4. ADDITIONAL AGGRAVATING AND MITIGATING RISK FACTORS FOR FISCAL SUSTAINABILITY

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Main takeaways

This chapter explores additional aggravating and mitigating risk factors for fiscal sustainability*. These factors are only partially reflected in the analysis of the previous chapters, but are critical to provide an overall assessment of fiscal sustainability risks. The risk factors include the structure of debt, government liabilities beyond (EDP) public debt, in particular contingent liabilities, as well as government assets and net debt.*

Recent developments in the structure of government debt are overall favourable across the EU, although the increased share of short-term debt in some Member States is a potential source of concern. *Over the past years, a general trend of lengthening debt maturities has been observed. However, in many Member States, the share of short-term debt has increased as a result of the COVID-19 pandemic and has only partially receded last year. The investor base is large and diversified in many Member States. Asset purchases' programmes by the Eurosystem in recent years resulted in a substantial increase of the share of government debt held by central banks, representing a stable financing source. However, the ECB has announced that it will reduce its securities portfolio holdings in 2023. Lastly, few non-euro area Member States are exposed to foreign exchange rate risks.*

Risks concerning government contingent liabilities increased since the COVID-19 pandemic, but appear overall limited. *As a response to the COVID-19 pandemic, many governments granted substantial support to the private sector in the form of guarantees. However, the surge in such government guarantees remained moderate in most Member States, and overall lower than during the global financial crisis. Most of these government guarantee schemes have expired in the course of 2021 and 2022 and are expected to decline further in 2023 according to Member States' Draft Budgetary Plans. A snapshot analysis of bank balance sheets points to contained vulnerabilities in most Member States. However, simulations based on the Commission's SYMBOL model show that (implicit) contingent liabilities' risks linked to the banking sector exist in some Member States, in particular under a stressed scenario.*

The holding of (large) financial assets in some countries mitigate fiscal sustainability risks, while net debt increased. *Country rankings for indebtedness are similar when comparing gross and net debt ratios. Both indicators increased in the majority of Member States over the past decades, notably reflecting the succession of crises.*

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Additional aggravating and 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 the DSA risk framework as well as fiscal sustainability indicators. Yet, these quantitative results need to be complemented by additional aggravating and / or mitigating risk factors that are only partially factored in in the quantitative results of the framework. Such factors are particularly relevant at the current juncture of still important uncertainty.

A number of key aggravating and mitigating risk factors are analysed in this chapter. Section 4.1 provides an analysis of the debt structure, notably in terms of maturity, currency denomination and holders, which gives an important indication of potential vulnerabilities (or strengths). Section 4.2 examines implicit and contingent liabilities, notably those linked to the government guarantees granted as a response to the COVID-19 crisis, and those stemming from the banking sector in general, including on the basis of the Commission Symbol model. Section 4.3 discusses other relevant factors, including government assets. The additional risk factors considered in this chapter are treated horizontally in the overall assessment, insofar the identified vulnerabilities or supporting factors may materialise in the short, medium or long term. [44]

4.1. RISKS RELATED TO THE GOVERNEMENT 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.

Second, by influencing the degree of risks, notably refinancing and rollover risks. According to 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. [45] With this aim, three main variables are used to analyse the debt structure: 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 applied to capture additional vulnerabilities or mitigating factors 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 same signalling approach, which is used for the computation of S0 [46]. The results are reported for all Member States in the form of a heat map (see Table 4.1) [47]

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[44] Some other factors are not examined in this chapter. This concerns in particular the quality of institutions. As shown by a rich literature, the quality of institutions is an important supporting factor of public debt sustainability. In the EU, a deeply integrated region of mainly advanced economies, evidence suggests that the quality of institutions would be on average higher and less heterogeneous than in other parts of the world (for a literature review, see Box 1.2 in European Commission (2019), Fiscal Sustainability Report 2018, *European Economy Institutional Paper*, No. 094.

[45] 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 4.2 of this chapter).

[46] For details on the signals approach see Chapter 1. This methodology shows that, based on historical events, the three variables appear to be relatively good leading indicators of fiscal stress.

[47] See also the statistical fiches in volume 2 of the 2021 Fiscal Sustainability Report. 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. For information on the methodology, see European Commission (2022), Fiscal Sustainability Report 2021, *European Economy Institutional Paper*, No. 171.

Table 4.1: **Risks related to the government debt structure (2021)**

	Short-term public debt (original maturity)	Public debt held in foreign currency	Public debt held by non-residents
BE	7.4	0.0	53.8
BG	0.1	74.6	46.1
CZ	2.6	7.7	29.7
DK	13.2	2.4	26.5
DE	12.3	2.7	41.5
EE	8.6	0.0	69.7
IE	8.0	0.0	53.6
EL	5.5	0.3	78.9
ES	6.9	0.0	43.2
FR	10.2	3.2	46.2
HR	5.7	70.7	34.0
IT	13.1	0.1	29.1
CY	1.9	0.0	89.4
LV	3.1	0.0	63.9
LT	0.0	0.0	64.7
LU	2.2	0.0	49.7
HU	5.9	22.6	31.7
MT	8.5	0.0	23.8
NL	10.2	0.0	34.7
AT	7.1	0.4	60.6
PL	1.2	22.7	33.1
PT	15.5	0.0	45.2
RO	5.1	53.3	49.2
SI	2.1	0.1	55.2
SK	3.6	0.0	49.6
FI	10.7	2.5	51.8
SE	24.9	3.4	19.1

(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%; lower threshold 40%.
(2) Share of short-term public debt is based on partially missing information for Netherlands.
(3) Foreign-held debt figures are shown against a double shading that blends the colour coding of volatility 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).
Source: Eurostat, ECB.

The share of short-term government debt remains high in 14 Member States, although declining in most countries. 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 still persist for several EU countries (see Table 4.1). The share of short-term debt is considered high in 14 Member States, in particular in Sweden (about 25% of total government debt), but also in Denmark Portugal, Finland, Netherlands, Italy, France, and Germany (above 10% of total government debt). However, after the peak recorded during the COVID-19 crisis, the ratio of short-term debt decreased in

most countries and for the EU/EA as a whole in 2021 (see Graph 4.1). [48]

Graph 4.1: **Share of short-term debt (% of total general government debt)**
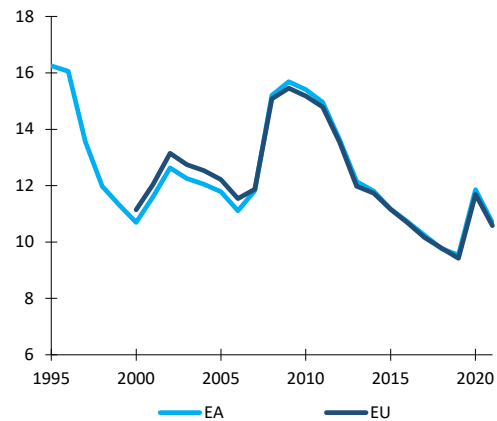
(1) Short-term debt includes currency and deposit, short-term debt securities and short-term loans.
Source: Eurostat.

Yet, the increase of the average maturity of government debt reduces vulnerabilities. The average (residual) maturity of government debt (securities) has increased significantly in recent years and reached a record high of close to 8 years on average in 2021 (see Graph 4.2) It seems to have stabilised in 2022. This increasing share is observed for most countries, and the maturity was particularly long in 2022 in Greece, Austria, Belgium, Ireland, Slovenia and Lithuania (see Table 4.2). Moreover, 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) [49]. In the case of external short-term debt of non-euro area Member States, the level of a country's international reserves equally deserves consideration. [50] Last, Treasury cash-flow

[48] If the structure of debt tends to be fairly stable over time, 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, A., Blattner, L., De Broeck, M., ElGanainy, A. and Hu, M. (2014), Sovereign debt composition in advanced economies: a historical perspective, *IMF Working papers*, No. 14 / 162 and also Box 3.4 in Chapter 3 of European Commission (2019), Fiscal Sustainability Report 2018, *European Economy Institutional Paper*, No. 094).
[49] See S0 indicator table on fiscal variables.
[50] 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

management has an influence both on the headline short-term debt and the availability of other liquid financial assets, such as cash deposits, which could mitigate potential stress (see also Section 4.3).

Graph 4.2: **Average residual maturity of government debt securities (in years, simple average over EU countries)**
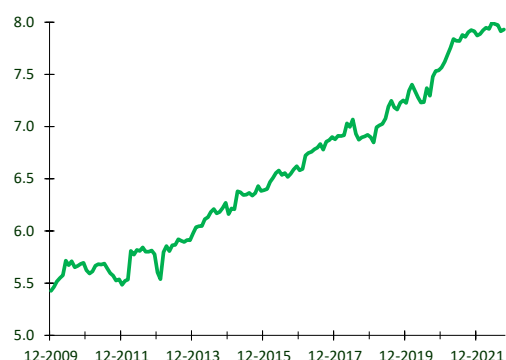
(1) Data are missing for Estonia.
Source: ECB (debt securities issuance and service by EU governments, November 2022).

