	55.2	51.3	52.3
Primary balance	1.7	1.5	1.6	-2.7	-2.8	-3.1	1.6	-2.0	-1.1
Structural primary balance (before CoA)	0.5	0.8	1.3	-1.6	-1.6	-1.6	0.9	-1.1	-0.6
Real GDP growth	5.6	3.5	3.2	2.3	1.9	1.8	4.1	2.7	3.0
6. Combined historical scenario									
Gross public debt	59.0	53.9	52.6	49.2	51.9	55.4	55.2	50.6	51.7
Primary balance	1.7	1.5	1.6	-2.7	-2.8	-3.1	1.6	-2.0	-1.1
Structural primary balance (before CoA)	0.5	0.8	1.3	-1.6	-1.6	-1.6	0.9	-1.1	-0.6
Real GDP growth	5.6	3.5	3.2	4.5	4.5	4.5	4.1	4.5	4.4
Implicit interest rate (nominal)	2.3	2.0	1.9	2.9	3.6	4.0	2.1	2.8	2.6
7. Higher IR scenario (standard DSA)									
Gross public debt	59.0	54.0	52.9	43.0	41.1	39.9	55.3	43.8	46.7
Implicit interest rate (nominal)	2.3	2.2	2.2	1.9	1.9	1.9	2.2	2.0	2.0
8. Lower IR scenario (standard DSA)									
Gross public debt	59.0	53.8	52.3	40.4	37.7	35.6	55.0	41.2	44.7
Implicit interest rate (nominal)	2.3	1.8	1.6	0.7	0.6	0.4	1.9	0.8	1.1
9. Higher IR scenario (enhanced DSA)									
Gross public debt	59.0	54.1	53.1	43.8	42.0	40.8	55.4	44.6	47.3
Implicit interest rate (nominal)	2.3	2.4	2.5	2.1	2.0	2.0	2.4	2.2	2.2
10. Higher growth scenario (standard DSA)									
Gross public debt	59.0	53.6	52.1	40.2	37.6	35.6	54.9	41.0	44.5
Real GDP growth	5.6	4.0	3.7	2.8	2.4	2.3	4.5	2.9	3.3
11. Lower growth scenario (standard DSA)									
Gross public debt	59.0	54.2	53.1	43.2	41.2	39.8	55.4	44.0	46.8
Real GDP growth	5.6	3.0	2.7	1.8	1.4	1.3	3.8	1.9	2.4
12. Higher growth scenario (enhanced DSA)									
Gross public debt	59.0	49.5	44.6	34.0	31.8	30.2	51.0	34.8	38.9
Real GDP growth	5.6	12.1	11.8	2.8	2.4	2.3	9.9	2.9	4.7
13. Lower growth scenario (enhanced DSA)									
Gross public debt	59.0	59.1	62.9	51.6	49.2	47.5	60.3	52.5	54.4
Real GDP growth	5.6	-5.1	-5.4	1.8	1.4	1.3	-1.6	1.9	1.0
14. Lower SPB scenario									
Gross public debt	59.0	53.9	52.9	43.6	41.9	40.8	55.3	44.4	47.1
Primary balance	1.7	1.5	1.2	-0.2	-0.3	-0.6	1.5	0.0	0.4
Structural primary balance (before CoA)	0.5	0.7	0.9	0.9	0.9	0.9	0.7	0.9	0.9
Real GDP growth	5.6	3.6	3.5	2.3	1.9	1.8	4.2	2.4	2.9
15. Exchange rate depreciation scenario									
Gross public debt	59.0	53.9	52.6	41.7	39.3	37.6	55.2	42.5	45.6
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	59.0	53.5	51.8	39.0	36.0	33.7	54.8	39.8	43.6
Implicit interest rate (nominal)	2.3	1.8	1.6	0.7	0.6	0.4	1.9	0.8	1.1
Real GDP growth	5.6	4.0	3.7	2.8	2.4	2.3	4.5	2.9	3.3
17. Adverse combined scenario (GDP & IR)									
Gross public debt	59.0	54.3	53.4	44.5	43.0	42.2	55.5	45.3	47.9
Implicit interest rate (nominal)	2.3	2.2	2.2	1.9	1.9	1.9	2.2	2.0	2.0
Real GDP growth	5.6	3.0	2.7	1.8	1.4	1.3	3.8	1.9	2.4

Spain

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

ES - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	98.6	97.6	96.7	96.6	96.0	96.1	96.5	96.9	96.7	96.5	96.3	96.0	95.8	95.7
Changes in the ratio (-1+2+3) of which	-0.6	-1.0	-0.9	-0.1	-0.6	0.1	0.3	0.4	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2
(1) Primary balance (1.1+1.2+1.3)	-0.5	-0.1	-0.1	-0.1	-0.1	-0.4	-0.8	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.2
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-0.3	-0.4	-0.8	-1.1	-1.0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.2
(1.1.1) Structural primary balance (bef. CoA)	-0.3	-0.4	-0.8	-1.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
(1.1.2) Cost of ageing						0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	-0.1	0.6	1.0	1.0	1.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	-0.1	-0.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.6	-0.9	-0.9	-0.6	-0.7	-0.3	-0.5	-0.7	-1.3	-1.3	-1.4	-1.4	-1.3	-1.4
(2.1) Interest expenditure	2.5	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.5	1.5	1.5
(2.2) Growth effect	-2.7	-2.2	-1.8	-1.4	-1.3	-0.7	-0.5	-0.5	-1.0	-1.0	-1.0	-1.0	-0.9	-1.0
(2.3) Inflation effect	-1.4	-1.1	-1.4	-1.3	-1.4	-1.5	-1.7	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.5	-0.2	-0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.5	-0.2	-0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-2.9	-2.9	-3.1	-3.2	-3.0	-2.9	-2.9	-2.8	-2.7	-2.7	-2.6	-2.6	-2.6	-2.7



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.4)	HIGH	HIGH (S1 = 3.8)	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	LOW (S2 = 1.8)	MEDIUM	
Risk category			HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH		
Debt level (2030)			95.7	94.1	100.7	101.0	96.3				
Debt peak year			2024	2019	2030	2030	2024				
Percentile rank			73.0%	71.0%							
Probability debt higher									51.1%		
Dif. between percentiles									20.9		

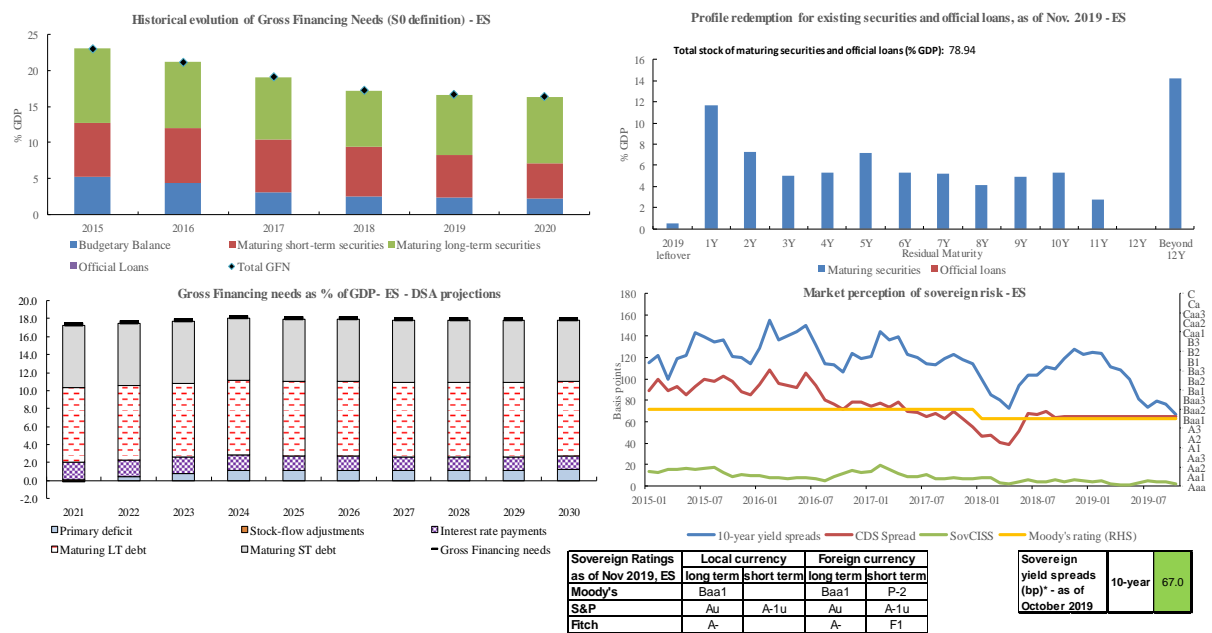
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold		
Overall index	0.79	0.37	0.46		
Fiscal sub-index	0.69	0.57	0.36		
Financial competitiveness sub-index	0.85	0.27	0.49		

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	5.2	3.8	3.9	4.1
of which Gap to the debt-stabilizing primary balance	1.4	0.0	-0.2	0.1
Cost of delaying adjustment	0.8	0.6	0.6	0.6
Debt requirement	2.6	3.0	3.0	3.0
Ageing costs	0.4	0.3	0.6	0.5
Required structural primary balance related to S1	4.3	2.8	3.2	3.1

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	2.3	1.8	1.6	4.0	2.2	2.1	2.5
of which Initial Budgetary position	2.0	1.7	1.5	1.7	1.9	1.7	2.1
Ageing costs	0.3	0.1	0.1	2.3	0.3	0.4	0.4
of which Pensions	-0.8	-1.0	-1.0	-1.0	-0.7	-1.0	-0.6
Health care	0.5	0.4	0.4	0.9	0.4	0.5	0.5
Long-term care	1.0	1.0	1.0	2.7	0.9	1.3	0.9
Others	-0.3	-0.3	-0.4	-0.3	-0.3	-0.3	-0.3
Required structural primary balance related to S2	1.3	0.8	0.8	2.9	1.2	1.1	1.5

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

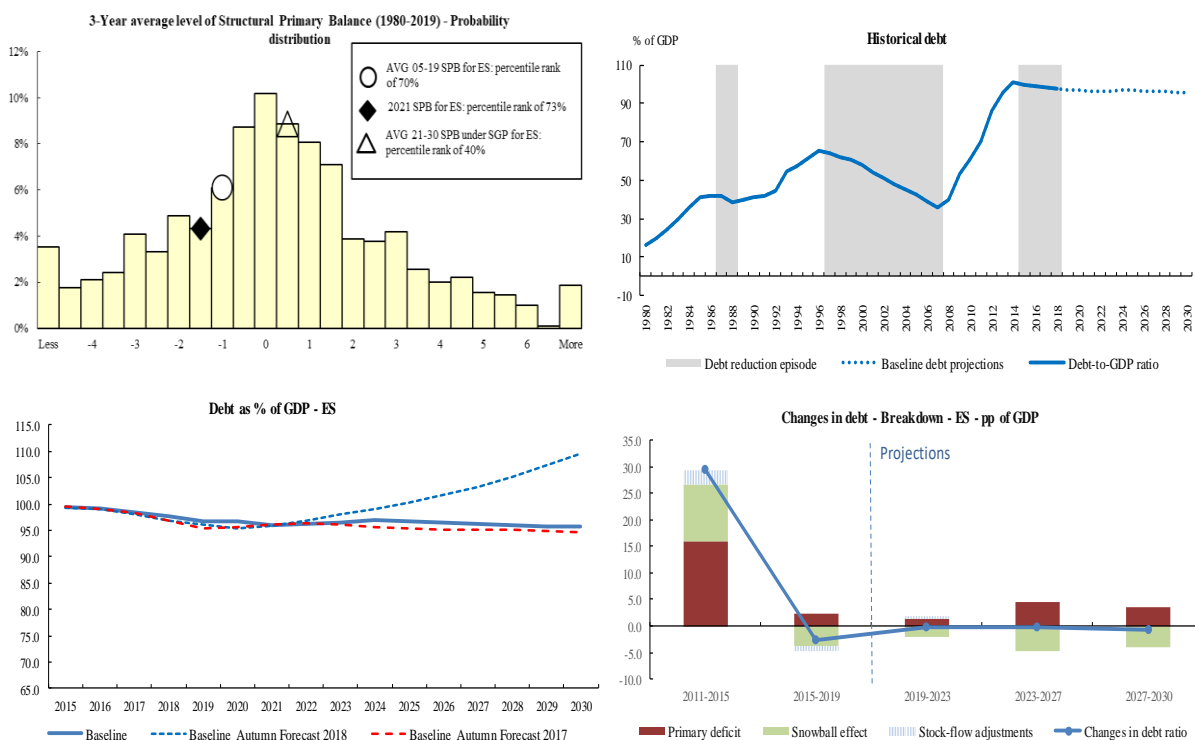
Public debt structure - ES (2018)	Share of short-term government debt (p.p.): 6.6	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents (%): 45.4	Net International Investment Position (IIP) - ES (2018)	Net IIP (% GDP): -80.4
--	---	---	---	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		ES					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		14.9	18.8	9.5	7.7	6.7	6.3
of which	One-off guarantees	14.9	18.8	9.5	7.7	6.7	5.8
	Standardised guarantees	:	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		:	0.4	0.4	0.4	0.3	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	6.1	4.6	0.3	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	4.8	4.0	3.4	3.0	0.1
	Total	6.1	9.4	4.3	3.4	3.0	0.8

Government's contingent liability risks from banking sector - ES (2018)	Private sector credit flow (% GDP): 0.4	Change in nominal house price index: 6.7	Bank loans-to-deposits ratio (p.p.): 111.2	Share of non-performing loans (%): 3.5	Change in share of non-performing loans (p.p.): -0.8	NPL coverage ratio 42.9	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.4% Stress 8.9%

6. Realism of baseline assumptions

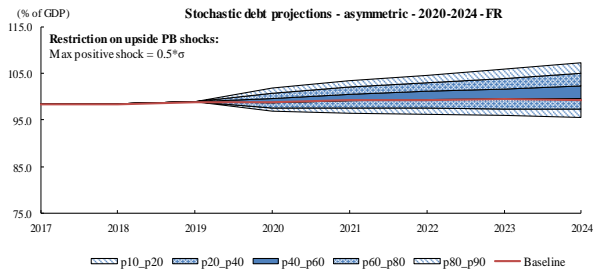
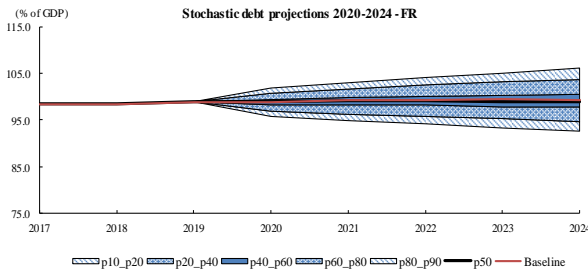
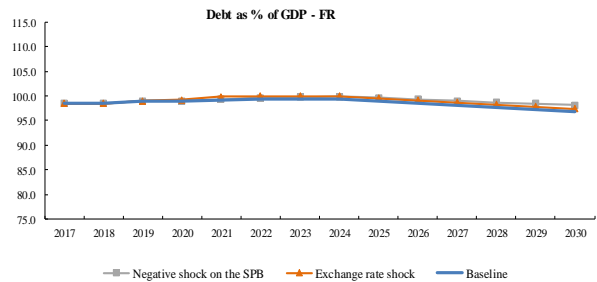
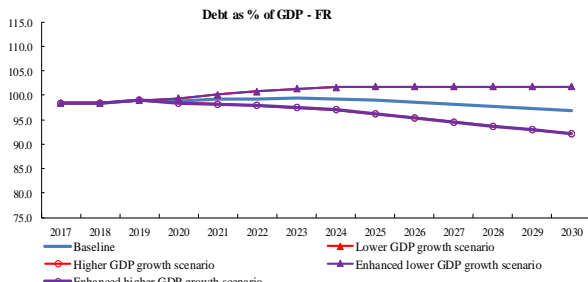
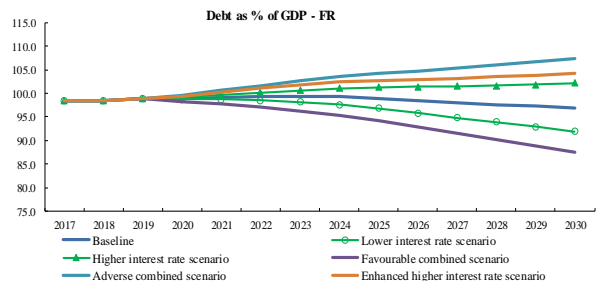
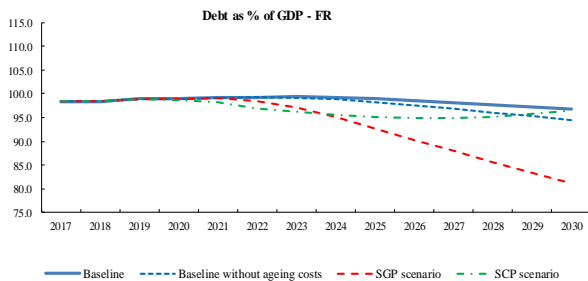
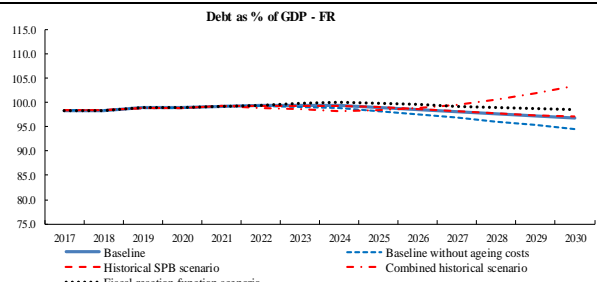
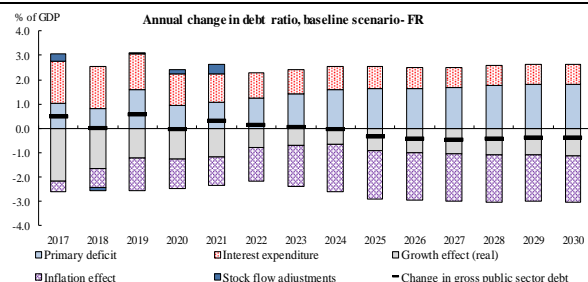


7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Spain									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	96.7	96.6	96.0	96.5	96.0	95.7	96.5	96.3	96.3
Primary balance	-0.1	-0.1	-0.1	-1.1	-1.1	-1.2	-0.1	-1.0	-0.8
Structural primary balance (before CoA)	-0.8	-1.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Real GDP growth	1.9	1.5	1.4	1.1	1.1	1.1	1.6	0.9	1.1
Potential GDP growth	1.3	1.4	1.5	1.1	1.1	1.1	1.4	1.1	1.2
Inflation rate	1.4	1.4	1.4	2.0	2.0	2.0	1.4	1.9	1.8
Implicit interest rate (nominal)	2.4	2.2	2.1	1.7	1.6	1.6	2.3	1.7	1.9
2. Fiscal reaction function scenario									
Gross public debt	96.7	96.6	96.0	90.2	87.1	84.8	96.5	90.3	91.8
Primary balance	-0.1	-0.1	-0.1	0.4	0.1	-0.2	-0.1	0.4	0.3
Structural primary balance (before CoA)	-0.8	-1.1	-1.0	0.5	0.2	0.0	-1.0	0.4	0.0
Real GDP growth	1.9	1.5	1.4	1.2	1.2	1.1	1.6	0.8	1.0
3. SGP scenario									
Gross public debt	96.7	96.6	95.9	88.0	82.7	77.8	96.4	87.5	89.7
Primary balance	-0.1	-0.1	0.5	1.5	1.4	1.3	0.1	1.2	0.9
Structural primary balance	-0.8	-1.1	-0.5	1.5	1.4	1.3	-0.8	1.1	0.6
Real GDP growth	1.9	1.5	1.0	1.1	1.1	1.1	1.4	0.8	0.9
4. SCP scenario									
Gross public debt	95.8	94.0	91.4	86.1	85.5	85.3	93.8	86.5	88.3
Primary balance	0.2	1.2	1.8	0.8	0.8	0.7	1.0	1.0	1.0
Structural primary balance (before CoA)	-0.4	0.2	0.6	0.9	0.9	0.9	0.2	0.9	0.7
Real GDP growth	2.2	1.9	1.8	0.7	0.7	1.0	2.0	0.8	1.1
Potential GDP growth	1.4	1.6	1.7	0.7	0.7	1.0	1.6	0.9	1.1
Inflation rate	1.6	1.7	1.8	2.0	2.0	2.0	1.7	2.0	1.9
Implicit interest rate (nominal)	2.5	2.5	2.4	3.1	3.6	3.9	2.5	3.1	3.0
5. Historical SPB scenario									
Gross public debt	96.7	96.6	96.0	95.9	94.9	94.1	96.5	95.6	95.8
Primary balance	-0.1	-0.1	-0.1	-0.9	-0.9	-1.0	-0.1	-0.8	-0.6
Structural primary balance (before CoA)	-0.8	-1.1	-1.0	-0.8	-0.8	-0.8	-1.0	-0.8	-0.9
Real GDP growth	1.9	1.5	1.4	1.1	1.1	1.1	1.6	0.9	1.1
6. Combined historical scenario									
Gross public debt	96.7	96.6	96.0	95.8	97.2	99.5	96.5	96.5	96.5
Primary balance	-0.1	-0.1	-0.1	-0.9	-0.9	-1.0	-0.1	-0.8	-0.6
Structural primary balance (before CoA)	-0.8	-1.1	-1.0	-0.8	-0.8	-0.8	-1.0	-0.8	-0.9
Real GDP growth	1.9	1.5	1.4	1.3	1.3	1.3	1.6	1.3	1.3
Implicit interest rate (nominal)	2.4	2.2	2.1	2.8	3.2	3.5	2.3	2.8	2.6
7. Higher IR scenario (standard DSA)									
Gross public debt	96.7	96.8	96.5	99.3	100.0	101.0	96.7	99.1	98.5
Implicit interest rate (nominal)	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.3
8. Lower IR scenario (standard DSA)									
Gross public debt	96.7	96.5	95.6	93.9	92.3	90.7	96.3	93.6	94.2
Implicit interest rate (nominal)	2.4	2.1	1.8	1.1	0.9	0.8	2.1	1.1	1.4
9. Higher IR scenario (enhanced DSA)									
Gross public debt	96.7	97.0	96.9	100.8	101.8	103.0	96.9	100.7	99.7
Implicit interest rate (nominal)	2.4	2.6	2.7	2.5	2.4	2.5	2.6	2.5	2.5
10. Higher growth scenario (standard DSA)									
Gross public debt	96.7	96.2	95.1	93.4	92.0	90.9	96.0	93.2	93.9
Real GDP growth	1.9	2.0	1.9	1.6	1.6	1.6	1.9	1.4	1.5
11. Lower growth scenario (standard DSA)									
Gross public debt	96.7	97.1	97.0	99.8	100.2	100.7	96.9	99.5	98.9
Real GDP growth	1.9	1.0	0.9	0.6	0.6	0.6	1.2	0.4	0.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	96.7	95.9	94.6	93.0	91.6	90.5	95.8	92.7	93.5
Real GDP growth	1.9	2.2	2.1	1.6	1.6	1.6	2.1	1.4	1.6
13. Lower growth scenario (enhanced DSA)									
Gross public debt	96.7	97.3	97.4	100.3	100.6	101.1	97.2	100.0	99.3
Real GDP growth	1.9	0.7	0.6	0.6	0.6	0.6	1.1	0.4	0.6
14. Lower SPB scenario									
Gross public debt	96.7	96.6	95.9	96.9	96.5	96.3	96.4	96.6	96.6
Primary balance	-0.1	0.0	-0.2	-1.2	-1.2	-1.3	-0.1	-1.1	-0.9
Structural primary balance (before CoA)	-0.8	-1.0	-1.1	-1.1	-1.1	-1.1	-1.0	-1.1	-1.1
Real GDP growth	1.9	1.4	1.6	1.1	1.1	1.1	1.6	0.9	1.1
15. Exchange rate depreciation scenario									
Gross public debt	96.7	96.6	96.0	96.5	96.0	95.7	96.5	96.3	96.3
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	96.7	96.0	94.7	90.8	88.5	86.2	95.8	90.5	91.9
Implicit interest rate (nominal)	2.4	2.1	1.8	1.1	0.9	0.8	2.1	1.1	1.4
Real GDP growth	1.9	2.0	1.9	1.6	1.6	1.6	1.9	1.4	1.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	96.7	97.3	97.4	102.7	104.3	106.3	97.1	102.5	101.2
Implicit interest rate (nominal)	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.3
Real GDP growth	1.9	1.0	0.9	0.6	0.6	0.6	1.2	0.4	0.6

France

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests														
FR - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	98.4	98.4	98.9	98.9	99.2	99.3	99.4	99.3	99.0	98.5	98.1	97.6	97.2	96.8
Changes in the ratio (-1+2+3) of which	0.5	0.0	0.6	0.0	0.3	0.1	0.0	-0.1	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4
(1) Primary balance (1.1+1.2+1.3)	-1.0	-0.8	-1.6	-0.9	-1.1	-1.2	-1.4	-1.6	-1.7	-1.6	-1.7	-1.8	-1.8	-1.8
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-1.0	-1.0	-1.2	-1.3	-1.4	-1.5	-1.6	-1.6	-1.7	-1.6	-1.7	-1.8	-1.8	-1.8
(1.1.1) Structural primary balance (bef. CoA)	-1.0	-1.0	-1.2	-1.3	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4
(1.1.2) Cost of ageing						0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
(1.2) Cyclical component	0.0	0.3	0.5	0.5	0.5	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	-0.2	-0.9	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.9	-0.7	-1.1	-1.1	-1.2	-1.1	-1.4	-1.7	-2.0	-2.1	-2.1	-2.2	-2.2	-2.2
(2.1) Interest expenditure	1.7	1.7	1.5	1.3	1.1	1.1	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8
(2.2) Growth effect	-2.2	-1.7	-1.2	-1.2	-1.2	-0.8	-0.7	-0.7	-0.9	-1.0	-1.0	-1.1	-1.1	-1.1
(2.3) Inflation effect	-0.4	-0.8	-1.3	-1.2	-1.1	-1.4	-1.7	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.3	-0.1	0.0	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.3	0.0	-0.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	-0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-2.7	-2.7	-2.7	-2.6	-2.6	-2.6	-2.6	-2.5	-2.5	-2.5	-2.5	-2.6	-2.6	-2.6



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.4)	HIGH	HIGH (S1 = 3.9)	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	LOW (S2 = 0.2)	MEDIUM	
Risk category			HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH		
Debt level (2030)			96.8	97.1	101.8	102.1	98.1				
Debt peak year			2023	2023	2025	2030	2024				
Percentile rank			77.0%	77.0%							
Probability debt higher									50.8%		
Dif. between percentiles									13.5		

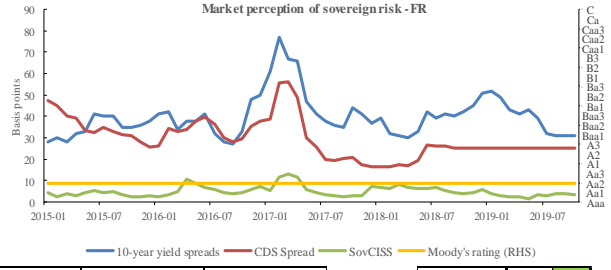
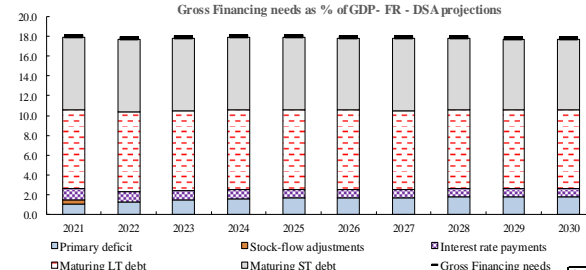
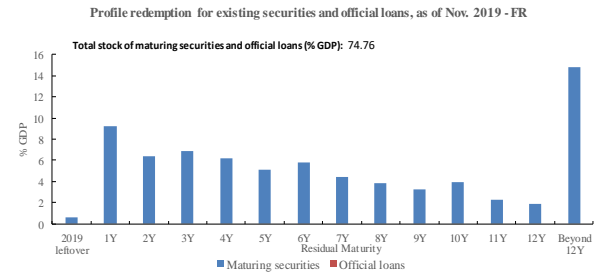
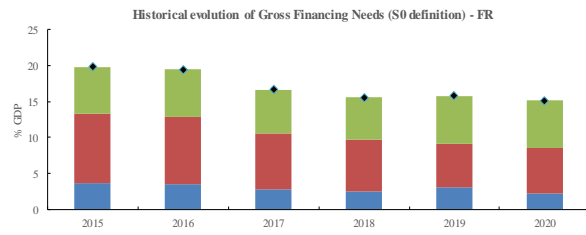
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.39	0.36	0.46	
Fiscal sub-index	0.96	0.57	0.36	
Financial competitiveness sub-index	0.09	0.25	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	4.2	3.9	3.9	4.3
of which Gap to the debt-stabilizing primary balance	0.3	-0.4	-0.5	-0.4
Cost of delaying adjustment	0.7	0.5	0.5	0.6
Debt requirement	2.8	3.4	3.4	3.4
Ageing costs	0.4	0.4	0.5	0.7
Required structural primary balance related to S1	3.9	2.5	2.5	2.8

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	-0.1	0.2	0.2	2.4	1.2	0.8	0.9
of which Initial Budgetary position	1.4	2.0	2.1	2.0	2.2	2.0	2.3
Ageing costs	-1.5	-1.9	-1.9	0.4	-1.0	-1.3	-1.4
of which Pensions	-2.0	-2.2	-2.3	-2.3	-1.4	-1.8	-1.8
Health care	0.3	0.3	0.3	0.9	0.3	0.3	0.3
Long-term care	0.5	0.5	0.5	2.2	0.6	0.7	0.5
Others	-0.4	-0.5	-0.5	-0.5	-0.4	-0.5	-0.4
Required structural primary balance related to S2	-0.5	-1.3	-1.3	1.0	-0.2	-0.7	-0.6

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, FR	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Aa2u	A-1+u	Aa2u	A-1+u
S&P	AaU	A-1+u	AaU	A-1+u
Fitch	AA	A+	AA	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	31.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

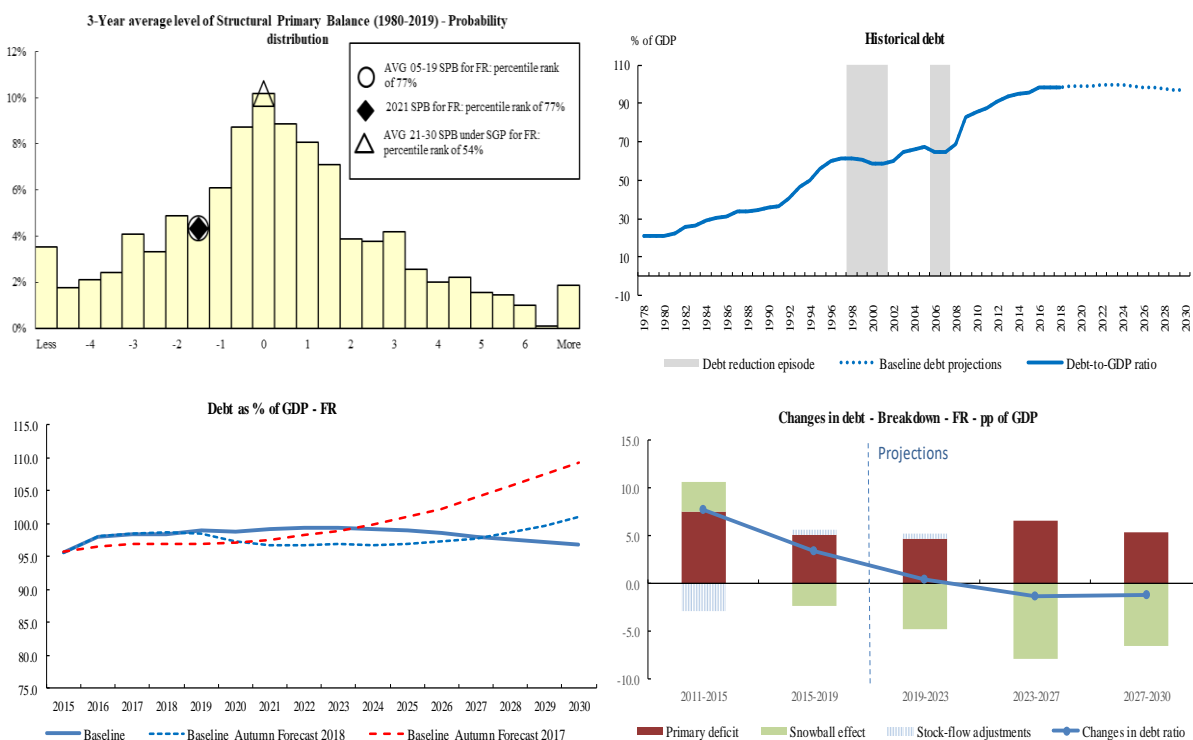
Public debt structure - FR (2018)	Share of short-term government debt (p.p.): 8.5	Share of government debt in foreign currency (%): 2.3	Share of government debt by non-residents (%): 47.3	Net International Investment Position (IIP) - FR (2018)	Net IIP (% GDP): -16.4
--	---	---	---	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		FR					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		4.1	4.7	4.9	5.1	4.7	6.3
of which	One-off guarantees	2.2	2.7	2.8	2.9	2.5	5.8
	Standardised guarantees	1.9	2.0	2.1	2.2	2.2	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.8	2.1	1.8	1.6	1.5	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	2.6	1.1	0.0	0.0	0.0	0.1
	Total	3.4	3.3	1.8	1.6	1.5	0.8

Government's contingent liability risks from banking sector - FR (2018)	Private sector credit flow (% GDP): 7.9	Change in nominal house price index: 3.0	Bank loans-to-deposits ratio (p.p.): 115.8	Share of non-performing loans (%): 2.6	Change in share of non-performing loans (p.p.): -0.3	NPL coverage ratio 50.6	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 1.7%

6. Realism of baseline assumptions



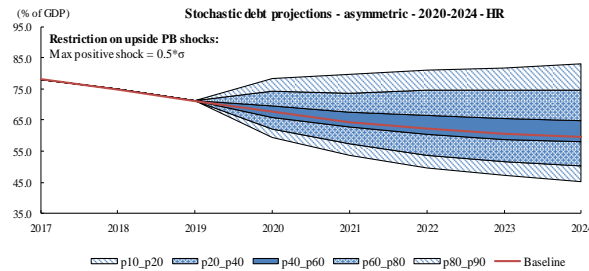
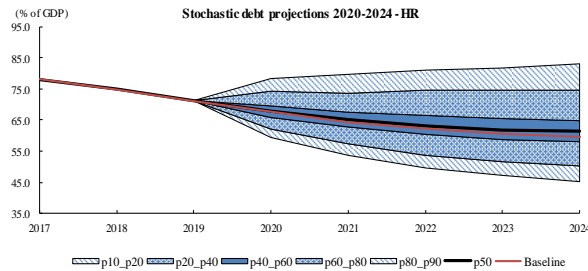
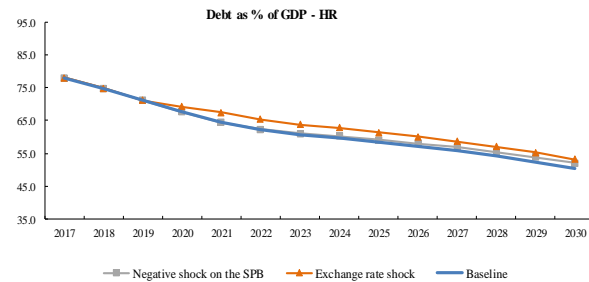
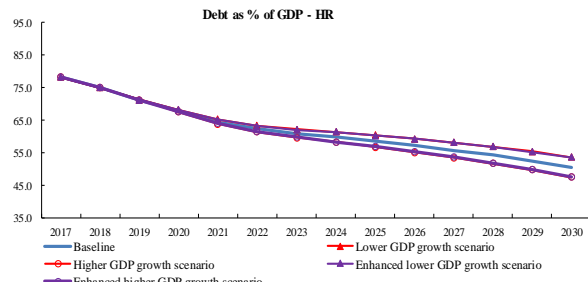
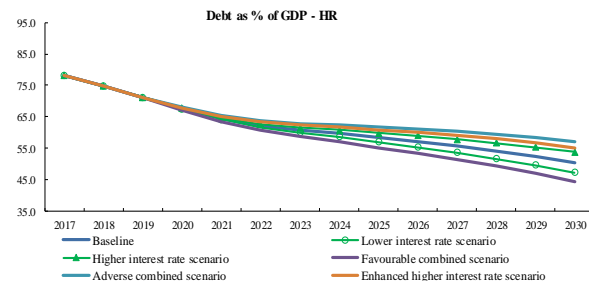
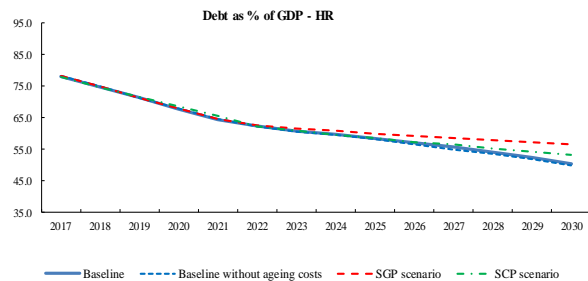
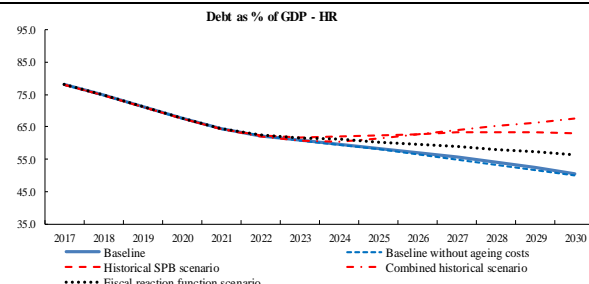
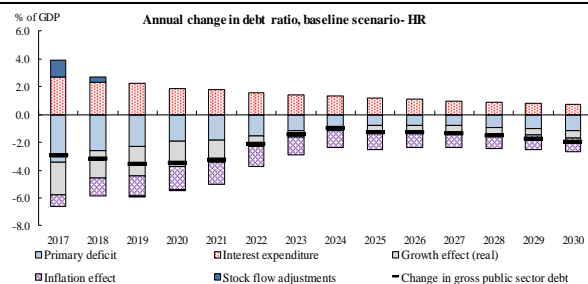
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, France									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	98.9	98.9	99.2	98.5	97.6	96.8	99.0	98.4	98.5
Primary balance	-1.6	-0.9	-1.1	-1.6	-1.8	-1.8	-1.2	-1.6	-1.5
Structural primary balance (before CoA)	-1.2	-1.3	-1.4	-1.4	-1.4	-1.4	-1.3	-1.4	-1.4
Real GDP growth	1.3	1.3	1.2	1.0	1.1	1.2	1.3	1.0	1.0
Potential GDP growth	1.1	1.2	1.3	1.0	1.1	1.2	1.2	1.1	1.1
Inflation rate	1.4	1.2	1.2	2.0	2.0	2.0	1.3	1.9	1.7
Implicit interest rate (nominal)	1.6	1.4	1.2	0.9	0.9	0.9	1.4	0.9	1.0
2. Fiscal reaction function scenario									
Gross public debt	98.9	98.9	99.2	99.5	99.0	98.5	99.0	99.3	99.2
Primary balance	-1.6	-0.9	-1.1	-1.9	-1.9	-2.0	-1.2	-1.8	-1.7
Structural primary balance (before CoA)	-1.2	-1.3	-1.4	-1.7	-1.6	-1.6	-1.3	-1.7	-1.6
Real GDP growth	1.3	1.3	1.2	1.1	1.1	1.2	1.3	1.0	1.1
3. SGP scenario									
Gross public debt	98.9	98.9	99.0	90.3	85.6	81.2	99.0	90.2	92.4
Primary balance	-1.6	-0.9	-0.5	0.4	0.4	0.3	-1.0	0.4	0.0
Structural primary balance	-1.2	-1.3	-0.8	0.4	0.4	0.3	-1.1	0.3	0.0
Real GDP growth	1.3	1.3	0.8	1.1	1.2	1.2	1.1	0.9	0.9
4. SCP scenario									
Gross public debt	98.9	98.7	98.1	94.8	95.2	96.5	98.6	95.6	96.4
Primary balance	-1.5	-0.5	0.0	-0.1	-0.2	-0.3	-0.6	-0.1	-0.2
Structural primary balance (before CoA)	-0.8	-0.7	-0.4	0.0	0.0	0.0	-0.6	0.0	-0.2
Real GDP growth	1.4	1.5	1.4	1.1	1.1	1.2	1.4	1.1	1.2
Potential GDP growth	1.3	1.3	1.3	1.1	1.1	1.2	1.3	1.1	1.1
Inflation rate	1.2	1.2	1.5	2.0	2.0	2.0	1.3	2.0	1.8
Implicit interest rate (nominal)	1.6	1.6	1.6	2.7	3.3	3.7	1.6	2.7	2.4
5. Historical SPB scenario									
Gross public debt	98.9	98.9	99.2	98.6	97.8	97.1	99.0	98.5	98.6
Primary balance	-1.6	-0.9	-1.1	-1.7	-1.8	-1.9	-1.2	-1.7	-1.5
Structural primary balance (before CoA)	-1.2	-1.3	-1.4	-1.5	-1.5	-1.5	-1.3	-1.5	-1.4
Real GDP growth	1.3	1.3	1.2	1.0	1.1	1.2	1.3	1.0	1.0
6. Combined historical scenario									
Gross public debt	98.9	98.9	99.2	98.8	100.6	103.4	99.0	99.8	99.6
Primary balance	-1.6	-0.9	-1.1	-1.7	-1.8	-1.9	-1.2	-1.7	-1.5
Structural primary balance (before CoA)	-1.2	-1.3	-1.4	-1.5	-1.5	-1.5	-1.3	-1.5	-1.4
Real GDP growth	1.3	1.3	1.2	1.2	1.2	1.2	1.3	1.2	1.2
Implicit interest rate (nominal)	1.6	1.4	1.2	1.9	2.5	2.9	1.4	1.9	1.8
7. Higher IR scenario (standard DSA)									
Gross public debt	98.9	99.1	99.7	101.3	101.6	102.1	99.2	101.3	100.8
Implicit interest rate (nominal)	1.6	1.6	1.5	1.5	1.6	1.6	1.5	1.5	1.5
8. Lower IR scenario (standard DSA)									
Gross public debt	98.9	98.7	98.7	95.8	93.9	91.9	98.8	95.6	96.4
Implicit interest rate (nominal)	1.6	1.2	0.9	0.3	0.2	0.1	1.2	0.3	0.6
9. Higher IR scenario (enhanced DSA)									
Gross public debt	98.9	99.3	100.2	102.9	103.5	104.2	99.5	102.8	102.0
Implicit interest rate (nominal)	1.6	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.7
10. Higher growth scenario (standard DSA)									
Gross public debt	98.9	98.4	98.2	95.4	93.7	92.2	98.5	95.3	96.1
Real GDP growth	1.3	1.8	1.7	1.5	1.6	1.7	1.6	1.5	1.5
11. Lower growth scenario (standard DSA)									
Gross public debt	98.9	99.4	100.2	101.8	101.7	101.8	99.5	101.6	101.1
Real GDP growth	1.3	0.8	0.7	0.5	0.6	0.7	0.9	0.5	0.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	98.9	98.4	98.3	95.4	93.7	92.2	98.5	95.3	96.1
Real GDP growth	1.3	1.8	1.7	1.5	1.6	1.7	1.6	1.5	1.5
13. Lower growth scenario (enhanced DSA)									
Gross public debt	98.9	99.4	100.2	101.8	101.7	101.7	99.5	101.6	101.1
Real GDP growth	1.3	0.8	0.7	0.5	0.6	0.7	0.9	0.5	0.6
14. Lower SPB scenario									
Gross public debt	98.9	98.9	99.3	99.3	98.7	98.1	99.1	99.2	99.1
Primary balance	-1.6	-1.0	-1.2	-1.8	-1.9	-2.0	-1.3	-1.8	-1.6
Structural primary balance (before CoA)	-1.2	-1.4	-1.6	-1.6	-1.6	-1.6	-1.4	-1.6	-1.5
Real GDP growth	1.3	1.3	1.3	1.0	1.1	1.2	1.3	1.0	1.1
15. Exchange rate depreciation scenario									
Gross public debt	98.9	99.2	99.8	99.1	98.2	97.4	99.3	98.9	99.0
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	98.9	98.2	97.8	92.8	90.1	87.5	98.3	92.6	94.0
Implicit interest rate (nominal)	1.6	1.2	0.9	0.3	0.2	0.1	1.2	0.3	0.6
Real GDP growth	1.3	1.8	1.7	1.5	1.6	1.7	1.6	1.5	1.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	98.9	99.6	100.6	104.7	105.9	107.3	99.7	104.6	103.4
Implicit interest rate (nominal)	1.6	1.6	1.5	1.5	1.6	1.6	1.5	1.5	1.5
Real GDP growth	1.3	0.8	0.7	0.5	0.6	0.7	0.9	0.5	0.6

Croatia

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

HR - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	78.0	74.8	71.2	67.7	64.4	62.2	60.7	59.7	58.4	57.1	55.7	54.1	52.4	50.4
Changes in the ratio (-1+2+3) of which	-3.0	-3.2	-3.6	-3.5	-3.3	-2.2	-1.5	-1.0	-1.3	-1.3	-1.4	-1.6	-1.7	-2.0
(1) Primary balance (1.1+1.2+1.3)	3.5	2.6	2.3	1.9	1.8	1.5	1.2	0.9	0.8	0.8	0.8	0.9	1.0	1.1
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	3.4	2.1	1.4	0.9	1.0	1.0	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.1
(1.1.1) Structural primary balance (bef. CoA)	3.4	2.1	1.4	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
(1.1.2) Cost of ageing (1.1.3) Others (taxes and property incomes)						0.0	0.1	0.1	0.2	0.2	0.2	0.0	-0.1	-0.2
(1.2) Cyclical component (1.3) One-off and other temporary measures	0.1	0.5	0.9	1.0	0.8	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.5	-1.0	-1.3	-1.6	-1.4	-0.7	-0.3	-0.2	-0.5	-0.5	-0.6	-0.7	-0.7	-0.8
(2.1) Interest expenditure	2.7	2.3	2.2	1.9	1.8	1.6	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7
(2.2) Growth effect	-2.3	-2.0	-2.1	-1.8	-1.6	-0.8	-0.4	-0.3	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
(2.3) Inflation effect	-0.9	-1.3	-1.4	-1.7	-1.6	-1.5	-1.3	-1.2	-1.2	-1.1	-1.1	-1.1	-1.1	-1.0
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	1.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	1.8	0.8	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	-0.6	-0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	0.7	-0.3	-0.8	-1.0	-0.8	-0.6	-0.5	-0.4	-0.4	-0.3	-0.2	0.0	0.2	0.4



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -2)	LOW	MEDIUM	LOW	LOW	LOW	MEDIUM	LOW	LOW (S2 = -2.1)	LOW
Risk category			LOW	MEDIUM	LOW	LOW	LOW	MEDIUM	LOW	LOW	LOW
Debt level (2030)			50.4	63.1	53.6	53.8	52.1				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			39.0%	66.0%							
Probability debt higher								26.3%			
Dif. between percentiles								37.7			

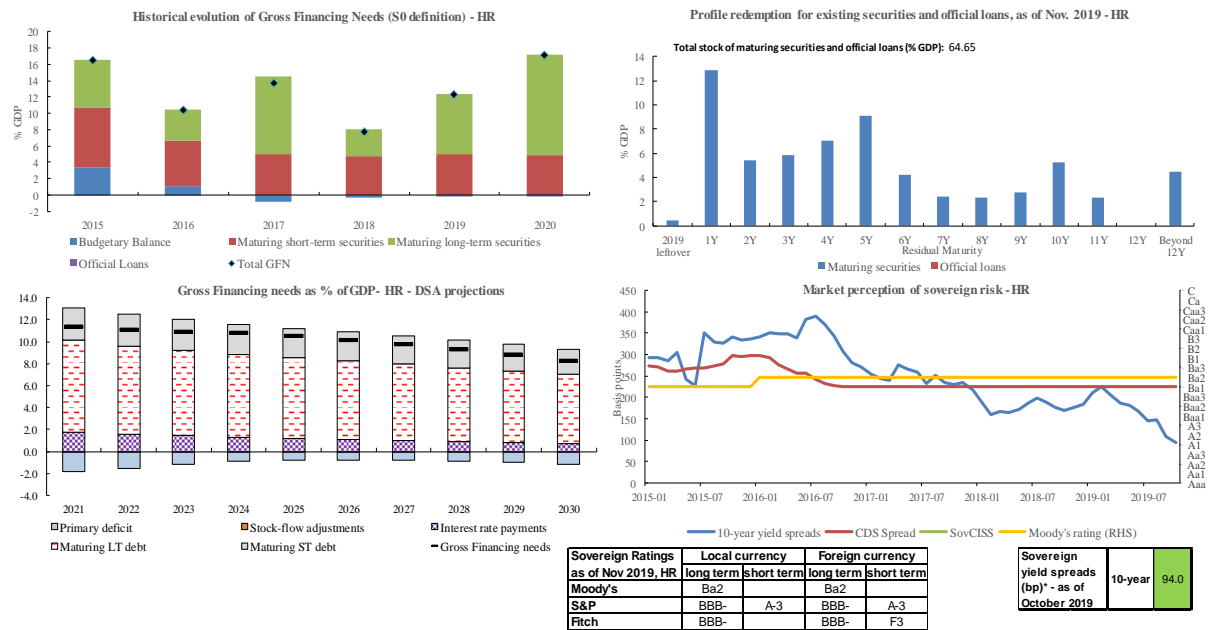
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold				
Overall index	0.84	0.24	0.46				
Fiscal sub-index	0.64	0.19	0.36				
Financial competitiveness sub-index	0.93	0.26	0.49				

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	0.2	-2.0	-0.5	-1.8
of which Gap to the debt-stabilizing primary balance	-0.3	-1.9	-0.1	-1.9
Cost of delaying adjustment	0.0	-0.3	-0.1	-0.3
Debt requirement	0.6	0.4	0.2	0.4
Ageing costs	-0.1	-0.2	-0.5	0.0
Required structural primary balance related to S1	1.2	-1.0	-1.4	-0.9

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	-2.1	-2.1	-0.2	-1.1	-1.9	-1.7	-1.8
of which Initial Budgetary position	0.2	-0.3	1.7	-0.2	-0.2	-0.3	-0.1
Ageing costs	-2.3	-1.9	-1.9	-0.8	-1.7	-1.4	-1.7
of which Pensions	-2.6	-2.2	-2.3	-2.2	-2.0	-1.8	-2.0
Health care	0.4	0.5	0.5	1.0	0.4	0.5	0.4
Long-term care	0.2	0.2	0.2	0.7	0.2	0.2	0.2
Others	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Required structural primary balance related to S2	-1.0	-1.1	-1.2	-0.1	-0.9	-0.7	-0.8

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

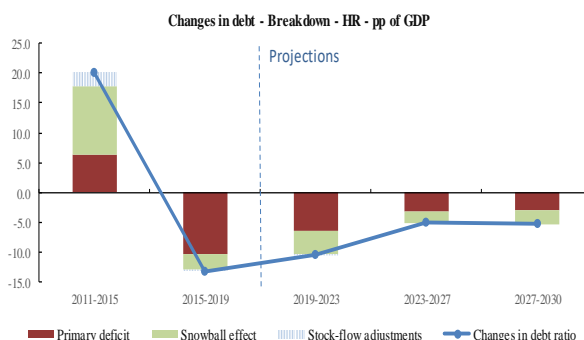
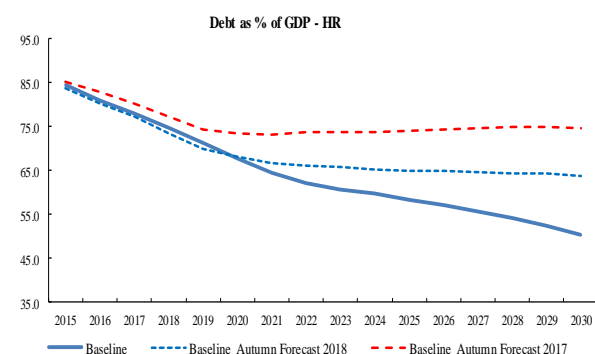
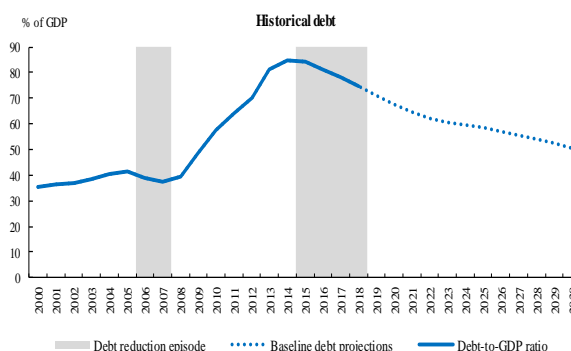
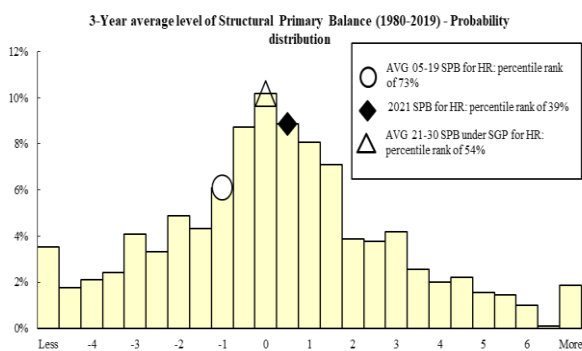
Public debt structure - HR (2018)	Share of short-term government debt (p.p.): 4.6	Share of government debt in foreign currency 75.1	Share of government debt by non-residents (%): 36.7	Net International Investment Position (IIP) - HR (2018)	Net IIP (% GDP): -57.9
--	--	---	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		HR					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		2.5	2.7	2.5	3.3	3.3	6.3
of which	One-off guarantees	2.5	2.7	2.5	3.3	3.3	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.2	0.1	0.1	0.1	0.1	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - HR (2018)	Private sector credit flow (% GDP): 2.3	Change in nominal house price index: 6.1	Bank loans-to-deposits ratio (p.p.): 77.5	Share of non-performing loans (%): 6.1	Change in share of non-performing loans (p.p.): -1.5	NPL coverage ratio 55.3	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.5%

6. Realism of baseline assumptions



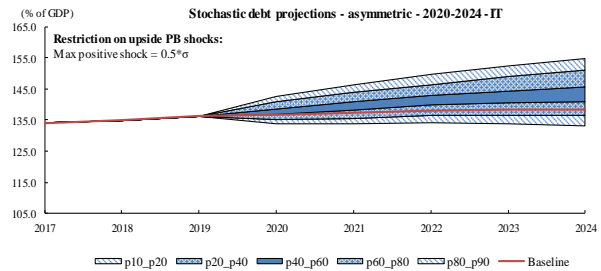
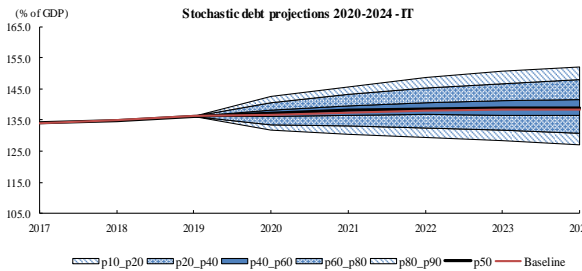
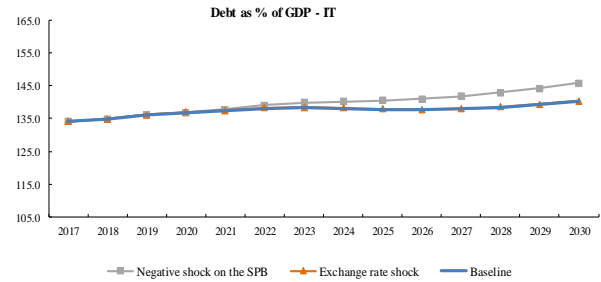
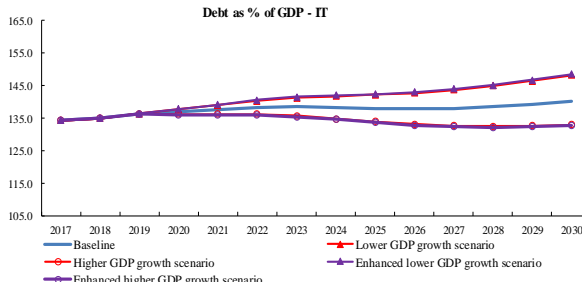
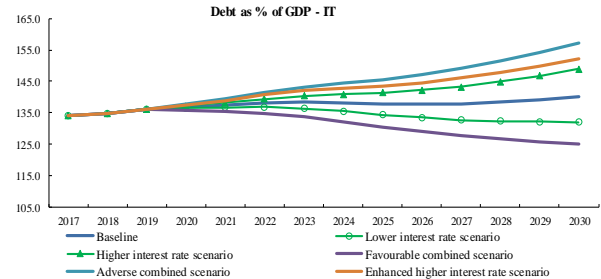
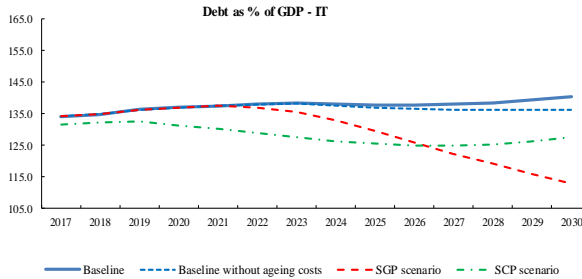
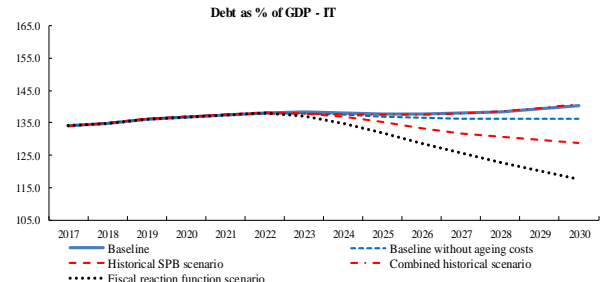
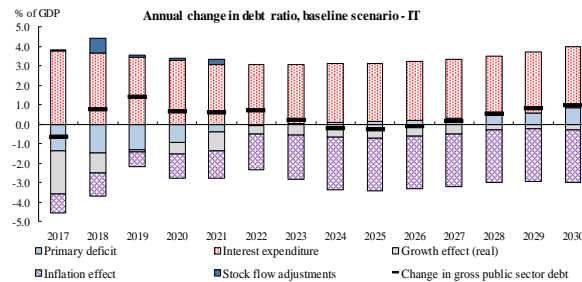
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Croatia									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	71.2	67.7	64.4	57.1	54.1	50.4	67.7	56.7	59.5
Primary balance	2.3	1.9	1.8	0.8	0.9	1.1	2.0	1.0	1.3
Structural primary balance (before CoA)	1.4	0.9	1.0	1.0	1.0	1.0	1.1	1.0	1.0
Real GDP growth	2.9	2.6	2.4	0.8	0.9	1.0	2.7	0.9	1.3
Potential GDP growth	2.1	2.5	2.8	0.8	0.9	1.0	2.5	1.1	1.4
Inflation rate	1.9	2.4	2.5	2.0	2.0	2.0	2.3	2.1	2.1
Implicit interest rate (nominal)	3.1	2.8	2.8	1.9	1.6	1.4	2.9	1.9	2.2
2. Fiscal reaction function scenario									
Gross public debt	71.2	67.7	64.4	59.6	58.0	56.3	67.7	59.5	61.6
Primary balance	2.3	1.9	1.8	0.2	0.0	-0.1	2.0	0.2	0.7
Structural primary balance (before CoA)	1.4	0.9	1.0	0.4	0.1	-0.3	1.1	0.2	0.4
Real GDP growth	2.9	2.6	2.4	0.8	1.0	1.2	2.7	1.0	1.4
3. SGP scenario									
Gross public debt	71.2	67.7	64.5	59.3	57.8	56.4	67.8	59.3	61.4
Primary balance	2.3	1.9	1.6	0.1	0.0	-0.2	2.0	0.3	0.7
Structural primary balance	1.4	0.9	0.8	0.1	0.0	-0.2	1.0	0.2	0.4
Real GDP growth	2.9	2.6	2.6	0.9	0.9	1.1	2.7	0.9	1.4
4. SCP scenario									
Gross public debt	71.6	68.5	65.4	57.4	55.4	53.1	68.5	57.5	60.2
Primary balance	2.1	2.1	2.1	1.3	1.5	1.8	2.1	1.5	1.7
Structural primary balance (before CoA)	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.4	1.4
Real GDP growth	2.5	2.4	2.3	0.9	0.9	1.0	2.4	1.0	1.4
Potential GDP growth	1.9	2.3	2.3	0.9	0.9	1.0	2.2	1.1	1.3
Inflation rate	1.4	1.8	1.8	2.0	2.0	2.0	1.7	2.0	1.9
Implicit interest rate (nominal)	3.2	3.0	2.9	3.4	3.8	4.1	3.0	3.4	3.3
5. Historical SPB scenario									
Gross public debt	71.2	67.7	64.4	62.8	63.4	63.1	67.7	62.7	64.0
Primary balance	2.3	1.9	1.8	-1.2	-1.0	-0.8	2.0	-0.6	0.0
Structural primary balance (before CoA)	1.4	0.9	1.0	-0.9	-0.9	-0.9	1.1	-0.6	-0.2
Real GDP growth	2.9	2.6	2.4	0.8	0.9	1.0	2.7	1.0	1.4
6. Combined historical scenario									
Gross public debt	71.2	67.7	64.4	62.5	65.1	67.6	67.7	63.3	64.4
Primary balance	2.3	1.9	1.8	-1.2	-1.0	-0.8	2.0	-0.6	0.0
Structural primary balance (before CoA)	1.4	0.9	1.0	-0.9	-0.9	-0.9	1.1	-0.6	-0.2
Real GDP growth	2.9	2.6	2.4	1.1	1.1	1.1	2.7	1.5	1.8
Implicit interest rate (nominal)	3.1	2.8	2.8	3.2	3.6	3.8	2.9	3.2	3.1
7. Higher IR scenario (standard DSA)									
Gross public debt	71.2	67.8	64.7	58.9	56.7	53.8	67.9	58.6	60.9
Implicit interest rate (nominal)	3.1	3.0	3.0	2.5	2.4	2.2	3.0	2.6	2.7
8. Lower IR scenario (standard DSA)									
Gross public debt	71.2	67.5	64.1	55.3	51.7	47.3	67.6	55.0	58.1
Implicit interest rate (nominal)	3.1	2.6	2.5	1.3	0.9	0.7	2.7	1.3	1.7
9. Higher IR scenario (enhanced DSA)									
Gross public debt	71.2	67.9	65.0	60.0	58.0	55.1	68.0	59.7	61.8
Implicit interest rate (nominal)	3.1	3.1	3.3	2.7	2.5	2.3	3.2	2.8	2.9
10. Higher growth scenario (standard DSA)									
Gross public debt	71.2	67.3	63.8	55.0	51.6	47.5	67.4	54.7	57.9
Real GDP growth	2.9	3.1	2.9	1.3	1.4	1.5	3.0	1.4	1.8
11. Lower growth scenario (standard DSA)									
Gross public debt	71.2	68.0	65.1	59.2	56.8	53.6	68.1	58.9	61.2
Real GDP growth	2.9	2.1	1.9	0.3	0.4	0.5	2.3	0.4	0.9
12. Higher growth scenario (enhanced DSA)									
Gross public debt	71.2	67.4	63.8	55.1	51.6	47.5	67.5	54.8	58.0
Real GDP growth	2.9	3.1	2.9	1.3	1.4	1.5	3.0	1.4	1.8
13. Lower growth scenario (enhanced DSA)									
Gross public debt	71.2	68.0	65.0	59.1	56.7	53.5	68.0	58.8	61.1
Real GDP growth	2.9	2.2	2.0	0.3	0.4	0.5	2.4	0.4	0.9
14. Lower SPB scenario									
Gross public debt	71.2	67.6	64.4	58.0	55.4	52.1	67.7	57.7	60.2
Primary balance	2.3	2.1	1.6	0.6	0.7	0.9	2.0	0.8	1.1
Structural primary balance (before CoA)	1.4	1.1	0.8	0.8	0.8	0.8	1.1	0.8	0.9
Real GDP growth	2.9	2.5	2.7	0.8	0.9	1.0	2.7	0.9	1.3
15. Exchange rate depreciation scenario									
Gross public debt	71.2	69.2	67.5	60.1	57.0	53.2	69.3	59.7	62.1
Exchange rate depreciation	0.0%	2.1%	2.1%	0.0%	0.0%	0.0%	1.4%	0.0%	0.3%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	71.2	67.2	63.5	53.3	49.2	44.5	67.3	53.0	56.6
Implicit interest rate (nominal)	3.1	2.6	2.5	1.3	0.9	0.7	2.7	1.3	1.7
Real GDP growth	2.9	3.1	2.9	1.3	1.4	1.5	3.0	1.4	1.8
17. Adverse combined scenario (GDP & IR)									
Gross public debt	71.2	68.1	65.4	61.1	59.5	57.1	68.2	60.8	62.7
Implicit interest rate (nominal)	3.1	3.0	3.0	2.5	2.4	2.2	3.0	2.6	2.7
Real GDP growth	2.9	2.1	1.9	0.3	0.4	0.5	2.3	0.4	0.9

Italy

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

IT - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	134.1	134.8	136.2	136.8	137.4	138.1	138.3	138.1	137.8	137.7	137.9	138.4	139.2	140.2
Changes in the ratio (-1+2+3)	-0.7	0.7	1.4	0.6	0.6	0.7	0.2	-0.2	-0.3	-0.1	0.2	0.6	0.8	1.0
of which														
(1) Primary balance (1.1+1.2+1.3)	1.3	1.5	1.3	0.9	0.4	0.0	0.0	-0.1	-0.1	-0.2	-0.3	-0.5	-0.6	-0.8
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.6	1.3	1.3	0.8	0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.3	-0.5	-0.6	-0.8
(1.1.1) Structural primary balance (bef. CoA)	1.6	1.3	1.3	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
(1.1.2) Cost of ageing						0.2	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.2
(1.1.3) Others (taxes and property incomes)						0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
(1.2) Cyclical component	-0.2	0.1	-0.1	-0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.1	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	0.6	1.5	2.6	1.5	0.7	0.8	0.2	-0.3	-0.4	-0.3	-0.2	0.1	0.2	0.1
(2.1) Interest expenditure	3.8	3.7	3.5	3.3	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.1	3.1	3.1
(2.2) Growth effect	-2.3	-1.0	-0.1	-0.6	-1.0	-0.4	-0.6	-0.6	-0.7	-0.6	-0.5	-0.3	-0.2	-0.3
(2.3) Inflation effect	-0.9	-1.2	-0.8	-1.2	-1.4	-1.9	-2.3	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.1	0.7	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.1	0.7	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-2.2	-2.4	-2.2	-2.5	-2.9	-3.1	-3.1	-3.1	-3.1	-3.2	-3.3	-3.5	-3.7	-4.0



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.3)	HIGH	HIGH (S1 = 8.8)	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	
			Risk category	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	
			Debt level (2030)	140.2	128.9	148.0	148.9	145.8			
			Debt peak year	2030	2022	2030	2030	2030			
			Percentile rank	55.0%	31.0%						
			Probability debt higher					60.4%			
			Dif. between percentiles					25.2			

