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EUROPEAN ECONOMY

Economic and Financial Affairs

The **Quarterly Report on the Euro Area** is written by staff of the Directorate-General for Economic and Financial Affairs. It is intended to contribute to a better understanding of economic developments in the euro area and to improve the quality of the public debate surrounding the area's economic policy.

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Boxes

The recent surge in COVID-19 infections continues to dominate the economic outlook. Nevertheless, euro-area real GDP is forecast to grow by 5% in 2021 and gradually moderate to 2.4% in 2023, driven by a rebound in demand across Europe. Inflation is forecast to reach 2.4% in 2021 before decelerating to 1.4% in 2023 as energy prices are set to gradually level out as from the second half of next year and the imbalances between supply and demand gradually solve. While these forecasts are higher than we expected half a year ago, they remain clouded in uncertainty in the wake of lingering effects of the pandemic.

We need to continue to draw lessons from the effects of and policy responses to the COVID-19 pandemic. Thus, this issue of the Quarterly Report on the Euro Area (QREA) first analyses the extent to which the tax-benefit systems of the euro area Member States have protected household incomes during the COVID-19 pandemic. Next, the QREA examines the pandemic's impact on gross fixed capital formation (GFCF). As the pandemic is leaving a legacy of increased public debt while the need for policy support is not yet over, the next two sections focus on fiscal issues beyond the crisis response. The third section shows how reforms of recurrent taxes on residential property can be an important element of the tax mix to promote growth, the green transition and temper income inequality. The last section provides further evidence of the non-linear impact of government debt on sovereign interest rate spread across the euro area. As usual, a short summary of recent policy developments in the euro area concludes the QREA.

The pandemic sheds light on the ability of tax-benefit policies to protect household incomes. These policies include short-term work schemes paid directly to workers and subsidies to firms if these directly cover part of workers' salaries. Most euro-area countries experienced a significant fall in market incomes, with poorer households being hit the hardest. However, empirical analysis, based on the microsimulation model EUROMOD, suggests that the tax-benefit systems of those countries have helped to absorb a significant share of the COVID-19 shock, offsetting – or alleviating – its regressive nature on market incomes.

The pandemic has had a significant impact on gross fixed capital formation across the euro area. While the contraction of investment was initially much sharper than at the height of the global financial crisis, a strong rebound followed in the third quarter of 2020. Despite this rebound, euro-area GFCF remained below its pre-pandemic level according to the last available figures of the second quarter of 2021. Econometric analysis suggests that country differences in investment growth during the pandemic were driven largely by the intensity of the restrictions to contain the spread of the virus and differences in economic structures, notably the weight of contact-intensive services. Overall, firms have proved adaptive in the face of the COVID-19 shock, due notably to the strong government support. The faster-than-expected recovery might suggest that the negative economic impact of the COVID-19 crisis on capital accumulation might be more contained than initially feared.

Against increasing pressures on public finances a well-designed recurrent tax on immovable property can simultaneously generate tax revenues, be growth-friendly, reduce income inequality and contribute to a sustainable environment. However, although recurrent taxes on immovable property are considered to be among the taxes least detrimental to growth, their share in total tax revenue is fairly low across the euro area. The analysis suggests that to exploit fully their inclusive green growth potential, the value of property needs to be regularly updated, mortgage interest relief should be gradually phased out and the energy performance of buildings taken into account.

The response of sovereign interest rate spreads of euro area Member States (in relation to Germany) to fundamental factors, especially government debt, remains a relevant subject to analyse. Econometric analysis highlights that the response is non-linear. Structural factors can largely mitigate the government debt impact on spreads, as the marginal effect of government debt on spreads is close to zero in countries with the highest potential growth and strongest institutions. Overall, policies reinforcing potential growth and government effectiveness have a strong potential to improve investors' perception of sovereign risk and their forbearance of higher debt.

The COVID-19 pandemic is still not behind us. Policy makers need to stand ready to continue addressing its potential fall-outs. At the same time, it is important not to lose sight of the long- term opportunities posed by the ongoing digitalisation and greening of the economy, which must be underpinned by ambitious policies and reforms.

I. Assessing the cushioning role of tax-benefit systems on households' income in the euro area during the COVID-19 pandemic: a microsimulation analysis

By Michael Christl, Silvia De Poli, Francesco Figari, Tine Hufkens, Chrysa Leventi, Andrea Papini and Alberto Tumino

Abstract: *This section analyses the extent to which the tax-benefit systems of the euro area countries have protected household incomes during the COVID-19 pandemic. We make use of EUROMOD, the EU tax-benefit microsimulation model. Detailed aggregate labour market statistics combined with a novel approach to simulate transitions from work into monetary compensation schemes (short-time work schemes, as well as compensation schemes for self-employed) and into unemployment allows us to replicate the labour market conditions observed in the COVID-19 crisis in 2020. The analysis focuses on the role of existing and newly implemented tax-benefit instruments directly affecting household income. These policies include short-term work schemes paid directly to workers and subsidies paid to firms if their amount covers directly part of workers' salaries. The analysis is limited to the effects of the tax-benefit systems on household income and partially disregards behavioural responses and macro-feedbacks, since we only account for the observed changes on the labour market. We find that most of the euro area countries experienced a significant drop in market incomes, with poorer households hit the hardest. However, our findings also suggest that the tax-benefit systems of those countries have been able to absorb a significant share of the COVID-19 shock, offsetting its regressive nature on market incomes. Monetary compensation schemes implemented by euro area countries, often supported by the European instrument for temporary Support to mitigate Unemployment Risks in an Emergency (SURE), played a key role in cushioning the fall in household income during the crisis ([1]).*

I.1. Introduction

The COVID-19 pandemic hit Europe severely in 2020, leading to a large reduction in GDP across all euro area (EA) countries. Households faced an increased risk of unemployment due to lockdown measures and a general reduction in economic activity. Governments tried to withstand the crisis with various policy measures in support of household income. In particular, monetary compensation schemes (short-time work schemes, as well as schemes for the self-employed) compensated employees and the self-employed for the reduction in their economic activity and played a major role in stabilising household incomes and demand, also allowing for a smoother return to economic activity for workers and firms. In this context, the European instrument for temporary Support to mitigate Unemployment Risks in an Emergency (SURE) played a significant role in providing financial assistance to a number Member States, facilitating the implementation of measures to protect workers against the risk of jobs and income loss ([2]).

All this raises the question to what extent have the tax-benefit systems of the EA countries protected and stabilised household incomes during the COVID-19 pandemic?

Both macro- and micro-based approaches are traditionally used to assess the stabilisation properties of tax-benefit systems ([3]). The former employs macroeconomic models to quantify the stabilisation effect of fiscal policy on GDP. Macro-based stabilisation coefficients have the significant advantage of embedding both the direct and indirect (second round) effects of fiscal policy, including behavioural response and macroeconomic feedbacks. On the other hand, macro-based estimates often require a high degree of simplification in the modelling of the fiscal policy rules in place in a certain country and allow

([1]) We are indebted to the many colleagues who have contributed to the development of EUROMOD and the labour market adjustment (LMA) add-on, especially the EUROMOD developers at the JRC and at the University of Essex, the EUROMOD national teams and the flash estimates team of EUROSTAT. A special mention goes to Salvador Barrios and Ana Agúndez for their helpful comments and advice. We also wish to thank an anonymous reviewer for useful comments. This section represents the authors' views and not necessarily those of the European Commission.

([2]) For a summary of the use of SURE financial assistance up to late May 2021 and early evidence of its impact, see for instance McDonnell, C. (2021), 'The SURE instrument – key *features and first assessment', Quarterly* Report on the Euro Area, Vol. 20, No. 2, pp. 41-49.

([3]) For an overview on macro-based approaches on the impact of COVID-19, see the Quarterly Report on the Euro Area (QREA), Vol. 20, No. 2 (2021).

for limited distributional analysis. The microeconomic approach typically employs microsimulation models to quantify the stabilisation properties of tax-benefit instruments. This approach allows for a detailed representation of the tax-benefit rules in place in a certain country, including recent policy reforms, and it produces reliable estimates of the cushioning effect of the tax-benefit systems along various dimensions, e.g. the whole income distribution. As a drawback, in its basic form the microeconomic approach disregards second round effects, focusing on the "day after" effect of shocks or policy reforms ([4]).

In this analysis, we provide a micro-based assessment of the cushioning effect of EA tax-benefit systems on household income in the context of the COVID-19 pandemic. The reasons for the choice of a micro-approach are twofold: first, the importance of distributional considerations when assessing the shock absorption properties of tax-benefit systems; second, the possibility to simulate with a high level of precision the characteristics of tax-benefit systems in EA countries, including the policy responses to the pandemic.

This work makes use of the EU microsimulation model EUROMOD and survey data from the 2018 EU Statistics on Income and Living Conditions (EU-SILC) ([5]). The study employs nowcasting techniques to replicate the labour market conditions of 2020 in the underlying EU-SILC data ([6]), including transitions from work into unemployment and into monetary compensation schemes (e.g., short-term work schemes, monetary support for the self-employed) (see Box I.1 for more details). Then, the analysis compares two alternatives scenarios for the year 2020. The *2020 Baseline scenario* reflects 2020 policies but is based on the labour market characteristics before the COVID-19 pandemic (from the EU-SILC 2018 data) and therefore excludes the massive negative effect of the crisis on employment and income. The *2020 with COVID scenario* takes into account the labour market transitions related to the COVID-19 pandemic ([7]). Intuitively, the analysis evaluates the budgetary and distributional effects of the labour market changes caused by the COVID-19 pandemic at constant policies ([8]). Differences in market income provide an assessment of the impact of the COVID-19 crisis on earnings. Changes in the various components of disposable income are informative of the shock absorption properties of the tax-benefit systems.

We present results for each EA country and for the EA as a whole, with a specific focus on the stabilisation effect offered by monetary compensation schemes to households' income. The study focuses on the role of existing and newly implemented tax-benefit instruments directly affecting individual incomes. These policies include short-term work schemes paid directly to workers (both, employed and self-employed) and subsidies to firms if their amount covers directly part of workers' salaries ([9]). The analysis is limited to the

([4]) In addition to the macro- and micro-based approaches, Mohl et al. (2019) also describe the statistical approach for the computation of automatic stabilisation coefficients. The approach is used in fiscal surveillance and focuses on the extent to which the government budget balance responds to a change in GDP. In particular, automatic stabilisers are identifies as the cyclical components of the government budget balance. Although relevant, this concept is only partially related to the stabilising effect of fiscal policy on household incomes. For further details see Mohl, P., Mourre, G and K. Stovicek (2019), 'Automatic Fiscal Stabilisers in the EU: Size & Effectiveness', *Economic Brief* 042, European Commission, Directorate-General for Economic and Financial Affairs.

([5]) EUROMOD is a tax benefit calculator that allow the simulation of tax liabilities and benefit entitlements for private households in each EU Member State. The model is maintained and developed at the Joint Research Centre of the European Commission in collaboration with EUROSTAT and a network of national teams. EU-SILC survey microdata contain information on income and socio-demographic circumstances for representative samples of private households in EU Member States. The use of EUROMOD in combination with EU SILC microdata maximises the consistency and the cross-country comparability of the EUROMOD simulations.

([6]) The 2018 EU-SILC data used in the simulations were the latest available data in EUROMOD at the time of the analysis and had to be nowcasted to 2020.

([7]) Both transitions, from employment to monetary compensation schemes, as well as from employment to unemployment are simulated in this scenario. The number of transitions simulated is based on statistics available at different level of socio-economic aggregation in each EA Member State. Transitions into monetary compensation schemes is available by sector of activity in most cases. Transition into unemployment is usually available by gender.

([8]) The evaluation is performed at constant 2020 policies, hence including the policies implemented in response to the pandemic. The analysis does not build counterfactual labour market scenarios in absence of a policy response to COVID-19. In the baseline scenario no worker is assumed to be receiving COVID-19 related short term work schemes.

([9]) EUROMOD scope of simulations is limited to households and, as a rule, subsidies to firms are not simulated. In this sense, firm subsidies whose amount is linked to a loss in turnover are not simulated because of lack of information in our data. Nevertheless, the model simulates as benefits received by the workers those subsidies paid to firms to cover a defined share of salaries of workers. The reason is that in this case the subsidy would be directly and univocally aimed at cushioning the effect of

Table I.1: **Change in market and disposable incomes, 2020 Baseline vs 2020 with COVID-19 (%) – EA countries**

	Market income change (%)						Disposable income change (%)					
	Q1	Q2	Q3	Q4	Q5	TOTAL	Q1	Q2	Q3	Q4	Q5	TOTAL
AT	-12.3	-11.3	-9.6	-9.7	-7.4	-8.9	-1.1	-2.3	-2.1	-2.6	-2.6	-2.3
BE	-8.9	-8.7	-6.7	-7	-6.8	-7.1	-0.1	-0.5	-0.8	-1.4	-2.4	-1.3
CY	-11	-9	-8.8	-7.9	-5.9	-7.5	-1.3	-1.9	-2.8	-2.6	-2.2	-2.3
DE	-4.3	-4.8	-4.5	-4.2	-3.6	-4	-0.6	-0.7	-0.9	-1	-1.3	-1
EE	-7.2	-7.7	-6.1	-5.5	-5.9	-6	-0.2	-1.2	-1.7	-1.9	-3	-2
EL	-14.6	-14.2	-14	-13.4	-14.4	-14.1	-0.1	-2.2	-2.8	-4.1	-7.5	-4.7
ES	-13.3	-11.2	-10.1	-8.9	-6.9	-8.6	-0.5	-1.5	-2.3	-2.6	-3.3	-2.5
FI	-3.1	-1.5	-1.8	-1.4	-1.3	-1.5	0	0	-0.4	-0.4	-0.6	-0.4
FR	-5.9	-4.7	-4.4	-4.5	-3.8	-4.2	1.2	0.5	-0.5	-1	-1.3	-0.6
IE	-21	-26.9	-23.5	-20.3	-18.2	-20	-1.2	-2.4	-4.7	-6.2	-9.6	-6.4
IT	-8.5	-7.9	-7.1	-7.1	-7.1	-7.2	-1.1	-1.5	-1.7	-2.1	-3	-2.2
LT	-6.6	-7.2	-6.5	-5.4	-5.4	-5.7	0.6	0.1	-0.4	-0.4	-2.1	-0.9
LU	-15	-13.5	-10.1	-8.7	-8.3	-9.7	-0.1	-1.2	-0.9	-1.3	-2.5	-1.5
LV	-3	-3.3	-2.9	-2.4	-2.5	-2.6	-0.1	-0.3	-0.2	-0.4	-1	-0.6
MT	-18.2	-20.3	-16.9	-14	-12.9	-14.7	1.1	-2.4	-4	-4.8	-7.4	-4.7
NL	-0.7	-0.8	-0.6	-1.1	-1.2	-1	-0.2	-0.3	-0.4	-0.6	-1	-0.6
PT	-6.4	-5.5	-5.4	-5.1	-6.1	-5.7	-0.9	-1	-1.2	-1.5	-2.4	-1.7
SI	-6.7	-5.7	-5.8	-6.3	-4.8	-5.6	0	-0.4	-0.9	-1.4	-1.3	-1
SK	-6	-3.9	-4.1	-4.1	-3.6	-4	-0.6	-0.1	-0.6	-0.7	-0.9	-0.6
EA	-6.5	-6.2	-5.7	-5.6	-5	-5.4	-0.2	-0.7	-1.2	-1.5	-2.1	-1.4

(1) Quintile groups defined in the baseline scenario.
Source: Authors' calculation using EUROMOD I3.0+

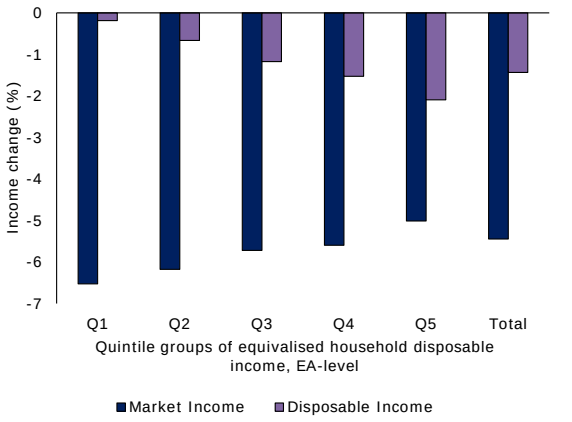
effects of the tax-benefit systems on household income and disregards behavioural responses and macro-feedbacks. For more detailed information on data, methodology and results we refer to Christl et al. (2021), on which this section relies ([10]).

I.2. The impact of the COVID-19 crisis on household incomes in 2020

First, we analyse the impact of the COVID crisis on household incomes, distinguishing between rich and poor households by separating the effect by income quintile groups. Graph I.1 reports the percentage changes in market and disposable incomes in the EA by quintile groups and for the entire population ([11]). It shows that market income dropped in total by more than 5.4% in 2020 at the EA level because of the COVID-19 pandemic.

The reduction in market income was regressive (the earnings loss share decreases with rising income), with the poorest quintile experiencing a reduction of more than 6.5% against a 5.0% decrease for the richest quintile. The drop in disposable income was significantly smaller than the drop in market income (1.4%) and the reduction indicates a progressive pattern, with the poorest quintile losing around 0.2% of disposable income against 2.1% loss for the richest quintile.

Graph I.1: **Change in market and disposable incomes, 2020 Baseline vs 2020 with COVID-19 (%) – EA**



(1) Quintile groups defined in the baseline scenario.
Source: Authors' calculation using EUROMOD I3.0+

These results highlight that tax-benefit systems – comprising the sum of automatic stabilisers and additional policy measures that were introduced during the COVID-19 crisis – were able to partly offset the strong income losses related to the crisis in the EA. This cushioning effect of policy measures seems to be especially strong for low-income households.

the reduction in economic activity, as it is the case when benefits are directly paid by governments as benefits.

([10]) Christl M., De Poli, S., Figari, F., Hufkens, T., Leventi, C., Papini, A. and A. Tumino (2021), 'The cushioning effect of fiscal policy in the EU during the COVID-19 pandemic', *JRC Working Paper on Taxation and Structural Reforms* 2/2021.

([11]) The EA-level indicators are built by aggregating at the EA level the raw changes in market (disposable) income and dividing for the aggregated market (disposable) income in the baseline system. The EA indicators by quintile are built using the same logic but aggregating market (disposable) incomes by quintile.

Table I.1 reports the percentage changes in market and disposable incomes for each EA country and the EA as a whole in 2020. Market income dropped in all the countries. Ireland experienced the highest reduction in total market income (-20%), and the Netherlands experienced the smallest (-1%). The high value for Ireland is related to the high share of the workforce experiencing unemployment spells (18%) as well as to transitions to short-term work schemes for employees (12.8% of employees) and the (uncompensated) reduction in self-employment activity (29.8% of the self-employed). The low value for the Netherlands is caused by two circumstances. First, the government paid all employers a subsidy for continuing to pay 100% of wages (in case they suffered a loss in turnover). In this sense, there is no loss in market income associated with the transition from employment to short-term work ([12]). Second, there was only a small number of transitions from work into unemployment (0.77%).

The reduction in market income usually shows a regressive pattern, with earning losses in the lower part of the income distribution being larger than those in the upper part. The pattern is less clear-cut in Greece, the Netherlands, and Portugal.

Consistent with the EA-wide results, disposable income drops less than market income in all countries. All EA countries show a reduction in disposable income, with Ireland experiencing the largest drop (-6.4%) and Finland the smallest (-0.4%). The pattern of disposable income change is markedly progressive, with households in the richest quintile always experiencing a greater loss than those at the bottom of the income distribution, as also highlighted in Table I.1. Moreover, several countries experienced an increase in the disposable income of households located in the lower half of the income distribution. In particular, Malta shows evidence of an increase in the disposable income of households in the lowest quintile. France and Lithuania experienced a slight increase in the disposable income of the two lowest quintile groups, while in Finland it remained stable.

([12]) The size of the subsidy for employers depends also on the share of loss in turnovers. Due to lack of data about turnover of firms, we cannot simulate the subsidy and the share of wages supported by the government. Indeed, the monetary compensation scheme for employees in the Netherlands is not simulated in EUROMOD.

I.3. The cushioning effect of policy measures during the COVID-19 crisis

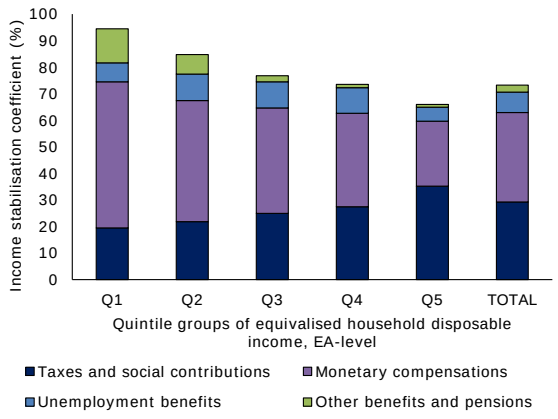
The impact of COVID-19 on household incomes suggests that the tax-benefit systems of EA countries absorbed a significant share of the shock in market incomes. To analyse this effect in more detail, we calculate the income stabilising coefficient (ISC) following the methodology described in Box I.1. With the ISC for the EA (reported in Graph I.2), it is possible to quantify the stabilisation properties of the tax-benefit systems of EA countries in 2020 and identify of the contribution of each of the fiscal policy instruments of interest.