Table 4.2: **Average residual maturity of debt (general government)**

	Debt securities					All debt (Oct. 2022)
	Dec. 2009	Dec. 2020	Dec. 2021	Sep. 2022	Diff. 2022 - 09	
BE	5.5	10.1	10.4	10.7	5.2	10.7
BG	4.3	6.2	8.4	7.4	3.1	8.1
CZ	6.2	6.0	5.9	6.4	0.2	6.1
DK	8.1	7.9	7.3	8.3	0.2	8.9
DE	5.5	6.5	6.7	7.2	1.7	7.5
EE	:	:	:	:	:	8.0
IE	6.3	9.5	10.9	10.8	4.5	10.9
EL	7.9	7.6	9.2	9.5	1.6	22.1
ES	6.5	7.6	7.8	7.8	1.3	7.7
FR	6.4	7.6	7.9	8.2	1.8	8.4
HR	:	7.6	7.9	8.2	:	6.0
IT	7.3	6.8	7.0	7.1	-0.2	7.6
CY	3.1	4.9	7.9	7.7	4.6	7.5
LV	3.7	9.9	8.8	8.9	5.2	8.1
LT	:	6.2	9.0	9.3	:	9.5
LU	3.9	5.2	6.3	6.0	2.1	6.9
HU	4.1	3.7	5.6	6.9	2.8	5.9
MT	5.3	8.2	7.7	8.7	3.3	8.9
NL	5.2	7.4	7.2	8.1	2.9	8.7
AT	7.3	10.0	10.9	11.3	4.0	11.4
PL	5.3	4.8	4.4	4.4	-0.9	4.4
PT	6.1	6.1	6.5	7.1	1.0	7.4
RO	2.3	6.9	7.4	7.4	5.1	7.4
SI	5.9	9.4	8.8	9.7	3.8	9.8
SK	4.5	8.6	8.3	8.5	4.1	8.5
FI	4.1	6.6	6.5	7.3	3.2	7.6
SE	5.4	4.5	4.4	4.6	-0.8	5.0
Average (simple)	5.4	7.0	7.6	7.9	7.9	8.5

Source: ECB (debt securities), ECB, Eurostat, national sources (all debt).

The share of debt denominated in foreign currency is limited, except in few non-EA

flows and its capacity to service its short-term external debt.

Member States. As advanced economies finance themselves overwhelmingly in their own currency, currency-related fiscal risks are largely absent for the EU Member States that have adopted the euro (see Table 4.1). [51] Yet, foreign currency-denominated debt is large in some Central and Eastern European countries (CEEC). This is the case of Bulgaria and Romania (with a share well above 50% of total debt), [52] as well as to a lesser extent Poland, Hungary and Sweden. In the case of Croatia, the bulk of debt shown on Table 4.1 is denominated in euro, and the country joined the euro area in 2022. For all these Member States, hedging of foreign currency positions can mitigate potential exchange rate risks, [53] whereas pegs or currency boards also significantly reduce exposure to fiscal risks from the share of public debt in foreign currency. [54] Moreover, in these countries, the major share of foreign currency issuances are denominated in euro, and in some countries, governments have succeeded in reducing their reliance on foreign currency borrowing, e.g. in Czechia, Hungary, Poland and Romania (Eller and Holler, 2018).

EU Member States' investor base is solid, though in some cases, the substantial share of debt held by non-residents creates vulnerabilities. [55] Several euro-area Member States are found to have large shares of foreign held government debt, including Greece, Cyprus, the Baltic countries, Austria, Finland, Slovenia,

[51] A domestic currency denomination traditionally protects governments against currency mismatches between a government's interest expenditure and tax revenue. Yet, in some countries, the rationale behind foreign-currency-denominated 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 (see Eller, M. and Holler, J. (2018), Digging into the composition of government debt in CESEE: a risk evaluation, Oesterreische Nationalbank (OeNB)).

[52] 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.

[53] Hedging operations are not taken into account in the DSM.

[54] 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), Debt Sustainability Monitor 2016, *European Economy Institutional Paper*, No. 47. - Chapter 2, Box 2.2.

[55] Indeed, the foreign investor base tends to be more volatile and prone to sudden stops in situations of heightened uncertainty.

Belgium, Ireland, Slovakia and Romania (all beyond 50% of total government debt; see Table 4.1). However, in some cases, this high share reflects important official lending associated to past financial assistance programmes (Greece, Cyprus, Ireland and Portugal; see Graph 4.3). In others, the large foreign investor base underlines the country's worthiness, as shown by limited sovereign bond spreads (e.g. Austria, Finland and Belgium). [56] In general, 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. [57] For some other non-euro area Member States such as Romania, Poland and Hungary, the significant share of foreign held debt could be more associated with a search for yield given a more emerging markets status and relatively small local-currency markets.

Graph 4.3: **Share of government debt held by domestic central banks (% of total govt. debt, EA aggregate)**
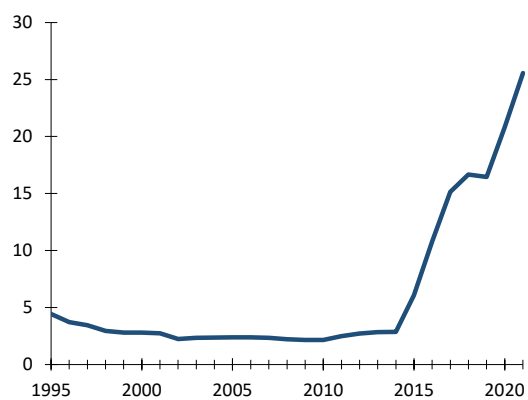
(1) Based on Maastricht debt (at face value).
Source: ECB.

A detailed overview of government debt allocations by different holders indicates that an increasing share of government debt is held by domestic central banks (and the ECB for EA countries). By end 2021, in more than half of EA
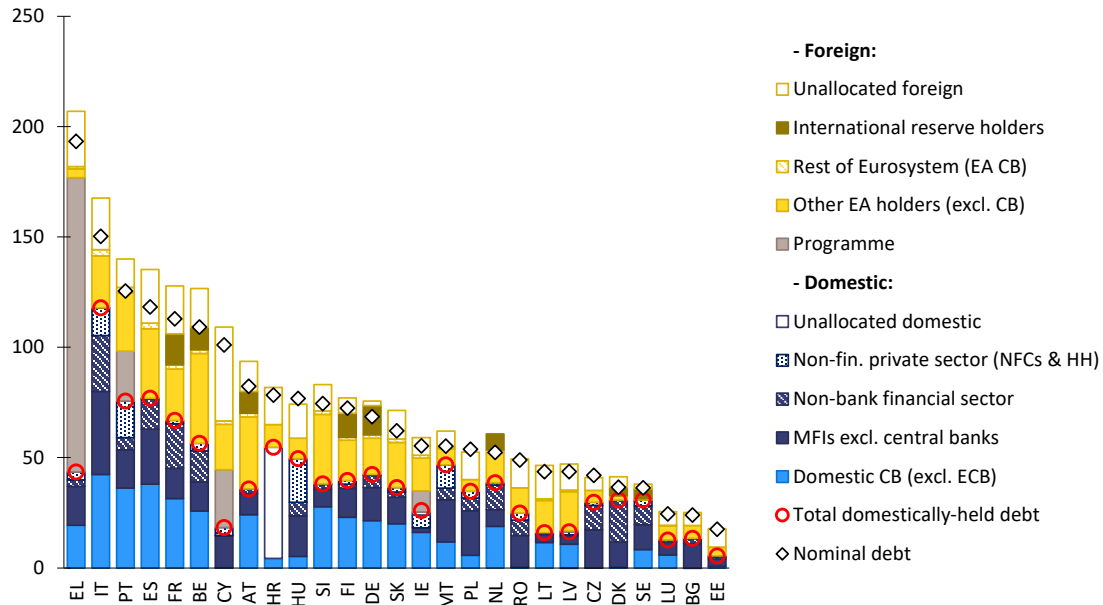
countries, at least one quarter of government debt was held by domestic Central Banks (see Graph 4.4). Largest shares are observed in Slovenia (close to 35%), Slovakia, Spain, Finland and Germany (close to 30%). For high debt countries, this share varies from less than 10% (Greece) to more than 25% (Spain). Moreover, for the EA on average, the share of debt held by (domestic) Central Banks has significantly increased since 2014 (when this share amounted to less than 3%; see Graph 4.3), notably reflecting asset purchases' programmes (see also chapter 1).

For almost all EA countries, the detailed overview of government debt allocation by different holders also indicates the degree of risks, notably refinancing and rollover risks (illustrated in Table 4.1**)** (see Graph 4.3). For medium size and 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 (including Germany, France, the Netherlands, Finland, Austria, and Belgium). 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 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 Member States, such as Malta, Sweden and Italy, a high share of 2021 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 (e.g. Romania, Cyprus, Lithuania, Finland and Slovakia).

The analysis of risks arising from the debt profile needs not be confined to these indicators and the associated benchmarks. Other factors, such as the exchange rate regime, the role of the

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[56] In Table 4.1, foreign-held debt figures are shown against a double shading that blends the colour coding of volatility 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).

[57] 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*, No. 185.

Graph 4.4:   **Holders of government debt (market value, % of GDP, 2021-Q4)**

(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).
Source: Commission services based on ECB, Eurostat and IMF.

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

4.2.   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 2). The section looks in particular into government direct liabilities that are not included in the EDP debt (Section 4.1), while sub-sections 4.2.2 to 4.2.3 discuss risks linked to contingent liabilities. Assessing the risks related to those liabilities,

including the additional risks stemming from the banking sector, is particularly relevant in the current context, as vulnerabilities could eventually materialise.

4.2.1. EDP debt, other debt and non-debt financial instruments: an overview

The EDP debt liabilities were the main component of on-balance government gross liabilities in 2021 in all Member States. In the EU as a whole, the EDP debt was around 90% of GDP in 2021 and accounted for about eight tenths of total gross financial liabilities in 2021 (see Graph 4.5). In terms of instrument coverage, debt securities, commonly in the form of bills, commercial papers and bonds, account for more than seven tenths 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. ([58])

The difference between total gross liabilities and the EDP debt varies widely across Member States. In 2021, the portion of total gross government liabilities (at market value) not reflected in the EDP debt (measured at face value) ranged from 29 to 38% of GDP in Greece, Austria and Portugal, and close to 10% of GDP in Estonia, Luxembourg, and Lithuania. This difference 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. ([59])

Graph 4.5: **Debt and non-debt financial liabilities (% of GDP, 2021)**
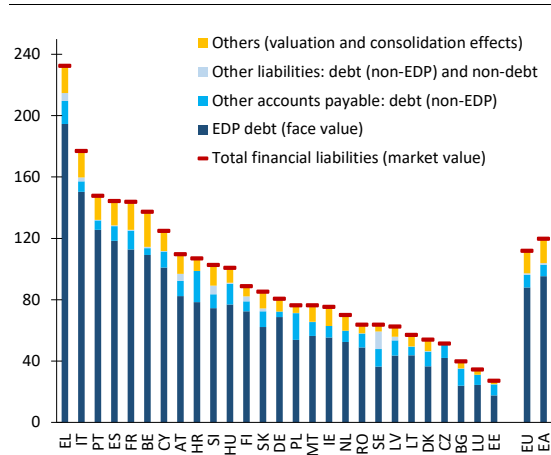
*Source:* Commission services based on Eurostat.

