ECONOMIC BULLETIN

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1 Introduction

The Portuguese economy is expected to grow by 1.5% in 2023, after 6.8% in 2022, and to expand at a pace close to 2% in 2024 and 2025. Inflation is projected to reach 8.1% in 2022, gradually falling to 5.8% in 2023, 3.3% in 2024 and 2.1% in 2025 (Table I.1.1). Compared with the June projections, GDP growth is revised upwards in 2022 and downwards in 2023, while inflation and the unemployment rate are more elevated over the whole projection horizon. The economic recovery that started in the second quarter of 2020 has been stronger and faster than projected, including for employment. In 2025, economic activity and employment are expected to stand 1.1% and 1.7%, respectively, above the projected path at the end of 2019.

High inflation has a negative impact on activity and income, especially for households with fewer financial resources. The sharp and persistent rise in inflation in the euro area has led the Governing Council of the European Central Bank (ECB) to start a process of monetary policy normalisation. Policy interest rate rises have passed through to the cost of financing for firms and households, helping to contain inflationary pressures. Curbing inflation is key to the recovery of households' purchasing power and to support a pick-up in activity amid lower uncertainty. The terms-of-trade loss induced by rising import prices of energy commodities is a real income loss for the economy that should be borne and shared by all agents. Increases in wages and profit margins must be consistent with price stability, helping to prevent inflationary pressures and preserve external competitiveness. Consequently, monetary policy must be complemented by the joint effort of the other institutional sectors – general government, firms and households – to reverse and limit the length of the inflationary process. Against this background, a broad-based fiscal stimulus would not be desirable.

In 2022 the budget deficit declined, standing below the euro area average. Albeit high, public debt as a percentage of GDP maintained a downward path. These favourable developments are projected to continue in the coming years and this ratio is expected to stand below 100% by the end of the projection horizon.

Economic activity decelerated sharply from the second quarter of 2022 onwards, following a period of recovery from the pandemic crisis (Chart I.1.1). This deceleration is visible in a broad set of indicators (Box 1). Recent developments in the Portuguese economy have been constrained by the effects of Russia's military aggression against Ukraine, in particular the increase in geopolitical uncertainty and the energy crisis in Europe, which have contributed to exacerbate rising costs and prices and deteriorate the confidence of economic agents.

Nevertheless, recent developments in activity have been more positive than projected in October – the quarter-on-quarter rate of change in GDP was 0.3 p.p. higher in the third quarter – extending the upward surprises observed over the period of economic recovery following the second quarter of 2020. In an environment of high inflation and stagnating real disposable income, the resilience of consumption is explained by the performance of the labour market, which is estimated to be at full employment, the impact of public support measures and the use of savings accumulated during the pandemic. Nominal private consumption is projected to increase by 12.8% in 2022, well above the change in disposable income (6.4%). As a result, the saving rate is expected to decrease to 4.4%. Signalling a reduction in the financial buffer accumulated during the pandemic, households' net financial wealth as a percentage of income has been decreasing. In the second quarter, this ratio was approximately 8 p.p. lower than the ratio at the end of 2021, but still 7.5 p.p. higher than that in the fourth quarter of 2019.

Portuguese economic growth is projected to decline in 2023, following an annual change of 6.8% in the previous year. The growth rate in 2022 reflects the sharp improvement in activity observed throughout 2021 and Statistics Portugal's current estimate for GDP in the first quarter of 2022. For 2022 the carry-over effect was 3.9 p.p. and is projected to be lower for 2023 (0.6 p.p.).

Growth will be contained in the first half of 2023, with household spending projected to moderate, business investment plans expected to be postponed somewhat and exports to slow down. These developments occur amid considerable global uncertainty, sustained high energy prices, erosion of purchasing power, tighter financial conditions and weakening external demand. The factors that have supported private consumption are projected to lose importance. Not only is the adjustment margin resulting from wealth accumulated during the pandemic projected to decline, but rising risk perceptions of changing labour market conditions – while not materialising in the projection - are also projected to weigh on consumption decisions.

From the second half of 2023 onwards, activity is projected to accelerate, reflecting expectations of easing tensions in energy markets, a gradual recovery in real household income, improving external demand and a normalisation of global supply chains. A higher absorption of EU funds is also expected to support activity in this period.

The Portuguese economy grew above the euro area between 2016 and 2019 and will maintain this trend on average between 2020 and 2025. In the Eurosystem projections, GDP growth in the euro area is expected to stand at 3.4% in 2022 and to decline to 0.5% in 2023, then rebounding to approximately 1.9% in 2024-25. The impact of the pandemic was more significant in Portugal, resulting in a sharper decline in GDP in 2020 (8.3% compared with 6.2%) and a similar recovery in 2021 (5.5% compared with 5.2%). The positive growth differential vis-à-vis the euro area since 2019 is close to 3 p.p. and reflects a number of structural and cyclical factors.

Table I.1.1 • Projections of Banco de Portugal for 2022-25 | Annual rate of change, in percentage (unless otherwise stated)

	Weights 2021	EB December 2022					EB oct. 2022		EB jun. 2022			
		2021	2022 (p)	2023 (p)	2024 (p)	2025 (p)	2021	2022 (p)	2021	2022 (p)	2023 (p)	2024 (p)
Gross domestic product	100	5.5	6.8	1.5	2.0	1.9	5.5	6.7	4.9	6.3	2.6	2.0
Private consumption	63.5	4.7	5.9	0.2	0.8	1.1	4.7	5.5	4.5	5.2	1.2	1.5
Public consumption	18.8	4.6	2.0	1.9	1.2	0.9	4.6	2.0	4.1	2.2	-0.9	-0.2
Gross fixed capital formation	20.3	8.7	1.3	2.9	5.4	4.3	8.7	0.8	6.4	5.0	7.6	5.0
Domestic demand	103.0	5.6	4.3	0.9	1.8	1.7	5.6	4.0	5.0	4.8	2.1	1.9
Exports	41.6	13.5	17.7	4.3	3.7	3.9	13.5	17.9	13.1	13.4	5.8	3.6
Imports	44.6	13.3	11.1	3.0	3.2	3.4	13.3	10.8	12.9	9.5	4.5	3.4
Employment (number of persons)[a]		1.9	2.3	0.0	0.2	0.1	1.9	2.3	2.1	1.7	0.4	0.2
Employment (hours worked)[a]		3.1	3.2	3.8	1.9	0.1	3.1	5.1	4.5	5.8	2.0	0.2
Unemployment rate [b]		6.6	5.9	5.9	5.9	5.9	6.6	5.8	6.6	5.6	5.4	5.4
Current plus capital account (% of GDP)		0.6	-0.6	1.7	1.7	2.2	0.6	0.6	0.7	0.4	2.2	1.0
Trade balance (% of GDP)		-2.7	-2.2	-0.9	-0.3	0.1	-2.7	-1.9	-2.6	-3.5	-2.2	-1.7
Harmonised index of consumer prices		0.9	8.1	5.8	3.3	2.1	0.9	7.8	0.9	5.9	2.7	2.0
Energy goods		7.5	24.3	3.6	3.6	0.0	7.5	24.5	7.5	18.8	4.5	0.0
Excluding energy goods		0.4	6.7	6.0	3.3	2.3	0.4	6.4	0.4	4.8	2.5	2.2

Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected, pp – percentage points. Cut-off date for macroeconomic projections: 28 november. For each aggregate, this table shows the projection corresponding to the most likely value, conditional on the set of assumptions. (a) According to the national accounts concept. (b) In percentage of the labour force.

Structural factors include the increase in labour force qualifications, reduced inequality, declining indebtedness and the impact of these factors on attracting investment. All these key factors for sustained growth have benefited the Portuguese economy. Not only has Portugal converged towards the euro area average, but it presents already a more favourable position than the euro area average regarding the level of education of younger generations and the private sector indebtedness ratio. The boost provided by the momentum in the services sector, in particular tourism, benefits from the sector's external competitiveness, reflected in market share gains recorded in recent years. These share gains extend to goods exports, showing the resilience of economic growth in Portugal.

Cyclical factors include the fact that the Portuguese economy is less affected by the energy crisis compared to other euro area countries, given its lower exposure to supplies from Russia. The planned amount of EU funds, in particular RRP financing, supports more favourable developments in investment in Portugal than the euro area average. In contrast, given the prevalence of variable rate loans, the Portuguese economy is more exposed to the impact of the sharp interest rate hike. However, this effect has been mitigated by the reduction in private sector indebtedness observed since 2011. The weakness in investment dynamics in recent quarters is expected to contribute to lower economic growth in the coming years.

Inflation has surprised on the upside since the end of 2021. These developments have reflected an accumulation of global shocks and contagion effects from international energy and food prices to most HICP components. In 2022 the inflation rate is expected to be the highest in 30 years.

In 2023 inflation is projected to start on a downward path, reaching figures close to the ECB's medium-term objective in 2025. This decline is the result of lower prices for energy, food and other commodities on international markets, the restoration of global supply chains and lower demand pressures associated to a tighter monetary policy.

The materialisation of these factors in reducing inflation is crucial to ensure that uncertainty decreases in the coming years and market agents' confidence increases. A de-anchoring of medium-term inflation expectations, or a functioning of goods and services' markets that does not reflect the effect of these factors, would bring inflation and economic growth to paths inconsistent with economic stabilisation and closer to scenarios of stagflation. This issue of the Economic Bulletin presents an alternative scenario which considers the possibility of these risks materialising (Box 2).

The decline in inflation will be gradual given the extent of existing pressures – with a significant proportion of goods and services showing high price changes - recovering profit margins and wage pressures. These pressures reflect the reduced slack in the labour market, in addition to demands to recover part of wages' loss in the purchasing power. The year-on-year rate of change in the HICP is projected to decline to 3.7% in the fourth quarter of 2023 and to stand at 1.7% at the end of 2025.

The uncertainty surrounding the projection is high, with downside risks to activity and upside risks to inflation. The main source of uncertainty stems from developments in the European energy crisis, including the possibility of a gas shortage requiring a period of rationing and production cuts, which would result in further rises in international prices of goods and services. Inflation would remain high for longer, and, together with heightened uncertainty, would have an adverse impact on activity. In addition, there is a possibility of stronger growth in wages and corporate profit margins, with second-round effects on prices.

Chart I.1.1 • Quarterly projections for GDP and inflation | Quarter-on quarter rate for GDP and year-on-year rate for HICP
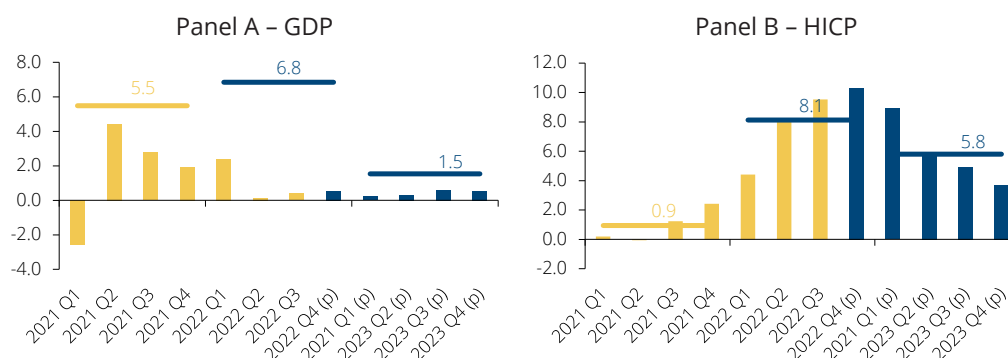
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) – projected.

2 External environment, financing conditions and policies

In 2022-23, the global economy is projected to be constrained by high inflation, tight financial conditions and heightened geopolitical uncertainty, recovering from 2024 onwards as these effects fade away. After contracting slightly in the second quarter of 2022, global activity is projected to grow at a modest pace in the second half of the year (quarter-on-quarter rates of change of 0.6%, on average), particularly in advanced economies (0.2%). International trade continued to recover in the first half of 2022, benefiting from easing supply chain disruptions against a background of normalisation in supply and subdued global demand. In the second half of the year, weakening activity, particularly in industry, is expected to be a drag on global trade, extending into 2023. In line with this outlook, the assumptions for the external demand for Portuguese goods and services were revised downwards in 2023-24 compared with the June issue of the *Economic Bulletin* (-0.7 p.p. in 2023 and -0.4 p.p. in 2024).