Graph I.2 shows that euro area tax-benefit systems absorbed as much as 73.3% of the market income shock at the EA level in 2020. Monetary compensation schemes seem to have absorbed the largest share of the shock (33.7%), followed by taxes and social contributions (SCs) (29.2%) ([13]). The stabilisation provided by unemployment benefits was significant (7.7%) but smaller than that provided by the monetary compensation schemes. This finding is in line with the smaller number of transitions from work to unemployment compared to transitions from work into monetary compensation schemes. Other benefits (e.g. social assistance, family benefits) and pensions played a relatively minor role in total ([14]).

([13]) Intuitively, a drop in market is followed by a reduction in the amount of taxes and social contribution paid. Therefore, income after taxes and social contributions will vary less than market income. Imagine a market income drop of EUR 1000 in the presence of a flat personal income tax rate of 20% and a flat social contributions rate of 10%. The individual will pay EUR 200 less in taxes and EUR 100 less in social contributions. Taxes and social contributions absorb 30% of the market income shock.

([14]) The analysis also highlights that ISC was about 77.6% for people living in households with employment income as primary income source, while it was about 52,0% for those living in households with self-employment income as their main income source.

Graph I.2: **Income stabilisation coefficient, 2020 - EA**



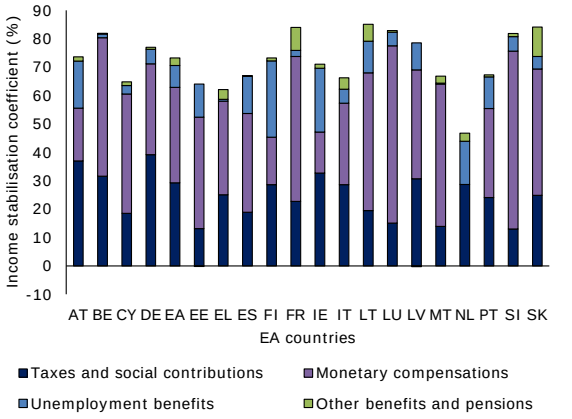
(1) Quintile groups defined in the baseline scenario.
Source: Authors' calculation using EUROMOD I3.0+

Looking at the distribution of ISCs, it emerges that the degree of stabilisation offered by the tax-benefit systems is higher for lower-income households. It should be noted that the importance of monetary compensation schemes decreases with income, while the stabilisation properties of taxes and social contributions follow the opposite pattern. This result is in line with the existence of upper thresholds or lump-sum components in the amount of the monetary compensation received and with the progressivity of the tax system. In addition, as expected, the importance of other benefits is larger at the bottom of the income distribution because of means-tested benefits.

Graph I.3 reports similar information for each of the EA countries. In order to facilitate readability, the chart does not include information by quintile groups and only focuses on country totals ([15]). The figure shows that the ISCs ranged from 46% in the Netherlands to 85% in Lithuania. Monetary compensation played a major role in most countries, ranging from 62.5% in Slovenia to 14.3% in Ireland. It should be noted that the ISC on monetary compensation schemes is missing in the Netherlands. The government paid employers a subsidy for continuing to pay 100% of wages, but this is not included in the simulation, because the share of the worker's wage covered by the subsidy cannot be determined. A new social assistance benefit for the self-employed introduced in the Netherlands is captured in the category 'other benefits and pensions'. The contribution of (reduced) taxes and social contributions to income stabilisation is significant too, ranging from 39% in Germany to 13% in Slovenia.

The decomposition of ISC by quintile (not shown) confirms that tax-benefit instruments have stabilised the incomes of poorer households more than richer ones. In France, Lithuania and Malta, the ISC for households at the bottom of the income distribution was actually above 100%, indicating a certain degree of overcompensation for the income loss ([16]). This result is often driven by the presence of generous monetary compensation schemes (often with lump-sum components) that are in some cases exempted from social contributions and/or personal income taxes or are not taken into account in the means-testing of benefits.

Graph I.3: **Income stabilisation coefficient, 2020 – EA countries**



Source: Authors' calculation using EUROMOD I3.0+

I.4. COVID-19 and its impact on poverty and inequality

We also briefly analyse the impact of the COVID-19 crisis on policy-relevant indicators for inequality and poverty. Graph I.4 reports At-risk-of-poverty (AROP) rates (based on disposable income) for the EA countries and the euro area as a whole, differentiating between fixed poverty lines (at the baseline) and floating poverty lines ([17]).

([15]) The full set of ISCs, including decomposition by quintile groups, are reported Christl et al. (2021*), op. cit.*

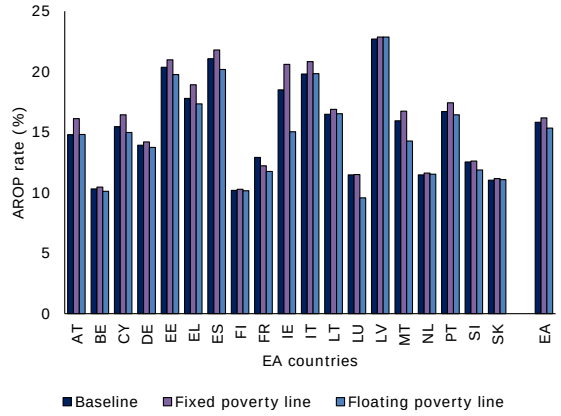
([16]) For detailed results, see Christl et al. (2021), *op. cit.*

([17]) The AROP rate is the share of individuals whose equivalised household disposable income falls below 60% of the median household equivalised disposable income. This threshold, known as poverty line, can be floating if scenario-specific or fixed if anchored to the value observed in the baseline scenario. The OECD modified equivalence scale is used to equivalise household

Focusing on fixed poverty lines, EA-level AROP rates on disposable income show a small increase, from 15.8% to 16.2% ([18]). AROP rates slightly decline from 15.8% to 15.3% if computed using a floating poverty line.

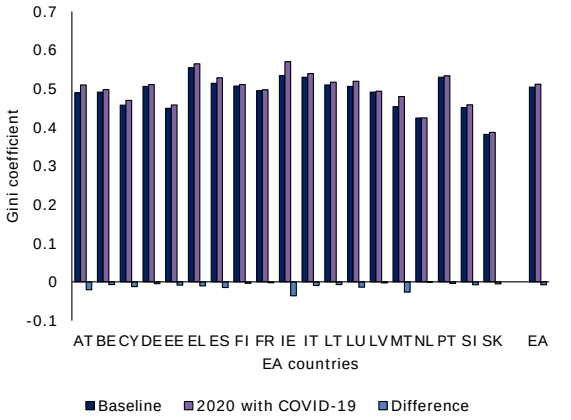
All EA countries, except France, experienced an increase in AROP rates based on disposable income, ranging from +2.1 p.p. in Ireland to +0.02 p.p. in Luxembourg if computed with a fixed poverty line. By contrast, France experienced a slight decrease in the risk of poverty of around -0.7 p.p. AROP rates remained stable or decreased slightly in the majority of countries when calculated employing a floating poverty line. Nevertheless, because of the drop in median income caused by the adverse labour market transitions, Ireland experienced a significant decrease in the AROP rate in the range of -3.5 p.p. when calculating using a floating poverty line.

Graph I.4: **AROP rates – EA countries**



(1) 'Fixed poverty line' as defined in the baseline.
Source: Authors' calculation using EUROMOD I3.0+

Graph I.5: **Income inequality (Gini coefficient) – Market income – EA countries**



Source: Authors' calculation using EUROMOD I3.0+

Graph I.5 shows the evolution of the Gini coefficients on market income in the countries analysed and for the EA as a whole ([19]). At the EA level, the Gini coefficient of the distribution of market income increases by 0.007. The highest increase is observed in Ireland (+0.036), the smallest in the Netherlands, where no variation was observed.

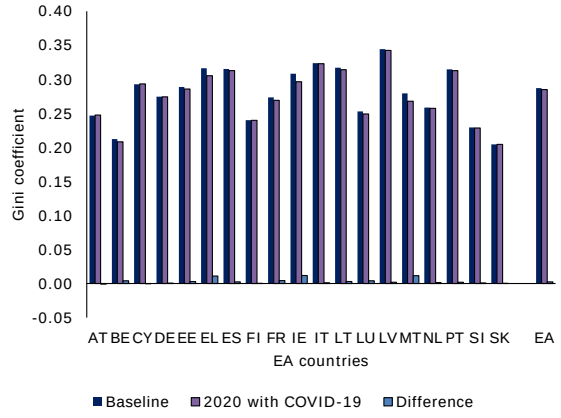
To account for the impact of the tax-benefit systems of the EA countries on income inequality, Graph I.6 presents the Gini coefficient of disposable income. Contrary to the indicated inequality increase of market incomes, the Gini of the distribution of disposable income decreases by 0.02. In terms of disposable income, most countries show a stable or slightly declining Gini coefficient between the two scenarios analysed. This confirms that during the COVID-19 crisis inequality of disposable income was affected only marginally thanks to the cushioning impact of the tax-benefit systems and the emergency policy measures introduced at national and EU levels.

disposable incomes accounting for differences in household composition.

([18]) EA-level AROP rates and Gini coefficients are population weighted averages of the EA countries indicators.

([19]) The Gini coefficient measures the level of income inequality in a certain country. Ranging between 0 and 1, low values of Gini coefficients express a more equal income distribution. The higher the Gini, the more unequal the distribution.

Graph I.6: **Income inequality (Gini coefficient) – Disposable Income – EA countries**



Source: Authors' calculation using EUROMOD I3.0+

I.5. Conclusions

This work´s contribution to the existing literature is twofold. First, to the best of our knowledge, this section contains the first EA-wide assessment of the cushioning effects of taxes and social transfers during the COVID-19 pandemic, including unemployment benefits and monetary compensation schemes (short-term work schemes and compensations for self-employed). Second, from a methodological point of view, the section employs a novel, simplified nowcasting approach to study the consequences of changes in labour market conditions using the microsimulation model EUROMOD.

We conclude that most EA countries experienced a large drop in market incomes during 2020, with poorer households hit hardest. We also find that the tax-benefit systems absorbed a significant share of the COVID-19 shock and were able to offset – in most countries – the regressive nature of the shock on market incomes. Monetary compensation schemes played a major role in cushioning the effect of adverse labour market transitions, although in aggregate terms they represent a minor component of household disposable income. Finally, we provide evidence of increases in AROP rates in 2020 if measured using a fixed poverty line. By contrast, if measured using a floating poverty line, we provide evidence of stable or slightly declining poverty rates across the EA.

Box I.1: **Data and modelling**

The approach followed in this section represents a novel, simplified application of the nowcasting approach used by EUROSTAT to produce the flash estimates of income inequality and poverty indicators. The approaches differ in two main dimensions. First, while the flash estimates methodology employs model-based individual transition probabilities to identify observations experiencing labour market transitions, we employ statistics available at various levels of disaggregation to simulate transitions for randomly chosen observations until the target number of transitions within each level of disaggregation is reached. Although the extent to which the simulated transitions mimic the reality depends on the level of disaggregation of the statistics, our approach can be easily implemented in EUROMOD and applied to a large range of actual and hypothetical labour market shocks. Second, the simulation of transitions to monetary compensation schemes represents a novelty of EUROMOD I3.0+, which was developed by the JRC in close collaboration with the flash estimates team at EUROSTAT, EUROMOD national teams and the University of Essex ([1]) .

The analysis makes use of the tax-benefit microsimulation model EUROMOD, version I3.0+, relying on data from the 2018 EU-SILC (2017 incomes). EUROMOD allows the simulation of direct tax liabilities and cash benefit entitlements in a comparable way across EU countries. Tax-benefit instruments that cannot be simulated due to a lack of information in the underlying EU-SILC data are taken directly from the microdata. EUROMOD is a static tax-benefit simulator, in the sense that it simulates the day-after effect of policy changes and disregards any potential behavioural response. The model has been validated at both micro and macro level and has been tested in several applications. For a comprehensive overview, see Sutherland and Figari (2013) ([2]).

We use tax-benefit rules in place in 2020. Since the underlying data refer to 2017 incomes, monetary values of market incomes and non-simulated tax and benefit instruments are uprated to the relevant year, making use of specific uprating factors ([3]). In addition, the microdata have been adjusted to account for the significant changes in labour market conditions that occurred during 2020 as a consequence of the COVID-19 pandemic.

We employ statistics on the share of workers experiencing transitions to either unemployment or monetary compensation schemes in an effort to mimic the labour market conditions of 2020 as observed in the underlying EU-SILC data ([4]). Labour market transitions are modelled using two main data sources: administrative data collected by EUROMOD national teams and developers, and data provided by EUROSTAT. Within each degree of disaggregation (gender, sector, self-employed or employees, etc.), workers are randomly assigned into the new labour market status until the target number of transitions is reached.

Methods

The analysis compares two alternative scenarios for the year 2020; one in which labour market transitions to unemployment and/or temporary layoffs did not occur and one in which they occurred, and, hence, monetary compensation schemes are simulated. Holding policies constant, this comparison allows us to focus on the extent to which 2020 policies protected the incomes of the households that underwent these labour market changes.

The following indicators are provided. First, we analyse to what extent market incomes and disposable incomes varied between the 'baseline' scenario (2020 system without labour market changes) and the 'reform' scenario (2020 system with labour market changes).

([1]) For more information on the flash estimates methodology see: https://ec.europa.eu/eurostat/documents/7894008/11598903/Short-methodological-note.pdf

([2]) Sutherland, H. and F. Figari (2013), 'EUROMOD: The European Union tax-benefit microsimulation model', *The International Journal of Microsimulation*, Vol. 6, No. 1, pp. 4–26.

([3]) See https://euromod-web.jrc.ec.europa.eu/using-euromod/country-reports.

([4]) Data on labour market transition to monetery copmensation schemes only cover the entire year 2020 in some countries. In other countries, they were available only until July-September. For an overview of the information available in each country, see Christl M., De Poli, S., Figari, F., Hufkens, T., Leventi, C., Papini, A. and A. Tumino (2021), 'The cushioning effect of fiscal policy in the EU during the COVID-19 pandemic', *JRC Working Paper on Taxation and Structural Reforms* 2/2021.

(Continued on the next page)

Box (continued)

Second, we compute the income stabilisation coefficient (ISC), in the spirit of Dolls et al. (2012) ([5]).

$$ISC = 1 - \frac{\sum \Delta Y^D}{\sum \Delta Y^M} \qquad (1)$$

Where $\sum \Delta Y^D$ indicates the aggregate (country level) difference in disposable income and $\sum \Delta Y^M$ indicates the aggregate difference in market incomes. The coefficient is reported in percentage terms (ISC*100). Intuitively, it indicates the share of a shock that is absorbed by the tax-benefit system. An ISC=100 indicates no change in disposable income despite a change in market income. An ISC=0 indicates that disposable income changed exactly as much as market income, hence the shock is fully transmitted to disposable income. In addition, we decompose the ISC to study the stabilising properties of various tax-benefit instruments, namely taxes and social insurance contributions, monetary compensation schemes, unemployment benefits, other benefits and pensions.

These indicators are provided for the entire population and by income quintile groups by fixing the quintile to which each household belongs to the 'baseline' value (2020 without labour market transitions). Finally, we provide at-risk-of-poverty (AROP) rate ([6]) estimates (by fixing poverty lines to their 'baseline' values and by using floating poverty lines) and Gini coefficients.

Caveats

A number of caveats should be kept in mind when interpreting these results. First, our analysis disregards second round and macro-feedback effects. Second, some heterogeneity exists in the time reference and level of disaggregation of the statistics used to simulate labour transitions. Third, we randomly identify workers within sociodemographic groups to undergo labour market transitions. This adds some uncertainty to the distributional findings of the model, especially in the case of transitions to unemployment, because the relevant statistics are only available with a broad level of disaggregation. Ideally, this issue would be alleviated by basing the identification of observations transiting into unemployment (or monetary compensation schemes) on characteristics highly correlated with household income. We hope that the use of more homogenised and up-to-date data, possibly at the individual level and covering 2020 in its entirety, will allow us to tackle these issues in the coming months. Finally, a problem of over-simulation of monetary compensation amounts might arise because of the interaction between EU-SILC data, EUROMOD modelling conventions, and specific-country rules. For instance, in cases where a minimum amount of monetary compensation is determined by law and is based on the minimum wage, we might end up over-simulating the compensation for individuals that in EU-SILC are observed to earn less than the minimum wage. Keeping these caveats in mind, this research offers a first comprehensive insight into the effectiveness of tax-benefit policies in mitigating the impact of the COVID-19 pandemic on household incomes across the EA countries.

([5]) Dolls, M., Fuest, C. and A. Peichl (2012), 'Automatic stabilizers and economic crisis: US vs. Europe', *Journal of Public Economics*, Vol. 96, No. 3–4, pp. 279–294.

([6]) According to EUROSTAT, the at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income after social transfers.

II. Gross fixed capital formation in the euro area during the COVID-19 pandemic

By Mirko Licchetta and Eric Meyermans

Abstract: *This section examines the impact of the COVID-19 pandemic on gross fixed capital formation (GFCF) across the euro area. Following the outbreak of the COVID-19 pandemic, the euro area entered an unprecedented recession that induced a sharp fall in GFCF in the first and second quarter of 2020. The contraction was much sharper than at the height of the global financial crisis, but it was very short-lived and a strong rebound followed in the third quarter of 2020. In stark contrast with the period following the global financial crisis, the fall in private investment (as a share of GDP) was partially offset by a rise in public investment (as a share of GDP). The empirical analysis suggests that the extent of the lockdown measures to contain the spread of the virus and the country-specific structure of the economy along with other traditional drivers, in particular, falling output, can explain a large part of the contraction. The bold policy response at the national and EU level mitigated the impact of COVID-19 and supported the recovery. The faster-than-expected rebound in economic activity suggests that the negative economic impact of the pandemic will be more contained than initially feared. However, uncertainty over future health developments remains high, especially given the risks of new more transmissible variants ([20]).*

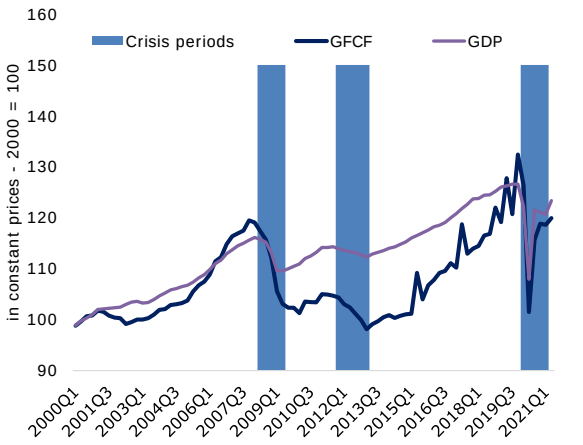
II.1. Introduction

Investment growth has been subdued across the euro area in recent decades. In the short to medium run, investment affects aggregate demand. In the long-run the quantity and quality of the disposable capital stock are important determinants of potential output growth. Investment fell strongly during the global financial crisis and remained at subdued levels for a long time due to a variety of factors including corporate deleveraging, balance sheet repair in the banking sector and consolidation of public finances.

Following the outbreak of the COVID-19 pandemic, gross fixed capital formation (GFCF) in the euro area fell very rapidly in the first and second quarter of 2020 and at a much sharper rate than at the height of the global financial crisis.

The sharp contraction in GFCF prompted many commentators to highlight the risks that the pandemic could lead to another period of subdued investment growth similar to the one following the global financial crisis, when it took about 10 years ([21]) to return to its pre-crisis level ([22]).

Graph II.1: **Gross Fixed Capital Formation and GDP in the euro area**



Source: Eurostat.

However, GFCF recovered (although only partially) at a much faster pace than in the wake of the financial crisis (Graph II.1). The multifaceted and sizable policy response at the national and EU

([20]) The authors wish to thank an anonymous reviewer for useful comments. This section represents the authors' views and not necessarily those of the European Commission.

([21]) In the national accounts (ESA2010), gross fixed capital formation covers machinery, equipment (including transport and ICT equipment), buildings (including dwellings) and structures, as well as cultivated biological resources (including livestock) and intellectual property products (including R&D and computer software and databases). Some expenditures, such as, market research, advertising, firm-specific human and organisational capital, are treated as intermediate expenditures, but could arguably be treated as investments. See for instance Corrado, C., Haltiwanger, J. and D. Sichel (eds) (2005), *Measuring Capital in the New Economy*, NBER.