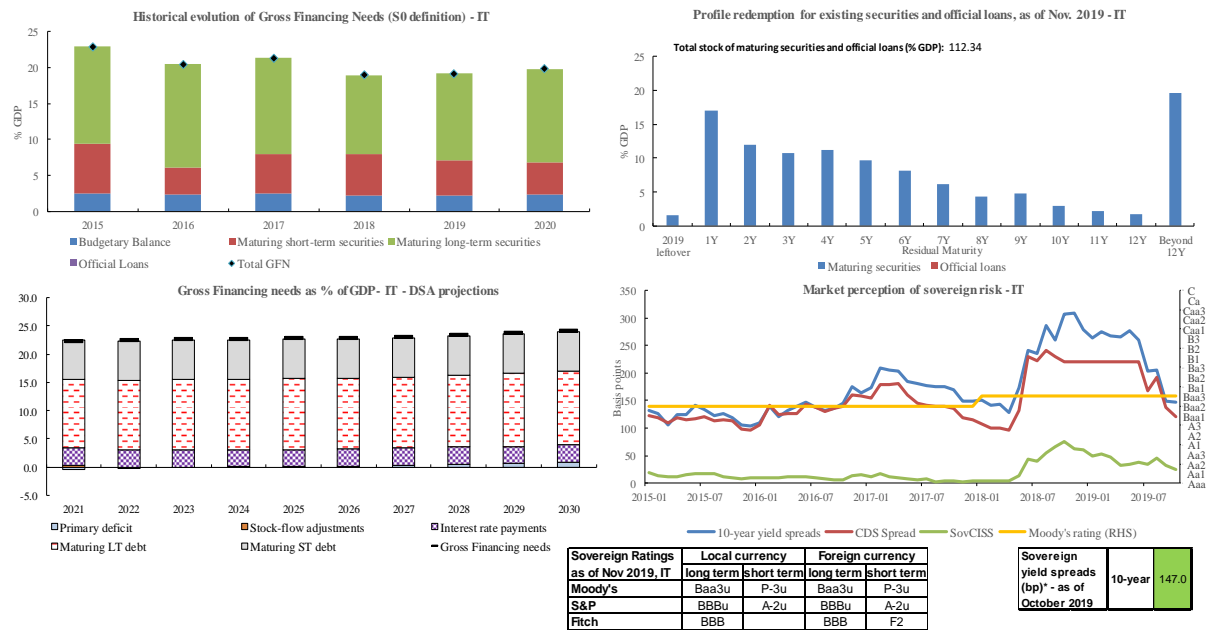
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.58	0.33	0.46	
Fiscal sub-index	0.96	0.52	0.36	
Financial competitiveness sub-index	0.38	0.24	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	9.4	8.8	7.1	8.9
of which Gap to the debt-stabilizing primary balance	2.0	0.8	-1.0	0.8
Cost of delaying adjustment	1.6	1.4	1.1	1.4
Debt requirement	4.9	5.8	5.6	5.8
Ageing costs	0.9	0.8	1.4	0.9
Required structural primary balance related to S1	9.8	8.9	9.0	9.1

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	2.9	2.1	0.4	3.0	2.8	2.2	2.9
of which Initial Budgetary position	1.8	1.5	-0.2	1.5	1.7	1.4	2.1
Ageing costs	1.1	0.6	0.6	1.5	1.1	0.8	0.9
of which Pensions	-0.1	-0.7	-0.7	-0.7	-0.1	-0.6	-0.3
Health care	0.7	0.7	0.8	1.0	0.7	0.8	0.7
Long-term care	0.9	0.9	0.9	1.6	0.9	1.1	0.8
Others	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.4
Required structural primary balance related to S2	3.3	2.2	2.3	3.2	2.9	2.3	3.1

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

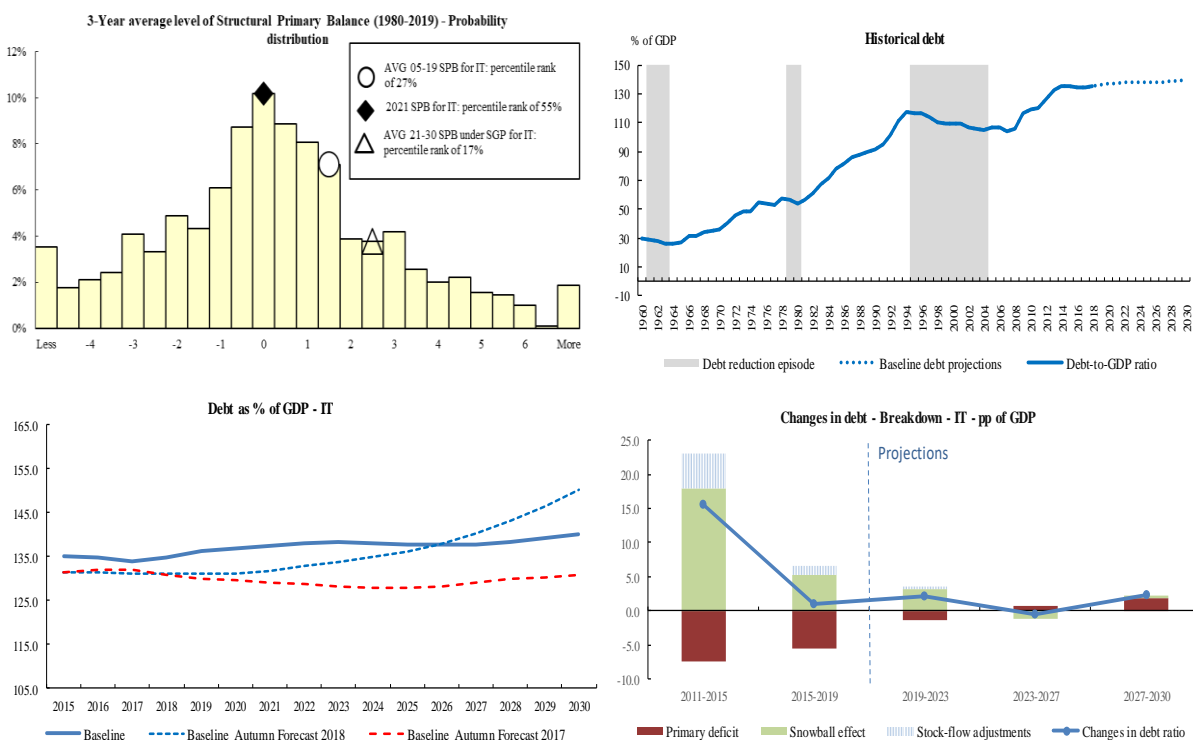
Public debt structure - IT (2018)	Share of short-term government debt (p.p.): 12.8	Share of government debt in foreign currency (%): 0.1	Share of government debt by non-residents (%): 29.4	Net International Investment Position (IIP) - IT (2018)	Net IIP (% GDP): -4.7
--	--	--	--	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		IT					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		3.5	6.2	2.1	2.4	3.9	6.3
of which	One-off guarantees	3.0	5.5	1.2	1.2	2.5	5.8
	Standardised guarantees	0.5	0.7	1.0	1.2	1.4	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	2.7	5.1	0.4	1.3	0.9	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	2.7	5.1	0.4	1.3	0.9	0.8

Government's contingent liability risks from banking sector - IT (2018)	Private sector credit flow (% GDP): 1.6	Change in nominal house price index: -0.6	Bank loans-to-deposits ratio (p.p.): 111.8	Share of non-performing loans (%): 7.9	Change in share of non-performing loans (p.p.): -1.8	NPL coverage ratio 53.0	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.2% Stress 14.0%

6. Realism of baseline assumptions



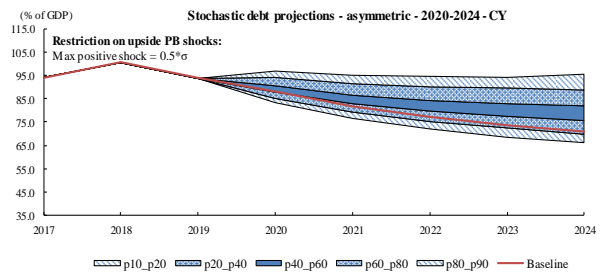
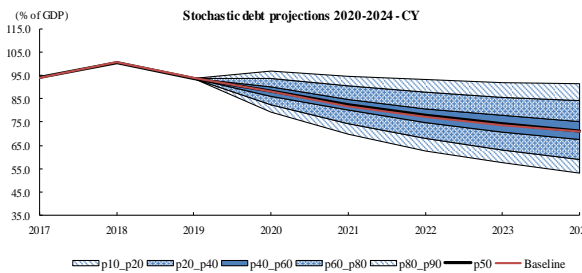
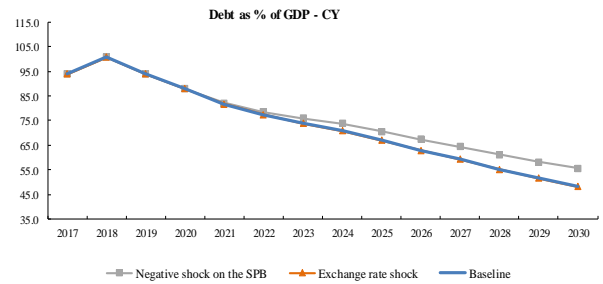
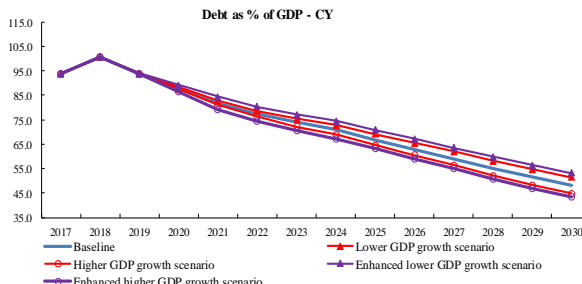
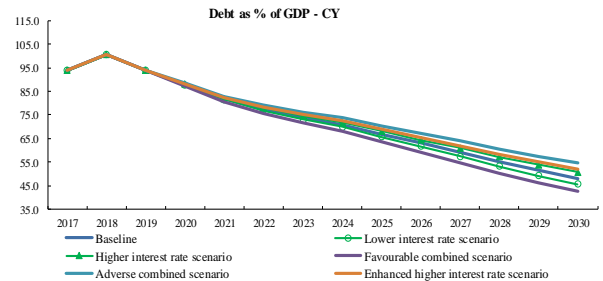
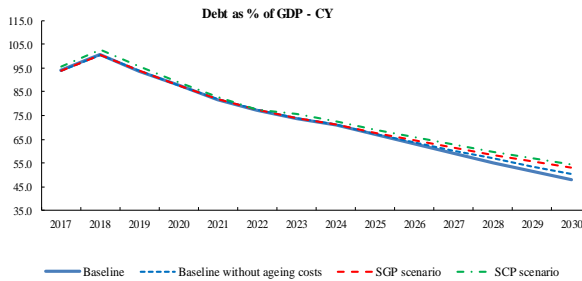
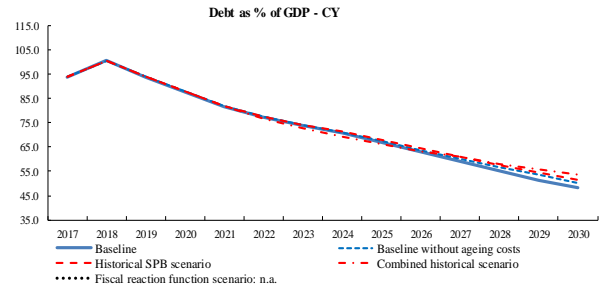
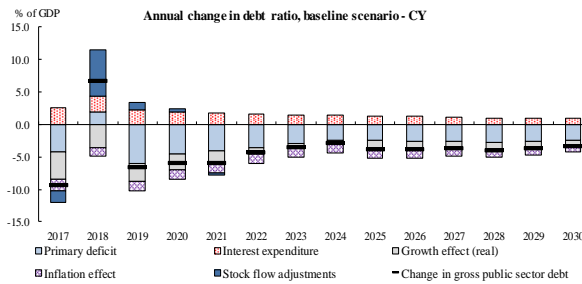
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Italy									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	136.2	136.8	137.4	137.7	138.4	140.2	136.8	138.4	138.0
Primary balance	1.3	0.9	0.4	-0.2	-0.5	-0.8	0.9	-0.3	0.0
Structural primary balance (before CoA)	1.3	0.8	0.1	0.1	0.1	0.1	0.8	0.1	0.3
Real GDP growth	0.1	0.4	0.7	0.5	0.2	0.2	0.4	0.3	0.4
Potential GDP growth	0.5	0.4	0.5	0.5	0.2	0.2	0.4	0.4	0.4
Inflation rate	0.6	0.9	1.1	2.0	2.0	2.0	0.8	1.9	1.6
Implicit interest rate (nominal)	2.6	2.4	2.3	2.2	2.3	2.3	2.4	2.3	2.3
2. Fiscal reaction function scenario									
Gross public debt	136.2	136.8	137.4	128.7	122.8	117.4	136.8	128.5	130.6
Primary balance	1.3	0.9	0.4	3.0	3.0	2.8	0.9	2.6	2.2
Structural primary balance (before CoA)	1.3	0.8	0.1	3.4	3.6	3.8	0.8	3.1	2.5
Real GDP growth	0.1	0.4	0.7	0.3	0.1	0.1	0.4	0.0	0.1
3. SGP scenario									
Gross public debt	136.2	136.8	137.4	125.7	119.1	113.0	136.8	125.6	128.4
Primary balance	1.3	0.9	1.5	3.3	3.2	3.1	1.2	3.0	2.5
Structural primary balance	1.3	0.8	1.2	3.3	3.2	3.1	1.1	3.0	2.5
Real GDP growth	0.1	0.4	-0.1	0.5	0.2	0.2	0.1	0.2	0.2
4. SCP scenario									
Gross public debt	132.6	131.3	130.2	124.9	125.3	127.4	131.4	126.3	127.6
Primary balance	1.2	1.5	1.8	1.8	1.5	1.2	1.5	1.8	1.7
Structural primary balance (before CoA)	1.3	1.5	1.9	2.3	2.3	2.3	1.6	2.3	2.1
Real GDP growth	0.2	0.8	0.8	0.6	0.4	0.3	0.6	0.5	0.5
Potential GDP growth	0.4	0.7	0.8	0.6	0.4	0.3	0.6	0.5	0.5
Inflation rate	1.0	2.0	1.8	2.0	2.0	2.0	1.6	2.0	1.9
Implicit interest rate (nominal)	2.8	2.8	2.9	3.6	4.0	4.3	2.8	3.6	3.4
5. Historical SPB scenario									
Gross public debt	136.2	136.8	137.4	133.4	130.7	128.9	136.8	133.6	134.4
Primary balance	1.3	0.9	0.4	1.5	1.3	0.9	0.9	1.2	1.1
Structural primary balance (before CoA)	1.3	0.8	0.1	1.9	1.9	1.9	0.8	1.6	1.4
Real GDP growth	0.1	0.4	0.7	0.5	0.2	0.2	0.4	0.2	0.3
6. Combined historical scenario									
Gross public debt	136.2	136.8	137.4	137.5	138.4	140.8	136.8	138.3	137.9
Primary balance	1.3	0.9	0.4	1.5	1.3	0.9	0.9	1.2	1.1
Structural primary balance (before CoA)	1.3	0.8	0.1	1.9	1.9	1.9	0.8	1.6	1.4
Real GDP growth	0.1	0.4	0.7	0.1	0.1	0.1	0.4	0.0	0.1
Implicit interest rate (nominal)	2.6	2.4	2.3	3.1	3.5	3.7	2.4	3.1	2.9
7. Higher IR scenario (standard DSA)									
Gross public debt	136.2	137.1	138.2	142.2	144.9	148.9	137.2	143.1	141.6
Implicit interest rate (nominal)	2.6	2.7	2.6	2.9	3.0	3.1	2.6	2.9	2.8
8. Lower IR scenario (standard DSA)									
Gross public debt	136.2	136.5	136.7	133.5	132.4	132.1	136.5	134.0	134.6
Implicit interest rate (nominal)	2.6	2.2	2.0	1.6	1.5	1.5	2.3	1.6	1.8
9. Higher IR scenario (enhanced DSA)									
Gross public debt	136.2	137.5	138.9	144.6	147.8	152.2	137.5	145.5	143.5
Implicit interest rate (nominal)	2.6	2.9	2.9	3.1	3.1	3.2	2.8	3.1	3.0
10. Higher growth scenario (standard DSA)									
Gross public debt	136.2	136.1	136.0	133.0	132.4	132.8	136.1	133.7	134.3
Real GDP growth	0.1	0.9	1.2	1.0	0.7	0.7	0.8	0.8	0.8
11. Lower growth scenario (standard DSA)									
Gross public debt	136.2	137.5	138.8	142.6	144.7	148.0	137.5	143.3	141.9
Real GDP growth	0.1	-0.1	0.2	0.0	-0.3	-0.3	0.1	-0.2	-0.1
12. Higher growth scenario (enhanced DSA)									
Gross public debt	136.2	136.0	135.8	132.7	132.1	132.6	136.0	133.4	134.1
Real GDP growth	0.1	1.0	1.3	1.0	0.7	0.7	0.8	0.8	0.8
13. Lower growth scenario (enhanced DSA)									
Gross public debt	136.2	137.7	139.1	142.9	145.1	148.3	137.7	143.6	142.1
Real GDP growth	0.1	-0.2	0.1	0.0	-0.3	-0.3	0.0	-0.2	-0.1
14. Lower SPB scenario									
Gross public debt	136.2	136.8	137.8	141.0	142.8	145.8	136.9	141.7	140.5
Primary balance	1.3	0.6	-0.2	-0.8	-1.1	-1.4	0.5	-0.9	-0.5
Structural primary balance (before CoA)	1.3	0.4	-0.4	-0.4	-0.4	-0.4	0.4	-0.4	-0.2
Real GDP growth	0.1	0.7	0.9	0.5	0.2	0.2	0.6	0.3	0.4
15. Exchange rate depreciation scenario									
Gross public debt	136.2	136.9	137.5	137.8	138.5	140.3	136.9	138.5	138.1
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	136.2	135.8	135.3	128.9	126.6	125.2	135.8	129.5	131.1
Implicit interest rate (nominal)	2.6	2.2	2.0	1.6	1.5	1.5	2.3	1.6	1.8
Real GDP growth	0.1	0.9	1.2	1.0	0.7	0.7	0.8	0.8	0.8
17. Adverse combined scenario (GDP & IR)									
Gross public debt	136.2	137.8	139.5	147.2	151.5	157.2	137.9	148.2	145.6
Implicit interest rate (nominal)	2.6	2.7	2.6	2.9	3.0	3.1	2.6	2.9	2.8
Real GDP growth	0.1	-0.1	0.2	0.0	-0.3	-0.3	0.1	-0.2	-0.1

Cyprus

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

CY - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	93.9	100.6	93.8	87.8	81.8	77.4	73.8	70.8	66.9	62.9	59.1	55.1	51.4	48.1
Changes in the ratio (-1+2+3) of which	-9.5	6.7	-6.7	-6.0	-6.0	-4.4	-3.6	-3.0	-3.9	-3.9	-3.8	-4.0	-3.7	-3.4
(1) Primary balance (1.1+1.2+1.3)	4.2	-2.0	6.0	4.6	4.1	3.5	2.9	2.4	2.5	2.6	2.5	2.8	2.6	2.5
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	3.5	4.3	4.0	2.6	2.2	2.3	2.3	2.4	2.5	2.6	2.5	2.8	2.6	2.5
(1.1.1) Structural primary balance (bef. CoA)	3.5	4.3	4.0	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
(1.1.2) Cost of ageing						0.0	-0.1	-0.2	-0.3	-0.4	-0.3	-0.6	-0.4	-0.3
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.7	1.7	2.0	2.0	1.9	1.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	-8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-3.5	-2.5	-2.0	-1.8	-1.7	-0.8	-0.6	-0.6	-1.4	-1.3	-1.3	-1.2	-1.1	-0.9
(2.1) Interest expenditure	2.5	2.4	2.3	2.0	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0	0.9
(2.2) Growth effect	-4.2	-3.6	-2.8	-2.4	-2.0	-1.0	-0.7	-0.5	-1.3	-1.2	-1.1	-1.1	-0.9	-0.8
(2.3) Inflation effect	-1.8	-1.3	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.3	-1.2	-1.2	-1.1	-1.0
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-1.8	7.2	1.2	0.4	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-1.8	7.2	1.2	0.4	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	1.0	1.9	1.7	0.6	0.5	0.7	0.8	1.0	1.2	1.4	1.4	1.8	1.7	1.6



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.5)	LOW	LOW (S1 = -2.4)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = -0.7)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	MEDIUM			
Debt level (2030)			48.1	51.5	51.6	50.8	55.5				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			22.0%	27.0%							
Probability debt higher									6.8%		
Dif. between percentiles									38.2		

2.2. Sustainability indicators

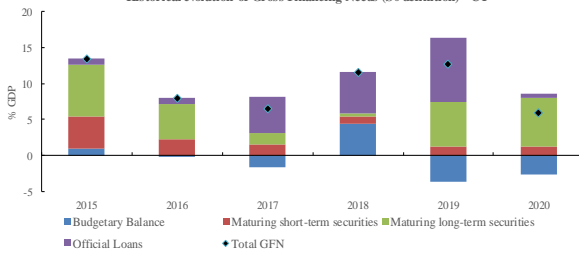
S0 indicator	2009	2019	Critical threshold
Overall index	0.71	0.45	0.46
Fiscal sub-index	0.56	0.23	0.36
Financial competitiveness sub-index	0.77	0.57	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-0.7	-2.4	-2.5	-2.2
of which Gap to the debt-stabilizing primary balance	-2.8	-3.7	-2.8	-3.7
Cost of delaying adjustment	-0.1	-0.3	-0.4	-0.3
Debt requirement	2.3	1.8	0.7	1.8
Ageing costs	-0.1	-0.2	0.0	0.0
Required structural primary balance related to S1	2.2	-0.1	-0.8	0.0

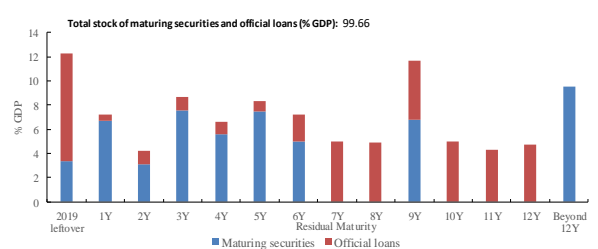
S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	-0.9	-0.7	-0.2	1.2	-0.5	-1.0	-0.7
of which Initial Budgetary position	-1.7	-1.6	-1.2	-1.5	-1.5	-1.8	-1.7
Ageing costs	0.9	0.9	1.0	2.7	1.0	0.8	1.0
of which Pensions	1.7	1.7	1.8	1.6	1.8	1.7	1.7
Health care	0.2	0.3	0.3	0.5	0.2	0.3	0.3
Long-term care	0.2	0.2	0.2	1.8	0.2	0.2	0.2
Others	-1.3	-1.2	-1.3	-1.2	-1.2	-1.3	-1.2
Required structural primary balance related to S2	2.1	1.5	1.5	3.4	1.7	1.3	1.5

3. Financing needs and financial information

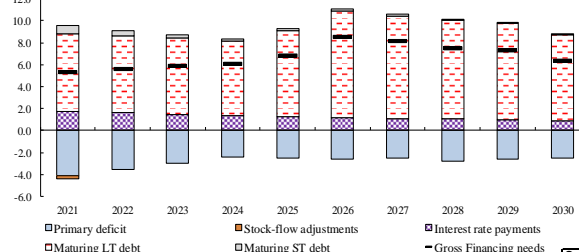
Historical evolution of Gross Financing Needs (S0 definition) - CY



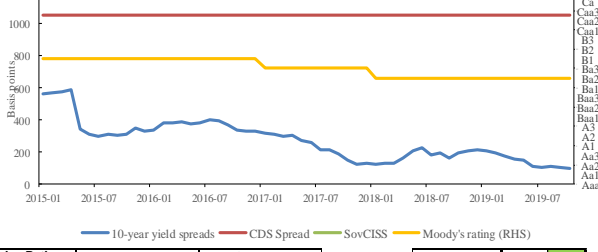
Profile redemption for existing securities and official loans, as of Nov. 2019 - CY



Gross Financing needs as % of GDP - CY - DSA projections



Market perception of sovereign risk - CY



Sovereign Ratings as of Nov 2019, CY	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Ba2	NP	(P)Ba2	NP
S&P	BBB-	A-3	BBB-	A-3
Fitch	BBB-		BBB-	F3

Sovereign yield spreads (bp) - as of October 2019	10-year	98.0

4. Risks related to the structure of public debt financing and net International Investment Position

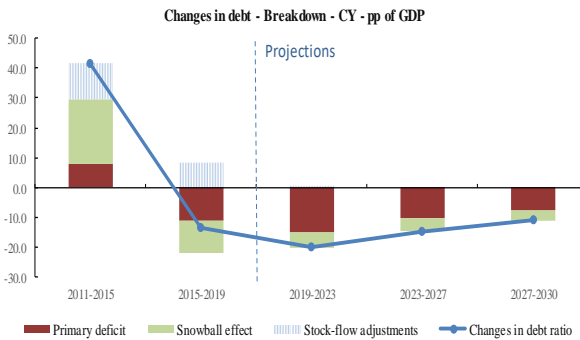
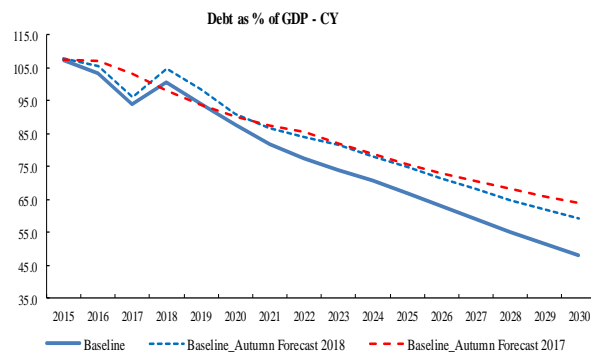
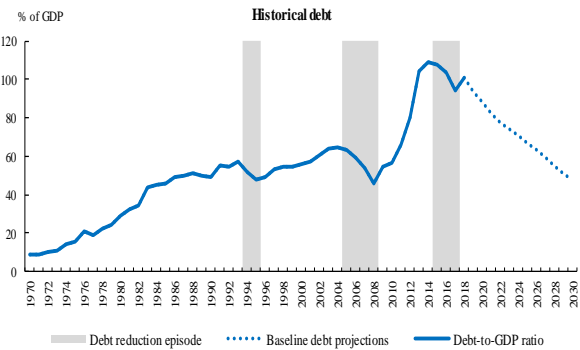
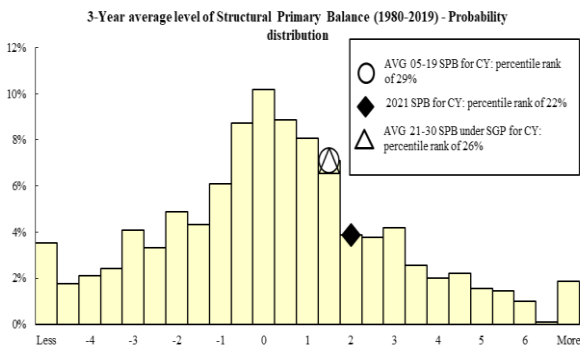
Public debt structure - CY (2018)	Share of short-term government debt (p.p.): 1.8	Share of government debt in foreign currency (%): 3.3	Share of government debt by non-residents 76.5	Net International Investment Position (IIP) - CY (2018)	Net IIP (% GDP): -120.8
--	---	---	---	--	--

5. Risks related to government's contingent liabilities

General government contingent liabilities		CY					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		7.7	15.8	15.4	9.2	8.7	6.3
of which	One-off guarantees	7.7	15.8	15.1	8.9	8.4	5.8
	Standardised guarantees	0.0	0.0	0.3	0.3	0.2	0.4
Public-private partnerships (PPPs) (% GDP)		0.1	0.9	0.8	0.7	0.7	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	14.0	5.5	5.6	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	14.0	5.5	5.6	0.0	0.0	0.8

Government's contingent liability risks from banking sector - CY (2018)	Private sector credit flow (% GDP): 8.4	Change in nominal house price index: 1.8	Bank loans-to-deposits ratio (p.p.): 59.8	Share of non-performing loans (%): 21.5	Change in share of non-performing loans (p.p.): -12.6	NPL coverage ratio 45.9	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 1.8%
							Stress 49.2%

6. Realism of baseline assumptions



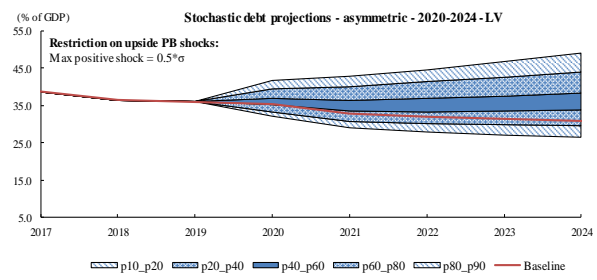
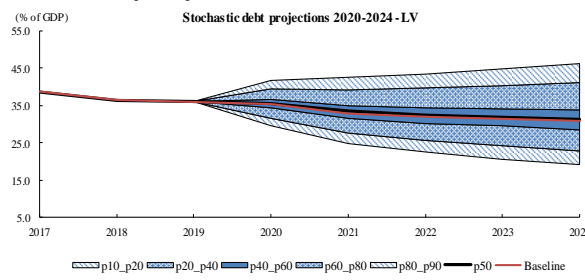
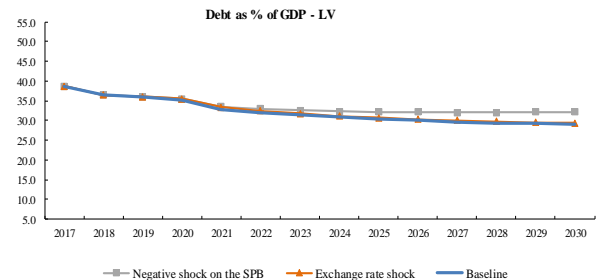
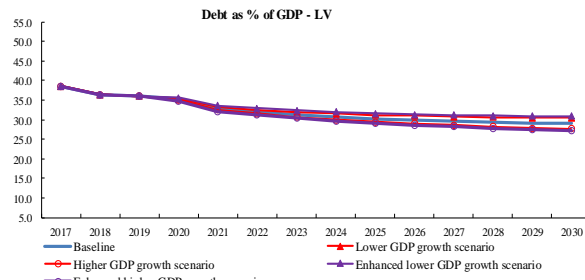
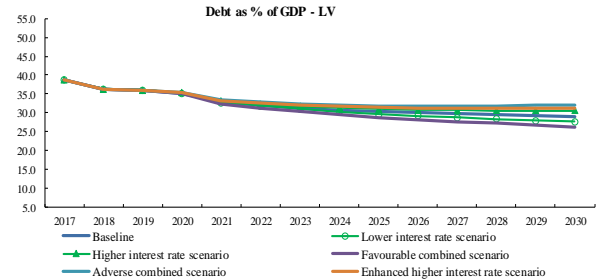
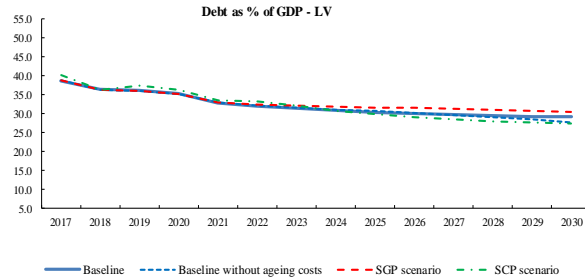
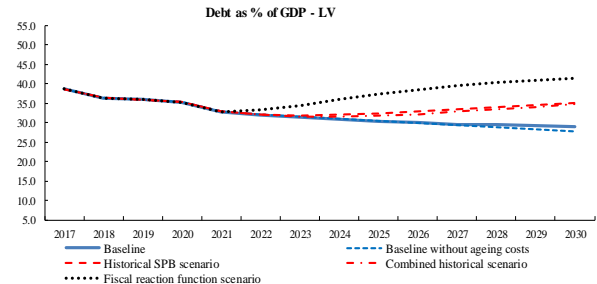
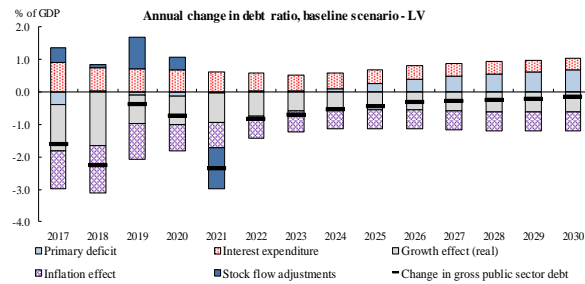
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Cyprus									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	93.8	87.8	81.8	62.9	55.1	48.1	87.8	62.8	69.1
Primary balance	6.0	4.6	4.1	2.6	2.8	2.5	4.9	2.7	3.3
Structural primary balance (before CoA)	4.0	2.6	2.2	2.2	2.2	2.2	2.9	2.2	2.4
Real GDP growth	2.9	2.6	2.3	1.9	1.9	1.6	2.6	1.5	1.8
Potential GDP growth	2.3	2.5	2.6	1.9	1.9	1.6	2.5	2.0	2.1
Inflation rate	1.5	1.5	1.7	2.0	2.0	2.0	1.5	2.0	1.9
Implicit interest rate (nominal)	2.3	2.2	2.0	1.9	1.8	1.8	2.2	1.9	2.0
2. Fiscal reaction function scenario									
Gross public debt	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Primary balance	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Structural primary balance (before CoA)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Real GDP growth	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
3. SGP scenario									
Gross public debt	93.8	87.8	81.7	64.7	58.6	53.2	87.8	64.9	70.6
Primary balance	6.0	4.6	4.2	1.8	1.7	1.6	4.9	2.1	2.8
Structural primary balance	4.0	2.6	2.3	1.8	1.7	1.6	3.0	1.8	2.1
Real GDP growth	2.9	2.6	2.3	2.0	1.9	1.6	2.6	1.6	1.9
4. SCP scenario									
Gross public debt	95.7	89.1	83.0	65.9	59.6	54.5	89.2	66.0	71.8
Primary balance	5.3	4.8	4.4	2.8	3.0	2.7	4.8	2.9	3.4
Structural primary balance (before CoA)	3.8	3.2	2.9	2.5	2.5	2.5	3.3	2.5	2.7
Real GDP growth	3.7	3.2	3.0	1.5	1.6	1.3	3.3	1.4	1.9
Potential GDP growth	2.6	2.8	2.8	1.5	1.6	1.3	2.7	1.5	1.8
Inflation rate	1.0	1.2	1.5	2.0	2.0	2.0	1.2	1.9	1.8
Implicit interest rate (nominal)	2.4	2.4	2.4	2.9	3.4	3.9	2.4	3.0	2.9
5. Historical SPB scenario									
Gross public debt	93.8	87.8	81.8	64.4	57.6	51.5	87.8	64.4	70.3
Primary balance	6.0	4.6	4.1	2.1	2.3	1.9	4.9	2.3	2.9
Structural primary balance (before CoA)	4.0	2.6	2.2	1.7	1.7	1.7	2.9	1.8	2.1
Real GDP growth	2.9	2.6	2.3	1.9	1.9	1.6	2.6	1.6	1.8
6. Combined historical scenario									
Gross public debt	93.8	87.8	81.8	63.4	58.2	53.8	87.8	64.1	70.0
Primary balance	6.0	4.6	4.1	2.1	2.3	1.9	4.9	2.3	2.9
Structural primary balance (before CoA)	4.0	2.6	2.2	1.7	1.7	1.7	2.9	1.8	2.1
Real GDP growth	2.9	2.6	2.3	1.7	1.7	1.7	2.6	1.9	2.1
Implicit interest rate (nominal)	2.3	2.2	2.0	2.6	3.2	3.6	2.2	2.7	2.6
7. Higher IR scenario (standard DSA)									
Gross public debt	93.8	87.9	82.0	64.4	57.2	50.8	87.9	64.4	70.3
Implicit interest rate (nominal)	2.3	2.4	2.2	2.3	2.4	2.5	2.3	2.3	2.3
8. Lower IR scenario (standard DSA)									
Gross public debt	93.8	87.7	81.5	61.5	53.2	45.6	87.6	61.4	68.0
Implicit interest rate (nominal)	2.3	2.1	1.9	1.4	1.2	1.1	2.1	1.4	1.6
9. Higher IR scenario (enhanced DSA)									
Gross public debt	93.8	88.1	82.3	65.4	58.3	52.0	88.1	65.3	71.0
Implicit interest rate (nominal)	2.3	2.5	2.4	2.5	2.5	2.6	2.4	2.5	2.5
10. Higher growth scenario (standard DSA)									
Gross public debt	93.8	87.3	80.9	60.5	52.2	44.8	87.4	60.4	67.2
Real GDP growth	2.9	3.1	2.8	2.4	2.4	2.1	3.0	2.0	2.3
11. Lower growth scenario (standard DSA)									
Gross public debt	93.8	88.2	82.6	65.5	58.2	51.6	88.2	65.4	71.1
Real GDP growth	2.9	2.1	1.8	1.4	1.4	1.1	2.3	1.0	1.4
12. Higher growth scenario (enhanced DSA)									
Gross public debt	93.8	86.5	79.2	58.9	50.8	43.4	86.5	58.9	65.8
Real GDP growth	2.9	4.1	3.8	2.4	2.4	2.1	3.6	2.0	2.4
13. Lower growth scenario (enhanced DSA)									
Gross public debt	93.8	89.2	84.4	67.2	59.9	53.2	89.1	67.0	72.6
Real GDP growth	2.9	1.2	0.8	1.4	1.4	1.1	1.6	1.0	1.2
14. Lower SPB scenario									
Gross public debt	93.8	87.8	82.0	67.4	61.1	55.5	87.9	67.2	72.4
Primary balance	6.0	4.7	3.3	1.7	1.9	1.6	4.7	1.8	2.5
Structural primary balance (before CoA)	4.0	2.7	1.4	1.4	1.4	1.4	2.7	1.4	1.7
Real GDP growth	2.9	2.6	3.1	1.9	1.9	1.6	2.8	1.5	1.9
15. Exchange rate depreciation scenario									
Gross public debt	93.8	87.8	81.8	62.9	55.1	48.1	87.8	62.8	69.1
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	93.8	87.2	80.6	59.1	50.3	42.4	87.2	59.1	66.1
Implicit interest rate (nominal)	2.3	2.1	1.9	1.4	1.2	1.1	2.1	1.4	1.6
Real GDP growth	2.9	3.1	2.8	2.4	2.4	2.1	3.0	2.0	2.3
17. Adverse combined scenario (GDP & IR)									
Gross public debt	93.8	88.4	82.9	67.1	60.4	54.5	88.4	67.0	72.3
Implicit interest rate (nominal)	2.3	2.4	2.2	2.3	2.4	2.5	2.3	2.3	2.3
Real GDP growth	2.9	2.1	1.8	1.4	1.4	1.1	2.3	1.0	1.4

Latvia

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

LV - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	38.6	36.4	36.0	35.2	32.9	32.0	31.3	30.8	30.3	30.0	29.7	29.4	29.2	29.0
Changes in the ratio (-1+2+3) of which	-1.6	-2.3	-0.4	-0.7	-2.4	-0.9	-0.7	-0.6	-0.5	-0.3	-0.3	-0.3	-0.2	-0.2
(1) Primary balance (1.1+1.2+1.3)	0.4	0.0	0.1	0.1	0.0	0.0	0.0	-0.1	-0.3	-0.4	-0.5	-0.6	-0.6	-0.7
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-0.2	-1.2	-0.9	-0.4	-0.3	-0.2	-0.1	-0.1	-0.3	-0.4	-0.5	-0.6	-0.6	-0.7
(1.1.1) Structural primary balance (bef. CoA)	-0.2	-1.2	-0.9	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
(1.1.2) Cost of ageing						0.0	-0.1	-0.1	0.0	0.2	0.3	0.3	0.4	0.4
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.6	1.2	0.8	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.7	-2.4	-1.2	-1.0	-1.0	-0.9	-0.7	-0.7	-0.7	-0.7	-0.8	-0.8	-0.8	-0.8
(2.1) Interest expenditure	0.9	0.7	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
(2.2) Growth effect	-1.4	-1.6	-0.9	-0.9	-0.9	-0.7	-0.6	-0.5	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6
(2.3) Inflation effect	-1.2	-1.5	-1.1	-0.8	-0.8	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.5	0.1	1.0	0.4	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.5	0.1	1.0	0.4	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-1.1	-1.9	-1.6	-1.1	-0.9	-0.8	-0.6	-0.6	-0.7	-0.8	-0.9	-0.9	-1.0	-1.0



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -3.3)	LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	LOW (S2 = 0.3)	LOW
Risk category			LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	LOW	LOW
Debt level (2030)			29.0	35.2	30.5	30.5	32.2				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			64.0%	73.0%							
Probability debt higher								33.6%			
Dif. between percentiles								26.9			

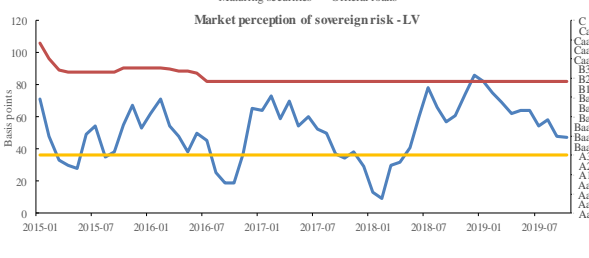
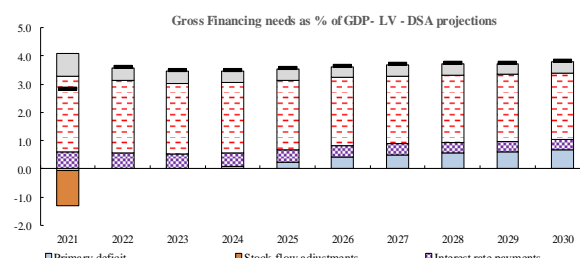
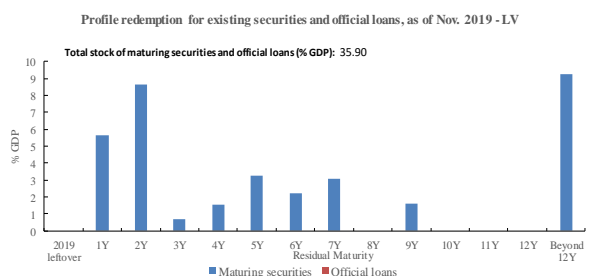
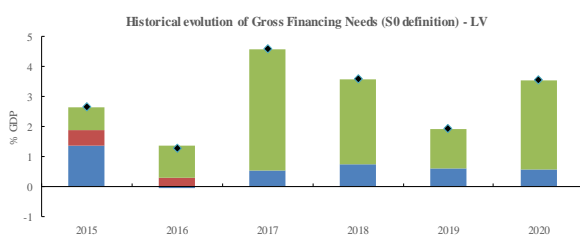
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.65	0.24	0.46
Fiscal sub-index	0.45	0.08	0.36
Financial competitiveness sub-index	0.76	0.33	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-2.0	-3.3	-1.7	-2.7
of which Gap to the debt-stabilizing primary balance	0.1	-0.7	0.4	-0.7
Cost of delaying adjustment	-0.3	-0.4	-0.2	-0.4
Debt requirement	-1.9	-2.5	-2.4	-2.4
Ageing costs	0.2	0.3	0.6	0.8
Required structural primary balance related to S1	-2.4	-3.5	-2.9	-3.0

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	0.7	0.3	1.3	2.8	0.5	0.4	0.6
of which Initial Budgetary position	0.9	0.5	1.5	0.6	0.6	0.5	0.6
Ageing costs	-0.3	-0.3	-0.3	2.3	-0.1	-0.1	-0.1
of which Pensions	-1.4	-1.4	-1.5	-1.4	-1.2	-1.3	-1.2
Health care	0.4	0.4	0.4	1.2	0.3	0.4	0.4
Long-term care	0.1	0.1	0.1	1.7	0.1	0.1	0.1
Others	0.7	0.7	0.7	0.7	0.7	0.7	0.6
Required structural primary balance related to S2	0.2	0.0	0.1	2.6	0.3	0.2	0.3

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, LV	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	A3	A-1	A3	A-1
S&P	A	A-1	A	A-1
Fitch	A-	A-	A-	F1

Sovereign yield spreads (bp) - as of October 2019	10-year	47.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

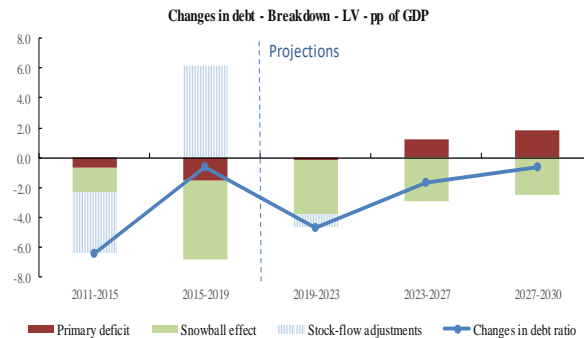
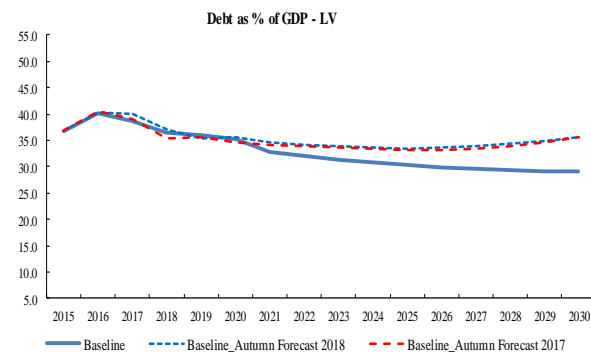
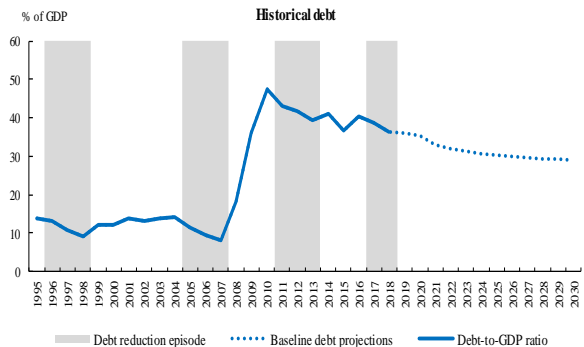
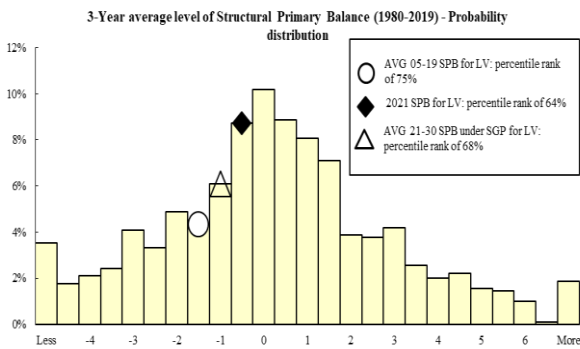
Public debt structure - LV (2018)	Share of short-term government debt (p.p.): 3.0	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents 74.0	Net International Investment Position (IIP) - LV (2018)	Net IIP (% GDP): -49.0
--	---	---	---	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		LV					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		3.0	2.4	1.6	1.5	1.4	6.3
of which One-off guarantees		2.5	1.9	1.1	0.9	0.9	5.8
Standardised guarantees		0.5	0.5	0.5	0.5	0.5	0.4
Public-private partnerships (PPPs) (% GDP)		0.1	0.3	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - LV (2018)	Private sector credit flow (% GDP): -0.2	Change in nominal house price index: 9.6	Bank loans-to-deposits ratio (p.p.): 84.0	Share of non-performing loans (%): 2.3	Change in share of non-performing loans (p.p.): -1.0	NPL coverage ratio 32.6	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):	
							Baseline 0.0%	Stress 0.0%

6. Realism of baseline assumptions



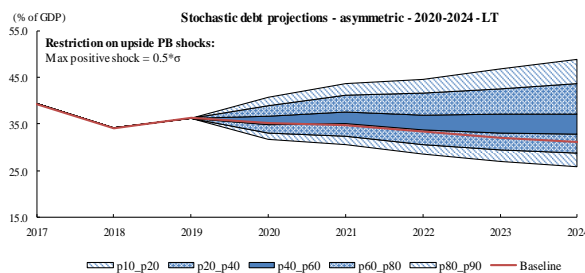
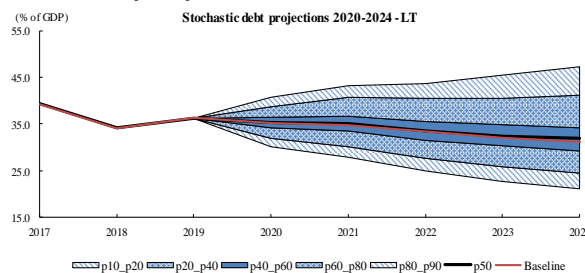
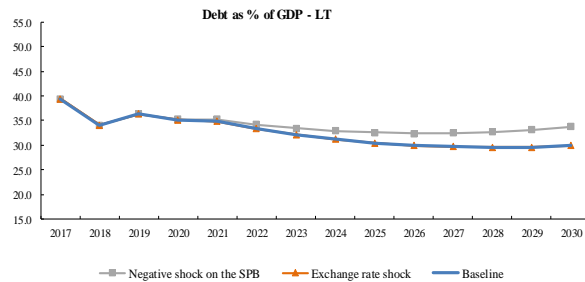
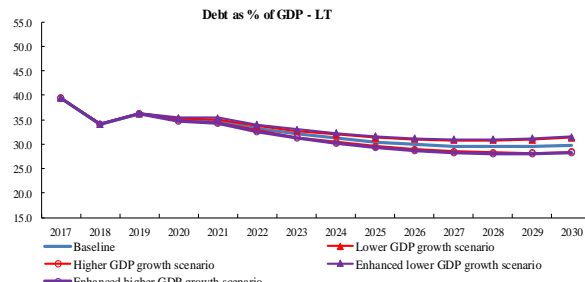
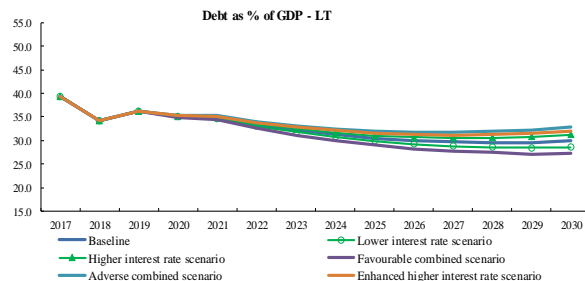
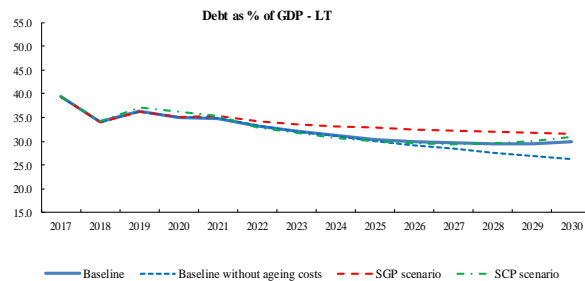
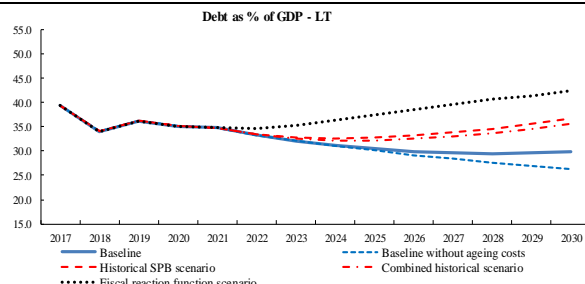
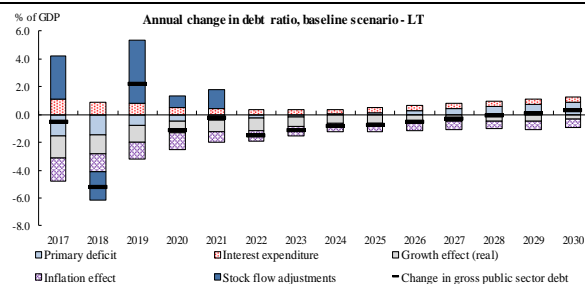
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Latvia									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	36.0	35.2	32.9	30.0	29.4	29.0	34.7	30.2	31.3
Primary balance	0.1	0.1	0.0	-0.4	-0.6	-0.7	0.1	-0.3	-0.2
Structural primary balance (before CoA)	-0.9	-0.4	-0.3	-0.3	-0.3	-0.3	-0.5	-0.3	-0.3
Real GDP growth	2.5	2.6	2.7	1.9	2.1	2.2	2.6	2.0	2.2
Potential GDP growth	3.4	3.5	3.3	1.9	2.1	2.2	3.4	2.1	2.4
Inflation rate	3.1	2.3	2.2	2.0	2.0	2.0	2.5	2.0	2.1
Implicit interest rate (nominal)	2.1	2.0	1.8	1.4	1.3	1.3	2.0	1.4	1.6
2. Fiscal reaction function scenario									
Gross public debt	36.0	35.2	32.9	38.6	40.3	41.5	34.7	38.0	37.2
Primary balance	0.1	0.1	0.0	-2.1	-1.9	-1.7	0.1	-2.0	-1.4
Structural primary balance (before CoA)	-0.9	-0.4	-0.3	-1.9	-1.6	-1.3	-0.5	-1.9	-1.5
Real GDP growth	2.5	2.6	2.7	1.7	2.0	2.1	2.6	2.1	2.2
3. SGP scenario									
Gross public debt	36.0	35.2	33.0	31.4	30.9	30.4	34.7	31.4	32.2
Primary balance	0.1	0.1	-0.1	-0.6	-0.6	-0.6	0.0	-0.5	-0.4
Structural primary balance	-0.9	-0.4	-0.4	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Real GDP growth	2.5	2.6	2.8	1.9	2.1	2.2	2.6	2.0	2.2
4. SCP scenario									
Gross public debt	37.4	36.1	33.5	29.0	28.0	27.3	35.7	29.5	31.1
Primary balance	0.3	0.4	0.6	0.4	0.2	0.1	0.4	0.4	0.4
Structural primary balance (before CoA)	-0.7	0.0	0.5	0.6	0.6	0.6	0.0	0.6	0.4
Real GDP growth	3.2	3.0	2.9	2.2	2.2	2.4	3.0	2.3	2.5
Potential GDP growth	3.5	3.4	3.2	2.2	2.2	2.4	3.4	2.4	2.6
Inflation rate	3.1	2.8	2.5	2.0	2.0	2.0	2.8	2.1	2.2
Implicit interest rate (nominal)	2.2	2.3	2.2	3.0	3.4	3.7	2.2	3.0	2.8
5. Historical SPB scenario									
Gross public debt	36.0	35.2	32.9	32.9	34.0	35.2	34.7	33.2	33.6
Primary balance	0.1	0.1	0.0	-1.3	-1.5	-1.6	0.1	-1.1	-0.8
Structural primary balance (before CoA)	-0.9	-0.4	-0.3	-1.2	-1.2	-1.2	-0.5	-1.0	-0.9
Real GDP growth	2.5	2.6	2.7	1.9	2.1	2.2	2.6	2.1	2.2
6. Combined historical scenario									
Gross public debt	36.0	35.2	32.9	32.2	33.4	34.8	34.7	32.7	33.2
Primary balance	0.1	0.1	0.0	-1.3	-1.5	-1.6	0.1	-1.1	-0.8
Structural primary balance (before CoA)	-0.9	-0.4	-0.3	-1.2	-1.2	-1.2	-0.5	-1.0	-0.9
Real GDP growth	2.5	2.6	2.7	2.5	2.5	2.5	2.6	2.6	2.6
Implicit interest rate (nominal)	2.1	2.0	1.8	1.7	1.8	1.8	2.0	1.7	1.8
7. Higher IR scenario (standard DSA)									
Gross public debt	36.0	35.3	33.0	30.8	30.6	30.5	34.8	31.0	32.0
Implicit interest rate (nominal)	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.0	2.0
8. Lower IR scenario (standard DSA)									
Gross public debt	36.0	35.2	32.7	29.2	28.3	27.7	34.6	29.4	30.7
Implicit interest rate (nominal)	2.1	1.8	1.5	0.9	0.7	0.5	1.8	0.9	1.1
9. Higher IR scenario (enhanced DSA)									
Gross public debt	36.0	35.4	33.2	31.3	31.1	31.1	34.9	31.5	32.3
Implicit interest rate (nominal)	2.1	2.4	2.4	2.1	2.1	2.1	2.3	2.2	2.2
10. Higher growth scenario (standard DSA)									
Gross public debt	36.0	35.1	32.6	29.0	28.2	27.6	34.5	29.2	30.6
Real GDP growth	2.5	3.1	3.2	2.4	2.6	2.7	2.9	2.5	2.6
11. Lower growth scenario (standard DSA)									
Gross public debt	36.0	35.4	33.2	31.0	30.7	30.5	34.9	31.2	32.1
Real GDP growth	2.5	2.1	2.2	1.4	1.6	1.7	2.3	1.5	1.7
12. Higher growth scenario (enhanced DSA)									
Gross public debt	36.0	34.9	32.2	28.6	27.9	27.3	34.3	28.9	30.2
Real GDP growth	2.5	3.7	3.8	2.4	2.6	2.7	3.3	2.5	2.7
13. Lower growth scenario (enhanced DSA)									
Gross public debt	36.0	35.6	33.6	31.4	31.0	30.9	35.1	31.6	32.5
Real GDP growth	2.5	1.5	1.6	1.4	1.6	1.7	1.9	1.5	1.6
14. Lower SPB scenario									
Gross public debt	36.0	35.5	33.5	32.1	32.1	32.2	35.0	32.3	33.0
Primary balance	0.1	-0.3	-0.3	-0.7	-0.9	-1.0	-0.1	-0.7	-0.6
Structural primary balance (before CoA)	-0.9	-0.8	-0.6	-0.6	-0.6	-0.6	-0.8	-0.6	-0.6
Real GDP growth	2.5	2.8	2.7	1.9	2.1	2.2	2.7	2.0	2.2
15. Exchange rate depreciation scenario									
Gross public debt	36.0	35.5	33.3	30.3	29.8	29.4	34.9	30.6	31.6
Exchange rate depreciation	0.0%	0.6%	0.6%	0.0%	0.0%	0.0%	0.4%	0.0%	0.1%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	36.0	35.0	32.4	28.2	27.2	26.3	34.5	28.5	30.0
Implicit interest rate (nominal)	2.1	1.8	1.5	0.9	0.7	0.5	1.8	0.9	1.1
Real GDP growth	2.5	3.1	3.2	2.4	2.6	2.7	2.9	2.5	2.6
17. Adverse combined scenario (GDP & IR)									
Gross public debt	36.0	35.5	33.4	31.8	31.9	32.1	35.0	32.1	32.8
Implicit interest rate (nominal)	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.0	2.0
Real GDP growth	2.5	2.1	2.2	1.4	1.6	1.7	2.3	1.5	1.7

Lithuania

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

LT - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	39.3	34.1	36.3	35.1	34.8	33.3	32.1	31.2	30.5	29.9	29.6	29.5	29.5	29.8
Changes in the ratio (-1+2+3)	-0.6	-5.3	2.2	-1.2	-0.3	-1.5	-1.2	-0.9	-0.7	-0.5	-0.3	-0.1	0.0	0.3
of which														
(1) Primary balance (1.1+1.2+1.3)	1.6	1.5	0.8	0.5	0.4	0.3	0.1	0.0	-0.2	-0.3	-0.5	-0.6	-0.7	-0.9
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.3	0.0	-0.8	-0.4	0.1	0.1	0.0	0.0	-0.2	-0.3	-0.5	-0.6	-0.7	-0.9
(1.1.1) Structural primary balance (bef. CoA)	0.3	0.0	-0.8	-0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
(1.1.2) Cost of ageing						0.0	0.0	0.1	0.2	0.4	0.5	0.7	0.8	1.0
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	1.2	1.5	1.5	0.9	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-2.1	-1.7	-1.6	-1.5	-1.2	-1.3	-1.0	-0.9	-0.9	-0.8	-0.8	-0.7	-0.7	-0.6
(2.1) Interest expenditure	1.1	0.9	0.8	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
(2.2) Growth effect	-1.6	-1.3	-1.2	-0.8	-0.8	-0.9	-0.7	-0.6	-0.6	-0.6	-0.5	-0.4	-0.5	-0.4
(2.3) Inflation effect	-1.6	-1.3	-1.2	-1.2	-0.8	-0.8	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	3.1	-2.1	4.6	0.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	3.1	-2.1	4.6	0.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-0.8	-0.8	-1.6	-0.9	-0.3	-0.3	-0.3	-0.4	-0.5	-0.6	-0.8	-0.9	-1.1	-1.2



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -2.7)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = 0.5)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			29.8	36.7	31.3	31.2	33.7				
Debt peak year			2019	2030	2019	2019	2019				
Percentile rank			57.0%	70.0%							
Probability debt higher									33.3%		
Dif. between percentiles									26.1		

2.2. Sustainability indicators

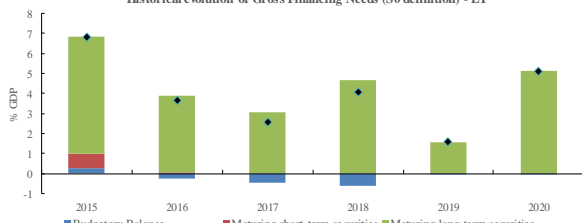
S0 indicator	2009	2019	Critical threshold
Overall index	0.58	0.21	0.46
Fiscal sub-index	0.58	0.00	0.36
Financial competitiveness sub-index	0.57	0.33	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-1.8	-2.7	-0.8	-2.3
of which Gap to the debt-stabilizing primary balance	-0.5	-0.9	0.5	-0.9
Cost of delaying adjustment	-0.3	-0.4	-0.1	-0.3
Debt requirement	-1.7	-2.1	-2.2	-2.1
Ageing costs	0.6	0.7	1.1	1.0
Required structural primary balance related to S1	-1.5	-2.6	-1.7	-2.2

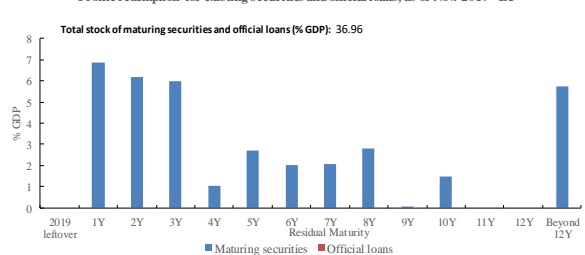
S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	0.5	0.5	1.6	2.9	0.6	1.0	0.8
of which Initial Budgetary position	0.1	0.2	1.2	0.2	0.2	0.2	0.3
Ageing costs	0.4	0.3	0.3	2.7	0.3	0.8	0.5
of which Pensions	-1.1	-1.3	-1.3	-1.2	-1.1	-1.0	-1.0
Health care	0.3	0.3	0.3	0.8	0.2	0.3	0.3
Long-term care	0.8	0.9	0.9	2.7	0.8	1.0	0.8
Others	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Required structural primary balance related to S2	0.8	0.6	0.6	3.0	0.6	1.0	0.9

3. Financing needs and financial information

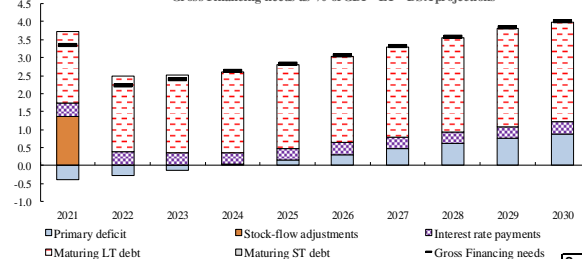
Historical evolution of Gross Financing Needs (S0 definition) - LT



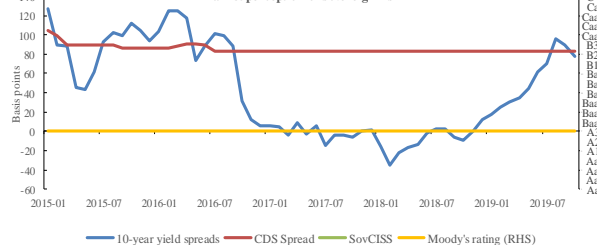
Profile redemption for existing securities and official loans, as of Nov. 2019 - LT



Gross Financing needs as % of GDP - LT - DSA projections



Market perception of sovereign risk - LT



Sovereign Ratings as of Nov 2019, LT	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	A3	A-1	A3	P-2
S&P	A	A-1	A	A-1
Fitch	A-	A-	A-	F1

Sovereign yield spreads (bp) - as of October 2019	10-year	78.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

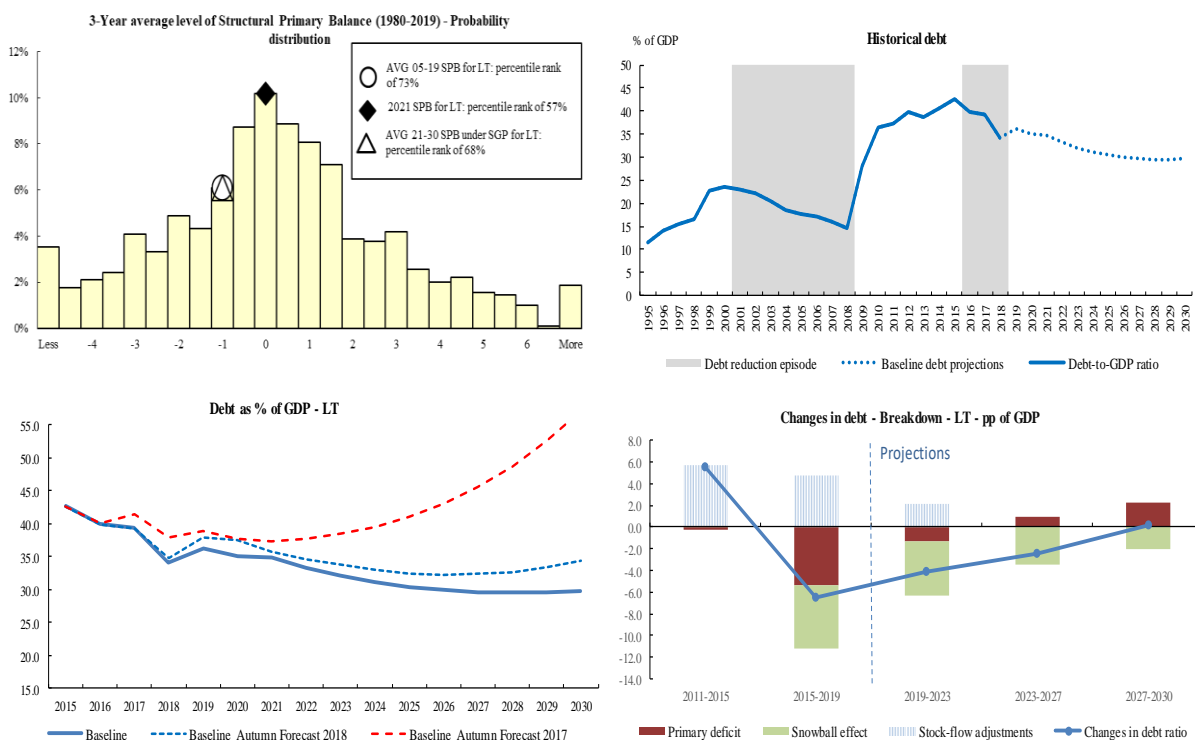
Public debt structure - LT (2018)	Share of short-term government debt (p.p.): 0.7	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents 72.5	Net International Investment Position (IIP) - LT (2018)	Net IIP (% GDP): -31.0
--	--	--	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		LT					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		1.0	0.8	0.8	1.0	1.0	6.3
of which One-off guarantees		0.3	0.3	0.2	0.2	0.3	5.8
Standardised guarantees		0.7	0.6	0.6	0.8	0.8	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - LT (2018)	Private sector credit flow (% GDP): 4.3	Change in nominal house price index: 7.3	Bank loans-to-deposits ratio (p.p.): 87.4	Share of non-performing loans (%): 1.8	Change in share of non-performing loans (p.p.): -0.9	NPL coverage ratio 33.4	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.0%