In the euro area, GDP decelerated to 0.3% in the third quarter of 2022 (0.8% in the previous quarter), reflecting a strong negative contribution from net exports, offset by resilient consumption and investment. The Eurosystem projections point to a slight contraction in euro area GDP in the last quarter of 2022 and the first quarter of 2023 (-0.2% and -0.1%, respectively), amid an erosion of purchasing power, high levels of uncertainty and deteriorating consumer confidence. The projected annual change for 2023 is only 0.5% (3.4% in 2022), with a significant slowdown in domestic demand. This projection incorporates distinct developments across countries, with contractions in 2023 in the countries most affected by the energy crisis. In 2024 and 2025, euro area activity is projected to recover as inflationary pressures and high uncertainty dissipate, growing at around 1.9%.

After a significant increase in 2022, euro area inflation is expected to decrease from 2023 onwards as supply-side pressures fade and demand weakens, amid a normalisation of monetary policy. In the euro area, inflation rose to 10% in November. This rise has reflected a high contribution from the more volatile components, but inflation excluding food and energy also increased (to 5% in November). In the December Eurosystem projections, euro area inflation is expected to stand at 8.4% in 2022. From 2023 onwards, a gradual reduction to 6.3% in 2023, 3.4% in 2024 and 2.3% in 2025 is envisaged, given the calibration of ECB's monetary policy, lagged effects of weaker economic activity and expectations of limited second-round effects on wages.

The assumptions of the projection exercise reflect an easing of external inflationary pressures in 2023-25, after the very significant price increases observed in 2022 (Table I.2.1). Competitors' import prices are assumed to slow down over the horizon, growing at around 2% in 2024-25. These prices were revised upwards compared to the two previous exercises. In contrast, international oil and non-energy commodity prices are projected to fall in 2023, more than expected in the June issue of the *Economic Bulletin*, amid a deteriorating outlook for the global economy. After a significant increase due to the cut-off in Russia's gas supplies, gas prices returned to lower levels in the fourth quarter of 2022, driven by the accumulation of gas reserves in Europe, the increase in the supply of liquefied natural gas and in the supply from Norway, the European Union's measures to reduce gas consumption and the forecast of a mild winter. However, futures prices have remained high, reflecting uncertainty about the plan to replace Russian gas (Chart I.2.1). Compared to previous exercises, the price of this commodity was revised downwards in 2022 (compared to the October issue of the *Economic Bulletin*) and upwards in 2023-24 (compared to the June issue of the *Economic Bulletin*).
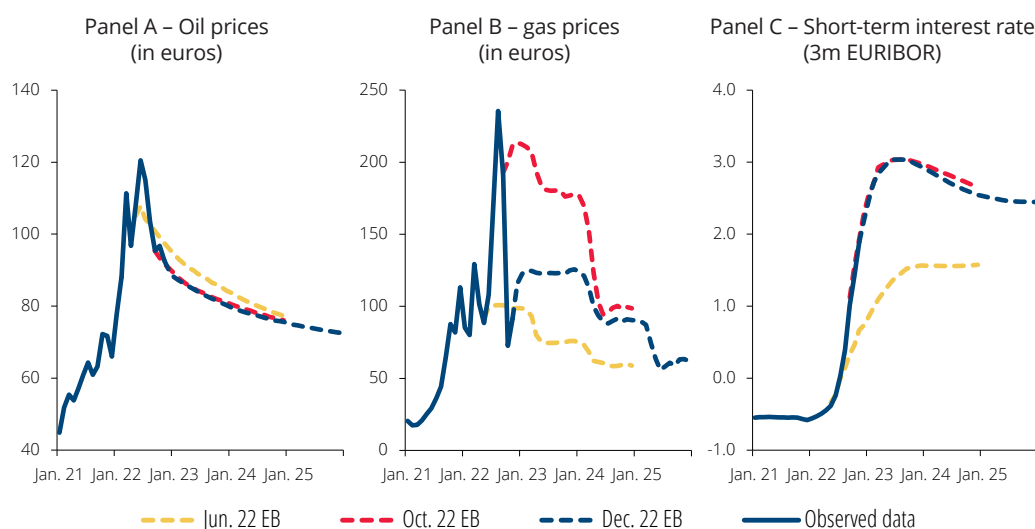
Technical assumptions point to higher short-term interest rates (Table I.2.1). Reflecting the interest rate increases decided in the latest ECB meetings and the expectations of further increases in the coming months, the three-month EURIBOR is assumed to rise to 2.9% in 2023, gradually decreasing to 2.5% in 2025. This profile implies an upward revision of 1.6 p.p. in 2023 compared to the June issue of the Economic *Bulletin*.

Table I.2.1 • Projection assumptions

		EB Dec. 2022					EB Oct. 2022	EB Jun. 2022		
		2021	2022	2023	2024	2025	2022	2022	2023	2024
International environment										
World GDP	yoy	6.3	3.3	2.3	2.9	3.1	2.9	3.0	3.3	3.4
Euro area GDP	yoy	5.3	3.4	0.3	1.9	1.9	3.1	2.8	2.1	2.1
World trade	yoy	11.6	6.1	2.0	3.3	3.3	4.8	4.3	3.2	3.6
External demand	yoy	10.2	8.0	2.5	3.0	3.1	6.7	4.9	3.2	3.5
International prices										
Oil prices (in USD)	aav	71.1	104.6	86.4	79.7	76.0	104.2	105.8	93.4	84.3
Oil prices (in euros)	aav	60.1	99.7	83.9	77.4	73.8	99.4	98.9	88.9	80.2
Gas prices (in euros, MWh)	aav	46.6	122.5	123.6	98.4	68.9	151.5	98.8	80.9	62.9
Non-oil commodity prices in euros	yoy	37.4	19.5	-8.7	0.7	1.4	20.5	26.3	-3.1	-6.3
Competitors' import prices	yoy	7.8	15.9	3.6	2.1	1.9	15.7	12.4	2.3	1.0
Monetary and financial conditions										
Short-term interest rate (3-month EURIBOR)	%	-0.5	0.4	2.9	2.7	2.5	0.4	0.0	1.3	1.6
Implicit interest rate on public debt	%	1.9	1.9	2.2	2.2	2.2	1.9	2.0	2.2	2.2
Effective exchange rate index	yoy	1.2	-3.6	0.9	0.0	0.0	-3.9	-3.4	-0.6	0.0
Euro-dollar exchange rate	aav	1.18	1.05	1.03	1.03	1.03	1.05	1.07	1.05	1.05

Source: Eurosystem (Banco de Portugal calculations). | Notes: yoy – year-on-year rate of change, % – in percentage, aav – annual average value, MWh – megawatt-hour. Technical and external environment assumptions, as well as projections for euro area GDP and inflation, coincide with those in the Eurosystem projection exercise released on 15 December, which include information up to 23 November. The technical assumptions for the price of oil, gas and non-energy commodities is based on futures markets. The import price of competitors corresponds to a weighted average of the export deflators of the countries from which Portugal imports, weighted by their share on total Portuguese imports (for more information, see "Trade consistency in the context of the Eurosystem projection exercises: an overview", ECB Occasional Paper 108, March 2010). The evolution of the 3-month EURIBOR is based on expectations implied in futures contracts. The implicit interest rate on public debt is computed as the ratio of interest expenditure for the year to the simple average of the stock of debt at the end of the same year and at the end of the preceding year. An increase in the exchange rate corresponds to an appreciation of the euro. The effective exchange rate of the euro is computed against 42 trading partner countries. The technical assumption for bilateral exchange rates assumes that the average levels observed in the 10 business days prior to the cut-off date are maintained over the projection horizon.

Chart I.2.1 • Projection assumptions for the prices of gas and oil, and the short-term interest rate | Euros and percentage

Panel A – Oil prices
(in euros)

Panel B – gas prices
(in euros)

Panel C – Short-term interest rate
(3m EURIBOR)

- - - Jun. 22 EB   - - - Oct. 22 EB   - - - Dec. 22 EB   —— Observed data

Sources: Banco de Portugal and Eurosystem (Banco de Portugal calculations).

3   The Portuguese economy in 2022-25

Following growth of 6.8% in 2022, the Portuguese economy is expected to slow down significantly in 2023, to 1.5%, and to accelerate to 1.9% in 2025. Developments in activity in 2023 reflect the reduction in contributions from private consumption and services exports (net of imported content) from 2.2 p.p. to 0.0 p.p. for the former and from 4.1 p.p. to 0.7 p.p. for the latter (Table I.3.1). Investment contribution is projected to increase to 0.2 p.p. and that of goods exports should slightly decrease to 0.3 p.p. In 2024-25, GDP developments are based on maintaining the contribution from goods and services exports at 0.9 p.p., while the contribution from investment is likely to increase to 0.5 p.p., in both cases close to those observed in the years prior to the pandemic. By contrast, private consumption is projected to grow less than GDP, with a contribution below the 2015-19 average.

Table I.3.1 • GDP and contributions of the main expenditure aggregate | Annual rate of change, in percentage, and net of import content contributions, in percentage points

|	Average value 2015-19	2020	2021	2022 (p)	2023 (p)	2024 (p)	2025 (p)	Average value 2020-25
GDP (%)	2.6	-8.3	5.5	6.8	1.5	2.0	1.9	1.6
Contribution to GDP growth:								
Private consumption	0.9	-2.8	1.6	2.2	0.0	0.4	0.4	0.3
Public consumption	0.1	0.1	0.5	0.3	0.3	0.2	0.1	0.2
Investment	0.5	-0.1	0.8	-0.1	0.2	0.6	0.4	0.3
Goods and services exports	1.1	-5.6	2.7	4.4	1.0	0.9	0.9	0.7
Goods exports	0.4	-0.9	1.1	0.4	0.3	0.5	0.5	0.3
Services exports	0.7	-4.6	1.6	4.1	0.7	0.4	0.4	0.4

Sources: Banco de Portugal and Statistics Portugal. | Notes: Demand aggregates, net of imports, are obtained by subtracting an estimate of the imports used in each component. For more information on the methodology underlying this calculation, see Cardoso and Rua (2021) "Unveiling the real contribution of final demand to GDP growth", Banco de Portugal, *Economic Studies* – Vol. 7, No. 3.

After rising by 5.9% in 2022, private consumption is projected to grow by 0.2% in 2023 and 1.0%, on average, in 2024-25. Strong growth in 2022 takes place amid a rebound to the pre-pandemic level, of stagnating real disposable income and a reduction in the savings rate to historically low levels (4.4%) (Chart I.3.1). Against a background of elimination of pandemic-related restrictions, households increased consumption, in particular on goods and services whose spending had been postponed for the previous two years, using part of the savings accumulated during the crisis. Consumer confidence –already at low levels since March – deteriorated further in September and October. In the last quarter of 2022, the extraordinary measures announced by the government to support households are also expected to sustain private consumption, as they benefit households that typically have a higher propensity to consume (Box 3).

In 2023, the very small increase in private consumption is associated with lower financial buffers of households, rising debt service and low consumer confidence. A further reduction in the savings rate will help to contain the deceleration in private consumption. Nominal disposable income is expected to decelerate in 2023 – reflecting the stabilisation of employment and the unwinding of temporary support measures together with rising debt service – and its purchasing power is expected to stagnate again given continued high inflation. The impact of rising interest rates and inflation on households' financial situation is expected to be more pronounced for lower-income indebted households (Box 4).

The recovery in private consumption in 2024-25 will reflect the dissipation of uncertainty and moderate growth in real disposable income amid lower inflation and stabilising interest rates, with the debt service expected to decline. Projected developments in income and consumption in this period are consistent with a recovery in the savings rate, which will notwithstanding remain below the pre-pandemic figures.