([22]) Analysis from the European Central Bank (ECB) shows that after the global financial crisis the loss of capital stock was the main drag on potential output growth. See ECB (2020), 'The scarring effects of past crises on the global economy', *ECB Economic Bulletin* Issue 8/2020.

level mitigated the impact of the crisis ([23]) and the plunge in GFCF at the onset of the crisis turned out to be short-lived. Investment bounced back forcefully in a context of very strong (and temporarily held back) demand and favourable financing conditions ([24]). Public investment picked up considerably, too.

The European Commission Autumn 2021 Economic Forecast and recent surveys suggest that the recovery in GFCF is likely to continue in the coming months. For example, managers from the manufacturing industry expected real investment to increase by 7% in the euro area in 2021 ([25]) in the wake of a reported 10% decline in 2020 and despite still elevated uncertainty and weaker corporate balance sheets ([26]).

Continued investment is essential to sustain the economic expansion in the short to medium term, boost potential and support the green and digital transition. In this context, and with a view to draw possible policy lessons going forward, this section examines how the COVID-19 pandemic affected investment across the euro area ([27]).

The structure of the section is as follows. The second subsection describes developments in gross fixed capital formation during the COVID-19 crisis comparing it with developments during the global financial crisis. The third subsection explores the role of lockdown measures introduced to supress the spread of the virus and other drivers of GFCF including the rise of uncertainty and the macroeconomic policy response. The fourth subsection provides an overall econometric assessment of the pandemic's impact on GFCF. The fifth section discusses the pandemic's long-term impact on GFCF. The last section draws some conclusions.

([23]) See Croitorov O. et al. (2021), 'The macroeconomic impact of the Covid-19 pandemic in the euro area', *Quarterly Report on the Euro Area*, Vol. 20, No. 2 (2021.

([24]) See European Commission (2021), *Autumn 2021 Economic Forecast.*

([25]) See European Commission (2021), *Business and Consumer Survey* carried-out in April 2021.

([26]) See ECB (2021), Survey on the Access to Finance of Enterprises (SAFE), June 2021.

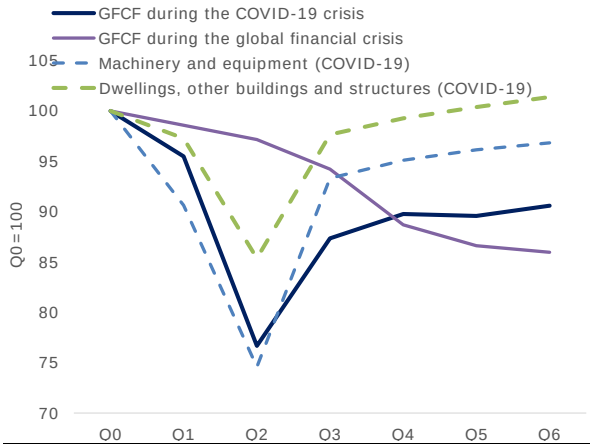
([27]) It complements policy-oriented analyses presented in the *Quarterly Report on the Euro Area*, Vol. 20, numbers 1 and 2 and other research such as Pfeiffer, P., Roeger W. and J. In 't Veld (2020). 'The COVID-19 pandemic in the EU: Macroeconomic transmission and economic policy response', *ECFIN Discussion Paper* 127.

II.2. Gross fixed capital formation during COVID-19

II.2.1. Euro area: national accounts

Following the COVID-19 shock, gross fixed capital formation contracted by around 23% between the fourth quarter of 2019 and the second quarter of 2020. Over the same period, GDP fell by 15% and the decline in investment was the second largest cause for this overall contraction (following the drop in consumption). This contraction was much larger than the one recorded following the outbreak of the global financial crisis (Graph II.2) ([28]). What was extraordinary about the decline in 2020 was that it all happened in just two quarters. To a large extent, this was due to the tightening of government lockdown measures to contain the spread of the pandemic (see below).

Graph II.2: **Gross fixed capital formation (GFCF) in the euro area during COVID-19 and global financial crisis**



(1) Q0=0 is 2008Q1 = 100 for the global financial crisis and 2019Q4 = 100 for the COVID-19 crisis; Q6 =2009Q3 for the GFC and 2021Q2 for the COVID-19 crisis. Real terms.
Source: Eurostat.

Lower investments in machinery and equipment (excluding the very volatile intellectual property products data) accounted for the majority of the fall to up to the sixth quarter since the outbreak of the crisis (second quarter of 2021) (Graph II.2), but it rebounded strongly in the third quarter of 2020. By contrast, dwellings and other buildings and structures contributed less to the contraction and they had recovered their pre-crisis levels by the first

([28]) For comparison, GDP in the first quarter of 2009 declined by around 5½ % relative to the first quarter of 2008, whereas investment fell by around 11%.

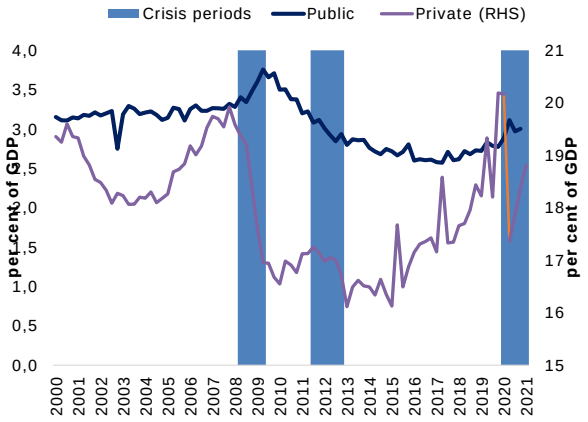
quarter of 2021. Investment in intangibles, such as research and development ([29]), fell relatively less than machinery and equipment.

II.2.2. Euro area: sector accounts

At the institutional sector level, the fall in private investment was partly compensated by a symmetric rise in public investment as euro-area governments pledged substantial public investment to support the recovery from the pandemic. This was in stark contrast to the period following the global financial crisis (Graph II.3), which saw euro-area governments cutting back on public investment with the aim of consolidating public finances.

The combination of national and EU funding ([30]) implies a pick-up in public investment spending, with the European Commission's Autumn 2021 Economic Forecasts seeing public investment rise to 3.5% of GDP in 2022 and 2023, its highest level since 2010.

Graph II.3: **Public and private investment (as a share of GDP)**

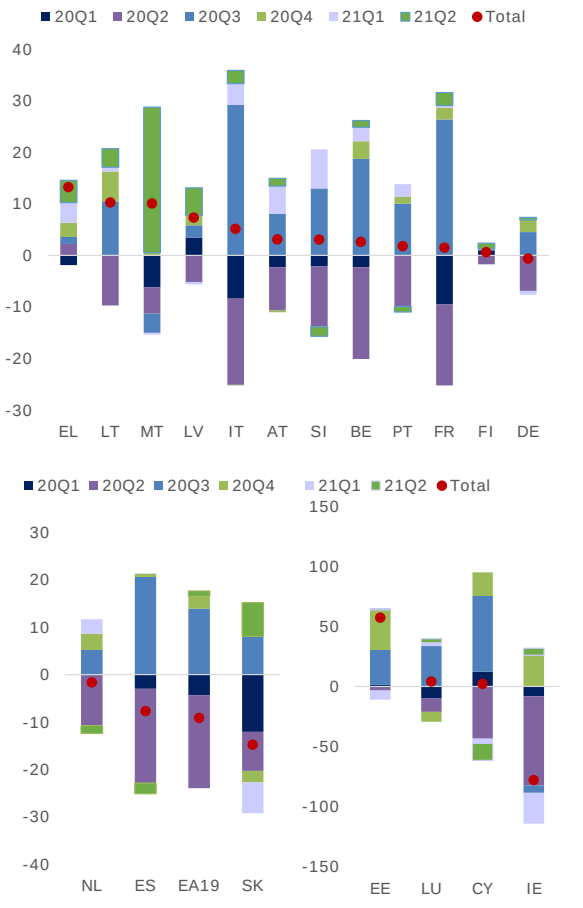


Source: Eurostat, Institutional sector accounts.

II.2.3. Member State level

The depth of the decline in GFCF between the fourth quarter of 2019 and the second quarter of 2020 varied widely within the euro area, ranging from just below 1% in Finland to 80% in Ireland (Graph II.4). Intellectual property – a key and growing component of GFCF – has been particularly volatile in Ireland, Estonia, Cyprus and Luxembourg (see bottom-right hand side in Graph II.4) ([31]).

Graph II.4: **Changes in gross fixed capital formation since the onset of COVID-19 (scales vary)]**



(1) Data on GFCF for IE, CY, LU and EE show very strong volatility in the intellectual property investment component.
(2) Total growth (red bullet) measures the compound growth rate (i.e. multiplicative). Given the large size of the growth rates, adding quarterly growth rates (coloured bars) is only a rough approximation of the total growth rate between the first quarter of 2020 and second quarter of 2021.
Source: Eurostat, National accounts

Part of these cross-country differences in investment growth can be attributed to differences in the intensity of the lockdown measures - with tighter measures associated with stronger decreases in gross fixed capital formation (the second quarter of 2020 in Graph II.5).

([29]) Once again, the volatile Ireland data are excluded.
([30]) Overall, the Recovery and Resilience Plan's total GDP impact generated during the 2021-2022 period is expected to be approximately 1.2% of the EU's 2019 real GDP, with a noticeable impact on the GFCF for a significant number of Member States. See European Commission (2021), *Spring 2021 Economic Forecasts*.
([31]) For this reason these four Member States were not included in the empirical assessment in section 4.

As restrictions on movement were lifted between the end of the second and the third quarter of 2020, GFCF rebounded in the third quarter of 2020 (See Graph II.5). Restrictive measures were tightened again in the fourth quarter of 2020 on the back of renewed pressures on the Member States health systems but the economic impact of the second lockdown was more contained than that of the first one.

Graph II.5: **Change in gross fixed capital formation and Oxford stringency index in 2020**

(1) IE, EE, CY and LU excluded from the sample.
(2) In this unconditional correlation between GFCF and the level of the Oxford stringency indicator the latter proxies all COVID-19 related factors at that moment. Further refined regression analysis (sub-section II.4) focusses on the effects of first differences of Oxford stringency indicator as well as other relevant factors separately.
Source: Eurostat and Oxford Stringency Index.

II.3. COVID-19 related drivers of GFCF

Several COVID-19 specific factors can explain the contraction in GFCF and they are briefly discussed as follows.

Stringent lockdown measures

The literature suggests a strong negative relationship between governments' lockdown measures and GDP (including its components). This negative impact increases with the intensity of the measures (e.g. IMF (2020) ([32]) and Niermann and Pitterle (2021) ([33])), the importance of tourism in the economy and lower quality of governance (e.g. Sapir 2020 ([34])). However, over time, economic activity became less sensitive to the stringency of lockdown measures as firms and households adapted to the new environment (see also Graph II.5) ([35]).

Rising uncertainty

Both expectations and uncertainty about future developments affect investment. However, it is very difficult to disentangle these factors, especially at the macro level ([36]). Moreover, the expected duration of the lockdown measures was a very specific pandemic related channel that affected investment. For example Buchheim et al. (2020) ([37]) report that in the early phase of the pandemic firms that expected the lockdown to last longer were more likely to postpone investment and lay-off workers ([38]).

Rising uncertainty affects investment via several channels including the postponement or cancellation of investment (especially when irreversible), a rising interest rate risk premium effect, and a reverse accelerator effect when output falls below its potential following for instance a sharp fall in household consumption. However, well-designed monetary and fiscal policies can mitigate the negative impact of an increase in uncertainty.

([32]) IMF (2020), 'A Long and Difficult Ascent', *World Economic Outlook*, October, presenting an analysis covering a sample of up to 52 advanced, emerging market, and developing economies.
([33]) Niermann, L. and I. Pitterle, 2021, 'The COVID-19 crisis: what explains cross country differences in the pandemic's short-term economic impact?', *MPRA Paper* No. 107414, presenting a sample covering 156 developed, developing and transition economies. They report that one standard deviation in countries' 2020 average stringency corresponds to at around 1 percentage point reduction in 2020 growth estimates, all else equal.
([34]) Sapir, A. (2020), 'Why has COVID-19 hit different European Union economies so differently', *Bruegel Policy Contribution Issue* n°18.
([35]) See also results in section II.4.
([36]) For instance Koetse, M., van der Vlist, A. and H. de Groot (2006), 'The Impact of Perceived Expectations and Uncertainty on Firm Investment', *Small Business Economics*, Vol. 26, pp. 365–376 using granular Dutch firm level data, report that expectations and uncertainty about input- and output prices and domestic demand have substantial but different effects on investment spending in firms of different sizes as for instance large firms may have better opportunities to hedge against risk and uncertainty than small firms.
([37]) Buchheim, L., Dovern, J., Krolage, C. and S. Link (2020), 'Firm-level Expectations and Behavior in Response to the COVID-19 Crisis', *IZA Discussion Paper* No. 13253, making use of a representative sample of approximately 9 000 German firms in all relevant sectors of the economy during the first phase of the pandemic.
([38]) In the absence of harmonised cross country indicators for expectations, this channel is proxied by the equity book ratio in the reduced-form regression analysis presented in sub-section 4.

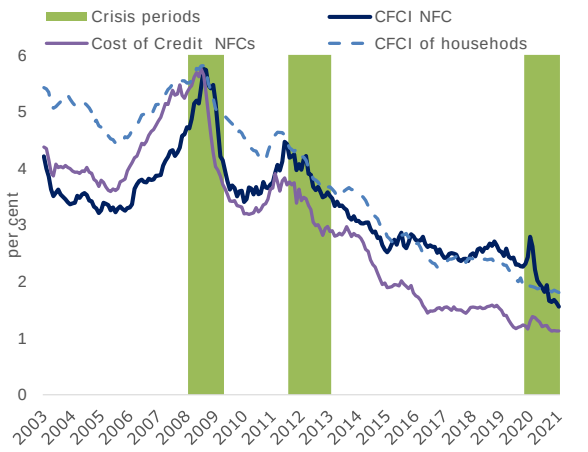
Early evidence suggested that higher uncertainty in the initial phase of the COVID-19 crisis ([39]) took a toll on business investment ([40]). For example, surveying about 13.500 firms across the EU in 2020, EIB (2020) ([41]) reports that about 80% of EU firms considered uncertainty to be an impediment with some 50% of firms even considering it a major impediment ([42]) ([43]). Gieseck and Rujin (2020) report that heightened uncertainty could have accounted for around one-fifth of the decline in activity by the first half of 2020, with a particularly strong impact on fixed capital formation ([44]).

Short-lived tightening of financial conditions

At the beginning of the COVID-19 crisis, financing conditions tightened somewhat given the overall uncertainty of the scale and duration of the crisis. However, the increase was short-lived (Graph II.6), following a strong monetary policy response preventing that financing conditions for the economy would tighten in a pro-cyclical way ([45]).

Further financial relief was provided under various state credit guarantee programmes that supported solvable firms' access to finance for investment ([46]).

Graph II.6: **Non-financial corporations (NFC) cost of credit and composite financial condition indicator (CFCI)**



Source: European Commission.

The policy response at Member States and EU level

Monetary and supervisory authorities supported the financing of investments in several ways. The ECB's monetary policy response mainly consisted of additional asset purchases including via the pandemic emergency purchase programme (PEPP), ample liquidity provision (mostly via targeted long-term refinancing operations), and easing of collateral standards, while maintaining the deposit facility rate at a record low of -0.5% (since September 2019). At the same time, several national macro-prudential authorities reduced countercyclical capital and systemic risk buffers ([47]), while the Single Supervisory Mechanism (SSM) allowed banks to meet part of their core capital requirements with non-core capital instruments.

The policy responses at the EU level that supported investment included the mobilisation of all available cash reserves from the European Structural and Investment Funds, putting in place the European instrument for temporary Support to mitigate Unemployment Risks in an Emergency

([39]) See EU Commission (2021) 'Economic Sentiment and Employment Expectations up in the EU and the euro area' (October 2021). See also 'Special topic: new survey-based measure of economic uncertainty'. Gayer, C., Reuter, A. and F. Morice (2021), 'Special topic: new survey-based measure of economic uncertainty', *Vox EU*.

([40]) With higher uncertainty, firms might become more cautious and postpone or cancel their investments, especially in the case of irreversible investments. See Pindyck, R. (1991), 'Irreversibility, Uncertainty, and Investment', *Journal of Economic Literature*, Vol. XXIX, pp. 1110-1148) and Bloom, N., Bond, S. and J. Van Reenen (2007), 'Uncertainty and Investment Dynamics', *The Review of Economic Studies*, Vol. 74, No 2, pp. 391-415.

([41]) EIB (2020), The EIB Investment Survey, 2020 EU overview.

([42]) Rivera Garrido B. and L. Maurin (2020), 'The cash conundrum: nature and implications for the post-COVID environment?', *EIB Working Paper*. See also Meyermans, E., Rutkauskas, V. and W. Simons (2021), 'The uneven impact of the COVID-19 pandemic across the euro area', *Quarterly Report on the Euro Area*, Vol. 20, No. 2, pp. 17-30.

([43]) Likewise, Commission (2020), *EU R&D Survey*, reports that firms expected a contraction of 4.5% in capital expenditure in 2020 with more than 40% of participants indicating negative expectations.

([44]) Gieseck, A. and S. Rujin (2020), 'The impact of the recent spike in uncertainty on economic activity in the euro area', *ECB Economic Bulletin*, Issue No. 6/2020.

([45]) Lane, P. (2020), 'The Monetary Policy Package: An Analytical Framework', *ECB Blog* 13 March 2020.

([46]) European Commission (2020), Policy measures taken against the spread and impact of the coronavirus – 8 December 2020

([47]) See the ECB macroprudential measures website for more details on policies aimed at increasing the financial system's resilience to shocks by addressing possible systemic risks across the euro area.

(SURE) ([48]) and the creation of the recovery instrument Next Generation EU (NGEU) ([49]).

At the national level, the fiscal authorities supported investments via several measures facilitated by the activation of the general escape clause of the Stability and Growth Pact. These measures included emergency spending on health care, short-time work schemes, grants, loan guarantees, loan repayments moratoria, tax deferrals ([50]), liquidity support and the roll-out of a vaccination programme.

II.4. Empirical results

The impact of the COVID-19 pandemic on quarterly growth in gross fixed capital formation across the euro area is estimated via a panel error correction model (see Box II.1). The model relates investment to output, the past change in capital stock which requires investment to offset capital depreciation ([51]), financing costs, a news-based measure of uncertainty ([52]) and the equity-to-book ratio. To account for the impact of the pandemic, this base model is augmented to include lockdown measures using the Oxford stringency index ([53]), a pandemic dummy (equal to 1 for the length of the pandemic since the second quarter of 2020 ([54])) that captures the net impact of other factors including fiscal and monetary policy responses ([55]).

Lockdown measures

The econometric results suggest that quarterly growth in GFCF decreases with the tightening of lockdown measures. This statistically significant finding suggests that a 10-points tightening in the Oxford stringency index leads on average to a contraction of about 2.5 ppt in GFCF quarter on quarter growth (variant 1 in Table B in Box II.1).

The sensitivity of GFCF to the lockdown measures (variant 2 in Table B in Box II.1) ([56]) decreases over time ([57]). This perhaps reflects learning from experiences and gradual adaptation, which includes greater digitalisation. Along these lines, earlier research ([58]) reports that the impact of the second and third wave on turnover in the various countries was substantially different from that of the first wave, as turnover reductions were relatively subdued in the Member States that suffered most in the first wave.

The sensitivity of GFCF differs also across Member States. It is the strongest in Italy and the weakest in Malta and Finland (variant 3 in Box II.1 and Graph II.7) ([59]). Such cross-country differences in responsiveness to the lockdown measures might reflect differences in economic structure such as the share of tourism and contact-intensive sectors in the economy ([60]). Graph II.8 confirms that the responsiveness to the lockdown measures increase with the size of contact-intensive sectors (as a share in total gross value added). In

([48]) See McDonnell, C. et al. (2021), 'The SURE instrument – key features and first assessment', *Quarterly Report on the Euro Area*, Vol. 20, No. 2, pp. 41-49.

([49]) See Alfman, E. et al. (2021), 'An overview of the economics of the Recovery and Resilience Facility', *Quarterly Report on the Euro Area*, Vol. 20, No. 2, pp. 7-17.

([50]) And in some countries the introduction of temporary suspensions of bankruptcy proceedings.

([51]) Net capital stock data with quarterly frequency are interpolated from AMECO annual capital stock series OKND.

([52]) Uncertainty is measured by the Economic Policy Uncertainty index based on newspaper articles regarding policy uncertainty. However, part of the impact of rising uncertainty may also be captured by other explanatory variables such as the pandemic dummy and lockdown measures.