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 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 Global Financial Crisis. Over time, stocks of trade credits and advances have receded in these Member States, while increasing in others (e.g. Belgium and Denmark). In 2021, as a share of GDP, these liabilities were highest in Italy (2.9% of GDP), Romania (2.3%), Bulgaria (2.0%), Denmark (1.8%), Finland (1.8%), Germany (1.7%) and Croatia (1.7%), and, compared to an EU average of 1.5% of GDP (see Graph 4.6). ([60])

Graph 4.6: **Trade credits and advances in selected Member States (2011 and 2021)**
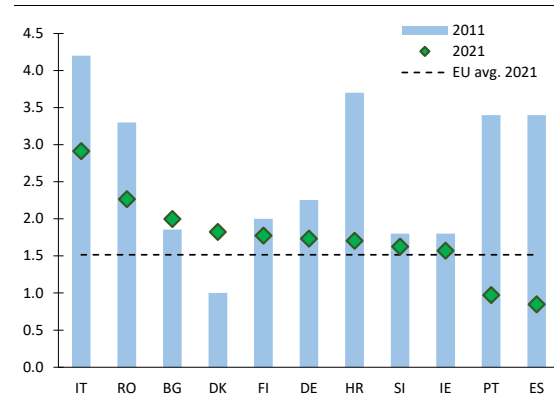
Source: Eurostat.

Other liabilities (debt and non-debt financial instruments) are typically a narrow set of total government liabilities. In 2021, these other liabilities were more relevant for Sweden (12% of GDP – of which mainly insurance, pensions and standardised guarantees), Slovenia (5.7%– of which mainly financial derivatives and employee stock options), Greece (5.1%– of which mainly financial derivatives and employee stock options), Austria (4.6%), Finland (3.2%), Italy (2.6%), Slovakia (1.8%) and Latvia (2.4%), while accounting for less than 1% of GDP in other Member States.

The gap reflecting valuation and consolidation effects can be relatively large in some Member States. Ranging from 1% to 23% of GDP in 2021, this gap was highest in Belgium, Italy, Spain,

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([58]) 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.

([59]) 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.

([60]) See Eurostat (2015), Note on stock of liabilities of trade credits and advances, April 2015 and Eurostat (2021), Note on stock of liabilities of trade credits and advances, October 2021.

Greece 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. ([61])

### 4.2.2. (Explicit) 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 comprise government guarantees, including those related to government interventions in the financial sector, and liabilities related to off-balance PPPs (public private partnerships). ([62])

Government guarantees and PPPs up to 2020

Government guarantees represent a source of potential fiscal cost in several Member States, in case they are called. ([63]) Before the COVID-19 crisis, in 2019, the highest stock of outstanding government guarantees was recorded in Finland (about 25% of GDP), Denmark (more than 18%) and Austria (about 16% of GDP) (see Graph 4.8). In Finland, a sizeable part of the guarantees were related to export guarantees, student loans and funds for supporting housing production, and have been overall increasing since 2010 (see Graph 4.7). In Denmark, most guarantees concerned social housing and state-owned enterprises such as the

Danish Railways, the national broadcaster DR and the Oresund, Storebaelt and Fehmarn connections. 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. ([64]) In the EU as a whole, after a peak at 14% of GDP in 2012, public guarantees have progressively declined around 9% of GDP in 2019 reflecting mainly the decline in the use of government guarantee schemes for financial institutions granted in the context of the 2007 Global Financial Crisis in a number of Member States. In 2020, a rebound in the recourse to public guarantees was recorded at 13% of GDP, as a result of the use of government guarantee schemes in the context of the COVID-19 crisis.

Graph 4.7: **Developments in government guarantees in selected EU Member States (% of GDP, 2010-2020)**
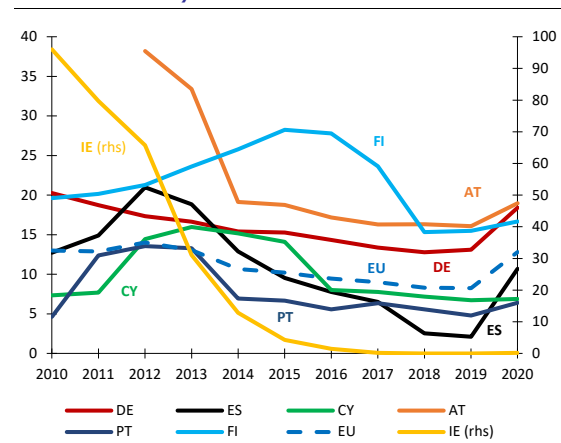
Source: Eurostat.

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 2020, the stock of *one-off guarantees* ranged from 25% of GDP in Finland and 19% of GDP in Austria to less than 1% of GDP in Romania, Lithuania, Latvia, Czechia, Bulgaria, Slovakia, Estonia and Ireland (see Graph 4.8). On the other hand, the total amount committed in *standardised guarantee schemes* (issued in large numbers for small amounts) carries a more modest risk for future

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([61]) See Eurostat (2021), Stock-flow adjustment for the Member States, the euro area and the EU, for the period 2017-2020, October 2021 EDP notification.

([62]) This information can also be found in the statistical country fiches (see volume 2 of the 2021 Fiscal Sustainability Report). 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.

([63]) Government guarantees are typically designed to reimburse a lender in case of possible losses linked to the loans it has provided. Government guarantees are issued to promote economic stability or pursue other public policy objectives, with the examples of guarantees on student loans or guarantees on the losses incurred by exporters in case of non-payment by a trading partner.

([64]) See IMF (2018), Austria. Fiscal Transparency Evaluation, *Country Report*, No. 18/193.

public expenditure in most Member States. These schemes account for more than 1% of GDP only in Italy (7.6% of GDP), Portugal (3.2%), Romania (2.8%), France (2.6%), Hungary (2.2%), Finland and Estonia (1.9% respectively), Latvia (1.5%). and Luxembourg (1.4%). ([65])

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 for 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 0.1% of GDP since 2010 and are only affecting few Member States (see Graph 4.8). In 2020, more sizeable contingent liabilities related to off-balance PPPs were recorded in Slovakia (2.4% of GDP), Portugal (2.3%) and Hungary (1.1%).

([65]) In some cases, governments issued *standardised* guarantees in response to the COVID-19 crisis; for such guarantees, expected losses are recorded as estimated deficit impact upfront, in line with ESA 2010 rules. While high uncertainty remains, this mitigates the potential impact of the guarantees for future deficits. This was particularly the case for Italy, where the stock of guarantees increased most in 2020: as the guarantees issued in 2020 in response to the COVID-19 crisis were predominantly standardised, losses associated with the expected future guarantee calls (0.7% of GDP) were already reflected in the deficit of 2020.

Graph 4.8: **Government guarantees and off-balance PPPs in EU Member States (% of GDP, 2020)**
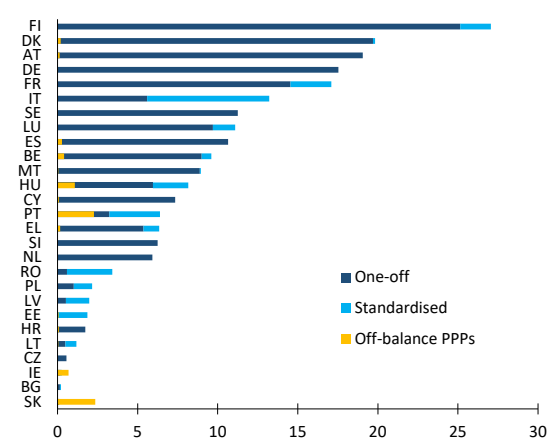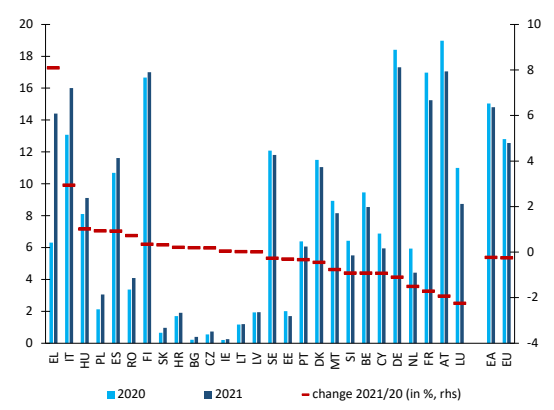

Source: Eurostat.

Government guarantees granted in the context of the COVID-19 crisis and recent developments

As a response to the COVID-19 crisis, Member States also provided significant liquidity support to households and businesses in the form of guarantees. During the COVID-19 crisis, the total stock of government guarantees for the EU as a whole increased from about 10% of GDP in 2019 to about 15% in 2020, and stabilised around that level in 2021. Large differences exist across Member States. While in 2021 increases were still recorded in Greece (about 8 pps. of GDP), Italy (about 3 pps.), and Hungary (1 pp.), the stock of guarantees in the remaining Member States has either stabilised (with a rise by less than 1 pp. of GDP) or decreased. The highest decrease in Luxembourg (-2.4 pps.), Austria (about -2 pps.), France (-1.7 pps.) and Netherlands (-1.5 pps.) (see Graph 4.8). Hence, the surge in government guarantees remained contained in most cases, and overall lower than during the Global Financial Crisis. It is worth noting that while the COVID-19 related guarantees schemes have expired in the course on 2020-21, some of the guarantees granted to sustain economic activity and sectors particularly hit by the pandemic might still be called over the near future and eventually be reflected in public debt and deficits, except in case of standardised guarantees.