Chart I.3.1 • Private consumption, disposable income and savings rate | 10^6 euros and in percentage of disposable income
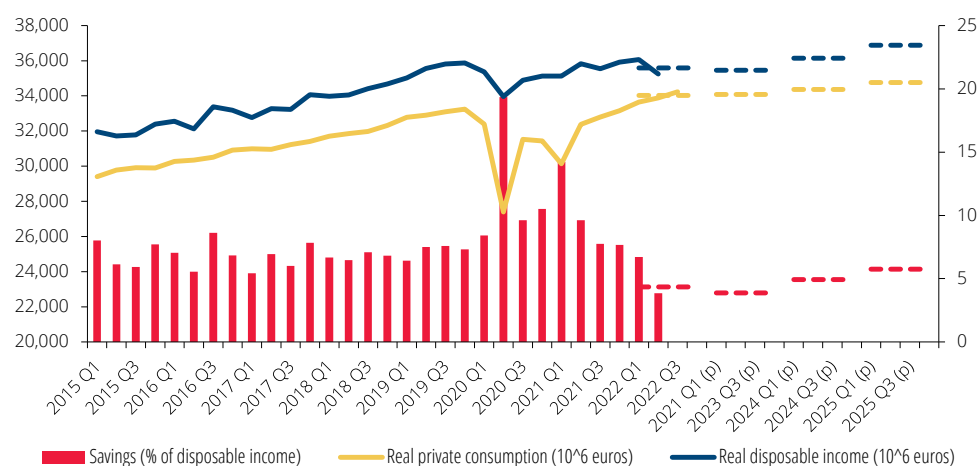
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) – projected.

Public consumption is expected to grow by 2% in 2022, gradually decelerating over the projection horizon. After increasing by 4.6% in 2021, public consumption is projected to slow down in 2022 reflecting a reduction in the effects related to the pandemic, including lower employment growth in general government. Underlying the slight deceleration in 2023

is an assumption of lower public employment growth, partly offset by an acceleration in net expenditure on goods and services, in line with the State Budget. In 2024 and 2025, despite the contribution made by the implementation of RRP-funded projects, a gradual deceleration in public consumption is assumed amid the stabilisation of employment in general government.

Investment is expected to decelerate to 1.3% in 2022, with growth projected to be 2.9% in 2023 and 4.9%, on average, in 2024-25. Contained behaviour of corporate investment in 2022-23 (rates of change of 0.8% and 1.6% respectively) is explained by the postponement of projects amid high uncertainty, supply constraints — both of materials and labour force — and rising production costs, tighter financing conditions and slowing demand. In subsequent years, the dissipation of uncertainty and improved global demand prospects are expected to lead to higher growth of this component (5.2% on average). The increase in inflows of EU funds, in particular those associated with the RRP, should contribute to support corporate investment in 2023-25. The characteristics of the firms benefiting from the RRP – in terms of size, capital stock, labour productivity and export tendency – suggest a significant impact of the co-financed investments (Box 5).

Housing investment is expected to slow down significantly in 2022 (from 12.2% to 0.3%) and to decline in 2023, reflecting the impact of stagnating disposable income and rising interest rates on demand. For 2024-25, average growth of 2.2% is expected, associated with the increase in income of resident households, as well as demand from non-residents and for tourism-related projects. The impact of the normalisation of financing conditions will imply that this aggregate does not return to the end-2021 figures.

Public investment is projected to continue to grow at high rates over the projection period, after decelerating in 2022, from 13.8% to 5.5%. In the following years, the implementation of RRP-funded projects and increased absorption of funds from the Multiannual Financial Framework for 2021-27 will lead to an average annual growth of 10.4%.

After growing by 17.7% in 2022, exports are expected to expand at rates around 4% in 2023-25. The buoyancy of this aggregate in 2022 reflects a strong recovery in the services component, in particular tourism (Chart I.3.2). Tourism exports are projected to grow by almost 80%, benefiting from the lifting of pandemic restrictions and the pent-up demand built up during that period. This aggregate is expected to be close to pre-pandemic figures at the end of 2022. Tourism exports are expected to grow by 8.6% in 2023, benefiting from the World Youth Day that will take place in Portugal in the third quarter. In 2024-25, this component is assumed to grow slightly above external demand.

Goods exports are expected to grow by 6.3% in 2022 and 3.5% in 2023, reflecting a less favourable international environment. In the first half of 2022 goods exports grew robustly, benefiting from rising external demand and fading disruptions associated with shortages of materials, especially in the car industry. In 2023, deceleration in external demand is expected to imply lower growth in sales abroad of goods, despite a small positive impact of the unwinding constraints in global value chains. In 2024-25, the improved international environment is projected to contribute to 4.1% average growth of goods exports. In the projection period, growth of this aggregate benefits from market share gains, which are notwithstanding conservative compared with those observed in the pre-pandemic period and from recent dynamics, as well as changes in the pattern of international trade amid a redefinition of globalisation.

Following an 11.1% increase in 2022, imports will continue to grow over the horizon but at gradually more subdued rates. Goods imports are expected to develop in line with global demand weighted by import content, with stronger growth in services being projected, particularly in 2022, reflecting the marked evolution of resident tourism abroad.

**Chart I.3.2 •** Exports of goods and services | Index 2019=100

Sources: Banco de Portugal and Statistics Portugal. | Note: (p) – projected.

The current and capital account is projected to present a deficit of 0.6% of GDP in 2022, returning to a positive balance of 1.9%, on average, over the period 2023-25. The goods account deficit will widen in 2022 – to values close to those observed before the sovereign crisis – reflecting the effect of the significant terms-of-trade loss related to the increase in oil and gas prices in international markets (Chart I.3.3). However, the deterioration in the goods account balance is expected to be offset by the strong recovery in tourism. The economy's net borrowing will reflect the decrease in the income and capital account surplus (from 3.2% of GPD in 2021 to 1.6% in 2022), relating to the increase in the payment of dividends abroad and the unwinding of a base effect associated with the reimbursement by the European Financial Stability Facility of amounts paid by Portugal under the Economic and Financial Assistance Programme. For 2023-25, the goods account balance is projected to improve gradually due to favourable terms-of-trade developments and additional gains in export market share. The surplus in the income and capital accounts is expected to increase to 2.0% in 2025, benefiting from increased inflows of European funds.

The labour market remained favourable in 2022, with employment and unemployment expected to stabilise in 2023-25. In 2022, employment is estimated to grow by 2.3%, in annual terms, while over the 2023-25 period it is expected to show reduced growth, of around 0.1%, in annual average terms. Extending labour supply growth observed in recent years, the participation rate is projected to increase by around 1 p.p. in 2022, with smaller increases assumed in 2023-25, considering the historically high value of the indicator, which stands above those in the pre-pandemic period and that of the euro area.

The unemployment rate is expected to fall to 5.9% in 2022, a historically low figure, and the labour market is estimated to be close to full employment. The share of firms reporting difficulties in hiring skilled labour remains historically high in the main sectors of activity. Despite the slowdown in activity, the unemployment rate is projected to stabilise in 2023-25 amid labour shortages – given limited labour force growth –, encouraging firms to retain workers.

Chart I.3.3 • Current plus capital account | Percentage of GDP
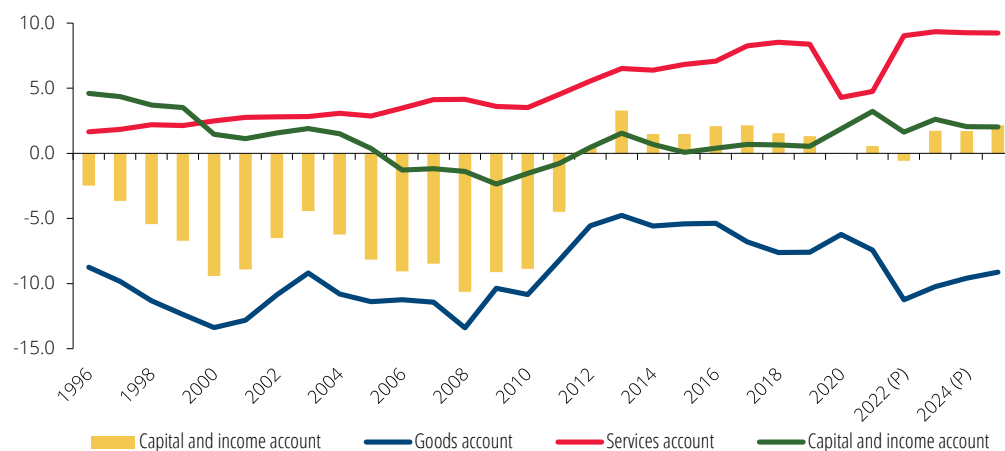
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) – projected.

Nominal wages in the private sector are expected to increase by 5.4% in 2022 and show similar average growth in 2023-25. These estimates include the increases to the minimum wage observed in 2022 (6%) and those announced for 2023-25 (7.8% in 2023, 6.6% in 2024 and 5.6% in 2025). In 2022, the nominal increase in wages per employee in the private sector is expected to lead to a reduction in real terms of around 1% – adjusted for the change in the private consumption deflator – reflecting the sharp and unforeseen increase in prices. In 2022 the increase in average compensation per employee is consistent with stronger wage developments across the distribution, given the negative composition effect associated with the concentration of the increase in employment in the lower wage brackets. The real change in private sector wages is projected to be approximately zero in 2023, rising to around 2% on average in 2024-25, a figure in line with productivity growth.

Inflation, as measured by the rate of change in the HICP, increased more quickly and persistently than expected over the course of 2022, standing at 8.1% for the year (0.9% in 2021). Excluding energy, consumer prices grew by 6.7% in 2022 (0.4% in 2021). The increase in inflation in 2022 largely reflects external pressures on energy and food, which subsequently spread to other goods and services categories (Chart I.3.4). Evidence points to contagion effects among the main HICP components being more intense in the recent period than in the past (Box 6). In addition, the prices of tourism-related services increased significantly, driven by the strong recovery in the sector. Domestic price pressures stemming from wages are expected to remain contained, while profit margins in the private sector will increase, recovering from the falls recorded during the pandemic.

Inflation is projected to decrease to 5.8% in 2023, 3.3% in 2024 and 2.1% in 2025, reflecting lower external pressures. The slowdown in global activity and the unwinding of supply chain constraints are expected to contribute to mitigating external inflationary pressures over the projection period, with the assumption of a deceleration in import prices and, in particular a decline in the case of gas and oil. These developments are partly offset by domestic pressures, against a backdrop of reduced slack in the labour market and as workers try to mitigate real wage losses and firms to regain profit margins. In the context of monetary policy normalisation and long-term inflation expectations remaining anchored, inflation is expected to approach figures consistent with price stability at the end of the projection horizon.

In 2022 and 2023, inflation is lower than that projected for the euro area (by 0.3 p.p. and 0.5 p.p., respectively), reflecting a lower increase in energy prices in Portugal, in particular electricity and gas. Projections are close for the 2024-25 period. Excluding energy, the inflation differential in Portugal vis-à-vis the euro area is expected to be positive over the projection horizon, being more significant in 2022, reflecting the increased dynamism in services and food prices (and their greater weight in the Portuguese HICP basket).