([53]) The Oxford COVID-19 stringency index varies between 1 and 100 (1= very loose, 100 = very tight). It includes several dimensions: (i) lockdown and closure measures (including school closing, workplace closing, cancelation public events, restrictions on gathering size, closing of public transport, stay-at-home requirements, restrictions on internal movement, and restrictions on international travel); (ii) economic response (including direct cash payments to people who lose their jobs or cannot work, debt/contract relief for households in danger of loosing access to services like water, announced fiscal measures and COVID-19 related international support) and (iii) health system measures (including public information campaign, testing policy, contact tracing, emergency investment in health, investment in COVID-19 vaccines, facial coverings and vaccination policies). See Halle, T. et al. (2020), 'A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)'.

([54]) Complemented with a dummy for the first quarter of 2020 as the first weeks of this quarter were not yet affected by the pandemic.

([55]) I.e. a dummy equal to 1 for the length of the pandemic since the second quarter of 2020, complemented with a dummy equal to 1 for the first quarter of 2020.

([56]) Variant V2 in Box II.1 allows the point estimate of the lockdown measures to vary across the 6 quarters during which the pandemic was hitting the euro area.

([57]) The positive value of the point estimate in the second quarter of 2021 in variant V2 is somewhat puzzling.

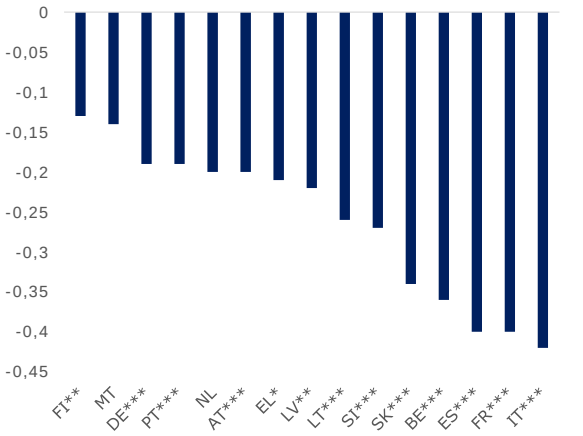
([58]) See for instance, Meyermans, E., Rutkauskas, V. and W. Simons (2021), *op. cit.*

([59]) Variant V3 in Box II.1 allows for the point estimate of the lockdown measures to vary across the 15 euro area Member States in the sample.

([60]) Coutinho, L., Vukšić, G. and S. Zeugner (2021), 'International tourism decline and its impact on external balances in the euro area', *Quarterly Report on the Euro Area*, Vol. 20, No.2, pp. 31-40, provide further evidence on how the lockdown measures that included restrictions on activities in the hospitality sector and on international travel had a strong adverse impact on tourism. This affected especially euro area countries with large tourism sectors, thereby also triggering a further deterioration of some countries' trade balance.

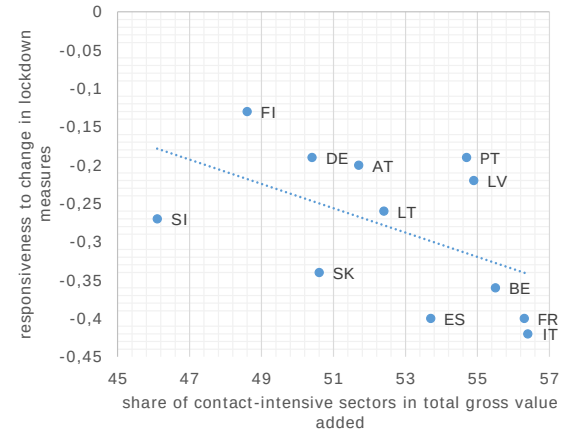
turn, these lockdown measures lowered private consumption and exports, thereby putting additional downward pressure on GDP and consequently also on investment.

Graph II.7: **Responsiveness to a change in lockdown measures across the euro area**



(1) Based on Variant V4 in Table B in Box II.1.Point estimate significance *** p<0.001, ** p<0.05 and * p<0.
Source: Authors' estimates.

Graph II.8: **Sensitivity to a change in lockdown measures and share of contact-intensive sectors in value added**



(1) Contact-intensive sectors refer to wholesale and retail trade, transport, accommodation and food service activities (NACE2 Rev2 classification: G-I), arts, entertainment and recreation (R-U); information and communication (J), financial and insurance activities (K), real estate (L), professional, scientific and technical activities (M), and administrative and support service activities (N). Only Member States with 0.05 significance.
Source: Authors' estimates and Eurostat national accounts

The policy response

The pandemic dummy is found to be statistically significant (see variant 1 in Table B of Box II.1). As such, the dummy captures the role of various factors including the response of monetary and fiscal policy during the COVID-19 crisis. To better understand the impact of the policy response on GFCF, the base model (variant 1) is augmented with a proxy for monetary and fiscal policy interventions (see variant 4 in Table B of Box II.1). At the same time, the parameter of the confinement measures is kept constant over time and across Member States and a dummy to capture all other COVID-19 related factors is kept.

The change in the ECB balance sheet (as measured by the change in total liabilities during the pandemic) is used as a proxy for the monetary policy related intervention. As for the fiscal policy response, it is measured by general government net lending (as a share of GDP).

The significant positive point estimate for monetary policy suggests that it supported investment through the normalisation of financial market conditions and the provision of credit to the banking sector at favourable rates, which helped banks to grant loans to solvable firms ([61]). Interestingly, both the monetary policy and financing conditions positively affect GFCF. As the latter reflects mostly market risk premia, the effects of the ECB policy measures are already captured by the financing condition variable. The presence of an additional, large and positive impact of ECB balance sheet policies on GFCF could reflect confidence related effects ([62]).

The significant negative point estimate for the public budget balance suggests that the increase in the headline deficit supported investment by countering the downward impact of the pandemic shock on aggregate demand ([63]) ([64]).

([61]) Caveat, keeping the coefficients fixed over time and per country may imply that the lower sensitivity of households and firms to lockdown measures during the second phase of the COVID-19 crisis is not captured. As a result there is a risk of overestimating the impact of the policies.
([62]) Schnabel, I. (2021), 'Asset purchases: from crisis to recovery', speech delivered at the Annual Conference of Latvijas Banka on 'Sustainable Economy in Times of Change'.
([63]) Taking first differences of GGNB reduces its significance.
([64]) On the combined effect of monetary and fiscal policy following the outbreak of the pandemic, Bellia, M., Calès, L., Frattarolo, L., Monteiro, D. and M. Petracco Giudici (2021), 'COVID-19: the stabilising impact of EU bond issuance on sovereigns and banks', *Quarterly Review on the Euro Area*, Vol.20, No. 3, pp. XX suggests that the introduction of EU bond issuance together with the Eurosystem asset purchases will increase the diversification of the government bond portfolio of the banking sector and support its

Box II.1: **The impact of COVID-19: a regression analysis**

This box shows estimation results for a panel error correction model, covering 15 euro area Member States ([1]) from the first quarter of 2002 to the second quarter of 2021 ([2]). First, the equilibrium relationship is estimated between the level of gross fixed capital formation (I) to traditional long-term determinants, i.e. the level of real GDP (GDP), the financing cost (USER) ([3]), the equity to book value ratio (PB_ratio) ([4]) and a global financial crisis dummy (DUM_GFC). To capture the specific impact of the pandemic this equilibrium relationship is augmented with the Oxford stringency indicator (LOCKDOWN) and a dummy for the net impact of all other factors affecting investment during the pandemic including a proxy for the monetary and fiscal policy response to the crisis (DUM_COVID) ([5]). More specifically, the estimated equation is:

(1) $\ln(I_{it}) = \beta_0 + \beta_1 ln(GDP_{it}) + \beta_2\, USER_{it} + \beta_3\, PB\_ratio_{it} + \beta_4\, LOCKDOWN_{it} + \beta_5 DUM\_COVID_t + \beta_6 DUM\_GFC_t + ECT_{i\,t}$

with the subscripts i and t referring to the countries and quarters respectively, and whereby $\beta_1, \beta_3 > 0$ while $\beta_2, \beta_4, \beta_6 < 0$ and the sign of β_5 is ambiguous as it covers a whole range of transmission channels. ECT is the error correction term used in the second step of the regression analysis. Table A shows that the point estimates all have the expected sign. The Pedroni and Kao panel cointegration test suggests that the null-hypothesis of no cointegration can be rejected at a high level of confidence, indicating that the proposed relationship constitutes an equilibrium relationship towards which the economy will converge once all short-term rigidities have petered out ([6]).

Table A: Equilibrium (semi-)elasticities

	GDP	USER	PB_ratio	LOCKDOWN	DUM_COVID	DUM_GFC
Equilibrium (semi-) elasticities	0.99	-0.56	0.14	-0.14	0.08	-0.02

Note: sample size 2002Q1-2021Q2, including BE, DE, EL, ES, FR, IT, LV, LT, MT, NL, AT, PT, SI,SK and FI.

Next, the short to medium term dynamics is estimated with pooled generalised least squares ([7]), using lagged variables and Hodrick-Prescot filtered series as instrumental variables ([8]), i.e.

(2) $\Delta\ln(I_{it}) = \gamma_0 + \sum_{j=1}^{4} \gamma_{1j}\, \Delta ln(GDP_{i\,t-j}) + \gamma_2 \Delta ln(Capital_{it-1}) + \gamma_3 \Delta USER_{it} + \gamma_4 \Delta PB\_ratio_{it} + \gamma_5\, \Delta LOCKDOWN_{it} + \gamma_6 DUM\_COVID_t + \gamma_7 DUM\_GFC_t + \gamma_8\, ECT_{i\,t-1} + u_{it}$

with Δ the operator comparing one quarter to the previous quarter, and with $\sum_{j=1}^{4} \gamma_{1j} > 1, \gamma_2, \gamma_4 > 0$.

Table B reports the main estimation results which are discussed in more detail in subsection II.4. Variant V1 is the baseline model capturing the dynamics towards equilibrium. Most point estimates have the expected sign and are statistically significant. Several robustness tests were performed, indicating that the qualitative nature of the results in Variant 1 is broadly unchanged if (i) a more stricter version of the Oxford indicator that focuses only on mobility restrictions is considered (variant V1-lockdown), (ii) investment in dwellings is

([1]) I.e. BE, DE, EL, ES, FR, IT, LV, LT, MT, NL, AT, PT, SI,SK and FI. IE, EE, CY and LU are not included as they show strong variability (or are confidential as in the case of IE in some quarters) in the intellectual property products component.

([2]) The main data sources are Eurostat National Accounts and Sectoral Accounts, Oxford COVID-19 Government Response Tracker project and AMECO.

([3]) I.e., the real user cost of capital measured as $USER_{it} = \frac{IR_{it} + \tau - \left(\frac{PC_{i\,t+1}}{PC_{i\,t}} - 1\right)(1-\tau)}{1 + IR_{it}} \frac{PC_{it}}{P_{it}}$, with IR the measured as the bank lending rate, τ the rate of capital depreciation, PC the price of capital, and P the price of output. The expected price change is assumed to be equal to the observed past change.

([4]) The Price/Book Ratio for the Europe STOXX 600 Index is taken as a proxy for the Tobin Q.

([5]) I.e. a dummy equal to 1 from the first quarter of 2020 to the second quarter of 2021, and zero during all other periods.

([6]) The Pedroni and Kao panel cointegration test extend the Engle-Granger framework to tests involving panel data, allowing for heterogeneity in the long-run cointegrating vectors among individual members of the panel. The panel cointegration test statistics are obtained from the EVIEWS econometric software.

([7]) Allowing for correlation between the random components across Member States.

([8]) Used to avoid potential simultaneity biases in the point estimates of some explanatory variables such as the financing cost, uncertainty measure and equity to book value ratio, as these variables may be correlated with the error term of the regression equation. The instrumental variables include the policy variables excluding its cyclical component estimated via the Hodrick-Prescot (HP) filter.

bank loans for investment.

(Continued on the next page)

Box (continued)

excluded (variant V1-dwellings), (iii) the error correction term is estimated excluding pandemic related variables ([9]) (variant V1-technical), (iv) replacing the change in the lockdown measures by its level did not change the significance of the point estimates, (v)estimation period is limited to the pre-pandemic period from the first quarter of 2001 until the fourth quarter of 2019 (Variant V1-pré 2020), (vi) for some important COVID-19 related factors such as the vaccination rate that took off in the first quarter of 2021 not enough degrees of freedom are available to obtain stable estimates.

Table B: Point estimates of the panel error correction model

(in natural logarithm changes of one quarter compared to the previous quarter)

Dependent variable: d ln of investment in constant prices

	V1	V1-lockdown	V1-dwellings	V1-technical	V1-pré2020	V2	V3	V4
First lag of real GDP growth	0.40 ***	0.29 ***	0.40 ***	0.55 ***	1.10 ***	0.55 ***	0.38 ***	0.68 ***
Second lag of real GDP growth	0.08	0.11	0.09	0.15	0.11	0.15	0.08	0.23 **
Third lag of real GDP growth	0.17 *	0.22 **	0.19 *	0.23 **	0.39 *	0.33 ***	0.16 *	0.44 ***
Fourth lag of real GDP growth	0.24 *	0.23 *	0.21	0.33 **	-0.28	-0.02	0.24 *	-0.20
First lag of capital stock growth	0.03 ***	0.03 ***	0.04 ***	0.03 ***	0.03 ***	0.03 ***	0.03 ***	0.03 ***
Change in financing cost (USER)	-0.46 **	-0.42 **	-0.46 **	-0.45 **	-0.27	-0.41 **	-0.42 **	-0.35 *
GFC dummy	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Newsbased risk index (UNCER)	0.00 **	0.00 **	0.00 **	-0.00 ***	0.00 *	0.00 *	0.00 **	0.00 *
Change in equity/book ratio (PB_ratio)	0.05 ***	0.05 ***	0.05 ***	0.03 *	0.05 ***	0.05 ***	0.05 ***	0.05 ***
Change in ECB liabilities during pandemic (ECB_L)								0.55 **
Public budget balance (% of GDP) during pandemic								-0.77 *
Change in lockdown measures (all) (LOCKDOWN)	-0.27 ***		-0.26 ***	-0.25 ***				-0.34 ***
Change in lockdown measures 20Q1 (all)						-0.56 ***		
Change in lockdown measures 20Q2 (all)						-0.26 ***		
Change in lockdown measures 20Q3 (all)						-0.46 ***		
Change in lockdown measures 20Q4 (all)						-0.26 **		
Change in lockdown measures 21Q1 (all)						-0.23		
Change in lockdown measures 21Q2 (all)						0.43 **		
Change in lockdown measures (only mobility)		-0.32 ***						
Pandemic dummy (DUM_COVID)	0.04 ***	0.05 ***	0.05 ***	0.05 ***		0.04 ***	0.04 ***	-0.03
Pandemic dummy 2020Q1	0.02	0.02	0.02	0.02		0.08 *	0.02	0.04 *
Lagged error correction term (ECT)	-0.14 ***	-0.15 ***	-0.24 ***	-0.11 ***	-0.12 ***	-0.14 ***	-0.14 ***	-0.13 ***
Change in lockdown measures (all) - BE							-0.36 ***	
Change in lockdown measures (all) - DE							-0.19 ***	
Change in lockdown measures (all) - EL							-0.21 *	
Change in lockdown measures (all) - ES							-0.40 ***	
Change in lockdown measures (all) - FR							-0.40 ***	
Change in lockdown measures (all) - IT							-0.42 ***	
Change in lockdown measures (all) - LV							-0.22 **	
Change in lockdown measures (all) - LT							-0.26 ***	
Change in lockdown measures (all) - MT							-0.14	
Change in lockdown measures (all) - NL							-0.20	
Change in lockdown measures (all) - AT							-0.20 ***	
Change in lockdown measures (all) - PT							-0.19 ***	
Change in lockdown measures (all) - SI							-0.27 ***	
Change in lockdown measures (all) - SK							-0.34 ***	
Change in lockdown measures (all) - FI							-0.13 **	
Autocorrelation of error term	-0.37 ***	-0.36 ***	-0.35 ***	-0.37 ***	-0.41 ***	-0.39 ***	-0.37 ***	-0.40 ***
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.29	0.30	0.30	0.27	0.31	0.32	0.30	0.33
Number of observations	1082	1082	1010	1082	992	1082	1082	1059
Number of explanatory variables	29	29	28	29	26	34	43	31

Note: sample size 2002Q1-2021Q2, including BE, DE, EL, ES, FR, IT, LV, LT, MT, NL, AT, PT, SI,SK and FI. Natural logarithm changes of one quarter compared to the previous quarter. Net capital stock data with quarterly frequency are interpolated form AMECO annual capital stock series OKND.

Note: Pooled generalised least squares , and with lagged and Hodrick-Prescot filtered series as instrumental variables. Country fixed effects included.

Note: point estimate significance *** p<0.001, ** p<0.05 and * p<0.1.

([9]) In all variants, except V2-technical, the error correction term, ECT, for the entire sample is estimated based on a regression of equilibrium equation (1) as reported in Table A. For variant V2-technical the error correction terms are obtained re-estimating equation (1) for a sample ending in the fourth quarter of 2019, and fitting the error correction term from the first quarter of 2020 to second quarter of 2021 using observed explanatory variables and point estimates of the re-estimated equation (1).

Finally, Graph II.9 provides an overview of the contribution of the various drivers of GFCF during the COVID-19 crisis.

II.5. Long-term impacts of COVID-19

The pandemic poses both upside and downside risks for gross fixed capital formation.

Upside risks

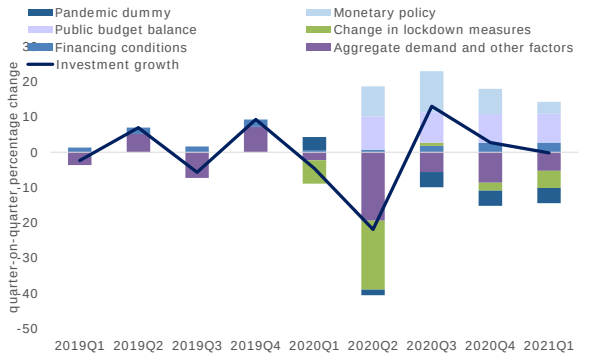
The pandemic accelerated investment in information and communications technology (ICT) infrastructure ([65]) to accommodate the rise in online work and digital sales. The McKinsey Global Institute Report (2021) ([66]) expects such changes have the potential to increase annual productivity growth by about one percentage point up to 2024. It is also notable that during the pandemic investment in intellectual property products (e.g. investment in software and research

([65]) Bellmann L. et al (2021), 'The pandemic has boosted firm investments in digital technologies', *VoxEU*, report that almost 30% of the surveyed German companies reported that the pandemic accelerated the introduction of digital technologies.

([66]) See McKinsey Global Institute Report (2021), Will productivity and growth return after the COVID-19 crisis?

and development) - that are key drivers in the knowledge economy - held up better than investment in machinery and equipment. This might be because the exchange of intellectual property products involves less physical interaction.

Graph II.9: **Decomposition of the changes in gross fixed capital formation during COVID-19**



(1) Model estimation based on variant V4 in Table B in Box II evaluated for the explanatory variables at EA19 aggregate, i.e. the plotted value is equal to the corresponding point estimate multiplied with the observed change/level of the explanatory variable.
(2) Legend: 'Pandemic dummy' refers to the variable DUM_COVID in equation (2) of Box II.1, 'Change in lockdown measures' refers to variable LOCKDOWN, 'Financing condition' refers to the sum of variables USER, PB_ratio and UNCERTAINTY, 'Public budget balance' refers to GGNB, 'Change in ECB liabilities' refers to ECB_L.
Source: Authors' estimates.

The pandemic also disrupted the functioning of global value chains (GVCs). The fear of a repeat of a pandemic may then strengthen the incentives to bring production closer to home ([67]), thus requiring additional investment. At the same time, such reshoring may limit countries' opportunities to exploit their comparative advantages thereby lowering the return on capital and incentives to invest. The available evidence on the impact of COVID-19 on GVCs is, however, somewhat ambiguous ([68]).

Downside risks

Available evidence suggests that much of the long-run damage initially feared from the COVID-19 crisis has been avoided thanks to the bold policy response at the national and EU level. However, risks remain that might dampen investment going forward, especially in case of a re-intensification of the pandemic ([69]).

If emergency policy support measures for firms are lifted too abruptly, this might contribute to an increase in corporate distress. This in turn may intensify the financing constraints on investment ([70]). For example, OECD (2021) ([71]) expects insolvencies to increase significantly in the next two years, particularly in high-contact services sectors, admittedly from artificially low levels. Near-term euro-area corporate insolvency concerns have however fallen, although some sectors remain vulnerable, notably accommodation and food ([72]). European Commission (forthcoming) ([73]) estimates that about 5% of additional firms would be financially vulnerable by the end of 2021 as compared with a counterfactual scenario with no impact of COVID-19 on profits because of the depletion of equity following protracted periods of losses, and from an increased debt burden.

At the same time, the continuation of support policies could carry the risk of locking capital and labour in unproductive sectors, hindering business dynamism over the medium-to-long term ([74]).