6. Realism of baseline assumptions



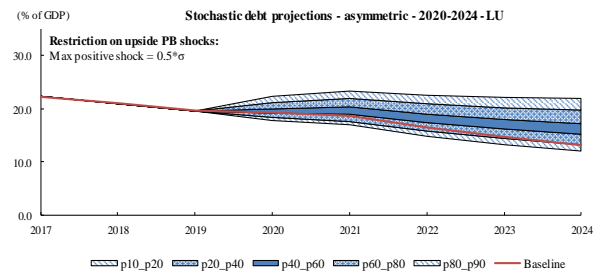
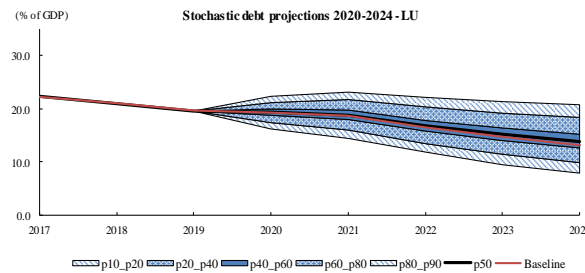
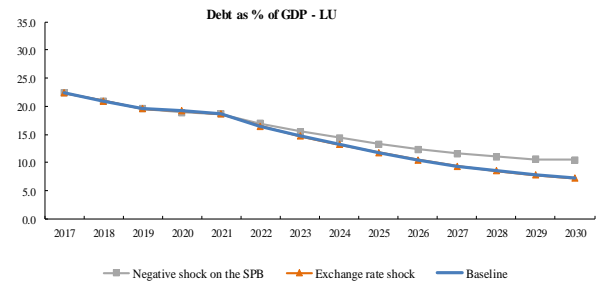
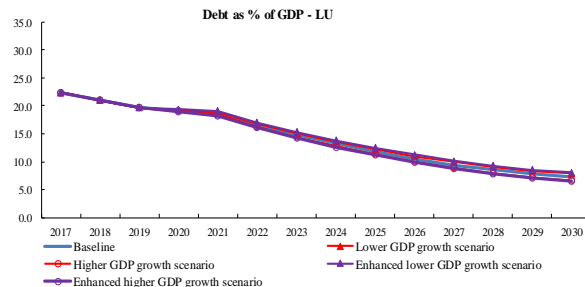
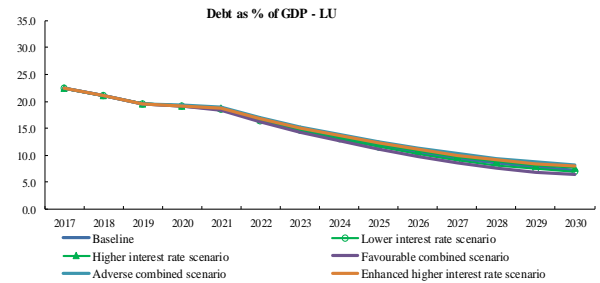
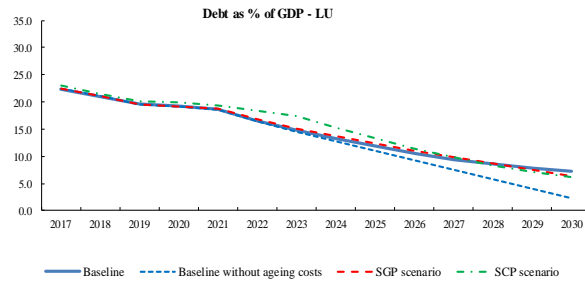
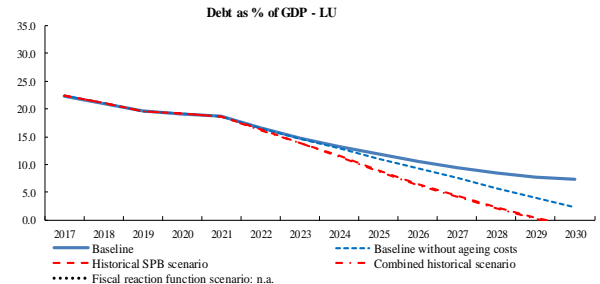
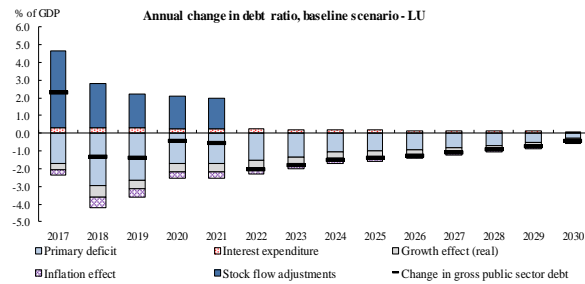
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Lithuania									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	36.3	35.1	34.8	29.9	29.5	29.8	35.4	30.6	31.8
Primary balance	0.8	0.5	0.4	-0.3	-0.6	-0.9	0.6	-0.3	-0.1
Structural primary balance (before CoA)	-0.8	-0.4	0.1	0.1	0.1	0.1	-0.4	0.1	0.0
Real GDP growth	3.8	2.4	2.4	1.9	1.6	1.2	2.9	1.9	2.1
Potential GDP growth	3.6	3.9	3.9	1.9	1.6	1.2	3.8	2.0	2.4
Inflation rate	3.6	3.3	2.4	2.0	2.0	2.0	3.1	2.0	2.3
Implicit interest rate (nominal)	2.5	1.4	1.2	1.1	1.1	1.2	1.7	1.1	1.3
2. Fiscal reaction function scenario									
Gross public debt	36.3	35.1	34.8	38.6	40.6	42.3	35.4	38.5	37.7
Primary balance	0.8	0.5	0.4	-2.0	-1.9	-1.7	0.6	-1.9	-1.3
Structural primary balance (before CoA)	-0.8	-0.4	0.1	-1.7	-1.2	-0.7	-0.4	-1.5	-1.2
Real GDP growth	3.8	2.4	2.4	1.7	1.4	1.1	2.9	1.9	2.2
3. SGP scenario									
Gross public debt	36.3	35.1	35.2	32.5	32.0	31.6	35.5	32.7	33.4
Primary balance	0.8	0.5	-0.2	-0.6	-0.6	-0.5	0.4	-0.5	-0.3
Structural primary balance	-0.8	-0.4	-0.5	-0.6	-0.6	-0.5	-0.6	-0.5	-0.6
Real GDP growth	3.8	2.4	2.8	1.9	1.6	1.2	3.0	1.9	2.2
4. SCP scenario									
Gross public debt	37.0	36.2	35.4	29.5	29.6	30.8	36.2	30.5	32.0
Primary balance	1.2	0.9	0.6	0.0	-0.3	-0.5	0.9	0.0	0.2
Structural primary balance (before CoA)	0.1	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4
Real GDP growth	2.6	2.4	2.3	1.3	1.0	0.6	2.4	1.3	1.6
Potential GDP growth	3.5	3.5	3.1	1.3	1.0	0.6	3.4	1.4	1.9
Inflation rate	2.3	2.2	2.1	2.0	2.0	2.0	2.2	2.0	2.1
Implicit interest rate (nominal)	2.3	1.7	1.3	2.0	2.7	3.3	1.8	2.0	2.0
5. Historical SPB scenario									
Gross public debt	36.3	35.1	34.8	33.1	34.6	36.7	35.4	33.9	34.3
Primary balance	0.8	0.5	0.4	-1.3	-1.6	-1.9	0.6	-1.2	-0.7
Structural primary balance (before CoA)	-0.8	-0.4	0.1	-1.0	-1.0	-1.0	-0.4	-0.8	-0.7
Real GDP growth	3.8	2.4	2.4	1.9	1.6	1.2	2.9	2.0	2.2
6. Combined historical scenario									
Gross public debt	36.3	35.1	34.8	32.5	33.7	35.6	35.4	33.3	33.9
Primary balance	0.8	0.5	0.4	-1.3	-1.6	-1.9	0.6	-1.2	-0.7
Structural primary balance (before CoA)	-0.8	-0.4	0.1	-1.0	-1.0	-1.0	-0.4	-0.8	-0.7
Real GDP growth	3.8	2.4	2.4	2.9	2.9	2.9	2.9	2.9	2.9
Implicit interest rate (nominal)	2.5	1.4	1.2	1.6	2.0	2.3	1.7	1.7	1.7
7. Higher IR scenario (standard DSA)									
Gross public debt	36.3	35.1	34.9	30.7	30.6	31.2	35.4	31.4	32.4
Implicit interest rate (nominal)	2.5	1.6	1.4	1.6	1.7	1.9	1.8	1.6	1.7
8. Lower IR scenario (standard DSA)									
Gross public debt	36.3	35.0	34.7	29.2	28.5	28.5	35.3	29.9	31.2
Implicit interest rate (nominal)	2.5	1.2	1.0	0.6	0.5	0.5	1.5	0.6	0.9
9. Higher IR scenario (enhanced DSA)									
Gross public debt	36.3	35.2	35.1	31.2	31.2	31.9	35.5	31.9	32.8
Implicit interest rate (nominal)	2.5	1.7	1.7	1.8	1.9	2.1	2.0	1.9	1.9
10. Higher growth scenario (standard DSA)									
Gross public debt	36.3	34.9	34.5	28.9	28.3	28.4	35.2	29.6	31.0
Real GDP growth	3.8	2.9	2.9	2.4	2.1	1.7	3.2	2.4	2.6
11. Lower growth scenario (standard DSA)									
Gross public debt	36.3	35.3	35.1	31.0	30.8	31.3	35.5	31.6	32.6
Real GDP growth	3.8	1.9	1.9	1.4	1.1	0.7	2.5	1.4	1.7
12. Higher growth scenario (enhanced DSA)									
Gross public debt	36.3	34.8	34.2	28.7	28.1	28.2	35.1	29.4	30.8
Real GDP growth	3.8	3.3	3.3	2.4	2.1	1.7	3.5	2.4	2.7
13. Lower growth scenario (enhanced DSA)									
Gross public debt	36.3	35.4	35.4	31.2	31.0	31.6	35.7	31.9	32.8
Real GDP growth	3.8	1.5	1.5	1.4	1.1	0.7	2.3	1.4	1.6
14. Lower SPB scenario									
Gross public debt	36.3	35.2	35.3	32.4	32.7	33.7	35.6	33.0	33.7
Primary balance	0.8	0.4	0.0	-0.7	-1.0	-1.3	0.4	-0.7	-0.5
Structural primary balance (before CoA)	-0.8	-0.6	-0.4	-0.4	-0.4	-0.4	-0.6	-0.4	-0.4
Real GDP growth	3.8	2.5	2.6	1.9	1.6	1.2	3.0	1.9	2.2
15. Exchange rate depreciation scenario									
Gross public debt	36.3	35.1	34.8	29.9	29.5	29.8	35.4	30.6	31.8
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	36.3	34.9	34.3	28.3	27.4	27.2	35.1	28.9	30.5
Implicit interest rate (nominal)	2.5	1.2	1.0	0.6	0.5	0.5	1.5	0.6	0.9
Real GDP growth	3.8	2.9	2.9	2.4	2.1	1.7	3.2	2.4	2.6
17. Adverse combined scenario (GDP & IR)									
Gross public debt	36.3	35.3	35.3	31.7	31.9	32.8	35.6	32.4	33.2
Implicit interest rate (nominal)	2.5	1.6	1.4	1.6	1.7	1.9	1.8	1.6	1.7
Real GDP growth	3.8	1.9	1.9	1.4	1.1	0.7	2.5	1.4	1.7

Luxembourg

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

LU - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	22.3	21.0	19.6	19.2	18.6	16.5	14.7	13.2	11.8	10.5	9.4	8.5	7.8	7.3
Changes in the ratio (-1+2+3)	2.3	-1.3	-1.4	-0.4	-0.5	-2.1	-1.8	-1.5	-1.4	-1.3	-1.1	-0.9	-0.7	-0.5
of which														
(1) Primary balance (1.1+1.2+1.3)	1.7	3.0	2.6	1.7	1.7	1.5	1.3	1.1	1.0	0.9	0.8	0.7	0.5	0.3
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.5	2.3	1.9	1.0	1.1	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.5	0.3
(1.1.1) Structural primary balance (bef. CoA)	1.5	2.3	1.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
(1.1.2) Cost of ageing						0.0	0.1	0.3	0.4	0.6	0.8	1.0	1.2	1.5
(1.1.3) Others (taxes and property incomes)						0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6
(1.2) Cyclical component	0.1	0.7	0.7	0.6	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.4	-0.9	-0.7	-0.6	-0.6	-0.5	-0.5	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2
(2.1) Interest expenditure	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
(2.2) Growth effect	-0.3	-0.7	-0.5	-0.5	-0.5	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2
(2.3) Inflation effect	-0.3	-0.5	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	4.3	2.5	1.9	1.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	4.3	2.5	1.9	1.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	1.2	2.0	1.6	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.5	0.4	0.2



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -5.7)	LOW	LOW	LOW	LOW	LOW	LOW	HIGH (S2 = 8.6)	HIGH	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			7.3	-1.0	7.9	7.6	10.5				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			36.0%	24.0%							
Probability debt higher									14.0%		
Dif. between percentiles									12.7		

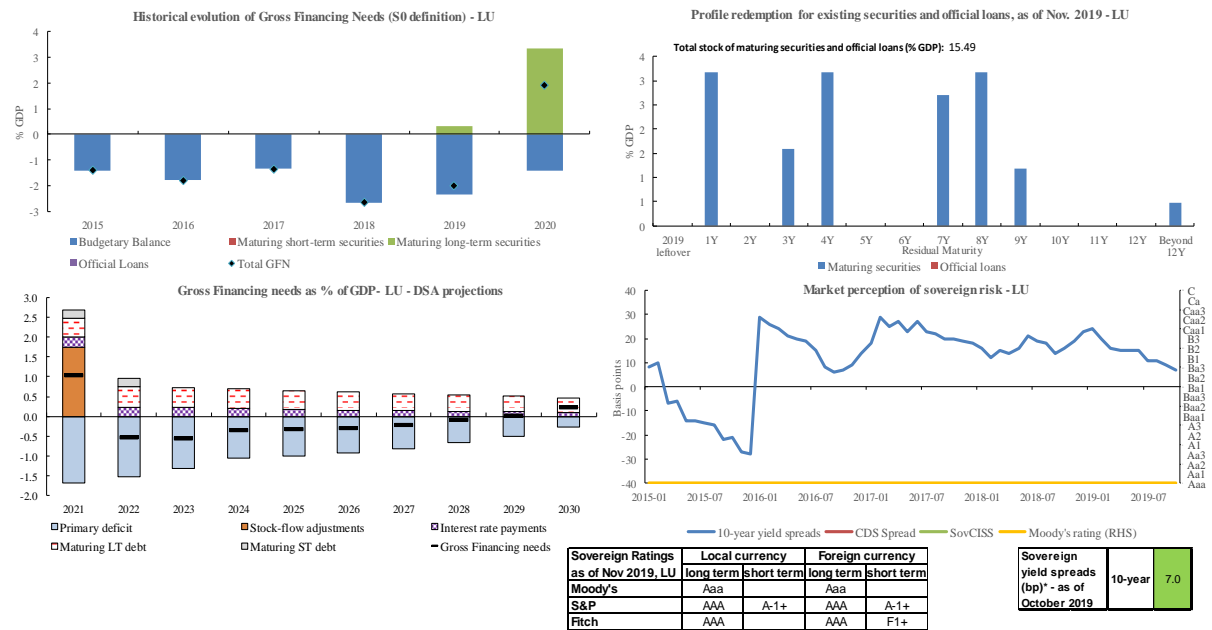
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.23	0.19	0.46	
Fiscal sub-index	0.26	0.00	0.36	
Financial competitiveness sub-index	0.22	0.30	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-4.8	-5.7	-6.6	-5.4
of which <i>Gap to the debt-stabilizing primary balance</i>	-1.7	-2.1	-2.9	-2.1
<i>Cost of delaying adjustment</i>	-0.7	-0.7	-0.9	-0.7
<i>Debt requirement</i>	-3.2	-3.9	-4.6	-3.9
<i>Ageing costs</i>	0.8	1.1	1.8	1.3
Required structural primary balance related to S1	-3.7	-4.5	-4.2	-4.3

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	8.1	8.6	7.6	10.7	8.5	9.3	7.2
of which <i>Initial Budgetary position</i>	-0.6	-0.7	-2.0	-0.7	-0.7	-0.7	-0.7
<i>Ageing costs</i>	8.7	9.4	9.6	11.4	9.2	10.1	7.9
of which <i>Pensions</i>	5.8	6.1	6.3	6.1	6.3	6.5	5.2
<i>Health care</i>	0.8	0.9	0.9	1.2	0.8	0.9	0.8
<i>Long-term care</i>	2.0	2.1	2.1	3.8	1.9	2.4	1.8
<i>Others</i>	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Required structural primary balance related to S2	9.3	9.8	10.0	11.8	9.6	10.5	8.3

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

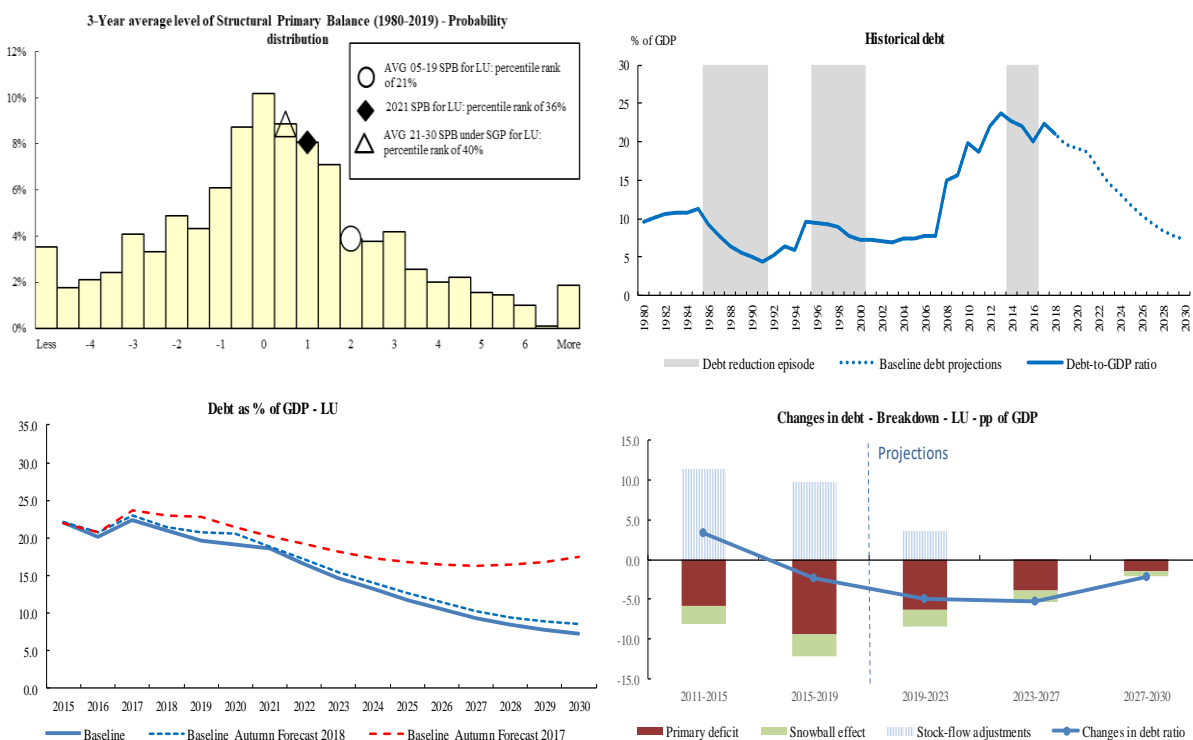
Public debt structure - LU (2018)	Share of short-term government debt (p.p.): 7.2	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents (%): 44.1	Net International Investment Position (IIP) - LU (2018)	Net IIP (% GDP): 59.8
--	---	---	---	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		LU					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		7.9	9.0	11.4	12.8	12.2	6.3
of which	One-off guarantees	7.1	8.2	10.6	12.0	11.3	5.8
	Standardised guarantees	0.8	0.8	0.8	0.9	0.9	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	3.2	4.9	3.6	3.7	3.3	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	3.2	4.9	3.6	3.7	3.3	0.8

Government's contingent liability risks from banking sector - LU (2018)	Private sector credit flow (% GDP): -0.5	Change in nominal house price index: 7.1	Bank loans-to-deposits ratio (p.p.): 136.0	Share of non-performing loans (%): 1.1	Change in share of non-performing loans (p.p.): 0.3	NPL coverage ratio 35.2	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.3% Stress 5.9%

6. Realism of baseline assumptions



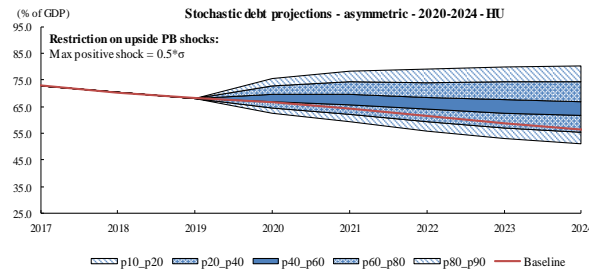
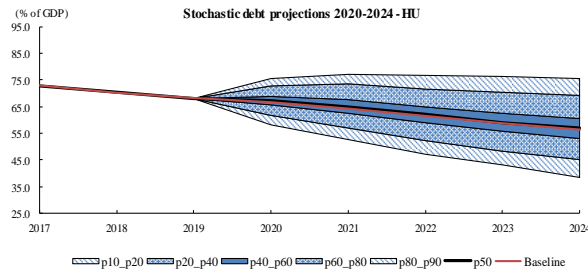
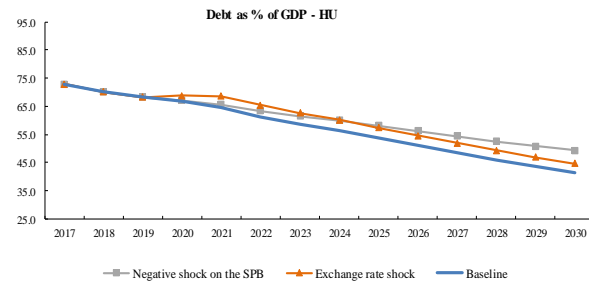
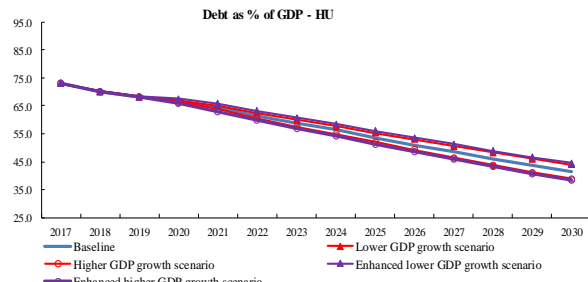
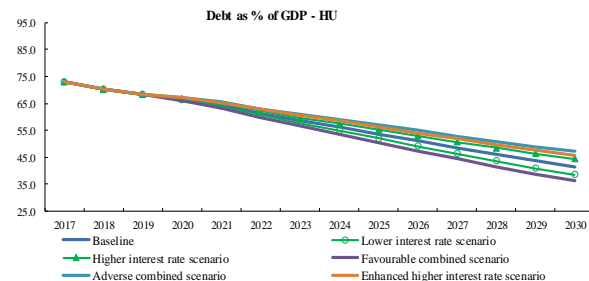
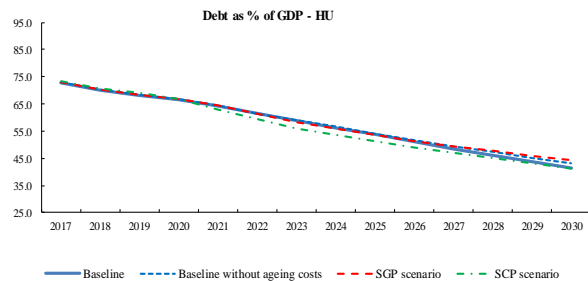
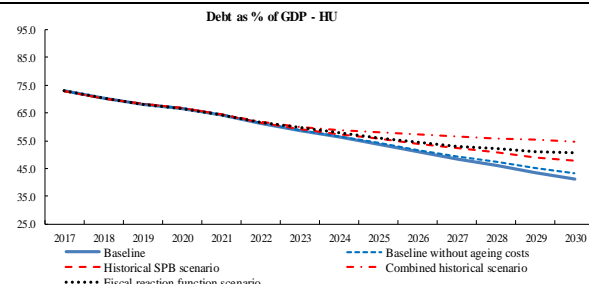
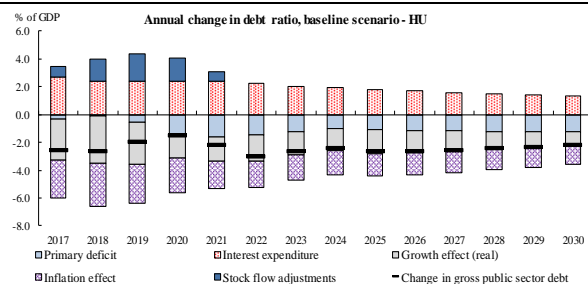
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Luxembourg									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	19.6	19.2	18.6	10.5	8.5	7.3	19.1	11.1	13.1
Primary balance	2.6	1.7	1.7	0.9	0.7	0.3	2.0	0.9	1.2
Structural primary balance (before CoA)	1.9	1.0	1.1	1.1	1.1	1.1	1.4	1.1	1.2
Real GDP growth	2.6	2.6	2.6	2.4	2.1	2.2	2.6	2.3	2.3
Potential GDP growth	2.5	2.7	2.7	2.4	2.1	2.2	2.6	2.4	2.5
Inflation rate	2.2	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Implicit interest rate (nominal)	1.4	1.4	1.4	1.3	1.3	1.3	1.4	1.3	1.4
2. Fiscal reaction function scenario									
Gross public debt	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Primary balance	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Structural primary balance (before CoA)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Real GDP growth	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
3. SGP scenario									
Gross public debt	19.6	19.2	18.7	11.0	8.6	6.4	19.2	11.3	13.2
Primary balance	2.6	1.7	1.6	0.9	0.9	0.9	2.0	1.0	1.2
Structural primary balance (before CoA)	1.9	1.0	1.0	0.9	0.9	0.9	1.3	0.9	1.0
Real GDP growth	2.6	2.6	2.6	2.4	2.1	2.2	2.6	2.3	2.4
4. SCP scenario									
Gross public debt	20.2	19.9	19.3	11.4	8.3	6.1	19.8	11.9	13.9
Primary balance	1.3	1.6	1.6	1.4	1.2	0.8	1.5	1.5	1.5
Structural primary balance (before CoA)	0.8	0.9	0.8	1.6	1.6	1.6	0.8	1.6	1.4
Real GDP growth	3.0	3.8	3.5	1.9	1.8	2.3	3.4	2.2	2.5
Potential GDP growth	2.6	2.9	2.8	1.9	1.8	2.3	2.8	2.2	2.3
Inflation rate	1.1	1.9	1.8	2.0	2.0	2.0	1.6	2.0	1.9
Implicit interest rate (nominal)	1.2	1.2	0.9	1.0	1.0	1.0	1.1	1.0	1.0
5. Historical SPB scenario									
Gross public debt	19.6	19.2	18.6	6.5	2.3	-1.0	19.1	7.0	10.0
Primary balance	2.6	1.7	1.7	2.2	1.9	1.5	2.0	1.9	1.9
Structural primary balance (before CoA)	1.9	1.0	1.1	2.4	2.4	2.4	1.4	2.2	2.0
Real GDP growth	2.6	2.6	2.6	2.4	2.1	2.2	2.6	2.2	2.3
6. Combined historical scenario									
Gross public debt	19.6	19.2	18.6	6.4	2.1	-1.2	19.1	6.9	9.9
Primary balance	2.6	1.7	1.7	2.2	1.9	1.5	2.0	1.9	1.9
Structural primary balance (before CoA)	1.9	1.0	1.1	2.4	2.4	2.4	1.4	2.2	2.0
Real GDP growth	2.6	2.6	2.6	2.7	2.7	2.7	2.6	2.5	2.5
Implicit interest rate (nominal)	1.4	1.4	1.4	1.3	1.3	1.3	1.4	1.3	1.4
7. Higher IR scenario (standard DSA)									
Gross public debt	19.6	19.2	18.7	10.8	8.8	7.6	19.1	11.3	13.3
Implicit interest rate (nominal)	1.4	1.4	1.7	1.7	1.7	1.7	1.5	1.7	1.6
8. Lower IR scenario (standard DSA)									
Gross public debt	19.6	19.2	18.6	10.3	8.2	6.9	19.1	10.8	12.9
Implicit interest rate (nominal)	1.4	1.4	1.1	1.0	1.0	1.0	1.3	1.0	1.1
9. Higher IR scenario (enhanced DSA)									
Gross public debt	19.6	19.2	18.7	11.1	9.2	8.0	19.2	11.6	13.5
Implicit interest rate (nominal)	1.4	1.5	2.0	2.0	2.0	2.0	1.6	2.0	1.9
10. Higher growth scenario (standard DSA)									
Gross public debt	19.6	19.1	18.4	10.0	8.0	6.7	19.0	10.6	12.7
Real GDP growth	2.6	3.1	3.1	2.9	2.6	2.7	2.9	2.8	2.8
11. Lower growth scenario (standard DSA)									
Gross public debt	19.6	19.3	18.8	11.0	9.1	7.9	19.2	11.6	13.5
Real GDP growth	2.6	2.1	2.1	1.9	1.6	1.7	2.2	1.8	1.9
12. Higher growth scenario (enhanced DSA)									
Gross public debt	19.6	18.9	18.2	9.8	7.8	6.5	18.9	10.4	12.6
Real GDP growth	2.6	3.7	3.7	2.9	2.6	2.7	3.3	2.8	2.9
13. Lower growth scenario (enhanced DSA)									
Gross public debt	19.6	19.4	19.0	11.2	9.3	8.1	19.3	11.8	13.7
Real GDP growth	2.6	1.4	1.4	1.9	1.6	1.7	1.8	1.8	1.8
14. Lower SPB scenario									
Gross public debt	19.6	18.9	18.7	12.4	11.1	10.5	19.1	12.9	14.5
Primary balance	2.6	2.0	1.3	0.5	0.3	-0.1	2.0	0.5	0.9
Structural primary balance (before CoA)	1.9	1.3	0.7	0.7	0.7	0.7	1.3	0.7	0.9
Real GDP growth	2.6	2.3	3.1	2.4	2.1	2.2	2.7	2.3	2.4
15. Exchange rate depreciation scenario									
Gross public debt	19.6	19.2	18.6	10.5	8.5	7.3	19.1	11.1	13.1
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	19.6	19.1	18.4	9.8	7.7	6.4	19.0	10.4	12.5
Implicit interest rate (nominal)	1.4	1.4	1.1	1.0	1.0	1.0	1.3	1.0	1.1
Real GDP growth	2.6	3.1	3.1	2.9	2.6	2.7	2.9	2.8	2.8
17. Adverse combined scenario (GDP & IR)									
Gross public debt	19.6	19.3	18.9	11.3	9.4	8.3	19.2	11.8	13.7
Implicit interest rate (nominal)	1.4	1.4	1.7	1.7	1.7	1.7	1.5	1.7	1.6
Real GDP growth	2.6	2.1	2.1	1.9	1.6	1.7	2.2	1.8	1.9

Hungary

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

HU - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	72.9	70.2	68.2	66.7	64.4	61.4	58.7	56.3	53.6	51.0	48.4	46.0	43.6	41.3
Changes in the ratio (-1+2+3)	-2.6	-2.7	-2.0	-1.5	-2.2	-3.0	-2.7	-2.4	-2.7	-2.6	-2.6	-2.5	-2.4	-2.2
of which														
(1) Primary balance (1.1+1.2+1.3)	0.3	0.1	0.6	1.4	1.6	1.5	1.2	1.0	1.1	1.1	1.2	1.2	1.2	1.2
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-1.0	-1.4	-0.9	0.2	0.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2
(1.1.1) Structural primary balance (bef. CoA)	-1.0	-1.4	-0.9	0.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
(1.1.2) Cost of ageing						-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.9	1.5	1.7	1.1	0.7	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.4	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-3.0	-4.1	-3.4	-1.8	-1.3	-1.6	-1.5	-1.4	-1.6	-1.5	-1.4	-1.2	-1.2	-1.0
(2.1) Interest expenditure	2.7	2.4	2.4	2.4	2.4	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3
(2.2) Growth effect	-3.0	-3.4	-3.0	-1.8	-1.8	-1.9	-1.7	-1.6	-1.7	-1.6	-1.5	-1.3	-1.2	-1.0
(2.3) Inflation effect	-2.7	-3.2	-2.8	-2.4	-2.0	-1.9	-1.8	-1.7	-1.6	-1.6	-1.5	-1.4	-1.3	-1.3
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.7	1.6	2.0	1.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	1.0	1.6	1.3	1.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	-0.3	0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-3.7	-3.8	-3.3	-2.1	-1.5	-1.2	-1.1	-0.9	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.3)	LOW	LOW (S1 = -2.7)	LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	MEDIUM (S2 = 2.7)	MEDIUM
Risk category			LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	MEDIUM	MEDIUM
Debt level (2030)			41.3	47.7	44.0	44.4	49.4				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			41.0%	55.0%							
Probability debt higher								22.0%			
Dif. between percentiles								36.9			

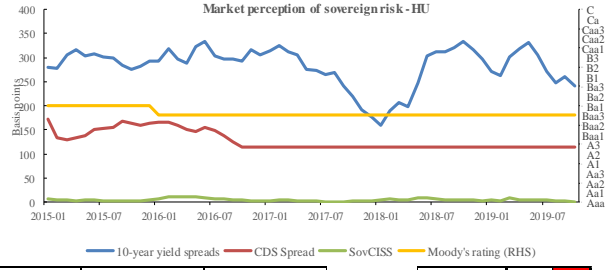
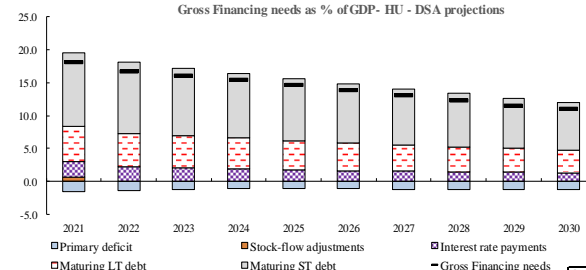
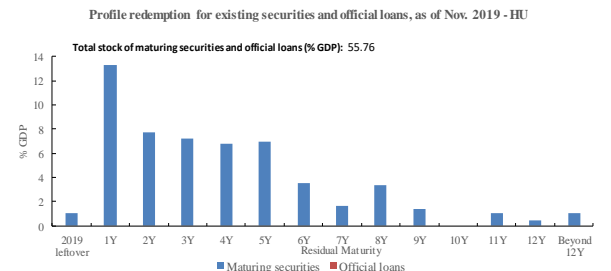
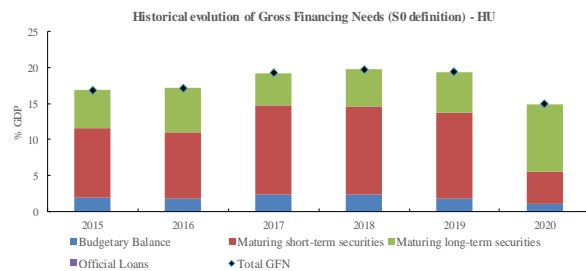
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.74	0.29	0.46
Fiscal sub-index	0.56	0.41	0.36
Financial competitiveness sub-index	0.84	0.22	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	1.1	-2.7	-1.6	-2.2
of which Gap to the debt-stabilizing primary balance	0.4	-2.5	-1.0	-2.5
Cost of delaying adjustment	0.2	-0.4	-0.2	-0.3
Debt requirement	0.7	0.4	-0.4	0.4
Ageing costs	-0.2	-0.2	0.0	0.2
Required structural primary balance related to S1	0.5	-1.8	-1.7	-1.3

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	4.1	2.7	3.8	6.5	3.0	3.3	2.5
of which Initial Budgetary position	1.5	-0.6	0.4	-0.6	-0.5	-0.6	-0.3
Ageing costs	2.7	3.3	3.4	7.1	3.5	4.0	2.8
of which Pensions	1.5	1.9	2.0	1.9	2.2	2.4	1.6
Health care	0.6	0.6	0.6	1.4	0.6	0.7	0.6
Long-term care	0.3	0.4	0.4	3.4	0.3	0.5	0.3
Others	0.3	0.4	0.4	0.4	0.4	0.4	0.3
Required structural primary balance related to S2	3.6	3.6	3.7	7.4	3.9	4.2	3.4

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, HU	Local currency	Foreign currency
Moody's	Baa3	Baa3
S&P	BBB	BBB
Fitch	BBB	BBB

Sovereign yield spreads (bp) - as of October 2019	10-year	241.0
---	---------	-------

4. Risks related to the structure of public debt financing and net International Investment Position

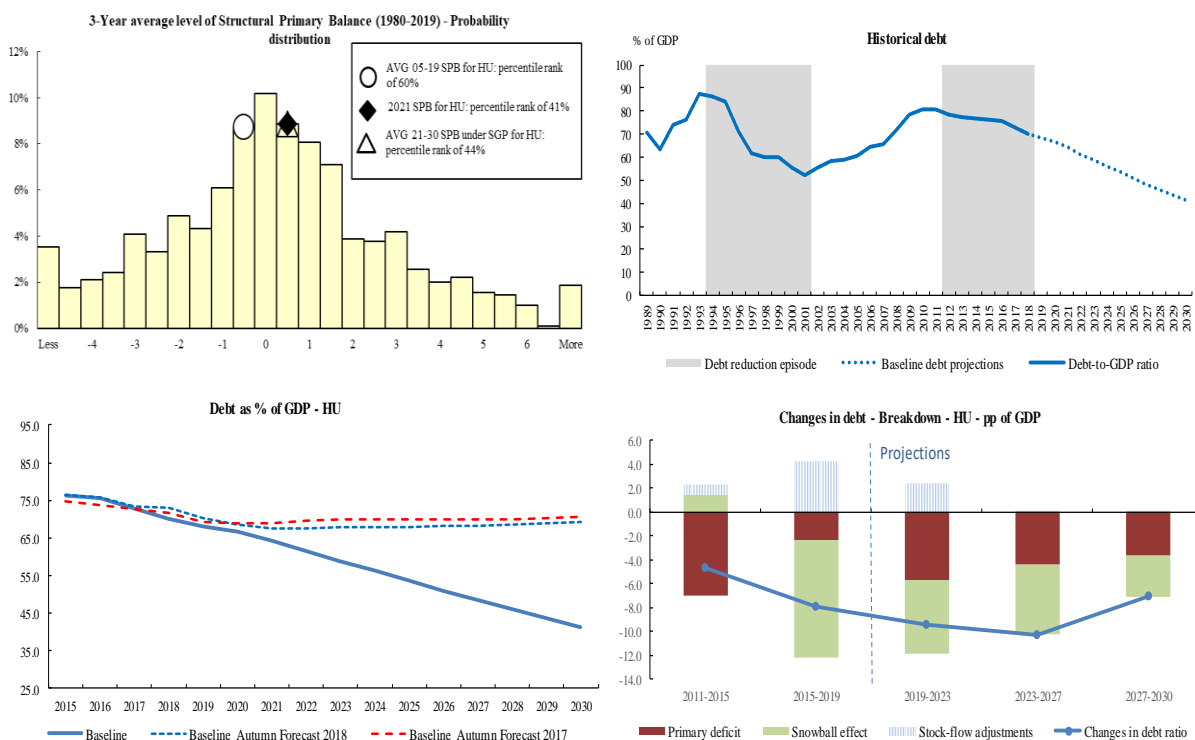
Public debt structure - HU (2018)	Share of short-term government debt (p.p.): 17.9	Share of government debt in foreign currency (%): 22.8	Share of government debt by non-residents (%): 36.5	Net International Investment Position (IIP) - HU (2018)	Net IIP (% GDP): -52.0
--	--	--	---	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		HU					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		8.0	6.6	6.2	5.9	5.1	6.3
of which	One-off guarantees	7.5	6.3	6.0	5.7	5.0	5.8
	Standardised guarantees	0.5	0.3	0.2	0.2	0.1	0.4
Public-private partnerships (PPPs) (% GDP)		2.4	2.2	1.8	1.7	1.5	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - HU (2018)	Private sector credit flow (% GDP): 4.3	Change in nominal house price index: 14.4	Bank loans-to-deposits ratio (p.p.): 79.5	Share of non-performing loans (%): 5.6	Change in share of non-performing loans (p.p.): -2.0	NPL coverage ratio 66.5	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):	
							Baseline	Stress
							0.0%	0.1%

6. Realism of baseline assumptions



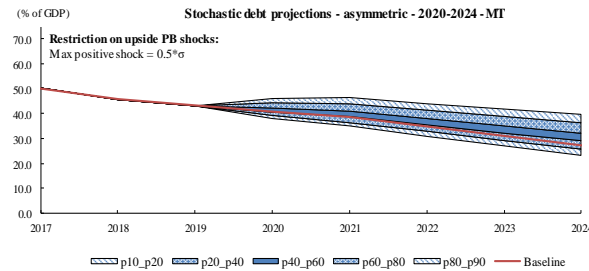
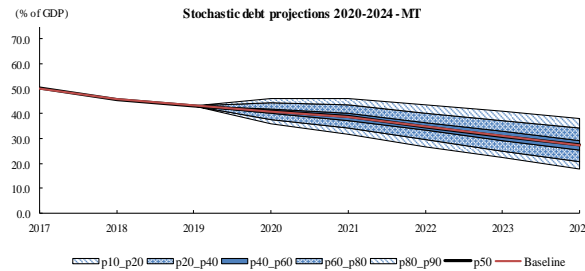
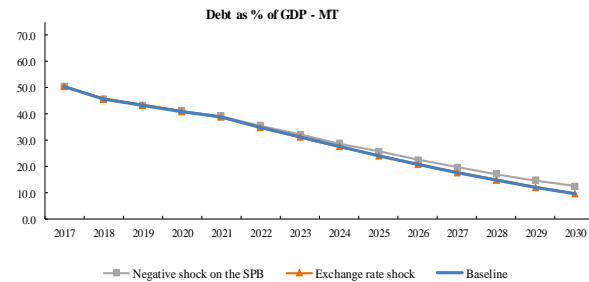
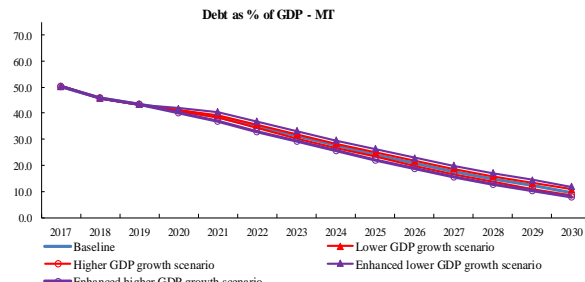
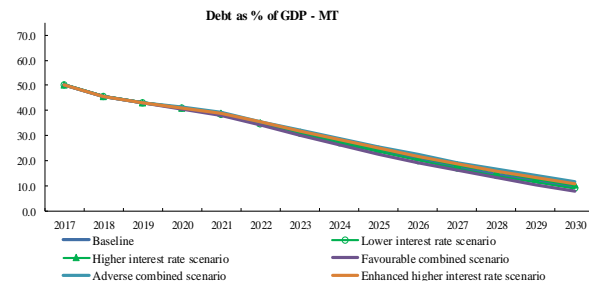
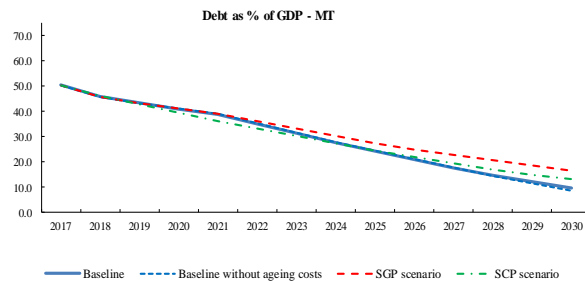
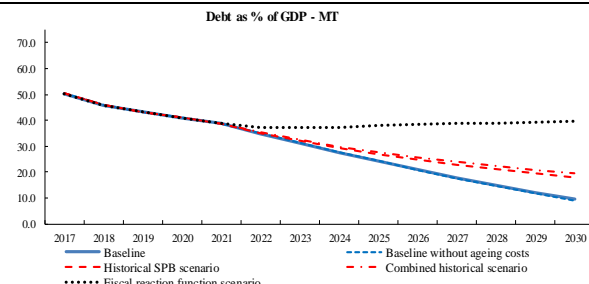
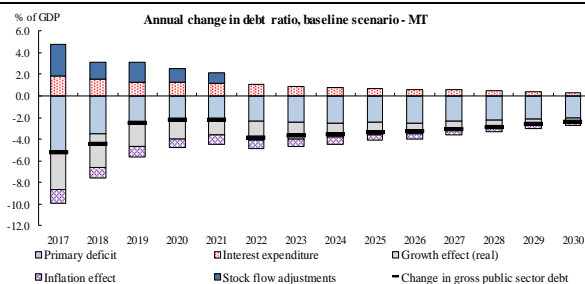
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Hungary									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	68.2	66.7	64.4	51.0	46.0	41.3	66.4	51.1	55.0
Primary balance	0.6	1.4	1.6	1.1	1.2	1.2	1.2	1.2	1.2
Structural primary balance (before CoA)	-0.9	0.2	0.9	0.9	0.9	0.9	0.1	0.9	0.7
Real GDP growth	4.6	2.8	2.8	3.2	2.9	2.5	3.4	3.0	3.1
Potential GDP growth	4.3	3.9	3.8	3.2	2.9	2.5	4.0	3.2	3.4
Inflation rate	4.2	3.7	3.0	3.0	3.0	3.0	3.6	3.0	3.2
Implicit interest rate (nominal)	3.7	3.7	3.8	3.3	3.3	3.2	3.7	3.4	3.5
2. Fiscal reaction function scenario									
Gross public debt	68.2	66.7	64.4	54.4	52.0	50.5	66.4	55.1	58.0
Primary balance	0.6	1.4	1.6	-0.1	-0.4	-0.6	1.2	0.0	0.3
Structural primary balance (before CoA)	-0.9	0.2	0.9	-0.3	-0.7	-0.9	0.1	-0.3	-0.2
Real GDP growth	4.6	2.8	2.8	3.4	3.0	2.6	3.4	3.1	3.2
3. SGP scenario									
Gross public debt	68.2	66.7	64.4	51.4	47.6	44.5	66.4	52.0	55.6
Primary balance	0.6	1.4	1.7	0.7	0.5	0.4	1.2	0.8	0.9
Structural primary balance	-0.9	0.2	1.0	0.7	0.5	0.4	0.1	0.7	0.6
Real GDP growth	4.6	2.8	2.7	3.3	3.0	2.6	3.4	3.0	3.1
4. SCP scenario									
Gross public debt	69.2	66.7	62.8	49.1	44.9	41.2	66.2	49.5	53.7
Primary balance	0.7	0.9	1.0	1.8	1.9	1.9	0.9	1.8	1.6
Structural primary balance (before CoA)	-0.5	-0.1	0.3	1.7	1.7	1.7	-0.1	1.6	1.2
Real GDP growth	4.0	4.0	4.1	2.8	2.6	2.2	4.0	3.0	3.2
Potential GDP growth	3.9	4.1	4.2	2.8	2.6	2.2	4.1	3.0	3.3
Inflation rate	3.8	3.2	3.0	2.0	2.0	2.0	3.3	2.2	2.5
Implicit interest rate (nominal)	3.6	3.6	3.6	4.1	4.4	4.5	3.6	4.1	4.0
5. Historical SPB scenario									
Gross public debt	68.2	66.7	64.4	53.9	50.7	47.7	66.4	54.2	57.2
Primary balance	0.6	1.4	1.6	0.1	0.2	0.2	1.2	0.4	0.6
Structural primary balance (before CoA)	-0.9	0.2	0.9	-0.1	-0.1	-0.1	0.1	0.1	0.1
Real GDP growth	4.6	2.8	2.8	3.2	2.9	2.5	3.4	3.1	3.1
6. Combined historical scenario									
Gross public debt	68.2	66.7	64.4	57.4	56.0	54.6	66.4	57.6	59.8
Primary balance	0.6	1.4	1.6	0.1	0.2	0.2	1.2	0.4	0.6
Structural primary balance (before CoA)	-0.9	0.2	0.9	-0.1	-0.1	-0.1	0.1	0.1	0.1
Real GDP growth	4.6	2.8	2.8	1.8	1.8	1.8	3.4	2.1	2.4
Implicit interest rate (nominal)	3.7	3.7	3.8	3.9	4.0	4.0	3.7	3.9	3.8
7. Higher IR scenario (standard DSA)									
Gross public debt	68.2	66.9	64.9	52.9	48.5	44.4	66.6	53.1	56.5
Implicit interest rate (nominal)	3.7	4.0	4.2	4.0	4.0	4.0	4.0	4.0	4.0
8. Lower IR scenario (standard DSA)									
Gross public debt	68.2	66.5	64.0	49.2	43.6	38.5	66.2	49.4	53.6
Implicit interest rate (nominal)	3.7	3.4	3.4	2.7	2.5	2.5	3.5	2.7	2.9
9. Higher IR scenario (enhanced DSA)									
Gross public debt	68.2	67.1	65.3	54.1	49.7	45.7	66.9	54.1	57.3
Implicit interest rate (nominal)	3.7	4.3	4.6	4.2	4.1	4.1	4.2	4.2	4.2
10. Higher growth scenario (standard DSA)									
Gross public debt	68.2	66.4	63.8	49.2	43.8	38.9	66.1	49.4	53.6
Real GDP growth	4.6	3.3	3.3	3.7	3.4	3.0	3.7	3.5	3.5
11. Lower growth scenario (standard DSA)									
Gross public debt	68.2	67.0	65.1	52.9	48.3	44.0	66.8	53.0	56.4
Real GDP growth	4.6	2.3	2.3	2.7	2.4	2.0	3.1	2.5	2.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	68.2	66.0	63.0	48.5	43.2	38.3	65.7	48.7	53.0
Real GDP growth	4.6	3.9	3.9	3.7	3.4	3.0	4.1	3.5	3.6
13. Lower growth scenario (enhanced DSA)									
Gross public debt	68.2	67.4	65.9	53.6	48.9	44.6	67.2	53.7	57.1
Real GDP growth	4.6	1.7	1.7	2.7	2.4	2.0	2.7	2.5	2.5
14. Lower SPB scenario									
Gross public debt	68.2	67.0	65.6	56.2	52.6	49.4	66.9	56.3	58.9
Primary balance	0.6	0.7	0.7	0.2	0.3	0.3	0.7	0.3	0.4
Structural primary balance (before CoA)	-0.9	-0.5	0.0	0.0	0.0	0.0	-0.5	0.0	-0.1
Real GDP growth	4.6	3.3	2.9	3.2	2.9	2.5	3.6	3.0	3.1
15. Exchange rate depreciation scenario									
Gross public debt	68.2	68.7	68.6	54.7	49.4	44.6	68.5	54.8	58.2
Exchange rate depreciation	0.0%	4.0%	4.0%	0.0%	0.0%	0.0%	2.7%	0.0%	0.7%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	68.2	66.2	63.4	47.4	41.5	36.2	65.9	47.6	52.2
Implicit interest rate (nominal)	3.7	3.4	3.4	2.7	2.6	2.5	3.5	2.7	2.9
Real GDP growth	4.6	3.3	3.3	3.7	3.4	3.0	3.7	3.5	3.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	68.2	67.2	65.5	54.9	50.9	47.2	67.0	55.0	58.0
Implicit interest rate (nominal)	3.7	4.0	4.2	4.0	4.0	4.0	4.0	4.0	4.0
Real GDP growth	4.6	2.3	2.3	2.7	2.4	2.0	3.1	2.5	2.6

Malta

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

MT - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	50.3	45.8	43.3	41.0	38.7	34.9	31.2	27.5	24.1	20.8	17.7	14.8	12.2	9.7
Changes in the ratio (-1+2+3) of which	-5.2	-4.5	-2.5	-2.2	-2.3	-3.9	-3.7	-3.6	-3.4	-3.3	-3.1	-2.9	-2.7	-2.4
(1) Primary balance (1.1+1.2+1.3)	5.2	3.5	2.5	2.3	2.1	2.4	2.4	2.5	2.4	2.5	2.4	2.3	2.2	2.1
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	4.7	2.4	1.8	2.1	2.5	2.6	2.6	2.5	2.4	2.5	2.4	2.3	2.2	2.1
(1.1.1) Structural primary balance (bef. CoA)	4.7	2.4	1.8	2.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
(1.1.2) Cost of ageing						-0.1	-0.1	0.0	0.1	0.0	0.1	0.2	0.3	0.4
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.8	1.1	0.7	0.2	-0.3	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-2.9	-2.6	-1.8	-1.3	-1.1	-1.5	-1.3	-1.1	-1.0	-0.8	-0.7	-0.6	-0.5	-0.4
(2.1) Interest expenditure	1.8	1.5	1.3	1.3	1.2	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.3
(2.2) Growth effect	-3.4	-3.1	-2.1	-1.7	-1.5	-1.7	-1.5	-1.3	-1.1	-1.0	-0.9	-0.7	-0.6	-0.4
(2.3) Inflation effect	-1.3	-1.0	-1.0	-0.8	-0.8	-0.8	-0.7	-0.6	-0.5	-0.5	-0.4	-0.3	-0.3	-0.2
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	2.9	1.6	1.8	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	2.9	1.6	1.8	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	2.8	0.8	0.5	0.8	1.3	1.6	1.6	1.7	1.7	1.9	1.8	1.8	1.8	1.8



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.1)	LOW	LOW (S1 = -6.4)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 3)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			9.7	18.1	10.9	10.4	12.5				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			20.0%	31.0%							
Probability debt higher									3.1%		
Dif. between percentiles									20.3		

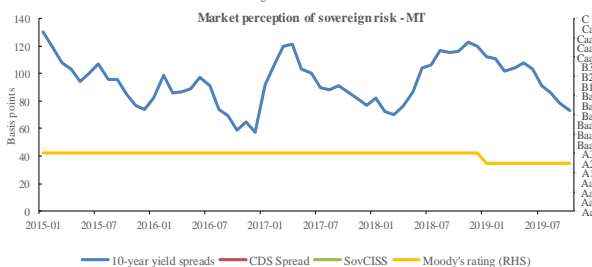
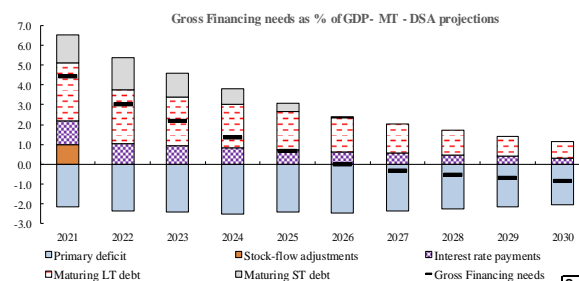
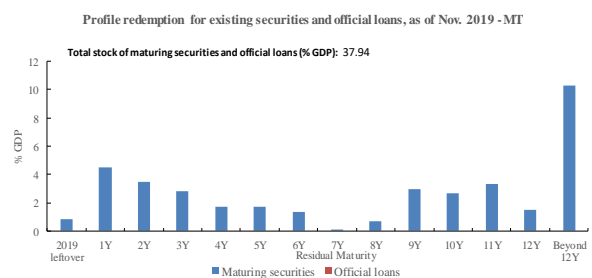
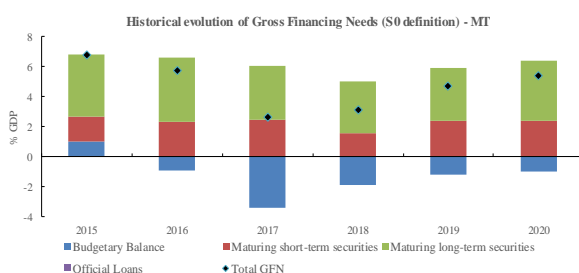
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.45	0.06	0.46
Fiscal sub-index	0.20	0.04	0.36
Financial competitiveness sub-index	0.58	0.08	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-4.7	-6.4	-4.9	-5.9
of which Gap to the debt-stabilizing primary balance	-2.9	-4.0	-2.0	-4.0
Cost of delaying adjustment	-0.7	-0.8	-0.6	-0.7
Debt requirement	-1.5	-2.0	-2.9	-2.0
Ageing costs	0.3	0.3	0.7	0.8
Required structural primary balance related to S1	-2.5	-4.0	-3.7	-3.4

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	3.3	3.0	4.4	5.4	3.1	3.7	2.2
of which Initial Budgetary position	-1.7	-2.2	-0.9	-2.2	-2.2	-2.2	-2.1
Ageing costs	5.0	5.2	5.4	7.6	5.2	5.9	4.3
of which Pensions	1.9	2.0	2.1	2.0	2.2	2.4	1.5
Health care	1.8	1.8	1.9	2.9	1.7	1.9	1.6
Long-term care	1.0	1.0	1.0	2.3	0.9	1.1	0.9
Others	0.3	0.4	0.4	0.4	0.4	0.4	0.3
Required structural primary balance related to S2	5.5	5.5	5.6	7.9	5.5	6.1	4.7

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, MT	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	A2	A-2	A-	A-2
S&P	A-	A-2	A-	A-2
Fitch	A+	A+	A+	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	73.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

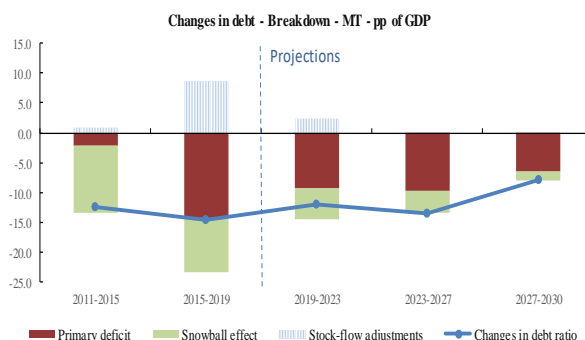
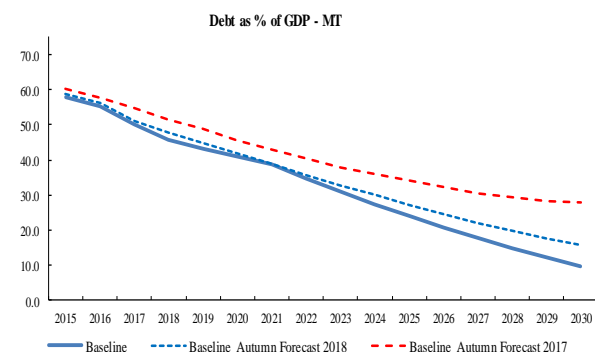
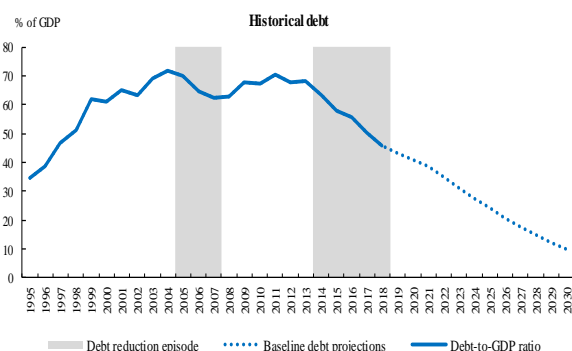
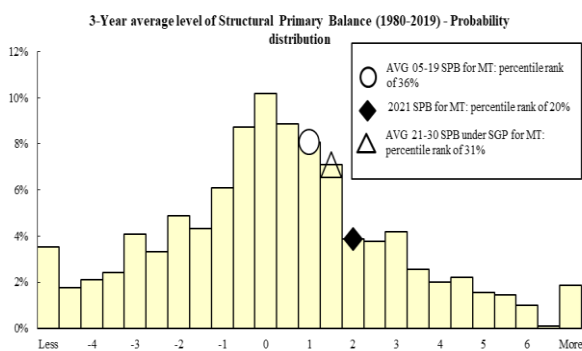
Public debt structure - MT (2018)	Share of short-term government debt (p.p.): 7.4	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents (%): 13.0	Net International Investment Position (IIP) - MT (2018)	Net IIP (% GDP): 62.7
--	---	---	---	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		MT					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		12.7	15.7	14.7	13.8	9.6	6.3
of which	One-off guarantees	12.7	15.7	14.7	13.8	9.6	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.1	0.1	0.1	0.1	0.1	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	n.a.	n.a.	n.a.	n.a.	n.a.	0.7
	Securities issued under liquidity schemes	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
	Special purpose entity	n.a.	n.a.	n.a.	n.a.	n.a.	0.1
	Total	n.a.	n.a.	n.a.	n.a.	n.a.	0.8

Government's contingent liability risks from banking sector - MT (2018)	Private sector credit flow (% GDP): 7.5	Change in nominal house price index: 5.8	Bank loans-to-deposits ratio (p.p.): 52.1	Share of non-performing loans (%): 3.0	Change in share of non-performing loans (p.p.): -0.8	NPL coverage ratio 25.7	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.2% Stress 4.7%

6. Realism of baseline assumptions



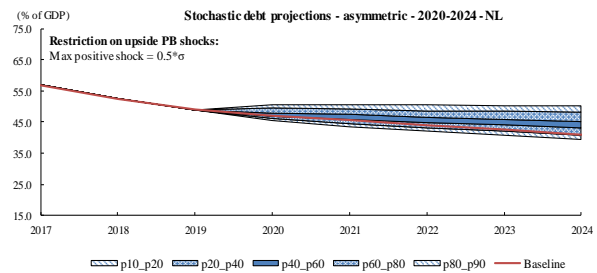
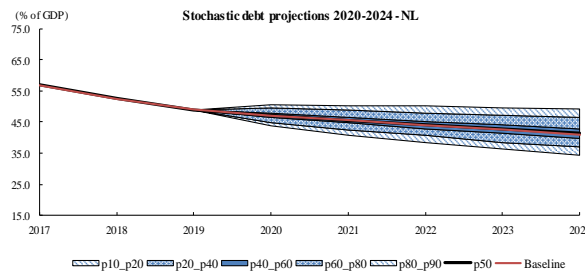
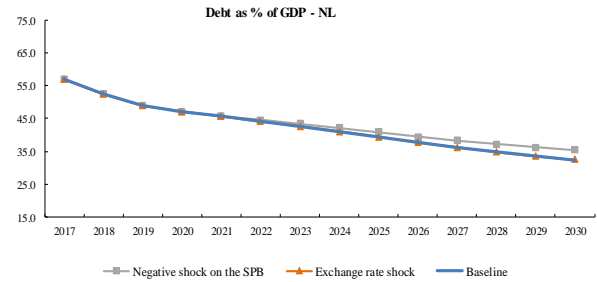
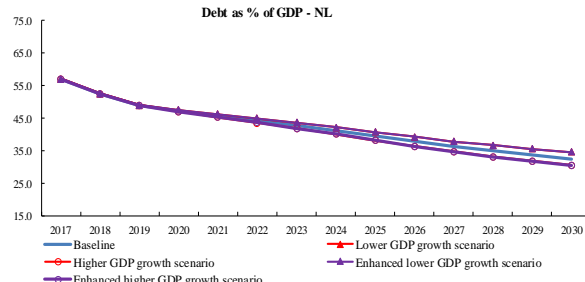
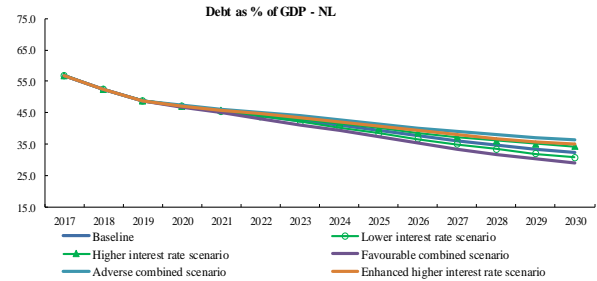
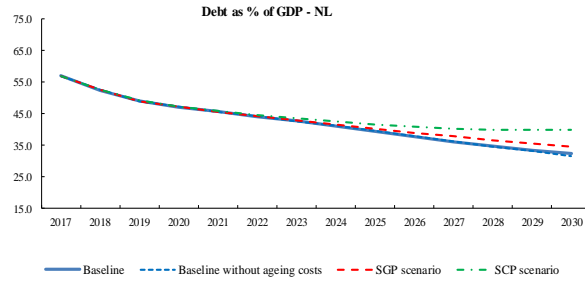
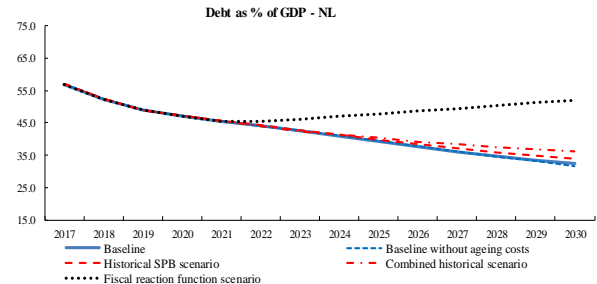
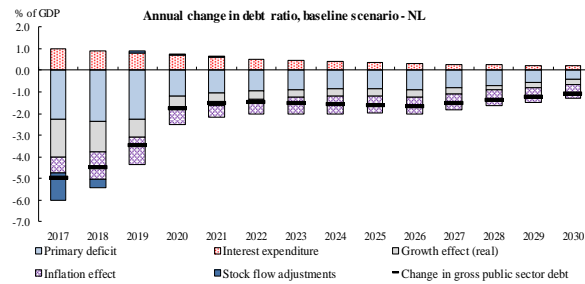
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Malta									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	43.3	41.0	38.7	20.8	14.8	9.7	41.0	21.4	26.3
Primary balance	2.5	2.3	2.1	2.5	2.3	2.1	2.3	2.4	2.3
Structural primary balance (before CoA)	1.8	2.1	2.5	2.5	2.5	2.5	2.1	2.5	2.4
Real GDP growth	5.0	4.2	3.8	4.4	4.3	3.8	4.3	4.4	4.4
Potential GDP growth	5.8	5.3	4.9	4.4	4.3	3.8	5.3	4.3	4.6
Inflation rate	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0
Implicit interest rate (nominal)	3.1	3.1	3.0	2.8	2.8	2.8	3.1	2.8	2.8
2. Fiscal reaction function scenario									
Gross public debt	43.3	41.0	38.7	38.3	39.0	39.7	41.0	38.3	39.0
Primary balance	2.5	2.3	2.1	-2.0	-1.9	-1.9	2.3	-1.7	-0.7
Structural primary balance (before CoA)	1.8	2.1	2.5	-2.0	-1.7	-1.4	2.1	-1.6	-0.7
Real GDP growth	5.0	4.2	3.8	4.4	4.2	3.7	4.3	4.7	4.6
3. SGP scenario									
Gross public debt	43.3	41.0	39.1	25.0	20.5	16.6	41.1	25.5	29.4
Primary balance	2.5	2.3	1.6	1.5	1.3	1.2	2.1	1.4	1.6
Structural primary balance	1.8	2.1	2.0	1.5	1.3	1.2	1.9	1.5	1.6
Real GDP growth	5.0	4.2	4.2	4.5	4.3	3.8	4.4	4.4	4.4
4. SCP scenario									
Gross public debt	42.7	39.4	36.2	21.9	17.1	13.1	39.4	22.4	26.7
Primary balance	2.3	2.2	2.2	2.1	1.9	1.7	2.2	2.0	2.0
Structural primary balance (before CoA)	1.9	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2
Real GDP growth	6.2	5.7	5.1	4.0	3.8	3.3	5.7	3.9	4.4
Potential GDP growth	6.5	6.5	5.3	4.0	3.8	3.3	6.1	3.9	4.5
Inflation rate	2.9	2.4	2.2	2.0	2.0	2.0	2.5	2.0	2.1
Implicit interest rate (nominal)	3.3	3.1	3.2	3.5	3.6	3.6	3.2	3.4	3.4
5. Historical SPB scenario									
Gross public debt	43.3	41.0	38.7	24.8	21.1	18.1	41.0	25.5	29.4
Primary balance	2.5	2.3	2.1	1.2	1.0	0.8	2.3	1.2	1.5
Structural primary balance (before CoA)	1.8	2.1	2.5	1.2	1.2	1.2	2.1	1.4	1.6
Real GDP growth	5.0	4.2	3.8	4.4	4.3	3.8	4.3	4.5	4.4
6. Combined historical scenario									
Gross public debt	43.3	41.0	38.7	25.8	22.3	19.6	41.0	26.5	30.1
Primary balance	2.5	2.3	2.1	1.2	1.0	0.8	2.3	1.2	1.5
Structural primary balance (before CoA)	1.8	2.1	2.5	1.2	1.2	1.2	2.1	1.4	1.6
Real GDP growth	5.0	4.2	3.8	4.3	4.3	4.3	4.3	4.3	4.3
Implicit interest rate (nominal)	3.1	3.1	3.0	3.1	3.3	3.4	3.1	3.1	3.1
7. Higher IR scenario (standard DSA)									
Gross public debt	43.3	41.1	38.9	21.4	15.5	10.4	41.1	22.0	26.7
Implicit interest rate (nominal)	3.1	3.2	3.3	3.1	3.1	3.1	3.2	3.1	3.1
8. Lower IR scenario (standard DSA)									
Gross public debt	43.3	40.9	38.6	20.3	14.2	9.1	40.9	20.9	25.9
Implicit interest rate (nominal)	3.1	2.9	2.8	2.4	2.4	2.4	2.9	2.5	2.6
9. Higher IR scenario (enhanced DSA)									
Gross public debt	43.3	41.1	39.0	21.8	16.0	10.9	41.1	22.4	27.1
Implicit interest rate (nominal)	3.1	3.4	3.5	3.3	3.3	3.3	3.3	3.3	3.3
10. Higher growth scenario (standard DSA)									
Gross public debt	43.3	40.8	38.4	19.8	13.8	8.6	40.8	20.5	25.6
Real GDP growth	5.0	4.7	4.3	4.9	4.8	4.3	4.6	4.9	4.8
11. Lower growth scenario (standard DSA)									
Gross public debt	43.3	41.2	39.1	21.8	15.9	10.9	41.2	22.4	27.1
Real GDP growth	5.0	3.7	3.3	3.9	3.8	3.3	4.0	3.9	3.9
12. Higher growth scenario (enhanced DSA)									
Gross public debt	43.3	40.1	37.0	18.8	12.8	7.7	40.1	19.5	24.6
Real GDP growth	5.0	6.4	6.0	4.9	4.8	4.3	5.8	4.9	5.1
13. Lower growth scenario (enhanced DSA)									
Gross public debt	43.3	41.9	40.6	23.0	17.0	11.9	41.9	23.6	28.2
Real GDP growth	5.0	1.9	1.5	3.9	3.8	3.3	2.8	3.9	3.6
14. Lower SPB scenario									
Gross public debt	43.3	41.1	39.1	22.6	17.1	12.5	41.1	23.2	27.6
Primary balance	2.5	2.2	1.8	2.1	1.9	1.7	2.2	2.0	2.1
Structural primary balance (before CoA)	1.8	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1
Real GDP growth	5.0	4.2	4.0	4.4	4.3	3.8	4.4	4.4	4.4
15. Exchange rate depreciation scenario									
Gross public debt	43.3	41.0	38.7	20.8	14.8	9.7	41.0	21.4	26.3
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	43.3	40.7	38.2	19.3	13.2	8.0	40.7	20.1	25.2
Implicit interest rate (nominal)	3.1	2.9	2.8	2.5	2.5	2.5	2.9	2.5	2.6
Real GDP growth	5.0	4.7	4.3	4.9	4.8	4.3	4.6	4.9	4.8
17. Adverse combined scenario (GDP & IR)									
Gross public debt	43.3	41.3	39.3	22.4	16.6	11.7	41.3	22.9	27.5
Implicit interest rate (nominal)	3.1	3.2	3.3	3.1	3.1	3.1	3.2	3.1	3.1
Real GDP growth	5.0	3.7	3.3	3.9	3.8	3.3	4.0	3.9	3.9