Chart I.3.4 • HICP annual growth rate and main contributions | Percentage and percentage points
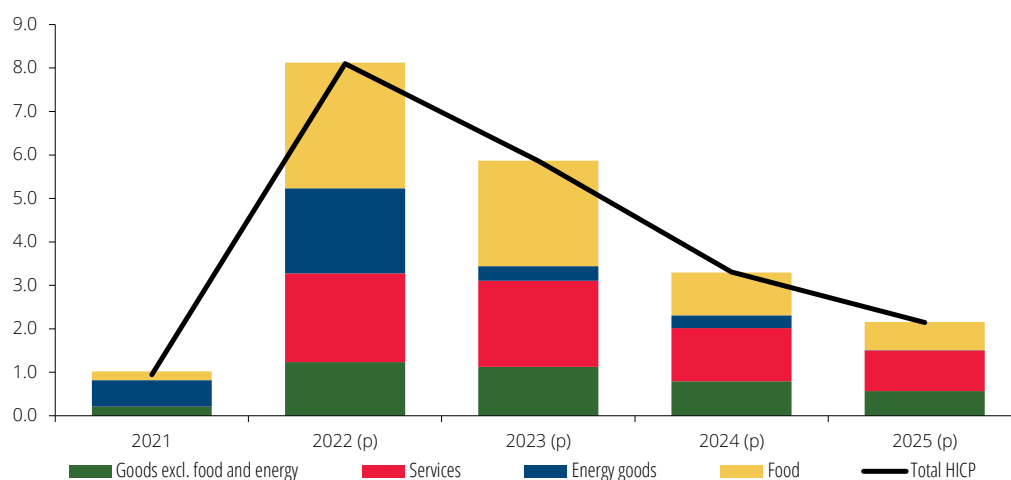
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) – projected.

4 Risks

The uncertainty surrounding the projections is high, with downside risks to economic activity and upside risks to inflation. The main risk stems from the possibility of more adverse repercussions from the conflict in Ukraine, in particular on the energy supply to Europe – triggering further price rises and cuts to production – and on economic agents' confidence. Another relevant risk in the current environment relates to the possibility of stronger growth in wages and corporate profit margins with second-round effects on prices. The impacts of these risks materialising are analysed in an alternative scenario for the Portuguese economy, presented in Box 2.

There are also risks associated with the pace and synchronisation of interest rate rises in major advanced economies, which may imply a more restrictive than projected impact. Uncertainty about the persistence of inflationary pressures, associated with both the duration of the underlying shocks and propagation factors, also creates uncertainty about the monetary normalisation process in the euro area. Higher inflation persisting would translate into tighter monetary policy and financing conditions, impacting consumption and investment decisions.

5 Conclusions

Economic growth in 2022 turned out to be stronger than projected in June. In the coming months, the less favourable international and financial environment, confidence remaining at very low levels, as well as rising inflation and its impact on households' purchasing power, are expected to imply lower than projected growth in activity in 2023. Low growth and persistent inflationary pressures create important challenges to the conduct of economic policies.

The current situation largely reflects a terms-of-trade loss in 2021-22 that assumes, in the Portuguese case and in cumulative terms, an unprecedented magnitude over the last two decades. These developments result in a loss of real income for the economy that should be shared by all economic agents. Against this background, it is important to coordinate expectations around the ECB's price stability objective, ensuring that increases in wages and corporate profit margins do not originate persistent inflationary pressures, with negative consequences for competitiveness and macroeconomic stability. Reducing inflation is the primary responsibility of monetary policy, but it must involve the coordination of the various economic agents – general government, firms and households. The coordination experience seen during the pandemic crisis shows the benefits it can bring to society.

Monetary policy normalisation in the euro area is expected to continue, with interest rates rising to neutral levels in order to contain price pressures and maintain inflation expectations anchored. Firms and households are currently better prepared to face a more adverse environment than during the sovereign debt crisis, but exposure to the impact of recent shocks is differentiated. Against this background, any support measures that may be needed should be targeted at the most vulnerable segments – avoiding a broad-based fiscal stimulus on demand that would reinforce inflationary pressures – and be temporary to preserve fiscal sustainability.

In the medium to long term, the Portuguese economy's growth potential is expected to be constrained by structural obstacles, related particularly to unfavourable demographic developments. These developments, which need to be addressed, imply that it is crucial to keep the commitment to increase skills and labour market participation. The effective and efficient use of the RRP funds and the implementation of the planned reforms – with a focus on improving the efficiency of public administration and reducing framework costs — are expected to contribute to increase the capital stock and productivity of the economy, enabling gains in potential growth.

Box 1 • Recent developments in the Portuguese economy in the light of a circular clock

Monitoring the economy and its development is crucial not only to gauge its position in the cycle, but also to support the formulation of sustainable economic policies from a perspective of economic growth. Therefore, one of the instruments that has been put forward to monitor the state of the economy is the business cycle clock, in which the cyclical component of the selected series is depicted in four quadrants showing the cycle phases. This is typically obtained as the deviation from a long-term trend, known as the growth cycle.

This box illustrates developments in economic activity in Portugal throughout 2022 based on the instrument recently presented in Lourenço and Rua (2022).[1] Using circular statistics, this new approach not only retains the appealing features of a clock, but also allows handle a wide range of information.

Each month, the clock shows the position in the growth cycle, where 90° corresponds to the peak and 270° corresponds to the trough of the cycle. The red arrow in Chart C1.1 sums up in a single direction the average positioning of all potentially divergent signals from the multiple series used.[2] The dispersion of the signals across the different series is illustrated by the blue bars, with each bar representing the number of indicators pointing to a particular cyclical positioning. The confidence intervals associated with the mean direction are represented by arcs, where the grey and black lines indicate the 95 and 99 per cent confidence intervals respectively. Against a background of greater synchronisation of the indicators, the dispersion will be lower, which translates into a smaller confidence interval.

Chart C1.1 shows the clocks for January, April, July and October 2022. The results signal a deterioration in the growth cycle of the Portuguese economy throughout 2022.

Chart C1.1 • Business cycle clocks

Panel A – jan. 2022   Panel B – apr. 2022   Panel C – jul. 2022   Panel D – oct. 2022
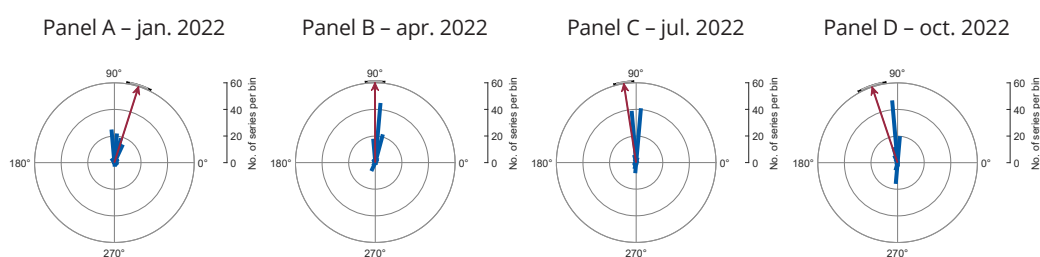
Source: Banco de Portugal.

1. For more details, see Lourenço, N. and Rua, A. (2022), "A circular business cycle clock for Portugal", *Banco de Portugal Economic Studies*, Vol. VIII, No 4.
2. An HP filter is used for detrending and smoothing the economic indicators.

Box 2 • An adverse scenario for the Portuguese economy

Heightened uncertainty related to the conflict in Ukraine and the possibility of more adverse economic spillovers imply risks to the projection. These risks are linked to a complete cut-off of the Russian energy supply to Europe and a further rise in the prices of these commodities, coupled with a reduction in agents' confidence. At the same time, other risks stem from stronger increases in wages and profit margins in Portugal, implying more persistent inflationary pressures than assumed in this Bulletin's projections. This box presents an adverse scenario for the Portuguese economy, quantifying the impact of the materialization of these risks on GDP, unemployment and inflation.

The external assumptions considered are those used by the Eurosystem in the adverse scenario for the euro area published in the December projections.[3]

The scenario assumes a complete cut-off of Russian gas and oil to Europe as of the first quarter of 2023, a harsher winter in 2022-23 and 2023-24 and a slower replacement of Russian oil and gas with other energy sources. These energy shortages lead to severe rationing and production cuts in the euro area, causing disruptions in global value chains. Despite Portugal's limited dependence on energy from Russia, significant impacts are anticipated, mainly due to the higher exposure of other countries with relevant links to Portugal. These effects imply a more unfavourable evolution of external demand for Portuguese goods and services (rate of change of 1.1% on average in 2023-24 in the adverse scenario, compared with around 3% in this Bulletin's projections).

The deterioration in trade flows – in particular, of goods in which Russia and Ukraine are major global suppliers – leads to a substantial increase in energy and food prices, which are passed through to prices of other goods and services (Table C2.1). The oil price rises by 19.4% in 2023, returning to the levels assumed in the projection at the end of the horizon. In the case of gas, the change is more significant (101.1% in 2023), reflecting the maintenance of the price at historical high levels (€275 per MWh) between the third quarter of 2023 and the first quarter of 2024. At the end of the horizon, the price of this commodity is still more than 80% higher than the level assumed in this Bulletin's projections, reflecting the greater difficulty of procuring alternative sources. These shocks imply a sharp increase in firms' production costs, constraining their activity, particularly in sectors more dependent on these commodities.

Table C2.1 • External environment assumptions for the adverse scenario and the projection | Annual rate of change, in percentage

|	Adverse scenario			December 2022 EB projection		
	2023	2024	2025	2023	2024	2025
Oil prices (in euros)	19.4	-24.9	-16.5	-15.8	-7.7	-4.7
Gas prices (in euros)	101.1	-18.5	-36.5	0.9	-20.4	-30.0
Food prices - DGAGRI meat	27.1	-6.6	-9.0	7.0	0.7	0.7
Food prices - DGAGRI oils and fats	20.3	-2.8	-5.8	7.7	0.0	0.0
Competitors' import prices	5.1	2.3	1.3	3.6	2.1	1.9
External demand	1.0	1.3	3.4	2.5	3.0	3.1

Source: Eurosystem (Banco de Portugal calculations).

3. The scenario presented here for Portugal is not part of the adverse scenario published by the Eurosystem for the euro area.

The intensification of geopolitical tensions and the worsening economic environment have led to a rise in uncertainty in the Portuguese economy since the beginning of the year (Chart C2.1). The adverse scenario includes an additional increase in uncertainty this winter and the next, followed by a gradual decline. High uncertainty and more adverse developments in economic activity lead to an amplification of financial frictions, with a deterioration in financing conditions. The scenario incorporates a reduction in asset prices and an increase in risk premia. Bank interest rates on loans to households and firms rise more sharply than implied in the Bulletin's projections (around +100 b.p.). Finally, high uncertainty and volatility in financial markets weigh on consumer and business confidence. Therefore, an additional shock impacting agents' consumption and investment decisions was considered, starting in the first quarter of 2023.

The impact of these shocks has been estimated using the Banco de Portugal's medium-term macroeconomic forecasting model ("M" Model). For the uncertainty shock, the models estimated in Manteu and Serra (2017) were used to determine the impact on GDP.

Chart C2.1 • Synthetic uncertainty indicator for Portugal | Index, average 2001-2019 = 0
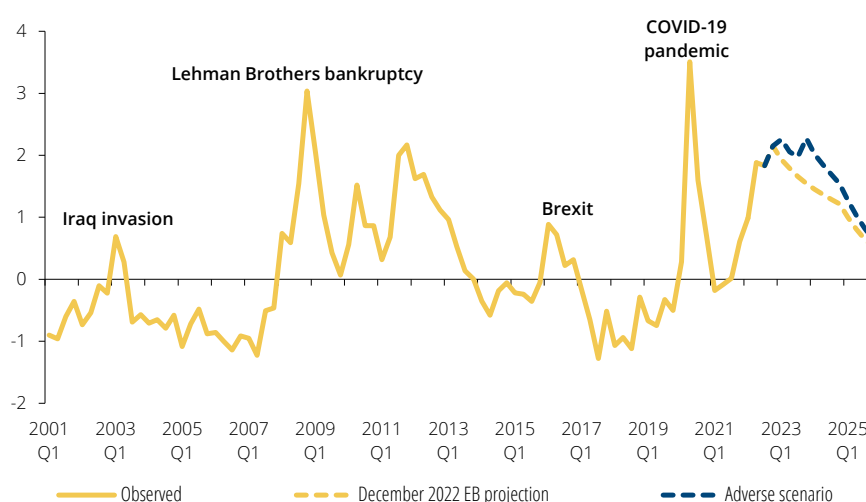
Source: Banco de Portugal. | Note: The uncertainty indicator is presented in Manteu and Serra (2017), "Impact of uncertainty measures on the Portuguese economy", Banco de Portugal *Economic Studies*, Volume III, n.º 2. The indicator was standardized to have zero mean and standard deviation equal to one in the 2001-2019 period.