Graph 4.9: **Stock of government guarantees (level and change 2021/20)**

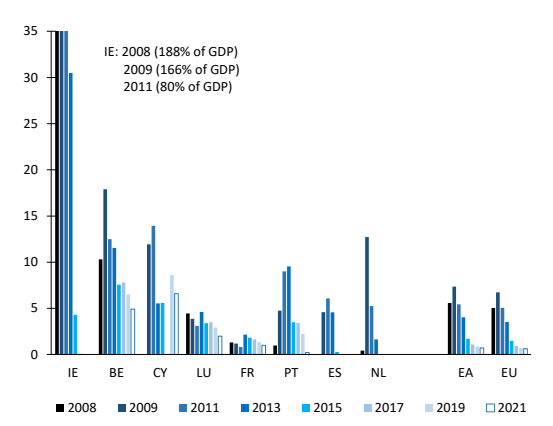(1) The 2021/20 change shown on the RHS also captures the dominator effect (GDP drop in 2020).
Source: Eurostat.

Graph 4.10: **Contingent liabilities linked to the financial sector interventions in the EU (2008-2021)**

Source: Eurostat.

Contingent liabilities and associated fiscal risks are expected to continue to ease in 2023. Government guarantees constituted an important part of support measures in response to the COVID-19 crisis. The reporting in the 2023 Draft Budgetary Plans highlights that the level of contingent liabilities has declined since 2021, as most of these government guarantee schemes have expired in the course of 2021 and 2022. Thus, no new COVID-19 related guarantees could be issued, while the guarantees granted in that context could still be in place for the near future. Furthermore, the cumulative issuance of guarantees linked to COVID-19 since 2020 is considerably lower than during the Global Financial Crisis. Nevertheless, the issuance of public guarantees in 2020 and 2021, including the COVID-19 related ones, has visibly affected the level of outstanding contingent liabilities in a number of Member States, particularly in Italy, Spain, France, Germany, Austria, Netherlands and Finland. ([66])

([66]) See European Commission (2022), Communication from the Commission to the European Parliament, the Council, and the European Central Bank on the 2023 Draft Budgetary Plans: Overall Assessment, COM (2022), 900 final, November.

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 Global Financial Crisis (GFC), the financial exposure of the government due to the financial stability schemes has been declining since 2013 in most Member States and in some countries already since 2012 (see Graph 4.10). In 2021, the contingent liabilities linked to financial stability schemes were close to zero in most Member States. Exceptions are Greece (10% of GDP), Cyprus (close to 7%), Belgium (5%), Luxembourg (2%) and France (1%). The lower level of 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 and that the creation of the Banking Union and its bank resolution framework provides a credible alternative to direct public support. Though going forward, the full impact of the recent crises on financial institutions remains uncertain, for instance because some COVID-19 related guarantees might still be called (see next section).

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

A snapshot overview

In order to complement the analysis of potential (implicit) contingent liabilities, additional information is provided related to the banking sector. This consists of a heat map reporting values of variables that indirectly capture potential building risks in the banking sector and that have proven in the past to be good leading indicators of banking – fiscal crises. Adverse developments in terms of private sector credit flows, bank loan-to-deposit ratios, non-performing loans and house prices, can represent substantial risks to the government's financial position in the future and thus give rise to contingent liabilities, though recent regulation, notably under the Banking Union, helps mitigate such risks.

Key financial indicators point to contained vulnerabilities, though it is challenging to assess the precise impact of the recent crises on credit quality. Overall, recorded non-performing loans (NPLs) ratios declined over the past years (see also Graph 4.11). Between mid-2021 and mid-2022, NPLs ratios continued to decline in most Member States, with more sizeable reductions in Greece (-9.6 pps.), Cyprus (-5.5 pps.), Bulgaria (-2.9 pps.), Italy (-1.1 pps.), Ireland (-1.0 pps.), and Croatia (1.0 pps) (⁶⁷). As of 2022Q2, the NPL coverage ratio shows that in the majority of Member States, NPLs are provisioned for in proportions of at least one third. Only in few cases (see Table 4.3), NPLs appear both high as a share of total loans, and provisioned for a level lower than 33% (i.e. Ireland – at 30.5% -, Cyprus – at 28.5% - and Malta – at 28.3%). 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, Finland and Luxembourg. Finally, risks on developments of private sector credit flows and house prices have increased in most Member States in light of the growth recovery in 2021 and the related pick up of investment. In few cases high risks stem from both the credit flow to the private sector and the change in the nominal house price index (i.e. Luxembourg, Hungary and Netherlands).

(⁶⁷) This overall declining trend is also confirmed by ECB data.

Table 4.3: **Potential triggers for contingent liabilities from the banking sector**

	Private sector credit flow (% GDP)	Bank loan-to-deposit ratio (%)	NPL ratio (% of total gross loans)	NPL ratio change (pps.)	NPL coverage ratio (%)	House price nominal index change (%)
BE	3.8	98.3	1.4	-0.3	44.3	7.1
BG	4.4	72.4	3.5	-2.9	65.7	8.7
CZ	2.9	78.3	1.2	-0.2	53.5	19.7
DK	12.3	311.8	1.5	-0.6	27.3	11.7
DE	5.7	123.8	1.0	-0.1	35.3	11.5
EE	6.5	99.8	0.7	-0.4	29.5	15.1
IE	2.6	72.5	2.4	-1.0	30.5	8.3
EL	-0.1	61.8	5.2	-9.6	41.8	7.5
ES	2.5	102.0	2.8	-0.4	41.8	3.7
FR	6.5	108.5	1.8	-0.2	48.6	6.3
HR	3.0	62.5	2.9	-1.0	62.6	7.3
IT	3.3	92.3	2.6	-1.1	52.7	2.6
CY	4.3	51.9	3.6	-5.5	28.5	-3.4
LV	0.9	70.3	0.6	-1.1	36.4	10.9
LT	5.9	68.5	0.9	0.0	38.5	16.1
LU	53.9	143.5	1.3	-0.1	29.9	13.9
HU	12.7	79.4	3.7	0.1	63.9	16.5
MT	9.4	52.5	2.6	-0.6	28.3	5.1
NL	11.7	115.8	1.3	-0.4	25.7	15.0
AT	7.4	96.2	1.8	-0.1	49.7	12.4
PL	4.0	83.6	4.3	-0.9	53.9	9.2
PT	4.0	73.3	3.3	-0.9	70.0	9.4
RO	3.8	63.2	2.9	-0.9	40.1	4.4
SI	3.5	69.4	2.2	-0.5	66.2	11.5
SK	5.5	111.5	1.5	-0.3	43.8	6.4
FI	6.1	162.5	1.1	-0.3	30.2	4.6
SE	16.6	166.8	0.3	-0.1	51.3	10.1

(1) Upper and lower thresholds (see Annex A4): (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 13.2%, 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 (2021– for private sector credit flows and change in house price nominal index), EBA (June 2022 – for other variables reported).

Caution is however warranted in interpreting these developments as the magnitude of the negative impact of the recent crises on banks' balance sheets remains uncertain. As explained in the next section, figures and risk indicators are affected by public support measures adopted by Member States (in particular, the introduction of loan moratoria and public guarantee schemes) and by monetary policy measures. (⁶⁸) The borrower relief and liquidity support measures have mitigated the impact of the pandemic on bank balance sheets, so that an increase in NPLs may have been deferred until the support measures would be phased out because of the recourse to moratoria for instance. (⁶⁹) This should be borne in mind when interpreting recent figures and inferring the impact of the crisis (and of mitigating measures) on credit risk.

(⁶⁸) For a detailed discussion of this point see for instance European Commission, ECB, SRB (2021), Monitoring report on risk reduction indicators, November 2021.
(⁶⁹) See European Commission, ECB, SRB (2021), Monitoring report on risk reduction indicators, May 2021.

Graph 4.11: **Non-performing loans ratio in the EU and selected countries (% of total loans)**
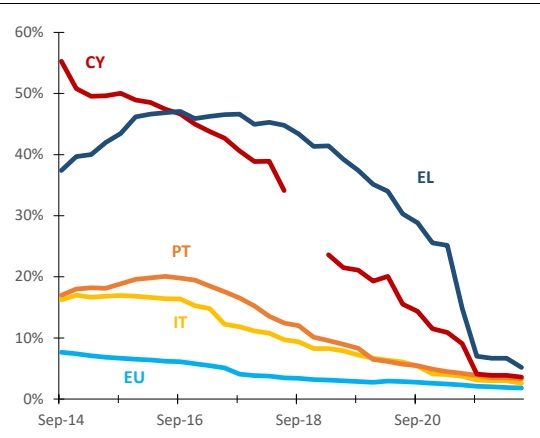
Source: EBA.

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 the SYMBOL model, estimates implicit contingent liabilities (and related losses) using bank stress scenarios'.

The COVID-19 pandemic has been a stress test for both the European banking system and the European bank crisis management framework. While evidence suggests that banks have remained resilient during the pandemic, validating past regulatory reform efforts, some financial stability risks remain as the uncertainty surrounding the banking sector outlook remains high. The COVID-19 pandemic has directly affected public finances and has resulted in significant increases in public debt levels, calling for targeted measures to avoid the onset of an adverse bank-sovereign 'doom loop' as seen in the past crisis. The effort made at the EU level with the NextGenerationEU, the largest stimulus package in the history of the Union, supported substantially the recovery from a challenging macroeconomic situation.

Gauging the effect of the crisis on the banking sector is challenging as measures to offset its impact may affect the interpretability of available information. As such, in 2020, the

EBA, the Commission, the ECB and the SRB ([70]) performed a useful assessments of the impact of COVID-19 on the EU banking sector, which showed a significant impact on asset quality and on non-performing loans developments.