Netherlands

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

NL - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	56.9	52.4	48.9	47.1	45.6	44.1	42.6	41.0	39.3	37.7	36.1	34.8	33.5	32.4
Changes in the ratio (-1+2+3) of which	-5.0	-4.5	-3.5	-1.8	-1.5	-1.5	-1.5	-1.6	-1.6	-1.7	-1.5	-1.4	-1.2	-1.1
(1) Primary balance (1.1+1.2+1.3)	2.3	2.4	2.2	1.2	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.7	0.6	0.4
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.7	1.8	1.5	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.7	0.6	0.4
(1.1.1) Structural primary balance (bef. CoA)	1.7	1.8	1.5	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
(1.1.2) Cost of ageing						0.1	0.1	0.2	0.3	0.3	0.5	0.7	1.0	1.2
(1.1.3) Others (taxes and property incomes)						0.1	0.2	0.3	0.4	0.4	0.5	0.7	0.7	0.8
(1.2) Cyclical component	0.1	0.6	0.6	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.5	-1.7	-1.3	-0.6	-0.5	-0.5	-0.6	-0.7	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
(2.1) Interest expenditure	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2
(2.2) Growth effect	-1.7	-1.4	-0.9	-0.6	-0.6	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	-0.3
(2.3) Inflation effect	-0.8	-1.2	-1.3	-0.7	-0.6	-0.7	-0.8	-0.8	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-1.2	-0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-1.2	-0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	0.7	0.9	0.7	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.5	0.4	0.3	0.2



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -3.2)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 2.8)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			32.4	33.9	34.5	34.2	35.4				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			43.0%	46.0%							
Probability debt higher									10.8%		
Dif. between percentiles									14.8		

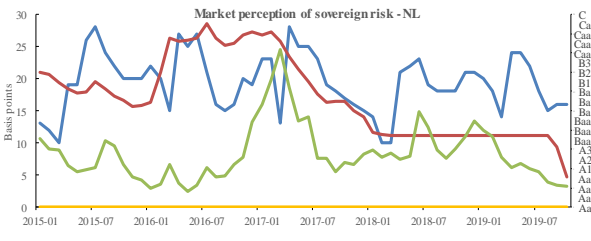
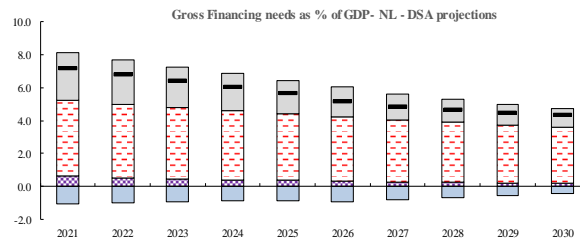
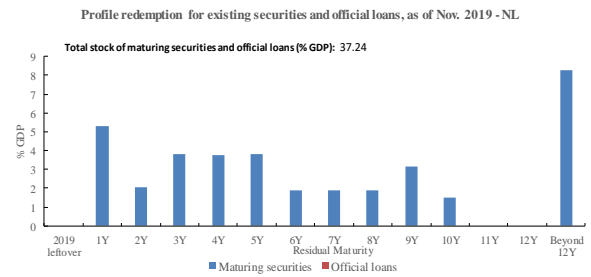
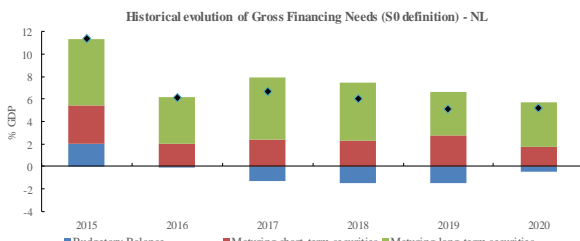
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.41	0.16	0.46
Fiscal sub-index	0.57	0.00	0.36
Financial competitiveness sub-index	0.33	0.24	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-1.7	-3.2	-2.6	-2.9
of which Gap to the debt-stabilizing primary balance	-0.9	-1.9	-1.5	-1.9
Cost of delaying adjustment	-0.3	-0.4	-0.4	-0.4
Debt requirement	-1.0	-1.3	-1.8	-1.3
Ageing costs	0.4	0.4	1.0	0.6
Required structural primary balance related to S1	-1.2	-2.4	-2.0	-2.1

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	3.0	2.8	3.1	4.8	2.7	3.1	2.7
of which Initial Budgetary position	0.2	0.0	0.2	0.0	0.0	0.0	0.1
Ageing costs	2.8	2.8	2.9	4.8	2.7	3.1	2.6
of which Pensions	0.5	0.6	0.6	0.6	0.6	0.5	0.5
Health care	0.6	0.5	0.6	1.0	0.5	0.6	0.5
Long-term care	2.0	1.9	1.9	3.5	1.8	2.2	1.7
Others	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2
Required structural primary balance related to S2	3.6	3.6	3.6	5.6	3.5	3.8	3.5

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, NL	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	AaaU	A-1+u	AaaU	P-1u
S&P	AAAU	A-1+u	AAAU	A-1+u
Fitch	AAA	A-1+u	AAA	A-1+u

Sovereign yield spreads (bp) - as of October 2019	10-year	16.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

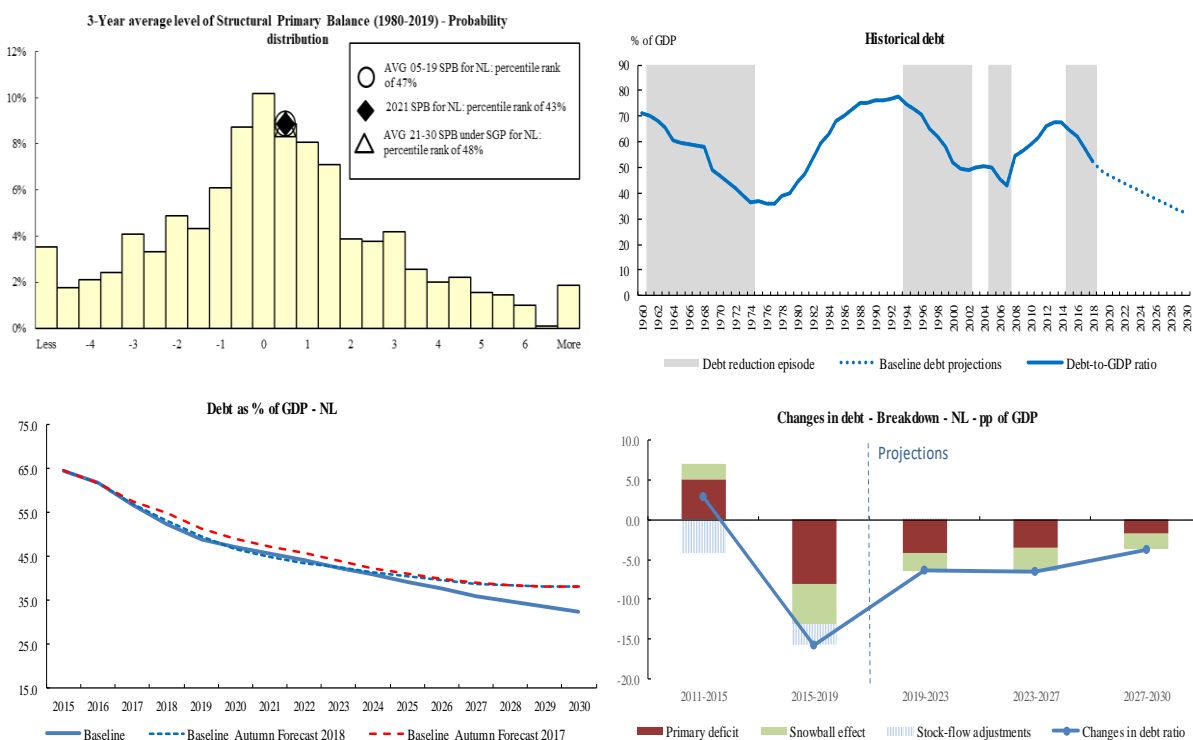
Public debt structure - NL (2018)	Share of short-term government debt (p.p.): 9.5	Share of government debt in foreign currency (%): 0.2	Share of government debt by non-residents (%): 40.0	Net International Investment Position (IIP) - NL (2018)	Net IIP (% GDP): 70.7
--	---	---	---	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		NL					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		9.4	6.7	3.9	3.7	3.6	6.3
of which	One-off guarantees	9.4	6.7	3.9	3.7	3.6	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	5.2	1.6	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	5.2	1.6	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - NL (2018)	Private sector credit flow (% GDP): 4.5	Change in nominal house price index: 9.5	Bank loans-to-deposits ratio (p.p.): 126.0	Share of non-performing loans (%): 1.9	Change in share of non-performing loans (p.p.): -0.2	NPL coverage ratio 24.2	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.1% Stress 0.7%

6. Realism of baseline assumptions



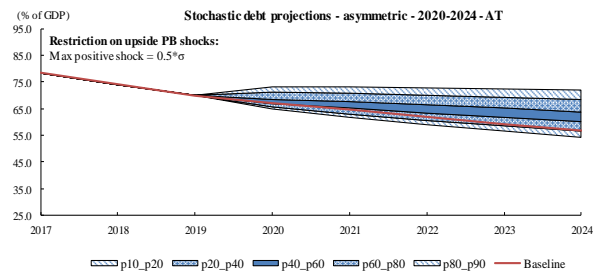
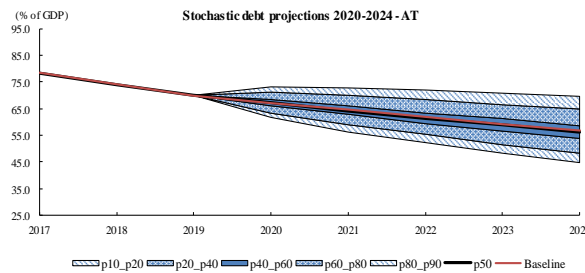
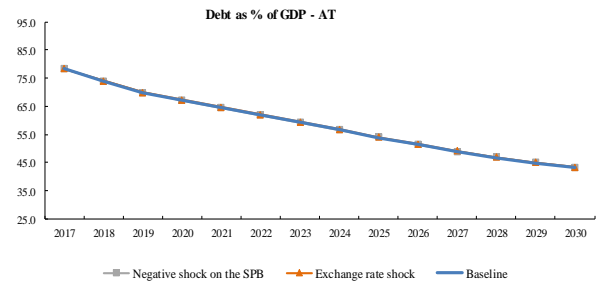
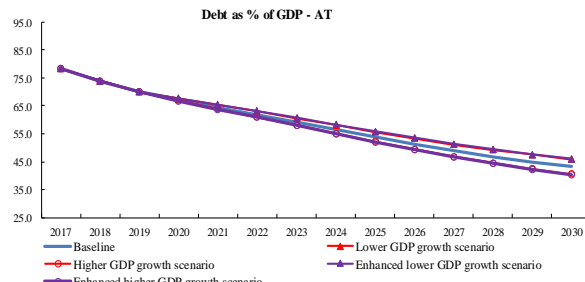
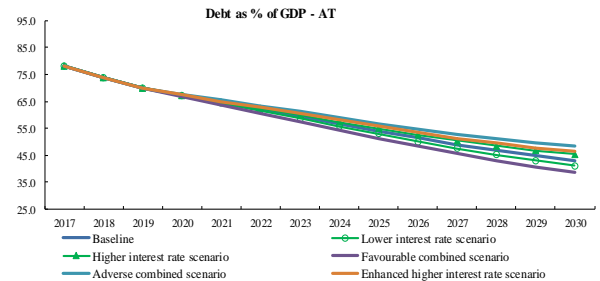
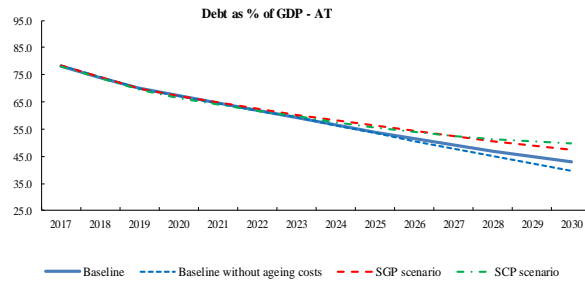
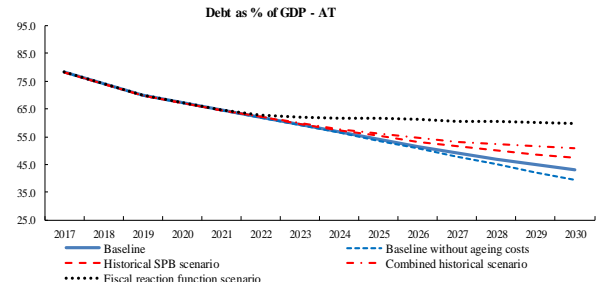
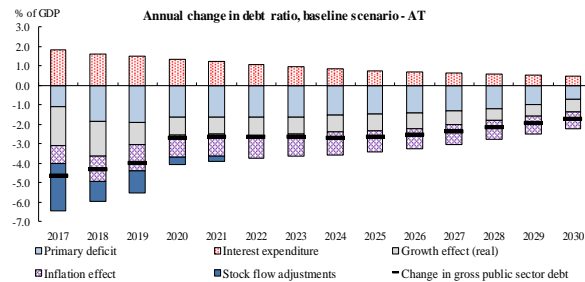
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Netherlands									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	48.9	47.1	45.6	37.7	34.8	32.4	47.2	37.9	40.3
Primary balance	2.2	1.2	1.0	0.9	0.7	0.4	1.5	0.8	1.0
Structural primary balance (before CoA)	1.5	0.8	0.8	0.8	0.8	0.8	1.0	0.8	0.8
Real GDP growth	1.7	1.3	1.3	0.8	0.6	0.8	1.4	0.7	0.9
Potential GDP growth	1.8	1.7	1.4	0.8	0.6	0.8	1.6	0.8	1.0
Inflation rate	2.5	1.5	1.2	2.0	2.0	2.0	1.7	1.9	1.9
Implicit interest rate (nominal)	1.5	1.4	1.3	0.8	0.7	0.6	1.4	0.9	1.0
2. Fiscal reaction function scenario									
Gross public debt	48.9	47.1	45.6	48.6	50.4	52.1	47.2	48.7	48.3
Primary balance	2.2	1.2	1.0	-1.8	-1.9	-1.9	1.5	-1.7	-0.9
Structural primary balance (before CoA)	1.5	0.8	0.8	-2.0	-1.8	-1.5	1.0	-1.7	-1.0
Real GDP growth	1.7	1.3	1.3	0.9	0.6	0.6	1.4	0.9	1.1
3. SGP scenario									
Gross public debt	48.9	47.1	45.6	39.0	36.6	34.4	47.2	39.1	41.1
Primary balance	2.2	1.2	1.0	0.5	0.4	0.4	1.5	0.5	0.8
Structural primary balance	1.5	0.8	0.8	0.5	0.4	0.4	1.0	0.5	0.6
Real GDP growth	1.7	1.3	1.3	0.8	0.7	0.8	1.4	0.8	0.9
4. SCP scenario									
Gross public debt	49.1	47.1	45.7	40.8	39.9	40.0	47.3	41.4	42.9
Primary balance	1.8	1.5	0.8	0.5	0.3	0.0	1.4	0.4	0.6
Structural primary balance (before CoA)	1.1	1.1	0.5	0.4	0.4	0.4	0.9	0.4	0.5
Real GDP growth	1.5	1.5	1.2	1.0	0.9	1.0	1.4	1.0	1.1
Potential GDP growth	1.7	1.8	1.5	1.0	0.9	1.0	1.7	1.0	1.2
Inflation rate	2.2	1.4	1.7	2.0	2.0	2.0	1.8	2.0	1.9
Implicit interest rate (nominal)	1.3	1.3	1.3	2.3	3.0	3.4	1.3	2.3	2.1
5. Historical SPB scenario									
Gross public debt	48.9	47.1	45.6	38.3	35.8	33.9	47.2	38.6	40.8
Primary balance	2.2	1.2	1.0	0.7	0.5	0.2	1.5	0.6	0.8
Structural primary balance (before CoA)	1.5	0.8	0.8	0.6	0.6	0.6	1.0	0.6	0.7
Real GDP growth	1.7	1.3	1.3	0.8	0.6	0.8	1.4	0.8	0.9
6. Combined historical scenario									
Gross public debt	48.9	47.1	45.6	39.2	37.5	36.2	47.2	39.5	41.5
Primary balance	2.2	1.2	1.0	0.7	0.5	0.2	1.5	0.6	0.8
Structural primary balance (before CoA)	1.5	0.8	0.8	0.6	0.6	0.6	1.0	0.6	0.7
Real GDP growth	1.7	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.3
Implicit interest rate (nominal)	1.5	1.4	1.3	2.5	2.3	2.4	1.4	2.1	1.9
7. Higher IR scenario (standard DSA)									
Gross public debt	48.9	47.2	45.8	38.7	36.2	34.2	47.3	39.0	41.1
Implicit interest rate (nominal)	1.5	1.6	1.5	1.4	1.3	1.3	1.6	1.4	1.4
8. Lower IR scenario (standard DSA)									
Gross public debt	48.9	47.1	45.4	36.7	33.4	30.7	47.1	37.0	39.5
Implicit interest rate (nominal)	1.5	1.3	1.1	0.3	0.1	0.0	1.3	0.4	0.6
9. Higher IR scenario (enhanced DSA)									
Gross public debt	48.9	47.3	45.9	39.3	36.9	35.0	47.4	39.6	41.5
Implicit interest rate (nominal)	1.5	1.7	1.8	1.5	1.5	1.4	1.7	1.6	1.6
10. Higher growth scenario (standard DSA)									
Gross public debt	48.9	46.9	45.1	36.3	33.1	30.5	47.0	36.6	39.2
Real GDP growth	1.7	1.8	1.8	1.3	1.1	1.3	1.8	1.2	1.4
11. Lower growth scenario (standard DSA)									
Gross public debt	48.9	47.4	46.1	39.1	36.5	34.5	47.4	39.4	41.4
Real GDP growth	1.7	0.8	0.8	0.3	0.1	0.3	1.1	0.2	0.5
12. Higher growth scenario (enhanced DSA)									
Gross public debt	48.9	46.9	45.1	36.3	33.1	30.5	47.0	36.6	39.2
Real GDP growth	1.7	1.8	1.8	1.3	1.1	1.3	1.7	1.2	1.4
13. Lower growth scenario (enhanced DSA)									
Gross public debt	48.9	47.4	46.0	39.1	36.5	34.5	47.4	39.4	41.4
Real GDP growth	1.7	0.8	0.8	0.3	0.1	0.3	1.1	0.2	0.5
14. Lower SPB scenario									
Gross public debt	48.9	47.1	45.7	39.5	37.2	35.4	47.2	39.7	41.6
Primary balance	2.2	1.3	0.7	0.6	0.3	0.0	1.4	0.4	0.7
Structural primary balance (before CoA)	1.5	1.0	0.4	0.4	0.4	0.4	1.0	0.4	0.6
Real GDP growth	1.7	1.2	1.6	0.8	0.6	0.8	1.5	0.7	0.9
15. Exchange rate depreciation scenario									
Gross public debt	48.9	47.1	45.6	37.7	34.8	32.5	47.2	38.0	40.3
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	48.9	46.8	45.0	35.3	31.8	28.9	46.9	35.7	38.5
Implicit interest rate (nominal)	1.5	1.3	1.1	0.3	0.1	0.0	1.3	0.4	0.6
Real GDP growth	1.7	1.8	1.8	1.3	1.1	1.3	1.8	1.2	1.4
17. Adverse combined scenario (GDP & IR)									
Gross public debt	48.9	47.4	46.2	40.2	38.0	36.4	47.5	40.4	42.2
Implicit interest rate (nominal)	1.5	1.6	1.5	1.4	1.3	1.3	1.6	1.4	1.4
Real GDP growth	1.7	0.8	0.8	0.3	0.1	0.3	1.1	0.2	0.5

Austria

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

AT - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	78.3	74.0	69.9	67.2	64.6	61.9	59.3	56.6	53.9	51.3	49.0	46.8	44.8	43.1
Changes in the ratio (-1+2+3) of which	-4.6	-4.3	-4.0	-2.7	-2.7	-2.6	-2.7	-2.7	-2.7	-2.6	-2.4	-2.2	-2.0	-1.7
(1) Primary balance (1.1+1.2+1.3)	1.1	1.8	1.9	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.3	1.2	1.0	0.7
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.0	1.3	1.5	1.4	1.6	1.6	1.6	1.5	1.5	1.4	1.3	1.2	1.0	0.7
(1.1.1) Structural primary balance (bef. CoA)	1.0	1.3	1.5	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
(1.1.2) Cost of ageing						0.0	0.0	0.1	0.2	0.3	0.5	0.6	0.9	1.1
(1.1.3) Others (taxes and property incomes)						0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
(1.2) Cyclical component	0.1	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.1	-1.5	-1.0	-0.7	-0.8	-1.0	-1.1	-1.2	-1.2	-1.1	-1.1	-1.0	-1.0	-1.0
(2.1) Interest expenditure	1.8	1.6	1.5	1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.6	0.5	0.5
(2.2) Growth effect	-2.0	-1.8	-1.1	-0.9	-0.9	-1.0	-0.9	-0.9	-0.8	-0.8	-0.7	-0.6	-0.6	-0.6
(2.3) Inflation effect	-0.9	-1.3	-1.3	-1.1	-1.1	-1.1	-1.1	-1.2	-1.1	-1.1	-1.0	-1.0	-0.9	-0.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-2.5	-1.0	-1.1	-0.4	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-2.4	-0.9	-1.2	-0.4	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-0.9	-0.3	0.0	0.0	0.3	0.5	0.6	0.7	0.7	0.7	0.7	0.6	0.4	0.2



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.1)	LOW	LOW (S1 = -2.3)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 2.3)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			43.1	47.4	45.9	45.3	43.3				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			30.0%	38.0%							
Probability debt higher									9.5%		
Dif. between percentiles									24.9		

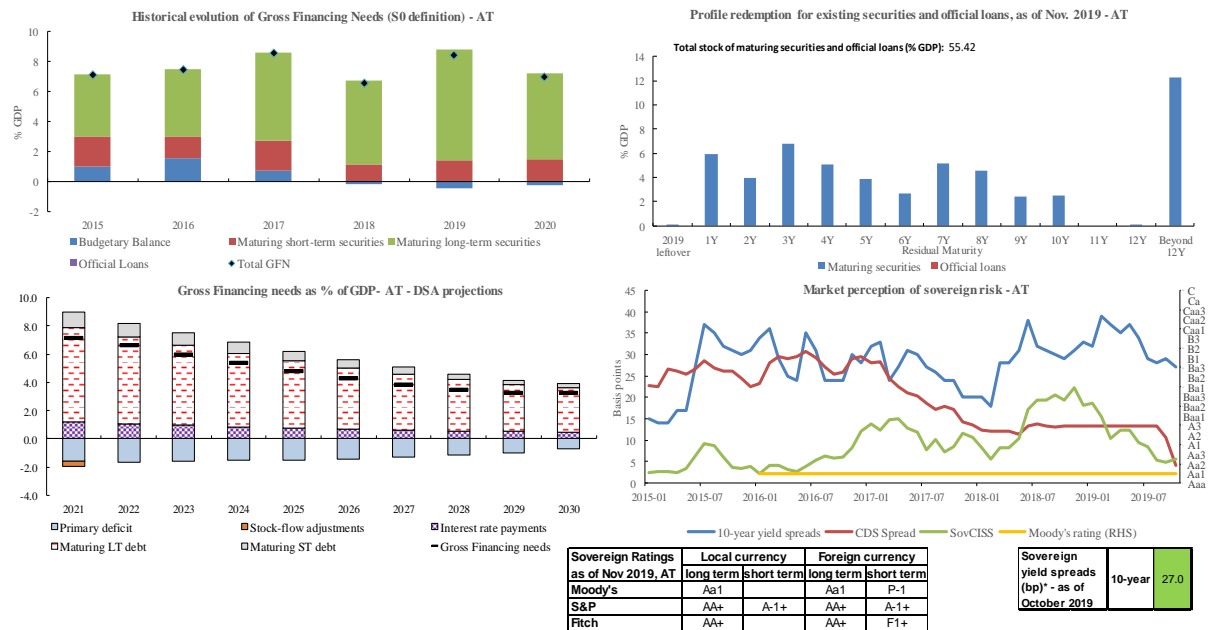
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.31	0.10	0.46	
Fiscal sub-index	0.64	0.07	0.36	
Financial competitiveness sub-index	0.16	0.12	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-0.8	-2.3	-1.5	-2.0
of which Gap to the debt-stabilizing primary balance	-2.0	-3.3	-2.4	-3.3
Cost of delaying adjustment	-0.1	-0.3	-0.2	-0.3
Debt requirement	0.6	0.4	-0.4	0.4
Ageing costs	0.6	0.8	1.5	1.1
Required structural primary balance related to S1	0.4	-0.8	-0.6	-0.5

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	2.6	2.3	3.0	3.8	3.2	3.1	2.2
of which Initial Budgetary position	-0.4	-0.9	-0.3	-0.8	-0.8	-0.8	-0.7
Ageing costs	3.1	3.2	3.3	4.7	4.0	3.9	2.9
of which Pensions	0.6	0.6	0.6	0.6	1.6	1.1	0.6
Health care	1.0	1.0	1.1	1.6	0.9	1.1	0.9
Long-term care	1.4	1.4	1.5	2.4	1.3	1.6	1.2
Others	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Required structural primary balance related to S2	3.9	3.8	3.9	5.4	4.8	4.6	3.7

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

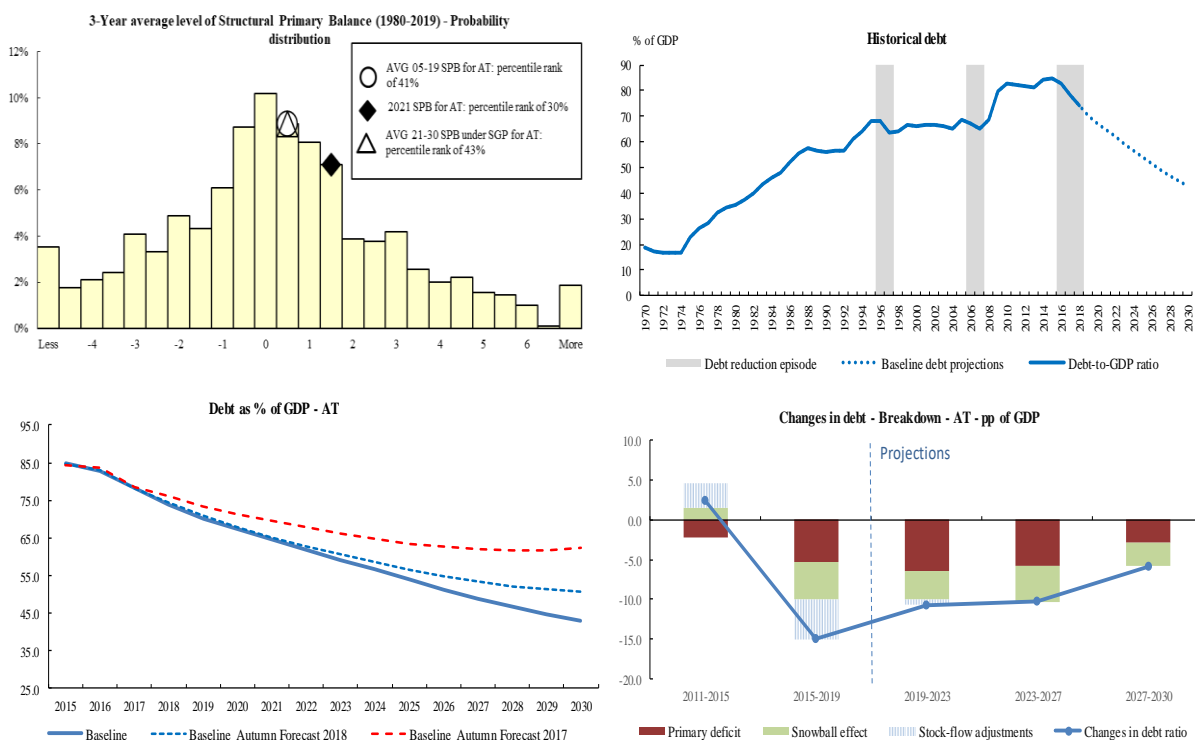
Public debt structure - AT (2018)	Share of short-term government debt (p.p.): 3.6	Share of government debt in foreign currency (%): 0.9	Share of government debt by non-residents 66.5	Net International Investment Position (IIP) - AT (2018)	Net IIP (% GDP): 3.7
--	--	--	--	--	-------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		AT					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		:	33.4	18.3	16.8	15.8	6.3
of which	One-off guarantees	44.5	33.4	18.3	16.8	15.8	5.8
	Standardised guarantees	:	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.1	0.1	0.1	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	3.2	1.0	0.5	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	3.2	1.0	0.5	0.0	0.0	0.8

Government's contingent liability risks from banking sector - AT (2018)	Private sector credit flow (% GDP): 3.9	Change in nominal house price index: 4.7	Bank loans-to-deposits ratio (p.p.): 107.3	Share of non-performing loans (%) : 2.5	Change in share of non-performing loans (p.p.): -0.7	NPL coverage ratio 53.1	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.6%

6. Realism of baseline assumptions



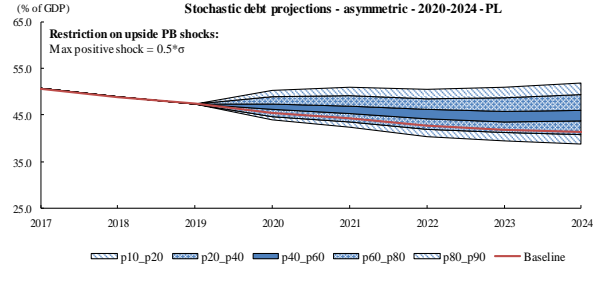
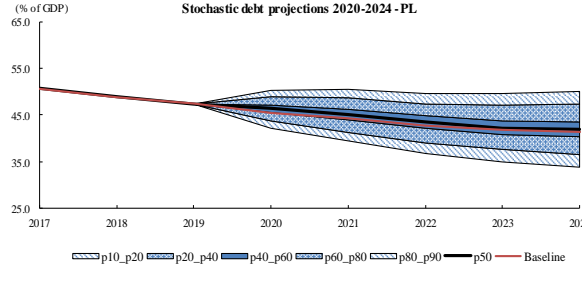
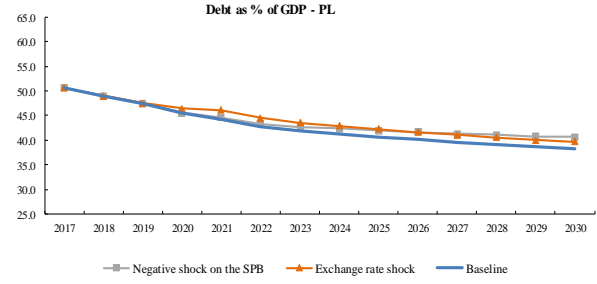
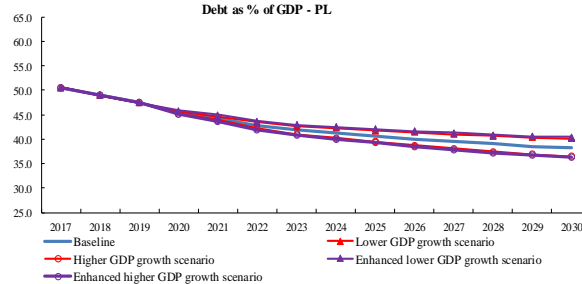
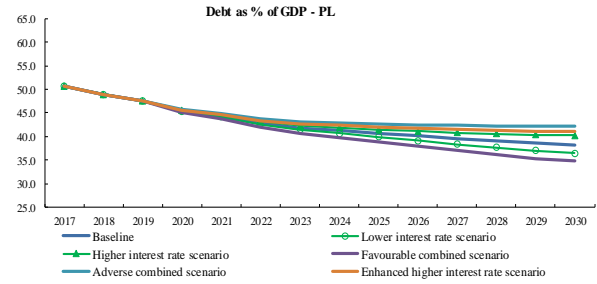
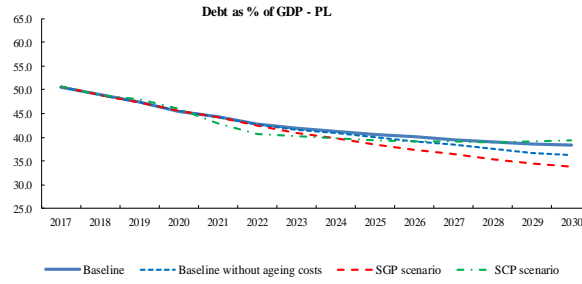
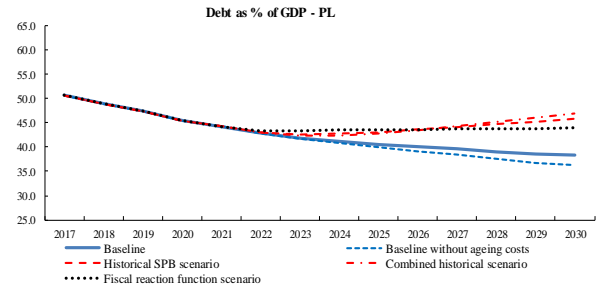
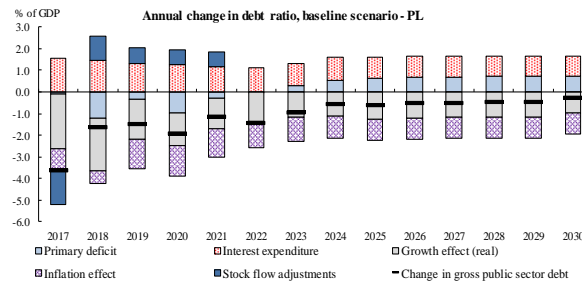
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Austria									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	69.9	67.2	64.6	51.3	46.8	43.1	67.2	51.9	55.7
Primary balance	1.9	1.6	1.6	1.4	1.2	0.7	1.7	1.3	1.4
Structural primary balance (before CoA)	1.5	1.4	1.6	1.6	1.6	1.6	1.5	1.6	1.5
Real GDP growth	1.5	1.4	1.4	1.5	1.3	1.4	1.4	1.4	1.4
Potential GDP growth	1.7	1.7	1.7	1.5	1.3	1.4	1.7	1.5	1.5
Inflation rate	1.9	1.7	1.7	2.0	2.0	2.0	1.7	2.0	1.9
Implicit interest rate (nominal)	2.1	2.0	1.9	1.3	1.2	1.2	2.0	1.4	1.5
2. Fiscal reaction function scenario									
Gross public debt	69.9	67.2	64.6	61.1	60.3	59.6	67.2	61.1	62.6
Primary balance	1.9	1.6	1.6	-0.9	-0.9	-0.9	1.7	-0.8	-0.2
Structural primary balance (before CoA)	1.5	1.4	1.6	-0.8	-0.6	-0.1	1.5	-0.6	-0.1
Real GDP growth	1.5	1.4	1.4	1.4	1.2	1.2	1.4	1.6	1.6
3. SGP scenario									
Gross public debt	69.9	67.2	64.7	54.2	50.7	47.4	67.3	54.6	57.7
Primary balance	1.9	1.6	1.3	0.7	0.6	0.5	1.6	0.8	1.0
Structural primary balance	1.5	1.4	1.2	0.7	0.6	0.5	1.4	0.8	0.9
Real GDP growth	1.5	1.4	1.6	1.6	1.4	1.4	1.5	1.5	1.5
4. SCP scenario									
Gross public debt	69.6	66.5	64.0	53.9	51.3	49.8	66.7	54.7	57.7
Primary balance	1.8	1.6	1.5	1.0	0.7	0.3	1.6	0.9	1.1
Structural primary balance (before CoA)	1.4	1.3	1.3	1.2	1.2	1.2	1.3	1.2	1.2
Real GDP growth	1.7	1.8	1.7	1.7	1.5	1.5	1.7	1.6	1.6
Potential GDP growth	1.9	1.9	1.9	1.7	1.5	1.5	1.9	1.6	1.7
Inflation rate	2.0	1.9	1.7	2.0	2.0	2.0	1.9	1.9	1.9
Implicit interest rate (nominal)	2.1	2.1	2.0	2.3	2.7	3.0	2.1	2.3	2.3
5. Historical SPB scenario									
Gross public debt	69.9	67.2	64.6	53.3	49.9	47.4	67.2	53.9	57.2
Primary balance	1.9	1.6	1.6	0.8	0.5	0.1	1.7	0.8	1.0
Structural primary balance (before CoA)	1.5	1.4	1.6	0.9	0.9	0.9	1.5	1.0	1.1
Real GDP growth	1.5	1.4	1.4	1.5	1.3	1.4	1.4	1.5	1.5
6. Combined historical scenario									
Gross public debt	69.9	67.2	64.6	54.5	52.2	51.0	67.2	55.4	58.3
Primary balance	1.9	1.6	1.6	0.8	0.5	0.1	1.7	0.8	1.0
Structural primary balance (before CoA)	1.5	1.4	1.6	0.9	0.9	0.9	1.5	1.0	1.1
Real GDP growth	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.4
Implicit interest rate (nominal)	2.1	2.0	1.9	2.1	2.4	2.6	2.0	2.1	2.1
7. Higher IR scenario (standard DSA)									
Gross public debt	69.9	67.3	64.8	52.6	48.5	45.3	67.3	53.1	56.7
Implicit interest rate (nominal)	2.1	2.1	2.1	1.8	1.8	1.8	2.1	1.8	1.9
8. Lower IR scenario (standard DSA)									
Gross public debt	69.9	67.2	64.4	50.2	45.2	41.1	67.2	50.7	54.8
Implicit interest rate (nominal)	2.1	1.9	1.7	0.9	0.7	0.6	1.9	0.9	1.2
9. Higher IR scenario (enhanced DSA)									
Gross public debt	69.9	67.4	65.0	53.4	49.5	46.4	67.4	53.9	57.3
Implicit interest rate (nominal)	2.1	2.2	2.3	2.0	1.9	1.9	2.2	2.0	2.1
10. Higher growth scenario (standard DSA)									
Gross public debt	69.9	66.9	63.9	49.4	44.5	40.5	66.9	50.0	54.2
Real GDP growth	1.5	1.9	1.9	2.0	1.8	1.9	1.8	1.9	1.9
11. Lower growth scenario (standard DSA)									
Gross public debt	69.9	67.6	65.2	53.4	49.2	45.9	67.6	53.8	57.3
Real GDP growth	1.5	0.9	0.9	1.0	0.8	0.9	1.1	0.9	1.0
12. Higher growth scenario (enhanced DSA)									
Gross public debt	69.9	66.8	63.7	49.3	44.4	40.4	66.8	49.8	54.1
Real GDP growth	1.5	2.0	2.0	2.0	1.8	1.9	1.9	1.9	1.9
13. Lower growth scenario (enhanced DSA)									
Gross public debt	69.9	67.7	65.4	53.5	49.4	46.1	67.7	54.0	57.4
Real GDP growth	1.5	0.8	0.8	1.0	0.8	0.9	1.0	0.9	1.0
14. Lower SPB scenario									
Gross public debt	69.9	67.2	64.5	51.4	46.9	43.3	67.2	51.9	55.8
Primary balance	1.9	1.7	1.6	1.4	1.1	0.7	1.7	1.3	1.4
Structural primary balance (before CoA)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Real GDP growth	1.5	1.3	1.5	1.5	1.3	1.4	1.5	1.4	1.4
15. Exchange rate depreciation scenario									
Gross public debt	69.9	67.4	64.8	51.5	47.0	43.3	67.4	52.1	55.9
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	69.9	66.8	63.7	48.3	42.9	38.6	66.8	48.8	53.3
Implicit interest rate (nominal)	2.1	1.9	1.7	0.9	0.7	0.6	1.9	0.9	1.2
Real GDP growth	1.5	1.9	1.9	2.0	1.8	1.9	1.8	1.9	1.9
17. Adverse combined scenario (GDP & IR)									
Gross public debt	69.9	67.7	65.4	54.7	51.0	48.2	67.7	55.1	58.3
Implicit interest rate (nominal)	2.1	2.1	2.1	1.8	1.8	1.8	2.1	1.8	1.9
Real GDP growth	1.5	0.9	0.9	1.0	0.8	0.9	1.1	0.9	1.0

Poland

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

PL - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	50.6	48.9	47.4	45.5	44.3	42.8	41.8	41.3	40.6	40.1	39.6	39.1	38.6	38.3
Changes in the ratio (-1+2+3) of which	-3.6	-1.7	-1.5	-2.0	-1.2	-1.5	-1.0	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.3
(1) Primary balance (1.1+1.2+1.3)	0.1	1.2	0.3	1.0	0.3	0.0	-0.3	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-0.4	0.0	-0.9	-0.7	-0.3	-0.4	-0.5	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7
(1.1.1) Structural primary balance (bef. CoA)	-0.4	0.0	-0.9	-0.7	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
(1.1.2) Cost of ageing						0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.5	1.2	1.2	1.0	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.9	-1.6	-1.9	-1.7	-1.6	-1.5	-1.2	-1.1	-1.3	-1.2	-1.2	-1.2	-1.2	-1.0
(2.1) Interest expenditure	1.6	1.4	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9
(2.2) Growth effect	-2.5	-2.4	-1.9	-1.5	-1.4	-1.3	-1.2	-1.1	-1.2	-1.2	-1.2	-1.2	-1.2	-1.0
(2.3) Inflation effect	-1.0	-0.6	-1.4	-1.4	-1.3	-1.2	-1.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-1.6	1.1	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-1.2	1.2	0.5	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	-0.4	-0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-1.9	-1.4	-2.2	-1.9	-1.5	-1.5	-1.5	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.3)	LOW	LOW (S1 = -2.2)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = 1.9)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			38.3	45.9	40.2	40.2	40.7				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			65.0%	75.0%							
Probability debt higher									19.5%		
Dif. between percentiles									16.3		

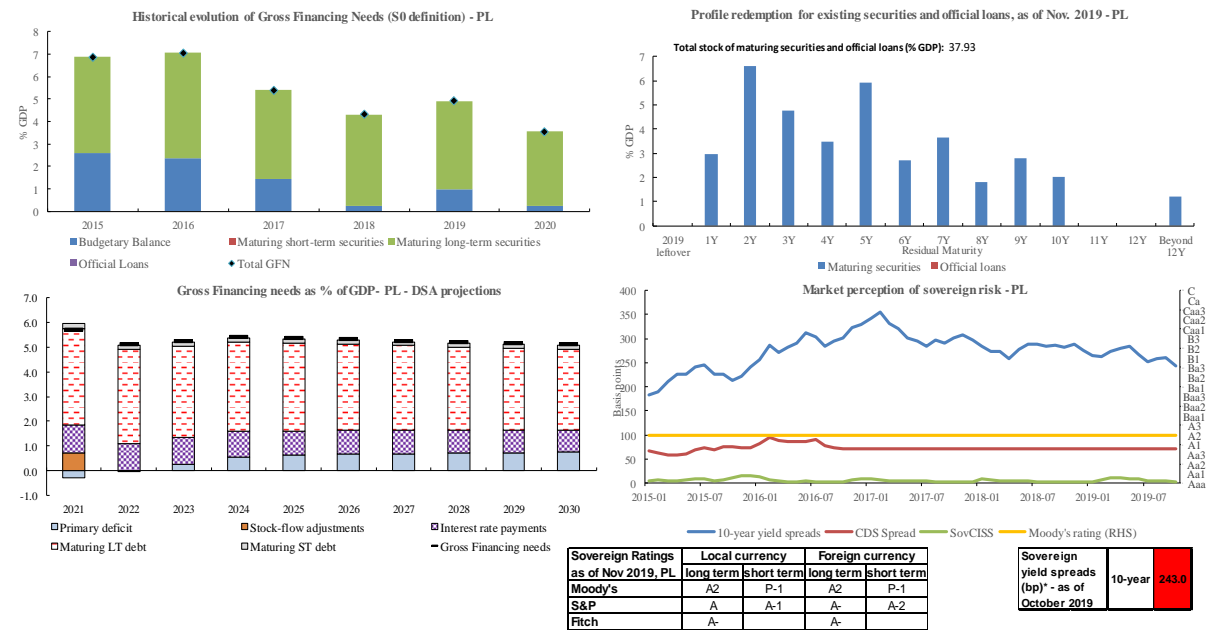
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.55	0.26	0.46	
Fiscal sub-index	0.22	0.00	0.36	
Financial competitiveness sub-index	0.73	0.40	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-0.7	-2.2	-0.4	-2.0
of which Gap to the debt-stabilizing primary balance	0.1	-0.9	0.7	-0.9
Cost of delaying adjustment	-0.1	-0.3	-0.1	-0.3
Debt requirement	-1.0	-1.4	-1.4	-1.4
Ageing costs	0.3	0.3	0.4	0.5
Required structural primary balance related to S1	-1.1	-2.6	-2.0	-2.3

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	2.2	1.9	3.2	3.1	2.3	2.3	2.0
of which Initial Budgetary position	1.1	0.7	1.9	0.8	0.8	0.7	0.8
Ageing costs	1.1	1.2	1.2	2.3	1.5	1.5	1.2
of which Pensions	-0.4	-0.6	-0.6	-0.6	-0.1	-0.3	-0.5
Health care	0.6	0.7	0.7	1.3	0.6	0.7	0.7
Long-term care	0.5	0.6	0.6	1.1	0.6	0.7	0.6
Others	0.4	0.5	0.5	0.5	0.4	0.5	0.4
Required structural primary balance related to S2	1.8	1.6	1.6	2.7	2.0	1.9	1.6

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

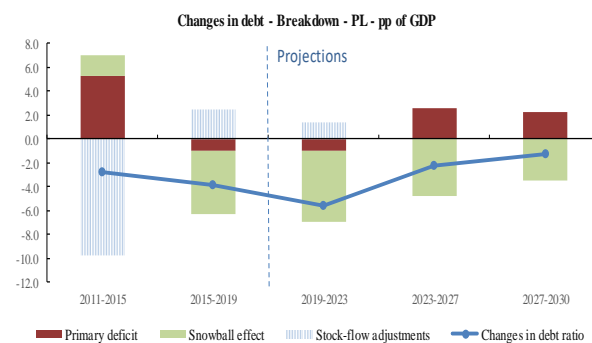
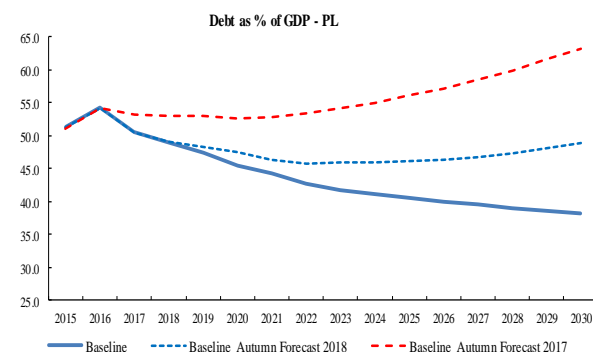
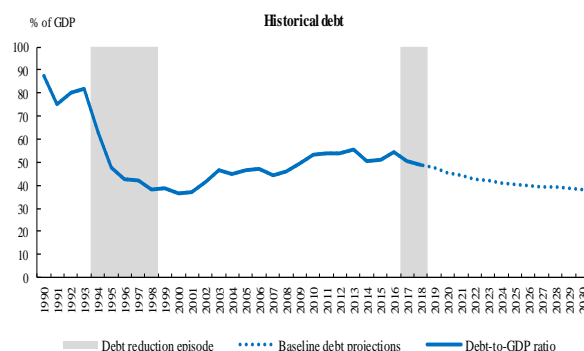
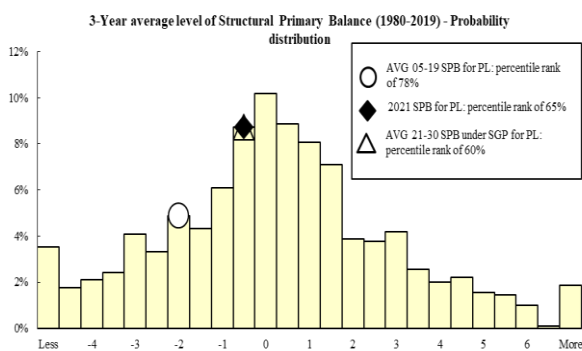
Public debt structure - PL (2018)	Share of short-term government debt (p.p.): 1.0	Share of government debt in foreign currency (%): 31.0	Share of government debt by non-residents 50.2	Net International Investment Position (IIP) - PL (2018)	Net IIP (% GDP): -55.8
--	---	--	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		PL					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		1.4	1.7	1.5	1.7	1.4	6.3
of which	One-off guarantees	1.3	1.3	1.0	1.0	0.7	5.8
	Standardised guarantees	0.1	0.4	0.6	0.7	0.7	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	n.a.	n.a.	n.a.	n.a.	n.a.	0.7
	Securities issued under liquidity schemes	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
	Special purpose entity	n.a.	n.a.	n.a.	n.a.	n.a.	0.1
	Total	n.a.	n.a.	n.a.	n.a.	n.a.	0.8

Government's contingent liability risks from banking sector - PL (2018)	Private sector credit flow (% GDP): 3.4	Change in nominal house price index: 6.6	Bank loans-to-deposits ratio (p.p.): 99.6	Share of non-performing loans (%): 4.8	Change in share of non-performing loans (p.p.): -0.8	NPL coverage ratio 62.3	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.6%

6. Realism of baseline assumptions



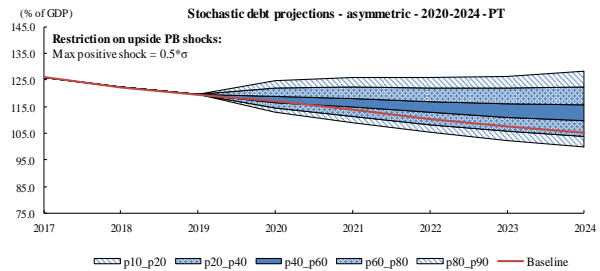
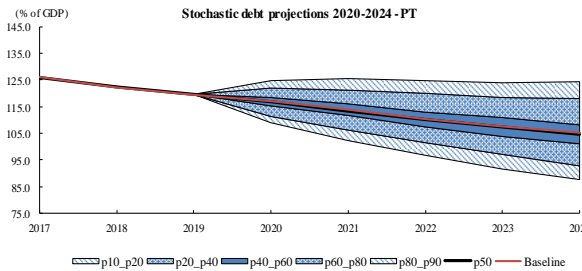
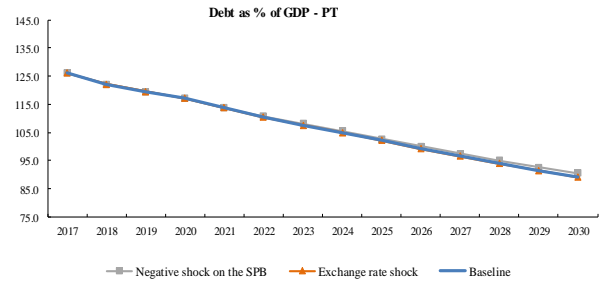
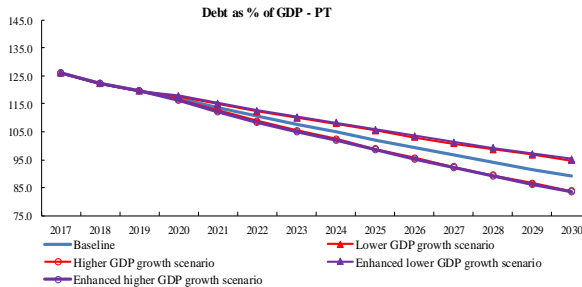
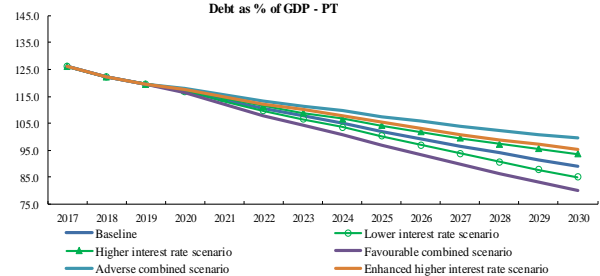
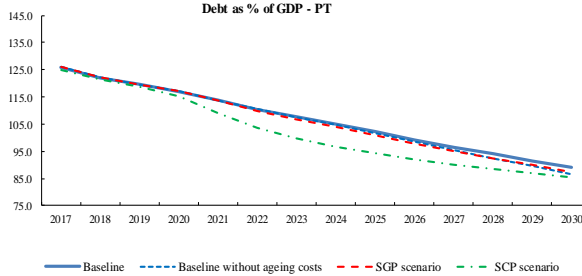
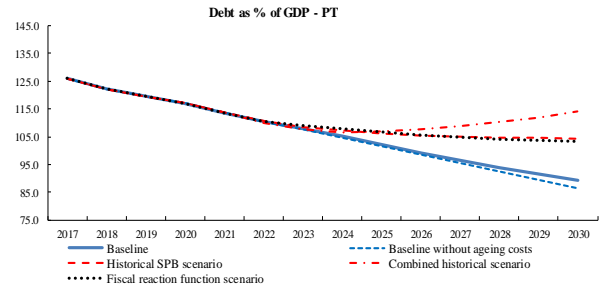
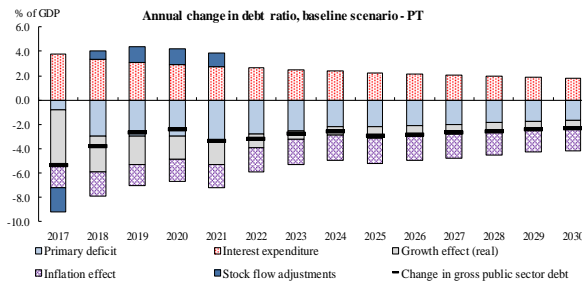
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Poland									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	47.4	45.5	44.3	40.1	39.1	38.3	45.7	40.2	41.6
Primary balance	0.3	1.0	0.3	-0.7	-0.7	-0.7	0.5	-0.6	-0.3
Structural primary balance (before CoA)	-0.9	-0.7	-0.3	-0.3	-0.3	-0.3	-0.6	-0.3	-0.4
Real GDP growth	4.1	3.3	3.3	3.1	3.2	2.7	3.6	3.0	3.2
Potential GDP growth	3.9	3.9	4.0	3.1	3.2	2.7	3.9	3.2	3.4
Inflation rate	2.9	3.1	3.1	2.5	2.5	2.5	3.0	2.6	2.7
Implicit interest rate (nominal)	2.9	2.8	2.7	2.5	2.5	2.4	2.8	2.5	2.6
2. Fiscal reaction function scenario									
Gross public debt	47.4	45.5	44.3	43.6	43.7	43.9	45.7	43.6	44.1
Primary balance	0.3	1.0	0.3	-1.4	-1.4	-1.4	0.5	-1.3	-0.8
Structural primary balance (before CoA)	-0.9	-0.7	-0.3	-1.1	-1.0	-1.0	-0.6	-1.1	-1.0
Real GDP growth	4.1	3.3	3.3	3.1	3.1	2.7	3.6	3.1	3.2
3. SGP scenario									
Gross public debt	47.4	45.5	44.2	37.5	35.5	33.8	45.7	37.7	39.7
Primary balance	0.3	1.0	0.4	-0.1	-0.1	-0.2	0.6	0.0	0.1
Structural primary balance	-0.9	-0.7	-0.3	-0.1	-0.1	-0.2	-0.6	-0.1	-0.2
Real GDP growth	4.1	3.3	3.2	3.1	3.2	2.7	3.5	3.0	3.2
4. SCP scenario									
Gross public debt	47.9	46.0	42.9	39.2	39.0	39.4	45.6	39.5	41.0
Primary balance	-0.3	1.1	0.8	-0.2	-0.2	-0.3	0.5	-0.1	0.1
Structural primary balance (before CoA)	-1.4	-0.4	0.2	0.1	0.1	0.1	-0.5	0.1	-0.1
Real GDP growth	4.0	3.7	3.4	3.1	3.1	2.3	3.7	2.9	3.1
Potential GDP growth	4.0	3.9	3.8	3.1	3.1	2.3	3.9	3.1	3.3
Inflation rate	1.7	2.4	2.5	2.0	2.0	2.0	2.2	2.1	2.1
Implicit interest rate (nominal)	3.0	3.3	3.5	4.0	4.3	4.5	3.3	4.1	3.9
5. Historical SPB scenario									
Gross public debt	47.4	45.5	44.3	43.7	44.7	45.9	45.7	43.9	44.3
Primary balance	0.3	1.0	0.3	-1.8	-1.9	-1.9	0.5	-1.5	-1.0
Structural primary balance (before CoA)	-0.9	-0.7	-0.3	-1.5	-1.5	-1.5	-0.6	-1.3	-1.2
Real GDP growth	4.1	3.3	3.3	3.1	3.2	2.7	3.6	3.1	3.3
6. Combined historical scenario									
Gross public debt	47.4	45.5	44.3	43.5	45.1	46.9	45.7	44.0	44.4
Primary balance	0.3	1.0	0.3	-1.8	-1.9	-1.9	0.5	-1.5	-1.0
Structural primary balance (before CoA)	-0.9	-0.7	-0.3	-1.5	-1.5	-1.5	-0.6	-1.3	-1.2
Real GDP growth	4.1	3.3	3.3	3.5	3.5	3.5	3.6	3.6	3.6
Implicit interest rate (nominal)	2.9	2.8	2.7	3.3	3.6	3.9	2.8	3.3	3.1
7. Higher IR scenario (standard DSA)									
Gross public debt	47.4	45.5	44.4	41.1	40.5	40.2	45.8	41.3	42.4
Implicit interest rate (nominal)	2.9	2.9	2.9	3.1	3.2	3.2	2.9	3.1	3.1
8. Lower IR scenario (standard DSA)									
Gross public debt	47.4	45.4	44.1	39.1	37.7	36.4	45.7	39.2	40.8
Implicit interest rate (nominal)	2.9	2.7	2.5	1.9	1.8	1.7	2.7	2.0	2.2
9. Higher IR scenario (enhanced DSA)									
Gross public debt	47.4	45.6	44.6	41.7	41.2	41.0	45.9	41.9	42.9
Implicit interest rate (nominal)	2.9	3.0	3.1	3.3	3.3	3.3	3.0	3.3	3.2
10. Higher growth scenario (standard DSA)									
Gross public debt	47.4	45.2	43.9	38.8	37.5	36.5	45.5	39.0	40.6
Real GDP growth	4.1	3.8	3.8	3.6	3.7	3.2	3.9	3.5	3.6
11. Lower growth scenario (standard DSA)									
Gross public debt	47.4	45.7	44.7	41.4	40.7	40.2	45.9	41.5	42.6
Real GDP growth	4.1	2.8	2.8	2.6	2.7	2.2	3.2	2.5	2.7
12. Higher growth scenario (enhanced DSA)									
Gross public debt	47.4	45.1	43.6	38.5	37.3	36.2	45.4	38.7	40.4
Real GDP growth	4.1	4.2	4.2	3.6	3.7	3.2	4.1	3.5	3.7
13. Lower growth scenario (enhanced DSA)									
Gross public debt	47.4	45.8	45.0	41.7	40.9	40.4	46.1	41.8	42.9
Real GDP growth	4.1	2.5	2.5	2.6	2.7	2.2	3.0	2.5	2.7
14. Lower SPB scenario									
Gross public debt	47.4	45.5	44.6	41.6	41.0	40.7	45.8	41.7	42.8
Primary balance	0.3	0.9	0.0	-0.9	-1.0	-1.0	0.4	-0.8	-0.5
Structural primary balance (before CoA)	-0.9	-0.8	-0.6	-0.6	-0.6	-0.6	-0.8	-0.6	-0.7
Real GDP growth	4.1	3.4	3.5	3.1	3.2	2.7	3.6	3.0	3.2
15. Exchange rate depreciation scenario									
Gross public debt	47.4	46.4	46.1	41.6	40.5	39.6	46.6	41.8	43.0
Exchange rate depreciation	0.0%	4.3%	4.3%	0.0%	0.0%	0.0%	2.9%	0.0%	0.7%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	47.4	45.2	43.7	37.8	36.2	34.7	45.4	38.0	39.9
Implicit interest rate (nominal)	2.9	2.7	2.5	1.9	1.8	1.7	2.7	2.0	2.1
Real GDP growth	4.1	3.8	3.8	3.6	3.7	3.2	3.9	3.5	3.6
17. Adverse combined scenario (GDP & IR)									
Gross public debt	47.4	45.7	44.9	42.5	42.2	42.2	46.0	42.6	43.5
Implicit interest rate (nominal)	2.9	2.9	2.9	3.1	3.2	3.2	2.9	3.1	3.1
Real GDP growth	4.1	2.8	2.8	2.6	2.7	2.2	3.2	2.5	2.7

Portugal

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

PT - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	126.0	122.2	119.5	117.1	113.7	110.5	107.7	105.1	102.1	99.3	96.5	93.9	91.5	89.2
Changes in the ratio (-1+2+3) of which	-5.4	-3.8	-2.7	-2.5	-3.4	-3.2	-2.8	-2.6	-2.9	-2.9	-2.7	-2.6	-2.4	-2.4
(1) Primary balance (1.1+1.2+1.3)	0.8	2.9	3.0	2.9	3.4	2.8	2.5	2.2	2.2	2.1	2.0	1.9	1.8	1.7
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	2.4	2.8	2.7	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.7
(1.1.1) Structural primary balance (bef. CoA)	2.4	2.8	2.7	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
(1.1.2) Cost of ageing						0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.5	0.9	0.9	0.8	0.7	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	-2.0	-0.7	-0.6	-0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-2.6	-1.5	-0.9	-0.8	-1.1	-0.4	-0.3	-0.4	-0.8	-0.8	-0.8	-0.7	-0.7	-0.7
(2.1) Interest expenditure	3.8	3.4	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.1	2.0	1.9	1.9	1.8
(2.2) Growth effect	-4.4	-3.0	-2.3	-2.0	-2.0	-1.1	-0.7	-0.7	-1.0	-0.9	-0.8	-0.7	-0.7	-0.7
(2.3) Inflation effect	-2.0	-2.0	-1.7	-1.8	-1.9	-2.0	-2.0	-2.1	-2.1	-2.0	-1.9	-1.9	-1.8	-1.8
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-2.0	0.6	1.2	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-2.0	0.6	1.2	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-1.4	-0.6	-0.4	-0.4	-0.4	-0.3	-0.2	-0.2	-0.1	0.0	0.0	-0.1	-0.1	-0.1



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.3)	HIGH	MEDIUM (S1 = 2.3)	MEDIUM	HIGH	HIGH	HIGH	HIGH	MEDIUM	HIGH	LOW (S2 = -0.3)	MEDIUM
Risk category			89.2	104.4	94.8	93.7	90.5				
Debt level (2030)			2019	2019	2019	2019	2019				
Debt peak year			21.0%	47.0%							
Percentile rank								17.6%			
Probability debt higher								36.7			
Dif. between percentiles											

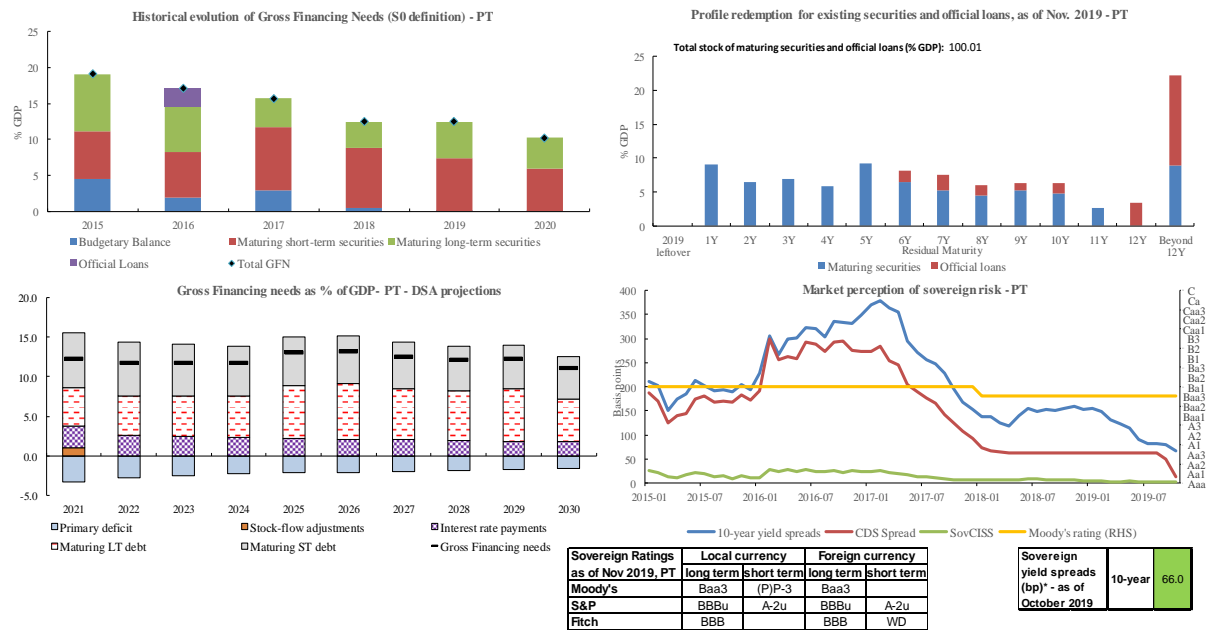
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.82	0.33	0.46
Fiscal sub-index	1.00	0.31	0.36
Financial competitiveness sub-index	0.72	0.33	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	4.3	2.3	5.0	2.6
of which Gap to the debt-stabilizing primary balance	-0.9	-2.9	-0.3	-2.8
Cost of delaying adjustment	0.7	0.3	0.8	0.4
Debt requirement	4.1	4.3	3.6	4.3
Ageing costs	0.5	0.5	0.9	0.8
Required structural primary balance related to S1	6.6	4.6	5.0	5.0

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	0.7	-0.3	2.2	1.5	0.6	0.4	0.2
of which Initial Budgetary position	-0.1	-1.0	1.4	-1.0	-0.9	-1.0	-0.7
Ageing costs	0.9	0.8	0.8	2.5	1.5	1.5	0.9
of which Pensions	-0.7	-1.0	-1.1	-1.0	-0.2	-0.5	-0.7
Health care	1.6	1.7	1.8	2.3	1.6	1.8	1.6
Long-term care	0.5	0.6	0.6	1.7	0.6	0.7	0.5
Others	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Required structural primary balance related to S2	3.0	2.1	2.1	3.8	3.0	2.8	2.6

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

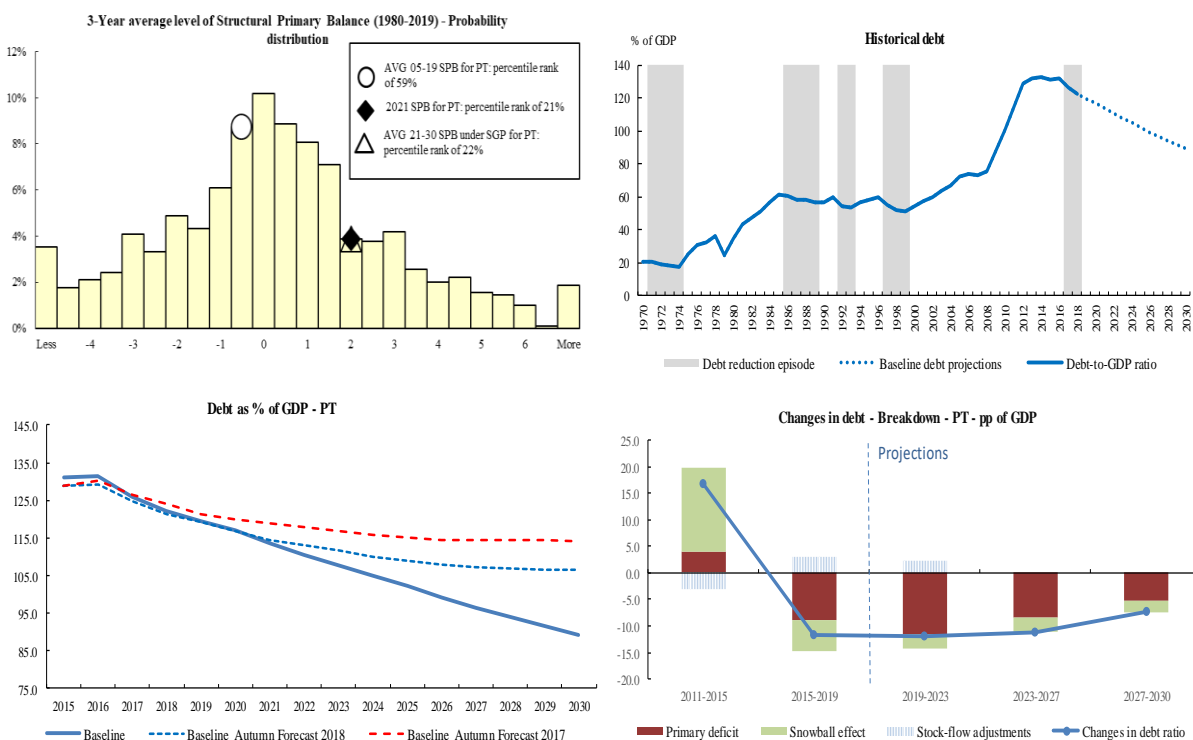
Public debt structure - PT (2018)	Share of short-term government debt (p.p.): 16.7	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents 52.1	Net International Investment Position (IIP) - PT (2018)	Net IIP (% GDP): -105.6
--	--	---	--	--	-----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		PT					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		12.4	13.3	6.7	5.6	6.4	6.3
of which	One-off guarantees	12.4	13.3	6.7	5.6	6.4	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		3.8	3.6	3.2	3.0	2.7	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	9.0	9.6	3.5	3.4	2.9	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	9.0	9.6	3.5	3.4	2.9	0.8