([67]) See Javorcik B, (2020), 'Global supply chains will not be the same in the post-COVID-19 world' in Baldwin, R. and S. Evenett (eds., 2020), *COVID-19 and Trade Policy: Why Turning Inward,* expects that primarily Eastern European and the Southern Mediterranean countries will benefit from 're-shoring' or 'near-shoring'.

([68]) The pandemic limited the mobility of goods and persons including managers but it gave a boost to digitalisation. See Simola, H. (2021), 'The impact of Covid-19 on global value chain', *BOFIT Policy Brief,* 2021 No. 2, Bank of Finland.

([69]) See IMF (2021), 'Austria – Selected Issues', *Staff Country Report*, arguing that many countries experienced a persistent output loss compared to the pre-crisis trend after a large crisis such as a currency crisis, health crisis, civil wars and systemic banking crisis. The magnitude of the losses ranges from less than 5% (currency crisis and health crisis), to over 10% (civil wars).

([70]) Based on a sample of 800 listed companies in the euro area and the UK, Jegard, T. and S. Ray (2021), 'The Macroeconomics of Covid-19 Leverage', *SUERF Policy Note,* No. 232, report that the COVID-19 induced a change in balance sheet composition form equity to debt borrowing to cover significant liquidity needs resulting from the COVID-19 pandemic.

([71]) OECD (BIAC) (2021), *Economic Policy Survey.*

([72]) ECB, 2021, Financial Stability Review, November. See also Bondt, G., Gieseck, A., Nicoletti, G., and M. Tujula (2021). 'Non-financial corporate health during the pandemic', *ECB Economic Bulletin* 6, September.

([73]) See European Commission (forthcoming), 'Corporate Vulnerability and Structural Developments post COVID-19: Challenges and Policy Responses', *Note for the Eurogroup* (

([74]) See Claeys, G., M. Hoffmann and G. Wolff (2021) 'Corporate insolvencies during COVID-19: keeping calm before the storm', Bruegel Blog, 7 January; Ebeke C., N. Jovanovic, L. Valderrama, and J. Zhou, 'Corporate Liquidity and Solvency in Europe during COVID-19: The Role of Policies', IMF Working Paper, No. 21/56 and Laeven L., G. Schepens and I. Schnabel, 'Zombification in Europe in times of pandemic', VoxEU.

Nevertheless, preliminary evidence suggest that this effect remains modest ([75]), and that business creation has rebounded since the second quarter of 2021 ([76]). Moreover, available research ([77]) suggests also that firms that received support are more positive about their investment outlook, as they found themselves in a better position to crowd-in investors and recapitalise.

Excessive corporate debt burden accumulated during the pandemic could also act as a drag on investment ([78]). For example, non-financial corporations' debt-to-GDP ratio (consolidated measure) rose from 77.2% in the first quarter of 2020 Q1 to 84.7% in the first quarter of 2021 – of which the largest part seems to be concentrated in a subset of already highly leveraged companies.

Such increases in debt might strengthen deleveraging needs thereby discouraging investment. For example, the Organisation for Economic Cooperation and Development (OECD) (2021) ([79]) reports that, on average, a percentage point increase in the equity leverage ratio between 2019 and 2020 was associated with a 2% drop in capital expenditures, suggesting that the persistence of a debt build-up strategy will ultimately weigh on investment in the medium term ([80]).

([75]) See Helmersson, T. et al. (2021), 'Corporate zombification: post-pandemic risks in the euro area', *ECB Financial Stability Review*, May 2021, Cros, M., A. Eupalard, P. Martin (2021), 'Will Schumpeter catch COVID-19? Evidence from France", VoxEU.

([76]) Eurostat (2021), Quarterly registrations of new businesses and declarations of bankruptcies - statistics.

([77]) Harasztosi, P., Maurin, L., Pál, R., Revoltella, D. and W. van der Wielen (2021), 'Policy support during the crisis: So far, so good?', paper presented at the EC Annual Research Conference 2021 making use of the 2021 vintage of the EIB Investment Survey (EIBIS) which contains a detailed set of questions regarding the nature of the policy support to firms during the Covid-19 crisis. They also report that there is no evidence that this support would have delayed the exit by firms that would otherwise have exited, even in the absence of crisis

([78]) On the accumulation of debt during the COVID-19 crisis in the Non Financial Corporations and related risks for investment decisions, see ECB (2021), *Financial Stability Review*, May.

([79]) Demmou, L., Calligaris, S., Franco, G., Dlugosch, D., Müge McGowan, A. and S. Sakha (2021), 'Insolvency and debt overhang following the COVID-19 outbreak: Assessment of risks and policy responses', O*ECD Working Paper*, No. 1651.

([80]) Microsimulations by Bénassy-Quéré, A, B Hadjibeyli, G Roulleau, (2021), 'French firms through the COVID storm: Evidence from firm-level data', VoxEU suggest that in France the debt overhang caused by the crisis could reduce corporate investment by almost 2% during the recovery phase. However, the authors do not take into account the impact of the French recovery plan. Similar results are reported by Maurin, L. and R. Pál (2020), 'Investment vs debt trade-offs in the post-COVID-19 European economy', *EIB Working Paper*, no. 2020/09.

Finally gross fixed capital formation differed notably across euro-area Member States during the pandemic (see Graph II.4 above). If these differences persist, they could lead to widening growth differentials in potential output, thereby weakening the convergence towards resilient economic structures across the euro area ([81]).

II.6. Conclusion

This section aimed at better understanding the macroeconomic transmission mechanisms of the COVID-19 crisis. This may be helpful to support policy design going forward and in case of comparable events.

This section suggests that lockdown measures to limit the spread of the virus had a strong adverse impact on gross fixed capital formation across the euro area. The impact varied across countries and over time, partly reflecting cross-country differences in economic structure and gradual learning and adaptation by economic agents.

The strong rebound in investment in a context of very strong (and temporarily held back) demand, favourable financing conditions and supportive public investments ([82]) provides reasons for optimism. However, it is still too early to assess the long-term impact of the COVID-19 crisis on GFCF. Available evidence suggests, however, that much of the long-run damage initially feared might have been avoided thanks to the bold policy response at the height of the pandemic and the comprehensive recovery strategy that has ensued.

With the support of the NextGenerationEU (NGEU) instrument flanked by appropriate structural reforms, Member States have an opportunity to implement a comprehensive investment and reform agenda offsetting risks of divergence.

([81]) The global financial crisis already produced long-lasting consequences on investment, resulting in diverging paths in the accumulation of capital that have reduced the resilience of the euro area. See EU Commission, 2021 'Adjustment to large shocks in the euro area - insights from the COVID-19 pandemic', *Technical note for the Eurogroup.*

([82]) See European Commission (2021), *Autumn 2021 Economic Forecast.*

III. Taxation of residential property in the euro area with a view to growth, equality and environmental sustainability

By Alexander Leodolter, Savina Princen and Aleksander Rutkowski

This section discusses economic effects of property taxation, which is a national competence. *It first provides an overview of recurrent residential property tax policies in euro area Member States. It then examines the design of efficient property taxation, which also includes removing the homeownership bias in taxation, and discusses the political economy of property tax reforms. Finally, the effects of recurrent residential property taxes on inequality and on environmental goals are explored. Overall, the economic literature reviewed in this section suggests that that well-designed recurrent taxes on residential property can be an important element of the tax mix and can help to foster growth while also addressing issues related to inequality and the green transition. A recurrent tax on residential property can thus be an important element of the tax mix if the tax is well-designed. Nevertheless, tax revenues from recurrent property taxes remain low in euro area Member States. Political economy considerations need to be addressed in the tax design. Also, it should be kept in mind that property taxation is a national competence. A consensus for a forward looking mix of tax, housing and other social and environmental policies could make it possible to reap the economic, social and environmental benefits of a sustainable and socially inclusive recurrent property tax.*

III.1. Introduction

A well-designed recurrent tax on residential immovable property can be an important element of a growth-friendly tax mix and help address policy issues related to inequality and environmental objectives. The COVID-19 pandemic has put economic activity under pressure, reducing output, investment and consumption. While stimulus measures were taken to cushion the economic shock, additional revenue measures may be needed in the medium -run as part of the policy response necessary to ensure sustainable debt levels. Recurrent immovable property taxes are among the taxes that are least distortive and least harmful to growth. In addition, if well-designed they can help reduce inequality of wealth and after-tax incomes and help provide the right incentives to address the global challenge of climate change ([83]). They may also be considered amongst the revenue sources least affected by increasing globalisation and tax base mobility. However, design of recurrent property taxes needs to carefully reflect possible drawbacks that underlie their widespread unpopularity.

This chapter is organised as follows: The following section sets out the economic principles for efficient, growth-friendly property taxation. Section 3 provides an overview of residential property taxation in the euro area and Section 4 briefly discusses the political economy of residential property taxes. Section 5 discusses the effect of property taxation on income inequality and Section 6 its effects on environmental goals. Section 7 concludes ([84]).

III.2. Taxation of immovable property in the euro area

Taxation of immovable property is rather low in many Member States. Immovable property taxation is a competence of the EU Member States. Graph III.1 shows the tax revenues from property taxes in euro area Member States. The contribution made by taxes on immovable property to Member States' budgets remains moderate. In 2019, revenue from these taxes was equivalent to 2.3% of GDP on average in the euro area, compared to labour (21.1%) and consumption taxes (10.9%) ([85]). They are similar in size to environmental taxes (2.3%) (see Graph III.2). More than half of all property tax revenues came from recurrent property taxes (1.3% of GDP), but there were sizable differences

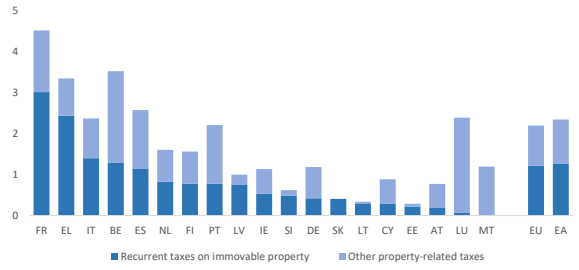
([83]) Taxation can help make the transition to an inclusive and climate-neutral economy, as set out by the European Green Deal, the roadmap for making the EU's economy sustainable by 2050 (European Commission communication (2019) 'The European Green Deal', COM (2019) 640 final). Property taxation in particular might be able to help support environmental goals by accounting for environmental effects in the calculation of the property tax base (see Section 5).

([84]) The taxation of commercial buildings differs from the taxation of residential property, as it is a form of taxation of intermediate inputs into production, and will therefore not be discussed in the context of this chapter.

([85]) Differences in the tax base however also have to be accounted for.

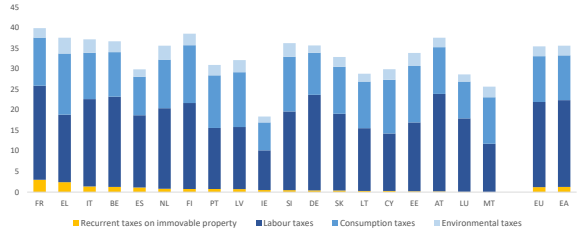
across Member States. While France had recurrent property tax revenues of 3.0% of GDP, Malta did not levy recurrent property tax at all (Graph III.1). While recurrent property tax revenues as % of GDP increased during the financial crisis, probably largely because of tax reforms in the wake of the crisis, their share in GDP has again been decreasing since 2015 ([86]).

Graph III.1: **Revenues from property taxation as % of GDP (2019)**



(1) 'Other property-related taxes' include taxes on net wealth, inheritance, gifts and other property items and on financial and capital transactions, including property transactions. Data does not include personal income tax on imputed rent.
Source: European Commission.

Graph III.2: **Tax revenues as % of GDP** *(2019)*



Source: European Commission.

Recurrent taxation of residential property differs significantly across euro area Member States, with value-based taxes being the most common. Table III.1 provides an overview of the laws in euro area countries regarding recurrent taxation of residential immovable property (see Leodolter et al 2022 ([87]) for more details). Almost all euro area countries use a recurrent tax on residential property. The most common tax base is the value of the property, either defined as capital value or annual rental value ([88]), although sometimes also the property area serves as the tax base. The value used as the property tax base can in practice differ substantially from the actual market value. While some countries have several residential property taxes, the only euro area country to tax imputed rents via the personal income tax system is the Netherlands. Also, capital gains from sales of primary residences are usually not taxed ([89]).

There are differences in the recurrent taxation of residential property in euro area countries when it comes to the tax base, the tax treatment of land and buildings and progressivity in relation to property values. Table III.1 shows differences in the tax design of residential recurrent property taxes in euro area countries. The most common tax base is the value of the property, either defined as capital value or annual rental value. In some countries there are differences between the taxation of land and the taxation of buildings in the form of an additional land tax or of differences in the tax rate or base. Also, as property taxes in the euro area are to a very large extent levied by local governments ([90]), many countries have at least one property tax where the final rate is within limits determined by the responsible municipality. Progressivity of residential recurrent property taxes in relation to the property value is rather the exception in the euro area and, if existent, mostly applies only to one of several taxes. Mortgage interest tax relief is still provided in some euro area Member States, even if some countries have recently limited the generosity of the tax relief or are phasing it out.

([86]) One reason for the increase and decrease is certainly to be found in the increase of housing stock values over time, which has been ben more even than the one of GDP.
([87]) Leodolter, A., Princen, S. and A. Rutkowski (2022), 'Immovable Property for Sustainable and Inclusive Growth', European Economy Discussion Paper 156.
([88]) For a discussion on the differences between capital value and annual rental value see UN-HABITAT (2013), 'Property Tax Regimes in Europe', The Global Urban Economic Dialogue Series, United Nations Human Settlements Programme.
([89]) Capital gains are however often only tax-exempt if the residence has been kept for a certain minimum period before sale.
([90]) See Leodolter et al (2022), *op.cit.*

Table III.1: **Recurrent taxation of residential immovable property in the euro area (2019)**

	Recurrent property tax	Tax base	Differences in treatment of land and structures	Limitation for the setting of tax rates in national law	Progressivity with respect to value of property	Exemptions of / Reductions for owner-occupied property	Imputed rent taxed via personal income tax	Mortgage interest tax relief for owner-occupied property
BE	yes	annual rental value	tax base is lower for land	minimum rate per region	-	reduction *	yes, but main residence is exempt	yes
DE	yes	multiple of annual average rent	-	minimum rate	-	-	-	-
EE	yes	capital value	only land is taxed	maximum and minimum rate	-	-	-	yes
IE	yes	capital value	-	fixed rates	yes	-	-	-
EL	yes	area / capital value	higher rates for buildings (partly)	fixed rates / maximum and minimum rate	partly	-	-	-
ES	yes	capital value	-	minimum rate	-	-	-	-
FR	yes	capital value / annual rental value	additional tax only on dwellings	fixed rates /no limitation for local authorities	partly	reductions	-	-
IT	yes	annual rental value	-	maximum and minimum rates	-	exemption (for certain property types reduction)	-	yes
CY	-	n.a.	n.a.	n.a.	n.a.	n.a.	-	-
LV	yes	capital value	-	fixed rates	yes	-	-	-
LT	yes	capital value	additional land tax	fixed rates / maximum and minimum rates	partly	-	-	-
LU	yes	capital value	-	no limitation for local authorities	-	-	-	yes
MT	-	n.a.	n.a.	n.a.	n.a.	n.a.	-	-
NL**	yes	capital value	-	no limitation for local authorities	depends on municipality	-	yes	yes
AT	yes	capital value	additional tax only on land value	maximum rates / fixed rate	partly	-	-	-
PT	yes	capital value	-	fixed rate / maximum and minimum rates	partly	Possible reduction or exemption by municipalities (partly)	-	-
SI	yes	area / capital value	different rates and valuation systems for buildings and land	no limitation for local authorities / fixed rates	-	-	-	-
SK	yes	capital value / area	different rates and valuation systems for buildings and land	rate that can be changed by municipalities / fixed rate ***	-	-	-	-
FI	yes	capital value	-	maximum and minimum rates	-	-	-	yes

(1) : Differences in treatment of land and structures refers to the taxation of developed land. '-' means not existent, 'n.a.' means not applicable, 'partly' means that there are several recurrent property taxes in the Member State and that the feature of the respective column applies to at least one but not all of these taxes. '/' separates information on different property tax regulations within one Member State. Imputed rent taxation as part of personal income taxation is not included in the table. * Only if the (deemed) annual rental value of the taxpayer's properties in the region (for Wallonia: in Belgium) does not exceed EUR 745. ** Landlord charge, which only applies if more than ten dwellings are rented out for which rent is below a maximum threshold, is not considered here. *** Municipalities may add a surcharge with a maximum amount per floor for buildings but not apartments.

Source: IBFD

III.3. Economic principles for taxing immovable property

Recurrent taxes on residential immovable property are widely considered to be one of the tax types least detrimental to growth. Property taxes offer several advantages in view of growth-friendly taxation: First, property ownership is generally easy to establish and identify. Also, the fixed geographic location of immovable property makes the taxes difficult to evade. Furthermore, recurrent taxes on residential immovable property offer a stable and predictable revenue source and usually have little impact on economic activity and on economic agents' decisions to supply labour or save and invest. To the extent that they do influence behaviour, they can be an incentive for taxpayers to put their property to optimal use. This applies in particular to land value-based taxes, as taxes on the building value can also discourage construction and renovation activity. Studies on the overall impact of recurrent property taxes on economic growth identify them as a highly growth-friendly tax type (Arnold 2008, Arnold et al. 2010) ([91]). However, valuation of property may be

([91]) Arnold, J. (2008), 'Do Tax Structures Affect Aggregate Economic Growth? Empirical evidence from a panel of OECD countries' *Economics Department Working Paper No. 643*, OECD, Paris.
Arnold, J., Brys, B., Heady, C., Johansson, A., Schwellnus, C. and L. Vartia (2010), 'Tax Policy for Economic Recovery and Growth' *The Economic Journal 121 (February)*. It should however be noted that some studies, like Baiardi D., Profeta P., Puglisi, R. and S. Scabrosetti (2019) 'Tax policy and economic growth: does it really matter?' *International Tax and Public Finance* 26: 282–316 find no effect of different tax types on growth.

challenging and require extensive administrative capacity. Also, homeowners with low incomes, such as for example pensioners, might have difficulties to pay the tax (see Section 5).

Recurrent taxes on immovable property seem to be - at least partially - capitalised into the net selling prices of property. If the supply of immovable property is completely inelastic, then the only consequence of a newly introduced or increased recurrent immovable property tax should be a reduction of the selling price of property, i.e. windfall losses by present property owners. . Empirical evidence on the degree of capitalisation of immovable property taxes into house prices suggests mostly partial capitalisation of a varying degree (Sirmans, Gatzlaff and Macpherson 2008) ([92]). However, there are also studies providing evidence for full capitalisation or showing no evidence for capitalisation at all. A pure land tax provides the most favourable economic incentives, as it should be fully capitalised in case of sale and the net selling price should decrease by the amount of the tax. As the supply of land is fixed, taxing land is a form of taxing economic rents, which implies no behavioural effects on the side of the taxpayer including no reduction of investment ([93]).

Owner-occupied property generally receives highly favourable tax treatment in the euro area. Whereas income from renting out property as well as from other forms of capital is taxed in euro area Member States, the imputed rents of owner-occupiers, i.e. their savings from not having to pay rent, are not taxed ([94]). This is often justified by the positive effects of homeownership: homeowners may experience a higher increase of net wealth over time, enjoy better health, may be more engaged in the local community and experience higher life satisfaction. Moreover, the children of homeowners' might achieve higher educational attainment and a high homeownership rate might also reduce crime. However, it is often difficult to isolate the role of homeownership, as its effects might be influenced by unobserved individual characteristics that also affect the decision to own a home ([95]). Also, some studies show no significant positive effects of homeownership, have inconclusive results or even find a negative impact. Moreover, homeownership might make labour suppliers less mobile and decrease employment (Blanchflower and Oswald 2013 ([96]), Laamanen 2017 ([97])) ([98]). In addition, homeowners might be more likely to oppose new residential developments in an area, thereby limiting housing supply.

The favourable tax treatment of owner-occupied property creates market distortions, which are only partially corrected through recurrent property taxation at its current levels. If the aim is to tax owner-occupied housing neutrally relative to other forms of investment, then its return on investment, i.e. imputed rents, should be taxed like other capital income ([99]). In

([92]) Sirmans, S., Gatzlaff, D. and D. Macpherson (2008), 'The history of property tax capitalisation in real estate', *Journal of Real Estate Literature* 16(3): 327-344.

([93]) Høj, A., Jørgensen, M. and P. Schou (2018) 'Land Tax Changes and Full Capitalisation', *Fiscal Studies* 39 (2)) find full capitalisation of land value taxes into house prices in Denmark. In line with this, moving from a tax on overall property value to one on land value seems to increase economic activity, such as residential construction or building alteration (see Murray, C. and J. Hermans (2019) 'Land value is a progressive and efficient property tax base: Evidence from Victoria', OSF Preprints. https://doi.org/10.31219/osf.io/mxg3j. and Gemmell, N., A. Grimes and M. Skidmore (2019) 'Do Local Property Taxes Affect New Building Development? Results from a Quasi-Natural Experiment in New Zealand', *Journal of Real Estate Finance and Economics* 58: 310–333..