The potential impact of the banks' losses on public finances ([71]) presented here is estimated using Systemic Model of Banking Originated Losses (SYMBOL). The 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, SYMBOL ([72]) uses

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([70]) See EBA (2020), The EU banking sector: First insights into the COVID-19 impacts, *Thematic Note*, No. 17/2020 and European Commission, ECB, SRB (2021), Monitoring report on risk reduction indicators, May 2021.

([71]) Second-round effects, which would be linked to the fiscal consequences of possible bank failures, are not taken into account. As explained in Part 5.2.2 and in Part IV of European Commission (2016), Fiscal Sustainability Report 2015, *European Economy Institutional Paper*, No. 018 and in Chapter 2 of European Commission (2011), Public Finances in EMU 2011, *European Economy*, No. 3/2011, the relationship between the government's budget and banks' balance sheets is not uni-directional 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.

([72]) More details are reported in European Commission (2016), Fiscal Sustainability Report 2015, *European Economy Institutional Paper*, No. 018. SYMBOL has been used by the European Commission for the ex-ante quantitative impact assessment of several legislative proposals (see Marchesi, M., Petracco Giudici, M., Cariboni, J., Zedda, S., and Campolongo, F. (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; European Commission (2011), Commission staff working document - impact assessment accompanying the proposal for a directive of the European Parliament and of the Council establishing a framework for the recovery and resolution, SWD(2012) 166 final; 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*, 78882; Cannas, G., Cariboni, J., Naltsidis, M., Pagano, A., and Petracco Giudici, M. (2013), 2012 EU 27 banking sector database and SYMBOL simulations analyses, *JRC Scientific and Technical Report*, 86395; Cariboni J., Di Girolamo, F., Maccaferri, S., and Petracco Giudici, M. (2015), Assessing the potential reduction of DGS funds according to Article 10(6) of Directive 2014/49/EU: a simulation approach based on the Commission SYMBOL model, *JRC Technical report*, 95181), for the cumulative evaluation of the entire financial regulation agenda (ERFRA, European Commission, (2014), Commission staff working document – Economic

unconsolidated 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. In particular, to account for the crisis environment, the SYMBOL assessment incorporates stress test results provided by the institutions mentioned above, and reports results under both a baseline and a stressed scenario (as done in the previous reports) ([73]).

The model estimates the potential residual costs on government budgets after all layers of the legal safety net available (capital, bail-in, resolution funds) have been deployed. The contingent liabilities due to a potential banking crisis are then split in government deficit and gross public debt. The implicit contingent liabilities that arise from the total funding needs, represented by the losses in excess of capital and recapitalisation needs at 10.5% of the Risk Weighted Assets (RWA) ([74]), are estimated for the short term and for the long term (ten year forward) scenarios (see Table 4.4 for the results and Annex A9 for details on the methodology). On the one hand, 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 public deficit and debt. On the other hand, recapitalisation is deemed to be recoverable, since capital injection is done in exchange of shares (partial government ownership of the bank) being recorded as a financial

transaction does not affect the deficit, but impacts (gross) debt through the stock-flow adjustment ([75]).

The COVID-19 outbreak posed a challenge to public finances by disrupting economies, though financial stability prevailed. Financial reforms adopted after the great financial crisis strengthened banks risk management processes, helping address the current challenge. This also helped preserve banks' credit flows to households, small businesses and corporates, cushioning the impact of the crisis and supporting the economic recovery ([76]). Coupled with direct government support to households and businesses ([77]), the improved regulatory environment mitigated the impact of the health crisis on bank balance sheets. Yet, a risk of a delayed adverse impact on the financial position of banks (e.g. non-performing loans) remains, notably as government support measures are now partially phased out. Moreover, the current energy crisis, and the changing macro-financial environment represent a new challenge for the banking sector.

The analysis in this section aims at quantifying the potential impact of a systemic banking crisis on public finances. As the estimates are based on 2021 data still affected by the COVID-19 crisis, the model was adapted to reflect the increased risk of bank losses, given the fact that government and other supportive measures were temporary. Thus, to assess properly the potential impact of a systemic banking crisis on public finances with

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review of the financial regulation agenda) and for the estimation of contingent liabilities linked to public support to the EU banking sector (European Commission (2011), Report on public finances in EMU (2011), *European Economy*, No. 3; European Commission (2012), Fiscal sustainability report, *European Economy*, No. 8; European Commission (2016), Fiscal sustainability report 2015, *European Economy Institutional Paper*, No. 018; Benczur, P., Berti, K., Cariboni, J., Di Girolamo, F. E., Langedijk, S., Pagano, A., and Petracco Giudici, M. (2015), Banking stress scenarios for public debt projections, *Economic Papers*, No. 548).

([73]) This particular implementation of SYMBOL, tailored for the treatment of the COVID-19 environment, is detailed in Bellia, M., Di Girolamo, F.E., Orlandi, F., Pagano, A., Pamies, S. and Petracco Giudici, M. (forthcoming 2023), Assessing risks for public finances stemming from banks in volatile times, European Commission Discussion Paper.

([74]) Risk-weighted assets refers to the risk exposure amounts. It are used to determine the minimum amount of regulatory capital that must be held by banks to maintain their solvency. This minimum is based on a risk assessment for each type of bank risk exposure. The riskier the asset, the higher the RWAs and the greater the amount of regulatory capital required.

([75]) 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 Decision and the earlier July 2009 Decision).

([76]) Macroprudential authorities, supervisors and macroprudential oversight bodies have allowed banks to release capital buffers, to defer the recognition of bad loans, and have recommended them to refrain from paying dividends with the final goal to deal with the consequences of the COVID-19 shock and provide lending to companies and households. These extraordinary measures has been terminated as of 10 February 2022, see FAQs on ECB supervisory measures in reaction to the coronavirus.

([77]) By the end of 2021, both EBA and ESRB data pointed to a substantial amount (around €400bln) of loans benefitting from (an uptake of) public guarantees, while moratoria measures has been suspended. However, there is a considerable stock of loans with expired moratoria (around €750bln) which might become problematic in the near future (see Box 4.1).

SYMBOL, several data adjustments were made in the baseline linked to the Covid-19 crisis to avoid underestimating potential bank losses in the estimates, and are notably based on the results of the EBA stress test (for the short-term scenario). These adjustments are presented in greater detail in Box 4.1. ([78]) Moreover, while loans under public guarantees are booked in the banks' balance sheet at a risk weight of zero, RWAs were adjusted assuming such (new) loans have average riskiness to avoid understating the risks of such loans due to the COVID-19 environment. In addition, in the SYMBOL simulations, losses associated to loans guaranteed by the state are directly transferred to public debt (without passing through the safety net cascade).

As in previous reports, only short-term effects of NPLs on the banking sector are considered in the baseline ([79]), **as their effect is assumed to become negligible over the long-term.** However, an adjustment is introduced to reflect an assumed delaying of adverse NPL developments due to moratoria ([80]). Specifically, the reported NPLs amount was adjusted by adding to it the amount of Stage 2 loans under moratoria, indicating that the latter loans could become non-performing in the near future ([81]). This adjustment reflects this by assuming that Stage 2 loans that are under moratoria or expired moratoria would eventually become NPLs (see Box 4.1).

The (adjusted amount of) NPLs is treated as in the previous reports. The baseline short-term scenario reflects how insufficient provisioning for NPLs may lead to overestimation of capital and to underestimation of potential losses in a banking crisis ([82]). The baseline modelling assumption is that non-collateralised NPLs count as loan losses for the system, while those that are collateralised (by immovable property) are redeemable subject to a recovery rate ([83]). Specifically, for each bank i and each country j, potential loans losses from NPLs are computed as follows:

$$NPLs\ Losses_{i.j} = \left(1 - CollShares_{i.j}\right) \times NPLs_{i.j} \\ + CollShares_j \times NPLs_{i.j} \\ \times \left(1 - RR_j\right) - Provisions_{i.j}$$

where RR is the recovery rate ([84]). *CollShares* represent the proportion of total loans covered by collateral, i.e. implicitly assuming that this proportion is also representative for the subset of NPLs ([85]). Provisions and NPLs are the amount of provisions and gross non-performing loans declared by banks in their balance sheet. The extra loan losses that come from the 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. ([86])

The approach used can be described as follows: i) The results are calibrated to match the severity of the 2008-2012 crisis, i.e. a severe and systemic crisis event, in line with the crisis event defined in

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([78]) See also Bellia, M., Di Girolamo, F.E., Orlandi, F., Pagano, A., Pamies, S. and Petracco Giudici, M. (forthcoming 2023), Assessing risks for public finances stemming from banks in volatile times, European Commission Discussion Paper.

([79]) To recall in the baseline the correlation among banks is fixed to 0.5 and the NPL recovery rate is fixed per country.

([80]) The ECB introduced a specific package concerning the treatment of NPLs, allowing banks to exercise flexibility for the classification of the debtors in the case of exposures covered by moratoria. See for details Budnik, K.B., Dimitrov, I., Groß, J., Jancoková, M., Lampe, M., Sorvillo, B., Stular, A. and Volk, M. (2021), Policies in support of lending following the coronavirus (COVID-19) pandemic, *ECB Occasional Paper Series*, No. 257. This package, together with other measures, has been terminated as of 10 February 2022, thus after our sample period (which is related to end-2021 balance sheet data).

([81]) Using EBA aggregated data on loans under moratoria and under Stage 2.

([82]) The strong reduction in the NPL ratios might also be due to an increase in lending by banks (i.e. dominator effect). EBA data show that the gross loans increased by 7% between 2020Q4 and 2021Q1 in their EU sample. In addition, the new regulation on the prudential backstop for non performing exposures is not taken into account in the current set up.

([83]) Note that this approach may entail a bias of different kind (and sign) depending on the circumstances and the type of loans – e.g. in the of difficult foreclosure of household mortgages (leading to loss underestimation) or when household's mortgages command better recovery rates than applicable to firms (leading to loss overestimation).

([84]) Based on country data provided by the World Banks in its flagship report "Doing Business 2020" available here.

([85]) Based on ECB data.