Government's contingent liability risks from banking sector - PT (2018)	Private sector credit flow (% GDP): -0.1	Change in nominal house price index: 10.3	Bank loans-to-deposits ratio (p.p.): 85.8	Share of non-performing loans (%): 8.9	Change in share of non-performing loans (p.p.): -3.5	NPL coverage ratio 51.4	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.7% Stress 32.0%

6. Realism of baseline assumptions



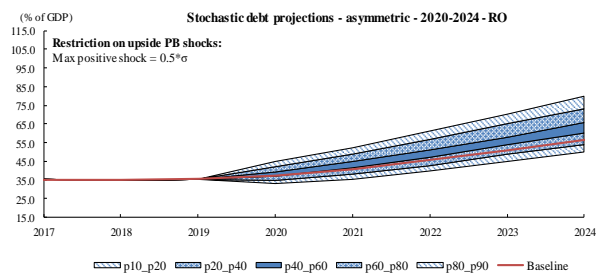
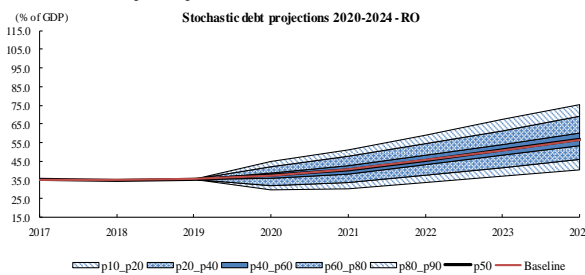
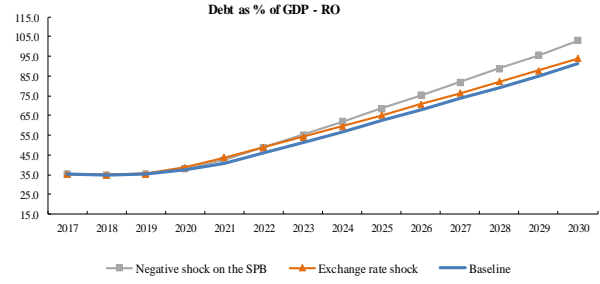
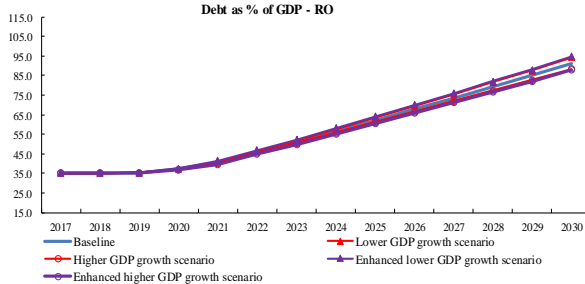
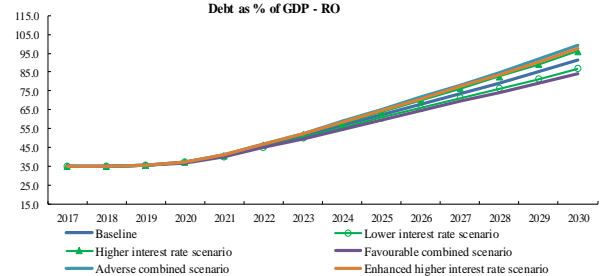
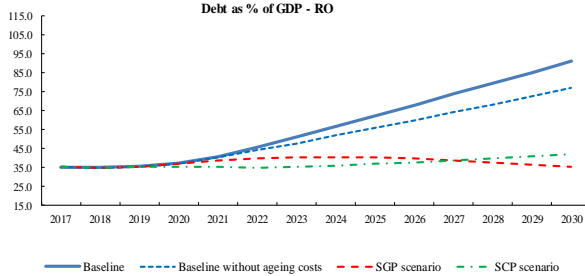
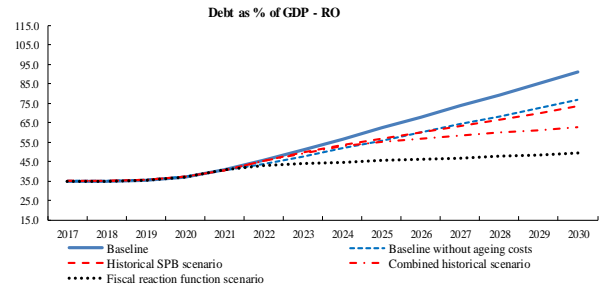
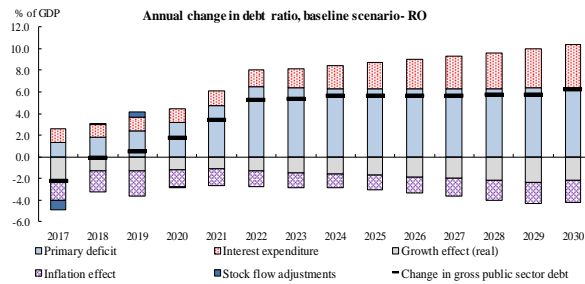
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Portugal									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	119.5	117.1	113.7	99.3	93.9	89.2	116.8	99.5	103.8
Primary balance	3.0	2.9	3.4	2.1	1.9	1.7	3.1	2.1	2.4
Structural primary balance (before CoA)	2.7	2.5	2.4	2.4	2.4	2.4	2.5	2.4	2.4
Real GDP growth	2.0	1.7	1.7	0.9	0.8	0.8	1.8	0.8	1.1
Potential GDP growth	1.8	1.9	1.9	0.9	0.8	0.8	1.9	1.0	1.2
Inflation rate	1.4	1.5	1.6	2.0	2.0	2.0	1.5	2.0	1.9
Implicit interest rate (nominal)	2.6	2.5	2.4	2.1	2.1	2.0	2.5	2.2	2.3
2. Fiscal reaction function scenario									
Gross public debt	119.5	117.1	113.7	105.6	104.2	103.3	116.8	106.2	108.8
Primary balance	3.0	2.9	3.4	0.0	-0.2	-0.4	3.1	0.3	1.0
Structural primary balance (before CoA)	2.7	2.5	2.4	0.3	0.2	0.3	2.5	0.5	1.0
Real GDP growth	2.0	1.7	1.7	1.0	0.8	0.7	1.8	1.0	1.2
3. SGP scenario									
Gross public debt	119.5	117.1	113.6	97.9	92.5	87.5	116.7	98.3	102.9
Primary balance	3.0	2.9	3.8	2.1	1.9	1.8	3.2	2.2	2.5
Structural primary balance	2.7	2.5	2.8	2.1	1.9	1.8	2.7	2.2	2.3
Real GDP growth	2.0	1.7	1.4	1.0	0.9	0.8	1.7	0.9	1.1
4. SCP scenario									
Gross public debt	118.6	115.2	109.0	91.9	88.3	85.5	114.3	93.0	98.3
Primary balance	3.1	3.3	3.5	2.7	2.5	2.3	3.3	2.8	2.9
Structural primary balance (before CoA)	3.2	3.3	3.2	2.9	2.9	2.9	3.2	2.9	3.0
Real GDP growth	1.9	1.9	2.0	0.7	0.6	0.8	1.9	1.0	1.2
Potential GDP growth	2.0	2.0	1.9	0.7	0.6	0.8	2.0	1.0	1.2
Inflation rate	1.5	1.5	1.6	2.0	2.0	2.0	1.5	1.9	1.8
Implicit interest rate (nominal)	2.8	2.7	2.6	3.2	3.7	3.9	2.7	3.2	3.1
5. Historical SPB scenario									
Gross public debt	119.5	117.1	113.7	105.5	104.7	104.4	116.8	106.3	108.9
Primary balance	3.0	2.9	3.4	-0.3	-0.5	-0.7	3.1	0.1	0.9
Structural primary balance (before CoA)	2.7	2.5	2.4	0.0	0.0	0.0	2.5	0.4	0.9
Real GDP growth	2.0	1.7	1.7	0.9	0.8	0.8	1.8	1.0	1.2
6. Combined historical scenario									
Gross public debt	119.5	117.1	113.7	107.6	110.3	114.0	116.8	109.3	111.2
Primary balance	3.0	2.9	3.4	-0.3	-0.5	-0.7	3.1	0.1	0.9
Structural primary balance (before CoA)	2.7	2.5	2.4	0.0	0.0	0.0	2.5	0.4	0.9
Real GDP growth	2.0	1.7	1.7	0.4	0.4	0.4	1.8	0.9	1.1
Implicit interest rate (nominal)	2.6	2.5	2.4	3.0	3.4	3.6	2.5	3.0	2.9
7. Higher IR scenario (standard DSA)									
Gross public debt	119.5	117.3	114.2	101.8	97.4	93.7	117.0	102.1	105.8
Implicit interest rate (nominal)	2.6	2.8	2.7	2.6	2.6	2.6	2.7	2.6	2.6
8. Lower IR scenario (standard DSA)									
Gross public debt	119.5	116.8	113.2	96.9	90.7	85.1	116.5	97.1	102.0
Implicit interest rate (nominal)	2.6	2.3	2.2	1.7	1.6	1.4	2.4	1.7	1.9
9. Higher IR scenario (enhanced DSA)									
Gross public debt	119.5	117.6	114.8	103.1	98.9	95.4	117.3	103.4	106.9
Implicit interest rate (nominal)	2.6	3.0	3.0	2.7	2.7	2.7	2.9	2.7	2.8
10. Higher growth scenario (standard DSA)									
Gross public debt	119.5	116.5	112.6	95.6	89.4	83.9	116.2	95.9	101.0
Real GDP growth	2.0	2.2	2.2	1.4	1.3	1.3	2.1	1.3	1.5
11. Lower growth scenario (standard DSA)									
Gross public debt	119.5	117.6	114.9	103.1	98.7	94.8	117.3	103.3	106.8
Real GDP growth	2.0	1.2	1.2	0.4	0.3	0.3	1.5	0.3	0.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	119.5	116.2	112.1	95.2	89.0	83.5	116.0	95.5	100.6
Real GDP growth	2.0	2.4	2.4	1.4	1.3	1.3	2.3	1.3	1.5
13. Lower growth scenario (enhanced DSA)									
Gross public debt	119.5	117.9	115.3	103.5	99.1	95.3	117.6	103.7	107.2
Real GDP growth	2.0	1.0	1.0	0.4	0.3	0.3	1.3	0.3	0.6
14. Lower SPB scenario									
Gross public debt	119.5	117.1	113.8	100.1	95.0	90.5	116.8	100.3	104.4
Primary balance	3.0	2.9	3.2	1.9	1.7	1.5	3.0	2.0	2.2
Structural primary balance (before CoA)	2.7	2.4	2.2	2.2	2.2	2.2	2.4	2.2	2.3
Real GDP growth	2.0	1.8	1.8	0.9	0.8	0.8	1.8	0.8	1.1
15. Exchange rate depreciation scenario									
Gross public debt	119.5	117.1	113.7	99.3	93.9	89.2	116.8	99.5	103.8
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	119.5	116.2	112.0	93.3	86.4	80.0	115.9	93.6	99.2
Implicit interest rate (nominal)	2.6	2.3	2.2	1.7	1.6	1.5	2.4	1.7	1.9
Real GDP growth	2.0	2.2	2.2	1.4	1.3	1.3	2.1	1.3	1.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	119.5	117.9	115.4	105.7	102.3	99.6	117.6	106.0	108.9
Implicit interest rate (nominal)	2.6	2.8	2.7	2.6	2.6	2.6	2.7	2.6	2.6
Real GDP growth	2.0	1.2	1.2	0.4	0.3	0.3	1.5	0.3	0.6

Romania

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

RO - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	35.1	35.0	35.5	37.2	40.6	45.8	51.1	56.7	62.3	68.0	73.6	79.3	85.1	91.2
Changes in the ratio (-1+2+3)	-2.2	-0.1	0.5	1.7	3.4	5.2	5.3	5.6	5.7	5.6	5.7	5.7	5.7	6.2
of which														
(1) Primary balance (1.1+1.2+1.3)	-1.4	-1.8	-2.4	-3.2	-4.8	-6.5	-6.4	-6.3	-6.2	-6.3	-6.3	-6.3	-6.4	-6.4
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-1.7	-1.6	-2.3	-3.1	-4.6	-6.4	-6.3	-6.3	-6.2	-6.3	-6.3	-6.3	-6.4	-6.4
(1.1.1) Structural primary balance (bef. CoA)	-1.7	-1.6	-2.3	-3.1	-4.6	-6.4	-6.6	-6.6	-6.6	-6.6	-6.6	-6.6	-6.6	-6.6
(1.1.2) Cost of ageing						1.8	1.7	1.6	1.6	1.6	1.6	1.6	1.7	1.7
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1
(1.2) Cyclical component	0.3	0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	-0.3	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-2.8	-2.0	-2.5	-1.5	-1.4	-1.3	-1.0	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.2
(2.1) Interest expenditure	1.3	1.2	1.2	1.2	1.3	1.5	1.8	2.1	2.4	2.7	3.0	3.4	3.7	4.0
(2.2) Growth effect	-2.4	-1.3	-1.3	-1.2	-1.1	-1.3	-1.5	-1.6	-1.6	-1.8	-2.0	-2.2	-2.3	-2.2
(2.3) Inflation effect	-1.7	-1.9	-2.4	-1.5	-1.6	-1.5	-1.4	-1.2	-1.4	-1.5	-1.7	-1.6	-1.9	-2.1
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-0.8	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	-1.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.2	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-3.0	-2.7	-3.6	-4.4	-5.9	-7.9	-8.1	-8.4	-8.7	-9.0	-9.3	-9.6	-10.0	-10.4



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.4)	HIGH	HIGH (S1 = 5.7)	HIGH	MEDIUM	HIGH	HIGH	HIGH	MEDIUM	HIGH	HIGH	
			Risk category	HIGH	MEDIUM	HIGH	HIGH	HIGH	HIGH	HIGH	
			Debt level (2030)	91.2	73.4	94.2	96.1	102.9			
			Debt peak year	2030	2030	2030	2030	2030			
			Percentile rank	96.0%	88.0%						
			Probability debt higher					96.2%			
			Dif. between percentiles					35.0			

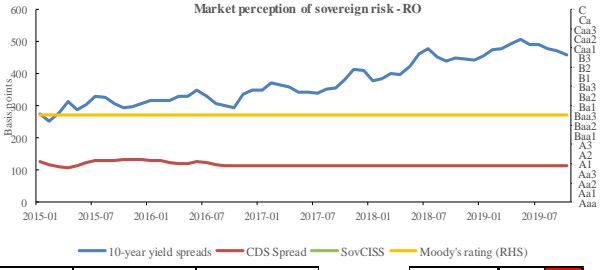
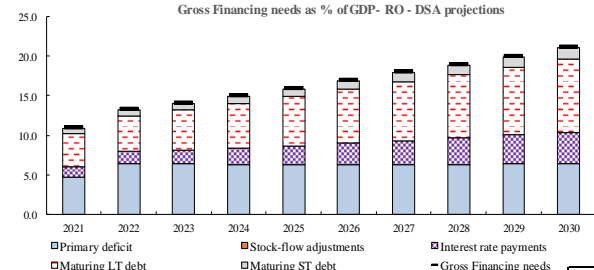
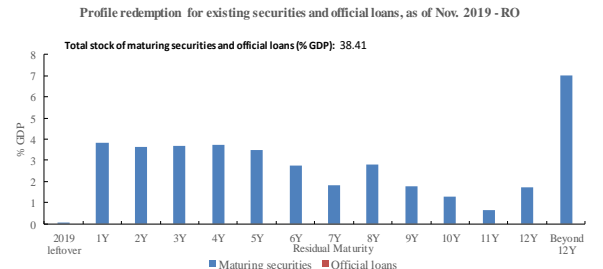
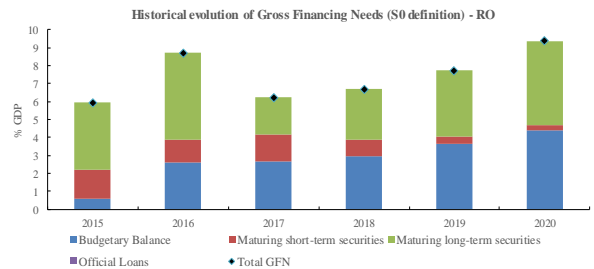
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.70	0.37	0.46
Fiscal sub-index	0.46	0.26	0.36
Financial competitiveness sub-index	0.81	0.44	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	1.5	5.7	5.4	6.2
of which Gap to the debt-stabilizing primary balance	3.0	4.5	2.5	4.6
Cost of delaying adjustment	0.2	0.9	0.8	0.9
Debt requirement	-1.6	-1.5	-0.2	-1.5
Ageing costs	-0.1	1.8	2.3	2.2
Required structural primary balance related to S1	-1.5	1.1	3.3	1.6

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	5.9	8.8	6.6	12.3	9.8	9.4	9.0
of which Initial Budgetary position	3.7	5.1	2.8	5.2	5.1	5.1	5.3
Ageing costs	2.1	3.7	3.7	7.1	4.6	4.2	3.6
of which Pensions	1.0	2.4	2.4	2.4	3.5	2.9	2.5
Health care	0.7	0.7	0.7	1.5	0.6	0.7	0.6
Long-term care	0.2	0.2	0.2	2.9	0.2	0.3	0.2
Others	0.3	0.4	0.4	0.4	0.3	0.4	0.3
Required structural primary balance related to S2	2.8	4.2	4.4	7.7	5.2	4.7	4.3

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, RO	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Baa3	A-3	Baa3	A-3
S&P	BBB-	A-3	BBB-	A-3
Fitch	BBB-		BBB-	F3

Sovereign yield spreads (bp) - as of October 2019	10-year	459.0
---	---------	-------

4. Risks related to the structure of public debt financing and net International Investment Position

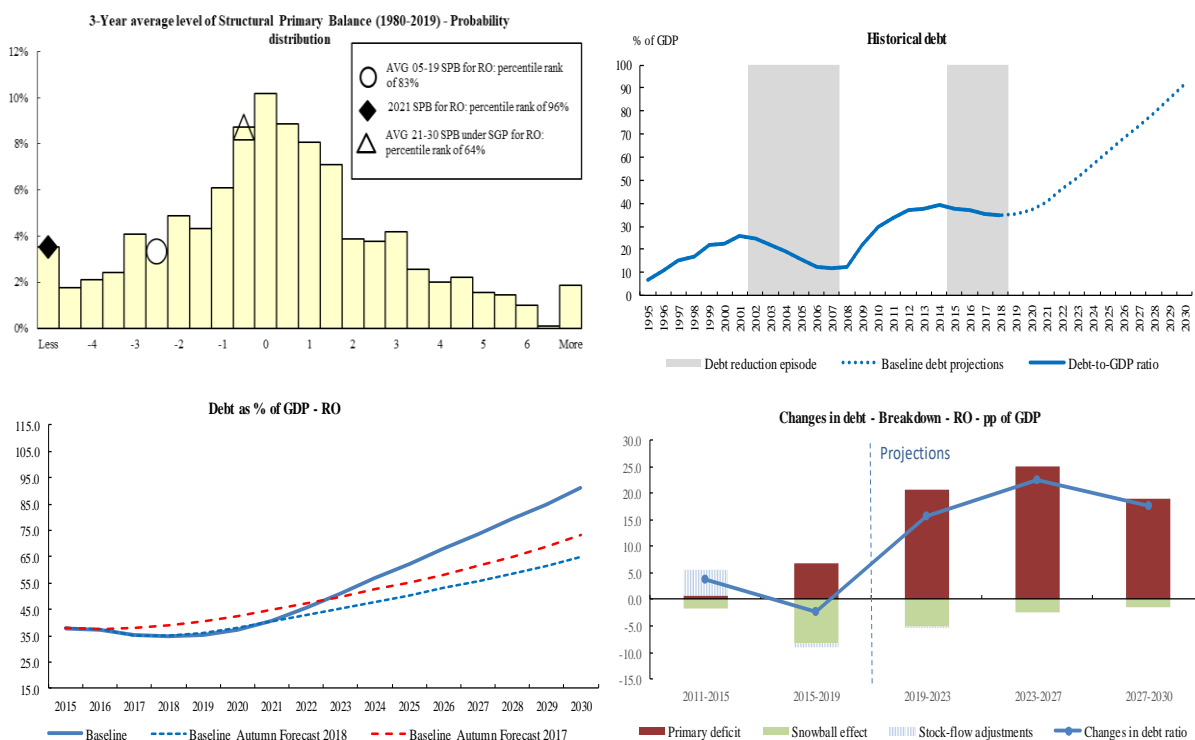
Public debt structure - RO (2018)	Share of short-term government debt (p.p.): 3.3	Share of government debt in foreign currency 50.4	Share of government debt by non-residents (%): 47.8	Net International Investment Position (IIP) - RO (2018)	Net IIP (% GDP): -44.1
--	---	---	---	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		RO					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		1.8	2.2	2.4	2.4	2.2	6.3
of which	One-off guarantees	0.9	0.8	0.6	0.5	0.4	5.8
	Standardised guarantees	0.8	1.3	1.8	1.9	1.8	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	n.a.	n.a.	n.a.	n.a.	n.a.	0.7
	Securities issued under liquidity schemes	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
	Special purpose entity	n.a.	n.a.	n.a.	n.a.	n.a.	0.1
	Total	n.a.	n.a.	n.a.	n.a.	n.a.	0.8

Government's contingent liability risks from banking sector - RO (2018)	Private sector credit flow (% GDP): 1.9	Change in nominal house price index: 5.6	Bank loans-to-deposits ratio (p.p.): 66.4	Share of non-performing loans (%): 4.9	Change in share of non-performing loans (p.p.): -1.1	NPL coverage ratio 66.7	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.0%

6. Realism of baseline assumptions



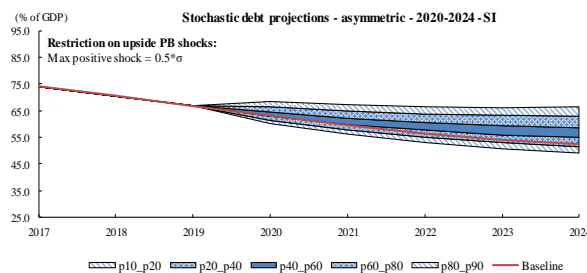
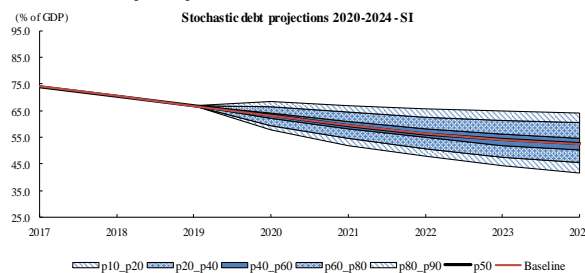
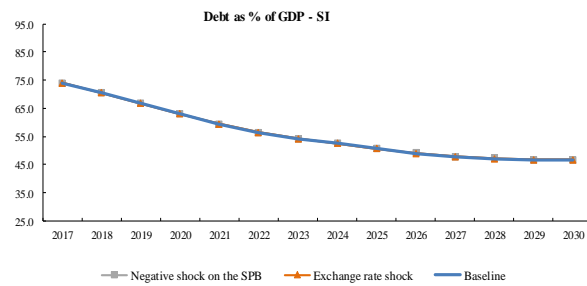
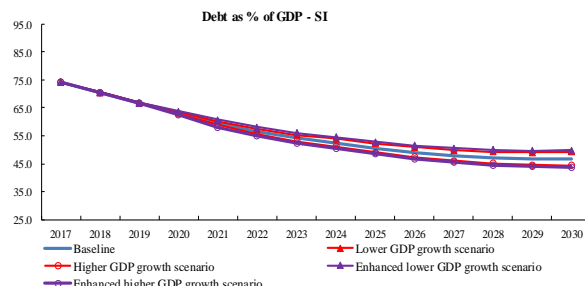
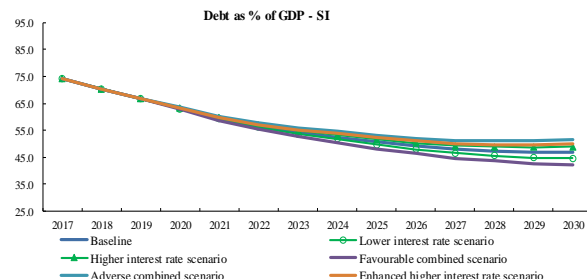
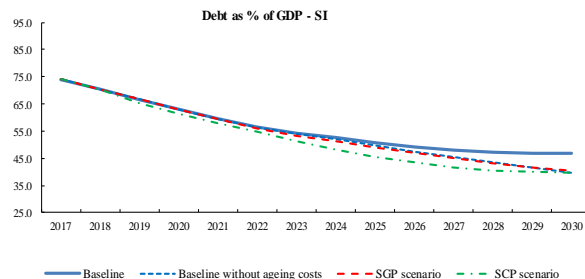
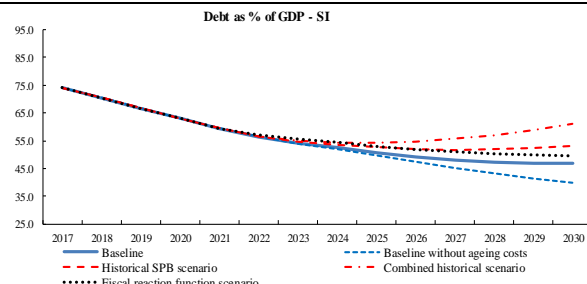
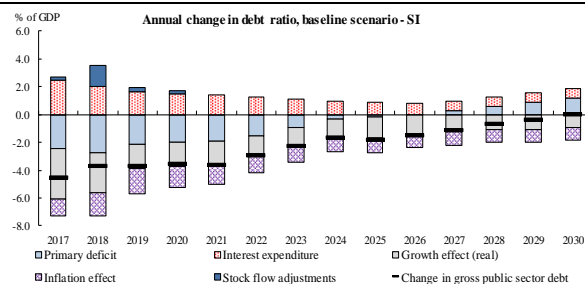
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Romania									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	35.5	37.2	40.6	68.0	79.3	91.2	37.7	68.1	60.5
Primary balance	-2.4	-3.2	-4.8	-6.3	-6.3	-6.4	-3.5	-6.3	-5.6
Structural primary balance (before CoA)	-2.3	-3.1	-4.6	-4.6	-4.6	-4.6	-3.4	-4.6	-4.3
Real GDP growth	4.1	3.6	3.3	3.1	3.1	2.7	3.6	3.2	3.3
Potential GDP growth	4.4	3.8	3.6	3.1	3.1	2.7	3.9	3.1	3.3
Inflation rate	7.3	4.5	4.4	2.5	2.5	2.5	5.4	2.7	3.4
Implicit interest rate (nominal)	3.8	3.8	3.8	4.6	4.8	5.0	3.8	4.6	4.4
2. Fiscal reaction function scenario									
Gross public debt	35.5	37.2	40.6	46.3	47.7	49.2	37.7	46.2	44.1
Primary balance	-2.4	-3.2	-4.8	-1.2	-1.1	-1.0	-3.5	-1.4	-1.9
Structural primary balance (before CoA)	-2.3	-3.1	-4.6	0.4	0.6	0.8	-3.4	0.3	-0.6
Real GDP growth	4.1	3.6	3.3	3.0	3.1	2.6	3.6	2.7	2.9
3. SGP scenario									
Gross public debt	35.5	37.2	39.0	39.6	37.5	35.6	37.2	38.7	38.4
Primary balance	-2.4	-3.2	-2.6	0.4	0.7	0.7	-2.7	-0.1	-0.7
Structural primary balance	-2.3	-3.1	-2.4	0.4	0.7	0.7	-2.6	-0.1	-0.7
Real GDP growth	4.1	3.6	1.6	2.7	3.1	2.7	3.1	2.9	2.9
4. SCP scenario									
Gross public debt	35.4	35.4	35.2	37.9	39.7	42.2	35.3	38.1	37.4
Primary balance	-1.6	-1.4	-1.2	-1.1	-1.1	-1.2	-1.4	-1.1	-1.2
Structural primary balance (before CoA)	-1.5	-1.6	-1.4	-1.2	-1.2	-1.2	-1.5	-1.2	-1.3
Real GDP growth	5.5	5.7	5.0	2.9	2.9	2.2	5.4	3.1	3.6
Potential GDP growth	5.0	5.1	5.0	2.9	2.9	2.2	5.0	3.0	3.5
Inflation rate	3.5	1.9	2.0	2.0	2.0	2.0	2.5	2.0	2.1
Implicit interest rate (nominal)	3.8	3.8	3.7	4.2	4.5	4.6	3.8	4.1	4.0
5. Historical SPB scenario									
Gross public debt	35.5	37.2	40.6	60.1	66.4	73.4	37.7	59.8	54.3
Primary balance	-2.4	-3.2	-4.8	-3.7	-3.8	-3.9	-3.5	-4.2	-4.0
Structural primary balance (before CoA)	-2.3	-3.1	-4.6	-2.1	-2.1	-2.1	-3.4	-2.5	-2.7
Real GDP growth	4.1	3.6	3.3	3.1	3.1	2.7	3.6	2.9	3.1
6. Combined historical scenario									
Gross public debt	35.5	37.2	40.6	56.8	59.8	62.5	37.7	55.7	51.2
Primary balance	-2.4	-3.2	-4.8	-3.7	-3.8	-3.9	-3.5	-4.2	-4.0
Structural primary balance (before CoA)	-2.3	-3.1	-4.6	-2.1	-2.1	-2.1	-3.4	-2.5	-2.7
Real GDP growth	4.1	3.6	3.3	3.9	3.9	3.9	3.6	3.6	3.6
Implicit interest rate (nominal)	3.8	3.8	3.8	2.7	2.3	2.0	3.8	2.9	3.1
7. Higher IR scenario (standard DSA)									
Gross public debt	35.5	37.3	40.8	70.1	82.6	96.1	37.9	70.4	62.3
Implicit interest rate (nominal)	3.8	4.1	4.2	5.5	5.7	5.9	4.0	5.4	5.1
8. Lower IR scenario (standard DSA)									
Gross public debt	35.5	37.1	40.4	66.0	76.2	86.7	37.6	65.9	58.9
Implicit interest rate (nominal)	3.8	3.5	3.4	3.8	3.9	4.0	3.6	3.8	3.7
9. Higher IR scenario (enhanced DSA)									
Gross public debt	35.5	37.4	41.0	71.0	83.7	97.3	38.0	71.3	63.0
Implicit interest rate (nominal)	3.8	4.3	4.7	5.7	5.8	6.0	4.3	5.6	5.3
10. Higher growth scenario (standard DSA)									
Gross public debt	35.5	37.0	40.3	66.5	77.2	88.4	37.6	66.6	59.3
Real GDP growth	4.1	4.1	3.8	3.6	3.6	3.2	4.0	3.7	3.7
11. Lower growth scenario (standard DSA)									
Gross public debt	35.5	37.4	40.9	69.5	81.5	94.2	37.9	69.7	61.8
Real GDP growth	4.1	3.1	2.8	2.6	2.6	2.2	3.3	2.7	2.8
12. Higher growth scenario (enhanced DSA)									
Gross public debt	35.5	36.7	39.7	66.0	76.7	87.9	37.3	66.1	58.9
Real GDP growth	4.1	4.9	4.6	3.6	3.6	3.2	4.6	3.7	3.9
13. Lower growth scenario (enhanced DSA)									
Gross public debt	35.5	37.6	41.5	70.0	82.0	94.8	38.2	70.3	62.3
Real GDP growth	4.1	2.2	1.9	2.6	2.6	2.2	2.7	2.7	2.7
14. Lower SPB scenario									
Gross public debt	35.5	37.9	42.3	75.2	88.7	102.9	38.6	75.4	66.2
Primary balance	-2.4	-4.1	-5.9	-7.4	-7.4	-7.5	-4.2	-7.5	-6.6
Structural primary balance (before CoA)	-2.3	-4.1	-5.8	-5.8	-5.8	-5.8	-4.1	-5.8	-5.4
Real GDP growth	4.1	4.3	3.4	3.1	3.1	2.7	3.9	3.2	3.3
15. Exchange rate depreciation scenario									
Gross public debt	35.5	38.6	43.6	70.7	82.0	93.9	39.2	70.9	63.0
Exchange rate depreciation	0.0%	5.2%	5.2%	0.0%	0.0%	0.0%	3.5%	0.0%	0.9%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	35.5	36.9	40.0	64.6	74.2	84.0	37.5	64.4	57.7
Implicit interest rate (nominal)	3.8	3.5	3.4	3.8	3.9	4.0	3.6	3.8	3.7
Real GDP growth	4.1	4.1	3.8	3.6	3.6	3.2	4.0	3.7	3.7
17. Adverse combined scenario (GDP & IR)									
Gross public debt	35.5	37.4	41.1	71.6	84.9	99.2	38.0	72.1	63.6
Implicit interest rate (nominal)	3.8	4.1	4.2	5.5	5.7	5.9	4.0	5.4	5.1
Real GDP growth	4.1	3.1	2.8	2.6	2.6	2.2	3.3	2.7	2.8

Slovenia

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

SI - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	74.1	70.4	66.7	63.1	59.5	56.5	54.2	52.5	50.6	49.1	47.9	47.1	46.7	46.7
Changes in the ratio (-1+2+3)	-4.5	-3.7	-3.8	-3.6	-3.6	-3.0	-2.3	-1.7	-1.9	-1.6	-1.2	-0.7	-0.4	0.0
of which														
(1) Primary balance (1.1+1.2+1.3)	2.5	2.8	2.1	2.0	2.0	1.5	0.9	0.4	0.2	0.0	-0.2	-0.6	-0.9	-1.2
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.9	1.3	0.7	0.6	0.7	0.7	0.5	0.4	0.2	0.0	-0.2	-0.6	-0.9	-1.2
(1.1.1) Structural primary balance (bef. CoA)	1.9	1.3	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
(1.1.2) Cost of ageing						0.0	0.2	0.3	0.5	0.7	0.9	1.3	1.6	1.9
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.7	1.5	1.5	1.5	1.3	0.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-2.3	-2.5	-1.9	-1.8	-1.7	-1.4	-1.4	-1.3	-1.7	-1.6	-1.4	-1.3	-1.3	-1.2
(2.1) Interest expenditure	2.5	2.0	1.6	1.5	1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.7	0.7	0.6
(2.2) Growth effect	-3.6	-2.9	-1.7	-1.7	-1.6	-1.4	-1.3	-1.3	-1.5	-1.4	-1.2	-1.1	-1.1	-0.9
(2.3) Inflation effect	-1.2	-1.6	-1.8	-1.6	-1.4	-1.3	-1.2	-1.1	-1.0	-1.0	-1.0	-0.9	-0.9	-0.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.2	1.6	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.2	1.6	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-0.6	-0.7	-1.0	-0.9	-0.7	-0.5	-0.6	-0.6	-0.7	-0.8	-1.0	-1.3	-1.6	-1.8



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0)	LOW	LOW (S1 = -1)	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM (S2 = 5.4)	MEDIUM	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			46.7	53.0	49.2	48.9	46.8				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			45.0%	59.0%							
Probability debt higher									6.3%		
Dif. between percentiles									22.2		

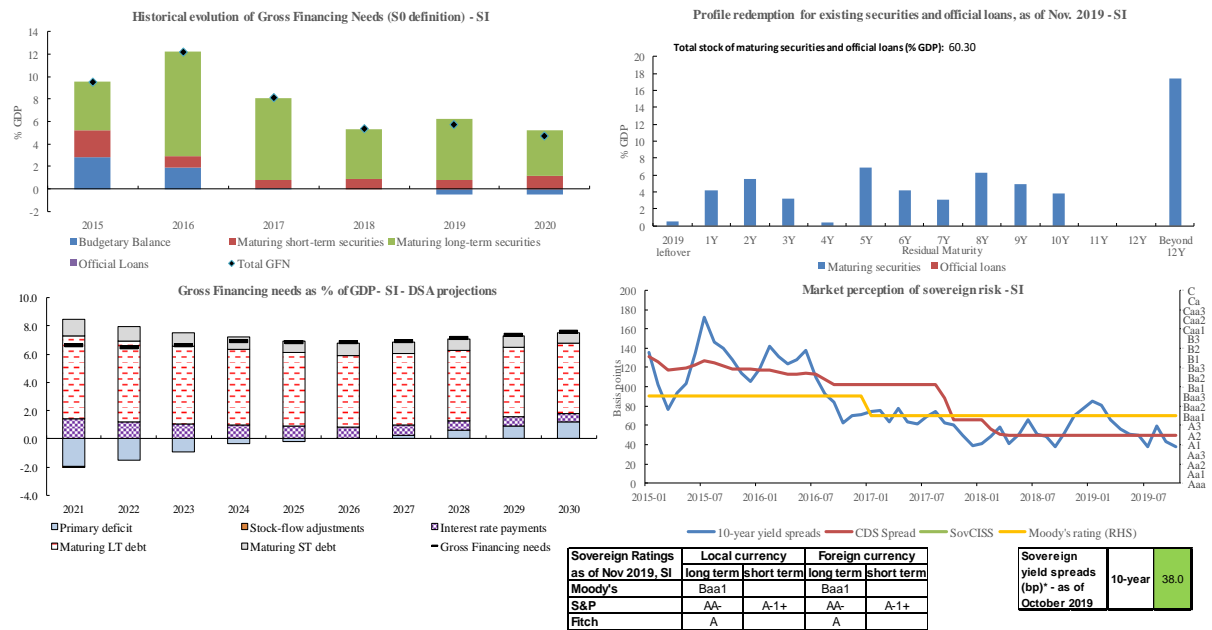
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.64	0.05	0.46	
Fiscal sub-index	0.56	0.00	0.36	
Financial competitiveness sub-index	0.68	0.07	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	0.2	-1.0	1.2	-0.6
of which Gap to the debt-stabilizing primary balance	-1.2	-2.3	-0.8	-2.3
Cost of delaying adjustment	0.0	-0.1	0.2	-0.1
Debt requirement	0.2	0.0	-0.6	0.0
Ageing costs	1.2	1.4	2.4	1.8
Required structural primary balance related to S1	0.7	-0.3	0.9	0.1

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	5.5	5.4	6.6	7.8	5.5	6.3	5.3
of which Initial Budgetary position	0.3	0.0	1.0	0.0	0.1	0.0	0.2
Ageing costs	5.2	5.4	5.6	7.9	5.5	6.3	5.1
of which Pensions	3.3	3.6	3.7	3.6	3.7	4.2	3.4
Health care	0.8	0.8	0.8	1.4	0.7	0.8	0.8
Long-term care	0.7	0.7	0.7	2.5	0.7	0.9	0.6
Others	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Required structural primary balance related to S2	6.1	6.1	6.3	8.5	6.2	7.0	6.0

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

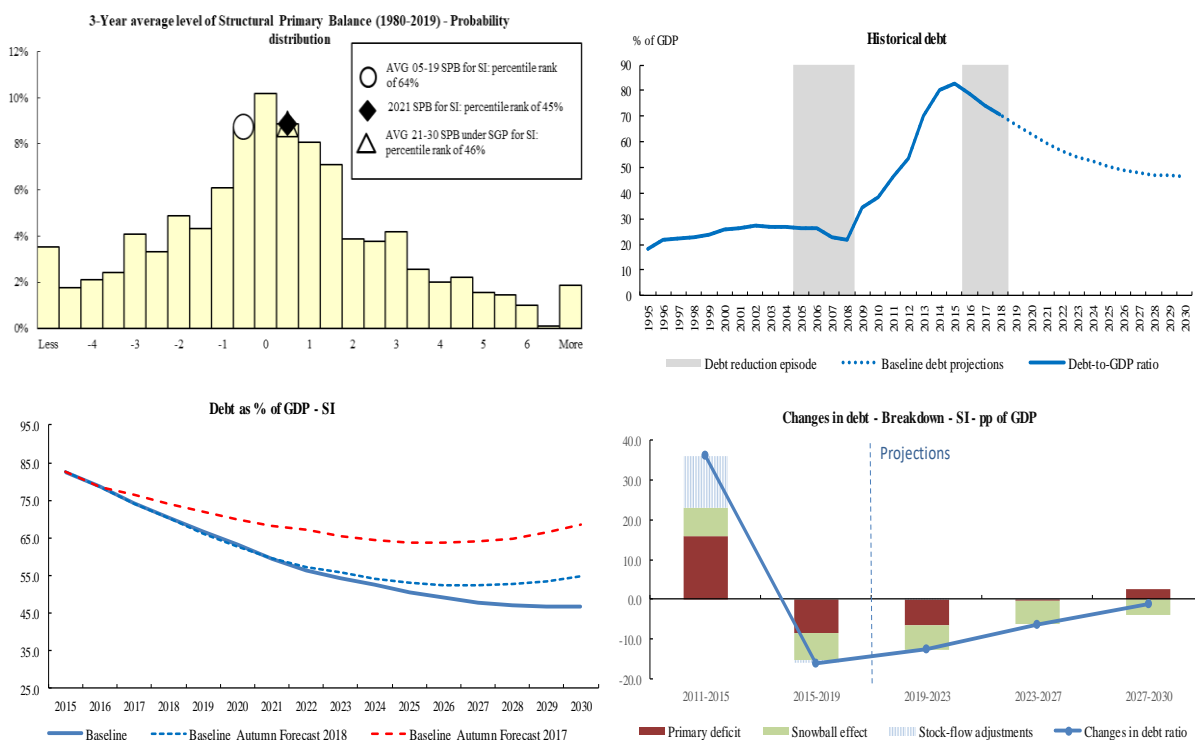
Public debt structure - SI (2018)	Share of short-term government debt (p.p.): 2.8	Share of government debt in foreign currency (%): 0.1	Share of government debt by non-residents 62.3	Net International Investment Position (IIP) - SI (2018)	Net IIP (% GDP): -18.9
--	--	--	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		SI					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		17.3	14.4	10.6	9.6	8.6	6.3
of which	One-off guarantees	17.3	14.4	10.6	9.6	8.6	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	4.2	1.1	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	4.2	1.1	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - SI (2018)	Private sector credit flow (% GDP): 1.3	Change in nominal house price index: 9.8	Bank loans-to-deposits ratio (p.p.): 67.9	Share of non-performing loans (%): 5.3	Change in share of non-performing loans (p.p.): -3.3	NPL coverage ratio 59.7	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.8%

6. Realism of baseline assumptions



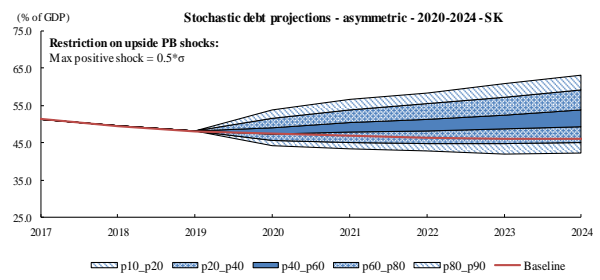
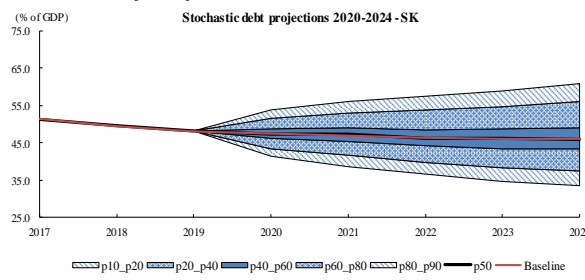
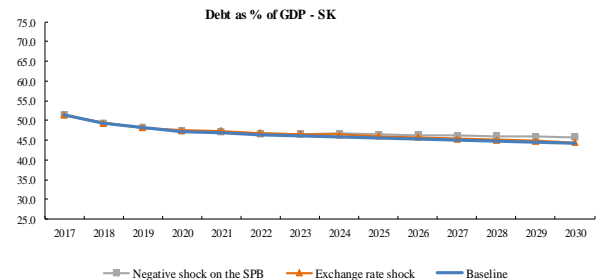
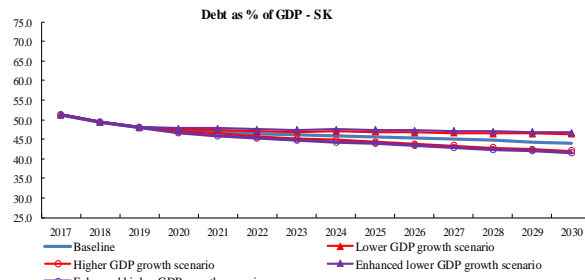
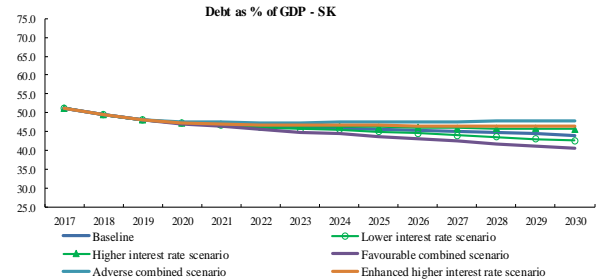
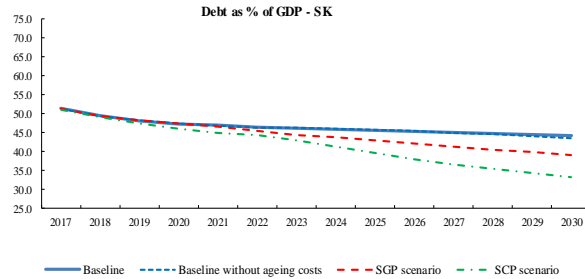
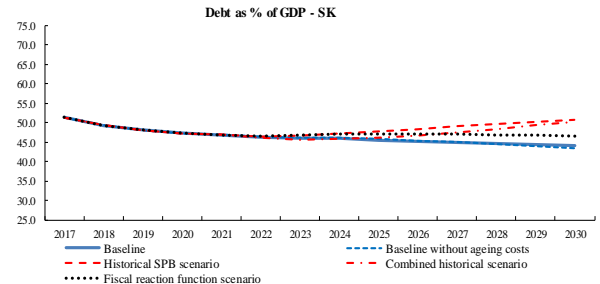
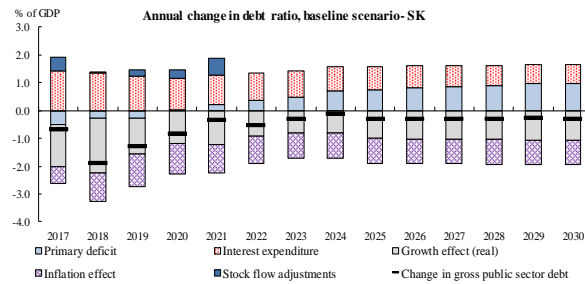
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Slovenia									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	66.7	63.1	59.5	49.1	47.1	46.7	63.1	50.1	53.4
Primary balance	2.1	2.0	2.0	0.0	-0.6	-1.2	2.0	0.0	0.5
Structural primary balance (before CoA)	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Real GDP growth	2.6	2.7	2.7	2.8	2.4	2.1	2.7	2.5	2.6
Potential GDP growth	2.5	2.9	3.1	2.8	2.4	2.1	2.9	2.8	2.8
Inflation rate	2.7	2.4	2.3	2.0	2.0	2.0	2.5	2.0	2.1
Implicit interest rate (nominal)	2.5	2.4	2.3	1.7	1.5	1.4	2.4	1.7	1.9
2. Fiscal reaction function scenario									
Gross public debt	66.7	63.1	59.5	51.9	50.4	49.4	63.1	52.5	55.1
Primary balance	2.1	2.0	2.0	-0.5	-0.7	-0.8	2.0	-0.4	0.2
Structural primary balance (before CoA)	0.7	0.6	0.7	0.2	0.6	1.0	0.7	0.3	0.4
Real GDP growth	2.6	2.7	2.7	2.8	2.2	1.9	2.7	2.5	2.5
3. SGP scenario									
Gross public debt	66.7	63.1	59.2	46.8	43.3	40.3	63.0	47.4	51.3
Primary balance	2.1	2.0	2.3	0.5	0.4	0.3	2.2	0.7	1.1
Structural primary balance	0.7	0.6	1.1	0.5	0.4	0.3	0.8	0.6	0.6
Real GDP growth	2.6	2.7	2.4	2.9	2.4	2.1	2.6	2.6	2.6
4. SCP scenario									
Gross public debt	65.4	61.3	57.9	43.5	40.6	39.6	61.5	45.0	49.2
Primary balance	2.6	2.4	2.4	1.3	0.7	0.1	2.5	1.2	1.5
Structural primary balance (before CoA)	1.1	1.1	1.5	2.0	2.0	2.0	1.2	2.0	1.8
Real GDP growth	3.4	3.1	2.8	2.7	2.4	1.9	3.1	2.6	2.7
Potential GDP growth	2.7	2.9	2.9	2.7	2.4	1.9	2.8	2.7	2.7
Inflation rate	2.7	2.5	2.6	2.0	2.0	2.0	2.6	2.1	2.2
Implicit interest rate (nominal)	2.5	2.4	2.3	2.8	3.3	3.7	2.4	2.8	2.7
5. Historical SPB scenario									
Gross public debt	66.7	63.1	59.5	52.0	51.8	53.0	63.1	53.1	55.6
Primary balance	2.1	2.0	2.0	-1.0	-1.6	-2.2	2.0	-0.8	-0.1
Structural primary balance (before CoA)	0.7	0.6	0.7	-0.3	-0.3	-0.3	0.7	-0.1	0.1
Real GDP growth	2.6	2.7	2.7	2.8	2.4	2.1	2.7	2.6	2.6
6. Combined historical scenario									
Gross public debt	66.7	63.1	59.5	54.7	57.0	60.9	63.1	56.3	58.0
Primary balance	2.1	2.0	2.0	-1.0	-1.6	-2.2	2.0	-0.8	-0.1
Structural primary balance (before CoA)	0.7	0.6	0.7	-0.3	-0.3	-0.3	0.7	-0.1	0.1
Real GDP growth	2.6	2.7	2.7	1.8	1.8	1.8	2.7	2.1	2.2
Implicit interest rate (nominal)	2.5	2.4	2.3	2.9	3.5	3.9	2.4	2.9	2.8
7. Higher IR scenario (standard DSA)									
Gross public debt	66.7	63.2	59.7	50.3	48.8	48.9	63.2	51.4	54.3
Implicit interest rate (nominal)	2.5	2.5	2.5	2.2	2.2	2.2	2.5	2.2	2.3
8. Lower IR scenario (standard DSA)									
Gross public debt	66.7	63.0	59.3	47.9	45.5	44.6	63.0	49.0	52.5
Implicit interest rate (nominal)	2.5	2.3	2.1	1.1	0.9	0.7	2.3	1.2	1.5
9. Higher IR scenario (enhanced DSA)									
Gross public debt	66.7	63.2	59.9	51.0	49.6	49.8	63.3	52.0	54.8
Implicit interest rate (nominal)	2.5	2.6	2.7	2.4	2.3	2.3	2.6	2.4	2.5
10. Higher growth scenario (standard DSA)									
Gross public debt	66.7	62.8	58.9	47.4	45.1	44.3	62.8	48.5	52.0
Real GDP growth	2.6	3.2	3.2	3.3	2.9	2.6	3.0	3.0	3.0
11. Lower growth scenario (standard DSA)									
Gross public debt	66.7	63.4	60.1	50.9	49.3	49.2	63.4	51.9	54.8
Real GDP growth	2.6	2.2	2.2	2.3	1.9	1.6	2.3	2.0	2.1
12. Higher growth scenario (enhanced DSA)									
Gross public debt	66.7	62.4	58.2	46.8	44.5	43.8	62.4	47.9	51.5
Real GDP growth	2.6	3.8	3.8	3.3	2.9	2.6	3.4	3.0	3.1
13. Lower growth scenario (enhanced DSA)									
Gross public debt	66.7	63.8	60.8	51.5	49.9	49.8	63.8	52.5	55.3
Real GDP growth	2.6	1.7	1.6	2.3	1.9	1.6	1.9	2.0	2.0
14. Lower SPB scenario									
Gross public debt	66.7	63.1	59.4	49.1	47.2	46.8	63.0	50.2	53.4
Primary balance	2.1	2.0	1.9	0.0	-0.6	-1.2	2.0	0.0	0.5
Structural primary balance (before CoA)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Real GDP growth	2.6	2.7	2.8	2.8	2.4	2.1	2.7	2.5	2.6
15. Exchange rate depreciation scenario									
Gross public debt	66.7	63.1	59.5	49.1	47.1	46.7	63.1	50.1	53.4
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	66.7	62.7	58.7	46.3	43.6	42.3	62.7	47.3	51.2
Implicit interest rate (nominal)	2.5	2.3	2.1	1.1	0.9	0.7	2.3	1.2	1.5
Real GDP growth	2.6	3.2	3.2	3.3	2.9	2.6	3.0	3.0	3.0
17. Adverse combined scenario (GDP & IR)									
Gross public debt	66.7	63.5	60.3	52.1	51.1	51.6	63.5	53.2	55.7
Implicit interest rate (nominal)	2.5	2.5	2.5	2.2	2.2	2.2	2.5	2.2	2.3
Real GDP growth	2.6	2.2	2.2	2.3	1.9	1.6	2.3	2.0	2.1

Slovakia

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

SK - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	51.3	49.4	48.1	47.3	46.9	46.4	46.1	45.9	45.6	45.3	45.0	44.7	44.4	44.1
Changes in the ratio (-1+2+3) of which	-0.7	-1.9	-1.3	-0.8	-0.4	-0.5	-0.3	-0.1	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
(1) Primary balance (1.1+1.2+1.3)	0.5	0.3	0.3	0.0	-0.2	-0.4	-0.5	-0.7	-0.7	-0.8	-0.8	-0.9	-1.0	-1.0
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.4	-0.4	-0.4	-0.6	-0.8	-0.7	-0.7	-0.7	-0.7	-0.8	-0.8	-0.9	-1.0	-1.0
(1.1.1) Structural primary balance (bef. CoA)	0.4	-0.4	-0.4	-0.6	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
(1.1.2) Cost of ageing						0.0	-0.1	-0.1	0.0	0.1	0.1	0.2	0.2	0.2
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.2) Cyclical component	0.1	0.7	0.7	0.6	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.7	-1.6	-1.2	-1.2	-1.2	-0.9	-0.8	-0.8	-1.1	-1.1	-1.2	-1.2	-1.2	-1.3
(2.1) Interest expenditure	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7
(2.2) Growth effect	-1.5	-1.9	-1.3	-1.2	-1.2	-0.9	-0.8	-0.8	-1.0	-1.0	-1.0	-1.0	-1.1	-1.1
(2.3) Inflation effect	-0.6	-1.0	-1.2	-1.1	-1.0	-1.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.5	0.0	0.2	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.5	0.1	0.1	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	-0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-1.1	-1.7	-1.6	-1.8	-1.8	-1.7	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.7	-1.6



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.3)	LOW	LOW (S1 = -1.8)	LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	MEDIUM (S2 = 3.8)	MEDIUM
Risk category			LOW	LOW	LOW	LOW	LOW	MEDIUM	LOW	MEDIUM	MEDIUM
Debt level (2030)			44.1	50.7	46.3	45.7	45.7				
Debt peak year			2019	2030	2019	2019	2019				
Percentile rank			70.0%	78.0%							
Probability debt higher								42.1%			
Dif. between percentiles								27.3			

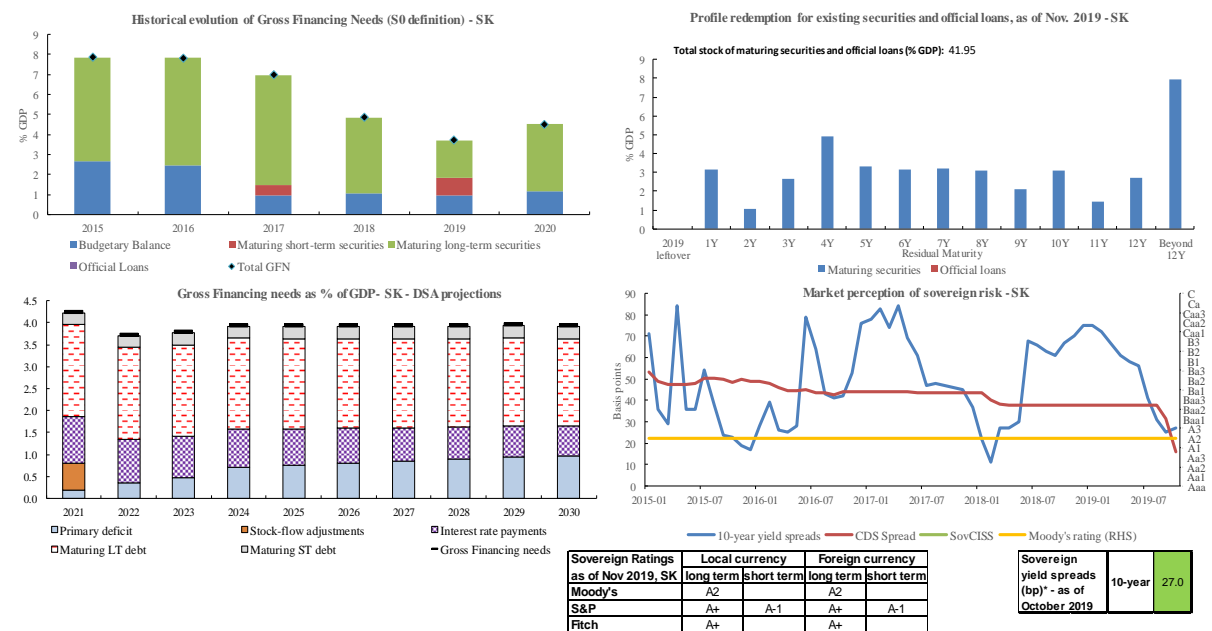
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.50	0.27	0.46
Fiscal sub-index	0.47	0.00	0.36
Financial competitiveness sub-index	0.52	0.40	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-2.9	-1.8	-0.3	-1.3
of which Gap to the debt-stabilizing primary balance	-1.3	-0.5	0.6	-0.5
Cost of delaying adjustment	-0.4	-0.2	0.0	-0.2
Debt requirement	-1.3	-1.2	-1.1	-1.2
Ageing costs	0.1	0.1	0.3	0.6
Required structural primary balance related to S1	-2.4	-2.6	-2.1	-2.1

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	2.5	3.8	5.0	5.8	4.1	3.8	3.6
of which Initial Budgetary position	0.1	1.3	2.3	1.3	1.3	1.3	1.4
Ageing costs	2.4	2.6	2.7	4.5	2.7	2.5	2.2
of which Pensions	0.9	1.1	1.1	1.1	1.4	1.1	0.8
Health care	0.9	0.9	0.9	1.9	0.8	0.9	0.9
Long-term care	0.4	0.4	0.5	1.4	0.4	0.5	0.4
Others	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Required structural primary balance related to S2	3.0	3.1	3.2	5.0	3.3	3.0	2.9

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

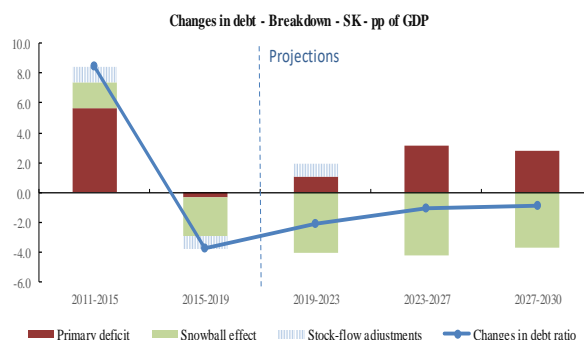
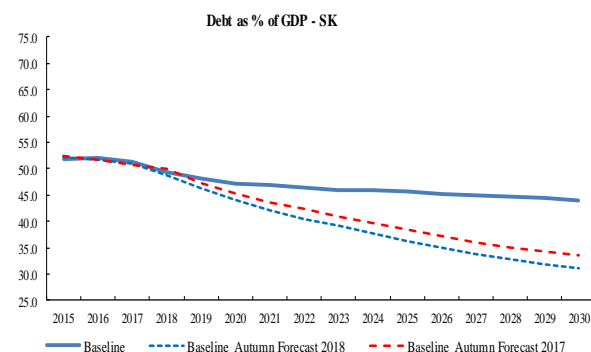
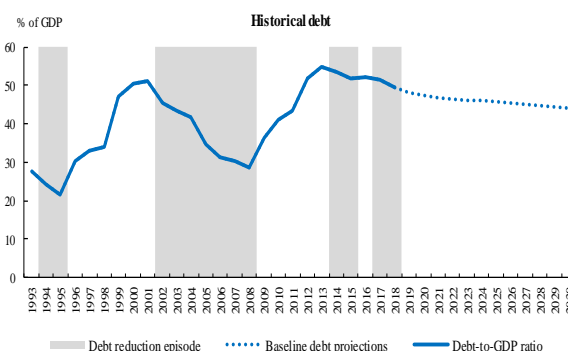
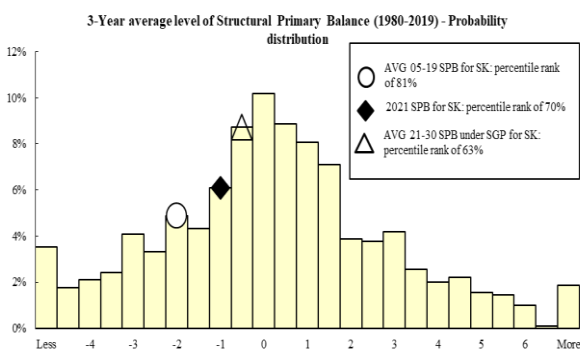
Public debt structure - SK (2018)	Share of short-term government debt (p.p.): 3.0	Share of government debt in foreign currency (%): 5.0	Share of government debt by non-residents 57.5	Net International Investment Position (IIP) - SK (2018)	Net IIP (% GDP): -68.1
--	--	--	--	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		SK					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		0.1	0.0	0.0	0.0	0.0	6.3
of which	One-off guarantees	0.1	0.0	0.0	0.0	0.0	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		1.5	1.3	1.1	3.1	2.9	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	n.a.	n.a.	n.a.	n.a.	n.a.	0.7
	Securities issued under liquidity schemes	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
	Special purpose entity	n.a.	n.a.	n.a.	n.a.	n.a.	0.1
	Total	n.a.	n.a.	n.a.	n.a.	n.a.	0.8

Government's contingent liability risks from banking sector - SK (2018)	Private sector credit flow (% GDP): 2.0	Change in nominal house price index: 7.4	Bank loans-to-deposits ratio (p.p.): 113.8	Share of non-performing loans (%): 2.6	Change in share of non-performing loans (p.p.): -0.4	NPL coverage ratio 63.6	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):	
							Baseline 0.0%	Stress 0.7%