The adverse scenario also assumes stronger inflationary pressures, reflecting higher wage and profit margin growth in Portugal, compared to those implied in this Bulletin's projections. This stronger dynamism is driven by efforts by workers and firms to recover real income amid the de-anchoring of inflation expectations, implying persistent effects on price developments. Specifically, a shock on private sector real wages and a shock on price markups were applied throughout 2023 and 2024, using the "M" Model and "PESSOA" (a dynamic general equilibrium model). These shocks create distortions to the normal functioning of the economy and imply a loss of competitiveness vis-à-vis the rest of the world, translating into adverse effects on activity and the labour market.

The results point to a negative impact of these shocks on the annual rate of change of GDP of 1.9 p.p. and 1.6 p.p. in 2023 and 2024, compared to the projections in this Bulletin, and a marginal impact in 2025 (-0.1 p.p.) (Chart C2.2 – Panel A). This implies a contraction in activity of 0.4% in 2023, followed by a slow and incomplete recovery (growth of 0.3% in 2024 and 1.8% in 2025). At the end of the
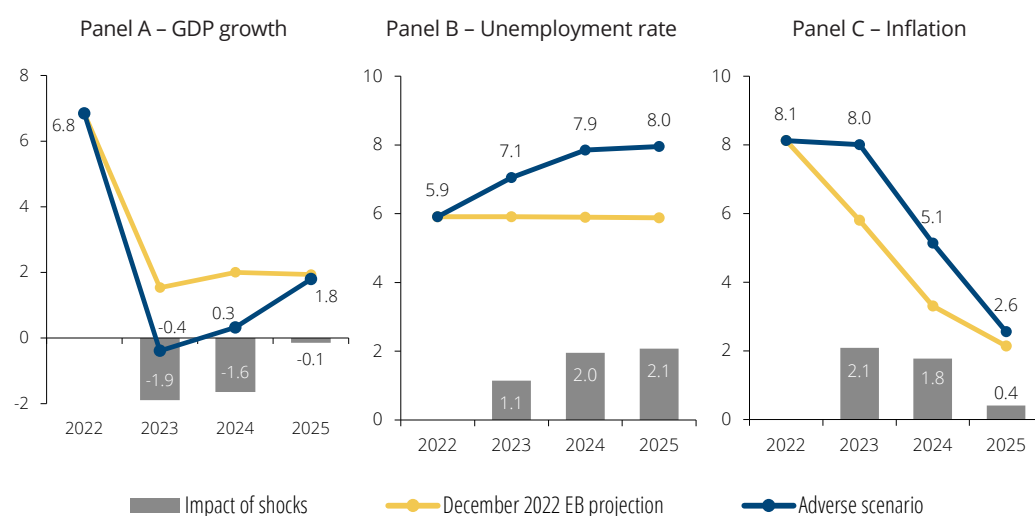
horizon, GDP stands 3.5% below the level implicit in this Bulletin's projections. The escalation of the conflict in Ukraine and the heightening of uncertainty motivate agents' precautionary behaviour, implying that the financial buffers from households and firms are not used to cushion these shocks (or are depleted in more adverse situations).

The labour market also goes through a significant adjustment, with the unemployment rate increasing from 5.9% in 2022 to 7.1% in 2023, 7.9% in 2024 and 8% in 2025 (2.1 p.p. higher than projected in this Bulletin) (Chart C2.2 – Panel B).

The impact on inflation is positive and significant over the horizon (2.1 p.p. in 2023, 1.8 p.p. in 2024 and 0.4 p.p. in 2025, compared to the projections in this Bulletin). In the adverse scenario, after an increase of 8.1% in 2022, prices rise again by 8% in the following year and 5.1% in 2024 (Chart C2.2 – Panel C). In 2025, inflation is estimated to still be above the ECB target, reflecting the impact of domestic shocks, which is only partly offset by the unwinding of external shocks – as the oil market and, to a lesser extent, the gas market return to normal.

The results presented are illustrative as the shocks do not have to materialise together or simultaneously. In addition, the scenario has been simulated against a background of no policy change, keeping the assumptions for monetary and fiscal policies similar to those assumed in the projections in this Bulletin.

Chart C2.2 • GDP, unemployment rate and inflation in the projections and the adverse scenario and the impact of shocks | In percentage and percentage points

Panel A – GDP growth

Panel B – Unemployment rate

Panel C – Inflation

Impact of shocks   December 2022 EB projection   Adverse scenario

Source: Banco de Portugal. | Note: Inflation measured as the annual rate of change of HICP.

Box 3 • The redistributive impact of recent measures to support family income

Over the course of 2022, temporary measures to strengthen household income were announced to mitigate the effects of inflation. These include the "Families First" package (Decree-Law No 57-C/2022 of 6 September 2022) and the extraordinary support for the most vulnerable households (Decree-Law No 28-A/2022 of 25 March 2022).[4] The analysis will also look into changes in the personal income tax presented in the draft State Budget for 2023. Based on the income distribution and the rules governing direct taxes and social transfers,[5] the EUROMOD microsimulation model[6] makes it possible to quantify the direct impact of these measures on the disposable income of different population groups.

The impact from the extraordinary support of €120 for the most vulnerable households was concentrated on the lowest income deciles. Access to this support was subject to restrictive eligibility conditions and was granted only to beneficiaries of the social electricity tariff, or recipients of minimum social benefits[7] or of the child benefit if belonging to its first two income brackets. As a result, the amounts of this transfer were mostly channelled to lower-income households (Chart B3.1). In particular, this measure contributed to a 1.3% increase in the household equivalised disposable income in the first decile (Chart B3.2).

The impact from the "Families First" package on income was spread across the different deciles, although its weight decreased with income. The extraordinary supplement for pensioners equivalent to 50% of their monthly pension ('supplement for pensioners') had a more marked impact as a percentage of income up to the third decile, despite being proportional to the pension received (Chart B3.2).[8] This partly results from a greater concentration of households with pensioners in these three deciles: around 60% of total households, compared with 40% in the other seven deciles. The extraordinary support of €125 for income earners and social benefit recipients ('supplement for non-pensioners') had a percentual impact on disposable income decreasing with income. This measure was still significant in the last decile, given that the requirement of a monthly income of less than €2,700 declared to Social Security was applied individually and not to the average of the household income. The extraordinary supplement of €50 per child or youngster accounted for a small share of disposable income, as it covered only about 30% of households. These measures (including the support for vulnerable households) had a greater impact on income in the first decile, making it possible to strengthen their equivalised disposable income by 4.4% (€208), compared to 1.5% (€215) for the total population. Despite the specific measure targeting households with children and young people, the estimated increase in the equivalised disposable income for these households is slightly smaller, reaching 1.2%, which reflects the fact that these households benefit to a lesser extent from the supplement for pensioners.
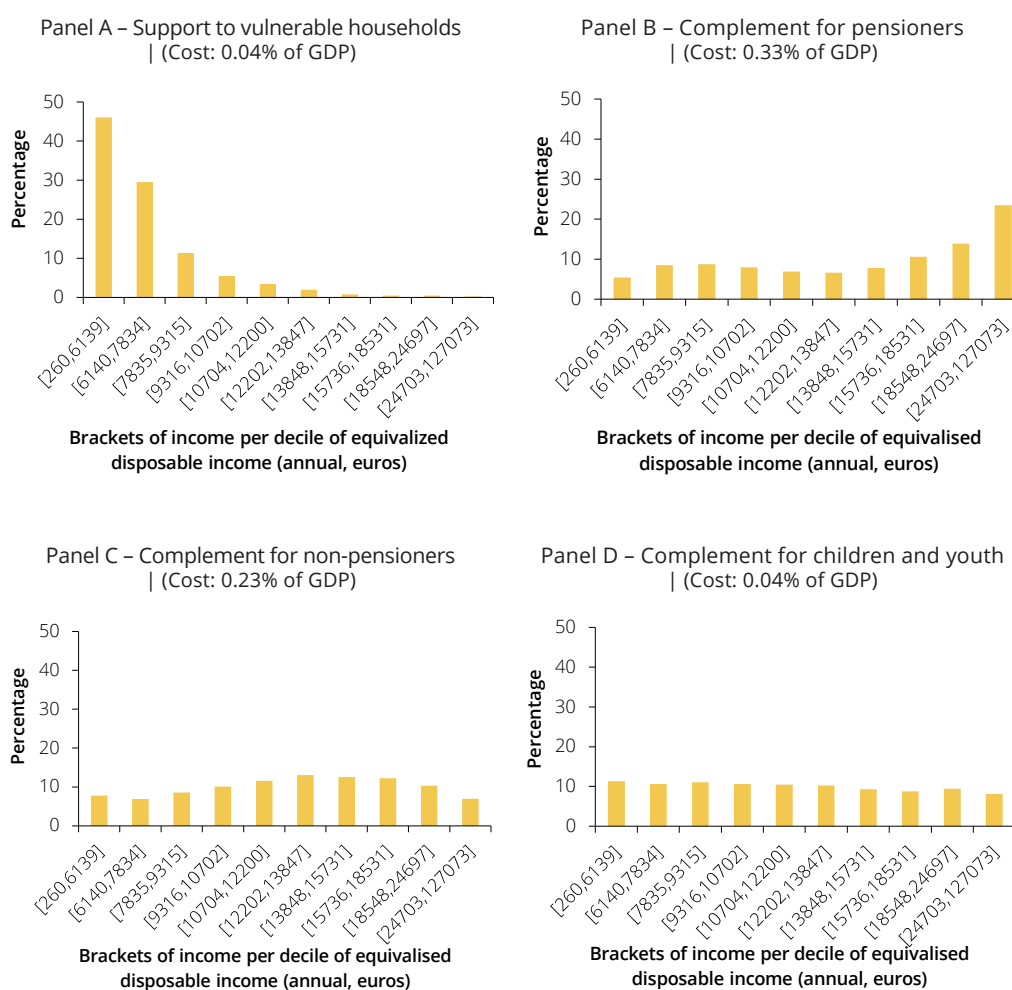
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4. Measures to mitigate price increases, such as cuts in fuel taxes, have also been implemented, but are not analysed in this box.

5. The income distribution stems from the 2020 Survey on Income and Living Conditions (EU-SILC) (income data referring to 2019) updated for 2022 and 2023. For more details regarding the update of monetary variables and the 2022 EUROMOD tax and benefit rules, see Appendix A in Narazani et al. (2022), "The role of family social transfers in reducing child poverty in Portugal", *Banco de Portugal Economic Studies*, Vol. VIII, No 4, October 2022.

6. For more details on the EUROMOD model, see Sutherland and Figari (2013), "EUROMOD: the European Union tax-benefit microsimulation model", *International Journal of Microsimulation*, International Microsimulation Association, 1(6), 4–26 and visit https://euromod-web.jrc.ec.europa.eu/.

7. Minimum social benefits include the solidarity supplement for the elderly, the social insertion income, the disability social pension under the special disability protection scheme, the supplement to the social benefit for inclusion, the old-age social pension and social unemployment benefits.

8. This measure was announced together with a pension update below the regular update rule for 2023. In a no-policy change scenario, in which the statutory pension update would be implemented, these measures had no impact on the total income level of 2022 and 2023. The information in Chart B3.2 makes it possible to calculate the impact of recent measures in a no-policy change scenario, by subtracting the impact of the supplement for pensioners from the total.

Chart C3.1 • Distribution of transfers to households by income decile | In percentage of total budgetary cost

Panel A – Support to vulnerable households
| (Cost: 0.04% of GDP)

Brackets of income per decile of equivalized
disposable income (annual, euros)

Panel B – Complement for pensioners
| (Cost: 0.33% of GDP)

Brackets of income per decile of equivalised
disposable income (annual, euros)

Panel C – Complement for non-pensioners
| (Cost: 0.23% of GDP)

Brackets of income per decile of equivalised
disposable income (annual, euros)

Panel D – Complement for children and youth
| (Cost: 0.04% of GDP)

Brackets of income per decile of equivalised
disposable income (annual, euros)

Source: Calculations by Banco de Portugal based on EUROMOD simulations and EU-SILC data. | Notes: Households are distributed by decile according to their equivalised disposable income in the baseline scenario for 2022 (without measures). The equivalised disposable income calculation uses the modified OECD scale, which weights the first adult as 1, additional household members above 14 years weight 0.5 and children up to 14 years 0.3. Panel B: As opposed to the other policy measures, the complement to pensioners is taxed under PIT and its budgetary cost is net of the tax paid.