([86]) As explained in the Annex 9, in case of a financial crisis there will be losses due to defaults from the private sector (before any safety net intervention). These losses are estimated by the probability of default of the portfolio of the bank related to credit risk. After safety net intervention, there could be extra losses among which those coming from NPLs. For more details see Bellia M., Di Girolamo, F.E., Orlandi, F., Pagano, A., Pamies, S. and Petracco Giudici, M. (forthcoming 2023), Assessing risks for public finances stemming from banks in volatile times, European Commission Discussion Paper.

previous reports. ([87]). ii) Second, as indicated above, the impact of (existing) NPLs is considered only in the short term. ([88]) iii) Third, a (conservative) assumption is made, whereby all simulated banks' excess losses and recapitalisation needs that cannot be covered by the safety net fall on public finances. iv) Fourth, the safety net is assumed to prevent the onset of any contagion effects ([89]). v) Finally, in the main scenario, non-significant banks are liquidated, and significant banks might be recapitalised or liquidated. This assumption is consistent with the fact that entities under direct ECB supervision do not go automatically into resolution, as the SRB decides on a case-by-case basis the resolution of the bank. ([90]).

The stressed scenario is constructed with the following features: as in previous reports, to

mimic a fire sales mechanism, increased asset correlation is calibrated in line with the importance of common shocks. During a 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. As in previous reports, NPL losses are modelled by 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 to clean up balance sheets. As pointed out before, the amount of NPL is increased to take into account the current moratoria on loans.

Under all scenarios, the required level of recapitalisation is set at 10.5% of RWA for each bank. This represents the minimum level of capital and capital conservation buffer set by the CRDIV. The extra capital buffers built for G-SIIs are also to be recapitalised. ([91])

Under the short-term (2022) baseline scenario ([92]), the expected budgetary impact of a major crisis ([93]) seems negligible for most Member States with losses and recapitalisation needs generally not exceeding 1% of the GDP (see Table 4.4). Highest figures are recorded for Luxembourg (2% of GDP). Similarly, in the long-term (2032) baseline scenario, where current NPL stocks' effects are assumed negligible, final losses are negligible for all countries. Hence, under the baseline, results show that the risk that contingent liabilities has a significant impact on public finances under the short-term and long-term baseline is limited.

Under the (stressed) scenario, more serious adverse results are expected with combined

([87]) 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 (2014), State Aid Scoreboard 2014, and Benczur, P., Berti, K., Cariboni, J., Di Girolamo, F.E., Langedijk, S., Pagano, A. and Petracco Giudici, M. (2015), Banking stress scenarios for public debt projections, *Economic Papers*, No. 548.

([88]) SYMBOL models NPLs not covered by collateration or provisions. In addition, the analysis includes the analysis the potential impact of stage 2 loans, which might become NPLs in the worse case scenario. In the SYMBOL framework, this is a short-term one-off effect as over the long run banks will recognise this NPLs, write-off part of the credits and clean up the balance sheet such that this NPL effect would not persist over time.

([89]) Potential contagion across banks through bail-in (some of the losses absorbed by the safety net re-entering the banking system) is disregarded due to scarce data. Contagion across Global Systemically Important Banks (or 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.

([90]) Please note that (i) in practice, most of the SRB's banks (82% of the total number of SRB banks accounting for 97% of total exposure at risk) are earmarked for resolution. In contrast, liquidation is foreseen for 18% of the banks, which account for 3% of total exposure at risk, mostly made up of public development banks and smaller banks with a specific business model. (2022-07-13_SRB-Resolvability-Assessment.pdf (europa.eu)). (ii) 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 supposed to go into liquidation. More details can be found in detailed in Bellia M., Di Girolamo F.E., Orlandi, F., Pagano, A., Pamies, S. and Petracco Giudici, M. (forthcoming 2023), Assessing risks for public finances stemming from banks in volatile times, European Commission Discussion Paper.

([91]) O-SIIs buffers are not taken into account due to unavailability of data and technical limitation in identifying the subsidiaries of all OSI.

([92]) With loans under public guarantees, moratoria, NPLs and Regulatory Capital reflecting data up to 2021Q3, provided by EBA.

([93]) That is impact due to excess bank losses and recapitalisation needs, after cascade intervention of regulatory tools.

losses and recapitalisation needs reaching up to 2-3% of GDP in some Member States, and up to 8% of GDP in one country. ([94]) In the short-term, the largest effects are witnessed for Cyprus (3.2% of GDP), Spain (1.8%), Greece (2.0%) and Luxembourg (7.8%). In the long-term stressed scenario, only Spain (1.0% of GDP) and Luxembourg (5.4%) have losses that exceed 1% of GDP, although linked to recapitalisation needs rather than excess losses, which partly reflects the large size of the banking sector in these countries.

Only in few countries, in case of a systemic banking crisis, related implicit contingent liabilities are likely to have an impact on public finances greater than 3% of GDP (Table 4.5). ([95]) The colour coding of the heat map reflects the relative magnitude of the theoretical probabilities of such an event (see Annex A9 for the details of heat map calculation and calibration). In the short-term, contingent liabilities would not have a potentially significant impact on public finances, under the baseline scenario for any Member States but Luxembourg. Under the more extreme (stressed) scenario, some Member States (i.e. Luxembourg, Cyprus, Greece, Spain and Portugal) post some probability of their public finances being hit by losses of (at least) 3% of GDP. Over the long-term, only for Luxembourg contingent liabilities would signal a potentially significant impact on public finances under the stressed scenario.

([94]) While in the baseline scenario, the correlation among banks is fixed to 0.5 and the NPL recovery rate is fixed per country, in the stressed scenario the correlation and the NPL recovery rate vary with the realisation of the common factor (i.e. the higher the realisation of the common factor, the higher the correlation between banks and lower the recovery rate). In addition, in the stressed scenario.

([95]) 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.

Table 4.4: **Implicit contingent liabilities from banks' excess losses and recapitalisation needs under alternative scenarios (% GDP 2021)**

Scenarios:	Initial (2023) short term scenarios				Final (2033) long term scenarios			
	Baseline (a)		Stressed (b)		Baseline (a)		Stressed (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%	0.1%	0.7%	0.0%	0.1%	0.0%	0.5%
BG	0.0%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.1%
CZ	0.0%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.2%
DK	0.0%	0.2%	0.1%	0.7%	0.0%	0.1%	0.1%	0.7%
DE	0.0%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.2%
EE	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%
IE	0.0%	0.2%	0.1%	1.0%	0.0%	0.1%	0.1%	0.5%
EL	0.1%	0.5%	0.3%	2.0%	0.0%	0.0%	0.0%	0.4%
ES	0.2%	0.4%	0.4%	1.8%	0.0%	0.1%	0.1%	1.0%
FR	0.1%	0.3%	0.3%	1.2%	0.0%	0.1%	0.1%	0.8%
HR	0.0%	0.1%	0.0%	0.3%	0.0%	0.0%	0.0%	0.2%
IT	0.2%	0.3%	0.4%	1.4%	0.0%	0.1%	0.1%	0.6%
CY	0.0%	0.4%	0.3%	3.2%	0.0%	0.0%	0.1%	0.4%
LV	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%
LT	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%
LU	0.1%	1.9%	0.3%	7.8%	0.0%	0.7%	0.2%	5.4%
HU	0.0%	0.1%	0.0%	0.3%	0.0%	0.1%	0.0%	0.3%
MT	0.1%	0.1%	0.2%	0.7%	0.0%	0.0%	0.0%	0.3%
NL	0.0%	0.2%	0.1%	0.9%	0.0%	0.1%	0.1%	0.7%
AT	0.0%	0.2%	0.1%	1.0%	0.0%	0.1%	0.0%	0.5%
PL	0.1%	0.4%	0.2%	1.6%	0.0%	0.1%	0.0%	0.6%
PT	0.1%	0.3%	0.3%	1.8%	0.0%	0.1%	0.1%	0.7%
RO	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.1%
SI	0.0%	0.1%	0.1%	0.6%	0.0%	0.0%	0.0%	0.4%
SK	0.0%	0.7%	0.1%	1.6%	0.0%	0.2%	0.0%	0.8%
FI	0.0%	0.1%	0.1%	0.4%	0.0%	0.0%	0.0%	0.3%
SE	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%

Source: Commission services.

Table 4.5: **Theoretical probabilities of public finances being hit by more than 3% of GDP in the event of a severe crisis**

	Initial (2023) short-term scenarios		Final (2033) long-term scenarios	
	Baseline (a)	Stressed (b)	Baseline (a)	Stressed (b)
BE	0.02%	0.38%	0.02%	0.29%
BG	0.01%	0.09%	0.00%	0.04%
CZ	0.01%	0.14%	0.01%	0.12%
DK	0.19%	0.55%	0.05%	0.50%
DE	0.01%	0.12%	0.00%	0.10%
EE	0.00%	0.02%	0.00%	0.01%
IE	0.06%	0.65%	0.03%	0.32%
EL	0.11%	1.50%	0.01%	0.23%
ES	0.15%	1.28%	0.06%	0.67%
FR	0.06%	0.65%	0.02%	0.45%
HR	0.00%	0.09%	0.00%	0.07%
IT	0.06%	0.79%	0.02%	0.29%
CY	0.15%	2.50%	0.02%	0.30%
LV	0.00%	0.02%	0.00%	0.02%
LT	0.01%	0.03%	0.00%	0.02%
LU	1.45%	5.62%	0.36%	3.26%
HU	0.02%	0.12%	0.01%	0.11%
MT	0.04%	0.46%	0.01%	0.22%
NL	0.08%	0.59%	0.02%	0.43%
AT	0.01%	0.43%	0.00%	0.22%
PL	0.02%	0.80%	0.01%	0.22%
PT	0.07%	1.18%	0.03%	0.43%
RO	0.00%	0.02%	0.00%	0.02%
SI	0.00%	0.21%	0.00%	0.15%
SK	0.04%	0.71%	0.01%	0.23%
FI	0.03%	0.29%	0.02%	0.23%
SE	0.03%	0.07%	0.01%	0.06%

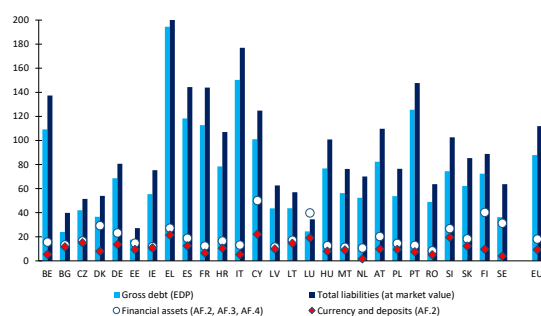Green: low risk (probability lower than 0.50%); Yellow: medium risk (probability between 0.50% and 1%); Red: high risk (probability higher than 1%).
Source: Commission services.