6. Realism of baseline assumptions



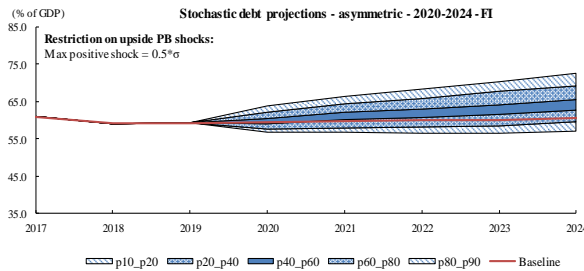
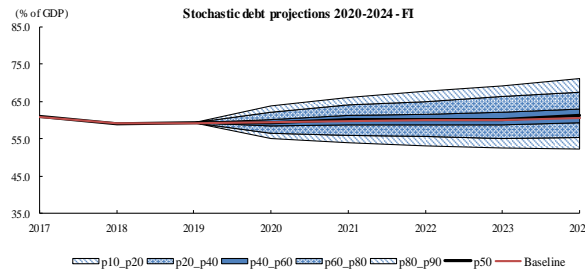
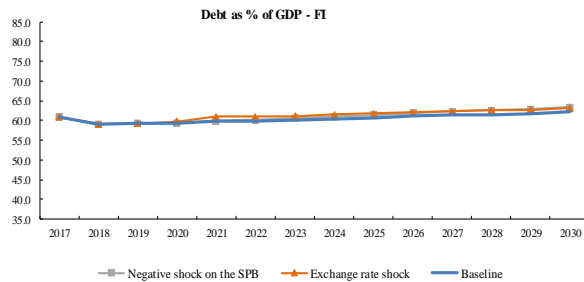
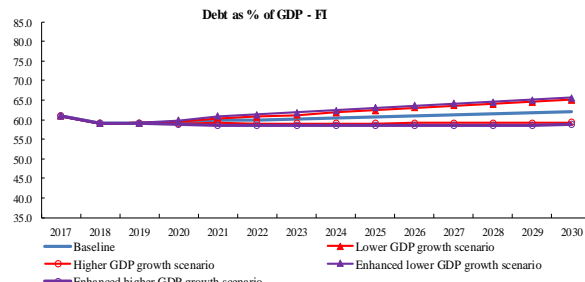
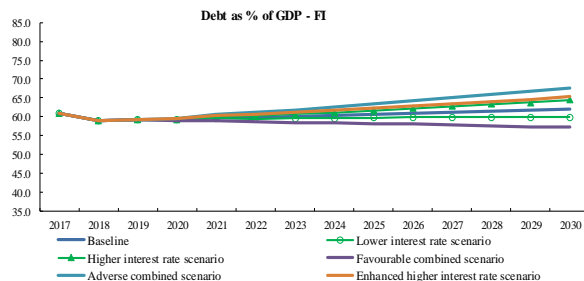
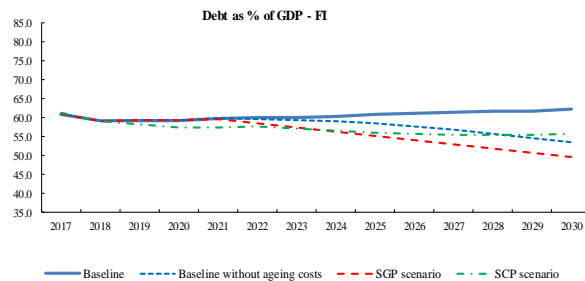
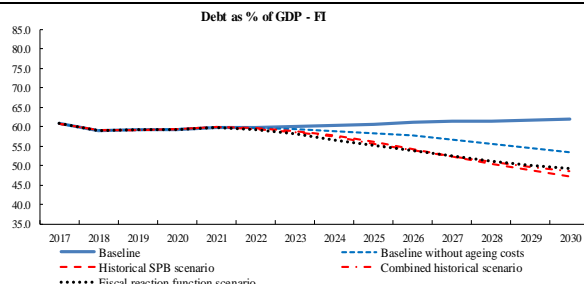
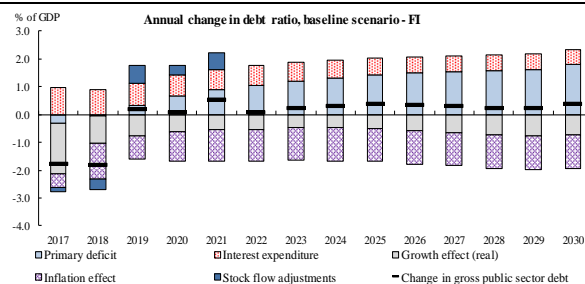
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Slovakia									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	48.1	47.3	46.9	45.3	44.7	44.1	47.4	45.3	45.8
Primary balance	0.3	0.0	-0.2	-0.8	-0.9	-1.0	0.0	-0.8	-0.6
Structural primary balance (before CoA)	-0.4	-0.6	-0.8	-0.8	-0.8	-0.8	-0.6	-0.8	-0.7
Real GDP growth	2.7	2.6	2.7	2.3	2.4	2.5	2.7	2.2	2.3
Potential GDP growth	2.6	2.8	2.9	2.3	2.4	2.5	2.7	2.4	2.5
Inflation rate	2.4	2.3	2.2	2.0	2.0	2.0	2.3	2.0	2.1
Implicit interest rate (nominal)	2.6	2.5	2.4	1.8	1.7	1.6	2.5	1.8	2.0
2. Fiscal reaction function scenario									
Gross public debt	48.1	47.3	46.9	47.1	46.9	46.5	47.4	46.9	47.0
Primary balance	0.3	0.0	-0.2	-1.1	-1.1	-1.1	0.0	-1.1	-0.8
Structural primary balance (before CoA)	-0.4	-0.6	-0.8	-1.1	-1.0	-0.9	-0.6	-1.1	-1.0
Real GDP growth	2.7	2.6	2.7	2.3	2.4	2.5	2.7	2.2	2.3
3. SGP scenario									
Gross public debt	48.1	47.3	46.5	42.2	40.6	39.1	47.3	42.2	43.5
Primary balance	0.3	0.0	0.4	-0.2	-0.3	-0.4	0.2	-0.1	-0.1
Structural primary balance	-0.4	-0.6	-0.2	-0.2	-0.3	-0.4	-0.4	-0.2	-0.3
Real GDP growth	2.7	2.6	2.3	2.4	2.5	2.5	2.5	2.2	2.3
4. SCP scenario									
Gross public debt	47.5	45.9	44.9	38.0	35.4	33.3	46.1	38.4	40.3
Primary balance	1.2	1.1	1.0	0.6	0.5	0.4	1.1	0.6	0.7
Structural primary balance (before CoA)	0.5	0.3	0.4	0.7	0.7	0.7	0.4	0.7	0.6
Real GDP growth	4.0	3.7	3.2	3.0	3.1	2.9	3.6	2.9	3.0
Potential GDP growth	3.8	3.7	3.4	3.0	3.1	2.9	3.6	3.0	3.1
Inflation rate	2.6	2.4	2.4	2.0	2.0	2.0	2.5	2.0	2.1
Implicit interest rate (nominal)	2.5	2.4	2.3	2.7	3.0	3.2	2.4	2.7	2.6
5. Historical SPB scenario									
Gross public debt	48.1	47.3	46.9	48.4	49.6	50.7	47.4	48.5	48.2
Primary balance	0.3	0.0	-0.2	-1.8	-1.9	-2.0	0.0	-1.6	-1.2
Structural primary balance (before CoA)	-0.4	-0.6	-0.8	-1.8	-1.8	-1.8	-0.6	-1.6	-1.4
Real GDP growth	2.7	2.6	2.7	2.3	2.4	2.5	2.7	2.3	2.4
6. Combined historical scenario									
Gross public debt	48.1	47.3	46.9	46.8	48.3	50.4	47.4	47.3	47.4
Primary balance	0.3	0.0	-0.2	-1.8	-1.9	-2.0	0.0	-1.6	-1.2
Structural primary balance (before CoA)	-0.4	-0.6	-0.8	-1.8	-1.8	-1.8	-0.6	-1.6	-1.4
Real GDP growth	2.7	2.6	2.7	3.5	3.5	3.5	2.7	3.5	3.3
Implicit interest rate (nominal)	2.6	2.5	2.4	2.8	3.2	3.5	2.5	2.8	2.7
7. Higher IR scenario (standard DSA)									
Gross public debt	48.1	47.3	47.0	46.1	45.8	45.7	47.5	46.1	46.4
Implicit interest rate (nominal)	2.6	2.6	2.5	2.2	2.2	2.2	2.6	2.3	2.3
8. Lower IR scenario (standard DSA)									
Gross public debt	48.1	47.2	46.8	44.5	43.6	42.6	47.4	44.5	45.2
Implicit interest rate (nominal)	2.6	2.4	2.2	1.4	1.2	1.0	2.4	1.4	1.7
9. Higher IR scenario (enhanced DSA)									
Gross public debt	48.1	47.3	47.1	46.6	46.4	46.3	47.5	46.6	46.8
Implicit interest rate (nominal)	2.6	2.6	2.6	2.4	2.3	2.3	2.6	2.4	2.5
10. Higher growth scenario (standard DSA)									
Gross public debt	48.1	47.0	46.5	43.9	42.9	42.0	47.2	43.9	44.7
Real GDP growth	2.7	3.1	3.2	2.8	2.9	3.0	3.0	2.7	2.8
11. Lower growth scenario (standard DSA)									
Gross public debt	48.1	47.5	47.4	46.8	46.5	46.3	47.7	46.7	47.0
Real GDP growth	2.7	2.1	2.2	1.8	1.9	2.0	2.3	1.7	1.9
12. Higher growth scenario (enhanced DSA)									
Gross public debt	48.1	46.8	46.0	43.4	42.5	41.6	47.0	43.4	44.3
Real GDP growth	2.7	3.7	3.8	2.8	2.9	3.0	3.4	2.7	2.9
13. Lower growth scenario (enhanced DSA)									
Gross public debt	48.1	47.8	47.9	47.3	47.0	46.7	47.9	47.2	47.4
Real GDP growth	2.7	1.5	1.6	1.8	1.9	2.0	1.9	1.7	1.8
14. Lower SPB scenario									
Gross public debt	48.1	47.3	47.1	46.3	46.0	45.7	47.5	46.3	46.6
Primary balance	0.3	-0.1	-0.4	-1.0	-1.1	-1.2	-0.1	-0.9	-0.7
Structural primary balance (before CoA)	-0.4	-0.7	-1.0	-1.0	-1.0	-1.0	-0.7	-1.0	-0.9
Real GDP growth	2.7	2.6	2.8	2.3	2.4	2.5	2.7	2.2	2.3
15. Exchange rate depreciation scenario									
Gross public debt	48.1	47.5	47.4	45.7	45.1	44.5	47.7	45.7	46.2
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	48.1	47.0	46.4	43.1	41.8	40.6	47.2	43.1	44.1
Implicit interest rate (nominal)	2.6	2.4	2.2	1.4	1.2	1.0	2.4	1.4	1.7
Real GDP growth	2.7	3.1	3.2	2.8	2.9	3.0	3.0	2.7	2.8
17. Adverse combined scenario (GDP & IR)									
Gross public debt	48.1	47.5	47.5	47.6	47.8	48.0	47.7	47.6	47.6
Implicit interest rate (nominal)	2.6	2.6	2.5	2.2	2.2	2.2	2.6	2.3	2.3
Real GDP growth	2.7	2.1	2.2	1.8	1.9	2.0	2.3	1.7	1.9

Finland

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

FI - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	60.9	59.0	59.2	59.3	59.8	59.9	60.1	60.4	60.7	61.1	61.3	61.5	61.7	62.1
Changes in the ratio (-1+2+3) of which	-1.8	-1.8	0.2	0.1	0.5	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.4
(1) Primary balance (1.1+1.2+1.3)	0.3	0.1	-0.3	-0.7	-0.9	-1.1	-1.2	-1.3	-1.4	-1.5	-1.5	-1.6	-1.6	-1.8
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	0.3	-0.1	-0.6	-0.8	-0.9	-1.1	-1.2	-1.3	-1.4	-1.5	-1.5	-1.6	-1.6	-1.8
(1.1.1) Structural primary balance (bef. CoA)	0.3	-0.1	-0.6	-0.8	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
(1.1.2) Cost of ageing						0.3	0.6	0.8	1.0	1.2	1.4	1.6	1.7	1.8
(1.1.3) Others (taxes and property incomes)						0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.0
(1.2) Cyclical component	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	-0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.3	-1.4	-0.8	-0.9	-1.0	-1.0	-1.0	-1.0	-1.1	-1.2	-1.3	-1.4	-1.4	-1.4
(2.1) Interest expenditure	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5
(2.2) Growth effect	-1.8	-1.0	-0.8	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.7	-0.8	-0.7
(2.3) Inflation effect	-0.5	-1.3	-0.8	-1.1	-1.1	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	-0.2	-0.4	0.6	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.0	-0.2	0.5	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	-0.2	-0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-0.7	-0.9	-1.4	-1.6	-1.6	-1.8	-1.9	-2.0	-2.0	-2.1	-2.1	-2.1	-2.2	-2.3



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.3)	MEDIUM	MEDIUM (S1 = 0.5)	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM (S2 = 3.6)	MEDIUM	
Risk category			MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM			
Debt level (2030)			62.1	47.2	65.1	64.5	63.4				
Debt peak year			2030	2021	2030	2030	2030				
Percentile rank			72.0%	43.0%							
Probability debt higher								60.0%			
Dif. between percentiles								18.9			

2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold	
Overall index	0.33	0.26	0.46	
Fiscal sub-index	0.35	0.08	0.36	
Financial competitiveness sub-index	0.31	0.36	0.49	

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-0.1	0.5	-2.2	0.7
of which Gap to the debt-stabilizing primary balance	-1.2	-0.8	-3.2	-0.8
Cost of delaying adjustment	0.0	0.1	-0.3	0.1
Debt requirement	-0.2	0.0	-0.3	0.0
Ageing costs	1.3	1.3	1.7	1.5
Required structural primary balance related to S1	0.1	-0.4	-0.8	-0.2

S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	2.7	3.6	1.3	4.6	4.0	3.9	3.5
of which Initial Budgetary position	0.7	1.7	-0.6	1.7	1.7	1.7	1.7
Ageing costs	2.0	1.9	1.9	2.9	2.3	2.2	1.7
of which Pensions	0.1	0.0	0.0	0.0	0.5	0.1	0.0
Health care	0.5	0.5	0.5	0.9	0.4	0.5	0.5
Long-term care	1.6	1.6	1.6	2.1	1.5	1.8	1.5
Others	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2
Required structural primary balance related to S2	2.9	2.6	2.7	3.7	3.1	2.9	2.6

3. Financing needs and financial information



4. Risks related to the structure of public debt financing and net International Investment Position

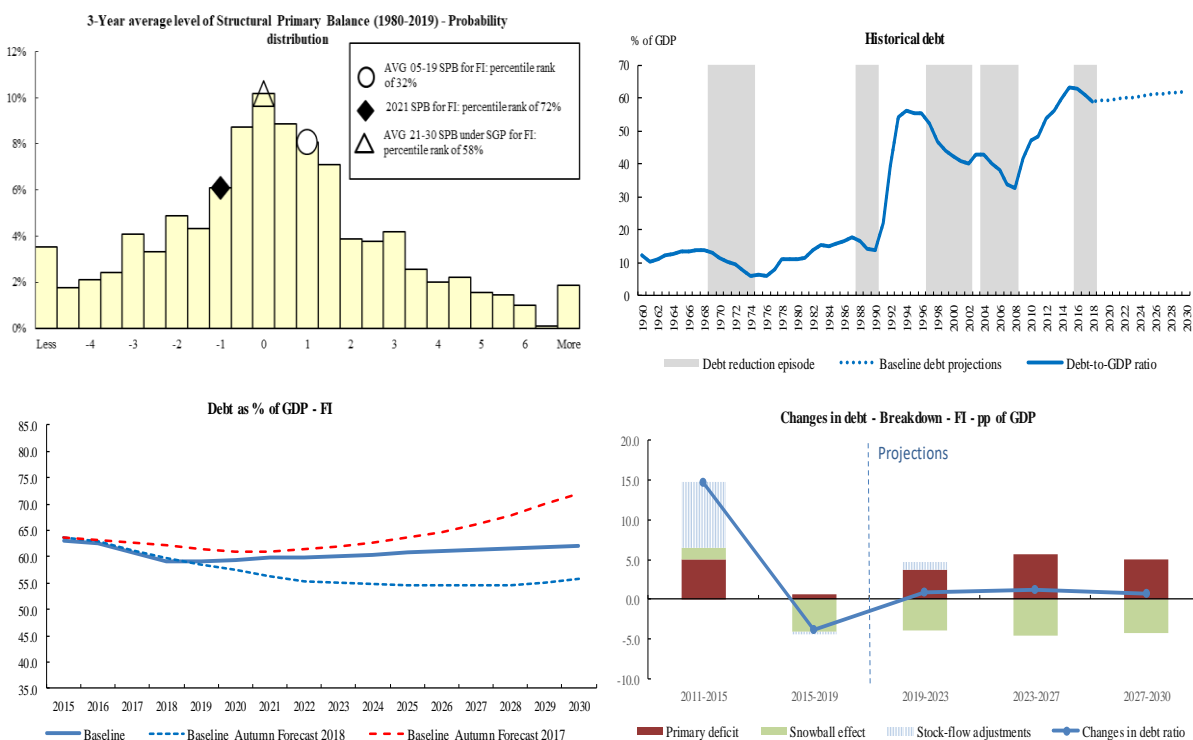
Public debt structure - FI (2018)	Share of short-term government debt (p.p.): 8.2	Share of government debt in foreign currency (%): 2.5	Share of government debt by non-residents 63.3	Net International Investment Position (IIP) - FI (2018)	Net IIP (% GDP): -2.0
--	---	---	--	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		FI					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		20.2	23.6	28.5	28.0	32.0	6.3
of which One-off guarantees		19.4	22.8	27.6	26.9	30.8	5.8
Standardised guarantees		0.7	0.8	1.0	1.1	1.2	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	0.0	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - FI (2018)	Private sector credit flow (% GDP): 1.6	Change in nominal house price index: 0.9	Bank loans-to-deposits ratio (p.p.): 186.7	Share of non-performing loans (%): 1.6	Change in share of non-performing loans (p.p.): 0.4	NPL coverage ratio 25.9	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):	
							Baseline 0.1%	Stress 1.1%

6. Realism of baseline assumptions



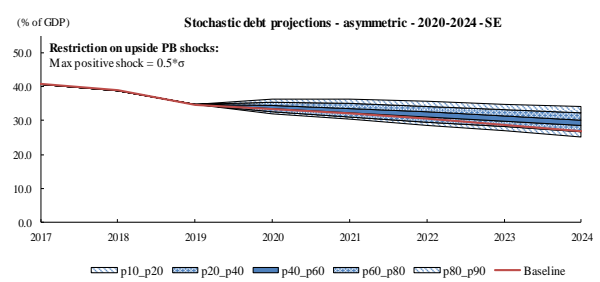
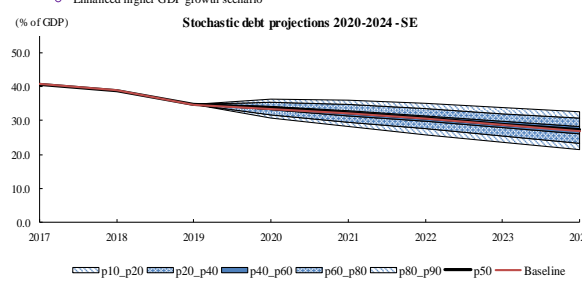
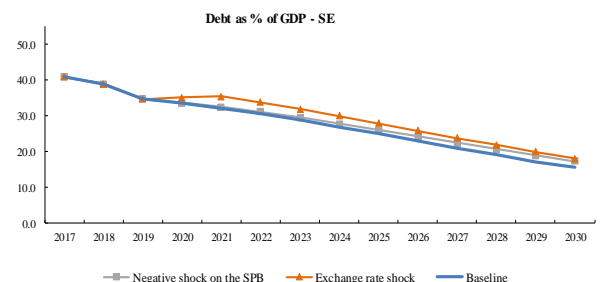
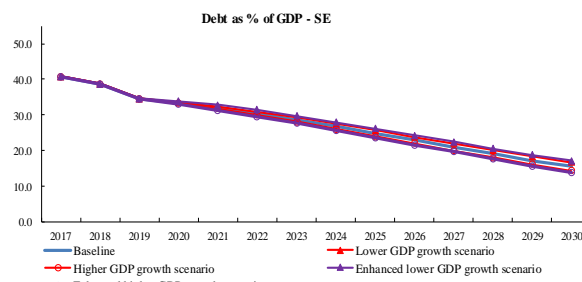
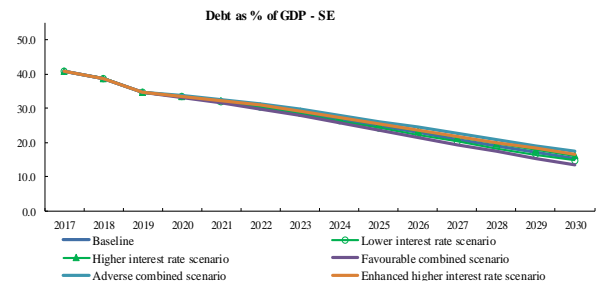
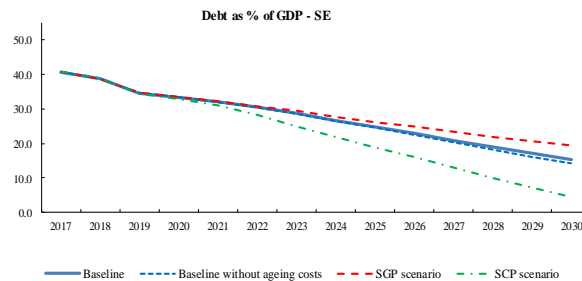
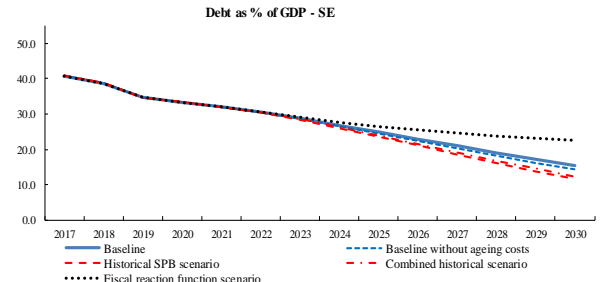
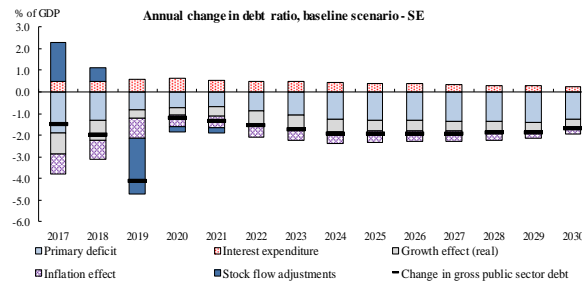
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Finland									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	59.2	59.3	59.8	61.1	61.5	62.1	59.4	61.0	60.6
Primary balance	-0.3	-0.7	-0.9	-1.5	-1.6	-1.8	-0.6	-1.4	-1.2
Structural primary balance (before CoA)	-0.6	-0.8	-0.9	-0.9	-0.9	-0.9	-0.8	-0.9	-0.9
Real GDP growth	1.4	1.1	1.0	1.0	1.2	1.2	1.1	1.0	1.1
Potential GDP growth	1.3	1.2	1.2	1.0	1.2	1.2	1.2	1.0	1.1
Inflation rate	1.4	1.8	2.0	2.0	2.0	2.0	1.7	2.0	1.9
Implicit interest rate (nominal)	1.4	1.3	1.3	1.0	0.9	0.9	1.3	1.0	1.1
2. Fiscal reaction function scenario									
Gross public debt	59.2	59.3	59.8	53.7	51.1	49.1	59.4	54.0	55.3
Primary balance	-0.3	-0.7	-0.9	0.4	0.1	-0.2	-0.6	0.2	0.0
Structural primary balance (before CoA)	-0.6	-0.8	-0.9	1.0	0.8	0.7	-0.8	0.8	0.4
Real GDP growth	1.4	1.1	1.0	1.0	1.3	1.2	1.1	0.9	1.0
3. SGP scenario									
Gross public debt	59.2	59.3	59.5	54.2	51.8	49.6	59.3	54.1	55.4
Primary balance	-0.3	-0.7	-0.3	0.1	0.0	0.0	-0.4	0.1	0.0
Structural primary balance	-0.6	-0.8	-0.3	0.1	0.0	0.0	-0.6	0.1	-0.1
Real GDP growth	1.4	1.1	0.5	1.0	1.2	1.3	1.0	1.0	1.0
4. SCP scenario									
Gross public debt	58.1	57.4	57.4	55.7	55.4	55.6	57.6	56.1	56.5
Primary balance	0.6	0.8	0.8	-0.1	-0.2	-0.4	0.7	0.0	0.2
Structural primary balance (before CoA)	0.1	0.6	0.5	0.3	0.3	0.3	0.4	0.3	0.3
Real GDP growth	1.7	1.4	1.2	0.9	1.0	1.1	1.4	0.9	1.0
Potential GDP growth	1.6	1.3	1.1	0.9	1.0	1.1	1.3	0.9	1.0
Inflation rate	1.7	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0
Implicit interest rate (nominal)	1.5	1.5	1.6	2.1	2.5	2.8	1.5	2.2	2.0
5. Historical SPB scenario									
Gross public debt	59.2	59.3	59.8	54.2	50.6	47.2	59.4	53.9	55.3
Primary balance	-0.3	-0.7	-0.9	0.8	0.7	0.5	-0.6	0.5	0.2
Structural primary balance (before CoA)	-0.6	-0.8	-0.9	1.4	1.4	1.4	-0.8	1.0	0.6
Real GDP growth	1.4	1.1	1.0	1.0	1.2	1.2	1.1	0.8	0.9
6. Combined historical scenario									
Gross public debt	59.2	59.3	59.8	54.0	51.0	48.6	59.4	54.1	55.4
Primary balance	-0.3	-0.7	-0.9	0.8	0.7	0.5	-0.6	0.5	0.2
Structural primary balance (before CoA)	-0.6	-0.8	-0.9	1.4	1.4	1.4	-0.8	1.0	0.6
Real GDP growth	1.4	1.1	1.0	1.0	1.0	1.0	1.1	0.8	0.9
Implicit interest rate (nominal)	1.4	1.3	1.3	1.3	1.7	1.9	1.3	1.4	1.4
7. Higher IR scenario (standard DSA)									
Gross public debt	59.2	59.4	60.0	62.3	63.3	64.5	59.5	62.3	61.6
Implicit interest rate (nominal)	1.4	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5
8. Lower IR scenario (standard DSA)									
Gross public debt	59.2	59.2	59.6	59.9	59.9	59.9	59.3	59.8	59.7
Implicit interest rate (nominal)	1.4	1.2	1.1	0.6	0.5	0.3	1.2	0.6	0.8
9. Higher IR scenario (enhanced DSA)									
Gross public debt	59.2	59.5	60.3	63.0	64.1	65.4	59.6	62.9	62.1
Implicit interest rate (nominal)	1.4	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6
10. Higher growth scenario (standard DSA)									
Gross public debt	59.2	59.0	59.2	59.2	59.2	59.3	59.2	59.1	59.1
Real GDP growth	1.4	1.6	1.5	1.5	1.7	1.7	1.5	1.5	1.5
11. Lower growth scenario (standard DSA)									
Gross public debt	59.2	59.6	60.4	63.0	64.0	65.1	59.7	63.0	62.1
Real GDP growth	1.4	0.6	0.5	0.5	0.7	0.7	0.8	0.5	0.6
12. Higher growth scenario (enhanced DSA)									
Gross public debt	59.2	58.7	58.7	58.6	58.7	58.8	58.9	58.6	58.7
Real GDP growth	1.4	2.1	2.0	1.5	1.7	1.7	1.8	1.5	1.6
13. Lower growth scenario (enhanced DSA)									
Gross public debt	59.2	59.9	61.0	63.6	64.6	65.6	60.0	63.5	62.6
Real GDP growth	1.4	0.1	0.0	0.5	0.7	0.7	0.5	0.5	0.5
14. Lower SPB scenario									
Gross public debt	59.2	59.3	59.9	61.8	62.6	63.4	59.5	61.8	61.2
Primary balance	-0.3	-0.7	-1.0	-1.6	-1.7	-1.9	-0.7	-1.6	-1.4
Structural primary balance (before CoA)	-0.6	-0.8	-1.1	-1.1	-1.1	-1.1	-0.8	-1.1	-1.0
Real GDP growth	1.4	1.1	1.0	1.0	1.2	1.2	1.2	1.0	1.1
15. Exchange rate depreciation scenario									
Gross public debt	59.2	59.8	60.9	62.0	62.5	63.0	60.0	62.0	61.5
Exchange rate depreciation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	59.2	58.9	59.0	58.0	57.6	57.2	59.1	57.9	58.2
Implicit interest rate (nominal)	1.4	1.2	1.1	0.6	0.5	0.3	1.2	0.6	0.8
Real GDP growth	1.4	1.6	1.5	1.5	1.7	1.7	1.5	1.5	1.5
17. Adverse combined scenario (GDP & IR)									
Gross public debt	59.2	59.7	60.6	64.3	65.9	67.6	59.8	64.3	63.2
Implicit interest rate (nominal)	1.4	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5
Real GDP growth	1.4	0.6	0.5	0.5	0.7	0.7	0.8	0.5	0.6

Sweden

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

SE - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	40.7	38.8	34.6	33.4	32.0	30.5	28.7	26.7	24.8	22.9	20.9	19.0	17.1	15.4
Changes in the ratio (-1+2+3) of which	-1.5	-2.0	-4.1	-1.2	-1.4	-1.6	-1.8	-2.0	-1.9	-1.9	-1.9	-1.9	-1.9	-1.7
(1) Primary balance (1.1+1.2+1.3)	1.9	1.3	0.8	0.7	0.7	0.9	1.1	1.3	1.3	1.3	1.4	1.4	1.4	1.3
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	1.5	0.8	0.7	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.4	1.4	1.3
(1.1.1) Structural primary balance (bef. CoA)	1.5	0.8	0.7	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
(1.1.2) Cost of ageing						0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4
(1.1.3) Others (taxes and property incomes)						0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.5
(1.2) Cyclical component	0.4	0.5	0.1	-0.3	-0.5	-0.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-1.4	-1.3	-0.8	-0.2	-0.4	-0.7	-0.7	-0.7	-0.6	-0.6	-0.6	-0.5	-0.5	-0.4
(2.1) Interest expenditure	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3
(2.2) Growth effect	-1.0	-0.9	-0.4	-0.3	-0.4	-0.7	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4	-0.4	-0.3
(2.3) Inflation effect	-0.9	-0.9	-0.9	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.4	-0.4	-0.4	-0.3
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	1.8	0.6	-2.6	-0.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	1.8	0.3	-3.2	-0.5	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.3	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	1.1	0.3	0.2	0.4	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.1	1.0



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.2)	LOW	LOW (S1 = -5.4)	LOW	LOW	LOW	LOW	LOW	LOW	LOW (S2 = 1.2)	LOW	
Risk category			LOW	LOW	LOW	LOW	LOW	LOW			
Debt level (2030)			15.4	11.7	16.7	16.2	17.3				
Debt peak year			2019	2019	2019	2019	2019				
Percentile rank			36.0%	30.0%							
Probability debt higher							4.6%				
Dif. between percentiles							11.4				

2.2. Sustainability indicators

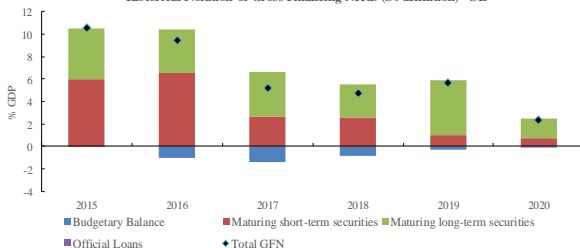
S0 indicator	2009	2019	Critical threshold
Overall index	0.31	0.24	0.46
Fiscal sub-index	0.15	0.00	0.36
Financial competitiveness sub-index	0.40	0.37	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	-4.6	-5.4	-6.4	-5.2
of which Gap to the debt-stabilizing primary balance	-2.1	-2.4	-2.7	-2.4
Cost of delaying adjustment	-0.6	-0.7	-0.8	-0.7
Debt requirement	-2.2	-2.6	-3.3	-2.6
Ageing costs	0.3	0.3	0.4	0.4
Required structural primary balance related to S1	-3.3	-4.3	-4.7	-4.0

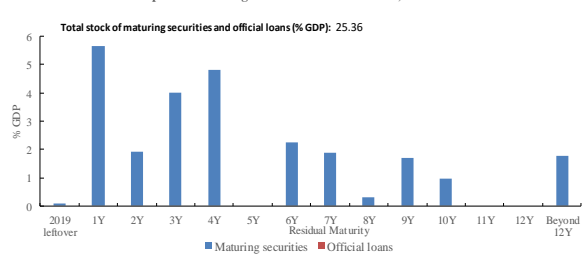
S2 indicator	2018 FSR	DSM 2019					
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	High life expectancy scenario	Higher interest rate scenario
Overall index	1.1	1.2	0.6	2.3	1.1	1.7	0.9
of which Initial Budgetary position	-0.7	-0.6	-1.2	-0.6	-0.6	-0.6	-0.6
Ageing costs	1.8	1.8	1.9	3.0	1.7	2.3	1.5
of which Pensions	-0.4	-0.3	-0.4	-0.3	-0.3	-0.2	-0.4
Health care	0.6	0.5	0.6	1.1	0.5	0.6	0.5
Long-term care	1.4	1.3	1.3	1.8	1.2	1.6	1.1
Others	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Required structural primary balance related to S2	2.4	2.3	2.4	3.5	2.2	2.9	2.1

3. Financing needs and financial information

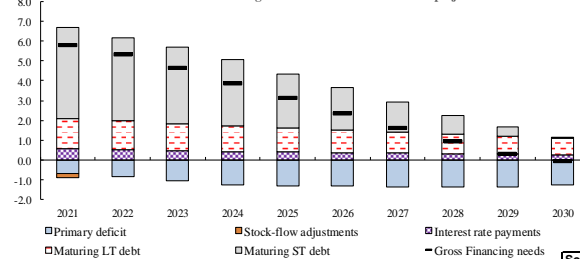
Historical evolution of Gross Financing Needs (S0 definition) - SE



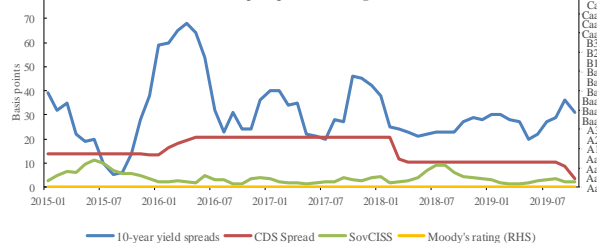
Profile redemption for existing securities and official loans, as of Nov. 2019 - SE



Gross Financing needs as % of GDP - SE - DSA projections



Market perception of sovereign risk - SE



Sovereign Ratings as of Nov 2019, SE	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Aaa	A-1	Aaa	P-1
S&P	AAU	A-1+u	AAU	A-1+u
Fitch	AAA	A+	AAA	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	31.0
---	---------	------

4. Risks related to the structure of public debt financing and net International Investment Position

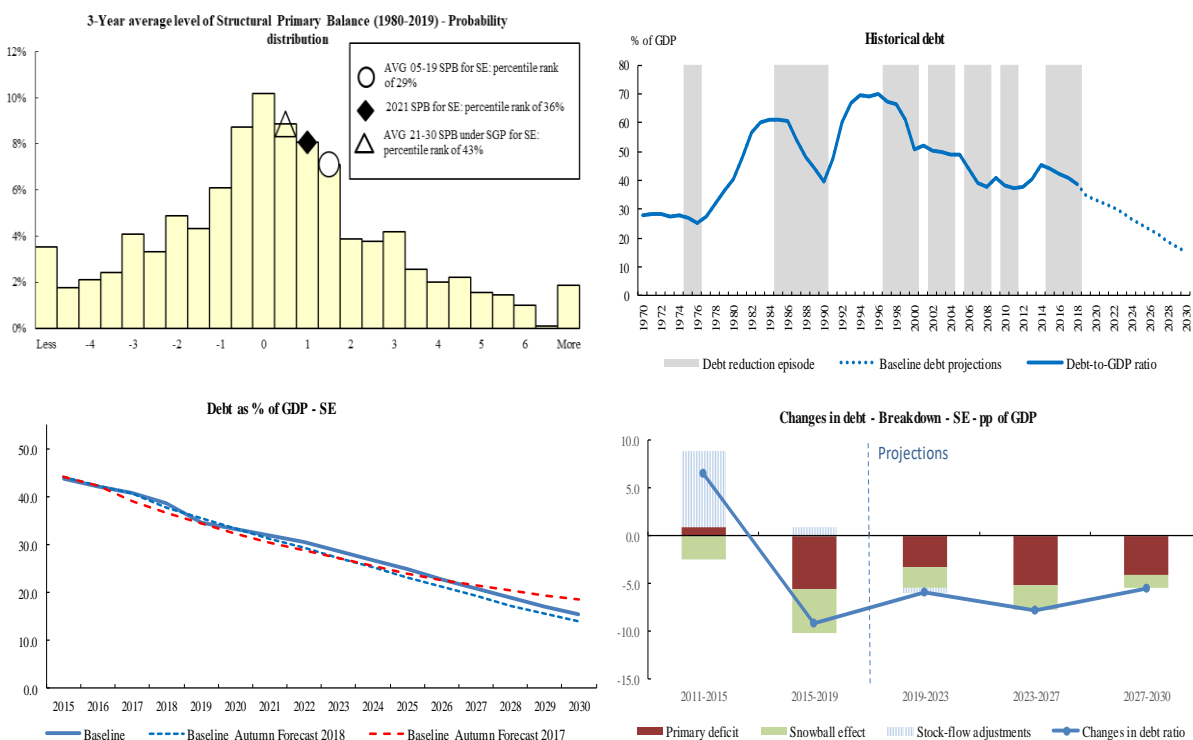
Public debt structure - SE (2018)	Share of short-term government debt (p.p.): 20.5	Share of government debt in foreign currency (%): 24.7	Share of government debt by non-residents (%): 22.7	Net International Investment Position (IIP) - SE (2018)	Net IIP (% GDP): 10.3
--	--	---	--	--	---------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		SE					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		14.1	11.6	11.1	10.6	9.9	6.3
of which	One-off guarantees	14.1	11.6	11.1	10.6	9.9	5.8
	Standardised guarantees	0.0	0.0	0.0	0.0	0.0	0.4
Public-private partnerships (PPPs) (% GDP)		0.0	0.0	0.0	0.0	0.0	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	2.4	0.2	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	0.0	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	2.4	0.2	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - SE (2018)	Private sector credit flow (% GDP): 9.0	Change in nominal house price index: -0.9	Bank loans-to-deposits ratio (p.p.): 210.1	Share of non-performing loans (%): 0.5	Change in share of non-performing loans (p.p.): -0.5	NPL coverage ratio 33.3	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.2%

6. Realism of baseline assumptions



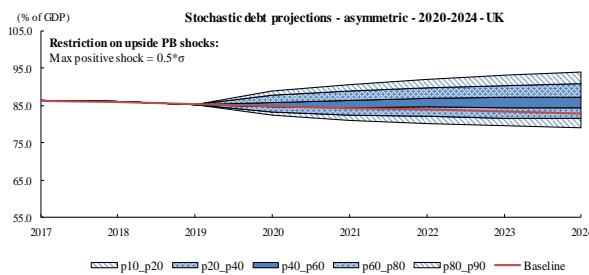
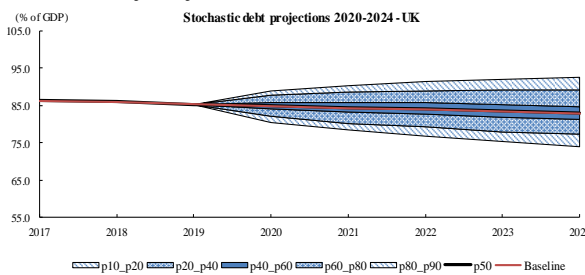
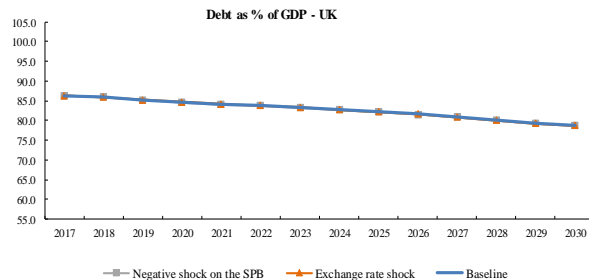
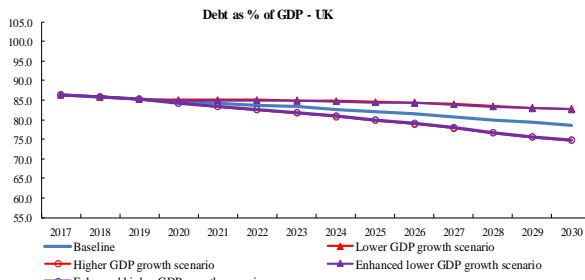
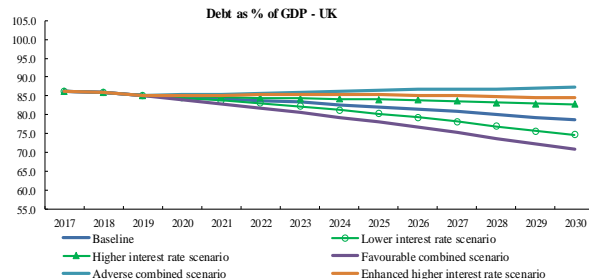
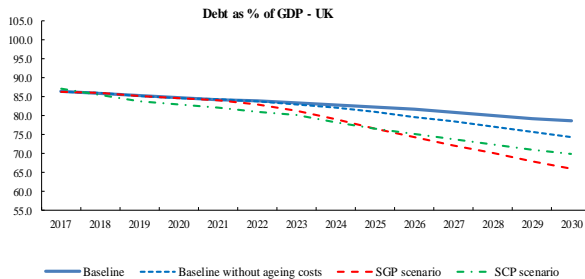
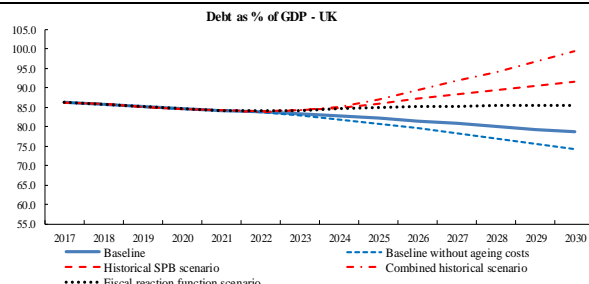
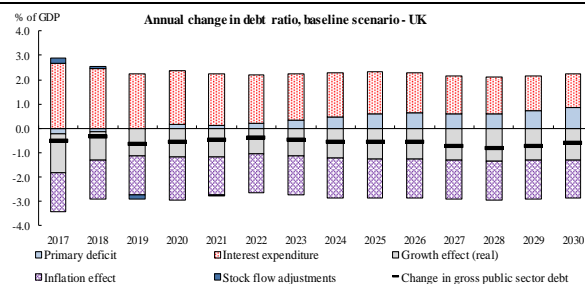
7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, Sweden									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	34.6	33.4	32.0	22.9	19.0	15.4	33.4	22.9	25.5
Primary balance	0.8	0.7	0.7	1.3	1.4	1.3	0.7	1.2	1.1
Structural primary balance (before CoA)	0.7	1.1	1.2	1.2	1.2	1.2	1.0	1.2	1.1
Real GDP growth	1.1	1.0	1.4	2.1	2.1	2.1	1.2	2.1	1.9
Potential GDP growth	1.9	1.7	1.6	2.1	2.1	2.1	1.8	2.0	1.9
Inflation rate	2.4	1.5	1.7	2.0	2.0	2.0	1.9	2.0	1.9
Implicit interest rate (nominal)	1.5	1.9	1.7	1.5	1.5	1.6	1.7	1.6	1.6
2. Fiscal reaction function scenario									
Gross public debt	34.6	33.4	32.0	25.5	23.7	22.4	33.4	25.9	27.8
Primary balance	0.8	0.7	0.7	0.3	0.2	0.0	0.7	0.4	0.5
Structural primary balance (before CoA)	0.7	1.1	1.2	0.2	-0.1	-0.1	1.0	0.3	0.5
Real GDP growth	1.1	1.0	1.4	2.2	2.2	2.1	1.2	2.2	1.9
3. SGP scenario									
Gross public debt	34.6	33.4	32.2	24.8	22.0	19.4	33.4	24.9	27.1
Primary balance	0.8	0.7	0.5	0.8	0.8	0.7	0.7	0.8	0.7
Structural primary balance	0.7	1.1	1.0	0.8	0.8	0.7	0.9	0.8	0.8
Real GDP growth	1.1	1.0	1.5	2.1	2.2	2.1	1.2	2.1	1.9
4. SCP scenario									
Gross public debt	34.5	32.8	30.9	15.9	10.1	4.5	32.7	16.1	20.3
Primary balance	1.0	1.1	1.4	2.5	2.6	2.5	1.2	2.5	2.2
Structural primary balance (before CoA)	1.0	1.3	1.7	2.4	2.4	2.4	1.4	2.4	2.1
Real GDP growth	1.6	1.6	1.6	1.8	1.8	1.9	1.6	1.8	1.8
Potential GDP growth	1.8	1.9	2.0	1.8	1.8	1.9	1.9	1.8	1.8
Inflation rate	2.3	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Implicit interest rate (nominal)	1.0	1.1	1.1	1.3	1.3	1.3	1.1	1.3	1.2
5. Historical SPB scenario									
Gross public debt	34.6	33.4	32.0	21.1	16.2	11.7	33.4	21.1	24.2
Primary balance	0.8	0.7	0.7	1.9	1.9	1.8	0.7	1.7	1.5
Structural primary balance (before CoA)	0.7	1.1	1.2	1.7	1.7	1.7	1.0	1.6	1.5
Real GDP growth	1.1	1.0	1.4	2.1	2.1	2.1	1.2	2.0	1.8
6. Combined historical scenario									
Gross public debt	34.6	33.4	32.0	21.5	16.8	12.4	33.4	21.5	24.5
Primary balance	0.8	0.7	0.7	1.9	1.9	1.8	0.7	1.7	1.5
Structural primary balance (before CoA)	0.7	1.1	1.2	1.7	1.7	1.7	1.0	1.6	1.5
Real GDP growth	1.1	1.0	1.4	2.1	2.1	2.1	1.2	1.9	1.7
Implicit interest rate (nominal)	1.5	1.9	1.7	1.9	2.0	2.0	1.7	1.9	1.8
7. Higher IR scenario (standard DSA)									
Gross public debt	34.6	33.5	32.2	23.4	19.7	16.2	33.4	23.4	25.9
Implicit interest rate (nominal)	1.5	2.1	1.9	1.9	1.9	1.9	1.8	1.9	1.9
8. Lower IR scenario (standard DSA)									
Gross public debt	34.6	33.3	31.9	22.3	18.4	14.7	33.3	22.4	25.1
Implicit interest rate (nominal)	1.5	1.6	1.5	1.2	1.2	1.2	1.5	1.2	1.3
9. Higher IR scenario (enhanced DSA)									
Gross public debt	34.6	33.6	32.3	23.8	20.1	16.6	33.5	23.8	26.2
Implicit interest rate (nominal)	1.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0
10. Higher growth scenario (standard DSA)									
Gross public debt	34.6	33.2	31.7	21.9	18.0	14.3	33.2	22.0	24.8
Real GDP growth	1.1	1.5	1.9	2.6	2.6	2.6	1.5	2.6	2.3
11. Lower growth scenario (standard DSA)									
Gross public debt	34.6	33.6	32.4	23.8	20.2	16.7	33.5	23.8	26.2
Real GDP growth	1.1	0.5	0.9	1.6	1.6	1.6	0.8	1.6	1.4
12. Higher growth scenario (enhanced DSA)									
Gross public debt	34.6	33.0	31.3	21.6	17.6	13.9	33.0	21.6	24.5
Real GDP growth	1.1	2.2	2.5	2.6	2.6	2.6	2.0	2.6	2.4
13. Lower growth scenario (enhanced DSA)									
Gross public debt	34.6	33.8	32.8	24.2	20.6	17.1	33.8	24.2	26.6
Real GDP growth	1.1	-0.2	0.2	1.6	1.6	1.6	0.4	1.6	1.3
14. Lower SPB scenario									
Gross public debt	34.6	33.6	32.4	24.1	20.6	17.3	33.5	24.1	26.5
Primary balance	0.8	0.5	0.5	1.1	1.2	1.1	0.6	1.0	0.9
Structural primary balance (before CoA)	0.7	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.9
Real GDP growth	1.1	1.2	1.3	2.1	2.1	2.1	1.2	2.1	1.9
15. Exchange rate depreciation scenario									
Gross public debt	34.6	35.0	35.3	25.8	21.8	18.0	35.0	25.8	28.1
Exchange rate depreciation	0.0%	6.5%	6.5%	0.0%	0.0%	0.0%	4.3%	0.0%	1.1%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	34.6	33.2	31.6	21.4	17.4	13.6	33.1	21.5	24.4
Implicit interest rate (nominal)	1.5	1.6	1.5	1.2	1.2	1.2	1.5	1.2	1.3
Real GDP growth	1.1	1.5	1.9	2.6	2.6	2.6	1.5	2.6	2.3
17. Adverse combined scenario (GDP & IR)									
Gross public debt	34.6	33.7	32.5	24.4	20.9	17.5	33.6	24.4	26.7
Implicit interest rate (nominal)	1.5	2.1	1.9	1.9	1.9	1.9	1.8	1.9	1.9
Real GDP growth	1.1	0.5	0.9	1.6	1.6	1.6	0.8	1.6	1.4

United-Kingdom

1. General Government Gross Debt projections under baseline, alternative scenarios and sensitivity tests

UK - Debt projections baseline scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	86.2	85.9	85.2	84.7	84.2	83.8	83.3	82.7	82.2	81.6	80.8	80.0	79.3	78.6
Changes in the ratio (-1+2+3) of which	-0.5	-0.4	-0.7	-0.6	-0.5	-0.4	-0.5	-0.6	-0.6	-0.6	-0.7	-0.8	-0.7	-0.6
(1) Primary balance (1.1+1.2+1.3)	0.2	0.2	0.0	-0.2	-0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.6	-0.6	-0.7	-0.9
(1.1) Structural primary balance (1.1.1-1.1.2+1.1.3)	-0.3	-0.2	-0.2	-0.3	-0.2	-0.2	-0.4	-0.5	-0.6	-0.7	-0.6	-0.6	-0.7	-0.9
(1.1.1) Structural primary balance (bef. CoA)	-0.3	-0.2	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
(1.1.2) Cost of ageing						0.1	0.3	0.4	0.5	0.6	0.6	0.6	0.7	0.9
(1.1.3) Others (taxes and property incomes)						0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2
(1.2) Cyclical component	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(1.3) One-off and other temporary measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Snowball effect (2.1+2.2+2.3+2.4)	-0.5	-0.3	-0.5	-0.7	-0.6	-0.6	-0.8	-1.1	-1.2	-1.2	-1.3	-1.4	-1.4	-1.5
(2.1) Interest expenditure	2.7	2.4	2.2	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.4
(2.2) Growth effect	-1.6	-1.2	-1.1	-1.2	-1.2	-1.0	-1.1	-1.2	-1.2	-1.3	-1.3	-1.3	-1.3	-1.3
(2.3) Inflation effect	-1.6	-1.6	-1.6	-1.8	-1.5	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6
(2.4) Exchange rate effect linked to the interest rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Stock-flow adjustments	0.2	0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.1) Base	0.2	0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3.2) Adjustment due to the exchange rate effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pro memoria														
Structural balance	-2.9	-2.6	-2.4	-2.5	-2.3	-2.2	-2.3	-2.3	-2.3	-2.3	-2.2	-2.1	-2.1	-2.3



2. Risk classification and sustainability indicators summary tables

2.1. Risk classification summary table

Short term	Medium term	S1	Debt sustainability analysis (detail)						DSA	S2	Long term
			Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections			
LOW (S0 = 0.4)	HIGH	MEDIUM (S1 = 1.9)	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	LOW	HIGH	MEDIUM (S2 = 4.3)	HIGH
Risk category			MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	LOW	HIGH	MEDIUM	HIGH
Debt level (2030)			78.6	91.6	82.8	82.9	78.7				
Debt peak year			2019	2030	2019	2019	2019				
Percentile rank			61.0%	80.0%							
Probability debt higher								36.8%			
Dif. between percentiles								18.5			

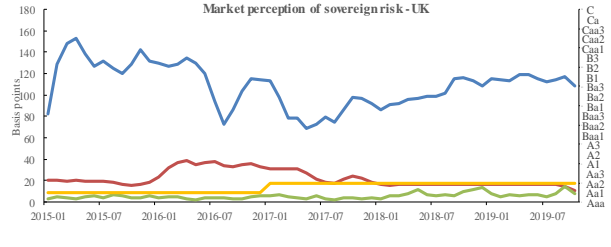
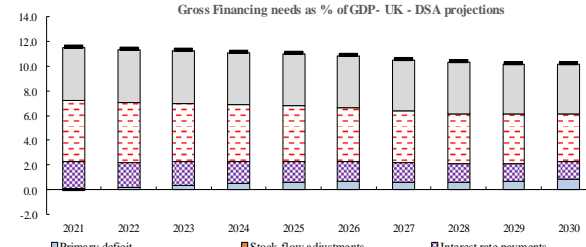
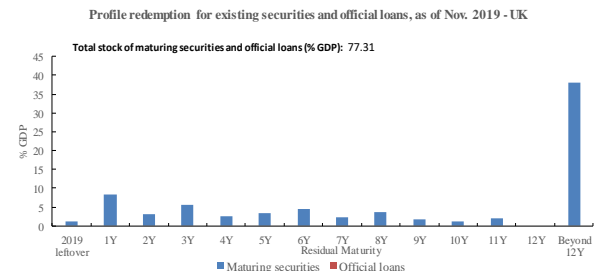
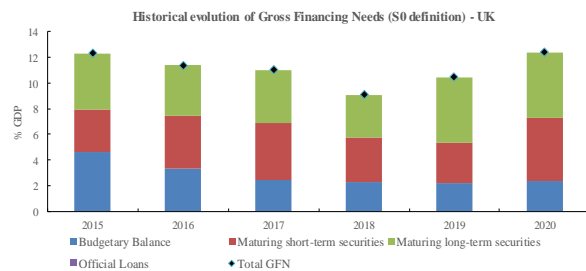
2.2. Sustainability indicators

S0 indicator	2009	2019	Critical threshold
Overall index	0.51	0.45	0.46
Fiscal sub-index	0.53	0.39	0.36
Financial competitiveness sub-index	0.49	0.47	0.49

S1 indicator	2018 FSR	DSM 2019		
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario
Overall index	1.3	1.9	4.9	2.2
of which Gap to the debt-stabilizing primary balance	-1.4	-1.2	0.8	-1.2
Cost of delaying adjustment	0.2	0.3	0.7	0.3
Debt requirement	1.7	2.1	2.2	2.1
Ageing costs	0.7	0.8	1.2	1.0
Required structural primary balance related to S1	2.5	1.8	2.7	2.0

S2 indicator	2018 FSR	DSM 2019					Higher life expectancy scenario	Higher interest rate scenario
		COM no-policy change scenario	Historical SPB scenario	AWG risk scenario	TFP risk scenario	Residual Maturity		
Overall index	3.0	4.3	6.4	5.4	4.5	4.9	4.1	
of which Initial Budgetary position	-0.3	0.9	3.0	1.0	1.1	1.0	1.2	
Ageing costs	3.3	3.3	3.5	4.4	3.4	4.0	3.0	
of which Pensions	1.3	1.4	1.4	1.3	1.6	1.7	1.2	
Health care	1.1	1.1	1.1	1.8	1.0	1.2	1.0	
Long-term care	1.0	1.0	1.0	1.3	0.9	1.1	0.9	
Others	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	
Required structural primary balance related to S2	4.2	4.1	4.2	5.2	4.3	4.8	4.0	

3. Financing needs and financial information



Sovereign Ratings as of Nov 2019, UK	Local currency		Foreign currency	
	long term	short term	long term	short term
Moody's	Aa2u	A-1+u	Aa2u	A-1+u
S&P	AAu	A-1+u	AAu	A-1+u
Fitch	AA+	A-1+	AA+	F1+

Sovereign yield spreads (bp) - as of October 2019	10-year	108.0
---	---------	-------

4. Risks related to the structure of public debt financing and net International Investment Position

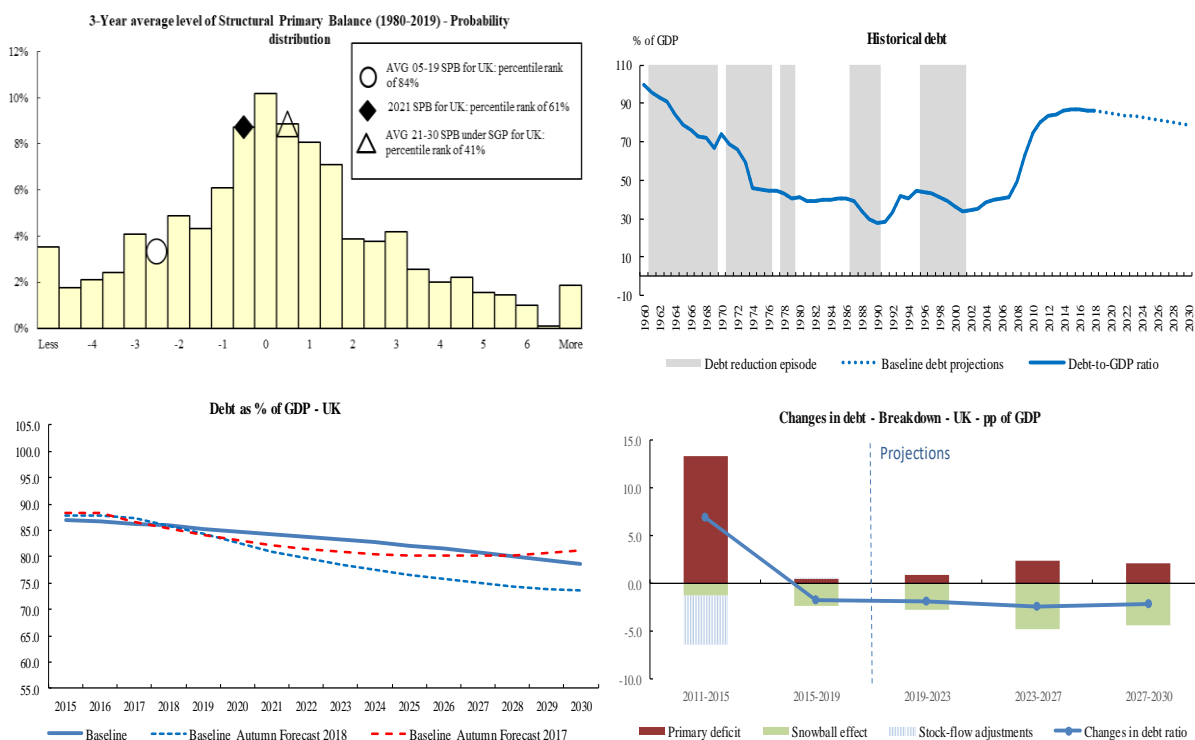
Public debt structure - UK (2018)	Share of short-term government debt (p.p.): 15.6	Share of government debt in foreign currency (%): 0.0	Share of government debt by non-residents (%): n.a.	Net International Investment Position (IIP) - UK (2018)	Net IIP (% GDP): -10.5
--	--	---	---	--	----------------------------------

5. Risks related to government's contingent liabilities

General government contingent liabilities		UK					EU
		2011	2013	2015	2016	2017	2017
State guarantees (% GDP)		0.0	0.2	0.3	0.4	0.2	6.3
of which	One-off guarantees	0.0	0.2	0.2	0.2	0.1	5.8
	Standardised guarantees	0.0	0.0	0.1	0.1	0.1	0.4
Public-private partnerships (PPPs) (% GDP)		2.1	1.8	1.7	1.5	1.4	0.4
		2011	2013	2015	2017	2018	2018
Contingent liabilities of gen. gov. related to support to financial institutions (% GDP)	Liabilities and assets outside gen. gov. under guarantee	5.4	0.0	0.0	0.0	0.0	0.7
	Securities issued under liquidity schemes	4.8	0.0	0.0	0.0	0.0	0.0
	Special purpose entity	0.0	0.0	0.0	0.0	0.0	0.1
	Total	10.2	0.0	0.0	0.0	0.0	0.8

Government's contingent liability risks from banking sector - UK (2018)	Private sector credit flow (% GDP): 4.4	Change in nominal house price index: 3.2	Bank loans-to-deposits ratio (p.p.): 93.4	Share of non-performing loans (%): 1.3	Change in share of non-performing loans (p.p.): -0.2	NPL coverage ratio 31.4	Probability of govt cont. liabilities (>3% of GDP) linked to banking losses and recap needs (SYMBOL):
							Baseline 0.0% Stress 0.4%

6. Realism of baseline assumptions



7. Underlying macro-fiscal assumptions

Macro-fiscal assumptions, United-Kingdom									
	Levels						Averages		
	2019	2020	2021	2026	2028	2030	2019-21	2022-30	2019-30
1. Baseline no-policy change scenario									
Gross public debt	85.2	84.7	84.2	81.6	80.0	78.6	84.7	81.4	82.2
Primary balance	0.0	-0.2	-0.1	-0.7	-0.6	-0.9	-0.1	-0.6	-0.4
Structural primary balance (before CoA)	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Real GDP growth	1.3	1.4	1.4	1.6	1.7	1.7	1.4	1.6	1.5
Potential GDP growth	1.6	1.6	1.5	1.6	1.7	1.7	1.6	1.6	1.6
Inflation rate	1.9	2.1	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Implicit interest rate (nominal)	2.7	2.7	2.6	2.0	1.9	1.8	2.6	2.1	2.2
2. Fiscal reaction function scenario									
Gross public debt	85.2	84.7	84.2	85.2	85.4	85.5	84.7	85.0	84.9
Primary balance	0.0	-0.2	-0.1	-1.6	-1.6	-1.6	-0.1	-1.4	-1.1
Structural primary balance (before CoA)	-0.2	-0.3	-0.2	-1.1	-1.1	-0.9	-0.2	-1.0	-0.8
Real GDP growth	1.3	1.4	1.4	1.6	1.7	1.6	1.4	1.6	1.6
3. SGP scenario									
Gross public debt	85.2	84.7	84.0	74.4	70.1	66.0	84.6	74.5	77.0
Primary balance	0.0	-0.2	0.3	1.1	0.9	0.8	0.1	1.0	0.8
Structural primary balance	-0.2	-0.3	0.3	1.1	0.9	0.8	-0.1	1.0	0.7
Real GDP growth	1.3	1.4	1.1	1.7	1.8	1.8	1.3	1.5	1.5
4. SCP scenario									
Gross public debt	83.8	82.9	82.2	75.1	72.3	70.0	83.0	75.3	77.2
Primary balance	1.0	1.1	1.0	1.2	1.2	1.0	1.0	1.2	1.2
Structural primary balance (before CoA)	0.8	1.1	1.0	1.4	1.4	1.4	1.0	1.4	1.3
Real GDP growth	1.2	1.4	1.6	1.5	1.6	1.7	1.4	1.6	1.5
Potential GDP growth	1.5	1.5	1.6	1.5	1.6	1.7	1.5	1.6	1.6
Inflation rate	2.0	1.8	1.9	2.0	2.0	2.0	1.9	2.0	2.0
Implicit interest rate (nominal)	2.9	2.7	2.7	3.1	3.4	3.6	2.8	3.1	3.0
5. Historical SPB scenario									
Gross public debt	85.2	84.7	84.2	87.3	89.4	91.6	84.7	87.4	86.7
Primary balance	0.0	-0.2	-0.1	-2.7	-2.6	-2.9	-0.1	-2.3	-1.7
Structural primary balance (before CoA)	-0.2	-0.3	-0.2	-2.2	-2.2	-2.2	-0.2	-1.9	-1.4
Real GDP growth	1.3	1.4	1.4	1.6	1.7	1.7	1.4	1.7	1.7
6. Combined historical scenario									
Gross public debt	85.2	84.7	84.2	89.4	94.2	99.5	84.7	90.2	88.8
Primary balance	0.0	-0.2	-0.1	-2.7	-2.6	-2.9	-0.1	-2.3	-1.7
Structural primary balance (before CoA)	-0.2	-0.3	-0.2	-2.2	-2.2	-2.2	-0.2	-1.9	-1.4
Real GDP growth	1.3	1.4	1.4	1.5	1.5	1.5	1.4	1.6	1.6
Implicit interest rate (nominal)	2.7	2.7	2.6	3.1	3.3	3.4	2.6	3.0	2.9
7. Higher IR scenario (standard DSA)									
Gross public debt	85.2	84.9	84.6	83.9	83.3	82.9	84.9	83.8	84.0
Implicit interest rate (nominal)	2.7	2.9	2.9	2.6	2.6	2.5	2.8	2.6	2.7
8. Lower IR scenario (standard DSA)									
Gross public debt	85.2	84.5	83.7	79.3	76.9	74.7	84.5	79.1	80.4
Implicit interest rate (nominal)	2.7	2.4	2.3	1.5	1.3	1.1	2.5	1.5	1.8
9. Higher IR scenario (enhanced DSA)									
Gross public debt	85.2	85.0	85.1	85.2	84.7	84.5	85.1	85.0	85.0
Implicit interest rate (nominal)	2.7	3.1	3.2	2.8	2.7	2.6	3.0	2.8	2.9
10. Higher growth scenario (standard DSA)									
Gross public debt	85.2	84.2	83.4	78.9	76.6	74.7	84.3	78.7	80.1
Real GDP growth	1.3	1.9	1.9	2.1	2.2	2.2	1.7	2.1	2.0
11. Lower growth scenario (standard DSA)									
Gross public debt	85.2	85.1	85.0	84.4	83.5	82.8	85.1	84.1	84.4
Real GDP growth	1.3	0.9	0.9	1.1	1.2	1.2	1.1	1.1	1.1
12. Higher growth scenario (enhanced DSA)									
Gross public debt	85.2	84.3	83.5	79.0	76.8	74.8	84.3	78.8	80.2
Real GDP growth	1.3	1.8	1.8	2.1	2.2	2.2	1.7	2.1	2.0
13. Lower growth scenario (enhanced DSA)									
Gross public debt	85.2	85.0	84.9	84.3	83.4	82.7	85.0	84.0	84.3
Real GDP growth	1.3	1.0	1.0	1.1	1.2	1.2	1.1	1.1	1.1
14. Lower SPB scenario									
Gross public debt	85.2	84.6	84.1	81.5	80.0	78.7	84.6	81.3	82.2
Primary balance	0.0	-0.1	-0.1	-0.7	-0.6	-0.9	-0.1	-0.6	-0.4
Structural primary balance (before CoA)	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Real GDP growth	1.3	1.3	1.5	1.6	1.7	1.7	1.4	1.6	1.5
15. Exchange rate depreciation scenario									
Gross public debt	85.2	84.7	84.2	81.6	80.0	78.6	84.7	81.4	82.2
Exchange rate depreciation	0.0%	12.9%	12.9%	0.0%	0.0%	0.0%	8.6%	0.0%	2.2%
16. Favourable combined scenario (GDP & IR)									
Gross public debt	85.2	84.0	82.9	76.7	73.7	71.0	84.1	76.5	78.4
Implicit interest rate (nominal)	2.7	2.4	2.3	1.5	1.3	1.1	2.5	1.5	1.8
Real GDP growth	1.3	1.9	1.9	2.1	2.2	2.2	1.7	2.1	2.0
17. Adverse combined scenario (GDP & IR)									
Gross public debt	85.2	85.3	85.5	86.8	86.9	87.3	85.3	86.6	86.3
Implicit interest rate (nominal)	2.7	2.9	2.9	2.6	2.6	2.5	2.8	2.6	2.7
Real GDP growth	1.3	0.9	0.9	1.1	1.2	1.2	1.1	1.1	1.1

ANNEX A3

Data sources and information

DATA SOURCES AND INFORMATION

The projections presented in this report are based on Autumn 2019 Commission forecast and on Council / Commission Ageing Report 2018. The cut-off date for the preparation of the report was 7 November 2019 (publication date of the Commission Autumn forecast 2019). Therefore, it does not integrate developments that may have occurred since this date.

The data sources for Greece generally come from ECFIN Country desk and national authorities.

SECTION 3

Financing needs and financial information

Historical evolution of Gross Financing Needs ('S0 definition')

Budgetary Balance – AMECO, Net lending (+) or net borrowing (-), General government – ESA 2010, as % of GDP at current prices.

Maturing short-term securities – ECB, Government Finance Statistics (GFS) database, Short-term government debt securities (non-consolidated, outstanding amounts) with short-term original maturity (up to 1 year), Monthly, as % of GDP.

Maturing long-term securities – ECB, Government Finance Statistics (GFS) database, Long-term government debt securities (non-consolidated, outstanding amounts), Long-term original maturity (over 1 year) with short-term residual maturity (up to 1 year), Monthly, as % of GDP.

Official Loans – ECFIN Country Desks (Cyprus, Ireland, Portugal), Programme Loans Repayment Schedule, Yearly, as % of GDP.

GDP – Actual nominal GDP for 2015-2020 (European Commission 2019 Autumn Forecast).

Profile redemption for existing securities and official loans

Maturing securities – Bloomberg, Active sovereign securities, Yearly outstanding amounts, as % of GDP, Extracted on November 2019.

In some cases, the scheduled redemption profile may not take into account possible buybacks not reported by Bloomberg.

Official Loans – ECFIN Country Desks (Cyprus, Ireland, Portugal), Programme Loans Repayment Schedule, Yearly, as % of GDP.

Note: Actual nominal GDP for 2019 (European Commission 2019 Autumn Forecast) is used to compute the total stock of maturing securities and official loans as share of GDP, throughout the scheduled redemption period.

Gross Financing Needs as % of GDP – DSA Projections

Sources – See Box 2.4 of the Debt Sustainability Monitor 2016, European Commission

Market perception of sovereign risk

10-year bond yield spreads to the German Bund – ECB, Interest rate statistics database, Long-term interest rate for convergence purposes, 10 years maturity, Denominated in Euro, Basis points, Monthly average.

5-year Credit Default Swap (CDS) spread – Bloomberg, Daily close, Basis points, Extracted on November 2019, Available for all countries except LU and MT.

SovCISS – Composite Indicator of Sovereign Stress – ECB, Pure number, Monthly, Available for 11 euro area countries (AT, BE, DE, ES, FI, FR, EL, IE, IT, NL, PT).

Moody's sovereign credit rating – Bloomberg, Local currency long-term sovereign credit rating, Moody's, Extracted on November 2019.

SECTION 4

Risks related to the structure of government debt financing and net International Investment Position

Government debt structure

Share of short-term government debt – Eurostat, 2018 data, General government consolidated gross debt, Original maturity of less than 1 year, as % of

total, Available for all countries except the NL and UK.

Share of short-term government debt (for the NL and UK) – Eurostat, 2018 data, General government, % of GDP, Government consolidated gross debt at face value (Currency and Deposits, Short-term debt securities, Short-term loans) as share of total government consolidated gross debt.

Share of government debt in foreign currency – Eurostat, 2018 data, Debt by currency of issue, General Government, Foreign Currency, % of total, Available for all countries except DK, EL, FI, SE, and the UK.

Share of government debt in foreign currency (for DK, FI, EL, SE and the UK) – ECB, 2018 data, Government Finance Statistics (GFS) database, Maastricht debt, General Government, Consolidated, All original maturities, Denominated in national currency; Denominated in currencies other than national currency and euro; Denominated in euro.

Share of government debt held by non-residents – Eurostat, 2018 data, General government consolidated gross debt, Rest of the world, Total-all maturities, % of total, Available for all countries except EL and the UK.

Net International Investment Position (IIP) – Eurostat, 2018 data, % of GDP.

SECTION 5

Risks related to government's contingent liabilities

Risks related to government's contingent liabilities

State guarantees – Eurostat, 2017 data, % of GDP.

One-off guarantees – Eurostat, 2017 data, % of GDP.

Standardised guarantees – Eurostat, 2017 data, % of GDP.

Public-private partnerships (PPPs) – Eurostat, 2017 data, % of GDP.

Contingent liabilities of general government related to support to financial institutions – Eurostat, 2018 data, % of GDP.

Government's contingent liability risks from the banking sector

Private sector credit flow – Eurostat (MIP scoreboard), 2018 data, % of GDP.

Change in nominal house price index – European Commission, DG ECFIN, Unit B1 House Price Database, 2018 data, y-o-y % change (2015=100).

Bank loan-to-deposit ratio – European Banking Authority (EBA), Risk indicator, Loan-to-deposit ratio for households and non-financial corporations, June 2019 data.

Share of non-performing loans – European Banking Authority (EBA), Risk indicator, Ratio of non-performing loans and advances (NPL ratio), June 2019 data.

Non-Performing Loans (NPL) coverage ratio – European Banking Authority (EBA), Risk indicator, Coverage ratio of non-performing loans and advances, June 2019 data.

Probability of government contingent liabilities exceeding 3% of GDP due to banking losses and recapitalisation needs in the event of a severe crisis (i.e. involving excess losses and recapitalization needs in at least three different EU countries), under a reference and an adverse scenario. The *baseline scenario* assumes that all the stressed systemic and some of the stressed (non-systemic but) significant banks go into resolution. The *stress scenario* features in addition (i) a fire sales mechanism whereby asset value is adversely affected (i.e. fire sales environment), (ii) upcoming reform of the prudential requirements for banks is taken into account which affects the amount of RWAs and on amount of capital each bank will need to recapitalise in order to reach the target level, (iii) recovery rate on NPLs are depressed relying on a similar fire sales mechanism as the one affecting asset value (i.e. reflecting the fire sales environment).

SECTION 6

Realism of baseline assumptions

3-year average level of Structural Primary Balance – Probability distribution – The realism of underlying fiscal projections (in 3 scenarios: baseline, historical, SGP) is assessed by plotting the distribution of past fiscal balances (measured by the 3-year average of the SPB) of all EU countries over the last 15 years, and measuring, for each country and each scenario, the percentile rank of the specific value of the fiscal balance against the overall distribution.