The changes to the personal income tax introduced by the State Budget for 2023 have a relatively limited impact, affecting disposable income by a similar proportion across the income deciles (Chart B3.3). The reform of the minimum untaxed income has a more marked effect between the second and fourth deciles, while affecting to a lesser extent the first decile, where the personal income tax paid was already quite low. In turn, cutting the marginal rate in the second bracket of the personal income tax from 23% to 21% and updating bracket limits by 5.1% – compared to a scenario of unchanged limits – have an impact which is growing with income. These two changes are more significant in deciles where the tax has a greater weight. Both in the baseline scenario and in the scenarios incorporating changes to personal income tax, labour income evolves at the rate for average wages per employee projected in this Bulletin, while pensions evolve according to the update announced by the Government for 2023. On average,

these changes as a whole increase equivalised disposable income by 0.9%. The tax's progressivity is not substantially changed by these measures, which lead to a slight reduction in the tax rate across deciles.

Chart C3.2 • Impact from transfers to households by income decile | In percentage of equivalised disposable income
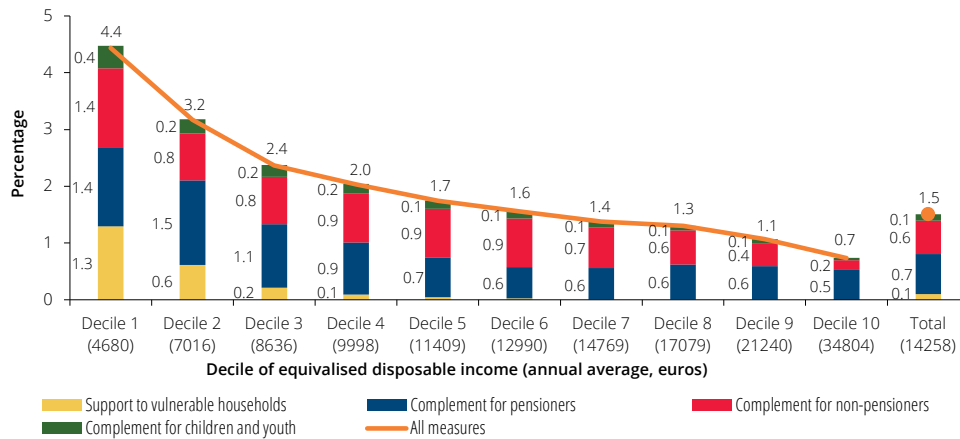
Source: Calculations by Banco de Portugal based on EUROMOD simulations and EU-SILC data. | Notes: Households are distributed by decile according to their equivalised disposable income in the baseline scenario for 2022 (without measures). The equivalised disposable income calculation uses the modified OECD scale, which weights the first adult as 1, additional household members above 14 years weight 0.5 and children up to 14 years 0.3.

Chart C3.3 • Impact from changes to PIT enacted by the State Budget for 2023 | In percentage of equivalised disposable income
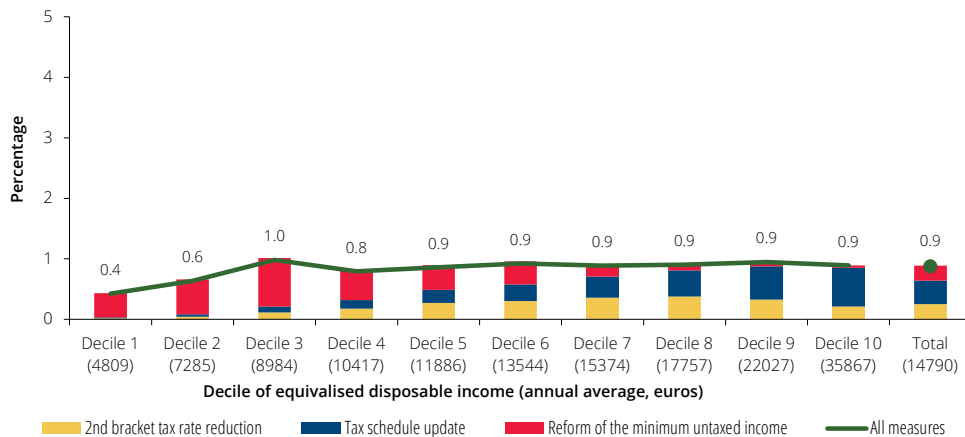
Source: Calculations by Banco de Portugal based on EUROMOD simulations and EU-SILC data. | Notes: Households are distributed by decile according to their disposable equivalised income in the baseline scenario for 2022 (without measures). The equivalised disposable income calculation uses the modified OECD scale, which weights the first adult as 1, additional household members above 14 years weight 0.5 and children up to 14 years 0.3.

Box 4 • Effect of inflation and rising interest rates on the financial situation of households

Rising inflation and interest rates put further pressure on households' budgets. These shocks have differentiated impacts on households according to their socio-economic characteristics, which is important to take into account when projecting economic developments and assessing the timeliness and design of policy response.

This box analyses, for households with different income levels, the combined effect of three factors: (i) the expected change in income in 2022 and 2023, (ii) the increase in debt service and (iii) the increase in nominal spending on food and energy due to higher prices estimated for 2022-23. In the latter exercise, it was necessary to assume, for each income quintile, that total quantities consumed remain the same as in 2021 and that the consumption structure by type of goods and services is the same as in 2015, the last year with known data.

The aim is to obtain a measure of the change in income available after serving debt and incurring expenditure on 'essential' goods (proxied by spending on food and energy).

The exercise is based on a set of simplifying assumptions, in particular about the capacity of households to adjust to inflation and interest rate shocks. Given the size and persistence of shocks, one should expect an adjustment to spending on non-essential goods or other changes in the consumption basket, the use of accumulated savings, including for debt reduction – which has become more costly – and an increase in the number of hours worked, among other things.

The results show the heterogeneity of the impact of inflation and interest rates across the different household groups, depending on income earned. The lowest income quintiles have greater increases in income in the two years combined. However, for households in the first two quintiles with variable rate credit, the increase in income does not cover the increase in spending on essential goods and in debt service. Nevertheless, the difference is small, not exceeding 20% of the overall value that households likely benefited on average from moratoria. The average debt-service-to-income ratio of these households is expected to remain below 25%, with a 1.7 p.p. increase in 2023 from 2021.

Developments in macroeconomic aggregates used in the exercise are anchored in the projections for 2022 and 2023 presented in this Bulletin. In the case of income, distinct changes in the following components of disposable income were considered: employee income, self-employment income, rents (including imputed rents), social benefits, interest received and other income, direct taxes and social contributions. To distribute these changes across income brackets, the latest available information from the Portuguese Household Finance and Consumption Survey (Portuguese acronym: ISFF 2020), the Survey on Income and Living Conditions (EU-SILC 2020) and the Labour Force Survey is used. Where there is no disaggregated information to differentiate developments in an income component according to household characteristics, the average change is applied to all households while maintaining the distribution of the baseline year. This is the case for self-employment income, rents (including imputed rents), interest received and other income.

In the case of employee income changes, the distribution by income quintile is calculated based on ISFF 2020 data, with 2019 as reference year. The use of data for an earlier period as a starting point does not preclude the findings of the exercise, as the distribution of income across different types of households is structural in nature. In this exercise, changes in earnings are obtained as the sum of two effects. The first is the effect of labour market transitions, which in 2022 is calculated

as described in the Special issue of the October *Economic Bulletin*[9] and assumed to be negligible in 2023. The second is the effect of wage increases in 2022 and 2023, calculated for each individual according to their situation: receiving a wage equal to or lower than the minimum wage or higher; working as a civil servant or an employee in the private sector. The wage changes considered for these sub-groups are those underlying the macroeconomic scenario presented in this Bulletin.

Turning to social benefits, the impacts of policy measures are distributed by income quintile using the figures resulting from simulations in the EUROMOD microsimulation model[10] of permanent shocks in 2022 and 2023 (regular and extra pension increases, higher family allowance and solidarity supplement for the elderly) and shocks with a positive impact on income in 2022 and a similar negative impact in 2023 ("Families First" package).

The change in direct taxes per income quintile considers average tax rates per quintile applied to changes in gross income and the effects of changes in law for 2023. The projected change in the aggregate value of social contributions is distributed across income quintiles according to the distribution of earnings obtained in this exercise.

The exercise combines changes in income with increases in the debt burden and spending on food and energy due to rising prices. Projected changes in the macro scenario for interest paid and debt repayments are applied to variable-rate debt service instalments per income quintile obtained in the ISFF 2020.

To obtain the increase in spending on food and energy, the projected average annual change in the price of these items in 2022 and 2023 is applied to expenditure in 2021.[11] The distribution of this expenditure per income quintile is obtained using the distribution of total consumption by quintile of the ISFF 2020 and the food and energy weights in total spending for each quintile of the Household Budget Survey (Portuguese acronym: IDEF) for 2015.

Table C4.1 illustrates the results of the exercise for all households, broken down into income quintiles per equivalent adult.[12] Households in the different quintiles are very heterogeneous in terms of work status and education. Households in the first quintile, for instance, have the lowest share of employees and the highest share of retired and unemployed people. In this quintile, in 70.9% of households the reference person has an educational attainment below the 9th grade. These differences affect the starting income level as well as the impact of the shocks analysed in this exercise.

In 2022, the change in average income decreases in tandem with the level of income, and is particularly high in the first quintile, reflecting: (i) the fact that employment growth is concentrated in this group of households, (ii) wage increases are more marked for this quintile due to the higher share of minimum wage recipients, (iii) the concentration of nearly all extraordinary support to vulnerable households in this quintile, which also benefits proportionally more from the supplement for pensioners.

In turn, the effect of rising food and energy prices is most pronounced in the first income quintile. The weight of these goods in the consumption basket of total households is around 35%,

9.   See the Special issue entitled "Distributional effects on households of recent economic developments", *Economic Bulletin*, October 2022.

10. For more details on the EUROMOD, see Sutherland and Figari (2013), "EUROMOD: the European Union tax-benefit microsimulation model", *International Journal of Microsimulation*, International Microsimulation Association, 1(6), 4–26 – https://euromod-web.jrc.ec.europa.eu/.

11. Food prices increase by 11.4% and 9.3% in 2022 and 2023 respectively, while the increase in energy goods stands at 24.3% and 3.6% over the same period.

12. Income per equivalent adult is calculated based on the modified OECD equivalence scale, which assigns a weight of 1.0 to the first adult in the household, 0.5 to the other adults and 0.3 to each child (individuals aged under 14).

accounting for a larger share of spending by lower-income households compared to those with higher income (43% and 27% respectively in the first and last quintiles).

The increase in debt service is moderate, as only 30% of households have variable interest rate debt. The impact measured as a percentage of disposable income is relatively close among the various quintiles, which combines with, among other factors, the fact that the share of indebted households in the first quintiles is smaller and that the disposable income of these quintiles is lower.

The change in income available for other purposes after serving debts and spending on 'essential' goods has been paid is positive across income classes. The average net impact is 1.5% for households as a whole and amounts to 3.4% in the first quintile.

In 2023, the effects of rising interest rates on debt service are larger, reflecting the increases observed throughout 2022 and expected in 2023. The increase in deposit rates is much lower than the increase in loan rates, so that the impact on interest received is subdued and lower on average than that of debt service across quintiles. In turn, the negative effects of rising food and energy prices are less marked than those seen in 2022.