4.3.   GOVERNMENT ASSETS AND NET DEBT

In 2021, the net debt ([96]) in the EU was about 18 pps. of GDP lower than gross debt, with sizeable differences across Member States. This essentially reflects the large variation of government financial assets across Member States, which is due to the set-up of pension systems, the past realisation 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 Sweden, Finland, Luxembourg and Cyprus (see Graph 4.12) and 20-30 pps. in the cases of Austria, Germany, Greece, Slovenia and Denmark. For Luxembourg, among the Member States with the lowest gross debt, net debt is even negative as the value of financial assets exceeds the outstanding government debt at face value. The difference between gross and net debt is less than 10 pps. of GDP for Romania. Among the Member States considered, for those with the highest government debt, i.e. Greece, Italy, Portugal, Spain and France, net debt is around 15 pps. of GDP lower than gross debt (though for Greece, the difference is higher at about 27 pps. of GDP due to large cash buffers). 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.

In most Member States gross and net debt ratios have increased over the past decade (see Graph 4.13). In the majority of Member States, debt increased under both gross and net terms over the last decade. In Malta, Hungary, Germany and Sweden, both gross and net debt ratios decreased between 2009 and 2021. A large (positive) difference between changes in gross and net debt is found for Cyprus. In this country, gross debt rose by about 50 pps. of GDP between 2009 and 2021, while over the same period, net debt only increased by 6 pps. of GDP. 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 the private sector.

Graph 4.13:   **Change in gross and net government debt ratio (pps. of GDP, 2009-21)**

(1) The following financial assets are considered for the calculations of net debt: currency and deposits (AF.2), debt securities (AF.3) and loans (AF.4).
Source: Commission services based on Eurostat.

Graph 4.12:   **Gross debt, total liabilities and financial assets in 2021 (% of GDP)**
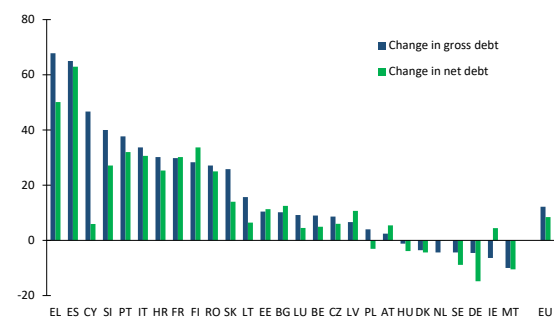

Source: Commission services based on Eurostat.

([96])   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 4.1: Details on SYMBOL, RWA, guarantees and moratoria

This box presents adjustments to the SYMBOL-based analysis to address specificities in the aftermath of the COVID-19 crisis ([1]), whose economic and financial consequences are still present. The COVID-19 crisis and associated government measures had a significant impact on a set of key indicators of the SYMBOL-based analysis. In order to consider this, adjustments were introduced in the form of the treatment of information related to risk weighted assets (RWA), loans under public guarantees and loans under (expired) moratoria.

1. REGULATORY MEASURES AND REPRESENTATIVENESS OF THE ACTUAL RISK WEIGHTED ASSETS

Balance sheet data for Q4 2021 show that the riskiness of bank's portfolios declined in 2020, although to a smaller extent than in 2019. The riskiness of banks' portfolios can be measured with the density of RWA. At EU level, this density declined from 40.9% in 2018 to 37.6% in 2020 and 36% in 2021. Given the strong economic downturn due to the COVID-19 crisis, this development is likely to be driven by the exceptional measures put in place by the regulators, which have a substantial impact on internal risk evaluation for reporting purposes. As such, reported RWAs by banks potentially underestimate the actual riskiness of banks' portfolios.

To account for a potential bias on the reported RWAs, a correction to the RWA coefficients were applied in line with the adverse scenario by the EBA stress test ([2]).

The EBA performed a stress test exercise to evaluate the impact of adverse market developments on banks, under a baseline and an adverse scenario at different time horizons (from end of 2021 to end of 2023). The correction applied to RWAs ensure that,

in the short term, riskiness of banks are in line with the adverse scenario depicted by EBA.

The impact of this correction on RWAs levels can be quite sizeable (see Table 1**).** The average increase of the RWAs of banks in the EU is around 8%. However, for some Member States (e.g. Denmark, the Netherlands, France and Germany) RWAs would increase by more than 10%. For this exercise, the end-2022 stress test correction, which is more severe with respect to the end-2021 correction used in the previous exercise, is considered to capture the heightened uncertainty of the economic context. For some Member States, the corrected RWAs density in 2021 remain lower than the year before (see Graph 1).

Table 1: **EBA stress test-based adjustments of RWAs (deviations from baseline, end of 2022)**

BE	6.2%	LT	8.0%
BG	8.0%	LU	8.0%
CZ	8.0%	HU	8.2%
DK	17.0%	MT	8.0%
DE	11.9%	NL	16.4%
EE	8.0%	AT	8.5%
IE	2.7%	PL	3.6%
EL	8.0%	PT	0.8%
ES	2.7%	RO	8.0%
FR	13.5%	SI	8.0%
HR	8.0%	SK	8.0%
IT	4.5%	FI	7.0%
CY	8.0%	SE	9.4%
LV	8.0%		

(1) Percentage change adjustment of RWAs based on adverse EBA scenario (end of 2022).
(2) In red, missing data replaced by standard assumption: we assume average increase of available data for the Member States included in the stress test exercise.
***Source:*** Commission services based on EBA stress test data (2021).

([1]) The analysis presented here is based on Bellia M., Di Girolamo F. E., Orlandi F., Pagano A., Pamies S. and Petracco Giudici M., 'Assessing risks for public finances stemming from banks in volatile times", European Commission Discussion paper (forthcoming 2023).

([2]) The EBA stress test, released on 30 July 2021, contains data for 50 banks from 15 EU and EEA countries, covering around 70% of the EU banking sector assets, (see https://www.eba.europa.eu/risk-analysis-and-data/eu-wide-stress-testing .

(Continued on the next page)

Box (continued)

Graph 1: **Risk-weighted assets (RWA) density comparison**
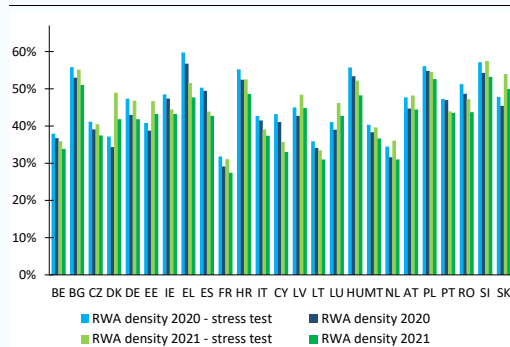
Source: Commission services.

2. PUBLIC GUARANTEES SCHEME

Loans guaranteed schemes by the government bear a zero risk weight in the banks' balance sheets, while losses on such loans would directly impact public finances. Since 2020, most Member States introduced programmes providing public guarantees to loans to support credit access for businesses severely impacted by the COVID-19 related containment measures. Risks associated to such loans, which might increase due to the crisis, would need to be properly reflected in the simulation of losses, via an adjustment of the banks' RWAs. The amount of guaranteed loansis substantial, totalling around EUR 400 bln at the end of 2021, which is larger than the year before (around EUR 350 bln). [3]

Under the assumption of an average risk weight for guaranteed loans, a measure of the increase in losses in SYMBOL simulations is performed. For this exercise, relying on EBA [4] aggregated data on new loans under guarantee as of Q4 2021, the adjustment proceeds in two steps (Table 2). First, for each bank in our sample we adjust the RWA, assuming that the new loans under guarantee bear same average riskiness as observed for other loans in the bank's portfolio. Second, SYMBOL is used to

[3] These values represent the amount of new loans under public guarantees for the sample of banks included in the EBA Risk Dashboard. Albeit the sample is quite representative, the amounts potentially underestimate the total loans guaranteed granted during 2021.

[4] Data for loans under guarantees come from the EBA risk dashboard, see https://www.eba.europa.eu/risk-analysis-and-data/risk-dashboard.

estimate the increased losses that these adjusted RWAs for all banks would imply.

The additional losses related to adjusted (*i.e.* increased) risk weight of loans under guarantee have a direct impact on public finances. As losses on guaranteed loans are covered by the guarantor (i.e. the state), the additional (gross) losses do not impact the capital of the institutions concerned. Instead, simulations directly transfer losses to deficit (excess losses) or debt (recapitalisation) [5].