Historical debt

Debt-to-GDP ratio – IMF, Global Debt Database, %. The data for the period 2000-30 are Ameco / European Commission data / projections. A debt reduction episode is defined as a period of at least 2 pps. of debt-to-GDP cumulative reduction over at least two consecutive years.

ANNEX A4

The early-detection indicator of fiscal stress risk (S0)

A4.1. THE METHODOLOGY FOR THE CALCULATION OF THE THRESHOLDS

For each variable used in the composite indicator S0 the optimal threshold is chosen in a way to minimise, based on historical data, the sum of the number of fiscal stress signals sent ahead of no-fiscal-stress episodes (false positive signals – type-I error) and the number of no-fiscal-stress signals sent ahead of fiscal stress episodes (false negative signals – type-II error), with different weights attached to the two components. The table below reports the four possible combinations of events.

Table A4.1: Possible cases based on type of signal sent by the variable at t-1 and state of the world at t

	Fiscal stress episode	No-fiscal stress episode
Fiscal stress signal	True Positive signal	False Positive signal (Type I error)
No-fiscal stress signal	False Negative signal (Type II error)	True Negative signal

Source: Commission services

Formally, for each variable i the optimal threshold (t_i^*) is such as to minimise the sum of type I and type II errors for variable i (respectively fiscal stress signals followed by no-fiscal stress episodes - False Positive signals - and no-fiscal-stress signals followed by fiscal stress episodes – False Negative signals) as from the following total misclassification error for variable i (TME_i): ⁽¹²²⁾

$$t_i^* = \arg \min_{t_i \in T_i} (TME_i(t_i)) = \arg \min_{t_i \in T_i} \left(\frac{FN_i(t_i)}{F_s} + \frac{FP_i(t_i)}{Nfs} \right) \quad (1)$$

$$i = 1, \dots, n$$

where T_i = set of all values taken by variable i over all countries and years in the panel; $FN_i(t_i)$ = total number of false negative signals sent by variable i (over all countries and years) based on threshold

t_i ; $FP_i(t_i)$ = total number of false positive signals sent by variable i (over all countries and years) based on threshold t_i ; F_s = total number of fiscal stress episodes recorded in the data; Nfs = total number of no-fiscal-stress episodes recorded in the data; ⁽¹²³⁾ n = total number of variables used.

It is straightforward to see from (1) that in the minimisation problem False Negative signals are weighted more than False Positive signals as:

$$\frac{1}{F_s} > \frac{1}{Nfs}$$

This is due to the fact that the total number of fiscal stress episodes recorded over a (large enough) panel of countries will be typically much smaller than the total number of non-fiscal-stress episodes. This is a positive feature of the model as we might reasonably want to weigh the type II error more than the type I given the more serious consequences deriving from failing to correctly predict a fiscal stress episode relative to predicting a fiscal stress episode when there will be none.

The threshold for variable i (with $i = 1, \dots, n$) obtained from (1) is common to all countries in the panel. We define it as a common *absolute* threshold (a critical value for the level of public debt to GDP, or general government balance over GDP, for instance) but it could also be defined as a common *relative* threshold (a common percentage tail of the country-specific distributions). ⁽¹²⁴⁾ In the latter case, while the optimal percentage tail obtained from (1) is the same for all countries, the associated absolute threshold will differ across countries reflecting differences in distributions (country j 's absolute threshold for variable i will reflect the country-specific history with regard to that variable). Both the aforementioned methods were applied and a decision was made to focus exclusively on the first, given that the second one tends to produce sensitive country-specific absolute thresholds for variable i only for those countries having a history of medium to high values for the variable concerned (or medium to

⁽¹²²⁾ Following this methodological approach the optimal threshold will be such as to balance between type I and type II errors. For variables for which values above the threshold would signal fiscal stress, a relatively low threshold would produce relatively more false positive signals and fewer false negative signals, meaning higher type I error and lower type II error; the opposite would be true if a relatively high threshold was chosen.

⁽¹²³⁾ Here we simplify on the total number of fiscal stress and non-fiscal-stress episodes as in fact also these numbers vary across variables. This is due to the fact that data availability constraints do not allow us to use the whole series of episodes for all variables.

⁽¹²⁴⁾ See, for instance, Reinhart, Goldstein and Kaminsky (2000); Hemming, Kell and Schimmelpfennig (2003).

low, depending on what the fiscal-stress-prone side of the distribution is), while country-specific thresholds would not be meaningful for the rest of the sample.

The TME function in equation (1) is the criterion we used to calculate the thresholds but it is not the only possible criterion used in the literature. The minimisation of the noise-to-signal ratio (*NSR*) is another possible option.⁽¹²⁵⁾ In this case the optimal threshold for variable *i* (t_i^*) is obtained as:

$$t_i^* = \arg \min_{t_i \in T_i} (NSR_i(t_i)) = \arg \min_{t_i \in T_i} \left(\frac{FP_i(t_i)/Nfs}{TP_i(t_i)/Fs} \right) \quad (2)$$

$i = 1, \dots, n$

where $TP_i(t_i)$ = total number of true positive signals sent by variable *i* (over all countries and years) based on threshold t_i . The TME minimisation was preferred to this alternative criterion based on the size of the total errors produced.

A4.2. THE CALCULATION OF THE COMPOSITE INDICATOR S0

The early-detection indicator of fiscal stress (*S0*) is constructed in a similar way to what done in Baldacci et al. (2011) and Reinhart et al. (2000).⁽¹²⁶⁾ To a certain country *j* and year *t*, a 1 is assigned for every variable *i* that signals fiscal stress for the following year (a dummy d^i is created for each variable *i* such that $d_{jt}^i = 1$ if a fiscal stress signal is sent by the variable and $d_{jt}^i = 0$ otherwise, i.e. if a no-fiscal-stress signal is sent or the variable is missing). The value of the composite indicator *S0* for country *j* and year *t*

($S0_{jt}$) is then calculated as the weighted number of variables having reached their optimal thresholds with the weights given by the "signalling power" of the individual variables:

$$S0_{jt} = \sum_{i=1}^n w_i d_{jt}^i = \sum_{i=1}^n \frac{z_i}{\sum_{k=1}^n h_{jt}^k \cdot z_k} d_{jt}^i \quad (3)$$

where n = total number of variables; $z_i = 1 - (\text{type I error} + \text{type II error})$ = signalling power of variable *i*; and $h_{jt}^k \in \{0,1\}$ is an indicator variable taking value 1 if variable *k* is observed for country *j* at time *t* and 0 otherwise.⁽¹²⁷⁾ The variables are therefore assigned higher weight in the composite indicator, the higher their past forecasting accuracy.⁽¹²⁸⁾

⁽¹²⁷⁾ This ensures that the sum of the weights is equal to 1 regardless of data availability (which is of course necessary to be able to analyse the evolution of the composite indicator).

⁽¹²⁸⁾ Moreover, as evident from (3), the weight attached to each variable is decreasing in the signalling power attached to the other variables, as well as in the number of variables available for a given country and year.

⁽¹²⁵⁾ See, for instance, Reinhart, Goldstein and Kaminsky (2000); Hemming, Kell and Schimmelpfennig (2003).

⁽¹²⁶⁾ See Berti et al. (2012). The difference with Baldacci et al. (2011) is that Berti et al. do not use a system of "double weighting" of each variable incorporated in the composite indicator based on the weight of the subgroup of variables it belongs to (fiscal and financial-competitiveness variables here) and the weight of the individual variable within the group. The difference with Reinhart et al. (2000) is in the way the individual variables' weights are computed (Reinhart et al. use as weights the inverse of the noise-to-signal ratios of the individual variables as they apply the *NSR* criterion, rather than the TME minimisation).

ANNEX A5

The medium- and long-term fiscal sustainability indicators (S1, S2)

A5.1. NOTATION

t : time index. Each period is one year

t_0 : last year before the long-term projection (e.g. 2021)

$t_0 + 1$: first year of the long-term projection period. Start of the fiscal adjustment

t_1 : end of the fiscal adjustment (relevant for S1)

t_2 : target year for the debt ratio (e.g. 2034, relevant for S1)

t_3 : final year of the long-term projection period (e.g. 2070)

Notice that $t_0 < t_1 < t_2 < t_3$.

D_t : debt-to-GDP ratio (at the end of year t).

PB_t : ratio of structural primary balance to GDP

$\Delta PB_t \equiv PB_t - PB_{t_0}$: change in the structural primary balance relative to the base year t_0 . In the absence of fiscal adjustment, it equals the change in age related expenditure (ΔA_t) for $t > t_0$

$\Delta A_t \equiv A_t - A_{t_0}$: change in age-related costs relative to the base year t_0

c : the annual increase in the primary structural balance during fiscal adjustment (i.e. between $t_0 + 1$ and t_1) (relevant for S1).

$S_1 \equiv c(t_1 - t_0)$: the value of the S1 indicator, i.e. the total fiscal adjustment.

r : differential between the nominal interest rate and the nominal GDP growth rate i.e.

$1 + r \equiv \frac{1+R}{1+G}$: where R and G are, respectively, the nominal interest rate and the nominal growth rate.

If the interest-growth rate differential is time-varying, we define

$$\alpha_{s,v} \equiv (1 + r_{s+1})(1 + r_{s+2}) \dots (1 + r_v)$$

$$\alpha_{v,v} \equiv 1$$

as the accumulation factor that transforms 1 nominal unit in period s to its period v value.

A5.2. DEBT DYNAMICS

By definition, the debt-to-GDP ratio evolves according to:

$$D_t = (1 + r_t)D_{t-1} - PB_t. \quad (1)$$

That is, the debt ratio at the end of year t , D_t , is a sum of three components: the debt ratio at the end of the previous year (D_{t-1}), interest accrued on existing debt during year t (rD_{t-1}), and the negative of the primary balance ($-PB_t$).

Repeatedly substituting for D_t , the debt ratio at the end of some future year $T > t$ can be expressed similarly, as:

$$D_T = D_{t-1}\alpha_{t-1,T} - \sum_{i=t}^T (PB_i\alpha_{i,T}). \quad (2)$$

The path of the debt ratio is thus determined by the initial debt ratio, accrued interest (net of growth), and the path of primary balances from t through T .

Important warning

It should be noted that the actual calculation of the S1 and S2 indicators also accounts for property income and tax revenue on pensions, although they are not explicitly included in the derivations in order to simplify them and to facilitate the interpretation of results. Their inclusion would be trivial, implying "adding" terms to the formulas similar to that for "ageing costs" ΔA_t .

A5.3. DERIVATION OF THE S1 INDICATOR

The S1 indicator is defined as the constant annual improvement in the ratio of structural primary balance to GDP, from year $t_0 + 1$ up to year t_1 , that is required to bring the debt ratio to a given level by year t_2 .⁽¹²⁹⁾ In addition to accounting for the need to adjust the initial intertemporal budgetary position and the debt level, it incorporates financing for any additional

⁽¹²⁹⁾ This is in contrast to the S2 indicator, which is defined as an immediate, one-off adjustment.

expenditure until the target date arising from an ageing population.

During the S1 adjustment, the primary balance (as a percentage of GDP) increases by a constant annual amount $c > 0$ each year starting from $t_0 + 1$ through t_1 . The adjustment is assumed to be permanent. Under the assumed consolidation schedule, the change in the primary balance is thus given by

$$PB_i = SPB_{t_0} + c(i - t_0) - \Delta A_i + \Delta PI_i + CC_i \quad (3i)$$

$$\text{for } t_0 < i \leq t_1$$

$$PB_i = SPB_{t_0} + \underbrace{c(t_1 - t_0)}_{=S_1} - \Delta A_i + \Delta PI_i + CC_i \quad (3ii)$$

$$\text{for } t_2 \geq i > t_1$$

Using (2), the debt ratio target D_{t_2} can then be written as:

$$D_{t_2} = D_{t_0} \alpha_{t_0;t_2} - \sum_{i=t_0+1}^{t_2} (PB_i \alpha_{i;t_2}) \quad (4)$$

Replacing (3i)-(3ii) into (4) yields:

$$\begin{aligned} D_{t_2} &= D_{t_0} \alpha_{t_0;t_2} - \sum_{i=t_0+1}^{t_1} (SPB_{t_0} + c(i - t_0)) \alpha_{i;t_2} \\ &\quad - \sum_{i=t_1+1}^{t_2} \left(SPB_{t_0} + \underbrace{c(t_1 - t_0)}_{=S_1} \right) \alpha_{i;t_2} \quad (5) \\ &\quad + \sum_{i=t_0+1}^{t_2} ((\Delta A_i - \Delta PI_i - CC_i) \alpha_{i;t_2}) \end{aligned}$$

After some straightforward manipulations, ⁽¹³⁰⁾ we can decompose the S1 into the following main components:

$$\begin{aligned} S_1 &\equiv \frac{c(t_1 - t_0)}{T} = \\ &= \frac{D_{t_0}(\alpha_{t_0;t_2} - 1)}{\sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})} - \frac{SPB_{t_0}}{\frac{\sum_{i=t_0+1}^{t_2} (\Delta PI_i \alpha_{i;t_2})}{A} - \frac{\sum_{i=t_0+1}^{t_2} (CC_i \alpha_{i;t_2})}{\sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})}} \\ &\quad + c \frac{\sum_{i=t_0+1}^{t_1} ((t_1 - i) \alpha_{i;t_2})}{\sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})} + \frac{D_{t_0} - D_{t_2}}{\sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})} \\ &\quad + \frac{\sum_{i=t_0+1}^{t_2} (\Delta A_i \alpha_{i;t_2})}{\sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})} \quad (6) \end{aligned}$$

where (T) is the total adjustment (the S1 indicator by definition); (A) the strict initial budgetary position (i.e. the gap to the debt-stabilizing primary balance); (B) the cost of delaying the adjustment; (C) the required additional adjustment due to the debt target (DR); and (D) the additional required adjustment due to the costs of ageing (LTC). The total initial budgetary position (IBP) is the sum of A and B i.e. includes the cost of delaying the adjustment.

A5.4. DERIVATION OF THE S2 INDICATOR

The intertemporal budget constraint and the S2 indicator

According to a generally invoked definition, fiscal policy is sustainable in the long term if the present value of future primary balances is equal to the current level of debt, that is, if the intertemporal government budget constraint (IBC) is met. Let us define the S2 as the immediate and permanent one-off fiscal adjustment that would ensure that the IBC is met. This indicator is appropriate for assessing long-term fiscal sustainability in the face of ageing costs. ⁽¹³¹⁾

Since the S2 indicator is defined with reference to the intertemporal government budget constraint (IBC), we first discuss which conditions are required for the IBC to hold in a standard model of debt dynamics. From (2), the debt to GDP ratio at the end of any year $t > t_0$ is given by:

⁽¹³⁰⁾ Add and subtract D_{t_0} on the LHS of (5). In the second term on the LHS, rewrite $c(i - t_0) = S_1 - c(t_1 - i)$, then exchange $-S_1 \cdot \sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})$ on the LHS for D_{t_2} on the RHS. Finally, divide by $\sum_{i=t_0+1}^{t_2} (\alpha_{i;t_2})$, simplify, and group the terms as in (6).

⁽¹³¹⁾ Note that the derivation of S2 does not assume that either the initial sequence of primary balances or the fixed annual increase (S2) are optimal according to some criterion. S2 should be considered as a benchmark and not as a policy recommendation or as a measure of the actual adjustment needed in any particular year.

$$D_t = D_{t_0} \alpha_{t_0,t} - \sum_{i=t_0+1}^t (PB_i \alpha_{i,t}). \quad (7)$$

Rearranging the above and discounting both sides to their time t_0 values, we obtain the debt ratio on the initial period:

$$D_{t_0} = \left(\frac{D_t}{\alpha_{t_0,t}} \right) + \sum_{i=t_0+1}^t \left(\frac{PB_i}{\alpha_{t_0,i}} \right). \quad (8i)$$

Assuming an infinite time horizon ($t \rightarrow \infty$) we get:

$$\begin{aligned} D_{t_0} &= \lim_{t \rightarrow \infty} \left(\frac{D_t}{\alpha_{t_0,t}} \right) + \lim_{t \rightarrow \infty} \sum_{i=t_0+1}^t \left(\frac{PB_i}{\alpha_{t_0,i}} \right) \\ &= \lim_{t \rightarrow \infty} \left(\frac{D_t}{\alpha_{t_0,t}} \right) + \sum_{i=t_0+1}^{\infty} \left(\frac{PB_i}{\alpha_{t_0,i}} \right) \end{aligned} \quad (8ii)$$

Either both of the limits on right-hand side of equation (8ii) fail to exist, or if one of them exists, so does the other.

Let us define the *no-Ponzi game condition* (also called the *transversality condition*) for debt sustainability, namely that the discounted present value of debt (in the very long term or in the infinite horizon) will tend to zero:

$$\lim_{t \rightarrow \infty} \left(\frac{D_t}{\alpha_{t_0,t}} \right) = 0 \quad (9i)$$

Condition (9i) means that asymptotically, the debt ratio cannot grow at a rate equal or higher than the (growth-adjusted) interest rate, which is what would happen if debt and interest were systematically paid by issuing new debt (i.e. a Ponzi game).

Combining the no-Ponzi game condition (9i) with (8ii), one obtains the intertemporal budget constraint, stating that a fiscal policy is sustainable if the present discounted value of future primary balances is equal to the initial value of the debt ratio.

$$D_{t_0} = \sum_{i=t_0+1}^{\infty} \left(\frac{PB_i}{\alpha_{t_0,i}} \right) \quad (9ii)$$

On the other hand, substituting the intertemporal budget constraint (9ii) into (8ii) implies the no-Ponzi game condition. This shows that the no-Ponzi game condition (9i) and the IBC (9ii) are, in fact, equivalent.

Assuming that the intertemporal budget constraint is satisfied through a permanent, one-off fiscal adjustment whose size is given by the S2, from $t_0 + 1$ onwards we can write:

$$PB_i = SPB_{t_0} + S_2 - \Delta A_i + \Delta PI_i + CC_i \quad (10)$$

for $i > t_0$.

Then the intertemporal budget constraint (9ii) becomes

$$D_{t_0} = \sum_{i=t_0+1}^{\infty} \left(\frac{PB_{t_0} + S_2 - \Delta A_i + \Delta PI_i + CC_i}{\alpha_{t_0,i}} \right). \quad (9iii)$$

Here the ratio of structural primary balance to GDP, PB_t is re-expressed in terms of the required annual additional effort, S2, and the change in age-related costs relative to the base year t_0 , combining the equation (10) with equation (9ii).

According to the theory on the convergence of series, necessary conditions for the series in equation (9ii)-(9iii) to converge are for the initial path of primary balances to be bounded and the interest rate differential in the infinite horizon to be positive⁽¹³²⁾. The latter is equivalent to the modified golden rule, stating that the nominal interest rate exceeds the real growth rate (i.e. $\lim_{t \rightarrow \infty} r_t > 0$).⁽¹³³⁾

After some rearranging,⁽¹³⁴⁾ we can decompose the S2 into the following two components:

$$\begin{aligned} S_2 &= \\ &= \frac{D_{t_0}}{\underbrace{\sum_{i=t_0+1}^{\infty} \left(\frac{1}{\alpha_{t_0,i}} \right)}_A} - \underbrace{SPB_{t_0}}_A - \frac{\sum_{i=t_0+1}^{\infty} \left(\frac{\Delta PI_i + CC_i}{\alpha_{t_0,i}} \right)}{\sum_{i=t_0+1}^{\infty} \left(\frac{1}{\alpha_{t_0,i}} \right)} \\ &\quad + \frac{\sum_{i=t_0+1}^{\infty} \left(\frac{\Delta A_i}{\alpha_{t_0,i}} \right)}{\underbrace{\sum_{i=t_0+1}^{\infty} \left(\frac{1}{\alpha_{t_0,i}} \right)}_B} \end{aligned} \quad (11)$$

where (A) is the initial budgetary position i.e. the gap to the debt stabilising primary balance⁽¹³⁵⁾;

⁽¹³²⁾ The latter is an application of the ratio test for convergence.
⁽¹³³⁾ See Escolano (2010) for further details on the relationships among the stability of the debt ratio, the IBC and the no-Ponzi game condition.

⁽¹³⁴⁾ In addition, constant multiplicative terms are systematically taken out of summation signs.

⁽¹³⁵⁾ In practical calculations, the present value of property income is also accounted for in the initial budgetary

and (B) the additional required adjustment due to the costs of ageing.

If the interest-growth rate differential r is constant, the accumulation factor simplifies to $\alpha_{s;v} = (1 + r_{s+1})(1 + r_{s+2}) \dots (1 + r_v) = (1 + r)^{v-s}$. Then equation (10) can be simplified further by noting that:

$$\sum_{i=t_0+1}^{\infty} \left(\frac{1}{\alpha_{t_0;i}} \right) = \sum_{i=t_0+1}^{\infty} \left(\frac{1}{(1+r)^{i-t_0}} \right) = \frac{1}{r} \quad (12)$$

Thus, for a constant discounting factor, (11) can be rewritten as:

$$S_2 = \underbrace{rD_{t_0} - SPB_{t_0} - r \sum_{i=t_0+1}^{\infty} \left(\frac{\Delta PI_i + CC_i}{\alpha_{t_0;i}} \right)}_A + r \underbrace{\sum_{i=t_0+1}^{\infty} \left(\frac{\Delta A_i}{\alpha_{t_0;i}} \right)}_B \quad (13i)$$

If the interest-growth rate differential and the structural primary balance are constant after a certain date (here $t_3 = 2070$), equation (11) can be rewritten as:

$$S_2 = \frac{D_{t_0}}{\sum_{i=t_0+1}^{2069} \left(\frac{1}{\alpha_{t_0;i}} \right) + \frac{1}{r \alpha_{t_0;2069}}} - SPB_{t_0} - \frac{\sum_{i=t_0+1}^{2069} \left(\frac{\Delta PI_i + CC_i}{\alpha_{t_0;i}} \right) + \frac{\Delta PI_{2070} + CC_{2070}}{r \alpha_{t_0;2069}}}{\sum_{i=t_0+1}^{2069} \left(\frac{1}{\alpha_{t_0;i}} \right) + \frac{1}{r \alpha_{t_0;2069}}} + \frac{\sum_{i=t_0+1}^{2069} \left(\frac{\Delta A_i}{\alpha_{t_0;i}} \right) + \frac{\Delta A_{2070}}{r \alpha_{t_0;2069}}}{\sum_{i=t_0+1}^{2069} \left(\frac{1}{\alpha_{t_0;i}} \right) + \frac{1}{r \alpha_{t_0;2069}}} \quad (13ii)$$

where $r_t = r$ and $\Delta A_t = \Delta A_{2070}$ for $t \geq t_3 = 2070$.

Derivation of the steady state debt level (at the end of the projection period) corresponding to the S2

Assuming that the intertemporal budget constraint is satisfied and that the primary balance and the interest-growth rate differential are constant at

position. Property income enters the equation in an identical manner as age-related costs ΔA_t (i.e. term (B)), but with an opposite sign.

their long-run levels after the end of the projection period, then the debt ratio remains constant at the value attained at the end point of the projection period (i.e. at $t_3 = 2070$).

To see this, rewrite (9ii) as:

$$D_{t_0} = \sum_{i=t_0+1}^{\infty} \left(\frac{PB_i}{\alpha_{t_0;i}} \right) = \sum_{i=t_0+1}^{t_3} \left(\frac{PB_i}{\alpha_{t_0;i}} \right) + \sum_{i=t_3+1}^{\infty} \left(\frac{PB_i}{\alpha_{t_0;i}} \right) \quad (14i)$$

Using (7) and the fact that for $t \geq t_3$ the primary balance and interest-growth rate differential stay constant at $PB_t = PB_{t_3}$ we can rearrange (14i) to obtain the debt ratio at t_3 :

$$D_{t_3} = D_{t_0} \alpha_{t_0;t_3} - \sum_{i=t_0+1}^{t_3} (PB_i \alpha_{i;t_3}) = \sum_{i=t_3+1}^{\infty} \left(\frac{PB_i}{\alpha_{t_3;i}} \right) = \sum_{i=1}^{\infty} \left(\frac{PB_{t_3}}{(1+r_{t_3})^i} \right) = \frac{PB_{t_3}}{r_{t_3}} \quad (14ii)$$

We can generalising the above to each $t \geq t_3$ by using (7) with the initial year changed to t_3 instead of t_0 , we see that for each year after t_3 , the debt ratio remains unchanged at this value:

$$D_t = D_{t_3} \alpha_{t_3;t} - \sum_{i=t_3+1}^t (PB_i \alpha_{i;t}) = \frac{PB_{t_3}}{r_{t_3}} (1+r_{t_3})^{t-t_3} - PB_{t_3} \sum_{i=t_3+1}^t (1+r_{t_3})^{t-i} = \left[(1+r_{t_3})^{t-t_3} - r_{t_3} \frac{(1+r_{t_3})^{t-t_3} - 1}{1 - (1+r_{t_3})^{-1}} \right] \frac{PB_{t_3}}{r_{t_3}} = \frac{PB_{t_3}}{r_{t_3}} \equiv \bar{D} \quad \text{for } t \geq t_3 \quad (15)$$

where \bar{D} is the constant debt ratio reached after the end of the projection period.

Using (4), the primary balance at the end of the projection period can be calculated as:

$$PB_{t_3} = SPB_{t_0} + \Delta PI_{t_3} + CC_{t_3} + S_2 - \Delta A_{t_3} \quad (16)$$

Replacing (16) into (15), the constant (steady-state) debt ratio (\bar{D}) is given by:

$$\bar{D} = \frac{PB_{t_3}}{r_{t_3}} = \frac{SPB_{t_0} + \Delta PI_{t_3} + CC_{t_3} + S_2 - \Delta A_{t_3}}{r_{t_3}} \quad (17)$$

for $t \geq t_3$

The S2 adjustment implies that the sum of debt and the discounted present value of future changes in aged-related expenditure is (approximately) constant over time

Replacing equations (16) and (13i) into (15), and assuming a constant interest rate differential, the following equation is obtained:

$$\begin{aligned}
 & D_t + \sum_{i=t+1}^{\infty} \left(\frac{\Delta A_i}{(1+r)^{i-t}} \right) - \sum_{i=t+1}^{\infty} \left(\frac{\Delta PI_i + CC_i}{(1+r)^{i-t}} \right) \\
 & = D_{t_0} + \sum_{i=t_0+1}^{\infty} \left(\frac{\Delta A_i}{(1+r)^{i-t_0}} \right) - \sum_{i=t_0+1}^{\infty} \left(\frac{\Delta PI_i + CC_i}{(1+r)^{i-t_0}} \right)
 \end{aligned} \tag{18}$$

Equation (18) can be interpreted as follows. Implementing a permanent annual improvement in the primary balance amounting to S2 (equation 5), which is both necessary and sufficient to secure intertemporal solvency, implies that the sum of explicit debt (the first term in both sides) and the variation in age-related expenditure or implicit debt (the second terms in both sides) is (approximately) constant over time. Equation (17) is exact in the steady state (e.g. after 2070), holding only as an approximation during transitory phases (i.e. for time-varying interest rate differentials).⁽¹³⁶⁾

⁽¹³⁶⁾ Moreover, equations (17) and (18) imply that both the debt and the variation in age-related expenditure are constant over time in the steady state.

ANNEX A6

Decomposing debt dynamics, projecting the interest rate on government debt and property incomes

A6.1. DECOMPOSING THE DEBT DYNAMICS

Deterministic government debt projections are based on a general identity characterizing the evolution of the stock of debt. In a simplified version, the evolution of the government debt to GDP ratio can be described in the following way:

$$d_t = \alpha^n \cdot d_{t-1} \cdot \frac{(1+i_t)}{(1+g_t)} + \alpha^f \cdot d_{t-1} \cdot \frac{(1+i_t)}{(1+g_t)} \cdot \frac{e_t}{e_{t-1}} - pb_t + f_t \quad (1)$$

where d_t represents the total government debt to GDP ratio in year t

α^n represents the share of total government debt denominated in national currency

α^f represents the share of total government debt denominated in foreign currency

i_t represents the implicit interest rate on government debt ⁽¹³⁷⁾

g_t represents the *nominal* growth rate of GDP (in national currency)

e_t represents the nominal exchange rate (expressed as national currency per unit of foreign currency)

pb_t represents the primary balance over GDP

f_t represents the stock-flow adjustments over GDP.

In order to obtain the debt dynamics, d_{t-1} is subtracted from both sides of equation (1). This gives the following expression:

$$\Delta d_t = \alpha^n \cdot d_{t-1} \cdot \frac{(i_t - g_t)}{(1+g_t)} + \alpha^f \cdot d_{t-1} \cdot \frac{(i_t - g_t) + \varepsilon_t \cdot (1+i_t)}{(1+g_t)} - pb_t + f_t \quad (2)$$

where $\varepsilon_t = \frac{e_t}{e_{t-1}} - 1$ represents the rate of depreciation of the national currency.

⁽¹³⁷⁾By simplicity, it is assumed that this interest rate is the same for government debt denominated in national currency and in foreign currency.

Decomposing further the nominal GDP growth rate, and rearranging the different terms, we obtain:

$$\Delta d_t = d_{t-1} \cdot \frac{i_t}{(1+g_t)} - d_{t-1} \cdot \frac{gr_t}{(1+g_t)} - d_{t-1} \cdot \frac{\pi_t(1+gr_t)}{(1+g_t)} + \alpha^f \cdot d_{t-1} \cdot \varepsilon_t \cdot \frac{(1+i_t)}{(1+g_t)} - pb_t + f_t \quad (2)'$$

where gr_t represents the *real* growth rate of GDP

π_t represents the inflation rate (in terms of GDP deflator, in national currency)

This expression allows us identifying the key drivers of the debt ratio dynamics, in particular the snow-ball effect, which can be further decomposed into four terms:

- (+) the interest rate effect: $d_{t-1} \cdot \frac{i_t}{(1+g_t)}$

- (-) the real GDP growth effect: $-d_{t-1} \cdot \frac{gr_t}{(1+g_t)}$

- (-) the inflation effect: $-d_{t-1} \cdot \frac{\pi_t(1+gr_t)}{(1+g_t)}$

- (+) the exchange rate effect: $\alpha^f \cdot d_{t-1} \cdot \varepsilon_t \cdot \frac{(1+i_t)}{(1+g_t)}$

As can be easily seen from this expression, both the interest rate and the foreign exchange depreciation rate contribute to the increase of the debt ratio. On the other hand, higher real GDP growth and higher inflation erode the debt to GDP ratio. ⁽¹³⁸⁾

Other key contributors to the debt motion are the primary balance (pb_t) (that is further decomposed in our tables between the structural primary balance before cost of ageing, the cost of ageing, the cyclical component and one-offs and other temporary measures) and stock and flow adjustments (f_t).

⁽¹³⁸⁾This presentation, based on the government debt ratio identity equation, allows grasping the impact of real GDP growth and inflation on the debt motion coming from direct valuation effects (as government debt is expressed as a share of GDP). However, the primary balance is also influenced by economic activity and inflation. Such behavioural effects are explicitly taken into account in the fiscal reaction function scenario presented in chapter 2 of the report.

As can be seen from the exchange rate effect expression, both valuation effects affecting the *stock* of foreign currency denominated debt and *interest rate* payments (on this share of government debt) contribute to the debt dynamic. ⁽¹³⁹⁾ Looking at historical series, Eurostat includes the exchange rate effect on the *stock* of foreign currency denominated debt in stock and flow adjustments, while the impact due to the cost of servicing debt in foreign currency is included in interest payments. In our tables, we follow this convention.

In practice, the equation used in our model is slightly more complex than equation (1), as we consider three currencies: the national currency, the EUR (foreign currency for non-euro area countries) and the USD (foreign currency for all countries). Hence, equation (1) becomes:

$$d_t = \alpha^n \cdot d_{t-1} \cdot \frac{(1+i_t)}{(1+g_t)} + \alpha^{eur} \cdot d_{t-1} \cdot \frac{(1+i_t)}{(1+g_t)} \cdot \frac{e_t}{e_{t-1}} + \alpha^{usd} \cdot d_{t-1} \cdot \frac{(1+i_t)}{(1+g_t)} \cdot \frac{\bar{e}_{t-1}}{\bar{e}_t} \cdot \frac{e_t}{e_{t-1}} - pb_t + f_t \quad (1)'$$

where α^{eur} represents the share of total government debt denominated in euros

α^{usd} represents the share of total government debt denominated in USD

e_t represents the nominal exchange rate between the national currency and the euro (expressed as national currency per EUR)

\bar{e}_t represents the nominal exchange rate between the USD and the euro (expressed as USD per EUR).

Such a specification allows taking into account the effect of exchange rate movements on government debt not only in non-euro area countries, but also in euro area countries (among which government debt issued in USD can be significant).

⁽¹³⁹⁾ An indirect effect, due to the fact that exchange rate movements affect the value of GDP in domestic currency through changes in prices in the tradable sector, could also be shown. However, in practice, in line with other institutions practices (e.g. IMF), these effects are not isolated (data limitation would require to impose further assumptions; effect likely to be of second-order).

A6.2. PROJECTING THE IMPLICIT INTEREST RATE ON GOVERNMENT DEBT

As seen from equation (1), a key driver of the debt motion is the implicit interest rate on government debt. Projecting the implicit interest rate on government debt requires not only assumptions on *market* interest rates (for newly issued debt), but also taking into account explicitly the current and future maturity structure of government debt (between short-term and long-term government debt, and between maturing, rolled-over or not, and non-maturing government debt). This allows a differential treatment in terms of interest rates applied to successive "debt vintages", and interestingly captures different levels of exposure of sovereigns to immediate financial markets' pressures.

Formally, in our model, the implicit interest rate is expressed in the following way:

$$iir_t = \alpha_{t-1} \cdot i_t^{ST} + (1 - \alpha_{t-1}) \cdot iir_t^{LT} \quad (3)$$

where iir_t is the implicit interest rate in year t ⁽¹⁴⁰⁾

i_t^{ST} is the *market* short-term interest rate in year t

iir_t^{LT} is the implicit long-term interest rate in year t

α_{t-1} is the share of short-term debt in total government debt (and $(1 - \alpha_{t-1})$ is the share of long-term debt in total government debt). ⁽¹⁴¹⁾

Our model considers two types of government debt in terms of maturity: short-term debt (debt issued with an *original* maturity of less than one year) and long-term debt (debt issued with an *original* maturity of more than one year). Furthermore, government debt can be decomposed between new debt (debt issued to cover new financing requirements), ⁽¹⁴²⁾ maturing debt (i.e. existing debt that is maturing within the year ⁽¹⁴³⁾ and that

⁽¹⁴⁰⁾ This corresponds to i_t in the previous section.

⁽¹⁴¹⁾ Hence, as indicated by the t index, these shares may vary through time depending on the debt dynamic.

⁽¹⁴²⁾ This amount also corresponds to the yearly budgetary deficit.

⁽¹⁴³⁾ Another way to describe it is that this existing debt has a *residual* maturity of less than one year.

needs to be repaid), rolled-over (i.e. whose repayment is covered by newly issued debt) or not, and outstanding debt (i.e. existing debt that has not reached maturity). Combining these different aspects, α_{t-1} (and $(1 - \alpha_{t-1})$) used in (3) can be described as follows:

$$\alpha_{t-1} = \frac{D_{t-1}^{STN} + D_{t-1}^{STR}}{D_{t-1}} \quad (4)$$

$$1 - \alpha_{t-1} = \frac{D_{t-1}^O + D_{t-1}^{LTN} + D_{t-1}^{LTR}}{D_{t-1}} \quad (5)$$

where D_{t-1}^{STN} is the new short-term government debt in year $t - 1$

D_{t-1}^{STR} is the maturing and rolled-over short-term government debt (i.e. the existing short-term debt that has reached maturity, and whose repayment is covered by newly issued short-term debt)

D_{t-1}^{LTN} is the new long-term government debt

D_{t-1}^{LTR} is the maturing and rolled-over long-term government debt (i.e. the existing long-term debt that has reached maturity, and whose repayment is covered by newly issued long-term debt)

D_{t-1}^O is the outstanding (non-maturing) long-term government debt.

Moreover, the implicit long-term interest rate used in (3) can be further decomposed:

$$iir_t^{LT} = \beta_{t-1} \cdot i_t^{LT} + (1 - \beta_{t-1}) \cdot iir_{t-1}^{LT} \quad (6)$$

where β_{t-1} is the share of newly issued long-term debt (corresponding to both new debt and maturing and rolled-over debt) in total long-term government debt in year $t - 1$ (and $(1 - \beta_{t-1})$ is the share of outstanding long-term debt in total long-term government debt)

i_t^{LT} is the *market* long-term interest rate in year t .

The share of newly issued long-term debt (respectively outstanding debt) in total long-term government debt, used in expression (6), is described as follows:

$$\beta_{t-1} = \frac{D_{t-1}^{LTN} + D_{t-1}^{LTR}}{D_{t-1}^O + D_{t-1}^{LTN} + D_{t-1}^{LTR}} \quad (7)$$

$$(1 - \beta_{t-1}) = \frac{D_{t-1}^O}{D_{t-1}^O + D_{t-1}^{LTN} + D_{t-1}^{LTR}} \quad (8)$$

Hence, replacing iir_t^{LT} in (3) by its expression in (6) gives:

$$iir_t = \alpha_{t-1} \cdot i_t^{ST} + b_{t-1} \cdot i_t^{LT} + (1 - \alpha_{t-1} - b_{t-1}) \cdot iir_{t-1}^{LT} \quad (3')$$

From equation (3)', we can see that the implicit interest rate on government debt at year t is a weighted average of market short-term and long-term interest rates and of the implicit interest rate on outstanding (i.e. non-maturing) long-term debt in year $t - 1$. Hence, depending on the weight of outstanding debt in total government debt, an increase of market interest rates will transmit more or less quickly to the implicit interest rate on government debt.

In the projections, the following assumptions are made:

- i_t^{LT} is supposed to converge linearly to 5% in nominal terms (3% in real terms) for all countries by the T+10 horizon;

- i_t^{ST} is supposed to converge linearly to i_t^{LT} time a coefficient corresponding to the historical (pre-crisis) EA yield curve (currently 0.83) for all countries by the T+10 horizon;

- new debt (D_{t-1}^{STN} and D_{t-1}^{LTN}) is assumed to be issued in the projections, as a proportion of the variation of government debt, based on the shares given by Estat (of short-term and long-term government debt), ⁽¹⁴⁴⁾ whenever government debt is projected to increase; ⁽¹⁴⁵⁾

- short-term debt issued in year $t - 1$ is assumed to entirely mature within the year, and to be rolled-over (D_{t-1}^{STR}) as a proportion of past government debt, based on the share of short-term government

⁽¹⁴⁴⁾ More precisely, we use the average shares over the last 3 years available.

⁽¹⁴⁵⁾ Otherwise, in the cases where government debt is projected to decrease, for instance, in case of a budgetary surplus, no new debt needs to be issued.

debt given by Estat, whenever government debt is projected to increase; ⁽¹⁴⁶⁾

- a fraction of long-term debt issued in the past is assumed to mature every year, and to be rolled-over (D_{t-1}^{LTR}), whenever government debt is projected to increase. ⁽¹⁴⁷⁾ This fraction is estimated based on Estat data on the share of long-term government debt and on ECB data on the share of existing long-term debt maturing within the year. ⁽¹⁴⁸⁾

Finally, the values of the different variables *over the forecast horizon* (especially i_t^{LT} , i_t^{ST} and iir_{t-1}^{LT}) are set consistently with the available forecast values of the implicit interest rate (iir_t) and information on the maturity structure of debt.

⁽¹⁴⁶⁾ Otherwise, in the cases where government debt is projected to decrease, for instance, in case of a budgetary surplus, only part of this maturing debt needs to be rolled-over (none when government debt is assumed to strongly decrease, for example, when a large budgetary surplus allows repaying past maturing debt).

⁽¹⁴⁷⁾ See previous footnote.

⁽¹⁴⁸⁾ More precisely, the starting point (currently 2019) is calculated based on the 2018 ECB data on the share of long-term debt that is maturing within the year. Beyond this year, it is assumed that the share of maturing long-term debt linearly converges from the value taken in the last available year (2019) to the country-specific historical average by the end of the T+10 projection horizon. Additionally, for post-program countries, IE, CY and PT, the redemption profile of official loans has been taken into account for the calculation of the long-term debt maturing within the year.

ANNEX A7

Stochastic debt projections based on a historical variance-covariance matrix

This Annex provides a description of the methodology used for stochastic debt projections based on the historical variance-covariance matrix approach and the data used to implement it. ⁽¹⁴⁹⁾

A7.1. THE METHOD TO OBTAIN (ANNUAL) STOCHASTIC SHOCKS TO MACROECONOMIC VARIABLES

Stochastic shocks are simulated for five macroeconomic variables entering the debt evolution equation: the government primary balance, nominal short-term interest rate, nominal long-term interest rate, nominal growth rate and exchange rate. First, the methodology requires transforming the time series of quarterly data for each macroeconomic variable x into series of historical quarterly shocks δ_q^x as follows:

$$\delta_q^x = x_q - x_{q-1}$$

A Monte Carlo simulation is then run by extracting random vectors of quarterly shocks over the projection period (2020-24) from a joint normal distribution with zero mean and variance-covariance matrix identical to that of historical (quarterly) shocks. The quarterly shocks (ε_q) obtained in this way are aggregated into annual shocks to primary balance, nominal short-term interest rate, nominal long-term interest rate, nominal growth, and exchange rate for non-EA countries, as follows:

- the shock to the primary balance b in year t is given by the sum of the quarterly shocks to the primary balance:

$$\varepsilon_t^b = \sum_{q=1}^4 \varepsilon_q^b$$

- the shock to nominal growth g in year t is given by the sum of the quarterly shocks to growth:

$$\varepsilon_t^g = \sum_{q=1}^4 \varepsilon_q^g$$

- the shock in year t to the nominal exchange rate e is given by the sum of the quarterly shocks to the exchange rate:

$$\varepsilon_t^e = \sum_{q=1}^4 \varepsilon_q^e$$

- the shock in year t to the nominal *short-term* interest rate i^s is given by the sum of the quarterly shocks to the short-term interest rate:

$$\varepsilon_t^{i^s} = \sum_{q=1}^4 \varepsilon_q^{i^s}$$

The calculation of the shock to the nominal short-term interest rate in annual terms is justified based on the fact that the short-term interest rate is defined here as the interest rate on government bonds with maturity below the year. With the equation above, we rule out persistence of short-term interest rate shocks over time, exactly as done in standard deterministic projections. In other words, unlike the case of the long-term interest rate (see below), a shock to the short-term interest rate occurring in any of the quarters of year t is not carried over beyond year t .

- the aggregation of the quarterly shocks to the nominal *long-term* interest rate i^l into annual shocks takes account of the persistence of these shocks over time. This is due to the fact that long-term debt issued/rolled over at the moment where the shock takes place will remain in the debt stock, for all years to maturity, at the interest rate conditions holding in the market at the time of issuance ⁽¹⁵⁰⁾. A shock to the long-term interest rate in year t is therefore carried over to the following years in proportion to the share of maturing debt that is progressively rolled over (ECB data on weighted average maturity is used to implement this). For countries where average weighted maturity of debt T is equal or greater than the number of projection years (5 years, from 2020 to 2024), the annual shock to long-term interest rate in year t is defined as:

⁽¹⁴⁹⁾ For more details see Berti (2013).

⁽¹⁵⁰⁾ The implicit assumption is made here that long-term government bonds are issued at fixed interest rates only.

$$\varepsilon_t^{iL} = \frac{1}{T} \sum_{q=1}^4 \varepsilon_q^{iL} \text{ if } t = 2020$$

$$\varepsilon_t^{iL} = \frac{2}{T} \sum_{q=-4}^4 \varepsilon_q^{iL} \text{ if } t = 2021$$

$$\varepsilon_t^{iL} = \frac{3}{T} \sum_{q=-8}^4 \varepsilon_q^{iL} \text{ if } t = 2022$$

$$\varepsilon_t^{iL} = \frac{4}{T} \sum_{q=-12}^4 \varepsilon_q^{iL} \text{ if } t = 2023$$

$$\varepsilon_t^{iL} = \frac{5}{T} \sum_{q=-16}^4 \varepsilon_q^{iL} \text{ if } t = 2024$$

where $q = -4, -8, -12, -16$ respectively indicate the first quarter of years $t-1, t-2, t-3$ and $t-4$. The set of equations above clearly allows for shocks to the long-term interest rate in a certain year to carry over to the following years, till when, on average, debt issued at those interest rate conditions will remain part of the stock.

For countries where the average weighted maturity of debt is smaller than the number of projection years, the equations above are adjusted accordingly to reflect a shorter carryover of past shocks. For instance, countries with average weighted maturity $T = 3$ years will have the annual shock to the long-term interest rate defined as follows ⁽¹⁵¹⁾:

$$\varepsilon_t^{iL} = \frac{1}{3} \sum_{q=1}^4 \varepsilon_q^{iL} \text{ if } t = 2020$$

$$\varepsilon_t^{iL} = \frac{2}{3} \sum_{q=-4}^4 \varepsilon_q^{iL} \text{ if } t = 2021$$

$$\varepsilon_t^{iL} = \sum_{q=-8}^4 \varepsilon_q^{iL} \text{ if } t \geq 2022$$

⁽¹⁵¹⁾ Annual shocks to the long-term interest rate for countries with weighted average maturities of 2 and 4 years will be defined in a fully analogous way.

Finally, the weighted average of annual shocks to short-term and long-term interest rates (with weights given by the shares of short-term debt, α^S , and long-term debt, α^L , over total) gives us the annual shock to the implicit interest rate i :

$$\varepsilon_t^i = \alpha^S \varepsilon_t^{i^S} + \alpha^L \varepsilon_t^{i^L}$$

A7.2. APPLYING STOCHASTIC SHOCKS TO THE CENTRAL SCENARIO

All results from stochastic projections presented in this report refer to a scenario in which shocks are assumed to be temporary. In this case, annual shocks ε are applied to the baseline value of the variables (primary balance b , implicit interest rate i , nominal growth rate g and exchange rate e) each year as follows:

$b_t = \bar{b}_t + \varepsilon_t^b$ with $\bar{b}_t =$ baseline (from standard deterministic projections) primary balance at year t

$g_t = \bar{g}_t + \varepsilon_t^g$ with $\bar{g}_t =$ baseline (from standard deterministic projections) nominal GDP growth at year t

$i_t = \bar{i}_t + \varepsilon_t^i$ with $\bar{i}_t =$ baseline (from standard deterministic projections) implicit interest rate at year t

$e_t = \bar{e}_t + \varepsilon_t^e$ with $\bar{e}_t =$ nominal exchange rate as in DG ECFIN forecasts if t within forecast horizon; nominal exchange rate identical to last forecasted value if t beyond forecast horizon.

In other words, if the shock in year t were equal to zero, the value of the variable would be the same as in the standard deterministic baseline projections.

A7.3. THE DEBT EVOLUTION EQUATION

Through the steps described above we obtain series, over the whole projection period, of simulated government primary balance, nominal growth rate, implicit interest rate and nominal exchange rate that can be used in the debt evolution equation to calculate debt ratios over a 5-year horizon, starting from the last historical value.

The debt evolution equation takes the following form:

$$d_t = \alpha^n d_{t-1} \frac{1+i_t}{1+g_t} + \alpha^f d_{t-1} \frac{1+i_t}{1+g_t} \frac{e_t}{e_{t-1}} - b_t + c_t + f_t$$

where d_t = debt-to-GDP ratio in year t

α^n = share of total debt denominated in national currency ⁽¹⁵²⁾

α^f = share of total debt denominated in foreign currency

b_t = primary balance over GDP in year t

c_t = change in age-related costs over GDP in year t relative to starting year ⁽¹⁵³⁾

f_t = stock-flow adjustment over GDP in year t

All the steps above (extraction of random vectors of quarterly shocks over the projection horizon; aggregation of quarterly shocks into annual shocks; calculation of the corresponding simulated series of primary balance, implicit interest rate, nominal growth rate and exchange rate; calculation of the corresponding path for the debt ratio) are repeated 2000 times. This allows us to obtain yearly distributions of the debt-to-GDP ratio over 2020-24, from which we extract the percentiles to construct the fan charts.

In the construction of the asymmetric fan charts, a restriction is placed on the upside primary balance shocks. This allows to exclude the primary balance shocks that are higher than a one half standard deviation of the primary balance sample.

A7.4. THE DATA USED

For the calculation of the historical variance-covariance matrix, quarterly data on government primary balance are taken from ESTAT; nominal short-term and long-term interest rates are taken from IMF-IFS and OECD; quarterly data on nominal growth rate come from ESTAT and IMF-IFS; quarterly data on nominal exchange rate for non-EA countries come from ESTAT.

Results using the methodology described above were derived for all EU countries by using both short-term and long-term interest rates, whenever possible based on data availability, to keep in line with standard deterministic projections. This was indeed possible for the vast majority of EU countries, the only exceptions being Bulgaria, Croatia and Estonia. ⁽¹⁵⁴⁾ Shocks to the primary balance were simulated for all countries but two (Croatia and Estonia), based on availability of sufficiently long time series of quarterly primary balances.

In general, data starting from the late 90s - early 2000s until the second quarter of 2019 were used to calculate the historical variance-covariance matrix.

⁽¹⁵²⁾ Shares of public debt denominated in national and foreign currency are kept constant over the projection period at the latest ESTAT data (ECB data are used for those countries, for which ESTAT data were not available).

⁽¹⁵³⁾ Figures on age-related costs from the European Commission's 2018 Ageing Report were used.

⁽¹⁵⁴⁾ For Estonia and Croatia we only used the short-term interest rate as quarterly data on the long-term rate were not available; for Bulgaria we used the long-term interest rate only as data on the short-term rate were not available for most recent years.

ANNEX A8

The Stability and Growth Pact scenario

The SGP scenario assumes that Member States implement the main provisions of the Stability and Growth Pact (SGP).

For countries under the EDP (the corrective arm), the recommended structural fiscal adjustment is assumed to be maintained until the correction of the excessive deficit⁽¹⁵⁵⁾. Thereafter, a structural consolidation effort, determined according to the preventive arm of the Pact⁽¹⁵⁶⁾, is maintained until the MTO is reached.

For countries under the preventive arm, the structural balance for 2020 is that of the Commission autumn forecast. As from 2021, the structural balance is assumed to converge to the Medium Term budgetary Objective (MTO). The MTO is set by each Member State to ensure sustainability, including taking into account future ageing-related liabilities and debt level (see European Commission, 2018g). Thereafter, Member States are assumed to keep their structural balance constant at the MTO, if converging from below it, or at the higher initial value of the structural balance, if the latter exceeded the MTO⁽¹⁵⁷⁾. Therefore, differently to the baseline no-fiscal policy change scenario, future changes in ageing costs are 'compensated' e.g. through expenditure re-allocation or additional revenues⁽¹⁵⁸⁾. More details are available in Table A8.1.

⁽¹⁵⁵⁾ Since 2019, no Member State is under the corrective arm of the SGP (EDP), meaning that at this stage no country is bound by an EDP recommendation.

⁽¹⁵⁶⁾ The annual fiscal adjustment required to reach the MTO is determined according to Regulation 1466/97, as clarified by the Commission Communication regarding SGP flexibility ('Commission Communication on flexibility hereafter) of 13 January 2015 (COM (2015)12 final). See also the commonly agreed position on flexibility within the SGP as endorsed by the ECOFIN Council of 12 February 2016 (Council document number 14345/15).

⁽¹⁵⁷⁾ In this scenario, MTOs remain constant, while in the EU framework the minimum MTOs are revised every 3 years (e.g. a reduction in debt or a revision in ageing costs would normally allow for a change in MTO).

⁽¹⁵⁸⁾ In the baseline no-fiscal policy change scenario, the structural balance is projected by assuming a constant structural primary balance (before costs of ageing) at the last forecast value, then integrating successively ageing costs and the interest rate bill. Hence, in the baseline scenario, expected increases (or decreases) of ageing costs are not supposed to be compensated.

Table A8.1: SGP scenario: main features

Date	Countries under EDP	Countries not under EDP whose SB < MTO in 2020	Countries not under EDP whose SB >= MTO in 2020
2020	fiscal consolidation (in terms of SB) fixed by Council recommendation	SB = forecast value	SB = forecast value (>= MTO)
2021 until excessive deficit (if any) corrected	fiscal consolidation (in terms of SB) fixed by Council recommendation	fiscal consolidation (in terms of SB) determined by the matrix (for cyclical conditions), investment and structural reforms' clauses (flexibility communication)	SB constant (>= MTO)
excessive deficit (if any) corrected until MTO reached	fiscal consolidation (in terms of SB) determined by the matrix (for cyclical conditions), investment and structural reforms' clauses (flexibility communication)		
MTO reached until end of projections (2030)	SB constant (>= MTO)	SB constant (>= MTO)	

Source: Commission services

For countries under the preventive arm that are not expected to reach their MTO by 2020 according to the Commission 2019 autumn forecast and for countries under EDP having corrected their excessive deficit, the annual fiscal adjustment as of 2021 is determined according to the matrix of adjustment requirements specified in the Commission Communication on flexibility (see Table A8.2.). This matrix specifies the fiscal adjustment required under the preventive arm of the SGP, taking account of the cyclical situation of individual Member States. The required fiscal effort is also modulated according to the level of the debt ratio (below or above 60% of GDP) and to the presence of sustainability risks.

Table A8.2: Matrix specifying the fiscal adjustment towards the MTO in terms of the change in the structural balance (preventive arm of the SGP)

	Condition	Required annual fiscal adjustment	
		Debt below 60% of GDP and no sustainability risk	Debt above 60% of GDP or sustainability risk
Exceptionnally bad times	Real growth < 0% or output gap < -4	no adjustment needed	
Very bad times	-4 <= output gap < -3	0	0,25
Bad times	-3 <= output gap < -1,5	0 if growth below potential, 0,25 if growth above potential	0,25 if growth below potential, 0,5 if growth above potential
Normal times	-1,5 <= output gap < 1,5	0,5	> 0,5
Good times	output gap >= 1,5	> 0,5 if growth below potential, >= 0,75 if growth above potential	>= 0,75 if growth below potential, >= 1 if growth above potential

Source: Commission services

Moreover, to reflect the feedback effect of fiscal consolidation on GDP, the SGP scenario assumes that a 1 pp. of GDP consolidation effort has a

negative impact on baseline GDP growth of 0.75 pp. in the same year) ⁽¹⁵⁹⁾.

The fiscal effort required as of 2021 under the preventive arm is incorporated in debt projections as reported in Table A8.3. In 2021, the required fiscal adjustment ranges from 0 pps. of GDP for a set of countries that would have already (over-) achieved their MTO (LT, BG, SE, DE, CZ, LU, DK, NL, MT, IE, AT, HR and CY) to 0.75 pp. of GDP in the case of HU and ES. By 2027, all countries will have reached their MTO in this scenario.

Table A8.3: **Fiscal adjustment required under the SGP scenario (change in structural balance, pps. of GDP)**

	2021	2022	2023	2024	2025	2026	2027	Beyond 2027	MTO reached in
BE	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	2024
BG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
CZ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
DK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
DE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
EE	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2021
IE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
ES	0.75	0.6	0.6	0.6	0.6	0.1	0.0	0.0	2026
FR	0.6	0.6	0.6	0.4	0.0	0.0	0.0	0.0	2024
HR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
IT	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	2025
CY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
LV	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2021
LT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
LU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
HU	0.75	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2022
MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
NL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
AT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
PL	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2022
PT	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2021
RO	0.6	0.5	0.5	0.5	0.5	0.5	0.3	0.0	2027
SI	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2022
SK	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2022
FI	0.5	0.5	0.1	0.0	0.0	0.0	0.0	0.0	2023
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2020
UK	0.6	0.6	0.6	0.2	0.0	0.0	0.0	0.0	2024

Source: Commission services

⁽¹⁵⁹⁾ Carnot and de Castro (2015).

Some elements should be kept in mind when interpreting the results. First, the SGP scenario (built on the *Autumn forecast* for the year 2020) only considers flexibility that has already been granted, and does not consider additional flexibility to temporarily deviate from the MTO or the adjustment path towards it, under the structural reform and / or investment clause (see the aforementioned flexibility Communication). Then, the scenario only mirrors compliance with the adjustment path towards the MTO and does not explicitly incorporate the debt reduction benchmark. Nevertheless, one should keep in mind that in general, though not always, under normal economic circumstances, the convergence to the MTO under the preventive arm tends to ensure compliance with the debt reduction benchmark. Last, for the purpose of the SGP scenario, Member States are assumed to comply with the required change in the structural balance, and not explicitly with respect to the expenditure benchmark ⁽¹⁶⁰⁾. However, while the annual fiscal effort measured by the expenditure benchmark can differ from the fiscal effort measured by the change in the structural balance ⁽¹⁶¹⁾, both measures tend to broadly concur over a medium term horizon.

⁽¹⁶⁰⁾ The required fiscal effort is also translated into an expenditure benchmark (a cap on primary expenditure growth net of discretionary revenue measures). Member States' adjustment to their MTO is assessed based on both the change in the structural balance as well as respect of the expenditure benchmark.

⁽¹⁶¹⁾ The fiscal effort measured by the expenditure benchmark can differ, for example due to changes in interest expenditure, which improve the structural balance but which are excluded from the expenditure benchmark. Moreover, the expenditure benchmark is set based on a 10-year average potential growth, while the structural balance is calculated based on the point estimate of potential growth.

ANNEX A9

Assessment of fiscal sustainability challenges: criteria used and decision trees

A9.1. THE OVERALL APPROACH FOLLOWED IN FISCAL SUSTAINABILITY RISK ASSESSMENT

The approach followed in fiscal sustainability risk assessment is the one used in the Fiscal Sustainability Report 2018 and in the Debt Sustainability Monitor 2017. An overview of the overall approach and the elements that feature in it is provided in Graph A9.1.

In the remainder of this annex, the approach to reach an overall assessment of medium-term and long-term fiscal sustainability risks is described in more details. A summary overview of the thresholds used in fiscal sustainability risk assessment (and in particular in the summary heat map in Chapter 6) is provided in Section A9.4.

A9.2. THE APPROACH USED IN THE ASSESSMENT OF MEDIUM-TERM FISCAL SUSTAINABILITY RISKS

The assessment of medium-term fiscal sustainability risks is based on an overall conclusion on the country's DSA *and* on S1 (under the baseline no-fiscal policy change scenario). A country is assessed to be at potential high (medium) risk if either the baseline S1 indicator *or* the DSA or both are highlighted in red (yellow) (see Graph A9.2).

The overall risk category of the country's DSA is reached by looking at debt projection results under two different scenarios (baseline no-fiscal policy change scenario; historical SPB scenario) and a series of negative sensitivity tests (on nominal growth, interest rates and primary balance) around the baseline no-fiscal policy change projections. ⁽¹⁶²⁾ Synthetic stochastic debt projection results are also taken into account to reach the overall risk assessment on DSA.

The decision tree that is followed in this respect can be visualised in Graph A9.3. Practically, a country's DSA is deemed to highlight potential high risks if the baseline no-fiscal policy change debt projections are assessed to entail high risks, or

⁽¹⁶²⁾ Positive sensitivity tests are neglected in the overall assessment as the idea is rather to stress test baseline debt projections against upward risks.

if they are deemed to entail medium risks, but high risks are still highlighted by alternative scenarios (the historical SPB scenario or at least one of the sensitivity tests on macro-fiscal assumptions) or by stochastic projections. The high-risk assessment based on the latter criterion is meant to prudentially capture significant upward risks around a baseline that is already considered at medium risk. ⁽¹⁶³⁾

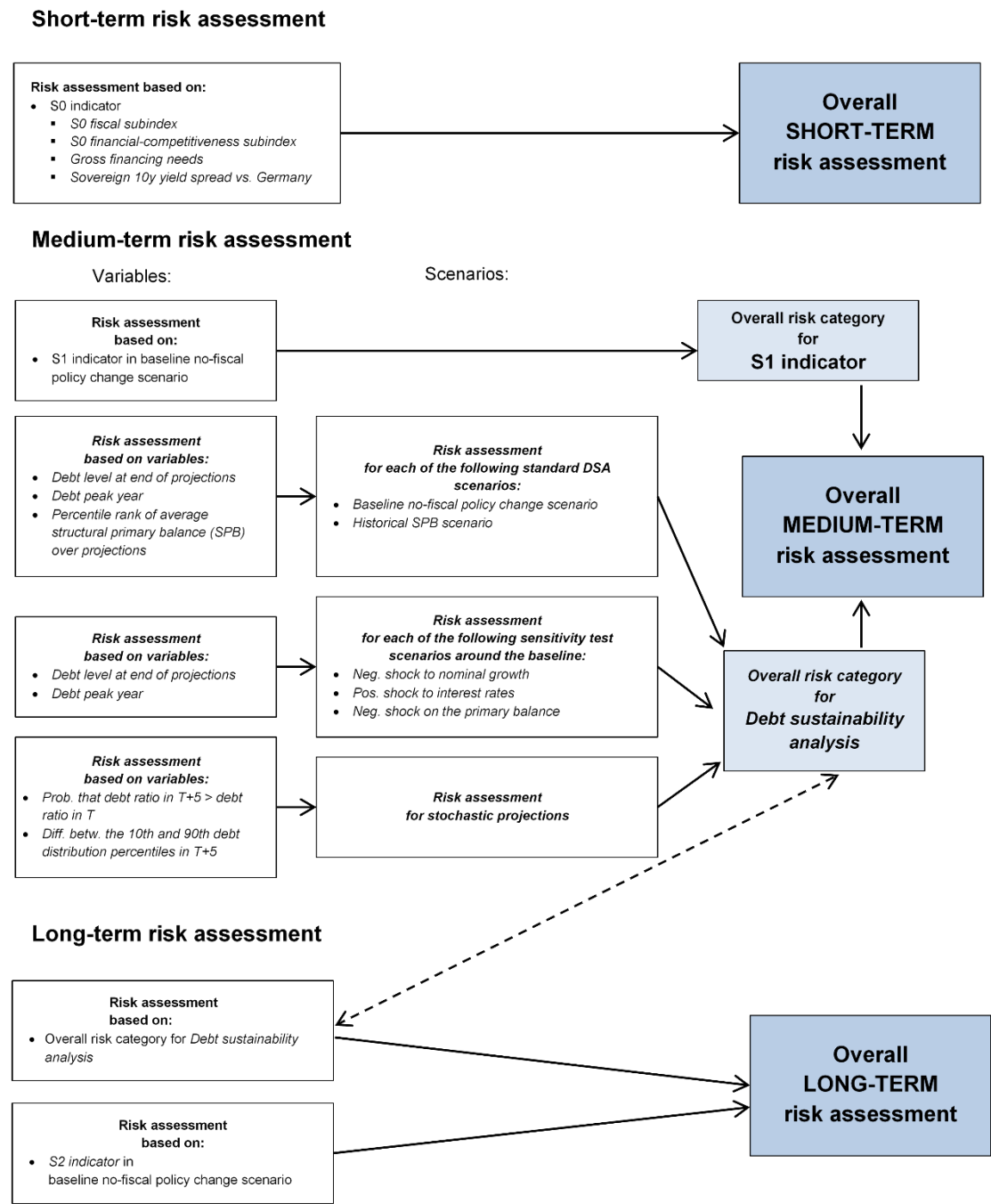
Finally, at the lowest level of granularity, the risk assessment for each debt projection scenario/sensitivity test and for stochastic projections, on which the overall DSA assessment relies, follows an economic rationale that is explained in Graph A9.4. The variables used to summarise deterministic debt projection results are the following:

- The level of the debt ratio at the end of projections (2030);
- The year in which the debt ratio peaks over the 10-year projection horizon (providing a synthetic indication of debt dynamics);
- The percentile rank of the average SPB assumed over the projection horizon in the specific scenario (giving a sense of how common/uncommon the fiscal stance assumed in the projections is, relative to the SPB distribution for all EU countries over 1980-2019). ⁽¹⁶⁴⁾

⁽¹⁶³⁾ A prudential approach is what guides this choice. In particular, adopting a high level of prudence has been considered as particularly important in the case of countries being already considered at medium risk under the baseline no-fiscal policy change scenario. In this case, an historical SPB scenario (where fiscal policy is assumed to revert to historical behaviour) in red would be sufficient to lead to a high risk assessment, as indicated in Graph A9.3. This high level of prudence has not been deemed necessary for a country that is, on the contrary, deemed to be at low risk (thus far from vulnerable) under the baseline scenario (in this case a medium or high risk assessment under the historical SPB scenario does not lead in itself to a medium risk assessment).

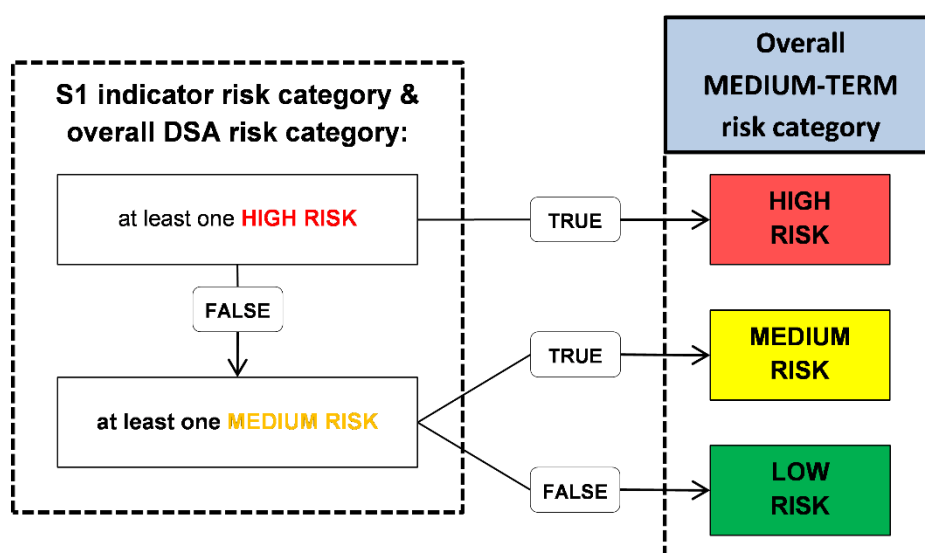
⁽¹⁶⁴⁾ For the individual sensitivity test scenarios, the percentile rank of the average SPB over the projection horizon is not used for the scenarios' risk assessment. The reason is that these sensitivity tests are all run around the baseline no-fiscal policy change scenario, for which the variable percentile rank of the average SPB is already used in the assessment.

Graph A9.1: Decision tree for the multi-dimensional approach to the assessment of fiscal sustainability risks



Source: Commission services.

Graph A9.2: Decision tree for the assessment of medium-term fiscal sustainability risks



Source: Commission services.

Stochastic debt projections are summarized using the following two indicators (as indicated in Chapter 3):

- The probability of a debt ratio at the end of the 5-year stochastic projection horizon (2024) greater than the initial (2019) debt ratio (capturing the probability of a higher debt ratio due to the joint effects of macroeconomic and fiscal shocks);
- The difference between the 10th and the 90th debt distribution percentiles (measuring the width of the stochastic projection cone, i.e. the estimated degree of uncertainty surrounding baseline projections).

As indicated in Graph A9.4, a DSA scenario is highlighted as high risk in case the debt ratio at the end of projections is considered at high risk (above 90% of GDP – see Table A9.1 for thresholds on all DSA variables) or if the debt peak year and the SPB percentile rank are both assessed as high risk, which means that the debt ratio is on a longer (at least up to T+7) increasing path, even with projections that are based on a relatively ambitious

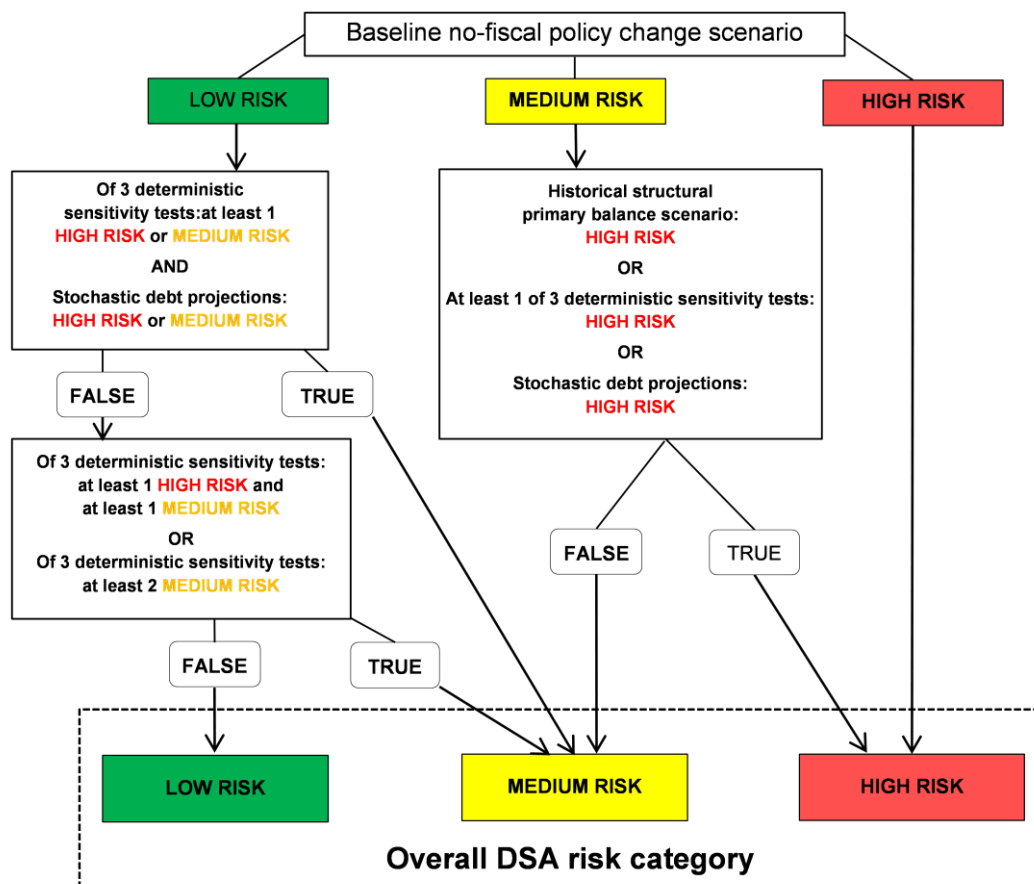
SPB (see again Table A9.1 for precise thresholds).⁽¹⁶⁵⁾

A sensitivity test (on growth, interest rate or the primary balance) is highlighted as high risk if it leads to a debt ratio at the end of projections above 90% (red), or if the end-of-projection debt ratio is between 70% and 90% (thus already significantly above the 60% Treaty reference value) and the debt peak year is highlighted in red, thereby indicating that the debt ratio is still on an increasing path towards the end of projections (up to T+7 at least).