The net impact grows in tandem with income and is positive in all but the first two quintiles. For households in the first quintile, the net impact is, on average, negative (-2.1% of disposable income), reflecting a lower increase in income and a more marked effect of rising food and energy prices in relation to the remaining quintiles. For these households, the negative impact on income of the unwinding of the extraordinary measures implemented in 2022, notably the support to vulnerable households, is particularly important. These measures correspond to an average benefit of around €500 per household in the first quintile, i.e. 3% of annual disposable income.

The results of the simulations are also obtained for the subset of households with variable rate debt (Table C4.2). These households, which in this exercise are those exposed to the interest rate shock, account for around 30% of all households. Households with variable rate loans are very unevenly distributed across income quintiles. More than half of households with variable interest rate debt belong to the two top-income quintiles and only 8% belong to the first quintile. In all quintiles, the reference person is employed in at least 85% of households and has upper secondary or higher education in at least 40% of households.

In 2021, the baseline year for the exercise, households with variable rate debt have a higher income on average than the rest, except for the last quintile. In particular, in the first quintile the average income of indebted households is 20% higher than that of all households in this quintile. Average variable rate debt is between around €57,000 for the first two income quintiles and €83,000 in the last quintile. Total debt service for these households, which encompasses instalments on all their loans (including fixed rate loans), amounts on average to €4,178/year for lower-income households and €7,072/year for higher-income households. Households' average variable rate debt in the first quintile is relatively high in terms of total annual income, which may indicate that these households have other forms of wealth or assets – note that 40% have upper secondary or higher education – which can be used to assess their creditworthiness.

Table C4.1 • Impact of inflation and the rise in interest rates on households financial situation, by income quintile – all households

	Q1	Q2	Q3	Q4	Q5	Total
			Situation in 2021			
		Number of households (thousand)				
	809	807	810	812	804	4042
		Work status (percentage of total)				
Employed	39.2	58.0	62.4	69.0	69.0	59.5
Unemployed	7.0	4.6	4.0	1.7	0.5	3.6
Retired	43.4	33.7	29.9	27.8	29.8	32.9
Other situation	10.4	3.6	3.7	1.6	0.7	4.0
		Education (percentage of total)				
Lower than 9th grade	70.9	51.4	45.3	27.2	10.7	41.1
Lower than secondary	11.4	23.7	19.6	23.0	13.8	18.3
Secondary	13.1	18.8	19.7	21.5	20.2	18.7
Tertiary	4.6	6.1	15.4	28.3	55.3	21.9
		Average value per household (euros)				
Disposable income excluding interest	15,006	22,868	30,213	39,984	78,184	37,202
Interest received	96	128	139	290	878	305
Food and energy expenditures	9,427	11,883	11,413	13,785	13,294	11,960
Debt service (annual)	810	1,638	1,701	2,410	3,421	1,994
Memo:						
Number of households with variable rate loans (%)	12.2	25.2	28.2	42.1	42.1	30.0
		Annual average change per household (euros)				
			2022			
Disposable income excluding interest	1,882	1,910	2,044	2,430	3,803	2,412
Interest received	4	5	6	12	37	13
- Food and energy expenditures	1,333	1,703	1,644	1,984	1,929	1,719
- Debt service (annual)	50	101	132	205	247	147
Net impact	503	111	274	253	1,663	559
			2023			
Disposable income excluding interest	555	1,158	1,444	2,060	3,626	1,767
Interest received	57	76	83	173	524	182
- Food and energy expenditures	859	1,072	1,026	1,240	1,189	1,077
- Debt service (annual)	117	237	309	480	580	344
Net impact	-363	-74	191	513	2,382	527
		Annual average change per household				
		Percentage of disposable income in the previous year				
			2022			
Disposable income excluding interest	12.5	8.4	6.8	6.1	4.9	6.5
Interest received	0.03	0.02	0.02	0.03	0.05	0.03
- Food and energy expenditures	8.9	7.4	5.4	5.0	2.5	4.6
- Debt service (annual)	0.3	0.4	0.4	0.5	0.3	0.4
Net impact	3.4	0.5	0.9	0.6	2.1	1.5
			2023			
Disposable income excluding interest	3.3	4.7	4.5	4.9	4.4	4.5
Interest received	0.3	0.3	0.3	0.4	0.6	0.5
- Food and energy expenditures	5.1	4.3	3.2	2.9	1.4	2.7
- Debt service (annual)	0.7	1.0	1.0	1.1	0.7	0.9
Net impact	-2.1	-0.3	0.6	1.2	2.9	1.3

Source: Banco de Portugal and Statistics Portugal (calculations by Banco de Portugal) | Notes: The values presented in the table are average values per household. Net income quintiles are calculated per equivalent adult and refer to all households in the base period of the exercise. The situation in 2021 is given by the ISFF 2020. The average annual values in 2021 are anchored in the macro scenario broken down by net income quintiles according to the ISFF 2020. Income evolves in line with the hypotheses of the macroeconomic scenario for the various components, food and energy expenditure varies in proportion to the increase in prices projected for these IHPC items and the interest received/debt service reflect the increases in the interest rates observed and projected taking into account the hypotheses for interest rates.

In the subset of households with variable interest rate debt, changes in income in 2022 were not very different (in euro) from that of households as a whole, but changes in debt service are, of course, much higher across quintiles. The net impact of increases in income, prices and interest rates is negative in 2022 for all quintiles except that with the highest income. The reduction in income net of the debt burden and spending on essential goods as a percentage of disposable income stands at 1.2% and 1.8% in the first two quintiles.

In 2023, among households with variable rate loans, no major differences stand out between the various quintiles in terms of the percentage change in income (6.1% in the first quintile and 5.4% in the last). The net impact of rising disposable income, the debt burden and food and energy prices is once again negative, on average, for households in the first two quintiles (-2.4% and -1.0% of income in their quintile) but is positive in the others.

The results of the exercise suggest that most households are able to maintain the same volume of consumption of essential goods as in 2021 and to meet debt service obligations using their current income, without jeopardising other types of expenditure. For indebted households in the first income quintile – which account for only 2.4 % of all households – their capacity to adjust should be more challenging. Nevertheless, the debt-service-to-income ratio of these households is 22.7% in 2021, remaining stable in 2022 (22.6%), and rising only slightly (by less than 2 p.p.) to 24.4% in 2023. Indebted households have a more favourable labour market situation and higher levels of education than others in that segment. This group of households may also have accumulated savings during the pandemic,[13] amid increased uncertainty and constraints to the consumption of various goods and services, and benefited from support measures, in particular credit moratoria. An estimate based on data from the Central Credit Register (CRC) indicates that approximately 400,000 households used the moratorium, with an average benefit per household of around €3,700 (€2,900 for households with education lower than secondary and 4,500 for households with tertiary education).

The analysis shows that indebted households in the first quintile would need an additional net amount of €699 in 2023 vis-à-vis 2021 to maintain the volume of consumption of essential goods and debt service. This corresponds to 19% of the total amount from which households benefited, on average, with moratoria.

The identification of vulnerable situations based on these results should be interpreted with caution as the results refer to averages per income quintile. In addition, the exercise does not take into account any decisions taken by households in response to shocks, in particular the adjustment of the consumption basket to mitigate the impact of inflation and the use of accumulated savings to cushion the consumption shock or repay debt – debt renegotiation being also a possibility.

The simulation likely overestimates the impacts of the inflation shock, by not considering the possibility of consumption substitution of the goods subject to more marked price rises. For instance, rising fuel prices may lead households to opt for greater use of public transport, with lower costs, instead of using private cars, an option that becomes more likely in the context of price freezes in urban public transport.

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13. There is evidence that the increase in savings during the pandemic crisis was broadly based across groups of households, although more concentrated in higher-income groups (Box: "Household saving during the pandemic crisis", *Economic Bulletin*, December 2021).

Table C4.2 • Impact of inflation and the rise in interest rates on households financial situation, by income quintile | Households with variable rate loans

	Q1	Q2	Q3	Q4	Q5	Total
	Situation in 2021					
	Number of households (thousand)					
	99	203	229	342	338	1211
	Work status (percentage of total)					
Employed	85.9	91.9	88.7	87.6	89.8	89.0
Unemployed	8.6	2.5	5.3	2.1	0.2	2.8
Retired	3.9	4.4	5.7	9.4	9.6	7.5
Other situation	1.5	1.3	0.3	0.9	0.4	0.8
	Education level (percentage of total)					
Lower than 9th grade	30.9	29.9	27.5	15.6	5.5	18.7
Lower than secondary	28.4	29.9	23.7	21.5	11.4	21.1
Secondary	25.3	31.4	24.4	25.7	21.3	25.1
Tertiary	15.5	8.8	24.4	37.2	61.8	35.1
	Average value per household (euros)					
Disposable income excluding interest	18,334	25,805	32,416	40,923	74,969	44,441
Interest received	60	81	94	215	517	242
Food and energy expenditures	11,965	14,542	12,152	14,502	13,224	13,501
Debt service (annual)	4,178	4,360	4,689	4,585	7,072	5,228
memo: variable rate loans	57,392	56,445	65,719	68,363	82,669	68,963
	Annual average change per household (euros)					
	2022					
Disposable income excluding interest	1,884	2,021	2,081	2,328	3,664	2,566
Interest received	3	3	4	9	22	10
- Food and energy expenditures	1,692	2,084	1,750	2,087	1,919	1,944
- Debt service (annual)	408	401	467	486	588	490
Net impact	-214	-461	-133	-236	1,178	142
	2023					
Disposable income excluding interest	1,233	1,626	2,057	2,502	4,272	2,662
Interest received	36	48	56	128	309	144
- Food and energy expenditures	1,090	1,312	1,092	1,305	1,182	1,214
- Debt service (annual)	664	653	760	791	956	798
Net impact	-485	-290	260	535	2442	794
	Annual average change per household					
	Percentage of disposable income in the previous year					
	2022					
Disposable income excluding interest	10.3	7.8	6.4	5.7	4.9	5.8
Interest received	0.01	0.01	0.01	0.02	0.03	0.02
- Food and energy expenditures	9.2	8.1	5.4	5.1	2.6	4.4
- Debt service (annual)	2.2	1.6	1.4	1.2	0.8	1.1
Net impact	-1.2	-1.8	-0.4	-0.6	1.6	0.3
	2023					
Disposable income excluding interest	6.1	5.8	6.0	5.8	5.4	5.7
Interest received	0.2	0.2	0.2	0.3	0.4	0.3
- Food and energy expenditures	5.4	4.7	3.2	3.0	1.5	2.6
- Debt service (annual)	3.3	2.3	2.2	1.8	1.2	1.7
Net impact	-2.4	-1.0	0.8	1.2	3.1	1.7

Source: Banco de Portugal and Statistics Portugal (calculations by Banco de Portugal). | Notes: The values presented in the table are average values per household. Net income quintiles are calculated per equivalent adult and refer to all households in the base period of the exercise. The situation in 2021 is given by the ISFF 2020. The average annual values in 2021 are anchored in the macro scenario broken down by net income quintiles according to the ISFF 2020. Income evolves in line with the hypotheses of the macroeconomic scenario for the various components, food and energy expenditures varies in proportion to the increase in prices projected for these IHPC items and the interest received/debt service reflect the increases in the interest rates observed and projected taking into account the hypotheses for interest rates.

In the case of natural gas supply, the possibility of switching from the deregulated to the regulated market – allowed since October 2022[14] – may also translate into significant savings for households, which are not contemplated in this exercise. Also, a recent analysis of e-commerce prices for a basic food basket showed significant price dispersion, even in narrowly defined product markets, pointing to potential savings from substituting among existing alternatives.[15] However, this substitution capacity may be limited for households whose consumption basket already comprises the lowest-priced products, such as lower-income households. Decisions to adjust the consumption basket hinge on each household's circumstances and cannot be simulated within the scope of the exercise.

On aggregate, the financial position of households has evolved favourably in recent years, with a reduction in the debt ratio and an increase in assets held, including liquid financial assets such as deposits. As a result, households are generally better placed to manage the impact of rising interest rates and inflation through a combination of reducing non-essential spending, cutting on current savings or drawing on accumulated savings. The situation of households most exposed to the impact of shocks should continue to be monitored.