([94]) The only exception to this is the Netherlands, but the values for imputed rents are usually much lower than market rents. However, property is also taxed through local recurrent property taxation in addition to the tax on imputed rents in the Netherlands.

([95]) For a discussion of the literature on the effects of homeownership including methodological questions see Dietz, R. and D. Haurin (2003), 'The social and private micro-level consequences of homeownership', *Journal of Urban Economics* 54: 401–450 and Rohe, W. and M. Lindblad (2013), 'Re-examining the social benefits of homeownership after the housing crisis.' Paper originally presented at 'Homeownership Built to Last: Lessons from the Housing Crisis on Sustaining Homeownership for Low-Income and Minority Families' – A National Symposium held on April 1 and 2, 2013 at Harvard Business School in Boston, Massachusetts.

([96]) Blanchflower, D. and A. Oswald (2013), 'Does High Homeownership impair the Labour Market?', *NBER Working Paper* 19079.

([97]) Laamanen, J.-P. (2017), 'Home-ownership and the Labour Market: Evidence from Rental Housing Market Deregulation', *Labour Economics* 48: 157-167.

([98]) The reduction of employment may be due to a higher homeownership rate causing increased job competition because of homeowners' higher job search activities and their lower reservation wages in a situation of less than perfectly elastic labour demand or also causing reduced consumption by homeowners. A higher unemployment rate specifically among homeowners would appear intuitive due to their lower mobility, but could not be found.

([99]) It should be added that there are also differences in the taxation of other types of capital income in euro area Member States. For an overview of the taxation of capital income in the EU see Princen, S., Kalyva, A., Leodolter, A., Denis, C., Reut, A., Thiemann, A. and V. Ivaskaite-Tamosiune (2020), 'Taxation of Household Capital in EU Member States: Impact on Economic Efficiency, Revenue & Redistribution', *European Economy Discussion Paper* 130.

this case, the costs, which come with the investment into housing, such as mortgage interest, should be deductible from taxable income. In addition, gains from transactions of owner-occupied property should be taxed equally to other capital gains. In reality, owner-occupied property receives a favourable income tax treatment relative to other investments: As mentioned in Section 2, taxation of imputed rents via the personal income tax system is practically inexistent and, on top of this, mortgage interest tax relief is granted in some euro area Member States, while also capital gains from the sale of the main residence are often tax-free. Recurrent property tax at its current low levels can only partially make up for this distortion and the result is a tax bias favouring owner-occupied housing, which has been estimated to lead to "excess" housing purchases of more than 30% of the financial assets held by homeowners (Fatica and Prammer 2018) ([100]). In the absence of imputed rents taxation, a well-designed lower recurrent property tax combined with the removal of mortgage interest tax relief seems the most realistic way forward if the goal is to reduce distortions ([101]). Mortgage interest tax relief has also shown to have other disadvantages: It acts as an incentive for households to take on and maintain higher debts, can contribute to increased and more volatile house prices (Turk 2015 ([102]), Andrews 2010 ([103])) and may actually reduce homeownership by increasing mortgage sizes and thereby making it more difficult for financially constrained households to obtain a mortgage and by increasing housing transaction costs and thereby increasing the opportunity cost of owning a house (Hilber and Turner 2014 ([104]), Bourassa and Yin 2008 ([105])).

Asset-rich but income-poor households might require special provisions. As the tax base of property taxes are illiquid assets, some taxpayers with low incomes and large properties might have difficulties to pay them. For these situations, the use of tax reductions and deferral schemes might be called for (see also III.5).

Transaction taxes on immovable property give rise to potentially large economic distortions. Taxes on the transfer of immovable properties make investment into property less attractive and distort the allocation of properties by putting an extra cost on property transfers. Also, they discourage labour mobility. Moreover, revenues tend to be procyclical and very volatile, as significant revenue increases in boom phases are followed by decreases in downturns. On the other hand, transaction taxes are sometimes seen as reducing speculation and mitigating the risk of housing market bubbles. However, the effect remains empirically ambiguous and macro-prudential policies such as capital requirements or loan-to-value limits seem more suitable (Crowe et al. 2011) ([106]). Transaction taxes might even be counterproductive, as a reduction in the number of transactions might make property prices more volatile.

III.4. Political economy issues

Low revenue from immovable property taxes is often explained by low public acceptability of property taxes, but the evidence is not clear. It is often argued that public reservations towards property taxes are particularly strong and would dampen the political willingness to rely on them. The available evidence is, however, not unequivocal. While Hammar et al. (2008) ([107]) find for Sweden that the recurrent property tax is highly unpopular, a UK survey on the perceived fairness

([100]) Fatica, Serena and Doris Prammer (2018), 'Housing and the Tax System: How Large Are the Distortions in the Euro Area?', *Fiscal Studies* 39(2): 299–342. See also Figari, F., Verbist. G. and F. Zantomio (2019), 'Homeownership Investment and Tax Neutrality: A joint assessment of income and property taxes in Europe', *Ca' Foscari University of Venice Working Paper* 27/2019 as well as the user cost of housing indicator in Leodolter et al (2022), *op.cit*.

([101]) A tax on net imputed rents reflecting the rents' true value might be difficult to maintain when house prices increase over time. As recurrent property taxes will realistically not reach the level of an efficient tax on imputed rents either, mortgage interest tax relief should not be granted, if the goal is a tax with little distortion (see Johannesson-Linden, Å and C Gayer (2012), 'Possible reforms of real estate taxation: Criteria for successful policies', *European Economy Occasional Paper* 119).

([102]) Turk, R. (2015), 'Housing Price and Household Debt Interactions in Sweden', *IMF Working Paper* 15/276.

([103]) Andrews, D. (2010), 'Real House Prices in OECD Countries - The Role of Demand Shocks and Structural and Policy Factors', *Economics Department Working Paper* 831, OECD, Paris.

([104]) Hilber, C. and T. Turner (2014), 'The Mortgage Interest Deduction and its Impact on Homeownership Decisions', *The Review of Economics and Statistics* 96(4): 618-637.

([105]) Bourassa, S. and M Yin, (2008) 'Tax Deductions, Tax Credits and the Homeownership Rate of Young Urban Adults in the United States', *Urban Studies* 45(5&6): 1141–1161.

([106]) Crowe, C., Dell'Ariccia, G., Igan, D. and P. Rabanal (2011), 'How to Deal with Real Estate Booms: Lessons from Country Experiences', *IMF Working Paper* 11/91.

([107]) Hammar, H., Jagers, S. and K. Nordblom (2008), 'What explains attitudes towards tax levels? A multi-tax comparison', *Fiscal Studies* 29(4): 523-543.

of different taxes (YouGov, 2015 ([108])) finds the recurrent property tax to be in the middle, it is seen as less fair than income tax but substantially fairer than, for example, inheritance tax. As property taxes are highly visible, taxpayers might overestimate their size compared to other, less visible taxes, for example labour taxes withheld at source or consumption taxes paid in smaller amounts (see also Cabral and Hoxby 2012 ([109])). Also, the fact that information on the incidence of the tax and its redistributive impact is often missing might add to public reservations. Moreover, depending on the design of the tax, liquidity-constrained households might be concerned about their ability to pay it.

The immobile tax base of immovable property taxes leaves little room for taxpayers to change behaviour. Whereas income or consumption taxes allow for at least limited reactions to a tax increase, owners of immovable property are more restricted in their possible reaction, especially in the case of a land tax. Consequently, affected citizens might voice their discontent more clearly than in the case of the increase of another tax, where they can react to a tax change by adapting their labour supply or consumption behaviour.

Ongoing revaluation often proves contentious. Recurrent property tax is, contrary to income or consumption taxes, based on a value which needs to be assessed and the tax base may therefore be disputed. In addition, a revaluation will usually increase the tax base and increases will not be equal for all properties, thereby increasing the risk for contention. Regular revaluations at shorter intervals will not only keep the tax efficient, but might also be more acceptable than irregular and less frequent valuation, given that property owners will face smaller and more predictable increases. Also, the costs of ongoing revaluation are apparently preferable to the annualised costs of irregular revaluations (UN-HABITAT 2013 ([110])). Denmark, for example, will begin performing biannual valuations combining statistical estimates based on property sales prices and individual housing characteristics with individual discretionary judgements starting in 2024. In the Netherlands the municipalities do a yearly assessment based on property sales prices and house characteristics.

Since property taxes are often levied at local level, reforming property taxation may affect the revenue distribution across government levels. While mortgage interest relief is often paid by central level governments, recurrent property taxes or transaction taxes are often levied by municipalities or regions. A reform of property taxes might therefore require measures to balance out revenues at different government levels in order to receive broad support. In addition, local governments might find it more difficult to increase taxes than central governments, as they are in closer contact with the public.

III.5. Immovable property taxation and inequality

The effect of existing property taxes on income inequality does not seem to be very pronounced. The impact of immovable property taxes on income and wealth inequality depends on different factors, such as the distribution of property, the design of the tax and its capitalisation into property prices. Studies on the overall effect of increasing recurrent property taxes on income inequality provide mixed results. While Alves and Alfonso (2019) ([111]) find that an increase of immovable property tax revenues reduces income inequality in OECD countries, even more significantly so in the long run, Akgun et al. (2017) ([112]) find no effect of higher recurrent property tax as a share of GDP on income distribution in the OECD. The low impact on income inequality is likely to be linked to the low level of property taxation in the euro area but also to tax design issues. In order to assess the progressivity of taxation of household savings with respect to income, the OECD has calculated marginal effective tax rates (METRs) for these different savings types at different income levels. The METRs on owner-occupied property are overall marginal tax rates for the average of asset holdings for each income level and they take into account all property-related taxes ([113]). As can be

([108]) YouGov (2015), 'Voters in all parties think inheritance tax unfair', https://yougov.co.uk/topics/politics/articles-reports/2015/03/19/inheritance-tax-most-unfair.
([109]) Cabral, M. and C. Hoxby (2012), 'The Hated Property Tax: Salience, Tax Rates, and Tax Revolts', *Working Paper* 18514.
([110]) UN-HABITAT (2013), *op.cit.*
([111]) Alves, J. and A. Alfonso (2019), 'Tax structure for consumption and income inequality: an empirical assessment', *SERIEs* 2019/10: 337–364. https://doi.org/10.1007/s13209-019-00202-3
([112]) Akgun O., Cournède B. and J.-M. Fournier (2017), 'The effects of the tax mix on inequality and growth', *Economics Department Working Paper* No. 1447, OECD, Paris.
([113]) These taxes are recurrent taxes on immovable property, transaction taxes, possible taxes on income, mortgage interest tax

seen in Graph III.3, they do not seem to increase too strongly for higher income levels and in some Member States METRs on owner-occupied housing do not at all increase with income. Also, due to relatively generous mortgage interest tax relief, METRs can in some cases even be negative. As immovable property makes up a substantial amount of households' total wealth (more than 67% in the euro area ([114])), property taxation can also impact wealth inequality.

The overall home ownership tax bias in personal income taxation only weakly affects income inequality. While the favourable taxation of homeownership creates non-negligible efficiency losses, its effect on inequality is small. Fatica and Prammer (2018) ([115]) find that the effects on the user cost of housing change only slightly for different income quintiles in 14 euro area countries. Similarly, Figari et al. (2017) ([116]) also find that abolishing the favourable tax treatment of homeownership would only lead to a small reduction of disposable income inequality.

Graph III.3: **Marginal effective tax rates on owner-occupied housing at various wage levels of owner (2016)**

(1) No data were available for Cyprus and Malta.
Source: OECD

relief and capital gains taxes, when applicable. The investment is debt-financed. The taxpayer at 67% of the average wage has an annual combined (labour plus capital) income equal to 67% of the average wage, with no or minimal net wealth. The taxpayer at 100% of the average wage has a combined income equal to 100% of the average wage, with net wealth equal to six times the average wage, of which three-quarters is held in residential property. The taxpayer at 500% of the average wage has an annual combined income equal to 500% of the average wage, with net wealth equal to twenty times the average wage, of which half is held in residential property. For more information on the calculation see OECD (2018) 'Taxation of Household Savings', OECD Tax Policy Studies, No. 25, OECD Publishing, Paris.

([114]) See European Central Bank Household Finance and Consumption Survey (HFCS) wave 2017.

([115]) Fatica, S. and D. Prammer (2018), *op.cit.*

([116]) Figari, F., Paulus, A., Sutherland, H., Tsaklogiou, P., Verbist, G. and F. Zantomio (2017), 'Removing Homeownership Bias in Taxation: the Distributional Effects of Including Net Imputed Rent in Taxable Income', *Fiscal Studies* 38 (4), 525-557.

Assessment methods may lead to preferential tax treatment of higher-income households. Several studies have found that owners of low-priced properties tend to suffer from "assessment regressivity", i.e. that their properties have a higher assessed value relative to the sales price of the property than higher-priced properties, leading to lower effective tax rates for higher-income households ([117]). If property values are not regularly updated, the tax base will not take into account the differences in value increases between regions or property types, resulting in an unequal tax treatment of properties of equal value.

Whereas the current taxation of immovable property in the euro area is not particularly conducive to reducing income inequality, some authors have stressed that the tax could be made more redistributive via design changes. A way to reduce inequality could be to increase the progressivity of recurrent residential property tax rates in relation to the property value. Due to the fact that behavioural effects related to recurrent property taxes are typically small, this measure would also not increase the distortive effect of the tax system on the economy. In addition, accompanying this with a reduction of the recurrent property tax based on the number of inhabitants, might be justified from the point of view that housing is a basic consumption good ([118]). Alternatively, the reduction could be made income-dependent to be more targeted and help foster homeownership of poorer, financially constrained households ([119]). A reform that increases the progressivity of the tax rate schedule in relation to property and also includes tax reductions for low-income households was shown to have a favourable impact on lower-income households relative to those with higher incomes in simulations for Ireland (O'Connor et al. 2016) ([120]).

([117]) This might be due to flawed valuation methods, but the reasons are not clear (see for example McMillen, D. and R. Singh (2020), 'Assessment Regressivity and Property Taxation', *Journal of Real Estate Finance and Economics* 60:155–169.

([118]) The reduction should be independent of the size or value of the property, only apply to the household's main residence and always be granted to the occupant of the building. In Belgium for example, tenants are allowed to reduce their rent accordingly.

([119]) However, as discussed above, the evidence on the effects of homeownership for society is not always clear.

([120]) O'Connor, B., Hynes, T., Haugh, D. and P. Lenain (2016), 'Searching for the Inclusive Growth Tax Grail: The Distributional Impact of Growth Enhancing Tax Reform in Ireland', *The Economic and Social Review* 47(1): 155-184. However, the simulation included a move from a very mildly progressive banded valuation system to a more progressive one with one rate per dwelling, where higher rates apply to more valuable dwellings. ()

Finally, reducing inequality via recurrent residential property taxation needs taking into consideration the overall tax structure of the country and in particular the design of taxes on other capital income types.

Mortgage interest tax relief primarily benefits higher-income households and increases income inequality. Mortgage interest relief from personal income tax has been shown to benefit households with higher incomes more than those with lower incomes. They receive a larger part of the overall tax relief and also experience a higher percentual increase of their disposable income due to the tax relief (Matsaganis et al. (2007) ([121]), Fatica 2015 ([122]), Leodolter and Rutkowski (forthcoming) ([123])) and their user-cost of housing sees a stronger reduction (Fatica and Prammer (2018) ([124])). Also, mortgage tax relief leads to greater income inequality (Leodolter and Rutkowski (forthcoming) ([125])) in most Member States.

A particular aspect of inequality that is relevant in the case of property taxation concerns asset-rich but income-poor households. Sometimes, people with low incomes, such as for example pensioners, might own relatively large houses and might not be able to pay the property tax. In this case, the use of tax deferral schemes until the point of sale might be coupled with the income-dependent property tax reduction to avoid increasing inequality in order to support income-poor households ([126]).

III.6. Immovable property tax and environmental goals

A value-based property tax base could discourage investments serving environmental objectives. Buildings in the EU are responsible for 40% of EU energy consumption and 36% of EU greenhouse gas emissions ([127]). Therefore, improving energy efficiency in buildings has a key role to play in achieving carbon-neutrality by 2050. While improving the energy efficiency of buildings is important to meet climate and energy objectives, the tax base is likely to increase as a result of the improvement ([128]). A value-based recurrent property tax could therefore discourage efforts to improve the building stock, if energy consumption taxes do not already factor in the full external environmental cost of energy consumption. Consequently, and as energy taxes cover the external costs of energy consumption only partially in reality, the energy performance of buildings could be included in an adjustment of the property tax base. Davis et al. (2017) ([129]) show that using a tax base assessment based on the energy performance of a building and thereby redistributing the tax burden from more energy-efficient to less energy-efficient buildings, would shift taxation from suburban to rural properties, while the taxation of urban properties would remain largely unchanged. Also, while taxes for apartments would decrease, the ones for terraced houses would increase. Distributional effects will have to be taken into account, if the tax base is adjusted to buildings' energy performance, as households with higher incomes might more likely own energy-efficient buildings.

Moreover, the tax base might need to consider infrastructure costs and the positive external effects of using land for non-residential purposes. Recurrent property taxes usually do not factor in the full cost of public infrastructure as

Matsaganis, M. and M. Flevotomou (2007), "The Impact of Mortgage Interest Tax Relief in the Netherlands, Sweden, Finland, Italy and Greece", *Euromod Working Paper* 2/07.

() Matsaganis, M. and M. Flevotomou (2007), "The Impact of Mortgage Interest Tax Relief in the Netherlands, Sweden, Finland, Italy and Greece", *Euromod Working Paper* 2/07.

([122]) Fatica, S. (2015), "Housing taxation: from micro design to macro impact", *Quarterly Report on the Euro Area* (QREA) 14(1), 27-33.

([123]) Leodolter, A. and A. Rutkowski (forthcoming), "The Fiscal and Distributional Effects of Removing Mortgage Interest Tax Relief in EU Member States"; *European Economy Economic Brief.*

([124]) Fatica, S. and D. Prammer (2018), op.cit.

([125]) Leodolter, A. and A. Rutkowski (forthcoming), *op.cit.*

([126]) While tax reductions or deferrals are able to help asset-rich low income households, there is however the downside that, if owners remain in houses that are too large for them, they might deprive others, for example younger families with children, of the chance to buy them, and also use high amounts of energy in order to be able to live in the house. On the other hand, having to move out of a neighbourhood and to cut social ties can also bear a substantial – also non-monetary - cost, especially for older homeowners.

([127]) European Commission News 17 February 2020, 'In focus: Energy efficiency in buildings' (https://ec.europa.eu/info/news/focus-energy-efficiency-buildings-2020-feb-17_en)

([128]) Fuerst, F., McAllister, P. Nanda, A. and P. Wyaff (2015), 'Does energy efficiency matter to home-buyers? An investigation of EPC ratings and transaction prices in England', *Energy Economics* 48: 145-156 show that a higher energy efficiency rating significantly increases the transaction price of a property. They find a premium of 5% for dwellings rated A/B and of 1.8% for those rated C compared to those rated D.

([129]) Davis P., M. McCord, W.J. McCluskey, E. Montgomery, M. Haran and J. McCord (2017), 'Is Energy Performance too taxing: A CAMA approach to modelling residential energy in housing in Northern Ireland', *Journal of European Real Estate Research* 10/2: 142-148.

well as the cost of environmental externalities. They can therefore be conducive to excessive use of land and urban sprawl, with detrimental effects on the environment, for example because of increased energy consumption due to higher transport needs ([130]) ([131]). A general land value-based tax might be well-suited to address this problem, as it can support more economical use of land. At the same time, lower rates for certain non-residential purposes can be used to take account of the positive external effects of, for example, open spaces, forests or farmland and to prevent their conversion for profit-making purposes. However, the effect of immovable property taxes on land use is small (Meng and Zhang 2013) ([132]) and has to be viewed in the context of planning instruments such as regulations and transport taxes. Yet, higher tax rates or bases than is currently the case might be able to increase the impact of property taxes on landowner's land use decisions. Progressive tax rates on residential property can also contribute to a more energy-efficient construction of houses and behaviour of homeowners by helping lower the demand for large immovable properties, which in turn reduces the consumption of energy and materials by wealthy households ([133]). In addition, reducing the favourable taxation of owner-occupied vis-à-vis rented housing as well as decreasing the distortive property transaction taxes could reduce the environmental damage resulting from transport, as there would potentially be fewer financial obstacles to move house to be closer to one's workplace.