Finally stochastic debt projections are summarised in red if the probability of a debt ratio at the end of the 5 years of projections greater than the initial debt level is assessed as high risk (with different thresholds being set in this case for different groups of countries with different initial debt ratios – see Table A9.1). On the contrary, the fact of having a high level of estimated uncertainty around baseline projections is in itself considered

⁽¹⁶⁵⁾ As indicated in Table A9.1, the SPB percentile ranks used as upper and lower thresholds are 15% and 30%. The 15% percentile rank corresponds to the 85th distribution percentile in the SPB distribution (over all EU countries for 1980-19), which corresponds to an SPB of 3.2% of GDP, while the 30% percentile rank corresponds to the 70th distribution percentile, which is an SPB of 1.7% of GDP.

Graph A9.3: Decision tree for country risk assessment based on debt sustainability analysis



Source: Commission services.

as a sufficient condition for a high-risk assessment but leads to a medium-risk assessment (this high volatility can be associated with very low or relatively low debt levels, in which case it cannot be meaningfully considered as high risk).

As already explained, the overall assessment reached for the country's DSA is then integrated with the assessment reached using the traditional S1 indicator (under the baseline no-fiscal policy change scenario) as indicated in Graph A9.2.

A9.3. THE APPROACH USED IN THE ASSESSMENT OF LONG-TERM FISCAL SUSTAINABILITY RISKS

The assessment of overall long-term fiscal sustainability risks is based on the results of the S2

sustainability gap indicator and the overall conclusion on the country's DSA. A country is assessed to be at potential high risk if (i) the S2 indicator flags high risk irrespective of the risk type implied by the overall results of the DSA or (ii) the S2 indicator is at medium risk, but the overall results of DSA point to either medium or high risk. Furthermore, a country is assessed at medium risk instead of low risk if the long-term sustainability S2 is assessed at low risk and the overall DSA flags either medium or high risk (see Table A9.2). The inclusion of the overall DSA results in the long-term risk assessment framework aims at prudently capturing risks linked to high debt levels. More explanations can be found in Box 4.1 of the FSR 2018.

Graph A9.4: Assessment criteria used for debt projections, sensitivity tests and stochastic debt projections

DSA scenarios (Baseline, HSPB)			Deterministic sensitivity tests			Stochastic debt projections		
Debt ratio at end of projections (t+11)	Debt peak year and structural primary balance percentile rank	RISK CATEGORY	Debt ratio at end of projections (t+11)	Debt peak year	RISK CATEGORY	Prob. of debt ratio at T+5 greater than at T	Debt distribution: Diff. b/w 10th and 90th percentiles	RISK CATEGORY
HIGH RISK	ANY	HIGH RISK	HIGH RISK	ANY	HIGH RISK	HIGH RISK	ANY	HIGH RISK
ANY	Both HIGH RISK	HIGH RISK	MEDIUM RISK & ≥ 70%	HIGH RISK	HIGH RISK	HIGH RISK	ANY	HIGH RISK
MEDIUM RISK	ANY but both HIGH RISK	MEDIUM RISK	MEDIUM RISK & < 70%	HIGH RISK	MEDIUM RISK	MEDIUM RISK	HIGH RISK	MEDIUM RISK
LOW RISK or MEDIUM RISK	one HIGH RISK, one MEDIUM RISK	MEDIUM RISK	MEDIUM RISK	MEDIUM RISK	MEDIUM RISK	MEDIUM RISK	MEDIUM RISK	MEDIUM RISK
	Both MEDIUM RISK	MEDIUM RISK		LOW RISK	LOW RISK	LOW RISK	HIGH RISK	MEDIUM RISK
LOW RISK	one HIGH RISK, one LOW RISK	LOW RISK	LOW RISK	ANY	LOW RISK	MEDIUM RISK	LOW RISK	LOW RISK
	one MEDIUM RISK, one LOW RISK	LOW RISK				LOW RISK	MEDIUM RISK	LOW RISK
	Both LOW RISK	LOW RISK				LOW RISK	LOW RISK	LOW RISK

Source: Commission services

Table A9.1: Thresholds used for DSA variables

Variable	Threshold
Debt ratio at the end of projections (2030)	<p>Red: above 90%</p> <p>Yellow: between 60% and 90%</p> <p>Green: below 60%</p>
Debt peak year	<p>Red: peak year btw. T+7 and end projections (2026-30), or still increasing at end projections</p> <p>Yellow: peak year between end of forecasts (T+3) and T+6 (2022-25)</p> <p>Green: peak year within forecast horizon (2019-21)</p>
Percentile rank of average SPB over projection period (2021-30)	<p>Red: if smaller than (or equal to) 15%</p> <p>Yellow: between 15% and 30%</p> <p>Green: greater than 30%</p>
Probability of debt ratio at the end of 5-year stochastic projection horizon (2024) greater than initial (2019) debt ratio	<p>Initial (2019) debt ratio at or above 90%:</p> <p>Red: if probability above 30%</p> <p>Yellow: if probability strictly positive and at or below 30%</p> <p>Green: if zero probability</p>
	<p>Initial (2019) debt ratio at or above 55% and below 90%:</p> <p>Red: if probability above 60%</p> <p>Yellow: if probability between 30% and 60%</p> <p>Green: if probability below 30%</p>
	<p>Initial (2019) debt ratio below 55%:</p> <p>Yellow: if probability above 70%</p> <p>Green: if probability at or below 70%</p>
Difference between 10 th and 90 th debt distribution percentiles from stochastic projections	<p>Red: the third of the countries with highest dispersion</p> <p>Yellow: the third of the countries with intermediate dispersion</p> <p>Green: the third of the countries with lowest dispersion</p>

Source: Commission services.

Table A9.2: **Assessment approach based on the S2 indicator and the overall results of the DSA**

S2 indicator - baseline scenario	Debt Sustainability Analysis (DSA) - overall risk	RISK CATEGORY
HIGH RISK	HIGH RISK	HIGH RISK
	MEDIUM RISK	
	LOW RISK	
MEDIUM RISK	HIGH RISK	HIGH RISK
	MEDIUM RISK	MEDIUM RISK
	LOW RISK	
LOW RISK	HIGH RISK	MEDIUM RISK
	MEDIUM RISK	
	LOW RISK	LOW RISK

Source: Commission services.

A9.4. A SUMMARY OVERVIEW OF THRESHOLDS USED IN FISCAL SUSTAINABILITY RISK ASSESSEMENT

In this section we provide a summary overview of thresholds used to identify fiscal sustainability risks (with the only exception of thresholds used for DSA variables that have already been discussed and reported in the previous section – see Table A9.1).

For the indicators / variables discussed in this section, the thresholds themselves, as well as the methodologies used to derive them, have already been described in more detail in other sections of the report (Chapters 2 - 5, Annexes A4 – A5). Here the purpose is to provide a quick reference for the identification of fiscal sustainability challenges reported in the different heat maps presented in this report (see also Annexes A1 – A2).

As explained in Chapter 2, the thresholds of risk for S0 and the two S0 sub-indexes (fiscal and financial-competitiveness) have been calculated using the signals' approach (see Annex A4 for details), and are reported in Table A9.3.

For all other variables used to identify short-term risks (see Chapters 2, 5), the upper thresholds of risk (above which values are highlighted in red) have also been derived using the signals' approach (see Chapter 5 and Annex A4), while lower thresholds of risk (above which values are

highlighted in yellow, till when they remain below the upper threshold of risk) have been set at around 80% of the original signals' approach thresholds, for prudential reasons (see Table A9.3).⁽¹⁶⁶⁾

For the S1-S2 indicators and respective ageing sub-components (used in the assessment of medium- and long-term sustainability challenges respectively), upper and lower thresholds are also reported in Table A9.3.

For S1 and S2 ageing sub-components (cost of ageing sub-component for S1; pensions, healthcare and long-term care sub-components for S2), thresholds (above which values are highlighted in red) correspond to the EU average (see Table A9.3). Finally, for the percentile rank of the required structural primary balance (RSPB) associated with S1 and S2 respectively, the same upper and lower thresholds are used as for the percentile rank of the average structural primary balance in DSA scenarios (see Table A9.1).

⁽¹⁶⁶⁾ Variables common to the scoreboard used in the Macroeconomic Imbalances Procedure (MIP) have here different thresholds than under the MIP because the methodologies used to calculate these thresholds are different.

Table A9.3: All thresholds used in fiscal sustainability assessment (except for DSA variables)

	<i>Safety</i>	<i>Upper threshold</i>	<i>Lower threshold</i>
SHORT-TERM RISKS			
S0 overall index	<	0.46	:
S0 fiscal sub-index	<	0.36	:
S0 financial-competitiveness sub-index	<	0.49	:
Fiscal risks from fiscal context			
Balance (% of GDP)	>	-9.6	-7.7
Primary balance (% of GDP)	>	0.2	0.3
Cyclically-adjusted balance (% of GDP)	>	-2.5	-2.0
Stabilising primary balance (% of GDP)	<	2.3	1.9
Gross debt (% of GDP)	<	68.4	54.8
Change in gross debt (% of GDP)	<	8.1	6.4
Short-term public debt (% of GDP)	<	13.2	10.6
Net debt (% of GDP)	<	59.5	47.6
Gross financing needs (% of GDP)	<	15.9	12.8
Interest-growth rate differential (%)	<	4.8	3.8
Change in government expenditure (% of GDP)	<	1.9	1.5
Change in government consumption (% of GDP)	<	0.6	0.5
Fiscal risks from macro-financial context			
Yield curve (%)	>	0.6	0.7
Real GDP growth (%)	>	-0.7	-0.5
GDP per capita in PPP (% US level)	>	72.7	87.2
Net international investment position (% of GDP)	>	-19.8	-15.8
Net savings households (% of GDP)	>	2.6	3.1
Private debt (% of GDP)	<	164.7	131.8
Private credit flow (% of GDP)	<	11.7	9.4
Short-term debt non-financial corporations (% of GDP)	<	15.4	12.3
Short-term debt households (% of GDP)	<	2.9	2.3
Construction (% of value added)	<	7.5	6.0
Current account balance (% of GDP)	>	-2.5	-2.0
Change in REER (%)	<	9.7	7.7
Change in nominal ULC (%)	<	7.0	5.6
Fiscal risks from financial market developments			
Sovereign yield spreads (bp) - 10 year	<	231.0	184.8
MEDIUM-TERM RISKS			
S1 indicator	<	2.5	0.0
Cost of ageing sub-component	<	0.5	:
RSPB related to S1 - Percentile rank	>	15%	30%
DSA variables			
		see Table A9.1	
LONG-TERM RISKS			
S2 indicator	<	6.0	2.0
Pensions sub-component	<	0.4	:
Health care sub-component	<	0.7	:
Long-term care sub-component	<	0.7	:
RSPB related to S2 - Percentile rank	>	15%	30%
ADDITIONAL VARIABLES			
Structure of public debt			
Share of short-term public debt (% of debt)	<	6.6	5.3
Share of public debt in foreign currency (% of debt)	<	31.6	25.0
Share of public debt held by non-residents (% of debt)	<	49.0	40.0
Contingent liabilities linked to banking sector			
Bank loans-to-deposits ratio (%)	<	133.4	107.0
Share of non-performing loans (% of loans)	<	2.3	1.8
Change in share of non-performing loans (p.p.)	<	0.3	0.2
NPL coverage ratio (% loans)	>	66.0	33.0
Change in nominal house price index (%)	<	13.2	11.0

Source: Commission services.

ANNEX A10

Signalling approach for the analysis of government debt structure, sovereign yield spreads and banking sector vulnerabilities

Table A10.1: **Thresholds, signalling power, type I and type II errors obtained by applying the signals' approach**

Variables	safety	threshold	signaling power	type I error	type II error
Government debt structure variables					
Government debt held by non-residents, share of total, %	<	49.01	0.30	0.36	0.33
Government debt issued in foreign currency, share of total, %	<	31.58	0.08	0.21	0.71
Government short-term debt, share of total, %	<	6.57	0.21	0.69	0.10
Government bond yield spread					
Govt bond yield spreads relative to Germany/US, 10-year benchmark, basis points	<	231.00	0.37	0.10	0.52
Variables of banking sector vulnerabilities					
Bank loan to deposit ratio	<	133.37	0.24	0.23	0.53
Non-performing loans to total gross loans, %	<	2.30	0.21	0.69	0.10
Change in non-performing loans to total gross loans, %	<	0.30	0.38	0.25	0.37
Change in nominal house price index, YoY growth	<	13.21	0.19	0.17	0.65

Source: Commission services.

Table A10.1 reports results on optimal thresholds, signalling power, type I and type II errors obtained by applying the signals' approach (as explained in Annex A1) to individual variables describing the structure of public debt financing, sovereign yield spreads and variables capturing banking sector vulnerabilities. In all these cases, *optimal thresholds of fiscal stress* are determined (by relating the historical behaviour of the variables to the time series of fiscal stress events, as explained in Annex A4). These variables are notably used in the heat maps on government debt structure and government contingent liability risks (see Chapter 5 and Annexes A1-A2) and in the table with financial market information reported in the country statistical fiches (see Annex A2).

ANNEX A11

Estimating the potential impact of simulated bank losses on public finances based on the SYMBOL model

SYMBOL approximates the probability distributions of individual bank's losses using publicly available information from banks' financial statements. In particular, the model estimates an average implied default probability of the individual banks' asset/loan portfolios by inverting the Basel FIRB formula for capital requirements ⁽¹⁶⁷⁾.

The main data source on banks' financial statements is Orbis Bank Focus, a commercial database of the private company Bureau van Dijk. For the reference year 2018, unconsolidated data for commercial, saving and cooperatives banks are included. The database as provided by Orbis Bank Focus lacks information on specific variables for some banks in the sample (e.g. capital, risk weighted assets, provisions, gross non-performing loans). In those cases, capital is imputed via a robust regression by common equity, while risk weighted assets are approximated using the total regulatory capital ratio (at bank or country level) ⁽¹⁶⁸⁾. While gross loans are available for all banks, values for provisions and non-performing loans are available only for two thirds of the sample. Missing values for provisions have thus been estimated by country aggregates coming from EBA dashboard ⁽¹⁶⁹⁾, while missing values for non-performing loans have been imputed by applying a robust regression with provisions as explanatory variable. Information on the sample is presented in Table A11.1 and Table A11.2 reports statistics at aggregated Member State level for non-performing loans (NPLs) and loans provisions, taken from the EBA dashboard, while recovery rates (country aggregates) are taken from the World Bank (2019).

Similarly to past exercises, the sample covers roughly 74% of all EU banking assets ⁽¹⁷⁰⁾. When

the sample as illustrated in Table A11.1 includes either a small number of banks or the share of total assets covered is low, results should be interpreted with caution, since a minor change to any bank's data or the addition of a new bank could have large effects on results.

Table A11.1: Descriptive statistics of samples used for SYMBOL simulations

	Sample ratio: Sample TA / Population TA	Nbr. of banks	GDP	Total assets (TA)	Capital	Risk weighted assets (RWA)	RWA / TA	Capital / RWA
	%		EUR bn	EUR bn	EUR bn	EUR bn	%	%
BE	106.2%	27	450.6	914.2	63.2	325.5	35.6%	19.4%
BG	84.9%	17	55.2	47.5	5.3	26.7	56.2%	19.9%
CZ	76.0%	17	206.8	196.9	15.3	77.7	39.5%	19.7%
DK	65.7%	62	297.6	625.7	51.8	227.9	36.4%	22.7%
DE	64.8%	1175	3,386.00	4783.5	392.6	2222.2	46.5%	17.7%
EE	91.0%	3	25.7	21.8	3.0	8.8	40.2%	33.8%
IE	27.0%	23	318.5	275.8	32.9	153.1	55.5%	21.5%
ES	82.4%	78	1,208.20	2084.7	181.5	1077.7	51.7%	16.8%
FR	83.2%	162	2,349.70	7131.7	393.3	2181.3	30.6%	18.0%
HR	87.7%	20	51.5	52.8	6.9	30.2	57.1%	22.8%
IT	69.2%	365	1,757.00	2366.9	201.8	1211.1	51.2%	16.7%
CY	77.9%	6	20.7	52.0	4.0	22.4	43.1%	17.9%
LV	95.4%	14	29.5	20.5	2.6	11.6	56.5%	22.5%
LT	95.5%	6	45.1	27.0	2.3	12.7	47.2%	18.3%
LU	48.4%	60	58.9	399.0	37.0	167.6	42.0%	22.1%
HU	40.3%	10	131.9	48.5	7.3	29.0	59.7%	25.1%
MT	59.1%	11	12.3	26.3	2.3	12.1	46.1%	19.3%
NL	76.5%	14	773.4	1699.6	119.9	530.3	31.2%	22.6%
AT	85.6%	471	386.1	706.0	65.2	341.0	48.3%	19.1%
PL	76.9%	121	496.5	343.0	37.5	204.9	59.7%	18.3%
PT	79.6%	105	201.6	290.7	26.9	168.8	58.1%	15.9%
RO	84.2%	17	202.9	78.6	8.3	42.1	53.6%	19.8%
SI	79.8%	10	45.9	32.4	3.8	19.7	60.8%	19.1%
SK	92.5%	10	90.2	66.1	6.0	39.3	59.4%	15.3%
FI	102.7%	154	233.6	575.3	46.0	202.3	35.2%	22.8%
SE	59.0%	79	467	627.1	47.2	197.7	31.5%	23.9%
UK	78.8%	92	2,393.70	4493.0	282.4	1349.5	30.0%	20.9%

(1) 2018 unconsolidated data.

(2) Low sample ratio and/or low nbr. of banks may weaken sample representativeness (e.g. in EE and HU).

Source: Commission services.

consolidated balance sheet data is used for the denominator (i.e. the population).

⁽¹⁶⁷⁾ European Commission (2016) Section 5.2.2 and Annex A7 for more detail on the SYMBOL model.

⁽¹⁶⁸⁾ The procedure for the imputation of missing values of capital and RWA is described in "SYMBOL database and simulations for 2013, P. Benczur, J. Cariboni, F. E. Di Girolamo, A. Pagano, M. Petracco, JRC European Commission, Technical Report, JRC9298"

⁽¹⁶⁹⁾ RISK DASHBOARD - data as of Q1 2019.

⁽¹⁷⁰⁾ The sample ratio changes per each MS ranging from 27% in Ireland to higher than 100% in Belgium and Finland. This variability calls for caution when reading the results in particular for country with a low coverage ratio and small number of banks. Values higher than 100% for the sample ratio reflect a 'consolidation effect' as unconsolidated banking data is used for the numerator (i.e. the sample) and

Table A11.2: Descriptive statistics on Non Performing Loans (NPL)

	Gross loans	NPL Ratio	NPL/TA	NPL/Capital	Provisions	Recovery rate	NPL losses
	EUR bn	Gross NPL / Gross loans	Gross NPL / TA	Gross NPL / Capital	EUR bn	Baseline Scenario	Baseline Scenario
BE	451.6	0.1%	0.0%	0.5%	0.0	89.1%	0.2
BG	27.3	10.9%	6.3%	56.1%	1.9	37.2%	0.5
CZ	109.7	2.4%	1.3%	17.0%	1.9	67.4%	0.5
DK	349.0	2.9%	1.6%	19.4%	5.8	88.5%	0.0
DE	2531.0	0.9%	0.5%	5.7%	10.3	80.4%	5.2
EE	16.2	1.4%	1.0%	7.6%	0.1	40.7%	0.1
IE	126.3	7.0%	3.2%	26.7%	4.5	86.0%	0.7
ES	1105.2	4.7%	2.5%	28.5%	27.5	77.3%	4.4
FR	2160.9	2.5%	0.8%	13.8%	31.6	73.8%	11.1
HR	32.8	11.1%	6.9%	53.2%	2.5	34.8%	0.9
IT	1563.6	9.9%	6.5%	76.5%	84.3	65.2%	30.8
CY	29.7	28.4%	16.2%	210.2%	3.9	73.4%	1.5
LV	12.6	7.6%	4.7%	36.6%	0.4	41.1%	0.4
LT	18.5	3.0%	2.1%	24.0%	0.2	40.6%	0.3
LU	151.6	1.0%	0.4%	4.3%	0.8	43.8%	0.5
HU	19.7	3.6%	1.5%	9.8%	0.5	44.2%	0.1
MT	12.6	5.4%	2.6%	29.2%	0.3	38.8%	0.3
NL	921.9	0.1%	0.0%	0.5%	0.3	89.8%	0.0
AT	430.8	1.3%	0.8%	8.6%	1.7	80.1%	2.0
PL	230.6	6.3%	4.2%	38.7%	9.9	60.8%	0.7
PT	165.0	11.7%	6.7%	72.2%	8.1	64.5%	4.3
RO	45.6	6.1%	3.5%	33.3%	2.4	35.8%	0.1
SI	19.7	6.6%	4.0%	34.7%	0.9	88.7%	0.0
SK	51.2	3.4%	2.6%	28.5%	1.6	48.8%	0.0
FI	257.4	2.0%	0.9%	11.4%	2.3	88.3%	0.2
SE	283.8	1.1%	0.5%	6.8%	1.7	78.0%	0.2
UK	1896.8	1.6%	0.7%	10.7%	16.0	85.3%	3.2

(1) 2018 unconsolidated data.

Source: Commission services.

Computation of aggregate banking losses and estimated impact on public finances

Starting from the estimated average probability of default of the asset portfolio of each bank, SYMBOL generates realisations for each individual bank's credit losses via Monte Carlo simulation using the Basel FIRB loss distribution function and assuming a correlation between simulated shocks hitting different banks in the system⁽¹⁷¹⁾. In the short-term scenario, losses from SYMBOL are added on top of losses due to current stocks of non-performing loans.

Individual bank losses are then transformed into excess losses and recapitalisation needs to be covered and finally aggregated at country and system level. Based on the bank-level balance sheet data and losses simulation, the model can then implement the loss allocation cascade (e.g. own funds, bail-in of eligible liabilities, Resolution Fund interventions...), distinguishing between excess losses and recapitalisation needs. Excess losses are losses in excess of available total capital of a bank, while recapitalisation needs are the funds necessary to restore the bank's minimum

⁽¹⁷¹⁾The correlation is assumed to be 0.5 for all banks in the current simulation. All EU banks are simulated together.

level of capitalisation given by the regulatory scenario under consideration⁽¹⁷²⁾.

Throughout the cascade of safety net intervention, it can then be traced how much of these two types of financing needs are picked up by the different tools. If a bank is failing or if it is left undercapitalised with respect to the minimum level established in the scenarios, the bail-in tool is applied at individual bank level up to 8% of its total liabilities and own funds (TLOF) (or total assets, TA)⁽¹⁷³⁾. Where a Resolution Fund (RF) is available, it is then assumed to intervene up to 5% of the total assets of each bank⁽¹⁷⁴⁾. Given that the sample coverage in terms of the number and total assets of banks in the sample is not complete, the RF is assumed to be equal to 1% of covered deposits of the banks in the sample by end of 2023. Any leftover losses or recapitalisation needs not covered after all available tools have intervened are finally assumed to be covered by the government, taking into account the ratio between the sample and the population TA of all banks.

For the purposes of determining the course of action in case of failure, banks are divided into two groups under the baseline scenario: those that are not designated as significant institutions for SSM purposes, which are assumed to be always liquidated (i.e. resolution probability equal to 0%), and those that are designated as significant institutions, which in case of distress might go into resolution or liquidation. In the category of significant institutions, for global systemically

⁽¹⁷²⁾European Commission (2016) Annex A7.

⁽¹⁷³⁾The BRRD does not establish a harmonised level of liabilities eligible for bail-in, but Art. 44 sets out that the RF can kick in only after shareholders and holders of other eligible instruments have made a contribution to loss absorption and recapitalisation of at least 8% of total liabilities and own funds (TLOF). Since bank-level data on bail-inable liabilities is unavailable, the bail-in tool is modelled in both the short- and long-term by imposing that individual banks hold a LAC of at least 8% of their TLOF. In practice banks with total capital under this threshold are assumed to meet the 8% minimum threshold via bail-inable liabilities. In the simulation, bail-in stops once the 8% of TA limit has been reached. If a bank holds capital above 8% of TA, there would be no bail-in, but capital might be bearing losses above 8% of TLOF.

⁽¹⁷⁴⁾Art. 44 of the BRRD sets out that the contribution of the resolution financing arrangement cannot exceed 5% of the total liabilities. In case of excess demand for SRF funds, funds are rationed in proportion to demand (i.e., proportionally to excess losses and recapitalization needs after the minimum bail-in, capped at 5% of TA at bank level).

important institutions (G-SIIs) and their subsidiaries the probability of going to resolution is set to 100% (i.e. we assume that G-SIIs will be always resolved), while for the other entities we assume an 80% resolution probability⁽¹⁷⁵⁾.

The results give an estimate of the implicit contingent liabilities - banking losses and recapitalisation needs after the safety net - that would be faced in case of a financial crisis similar to the one which began in 2008⁽¹⁷⁶⁾. For the EU as a whole, a loss of similar magnitude would correspond approximately to the 99.95th percentile of the distribution of aggregate losses including recapitalisation needs based on 2009 data and regulatory framework. Therefore, this analysis focuses on the same percentile of the distribution. It is important to highlight that focussing on the 99.95th percentile does not mean that the event happens with a probability of at most 0.05 percent. SYMBOL probabilities are more appropriately seen as "theoretical probabilities" which cannot be taken literally as frequencies: their magnitudes, however, inform on the relative risks among banks or countries⁽¹⁷⁷⁾.

Table A11.3 visualizes the role of the various safety-net tools in absorbing unexpected losses.

⁽¹⁷⁵⁾ Up until last year, for DSA exercises, the standard assumptions were either that only significant institutions go into resolution, or that all banks go into resolution. The current set up is thus more favorable to resolution funds, because a share of the significant banks (20%) is now assumed to go into liquidation.

⁽¹⁷⁶⁾ Bank losses and recapitalisation needs triggered by the last crisis are proxied by state aid data, in particular the total recapitalisation and asset relief provided to banks over 2008-12 (around 615 bn euro), see Benczur et al. (2015) and European Commission (2014).

⁽¹⁷⁷⁾ According to Basel II an institution would suffer losses exceeding its capital once in a thousand years on average (99.9% confidence level). (See Basel Committee on Banking Supervision, (2005)). While Laeven and Valencia (2013) identify 17 systemic banking crisis episodes during 2008-2011 worldwide and 147 episodes since 1970, the Basel model seems to under-predict the actual frequency of bank failures, affecting also SYMBOL estimates.

Table A11.3: **Leftover financial needs after each safety net tool (% of GDP 2018), under the short and long term scenarios**

	Initial (2020) short term scenarios			Final (2030) long term scenarios		
	Excess losses plus recap	Excess losses plus recap after bail in	Excess losses plus recap after bail in & RfFs	Excess losses plus recap	Excess losses plus recap after bail in	Excess losses plus recap after bail in & RfFs
BE	0.4%	0.2%	0.1%	0.6%	0.3%	0.1%
BG	0.2%	0.2%	0.1%	0.3%	0.3%	0.1%
CZ	0.3%	0.2%	0.1%	0.4%	0.3%	0.1%
DK	0.2%	0.1%	0.1%	0.3%	0.2%	0.1%
DE	0.5%	0.3%	0.2%	0.9%	0.4%	0.2%
EE	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
IE	0.5%	0.5%	0.3%	0.6%	0.6%	0.2%
ES	1.6%	1.4%	0.9%	2.5%	2.1%	0.9%
FR	1.3%	0.5%	0.3%	1.5%	0.7%	0.2%
HR	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
IT	2.1%	1.6%	1.0%	1.5%	1.4%	0.5%
CY	5.5%	4.6%	2.8%	1.3%	0.9%	0.3%
LV	0.2%	0.2%	0.2%	0.1%	0.1%	0.0%
LT	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
LU	2.7%	1.0%	0.5%	3.5%	1.6%	0.5%
HU	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%
MT	0.9%	0.9%	0.5%	0.7%	0.7%	0.2%
NL	0.3%	0.2%	0.1%	0.4%	0.3%	0.1%
AT	0.4%	0.3%	0.2%	0.6%	0.4%	0.1%
PL	0.3%	0.3%	0.2%	0.5%	0.5%	0.2%
PT	2.8%	2.7%	1.9%	1.3%	1.2%	0.4%
RO	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%
SI	0.4%	0.4%	0.3%	0.5%	0.5%	0.2%
SK	0.8%	0.8%	0.5%	0.6%	0.6%	0.2%
FI	0.3%	0.2%	0.1%	0.4%	0.3%	0.1%
SE	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%
UK	0.5%	0.2%	0.1%	0.7%	0.3%	0.1%

Source: Commission services.

Scenarios settings

SYMBOL estimates how the regulatory framework set up by the Commission in recent years would, under certain assumptions, limit the impact of a systemic banking crisis on public finances.

Three pieces of legislation are considered: the Capital Requirement Regulation and Directive IV (CRR, CRDIV)⁽¹⁷⁸⁾, which improved the definitions of regulatory capital and risk-weighted assets, increased the level of regulatory capital by introducing the capital buffers, including extra capital buffers for European Global Systemically Important Institutions (G-SIIs) and Other Systemically Important Institutions (O-SII)⁽¹⁷⁹⁾; the Bank Recovery and Resolution Directive (BRRD)⁽¹⁸⁰⁾, which introduced bail-in⁽¹⁸¹⁾ and national resolution funds⁽¹⁸²⁾, and the Single

⁽¹⁷⁸⁾ See European Parliament and Council (2013).

⁽¹⁷⁹⁾ Very few banks which are OSII are affected by extra buffer (not considered).

⁽¹⁸⁰⁾ See European Parliament and Council (2014a).

⁽¹⁸¹⁾ A legal framework ensuring that part of the distressed banks' losses are absorbed by unsecured creditors. The bail-in tool entered into force on 01/01/2016.

⁽¹⁸²⁾ Funds financed by banks to orderly resolve failing banks, avoiding contagion and other spill-overs.

Resolution Mechanism Regulation (SRMR),⁽¹⁸³⁾ which established the Single Resolution Board and the Single Resolution Fund (SRF). To reflect the phasing-in⁽¹⁸⁴⁾ of the safety-net tools foreseen by this body of legislation, two regulatory scenarios are modelled.

An initial (2020) short-term baseline scenario with safety net in progress, comprising:

- Asset correlation is fixed to 50% (traditional SYMBOL assumption, compatible with default regulatory parameter).
- Bank total capital and risk-weighted assets (RWAs) taken directly from the banks' balance sheets.
- Current stocks of non-performing loans contribute to losses in the banking system of each country and their magnitude has been estimated as explained in the main text. NPLs losses are added to all banks (this leads to a new group of banks which default due to a large amount of NPLs).
- Extra capital buffers for G-SIIs prescribed by the Financial Stability Board (FSB) are considered.
- Bail-in: modelled as a scenario whereby a Loss Absorbing Capacity (LAC) is built to represent, together with regulatory capital, 8% of TA⁽¹⁷³⁾.
- Resolution Funds⁽¹⁸⁵⁾ - national (NRFs, for Member States not part of the Banking Union)

⁽¹⁸³⁾ See European Parliament and Council (2014b).

⁽¹⁸⁴⁾ CRR/CRDIV increased capital requirements are being phased-in from 2014 to 2019 and banks are progressively introducing the capital conservation buffer; according to BRRD and SRMR, national RFs and the SRF have a target of 1% of covered deposits to be collected over 10 years from 2015 onwards and 8 years from 2016 onwards, respectively.

⁽¹⁸⁵⁾ In practice, under the Agreement on the mutualisation and transfer of contributions to the SRF (IGA), in the short-term only a part of current SRF contributions would be mutualised (i.e. available to all banks irrespective of their location), while the rest of the fund is only available to banks from their country of origin. Since a system-wide waterfall under IGA with sequential intervention of national and mutualised SRF is complex to model and since in the short-term only 10% of the SRF would be in place, the model assumes that the entire SRF is already mutualised.

and single (SRF, for Banking Union members) – phased-in in proportion of 5/10 of their target or long-run level and contributing to resolution absorbing losses up to 5% of the TA of the insolvent bank, provided that at least 8% LAC has already been called in⁽¹⁷⁴⁾. No backstop (other than public finances) nor ex-post contributions⁽¹⁸⁶⁾ are considered.

- No DGS contribution or intervention is modelled.

A final (long-term) 2030 baseline scenario as of when a completely phased-in safety net comprises:

- Asset correlation is fixed to 50% (traditional SYMBOL assumption, compatible with default regulatory parameter).
- Bank total capital taken directly from the banks' balance sheets and reflecting an increased minimum requirement topped-up to 10.5% RWA⁽¹⁸⁷⁾. The risk weighted assets are adjusted to take into account the upcoming reform of the prudential requirements for banks (partly CRR2 and partly the final elements of Basel III which will be implemented through upcoming legislation). G-SIIs buffers are considered⁽¹⁸⁸⁾.
- Losses on current NPL stocks are not considered⁽¹⁸⁹⁾.
- Extra capital buffers for G-SIIs prescribed by the Financial Stability Board (FSB) are considered.

⁽¹⁸⁶⁾ Given the aim to portray worst-case fiscal consequences, ex-post contributions to the NRFs/SRF are not modelled, but these can actually go up to 3 times the ex-ante contributions, further reducing the impact on public finances.

⁽¹⁸⁷⁾ Only mandatory requirements, i.e. the 8% total capital requirement and the 2.5% capital conservation buffer, are included. The discretionary counter-cyclical capital buffer (at the regulator's choice) is not.

⁽¹⁸⁸⁾ Before running the simulation, banks are “topped up” to this increased level of minimum capital requirement. No information on Pillar 2 requirement or guidance available. OSIs buffers are not taken into account due to unavailability of data and technical limitation in identifying the subsidiaries of all OSIs

⁽¹⁸⁹⁾ The impact of non-performing loans (NPLs) is considered only in the current situation and the effect is assumed to become negligible in the long-term.

- Bail-in: modelled as a scenario whereby a Loss Absorbing Capacity (LAC) is built to represent, together with regulatory capital, 8% of TA⁽¹⁹⁰⁾.
- Resolution Funds⁽¹⁹¹⁾ – national (NRFs, for Member States not part of the Banking Union) and single (SRF, for Banking Union members) – fully phased-in and contributing to resolution absorbing losses up to 5% of the TA of the insolvent bank, provided that at least 8% TA has already been called in⁽¹⁹²⁾. No backstop (other than public finances) nor ex-post contributions⁽¹⁹³⁾ are considered.
- No DGS contribution or intervention is modelled.
- Graph A11.1 illustrates the order of intervention of different tools. The first cushion assumed to absorb simulated losses is capital, the second tool is bail-in, and the last are RFs, as legally foreseen⁽¹⁹⁴⁾.
- Moreover, alternative scenario settings are considered, as summarised in Table A11.5 and Graph A11.2.

⁽¹⁹⁰⁾ Same assumptions regarding 8% TA hold under BRRD2 once it will become applicable in December 2020. See footnote 16.

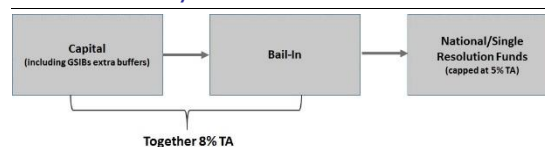
⁽¹⁹¹⁾ In practice, under the Agreement on the mutualisation and transfer of contributions to the SRF (IGA), in the short-term only a part of current SRF contributions would be mutualised (i.e. available to all banks irrespective of their location), while the rest of the fund is only available to banks from their country of origin. Since a system-wide waterfall under IGA with sequential intervention of national and mutualised SRF is complex to model and since in the short-term only 10% of the SRF would be in place, the model assumes that the entire SRF is already mutualised.

⁽¹⁹²⁾ In case of excess demand for SRF funds, funds are rationed in proportion to demand (i.e., proportionally to excess losses and recapitalization needs after the minimum bail-in, capped at 5% of TA at bank level).

⁽¹⁹³⁾ Given the aim to portray worst-case fiscal consequences, ex-post contributions to the NRFs/SRF are not modelled, but these can actually go up to 3 times the ex-ante contributions, further reducing the impact on public finances.

⁽¹⁹⁴⁾ Additional tools are available to absorb residual losses and recapitalisation needs, including additional bail-in liabilities, leftover resolution funds and the deposit guarantee scheme. See Benczur et al. (2015) for a discussion. In addition, by 2024 at the latest a common backstop to the SRF will be introduced.

Graph A11.1: Implemented order of intervention of the safety net tools



Source: Commission services.

Calibrating the heat map

The model allows estimating the probability distribution of the amount of public funds needed to cover losses after exhausting the protection provided by the financial safety net. To obtain the input for the heat map on government's implicit contingent liability risks, a minimum size of government's contingent liabilities is fixed, and the theoretical probability of the materialisation of the event is assessed.

Table A11.4 shows the heat map, which illustrates the relative riskiness of countries in terms of public finances being hit by at least a fixed share (3%, 5%, and 10%) of GDP, conditional on having (a) the banking sector in distress, (2) at least three countries with government's contingent liabilities. The colour coding reflects the relative magnitude of the theoretical probabilities of such an event.

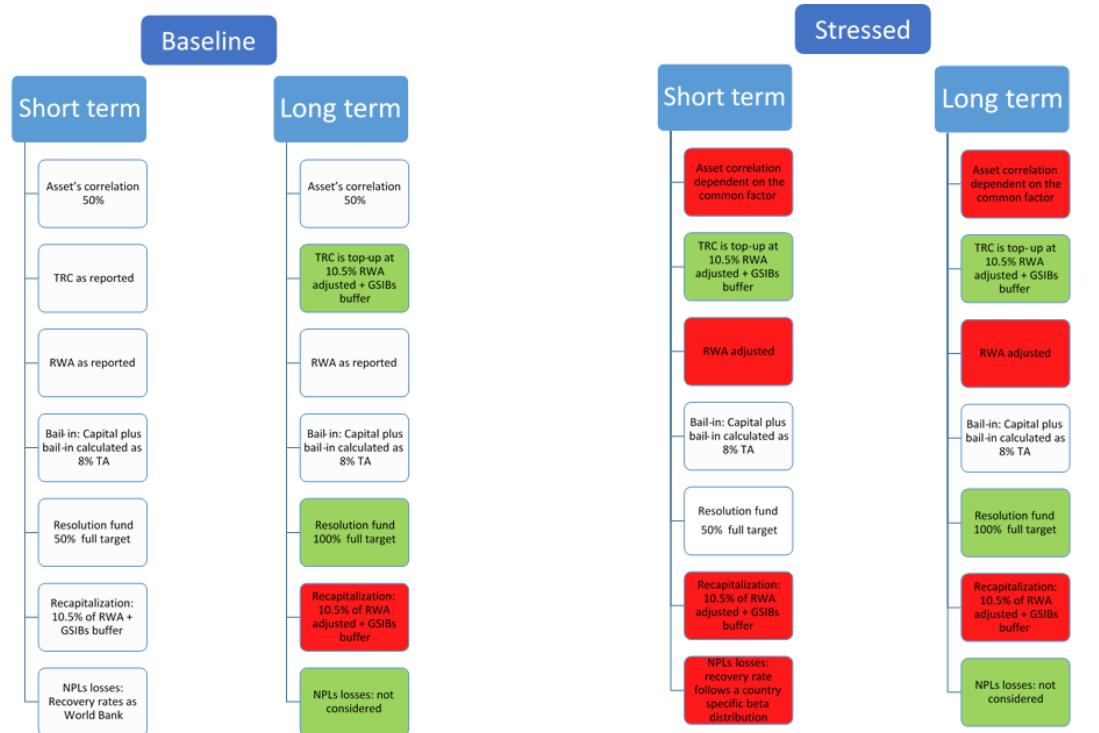
Table A11.4: Theoretical probability of public finances being hit by more than 3%, 5% or 10% of GDP, in the event of a severe crisis (i.e. involving excess losses and recapitalization needs in at least three different EU countries)

	Initial (2020) short term scenarios						Final (2030) long term scenarios					
	Baseline			Stress			Baseline			Stress		
	(a)			(b)			(a)			(b)		
	3%	5%	10%	3%	5%	10%	3%	5%	10%	3%	5%	10%
BE	0.0%	0.0%	0.0%	0.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.6%	0.2%	0.0%
BG	0.0%	0.0%	0.0%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
CZ	0.0%	0.0%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
DK	0.1%	0.0%	0.0%	0.4%	0.2%	0.1%	0.1%	0.0%	0.0%	0.4%	0.2%	0.0%
DE	0.0%	0.0%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	0.1%	0.0%
EE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IE	0.1%	0.0%	0.0%	3.2%	1.7%	0.4%	0.1%	0.0%	0.0%	1.6%	0.8%	0.2%
ES	0.4%	0.1%	0.0%	8.9%	3.3%	0.5%	0.3%	0.1%	0.0%	3.9%	1.6%	0.3%
FR	0.0%	0.0%	0.0%	1.7%	0.6%	0.1%	0.0%	0.0%	0.0%	1.2%	0.5%	0.1%
HR	0.0%	0.0%	0.0%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%
IT	0.2%	0.0%	0.0%	14.0%	4.6%	0.5%	0.1%	0.0%	0.0%	2.7%	1.0%	0.1%
CY	1.8%	0.8%	0.1%	49.2%	39.0%	20.4%	0.2%	0.1%	0.0%	2.7%	1.4%	0.4%
LV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LU	0.3%	0.1%	0.0%	5.9%	3.8%	1.9%	0.3%	0.2%	0.1%	4.2%	2.8%	1.4%
HU	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
MT	0.2%	0.1%	0.0%	4.7%	2.3%	0.6%	0.1%	0.0%	0.0%	1.5%	0.8%	0.2%
NL	0.1%	0.0%	0.0%	0.7%	0.3%	0.1%	0.0%	0.0%	0.0%	0.6%	0.3%	0.1%
AT	0.0%	0.0%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
PL	0.0%	0.0%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
PT	0.7%	0.1%	0.0%	32.0%	12.4%	1.2%	0.1%	0.0%	0.0%	2.9%	1.2%	0.2%
RO	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SI	0.0%	0.0%	0.0%	0.8%	0.2%	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
SK	0.0%	0.0%	0.0%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	0.1%	0.0%
FI	0.1%	0.0%	0.0%	1.1%	0.5%	0.1%	0.1%	0.0%	0.0%	0.8%	0.4%	0.1%
SE	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%
UK	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%

(1) Green: low risk (probability lower than 0.50%); Yellow: medium risk (probability between 0.50% and 1%); Red: high risk (probability higher than 1%).

Source: Commission services.

Graph A11.2: Schematic representation of the scenarios



Source: Commission services

Table A11.5: Detailed scenarios description

Scenarios:	Components:									
	Asset correlation	TRC	RWAs	Bail-in	National/Single RF	Recapitalization	Extra losses due to NPLs	Deposit Guarantee Scheme	Banks in resolution	
Initial Baseline (2020) Short term	50%	K	RWAs	Capital plus bail-in 8% TA	Yes, 5% TA cap, after LAC of 8% has been called in 5/10 of full target. No ex-post contributions.	10.5% RWAs adjusted+ GSIBs buffers.	Yes to all banks. RR as reported by World Bank.	No.	Random significant banks.	
Initial Stressed (2020) Short term	Depending on common factor.	Max(K, 10.5% RWAs adjusted + GSIBs buffer)	RWAs adjusted	Capital plus bail-in 8% TA	Yes, 5% TA cap, after LAC of 8% has been called in 5/10 of full target. No ex-post contributions.	10.5% RWAs adjusted+ GSIBs buffers.	Yes to all banks. RR as reported by World Bank.	No.	Random significant banks.	
Final Baseline (2030) Long term	50%	Max(K, 10.5% RWAs adjusted + GSIBs buffer)	RWAs	Capital plus bail-in 8% TA	Yes, 5% TA cap, after LAC of 8% has been called in. No ex-post contributions.	10.5% RWAs adjusted+ GSIBs buffers.	No.	No.	Random significant banks.	
Initial Stressed (2030) Long term	Depending on common factor.	Max(K, 10.5% RWAs adjusted + GSIBs buffer)	RWAs adjusted	Capital plus bail-in 8% TA	Yes, 5% TA cap, after LAC of 8% has been called in. No ex-post contributions.	10.5% RWAs adjusted+ GSIBs buffers.	No.	No.	Random significant banks.	

(1) The size of the Single Resolution Fund was on Q2 2018 €24.9 billion (<https://srb.europa.eu/en/node/596>) which is around 43% of its target size (i.e. 1% of deposits)

Source: Commission services.

REFERENCES

- Abbas, A., Blattner, L., De Broeck, M., El-Ganainy, A. and Hu, M. (2014), "Sovereign Debt Composition in Advanced Economies: a Historical Perspective", *IMF Working papers*, No. 14 / 162.
- Alcidi, C. and Gros, D. (2019), "Public debt and the risk premium: a dangerous doom loop", *CEPS Policy Insights*, no. 2019-06, May.
- Alcidi, C. and Gros, D. (2018), "Debt Sustainability Assessments: the State of the Art – Euro Area Scrutiny", *Study requested by the ECON Committee of the European Parliament*, November.
- Afonso, A., Tovar Jalles, J. and M. Kazemi (2019), "The effects of macroeconomic, fiscal and monetary policy announcements on sovereign bond spreads: an event study from the EMU", *REM working paper series*, No. 067, February.
- Afonso, A. and M. Kazemi (2018), "Euro area sovereign yields and the power of unconventional monetary policy", *Czech Journal of Economics and Finance*, Vol. 68, No. 2.
- Afonso, A., Arghyrou, M. G. and A. Kontonikas (2015), "The determinants of sovereign bond yield spreads in the EMU, ECB working paper series, No. 1781, April.
- Aglietta, M., L. Arrondel, T. Brand, L. De Fossé, G. Dufrénot, R. Du Tertre, E. Espagne, A. Faivre, Y. Guy, A. Masson, A. Mayerowitz, W. Oman, and A. Pottier (2018), "Transformer le régime de croissance", *Rapport Institut CDC pour la Recherche*, Paris.
- Aksoy, Y., Basso, H. S., Smith R. P. and T. Grasl (2016), "Demographic structure and macroeconomic trends", *CESifo working paper*, No. 5872, April.
- Arevalo, P., Berti, K., Caretta, A. and Eckefeldt, P. (2019), "The Intergenerational Dimension of Fiscal Sustainability", *European Economy Discussion Paper*, No. 112.
- Auerbach A.J., J. Gokhale, and L.J. Kotlikoff, (1991), "Generational accounts: A meaningful alternative to deficit accounting" In D. Bradford, editor, *Tax Policy and the Economy*, Chicago University Press.
- Auerbach A.J., J. Gokhale, and L.J. Kotlikoff, (1992), "Generational Accounting: A New Approach to Understanding the Effects of Fiscal Policy on Saving", [Scandinavian Journal of Economics](#), 1992, vol. 94, issue 2, 303-18.
- Auerbach A.J., J. Gokhale, and L.J. Kotlikoff, (1994), "Generational accounting: A meaningful way to evaluate fiscal policy", *Journal of Economic Perspectives* 8, no. 1 (winter): 73-94.
- Balassone, F., J. Cunha, G. Langenus, B. Manzke, J. Pavot, D. Prammer, P. Tommasino (2009), "Fiscal Sustainability and Policy Implications for the Euro Area", *ECB Working Paper*, No. 994, January.
- Baldacci, E., I. Petrova, N. Belhocine, G. Dobrescu, and S. Mazraani (2011), "Assessing fiscal stress", *IMF Working Paper*, No. 11/100.
- Bank of England (2019), "A framework for assessing financial impacts of physical climate change, a practitioner's aide for the general insurance sector", May.
- Basel Committee on Banking Supervision (2005), "An Explanatory Note on the Basel II IRB Risk Weight Functions", Bank for International Settlements.
- Batten, S. (2018), "Climate change and the macro-economy: a critical review", Bank of England Staff working paper, No. 706, January.
- Bernanke, B. (2005), "The global saving glut and the US current account deficit", *Sandridge lecture, Virginia association of economics*, Richmond, Virginia, Federal Reserve Board.
- Berti, K., E. Colesnic, C. Desponts, S. Pamies and E. Sail (2016), "Fiscal Reaction Functions for EU Countries", *European Economy Discussion Paper*, No. 028.
- Benczur, P., K. Berti, J. Cariboni, F.E. Di Girolamo, S. Langedijk, A. Pagano, and M. Petracco Giudici (2015), "Banking Stress Scenarios for Public Debt Projections", *European Economy Economic Paper*, No. 548.
- Ben Salem, M. and B. Castelletti Font (2016), "Which combination of fiscal and external

- imbalances to determine the long-run dynamics of sovereign bond yields?, *Document de travail Banque de France*, No. 606, November.
- Berg, A., Berkes, E., Pattillo, C., Presbitero A. F., and Y. Yakhshilikov (2014), "Assessing bias and accuracy in the World Bank – IMF's Debt sustainability framework for low-income countries", IMF working paper, No. 48, March.
- Berti, K. (2013), "Stochastic Public Debt Projections Using the Historical Variance-Covariance Matrix Approach for EU Countries", *European Economy Economic Paper*, No. 480.
- Berti, K., M. Salto and M. Lequien (2012), "An Early-Detection Index of Fiscal Stress for EU Countries", *European Economy Economic Paper*, No. 475.
- Blanchard, O. (2019), "Public debt and low interest rates", *American Economic Review*, vol. 109, no. 4, April.
- Blanchard, O., Leandro, A. and J. Zettelmeyer (2019), "Revisiting the EU fiscal framework in an era of low interest rates", *Presentation at the European Commission Annual Research Conference*, November.
- Blanchard, O., Chouraqui, J.C., Hagemann, R.P. and N. Sartor (1990), "The Sustainability of Fiscal Policy: New Answers to an Old Question", *OECD Economic Studies*, No. 15
- Bohn, H. (1998), "The Behaviour of U.S. Public Debt and Deficits", *The Quarterly Journal of Economics*, Vol. 113, No. 3.
- Borio, C., Disyatat, P., Juselius, M. and P. Rungecharoenkiktkul (2017), "Why so low for so long? A long-term view of real interest rates", *BIS working papers*, No. 685, December.
- Bouabdallah, O., Checherita-Westphal, C., Warmedinger, T., de Stefani, R., Drudi, F., Setzer, R. and Westphal, A. (2017), "Debt sustainability analysis for euro area sovereigns: a methodological framework", *ECB Occasional paper series*, No. 185, April.
- Brixi, H. P. and A. Mody. (2002), "Dealing with Government Fiscal Risk: An overview," in Brixi and Allen Schick (eds.) *"Government at Risk: Contingent Liabilities and Fiscal Risk"*, pp. 21–58, World Bank and Oxford University Press.
- Bruns, M. and Poghosyan, T. (2016), "Leading Indicators of Fiscal Distress: Evidence from the Extreme Bound Analysis", *IMF Working Paper*, No. 16/28.
- Calvo, G. (1988), "Servicing the Public Debt: The Role of Expectations", *American Economic Review*, 78(4): 647–661.
- Cannas, G., J. Cariboni, M. Forays, H. Joensson, S. Langedijk, M. Marchesi, N. Ndacyayisenga, A. Pagano, and M. Petracco-Giudici (2013), "Quantitative Estimation of a Part of the Costs and Benefits of Bank Structural Separation", *European Commission JRC Scientific and Technical Report 88531*.
- Capelle-Blancard, G., Crifo, P., Diaye, M.-A., Oueghlissi, R. and B. Scholtens (2019), "Sovereign bond yield spreads and sustainability: an empirical analysis of OECD countries", *Journal of Banking and Finance*, No. 98.
- Cariboni J., Petracco Giudici M., Pagano A., Marchesi M., and Cannas G. (2012), "Costs and Benefits of a New Bank Resolution Framework", *European Commission JRC Scientific and Policy Report*, JRC 78882.
- Carnot, N., Pamies, S. and A. Patarau (2020), "Do fundamentals explain differentials between EU/EA interest rates?", *forthcoming*.
- Carnot, N. and de Castro, F. (2015), "The Discretionary Fiscal Effort: an Assessment of Fiscal Policy and its Output Effect", *European Economy, Economic Papers*, No. 543.
- Cebotari, A. (2008), "Contingent liabilities: issues and practice", *IMF Working Paper*, No. 08/245.
- Celasun, O., Debrun, X. and J. D. Ostry (2006), "Primary surplus behaviour and risks to fiscal sustainability in emerging market countries: a 'fan-chart' approach", IMF working paper, No. 67, March.

- Cerovic, S., Gerling, K., Hodge, A. and Medas, P. (2018), “Predicting Fiscal Crises”, *IMF Working paper*, No. 18 / 181.
- Corsetti, G. (2018), “Debt sustainability assessments: the state of the art – euro area scrutiny”, *Study requested by the ECON Committee of the European Parliament*, November.
- D’Agostino, A. and M. Ehrmann (2014), “The pricing of G7 sovereign bond spreads – The times, they are a-changin”, *Journal of Banking and Finance*, No. 47.
- Debrun, X., Ostry, J. D., Willems, T. and C. Wyplosz (2019), “The art of assessing public debt sustainability: relevance, simplicity, transparency”, *Vox CEPR Policy Portal*, December.
- De Grauwe, P. and Y. Ji (2012), “Mispricing of sovereign risk and multiple equilibria in the eurozone”, *CEPS working document*, No. 361, January.
- De Haan, L., Hessel, J. and J. W. Van Den End (2014), “Are European sovereign bonds fairly priced? The role of modelling uncertainty”, *Journal of International Money and Finance*, No. 47.
- Eichler, S. (2014), “The political determinants of sovereign bond yield spreads”, *Journal of International Money and Finance*, No. 46.
- Eller, M. and J. Holler (2018), “Digging into the composition of government debt in CESEE: a risk evaluation”, Oesterreichische Nationalbank (OeNB).
- EIOPA (2018), “2018 Insurance stress test report”.
- European Central Bank (2019), “Interest rate-growth differential and government debt dynamics”, *Economic Bulletin*, Issue 2.
- European Central Bank (2018), “Economic Bulletin”, Issue 6.
- European Central Bank (2017), “Financial Stability Review”, November.
- European Commission (2020), “Report on public finances in EMU 2019”, *European Economy Institutional Paper*, forthcoming.
- European Commission (2019a), “European economic forecast, Autumn 2019”, *European Economy Institutional Paper*, No. 115, November.
- European Commission (2019b), “Enhanced surveillance report, Greece, November 2019”, *European Economy Institutional Paper*, No. 116, November.
- European Commission (2019c), “Fiscal Sustainability Report 2018”, *European Economy Institutional Paper*, No. 94, January.
- European Commission (2019d), “Communication from the Commission to the European Parliament, the Council and the European Central Bank on the 2020 Draft Budgetary Plans: overall assessment”, *COM(2019) 900 final*, November.
- European Commission (2019e), “Vade Mecum of the Stability and Growth Pact, 2019 edition”, *European Economy Institutional Paper*, No. 101, April.
- European Commission (2019f), “Communication on The European Green Deal”, 11th December, Brussels.
- European Commission (2018a), “Debt Sustainability Monitor 2017”, *European Economy Institutional Paper*, No. 090.
- European Commission (2018b), “Report on public finances in EMU”, *European Economy Institutional Paper*, No. 069, January.
- European Commission (2018c), “The 2018 Ageing Report: Economic and budgetary projections for the 28 EU Member States (2016-2070)”, *European Economy Institutional Paper*, No. 079.
- European Commission (2018d), “In-depth analysis in support on the European Commission COM (2018) 773 on A Clean Planet for All – A European strategic long-term vision for a prosperous, modern, competitive, and climate neutral economy”, Brussels.

- European Commission (2017), "Debt Sustainability Monitor 2016", *European Economy Institutional Paper*, No. 047.
- European Commission (2016), "Fiscal Sustainability Report 2015", *European Economy Institutional Paper*, No. 018, January.
- European Commission (2014), Directorate-General for Competition, "State Aid Scoreboard 2014".
- European Commission (2011), "Public Finances in EMU 2011", *European Economy Institutional paper*, No. 3/2011.
- European Commission (1999), "Generational Accounting in Europe", *European Economy, Reports and Studies*, No. 6.
- European Commission JRC (2018), "Climate impacts in Europe, final report of the JRC PESETA III project", *JRC Science for Policy Report*.
- European Parliament and Council (2014a), "Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council", *Official Journal of the European Union*, L 173/190.
- European Parliament and Council (2014b), "Regulation (EU) No 806/2014 of the European Parliament and of the Council of 15 July 2014 establishing uniform rules and a uniform procedure for the resolution of credit institutions and certain investment firms in the framework of a Single Resolution Mechanism and a Single Resolution Fund", *Official Journal of the European Union*, L 225/1.
- European Parliament and Council (2013), "Directive 2013/36/EU of the 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms", *Official Journal of the European Union*, L 176/338.
- Eurostat (2019a), "Note on stock of liabilities of trade credits and advances, October 2019".
- Eurostat (2019b), "Structure of government debt", *Statistics Explained*, June 2019.
- Eurostat (2019c), "Eurostat supplementary table for reporting government interventions to support financial institutions", *Background note*, October 2019.
- Eurostat (2018), "The extent of contingent liabilities and non-performing loans in the EU Member States", *Eurostat News Release* No. 19/2018, 29 January 2018.
- Eurostat (2017), Population projection website: <https://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-projections-data>
- Eurostat (2015), "Note on Stock of Liabilities of Trade Credits and Advances, April 2015".
- Eurostat (2014), "Measuring Net Government Debt; Theory and Practice", *Eurostat Statistical Working Papers*, 2014 edition.
- Financial Stability Board (2016), "2016 Update Of List Of Global Systemically Important Banks (G-SIBs)", 21 November 2016.
- Financial Stability Board (2014), "Adequacy of Loss-absorbing Capacity of Global Systemically Important Banks in Resolution, Consultative Document".
- Fournier, J.-M. and F. Fall (2017), "Limits to government debt sustainability in OECD countries", *Economic modelling*, Vol. 66, November.
- Gabriele, C., Erce, A., Athanasopoulou, M. and Rojas, J. (2017), "Debt stocks meet gross financing needs: a flow perspective into sustainability", *ESM Working paper series*, No. 24.
- Garcia-de-Andoain, C. and Kremer, M. (2018), "Beyond spreads: measuring sovereign market stress in the euro area", *ECB Working Paper Series*, No. 2185.

- Gerling, M. K., Medas, M. P. A., Poghosyan, M. T., Farah-Yacoub, J. and Xu, Y. (2017), "Fiscal Crises", *IMF Working paper*, No. 17/86.
- GFDRR (2017), "Damage and loss assessment (DaLaA) methodology", Global Facility for Disaster Reduction and Recovery, <https://www.gfdrr.org/en/damage-loss-and-needs-assessment-tools-and-methodology>
- Giordano, R., Pericoli, M., and P. Tommasino, "Pure or wake-up-call contagion? Another look at the EMU sovereign debt crisis", *International Finance*, 16 (2).
- Gomez-Puig, M., Sosvilla-Rivero, S. and M. del Carmen Ramos-Herrera (2014), "An update on EMU sovereign yield drivers in time of crisis: a panel data analysis", *Research Institute of Applied Economics working paper*, No. 07.
- Gosh, A. R., J. I. Kim, E. G. Mendoza, J. D. Ostry, and M. S. Qureshi (2011), "Fiscal fatigue, fiscal space and debt sustainability in advanced economies", *NBER Working Paper*, No. 16782.
- Gourinchas, P.-O. and H. Rey (2019), "Global real rates: a secular approach", *BIS working papers*, No. 793, July.
- Gruber, J., and S. Kamin (2012), "Fiscal Positions and Government Bond Yields in OECD Countries," *Journal of Money, Credit and Banking*, Vol. 44, No. 8, pp. 1563-1587.
- Hemming, R., M. Kell, and A. Schimmelpfennig (2003), "Fiscal vulnerabilities and financial crises in emerging market economies", *IMF Occasional Paper*, No. 218.
- Henao-Arbelaez, C., and N. Sobrinho (2017), "Government Financial Assets and Debt Sustainability", *IMF Working Paper*, No. 17/173.
- Hollo, D., Kremer, M. and Lo Duca, M. (2012), "CISS – a Composite Indicator of Systemic Stress in the Financial System", *ECB Working Paper Series*, No 1426.
- Ichiue, H., and Y. Shimizu (2015), "Determinants of Long-Term Yields: A Panel Data Analysis of Major Countries," *Japan and the World Economy*, Vol. 34-35, pp. 44-55.
- IMF (2019), "Fiscal Monitor: How to mitigate climate change", International Monetary Fund, October.
- IMF (2019), "Macroeconomic and Financial Policies for Climate Change Mitigation: A Review of Literature", *IMF Working Paper* 19/185.
- IMF (2018a), "Fiscal Monitor: Managing Public Wealth", International Monetary Fund, October.
- IMF (2018b), "Austria. Fiscal Transparency Evaluation", Country Report, No. 18/193.
- IMF / World Bank (2018), "Guidance note of the Bank-Fund debt sustainability framework for low income countries", February.
- IMF Policy Paper (2017a), "Review of the Debt Sustainability Framework for Low Income Countries: Proposed Reforms" (Joint IMF/WB LIC DSF), September.
- IMF Policy Paper (2017b), "State-Contingent Debt Instruments for Sovereigns", May.
- IMF (2016), "After Paris: fiscal, macroeconomic and financial implications of climate change", *IMF staff discussion note*, No. 16/01, January.
- IMF (2014), "World Economic Outlook: recovery strengthens, remains uneven", April.
- IMF (2013), "Staff Guidance Note for Public Debt Sustainability Analysis in Market-Access Countries", May.
- IMF (2010), "Fiscal monitor - Fiscal exit: from strategy to implementation", International Monetary Fund, November 2010.
- Intergovernmental Panel on Climate Change (2014), "Climate Change 2014 Synthesis Report", Geneva.
- Intergovernmental Panel on Climate Change (2018), "Global Warming of 1.5°C", Geneva.
- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem (2018), "Global assessment report on biodiversity and ecosystem services", IPBES, Germany.

- Kaufmann, D., Kraay, A. and Mastruzzi, M. (2011), "The Worldwide Governance Indicators: Methodology and Analytical Issues", *Hague Journal on the Rule of Law*, Vol. 3, Issue 2.
- Laeven L., and F. Valencia (2013), "Systemic Banking Crises Database", *IMF Economic Review*, No. 61, pp. 225–270.
- Marchesi M., M. Petracco Giudici, J. Cariboni, S. Zedda, and F. Campolongo (2012), "Macroeconomic Cost-benefit Analysis of Basel III Minimum Capital Requirements and of Introducing Deposit Guarantee Schemes and Resolution Funds", *European Commission JRC Scientific and Policy Report 24603*.
- Miller, M. and Zhang, L. (2014) "Saving the euro: self-fulfilling crisis and the 'Draghi put'", *VoxEU Column*.
- Monteiro, D. and B. Vasicek (2019), "A retrospective look at sovereign bond dynamics in the euro area", *European Economy Institutional Paper, Quarterly Report on the Euro Area*, Vol. 17, No. 4, March.
- Morgan Stanley (2018), "Debt sustainability 2.0", *Morgan Stanley research*, December 6.
- Nordhaus, W.D. (2014), "A question of balance: weighing the options on global warming policies", Yale University Press, London.
- OECD (2018), "Paris collaborative on green budgeting", <http://www.oecd.org/environment/cc/Flyer-Paris-Collaborative-on-Green-Budgeting.pdf>
- OECD and World Bank (2019), "Fiscal resilience to natural disasters, lessons from country experiences", OECD Publishing.
- Pamies Sumner, S. and Berti, K. (2017), "A complementary tool to monitor fiscal stress in European economies", *European Commission Discussion Paper*, No. 049.
- Pigato, M., ed., (2019), "Fiscal policies for development and climate action", *World Bank Group*, Washington D.C.
- Pindyck, R. S. (2013), "Climate change policy: what do the models tell us?" *Journal of Economic Literature* 51(3), pp. 860-872.
- Pindyck, R. S. (2017), "The use and misuse of models for climate policy?" *Review of Environmental Economics and Policy* 11(1), pp. 100-114.
- Poghosyan, T. (2012), "Long-run and short-run determinants of sovereign bond yields in advanced economies", *IMF working paper*, No. 271, November.
- Presbitero, A. F., Ghura, D., Adedeji, O. S. and L. Njie (2015), "International sovereign bonds by emerging markets and developing economies: driver of issuance and spreads", *IMF working paper*, No. 275, December.
- Rachel, L. and T. D. Smith (2015), "Secular drivers of the global real interest rate", *Bank of England staff working paper*, No. 571, December.
- Rachel, L. and L. H. Summers (2019), "On falling neutral real rates, fiscal policy and the risk of secular stagnation", *Brookings Papers on Economic Activity*, BPEA conference drafts, March 7-8.
- Rawdanowicz, L., Hammouch, M. and M. Kasai (2017), "The fall in real long-term government bond yields: disentangling different drivers", *OECD Economics Department Working Papers*, No. 1398, June.
- Solow, R. M., (1971), "The Economist's Approach to Pollution and Its Control", *Science* 173(3996), pp. 498-503.
- Summers, L. H. (2015), "Have we entered an age of secular stagnation?", *IMF Economic Review*, 63 (1).
- Swiss Confederation Federal Finance Administration (2016), "2016 Report on the long-term sustainability of public finances in Switzerland".
- Stern, Nicolas (2013), "The structure of economic modelling of the potential impacts of climate change: grafting gross underestimation of risk onto

already narrow science models”, *Journal of Economic Literature* 51, pp. 838-85.

United Kingdom Office for Budget Responsibility (2019), “Fiscal Risks Report”, July.

United States Congressional Budget Office (2019), “Expected costs of damage from hurricane winds and storm-related flooding”, April.

United States Office of Management and Budget (OMB) and Council of Economic Advisers (CEA) (2016), “Climate change: the fiscal risks facing the federal government, a preliminary assessment”, November.

Weitzman, Martin L. (2011), “Fat-tailed uncertainty in the economics of catastrophic climate change”, *Review of Environmental Economics and Policy* 5, pp. 275-92.

World Wide Fund for Nature (2018), “A warning sign from our planet: nature needs life support”, WWF, October.

Zigraiova, D. Erce, A. and X. Jiang (2019), “Quantifying risks to sovereign market access: methods and challenges”, *forthcoming*.

EUROPEAN ECONOMY INSTITUTIONAL PAPERS SERIES

European Economy Institutional Papers series can be accessed and downloaded free of charge from the following address:

[https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en?field_eurovoc_taxonomy_target_id_selective=All&field_core_nal_countries_tid_selective=All&field_core_date_published_value\[value\]\[year\]=All&field_core_tags_tid_i18n=22621](https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en?field_eurovoc_taxonomy_target_id_selective=All&field_core_nal_countries_tid_selective=All&field_core_date_published_value[value][year]=All&field_core_tags_tid_i18n=22621).

Titles published before July 2015 can be accessed and downloaded free of charge from:

- http://ec.europa.eu/economy_finance/publications/european_economy/index_en.htm
(the main reports, e.g. Economic Forecasts)
- http://ec.europa.eu/economy_finance/publications/occasional_paper/index_en.htm
(the Occasional Papers)
- http://ec.europa.eu/economy_finance/publications/qr_euro_area/index_en.htm
(the Quarterly Reports on the Euro Area)

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct Information Centres. You can find the address of the centre nearest you at: <http://europa.eu/contact>.

On the phone or by e-mail

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696 or
- by electronic mail via: <http://europa.eu/contact>.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: <http://europa.eu>.

EU Publications

You can download or order free and priced EU publications from EU Bookshop at: <http://publications.europa.eu/bookshop>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see <http://europa.eu/contact>).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex at: <http://eur-lex.europa.eu>.

Open data from the EU

The EU Open Data Portal (<http://data.europa.eu/euodp/en/data>) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.