Table 2: **Data related to adjustment of RWAs due to rescaling of guaranteed loans risks**

	RWA credit risk (EBA sample)	GL (EBA sample, excl. guarantees)	New loans guaranteed (EBA sample)	RWA (EBA sample)	New RWA (EBA sample)	Guarantee-based adjustment of RWAs
	EUR bn	EUR bn	EUR bn	EUR bn	EUR bn	%
	A	B	C	D	E = (A/B)*C	E/D
BE	329.3	969.7	1.2	393.8	0.4	0.1%
BG	18.8	31.3	0.4	20.5	0.2	1.1%
CZ	49.6	148.2	1.8	58.5	0.6	1.0%
DK	170.8	622.3	0.8	202.7	0.2	0.1%
DE	966.3	2,695.4	12.0	1,243.5	4.3	0.3%
EE	13.4	33.3	0.0	15.0	0.0	0.1%
IE	195.9	270.3	1.0	239.8	0.7	0.3%
EL	122.9	210.4	5.5	141.7	3.2	2.3%
ES	1,172.8	2,602.1	103.6	1,358.7	46.7	3.4%
FR	2,291.1	5,721.2	110.0	2,674.9	44.1	1.6%
HR	23.0	44.4	0.1	25.6	0.1	0.2%
IT	842.4	1,849.6	120.5	1,004.5	54.9	5.5%
CY	16.4	33.1	0.0	18.5	0.0	0.0%
LV	13.1	43.2	0.0	15.0	0.0	0.0%
LT	8.5	28.8	0.0	9.6	0.0	0.0%
LU	93.6	161.4	0.1	108.0	0.1	0.1%
HU	58.5	93.2	0.0	66.1	0.0	0.0%
MT	7.2	17.9	0.3	8.1	0.1	1.6%
NL	544.8	1,915.2	3.2	696.5	0.9	0.1%
AT	273.4	610.4	4.0	324.4	1.8	0.6%
PL	99.0	125.6	3.7	111.2	2.9	2.6%
PT	109.8	212.2	7.6	128.5	3.9	3.1%
RO	20.4	37.0	1.5	25.2	0.8	3.3%
SI	17.3	26.4	0.2	20.4	0.1	0.7%
SK	23.1	56.0	0.7	25.3	0.3	1.1%
FI	176.4	549.1	1.5	219.1	0.5	0.2%
SE	152.7	798.8	0.1	255.4	0.0	0.0%

Source: Commission services based on EBA data.

3. LOANS UNDER MORATORIA AND NPLS

NPLs, on average, have continued to decline in the almost all Member States since 2019 (see Graph 2). Part of this decline is due to the regulatory measures introduced following the COVID-19 pandemic, such as the allowed flexibility with regard to the classification of debtors in the event of

[5] Since the actual portfolio of loans includes both positions with and without guarantees, we subtract the guaranteed loans (with zero risk weight) from the total amount of gross loans to have an accurate representation of the riskiness for the banks' portfolio. The updated amount of gross loans serves as a reference to estimate the RWA amount for the credit risk without public guarantees.

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moratoria ([6]). All measures, including the ones related to capital and liquidity relief, as well as the restrictions on dividends and variable remuneration have been lifted on February 2022. ([7]) Although an overall decrease in the NPL ratio took place over the last few years, early warnings of credit risk deterioration has been detected, in particular for sectors particularly affected by the COVID-19 crisis. ([8])

Graph 2: **Recent NPL ratios (NPL over gross loans)**
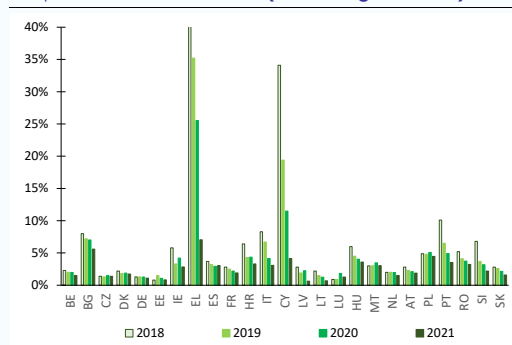
Source: Aggregated data from EBA risk dashboard.

To address the potential under-reporting of NPLs due to moratoria during the COVID-19

([6]) For the relevant requirements in relationship with legislative and non-legislative moratoria, see EBA "Guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis"

([7]) See FAQs on ECB supervisory measures in reaction to the coronavirus

([8]) See the EBA press release of 31 March 2021.

([9]) See the EBA press release of October 2021 "*Asset quality of exposures under moratoria and PGS deteriorated further*". In addition, see a publication by the Bank of Spain, which shows that the credit quality of loans linked to expired moratoria has deteriorated during 2021. In the same vein, the Bank of Italy reports that "*firms with moratoriums (expired or still outstanding at 31 December) had much higher actual riskiness levels than the other firms … This is consistent with the assumption that the riskiest firms would have applied for the longest suspension period possible*".

crisis, which still might affect the banks' balance sheets in 2021, *Stage 2* loans are considered. *Stage 2* loans identify loans where credit risk has increased significantly, though they are not yet registered as NPLs. EBA provides the following useful loan breakdown, per country (Table 3):

– Amount of loans that are under moratoria or where the moratoria has expired.
– Amount of loans that are in Stage 2.
– Amount of loans that are already non-performing.

Table 3 reports 2021 loans under (active or expired) moratoria in column B, while column C reports the amount of those loans that are also *Stage 2*. Several sources report that loans with moratoria (expired and not) might be riskier, and that the amount of *Stage 2* loans covered by moratoria (including expired ones) have substantially increased during 2021. ([9]) These *Stage 2* loans with moratoria (ongoing and expired) are seen as potential NPLs in a severe financial crisis, although their registering as such might be delayed by the fact that they were under moratoria. ([10]) The share of loans under moratoria that are also *Stage 2* is shown in column D. This

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([10]) As loans benefitting from moratoria are those to sectors particularly exposed to the COVID 19 shock, the assumption is that these loans could be particularly fragile in case of a severe crisis, and would be therefore more likely to transition to NPL status than to recover. In reality, it can be argued that not all *Stage 2* loans under (expired) moratoria will become NPLs but only a part of it, that most probably relates to the loans, which their maturity was extended before the pandemic and that were put under moratoria during the pandemic. Theoretically, it should be possible to infer the part of those loans that would become NPLs by defining a rescaling factor of the number of *Stage 2* loans based on the following information: (i) the loans, which maturity was extended before the pandemic and were put under moratoria, and have remained *Stage 2* loans when moratoria expired and; (ii) the new loans granted during the pandemic, which maturity was extended after 2020 and were put under moratoria, and have become *Stage 2* loans when moratoria expired. However, due to data availability it is not possible, to our knowledge, to compute such rescaling factor of Stage 2 loans such that all Stage 2 loans under expired and non-expired moratoria are considered for this exercise. This assumption might overestimate the amount of NPLs in normal situation. At the same time in a risk management perspective, it seems to be a suitable proxy in case of the severe financial crisis that it is considered here.

Box (continued)

share is around 30% on average, although significant difference exist for that proportion across countries.
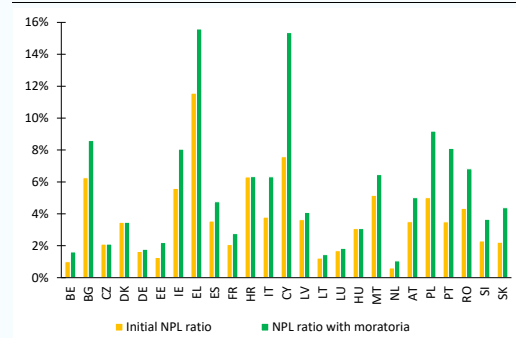
In a stress scenario using the SYMBOL model, we adjust the NPL stock by the share of loans that are *Stage 2* and are under ongoing or expired moratoria (Table 3, column E). This is a proxy for the idea that, in the case of a severe financial crisis, a country with a large share of *Stage 2* loans with ongoing or expired moratoria would be at a higher risk ending up with a larger amount of NPLs. ([11]) To illustrate this adjustment in terms of NPL amounts, Graph 4 report unadjusted and moratoria-adjusted NPLs.

Graph 3: **Impact of adjustment of NPL to account for delaying effect of moratoria**

Source: Aggregated data from Orbis Bankfocus and Commission services, references data 2021Q4.

Table 3: **Data related to adjustment of NPLs due to delayed effect of moratoria**

	Total Loans	Loans under moratoria (non expired and expired)	Loans under moratoria that are stage 2	Proportion of loans under moratoria that are stage 2	Increase in NPL
	EUR bn	EUR bn	EUR bn	%	%
	A	B	C	D = C/B	E=C/A
BE	970.8	33.7	5.9	0.2	0.0
BG	31.7	2.0	0.7	0.4	0.0
CZ	150.0	-	-	-	-
DK	623.1	-	-	-	-
DE	2,707.5	19.3	3.5	0.2	0.0
EE	33.3	0.6	0.3	0.5	0.0
IE	271.2	17.9	6.7	0.4	0.0
EL	215.8	21.8	8.7	0.4	0.0
ES	2,705.7	152.1	32.8	0.2	0.0
FR	5,831.2	198.6	39.7	0.2	0.0
HR	44.5	3.7	0.0	0.0	0.0
IT	1,970.1	145.4	49.9	0.3	0.0
CY	33.1	8.1	2.6	0.3	0.1
LV	43.2	0.7	0.2	0.3	0.0
LT	28.8	0.3	0.1	0.2	0.0
LU	161.5	2.6	0.2	0.1	0.0
HU	93.2	-	-	-	-
MT	18.2	1.1	0.2	0.2	0.0
NL	1,918.4	39.6	8.4	0.2	0.0
AT	614.4	24.5	9.3	0.4	0.0
PL	129.3	12.0	5.4	0.4	0.0
PT	219.8	33.8	10.1	0.3	0.0
RO	38.5	2.4	1.0	0.4	0.0
SI	26.6	2.0	0.4	0.2	0.0
SK	56.7	3.5	1.2	0.4	0.0
FI	550.7	7.1	0.2	0.0	0.0
SE	798.9	24.8	0.3	0.0	0.0

Source: Aggregated data from EBA risk dashboard, reference date 2021Q4, EUR bn.

([11]) It has to be stressed that a transition to NPL is due to a combination of current or past use of a COVID moratoria, being at stage 2, and a severe crisis (see also footnote 10 above). This is not a simple consequence of a moratoria, in line with EBA guidelines, since as long as moratoria are COVID related and only refer to deferral of payment dates, it should have no impact on evaluation of credit quality or definition of arrears or default.