III.7. Conclusions

The economic rationale for recurrent residential property taxation is strong, but the taxation of property is relatively low in many euro area Member States. Recurrent taxes on residential property are considered to be among the taxes least detrimental to growth. They can capture economic rents attached to land, constitute an immobile, stable tax base and are less distortive to economic growth than many other taxes. Despite these qualities, they are rather low compared to other taxes in many Member States. This can partly be explained by political economy considerations: the assessment of the property tax base might be disputed and the taxes might face reservations, as they are highly visible and leave little room for taxpayers to react. The appropriate design of the tax such as a lighter tax burden on lower value properties or on those with lower incomes, who in addition might face liquidity issues, and the payment of smaller amounts at a higher frequency instead of an annual tax payment might help address these reservations. Furthermore, as revenues often go to sub-central government levels, reforms should be accompanied by measures to balance out revenues at different government levels. Finally, property taxes very often do not sufficiently take equity and environmental issues into account.

Regular updates of the property tax base can help to keep recurrent housing property taxation non-distortive and fair. Phasing-out mortgage interest relief can both increase the efficiency of the tax and reduce income inequality. A regular update of the property tax base ensures that the latter reflects actual market values. Regular updates make the property tax efficient and fair in the sense that properties of equal value are not treated differently because of past differences in value. A land-value based tax has the advantages of taxing economic rents and not discouraging building activity. Tax relief for mortgage interest, however, contributes to the homeownership tax bias and favours higher-income households.

Inequality can be reduced also via other design features, like a progressive tax rate schedule. The use of a progressive recurrent property tax schedule would at the same time reduce income and wealth inequality while ensuring that the tax system remains growth-friendly. Similarly, the introduction of per capita or income-based property tax reductions might also be able to help reduce inequality. Also, deferred or reduced tax payments might be needed to support asset-rich but income-poor households. More in general, improving the fairness of property taxes should be considered in the broader context of the distributional effects of the taxation of wealth and income in the country's tax system.

([130]) See Brandt, N. (2014), 'Greening the Property Tax', *OECD Working Paper on Fiscal Federalism* 17.

([131]) In addition, 'tax holidays', i.e. tax abatements granted to new buildings for a limited time, increase the incentive to invest into new buildings rather than existing ones and thereby lead to inefficient land use.

([132]) Meng, L. and D. Zhang (2013), 'Impacts of property tax on land use change decisions in Georgia', *Urban Ecosystems* 16:3-12.

([133]) See Clune, S., Morrissey, J. and T. Moore (2012), 'Size matters: House size and thermal efficiency as policy strategies to reduce net emissions of new developments', *Energy Policy* 48: 657–667 and Wilson, A. and J. Boehland (2005), 'Small is Beautiful – U.S. House Size, Resource Use, and the Environment', *Journal of Industrial Ecology* 9 (1-2): 277-287.

Making the immovable property tax base more apt at achieving environmental goals requires taking into account the energy performance of the building. Reforming the tax base assessment by accounting for the building's energy performance and reducing the incentives for excessive land use can support environmental objectives. In order to combine environmental and social objectives, aprogressive recurrent property taxes might be able to counteract the fact that environmentally-related tax expenditures tend to benefit higher-income homeowners more than those with lower incomes.

IV. Revisiting the link between government debt and sovereign interest rates in the euro area

By Stéphanie Pamies, Nicolas Carnot and Anda Patarau

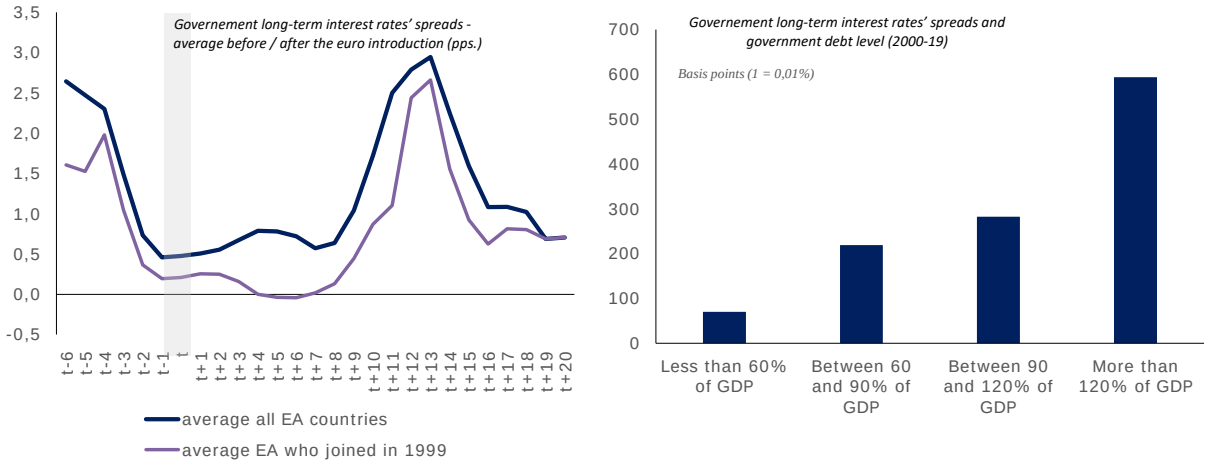
This section explores the determinants of sovereign interest rate spreads of euro-area countries (in relation to Germany). It focuses on the role of fiscal, macroeconomic and institutional fundamentals, considering also some contextual factors such as global risk aversion and controlling for the influence of central banks' asset purchases. Through extensive testing of various (fiscal) variables, interactions and non-linearities, the analysis confirms that sovereign spreads respond to fundamental variables, especially government debt, in non-linear fashion. The results also show that structural factors can largely mitigate the government debt impact on spreads, as the marginal effect of government debt on spreads would be close to zero in countries with the highest potential growth and strongest institutions. From a policy angle, the results remind us that, even in an environment of persistently low rates, governments with less solid fundamentals pay more than others to borrow and are exposed to higher risks. They highlight that policies reinforcing potential growth and government effectiveness can be expected to improve investors' perception of sovereign risk and their forbearance of higher debt.

IV.1. Developments in interest rates and spreads

Interest rates paid by governments on their debts have fallen for decades, but cross-country differentials between such rates (bond yields), also known as spreads, have behaved idiosyncratically. This is conspicuous in Europe, particularly within the euro area. Differentials between yields on euro-area government bonds fell already in the years preceding the Economic and Monetary Union (EMU), shot up in the global financial and euro-area debt crises, and since then have hovered at non-negligible levels (see Graph IV.1 – left panel). There are recurrent market spikes such as those affecting Greece in 2015, Italy in 2018, and vulnerable countries across the board at the onset of the COVID-19 crisis in March 2020.

In this study, we investigate the relationships between spreads on euro-area government bonds and fundamental factors. A casual look at the data suggests that spreads are correlated with fundamental characteristics, such as public debt levels (see Graph IV.1 – right panel). However, that influence is unlikely to obey simple laws, making it a challenge to capture it in empirical work. Building on the existing literature, we conjecture that fundamental conditions likely to affect spreads (called 'spread fundamentals') are of

Graph IV.1: **Government spreads' developments and their relation to government debt level, euro-area countries**



(1) The left panel graph represents the (non-weighted) average nominal spreads on 10-year government bonds (in relation to German yields) calculated, respectively, over all euro-area members and those who joined the euro area in 1999, i.e. Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. Year t represents the year when the euro was introduced. The right panel graph represents the average spreads depending on the government debt-to-GDP ratio level (calculated over all euro-area countries on data since 2000).
Source: Ameco, ECB, authors' calculations.

three main kinds: fiscal, macroeconomic (including external), and institutional. Moreover, we also consider 'context' variables, measuring financial market conditions (e.g. through indicators capturing international risk aversion, liquidity proxied by the size of the sovereign debt market) and the role of monetary policy, including the Eurosystem programme of government securities purchases ([134]).

IV.2.A glance at the literature

The literature finds significant effects of fundamental factors on spreads, starting with fiscal variables such as the stock of government *debt* or 'flow' fiscal determinants, such as the *primary balance* or *gross financing needs* ([135]), with evidence of non-linearity ([136]), possibly connected to debt limits ([137]).

Some papers also find non-fiscal imbalances to be an important determinant of government spreads. These include the *net international investment position* (NIIP) ([138]), *current account* and the *real effective exchange rate* ([139]).

More generic variables such as GDP growth or the quality of institutions are also considered. The strength of growth as a proxy of future taxes and as such of earning and repayment capacity appears in different forms - potential growth ([140]), actual growth, unemployment rate ([141]). More recently, some papers have explored the incidence of institutional factors such as environmental, social and governance indicators ([142]), better fiscal institutions (measured by the Commission's fiscal rule index ([143]), governance or political factors, with a focus on emerging countries ([144]). Chen and Chen (2018) and Jeanneret (2018) ([145]) find that the quality of public institutions has an effect on default probability. Gomez-Puig et al. (2014) ([146]) tests the impact of economic policy uncertainty on spreads. These variables may capture aspects of the government's ability or willingness to collect revenues and preserve fiscal discipline.

In addition to fundamental variables, financial and monetary conditions too contribute to explaining spreads. These comprise indicators of *liquidity* such as the market size of the national government debt or bid-ask spreads ([147]), *global risk sentiment*, captured e.g. by the VIX or VSTOXX index ([148]), the potential 'catalytic effect' of *official lending* on countries such as Greece, Ireland,

([134]) The full set of specifications, results and robustness checks in this study is available in Pamies, S., Carnot, N., and A. Patarau (2021), 'Do Fundamentals Explain Differences between Euro Area Sovereign Interest Rates?', *European Economy Discussion Paper*, No. 141, June. For instance, the approach adopted and variables chosen are more extensively explained in this Discussion Paper.

([135]) See 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; 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.

([136]) See De Grauwe, P. and Y. Ji (2012), 'Mispricing of sovereign risk and multiple equilibria in the eurozone', *CEPS working document*, No. 361; Afonso et al. (2015), op. cit.

([137]) Gosh, A. R., Kim, J. I., Mendoza, G., Ostry, J. D. and Qureshi, S. (2013), 'Fiscal fatigue, fiscal space and debt sustainability in advanced economies', *The Economic Journal*, Vol. 123, Issue 566, Fournier, J.-M. and F. Fall (2017), 'Limits to government debt sustainability in OECD countries', *Economic modelling*, Vol. 66; Cerovic, S., Gerling, K., Hodge, A. and P. Medas, P. (2018), 'Predicting Fiscal Crises', *IMF Working paper*, No. 18/181; and Berti, K., M. Salto and M. Lequien (2012), 'An Early-Detection Index of Fiscal Stress for EU Countries', *European Economy Economic Paper*, No. 475.

([138]) See 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.

([139]) See De Grauwe and Ji (2012), *op. cit.*; Afonso et al. (2015), *op. cit.*; and Capelle-Blancard et al. (2019), *op. cit.*

([140]) Poghosyan, T. (2012), 'Long-run and short-run determinants of sovereign bond yields in advanced economies', *IMF working paper,* No. WP/12/271.

([141]) See 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; D'Agostino, A. and M. Ehrmann (2012), 'The pricing of G7 sovereign bond spreads – the times, they are a-changing,' *MPRA Paper* 40604, University Library of Munich, Germany.

([142]) See 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.

([143]) See Jalles, J.T. (2019), 'How Do Macroeconomic Fundamentals Affect Sovereign Bond Yields? New Evidence from European Forecasts', *CESifo Economic Studies*, Vol. 65, No. 1, pp. 44–67. Monteiro, D. and B. Vasicek (2019), 'A retrospective look at sovereign bond dynamics in the euro area', *Quarterly Report on the Euro Area*, Vol. 17, No. 4.

([144]) See 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. WP/15/275; Eichler, S. (2014), 'The political determinants of sovereign bond yield spreads', *Journal of International Money and Finance*, No. 46.;

([145]) Chen, H-Y. and Chen, S-S. (2018), 'Quality of government institutions and spreads on sovereign credit swaps', *Journal of International Money and Finance*, no. 87 and Jeanneret, A. (2018), 'Sovereign credit spreads under good/bad governance', *Journal of Banking and Finance*, no. 93.

([146]) 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.

([147]) Codogno, L., Faveri, C. and Missale, A. (2003), 'Yield spreads on EMU government bonds', *Economic Policy*, Vol. 18, Issue 37.

([148]) See Monteiro, D. and B. Vasicek (2019), *op. cit.*; Afonso et al. (2015), *op. cit.*

Portugal and Cyprus ([149]), the *incidence of monetary policy*, in particular unconventional measures such as the outright monetary transactions (OMT) and the purchase of government securities under quantitative easing (QE) ([150]).

IV.3. Empirical strategy

We rely on a gradual empirical strategy, while paying attention to pitfalls in estimations. We analyse the role of fundamentals using data from the inception of the euro until 2019 included, which makes for a longer sample than earlier studies and includes the interesting 'post-financial crisis' period (but pre-COVID-19). We run the main estimates for euro-area countries (results shown in this section), and check their robustness on a sample with all EU countries, as background (see Annex IV to the paper referenced above) Moreover, this study considers the variety of ways through which fundamental factors, involving, e.g., government debt, the external position, potential growth, and the quality of institutions, can affect spreads. Relying on a large range of specifications and robustness checks, it recognises that the influence of fundamentals may be non-linear and context-dependent ([151]).

The variables retained in the estimations are selected based on the literature and complemented with specific fiscal variables that constitute the focus of this research. In particular, the choice of stock and flow fiscal variables – government debt, primary balance, change in the debt ratio, gross financing needs and average maturity of debt are driven by the paper's fiscal angle ([152]).

We start with a 'benchmark model' in static form and then estimate alternatives, testing for non-linearities, dynamic formulation, sample selection and time-sensitivity of parameters ([153]) and additional variables.

Step 1: **Benchmark estimation:**

$$spr_{it} = \alpha + \beta.NIIP_{it} + \gamma.GDPp_{it} + \delta.geff_{it} + \varepsilon.D_{it} + \theta.size_{it} + \mu.vix_t + \rho.PSPP_t + \alpha_i + u_{it} \quad (1)$$

where $i = 1\ to\ n$ (countries) and $t = 1\ to\ T$ (years). Spreads (spr_{it}) on 10-year government bonds (in relation to German government bonds) are regressed on key fundamental variables namely, general government gross debt-to-GDP ratio (D_{it}), country net international investment position-to-GDP ratio ($NIIP_{it}$), potential real GDP growth ($GDPp_{it}$) and an index of government effectiveness ($geff_{it}$) ([154]), as well as variables capturing liquidity risk ($size_{it}$ measuring the relative country size), international risk aversion (vix_t), and the (potential) effect of the Eurosystem public sector purchase programme ($PSPP_t$). α_i measures country random effects ($\alpha_i \approx iid(0, \sigma^2)$) ([155]), ([156]), ([157]).

([149]) See Corsetti G., Erce, A. and Uy, T. (2019), 'Official lending in the euro area: lessons for debt sustainability', *VOX CEPR*, Official lending and debt sustainability in the euro area | VOX, CEPR Policy Portal (voxeu.org).

([150]) Monteiro, D. and B. Vasicek (2019), *op. cit.*; 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.

([151]) Our paper extends the existing literature where many articles examined the behaviour of interest rate spreads following the sovereign debt stresses of the early 2020s. For references, see the main paper.

([152]) For improvements of the fit, we also tested, in addition to the regressions presented in the paper, variables such as actual GDP growth, total factor productivity growth, current account balance, alternative institutional variables to government effectiveness, GDP per capita, world GDP growth, credit ratings agencies' sovereign ratings and sovereign crisis history. These alternative variables were generally not found to improve the results.

([153]) To acknowledge that, even in the relatively homogeneous sample studied (euro-area countries), different 'structural breaks' affected the estimations, thus making it necessary to test the robustness of the results to the time sample.

([154]) Government effectiveness is measured by the index constructed by the World Bank (extracted from the Worldwide Governance Indicators database). 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. Thus, this indicator differs from a variable measuring the quality of public finances, in terms of composition of public spending, design of the tax system, or efficiency measures. Values range from -2.5 (weak government effectiveness) to 2.5 (strong).

([155]) In macroeconometric panels (as opposed to microeconometric panels), the more parsimonious random effects (RE) model is often superior to the fixed effects (FE) model (Bell, A. and Jones, K. (2015), 'Explaining fixed effects: random effects modelling of time-series cross-sectional and panel data', *Political Science Research and Methods*, Vol. 3, No. 1).
Having tested both, we favoured RE, differently from the approach commonly followed in the empirical literature, for several reasons. First, the model includes explanatory variables that already capture structural differences between countries varying very slowly over time (such as a country's relative size or government effectiveness). Then, the remaining features that are not captured in our model and that could influence spreads (e.g. the specific performance of a DMO, the results of specific elections, etc.) are unlikely to be correlated with the explanatory variables, and represent instead non observable statistical 'noise'. Last, a Hausman test tends to confirm that an RE model is more appropriate than an FE model. Reassuringly, regressions using FE

Step 2: **Debt level non linearities**

$$spr_{it} = \alpha + \beta.NIIP_{it} + \gamma.GDPp_{it} + \delta.geff_{it} + \varepsilon_1.D_{it} + \varepsilon_2.nl(D_{it}) + \theta.size_{it} + \mu.vix_t + \rho.PSPP_t + \alpha_i + u_{it} \quad (2)$$

where $nl(D_{it}) = D_{it}^2$ or $(D_{it}\_T).\Delta_T$ depending on the specification tested, with Δ_T representing a dummy variable taking value 1 when debt is above a certain threshold (60% and 90% of GDP are tested). Hence, different forms of non-linearities are tested to account for non-linear effects depending on the debt level: a quadratic debt term (as in De Grauwe and Ji, (201**2**) ([158])) and a debt-threshold term. ([159])

Step 3 : **Debt dynamics and structure**

$$spr_{it} = \alpha + \beta.NIIP_{it} + \gamma.GDPp_{it} + \delta.geff_{it} + \varepsilon_1.D_{it} + \varepsilon_2.D_{it}.flow_{it} + \epsilon.flow_{it} + \theta.size_{it} + \mu.vix_t + \rho.PSPP_t + \alpha_i + u_{it} \quad (3)$$

where $flow_{it} = PB_{it}$ or ΔD_{it} or GFN_{it} or $maturity_{it}$ depending on the specification tested, with PB_{it} representing government primary balance as a share of GDP, ΔD_{it} representing the change in the government debt-to-GDP ratio, GFN_{it} representing government gross financing needs as a share of GDP, and $maturity_{it}$ the average maturity of government debt. Such specification includes separate effects from and a possible interaction between fiscal stocks (debt), fiscal flows (primary balance, change in the debt ratio or GFN), and the term structure (GFN or average maturity). The latter variables are potentially particularly relevant in countries that benefited from official lending with very long repayment maturity (and where GFN are limited compared with what could be expected – given the debt burden – for an average market access country). Additional regressions further explore the effect of the (holders) structure of debt on spreads by directly testing a government debt variable net of debt held by the Eurosystem and official lenders (DM_{it}). ([160]).

Step 4: **Debt interactions with other macro-structural features and 'context' variables**

$$spr_{it} = \alpha + \beta.NIIP_{it} + \gamma.GDPp_{it} + \delta.geff_{it} + \varepsilon_1.D_{it} + \varepsilon_2.D_{it}.X_{(i)t} + \theta.size_{it} + \mu.vix_t + \rho.PSPP_t + \alpha_i + u_{it} \quad (4)$$

where $X_{(i)t} = NIIP_{it}$ or $GDPp_{it}$ or $geff_{it}$ or $size_{it}$ or vix_t or $PSPP_t$, ([161]) depending on the specification tested.

Equations (1) to (4) are estimated using the Generalised Two-stage Least Squares (G2SLS) method and endeavouring to address potential endogeneity issues by means of instruments, stationarity and cointegration tests. The *government debt-to-GDP ratio* ([162]), the *primary balance*, *GFN, average maturity* and *PSPP* are instrumented by their lag ([163]). The *net international investment position-*

show similar results/coefficients. See Section IV of the annex in Pamies *et al.* 2021.

([156]) In line with standard practice, we only consider the determinants of the country of interest, and not the ones of the benchmark country (here Germany). However, some part of the spread dynamics is likely to be driven also by the dynamics of German yield. For instance, in times of uncertainty, German yields tend to decrease due to a 'flight to safety', while other euro-area yields jointly increase. The latter phenomenon should, however, be captured through the VIX variable. Other phenomena such as spillover and contagion effects, which effectively partially de-link the sovereign yields from their country fundamentals, could also be at play. Afonso, A. and Ramos Félix, A. C. (2013), 'Contagion in EU sovereign yield spreads', *Working Paper Lisboa School of Economics & Management*, no. 04/2014/DE/UECE show that countries with worse macro and fiscal fundamentals are in fact more vulnerable to contagion effects.

([157]) In the regressions, a crisis dummy variable to capture the spike of spreads in 2012 is also included. This choice is supported by alternative regressions, including time-fixed effects.

([158]) See De Grauwe, P. and Y. Ji (2012), *op. cit.*

([159]) This type of specification is most often found in the literature on fiscal reaction functions (see Celasun, O., Debrun, X. and Ostry. J. D. (2006), 'Primary surplus behaviour and risks to fiscal sustainability in emerging market countries: a "fan-chart" approach', *IMF Working Paper*, No. 06/67). In the case of interest rate spreads, it can also be justified by Afonso, A., and J. T. Jalles, (2019), 'Quantitative easing and sovereign yield spreads: Euro-area time-varying evidence', *Journal of International Financial Markets, Institutions and Money*, Vol. 58, pp. 208-224. , 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. In addition, as the 90% of GDP threshold is used as a reference value, notably in EU debt sustainability analysis frameworks, this level is tested.

([160]) Such a measure is akin to the 'free float' measure used by the ECB.

([161]) PSPP variable represents net cumulated purchases of government bonds by the Eurosystem under the public sector purchase programme ('at historical purchase value') (% of GDP)

([162]) Nonetheless, as the debt dynamic responds only slowly to changing market yields, this potential problem should not be overstated. This slow response reflects a relatively long debt maturity of debt. In the euro area, the average maturity of debt (securities) is around 7½ years, ranging from 6.3 years in Luxembourg to more than 11 years in Austria (ECB, 2020).

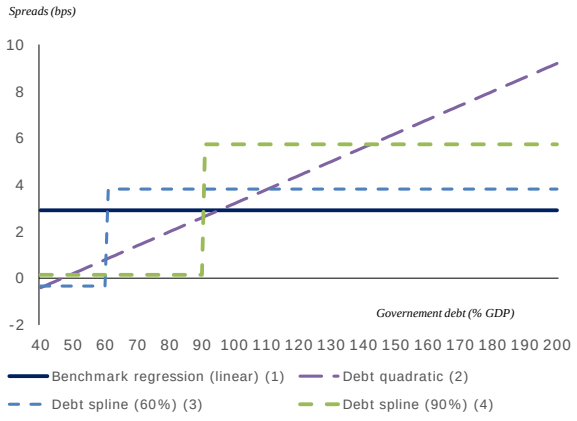
([163]) To deliver consistent estimators, a valid instrument (IV) must satisfy both exogeneity (instrument uncorrelated with the disturbance term) and relevance (IV correlated with the regressor instrumented). Since all fiscal variables and debt interacted variables are instrumented by their lag, exogeneity can be credibly

to-GDP ratio can be assumed as essentially exogenous (by definition, the NIIP is a measure affected by both the assets and liabilities' positions of the public and the private sector). The use of *potential GDP growth* (rather than actual growth, which is also tested) should also limit the endogeneity of the growth variable (as well as multicollinearity issues). The *relative country size*, used as a proxy of the liquidity of its bond market, is preferred to other indicators such as bid-ask spreads or the overall outstanding amount of government debt to limit endogeneity and multicollinearity issues with the government debt ratio. Also, with a view to mitigate endogeneity problems, the *VIX index*, a global US-based risk factor, is preferred to the VSTOXX index, an EU-specific variable. Stationarity and cointegration tests run on the main variables (spreads, NIIP, real potential GDP growth, the government debt ratio, government effectiveness, and size) show these are cointegrated.

IV.4.Findings

We find clear evidence that euro-area spreads respond to fundamentals through several channels, especially the level of government debt. Higher government debt significantly contributes to higher spreads, with strong indications that this effect is non-linear. That is, the marginal effect of additional debt on spreads increases with the level of debt. In a linear regression (equation in Step (1)), an additional one percent of GDP of debt increases the spread by around 3 basis points. However, once non-linearity is taken into account (equation in Step (2)), the marginal impact of additional debt can be twice that at higher debt levels (See Graph IV.2 and Table IV.1). Importantly, the marginal effect of government debt on spreads is found to be close to zero in countries with the highest potential growth (see the next paragraphs).

Graph IV.2: **Marginal impact of an increase in the government debt-to-GDP ratio on spreads (bps), as a function of the level of the government debt ratio**



(1) the graph reports the marginal impact of government debt on spreads as a function of the government debt ratio. The quadratic form suggests that the reaction of spreads to government debt becomes positive only for debt ratios above about 50% of GDP, but the marginal impact strongly increases after that and is higher than in the benchmark regression for debt ratios beyond 95% of GDP. Other non-linear forms, with a debt spline function (above 60% and 90% of GDP) also corroborate a higher responsiveness of spreads to changes in the debt ratio beyond these levels. At debt levels exceeding 100 percent of GDP, the marginal impact is typically in the high part of the range of estimates found in the rest of the literature.
Source: See Table IV.1 for the specifications represented in the graph – specifications (1), (2), (3) and (4),respectively.
Source: Authors' calculations

assumed (with lags of these variables and the current level of spreads not being co-determined). Similarly, using lags as instruments also insures relevance, given fiscal variables' autoregressive properties.

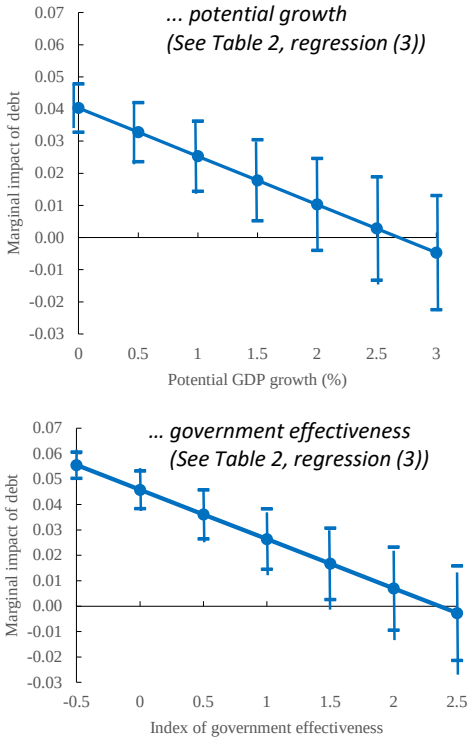
Table IV.1: **Estimation results: benchmark and non-linear forms (debt level). Dependent variable is nominal spreads on 10-year government bond yields (in relation to German bonds), Euro-area countries, 2000-19**

VARIABLES (expected sign)	(1) Benchmark	(2) Debt quadratic	(3) Debt spline (60)	(4) Debt spline (90)
niip_gdp (-)	**-0.00602****	**-0.00780*****	**-0.00673****	**-0.00718****
	(0.00276)	(0.00274)	(0.00300)	(0.00279)
GDPgp (-)	**-0.207****	**-0.170****	**-0.199****	**-0.174****
	(0.104)	(0.0777)	(0.0993)	(0.0776)
gee (-)	**-0.613***	**-0.395**	**-0.492**	**-0.371**
	(0.314)	(0.333)	(0.337)	(0.338)
relative_size (-)	**-0.151*****	**-0.0889****	**-0.126*****	**-0.0936****
	(0.0529)	(0.0350)	(0.0473)	(0.0410)
vix (+)	**0.0154*****	**0.0138***	**0.0160****	**0.0128***
	(0.00504)	(0.00721)	(0.00655)	(0.00773)
pspp_gdp (-)	**-0.0255***	**-0.0202**	**-0.0232***	**-0.0228***
	(0.0136)	(0.0128)	(0.0128)	(0.0128)
gdebt_gdp (+, linear)	**0.0291*****	**-0.0281****	**-0.00335**	**0.00143**
	(0.00840)	(0.0128)	(0.0134)	(0.00653)
debt_sq (+)		**0.000300*****		
		(7.55e-05)		
debt_60 (+)			**0.0415***	
			(0.0228)	
debt_90 (+)				**0.0559*****
				(0.0175)
crisis (+)	**2.289*****	**2.537*****	**2.360*****	**2.483*****
	(0.825)	(0.920)	(0.866)	(0.896)
Constant	**0.307**	**1.830****	**1.486***	**1.254***
	(0.594)	(0.738)	(0.820)	(0.720)
Observations	261	261	261	261
Number of cty_num	17	17	17	17
Country RE	YES	YES	YES	YES
R2	0.572	0.643	0.602	0.647
RMSE	1.294	1.227	1.260	1.205

(1) Model estimated through generalised two-stage least squares, with debt and PSPP instrumented by their lag. Random effects are included. Robust standard errors in parentheses. ***, ** and * denote p-values less than or equal to 1%, 5% and 10%. Countries include all euro-area countries except for Germany (benchmark country) and Estonia (the country joined the euro area in 2011, date as from which there is no market long-term interest rate data for this country).
Source: Authors' calculations.

Specifically, the marginal impact of government debt on spreads varies with potential growth and government effectiveness (See Graph IV.3). A high *potential growth* mitigates the impact from government debt on spreads. Taken at face value, the estimates suggest that the responsiveness of spreads to government debt would be close to zero when potential growth exceeds 2.5 %. By contrast, for countries with a weak potential growth, spreads are more sensitive to government debt. Effectively, the marginal impact of debt on spreads is higher than in the benchmark regression when potential growth falls below 0.75 %. Similarly, in countries with the highest *government effectiveness* index value (e.g. countries where the government effectiveness index is around 2), the marginal effect of government debt on spreads would be close to zero according to regression (4), while countries deemed to have less strong institutions (e.g. countries where the government effectiveness index is less than 0.5), the marginal effect of government debt on spreads is far higher (an increase of government debt of 1 pp. of GDP raises spreads by close to 4 bps.) The NIIP is also found to explain spreads (by itself and interacted with debt), confirming that investors take concerns about sustainability of the external account into account. A common interpretation is that private sector imbalances eventually weigh on the government accounts through subsequent recessions and the implicit liabilities of the government sector, as observed in the boom and bust cycle of several euro-area countries in the 2000s/2010s. These results are obtained after controlling for the influence of context variables such as global risk aversion, sovereign bond market size and central banks' asset purchases.

Graph IV.3: **Marginal impact of government debt on spreads, depending on…**



(1) the graphs report the (total) marginal impact of government debt on spreads conditional to a given level of potential growth (left panel) and government effectiveness (right panel). Bars represent the confidence interval of the estimated coefficients. The graphs plotting the impact on potential growth and government effectiveness represent regressions (3) and (4) in Table IV.2, respectively.
Source: Authors' calculations.

Some 'context' variables such as international investors' risk aversion also play a role. The sensitivity of spreads to government debt increases with international investors' risk aversion according to the study (See regression (5) in Table IV.2). On the other hand, spreads' responsiveness to debt would not be more acute in smaller countries assumed to have less liquid sovereign bond markets, as shown by the not significant interactive term between debt and the relative economic size (See regression (6) in Table IV.2). ([164])

These results dovetail with earlier empirical findings but give a complementary insight on political challenges. From a policy angle, the results are a reminder that even in an environment of persistently low rates, governments with less solid fundamentals pay more than others to borrow and are exposed to higher risks. Such findings echo previous research that establishes that more indebted countries generally experience less favourable interest–growth rate differentials. Importantly, our results highlight that policies aimed at reinforcing potential growth and government effectiveness can be expected to improve investors' perception of sovereign risk and their forbearance of higher debt.

Yet the behaviour of spreads can only partly be explained by fundamental variables. Even in a relatively homogenous panel focusing on euro-area economies only, it remains empirically difficult to determine one specification of fundamentals with superior explanatory power. The results also suggest that there have been already several 'regimes' in the euro area with specific incidences of fundamentals on spreads ([165]). Observed volatility factors such as global risk aversion only help to some extent in capturing these regime changes. While the latter part of the 2010s featured a regime of persistent, though contained spreads, the 2020s may see another regime occur, influenced by the high level of debt due to the COVID-19 crisis and the response at European and Member State level, including the concerted efforts to increase potential growth via investments and reforms.

([164]) The regressions also point to an influence of the Eurosystem's interventions on government long-term interest rates' spreads; yet, these interventions are not found to weaken the relationship between spreads and debt, suggesting that markets still pay attention to fundamentals, in particular public debt (See regression (7) in Table IV.2).

([165]) See Discussion Paper quoted in footnote (134) for a more extensive discussion of these results.

Table IV.2: **Estimation results: non-linear forms due to interaction with other macro-structural features and contextual variables. Dependent variable is nominal spreads on 10-year government bond yields (in relation to German bonds), Euro-area countries, 2000-2019**

VARIABLES (expected sign)	(1) Benchmark	(2) Debt & NIIP	(3) Debt & growth	(4) Debt & gvt. effectiveness	(5) Debt & VIX	(6) Debt & size	(7) Debt & PSPP
niip_gdp (-, linear)	**-0.00602****	**0.00644***	**-0.00776*****	**-0.00752****	**-0.00844*****	**-0.00530***	**-0.00726*****
	(0.00276)	(0.00349)	(0.00223)	(0.00293)	(0.00311)	(0.00299)	(0.00277)
GDPgp (-, linear)	**-0.207****	**-0.167****	**0.914*****	**-0.192****	**-0.208****	**-0.206****	**-0.198****
	(0.104)	(0.0809)	(0.292)	(0.0922)	(0.105)	(0.104)	(0.0946)
gee (-, linear)	**-0.613***	**-0.691*****	**0.0306**	**0.851***	**-0.432**	**-0.714****	**-0.512**
	(0.314)	(0.231)	(0.373)	(0.472)	(0.353)	(0.297)	(0.319)
relative_size (-, linear)	**-0.151*****	**-0.0872*****	**-0.0707****	**-0.132*****	**-0.141*****	**-0.0470**	**-0.136*****
	(0.0529)	(0.0274)	(0.0299)	(0.0494)	(0.0502)	(0.0872)	(0.0488)
vix (+, linear)	**0.0154*****	**0.0183*****	**0.0241*****	**0.0126****	**-0.168**	**0.0157*****	**0.0159*****
	(0.00504)	(0.00510)	(0.00856)	(0.00544)	(0.105)	(0.00496)	(0.00464)
pspp_gdp (-, linear)	**-0.0255***	**-0.0229***	**-0.00508**	**-0.0220***	**-0.0187***	**-0.0242***	**0.0541**
	(0.0136)	(0.0124)	(0.0145)	(0.0130)	(0.0112)	(0.0130)	(0.0459)
gdebt_gdp (+, linear)	**0.0291*****	**0.0118*****	**0.0403*****	**0.0458*****	**-0.0210**	**0.0323*****	**0.0321*****
	(0.00840)	(0.00291)	(0.00751)	(0.00738)	(0.0178)	(0.00950)	(0.0115)
debt_niip (-)		**-0.000180*****					
		(2.63e-05)					
debt_growth (-)			**-0.0150*****				
			(0.00341)				
debt_gee (-)				**-0.0194*****			
				(0.00448)			
debt_vix (+)					**0.00264****		
					(0.00130)		
debt_size (-)						**-0.00124**	
						(0.000889)	
debt_pspp (-)							**-0.000987**
							(0.000606)
crisis (+)	**2.289*****	**2.430*****	**2.440*****	**2.434*****	**2.289*****	**2.313*****	**2.271*****
	(0.825)	(0.895)	(0.789)	(0.865)	(0.802)	(0.841)	(0.797)
Constant	**0.307**	**1.104****	**-2.636***	**-1.276**	**3.453****	**0.222**	**-0.198**
	(0.594)	(0.499)	(1.422)	(0.883)	(1.575)	(0.588)	(0.938)
Observations	261	260	261	240	261	261	261
Number of cty_num	17	17	17	17	17	17	17
Country RE	YES	YES	YES	YES	YES	YES	YES
R2	0.572	0.633	0.702	0.621	0.531	0.577	0.583
RMSE	1.294	1.277	1.131	1.291	1.380	1.286	1.279

(1) Model estimated through generalised two-stage least squares, with debt and PSPP instrumented by their lag. Random effects included. Robust standard errors in parentheses. ***, ** and * denote p-values less than or equal to 1%, 5% and 10%. Countries include all euro-area countries except for Germany (benchmark country) and Estonia (as the country joined the euro area in 2011, there is no market long-term interest rate data for this country).

Source: Authors' calculations.

Annex – The euro area chronicle

The European Commission, the Ecofin Council and the Eurogroup regularly take decisions that have a bearing on the functioning of the Economic and Monetary Union (EMU). In order to keep track of most relevant decisions, the QREA features a chronicle of major legal and institutional developments, presented in a chronological order and containing appropriate references. This issue of the chronicle covers developments between early November and mid-December 2021. In November, the Commission adopted its autumn package for economic policy, which provides Member States with a guidance on their fiscal and economic policy. This includes in particular the euro area recommendation, which calls for actions by euro area Member States individually and collectively, within the Eurogroup, to address policy challenges for the Economic and Monetary Union ([166]).

Guidance for Member States on the economic policy. On 24 November, the European Commission adopted the so-called autumn package of the European Semester: a set of documents kicking off the annual cycle of economic policy coordination ([167]). The package includes the Annual Sustainable Growth Survey, the Alert Mechanism Report, the Joint Employment Report, the proposal for euro area recommendation as well as a set of country-specific documents related to fiscal policy guidance and to surveillance for euro area Member States that had exited financial programmes. The Annual Sustainable Growth Survey outlines the economic and employment policy priorities for the EU for the coming 12 to 18 months. The survey centres around four overarching policy objectives: environmental sustainability, productivity, fairness and resilience. This year's survey puts forward an agenda that steers the EU and the euro area away from crisis management towards a sustainable and fair recovery, in particular through further progress in the green and digital transition. The Alert Mechanism Report assesses economic developments in Member States to detect if they may be affected by economic imbalances that may require the Commission to undertake in-depth reviews. This year's report concludes that economic developments in nine euro area Member States (Cyprus, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain) require an in-depth review.

Identifying issues critical to the functioning of the single currency area. The recommendation for the euro area proposed by the European Commission presents tailored advice to euro area Member States on those topics that affect the functioning of the euro area as a whole. It recommends that euro area Member States take action over 2022-23, individually and collectively within the Eurogroup, to continue to use and coordinate national fiscal policies and to effectively underpin a sustainable recovery. The recommendation calls for a moderately supportive fiscal stance to be maintained in 2022 across the euro area and for fiscal policy measures to gradually pivot towards investments that promote a resilient and sustainable recovery. While euro-area Member States should maintain an agile fiscal policy to be able to react if pandemic risks re-emerge, they should differentiate their fiscal policies taking into account the state of their recovery, fiscal sustainability and the need to reduce economic, social and territorial divergences. Once economic conditions allow, euro area Member States should pursue fiscal policies aimed at achieving prudent medium-term fiscal positions and ensuring debt sustainability, while enhancing investment. The recommendation highlights the importance of a transition from emergency to recovery measures in labour markets by ensuring effective active labour market policies. It also underlines the importance of monitoring the effectiveness of policy support packages for companies, focusing on targeted support for the solvency of viable firms, further strengthening national institutional frameworks and pursuing reforms to address bottlenecks to investment and reallocation of capital. Finally, the recommendation also calls on euro area Member States to ensure the macro-financial stability of the euro area, continue work on completing the Banking Union, to strengthen the international role of the euro, and to support the process of creating a digital euro.

Further recommendations on fiscal guidance. The European Commission also adopted opinions assessing the compliance of draft budgetary plans for 2022 with the fiscal policy recommendations

([166]) Annex compiled by Jakub Wtorek. The cut-off date for this annex is 20 December 2021.
([167]) https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6105

adopted by the Council in June 2021. They take into account the continued application in 2022 of the general escape clause of the Stability and Growth Pact (a set of rules designed to ensure that countries in the European Union pursue sound public finances). The opinions are accompanied by a Commission communication that provides a horizontal overview of the budgetary outlook for the euro area as a whole as well as policy guidance on the appropriate fiscal stance for the euro area. The communication projects the euro-area fiscal stance to remain expansionary in 2022 thanks to the supportive fiscal stances in almost all euro-area Member States, driven mainly by nationally financed net current primary expenditure. The opinions welcome the fiscal expansions planned in the majority of low/medium debt euro-area Member States, and commend all euro-area Member States for preserving nationally financed investment and for using the Recovery and Resilience Facility to finance additional investment in support of the recovery. At the same time, the opinions remind the high-debt euro-area Member States of the importance, when taking supporting budgetary measures, to preserve prudent fiscal policy in order to ensure sustainable public finances in the medium term. In addition, Italy is invited, in order to contribute to the pursuit of a prudent fiscal policy, to take the necessary measures within the national budgetary process to limit the growth of nationally financed current expenditure.

IMF statement on economic policies in the euro area. On 6 December, the IMF published the statement concluding its 2021 consultation on common euro area policies ([168]). The preliminary findings of the IMF are that the forceful policies implemented in the euro area over the last year have supported household disposable incomes, maintained worker-job relationships, provided credit to the economy, and protected corporate sector balance sheets. Looking ahead, the IMF considers that coordinating fiscal, monetary, and financial sector policy normalisation in the face of uncertain pandemic dynamics and legacies will be a challenge. According to the IMF, policies should remain accommodative but become increasingly targeted, with a focus on mitigating potential increases in inequality and poverty. Fiscal policy space should be rebuilt once the expansion is firmly underway, but credible medium-term consolidation plans should be announced now.

([168]) https://www.imf.org/en/News/Articles/2021/12/06/mcs120621-euro-area-staff-concluding-statement-2021-mission-common-policies-for-member-countries

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