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14. Since October 2022, household consumers with annual gas consumption below 10,000 m³ can return to the regulated market for natural gas.

15. See box "Developments in e-commerce prices of a basket of basic food products", *Economic Bulletin*, October 2022.

Box 5 • A characterisation of the firms benefiting from the RRP

By the end of November 2022, the European Commission had transferred €3.3 billion to Portugal, part of the €16.6 billion initially allocated to finance the investments provided for in the national Recovery and Resilience Plan (RRP).[16] Of the total transferred, the direct beneficiaries – public entities responsible for implementing the investments directly specified in the RRP – received €638 million. Approximately one-third of this amount was channelled to the Secretaria-Geral da Educação e Ciência (Portuguese General Secretariat for Education and Science), responsible for implementing the "Digital Transition in Education" project. There is still €1.5 billion in transit, delivered to the so-called intermediate beneficiaries – public entities such as IAPMEI and Banco Português de Fomento – that are responsible for selecting the final beneficiaries who apply to implement the projects. The amount already paid to final beneficiaries, which can be public or private entities, corresponds to €488 million, which are highly concentrated in investments to improve energy efficiency in residential buildings. Note that payments to final and direct beneficiaries do not necessarily mean that the projects are being implemented.

The payments already made account for 7% of the total RRP envelope. However, approved applications from direct or final beneficiaries cover 62% of the allocation (€10.3 billion). Most of the close to 70,000 beneficiaries are private agents: 62,000 individuals with at least one successful application and an average funding of €1,800, accounting for 1.3% of the approved amount.[17] Half of the funding is set to go to firms.
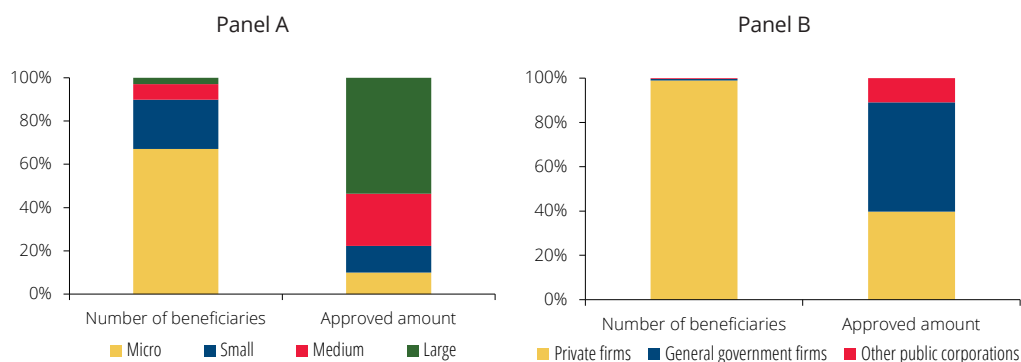
Among the beneficiaries with at least one approved application, 6,689 are included in the 2020 *Informação Empresarial Simplificada* (IES, simplified corporate information) data and account for €4.0 billion of funding (40% of the total amount approved). Merging IES and the detailed data on the RRP beneficiaries leads to the exclusion not only of households, but also of financial corporations, sole proprietors, associations, non-business public entities, and firms created in 2021 and 2022 (together covering the remaining 60%).

In the sample under analysis, most of the firms benefiting from the RRP are small: 97% are SMEs (Chart C5.1 – Panel A). On average, each beneficiary has only one approved project, a figure that increases with the size of the firm. Large firms account for 54% of the funding covered in this sample. Public corporations represent a negligible share in the total number of beneficiaries but concentrate more than half of the total funding (Chart C5.1 – Panel B).

There is high dispersion between the magnitudes of RRP-funded projects to be implemented by firms. The largest projects will be executed by large firms, involving an average funding of €11 million, while the micro firms' average is €90,000. These average figures compare with medians of €960 thousand and €7.9 thousand in the case of large firms and micro firms respectively. This shows high dispersion also between beneficiaries in the same size categories (Chart C5.2). Dispersion is particularly high among large firms, including for example direct beneficiaries responsible for wide-scale infrastructure projects (such as the expansion of the Lisbon or Oporto underground network, or the strenghtening of cross-border connections), as well as executers of very small investments.

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16. The total amount of grants available for Portugal was recalculated following the final release of the 2020 National Accounts by Eurostat. The investments to be financed by the additional €1.6 billion have not been announced yet.

17. Detailed information on RRP beneficiaries and projects is available on the Transparency Portal: https://transparencia.gov.pt/pt/fundos-europeus/prr/pesquisar/projeto.

Chart C5.1 • Characterization of the sample of firms benefiting from RRP funding, by size and institutional sector | Percentage

Panel A

Panel B

Micro   Small   Medium   Large

Private firms   General government firms   Other public corporations

Sources: Portal da Transparência and IES (calculations by Banco de Portugal).

Chart C5.2 • Dispersion of contracted amounts, by firm size | In million euro

Panel A – Micro

Panel B – Small

Panel C – Medium

Panel D – Large
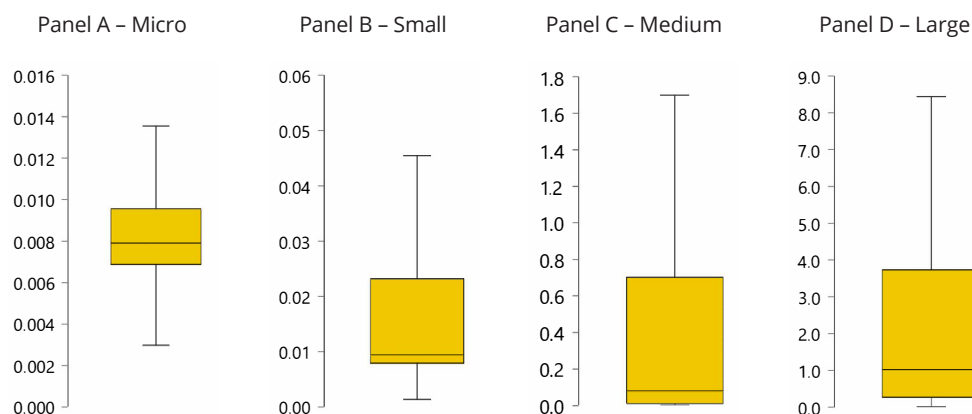
Sources: Portal da Transparência and IES (calculations by Banco de Portugal) | Notes: The boxes represent the interquartile range, corresponding to the difference between percentiles 75 and 25 of the distribution, and the horizontal lines inside the boxes represent the median. The external horizontal lines represent the maximum and the minimum of the distribution excluding, in both cases, outliers.

In terms of sectoral composition, 41.7% of firms with approved applications are concentrated in the trade and manufacturing sectors (Chart C5.3). However, the approved average funding for firms in these two sectors accounts for, respectively, 1.7% and 15.0% of the total amount in this sample. The sector with the largest share of approved funding is transportation and storage (34.7%). In this case, the approved amount is concentrated in a relatively small number of firms (2.9%) dominated by the direct beneficiaries implementing large transport infrastructure projects.

Chart C5.3 • Number of beneficiaries and approved amount, by sector | Percentage of total sample

■ % of total beneficiary firms　　　■ % of total approved amount
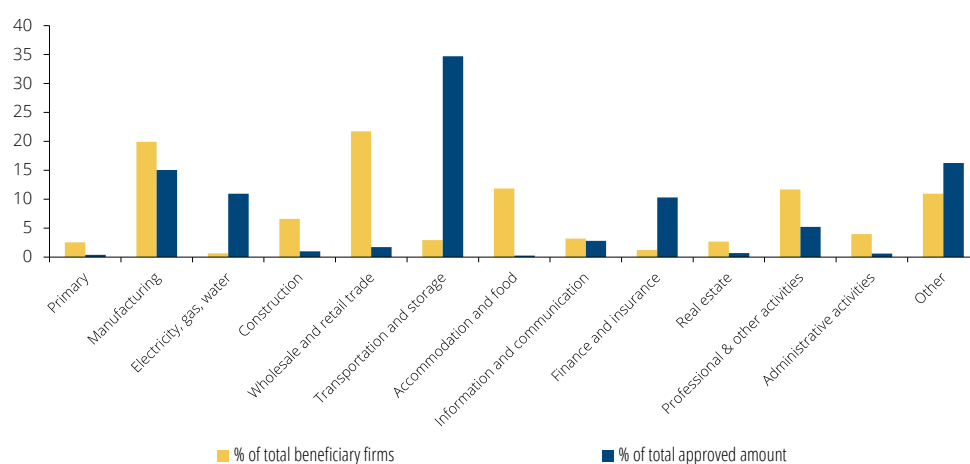
Sources: Portal da Transparência and IES (calculations by Banco de Portugal).

A simple comparison with the other non-financial corporations covered in the 2020 IES shows that the subset of RRP beneficiaries is very different. On average, the latter firms are larger, both in terms of the number of employees and turnover: 10.5% of firms with approved RRP funding are medium or large, while in the rest of the IES this share stands below 2% (Chart C5.4). They are also more concentrated in the manufacturing sector and show a stronger export intensity. In addition, beneficiary firms have on average higher levels of capital (as a percentage of total assets) and labour productivity (measured as the ratio of gross value added to total employment).

Chart C5.4 • Sample of RRP beneficiaries versus remaining firms (2020)


■ RRP beneficiaries　　　■ Other firms
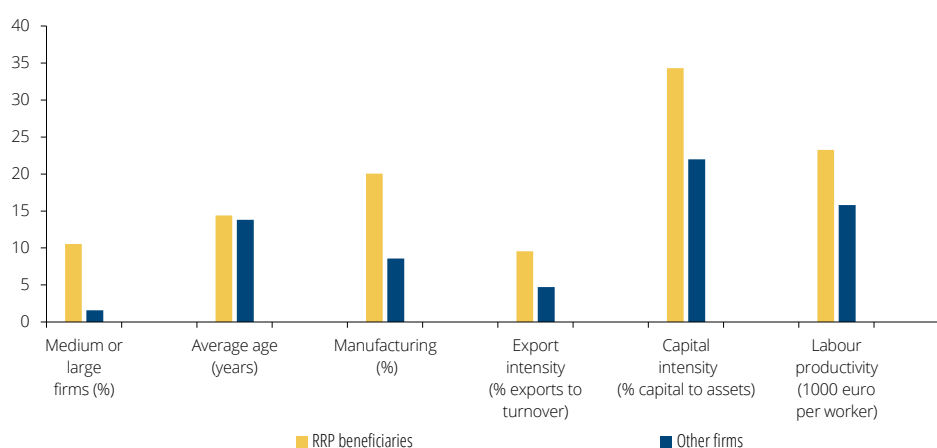
Sources: Portal da Transparência and IES (calculations by Banco de Portugal).

Box 6 • Increase in spillover effects across HICP components

The intensity and scope of inflationary pressures rose over 2022 and contributed to the propagation of price increases in energy and food to the other categories of goods and services included in the HICP. This box analyses how year-on-year monthly rates of change in prices of the main HICP components — unprocessed food, processed food, energy goods, non-energy industrial goods and services — are affected by shocks in other components. To this end, a model was estimated to measure the impact on the price volatility of each component of price changes in the other components. It also takes into account the developments in the macroeconomic determinants of inflation.[18] These include the price of oil in euros, the short-term interest rate, compensation per employee and the unemployment gap, measured by the differential between the observed and trend unemployment rates.[19]

Results show that spillovers between the different components rose in the most recent period, as shocks on prices have not only increased in size, but are also transmitted more intensely through the price chain. Chart C6.1 presents the share of the variance of each HICP component (each line) unexplained by the macroeconomic variables after a shock in each of the other categories (each column), considering two distinct sample periods. The reference period in panel A is between January 2010 and December 2019, and in panel B data ranges up to August 2022 are included, covering the pandemic period and the price hikes of recent months.

Chart C6.1 • Spillover effects from inflation pressures across HICP components for an horizon of 12 months | Percentage

Panel A – 2010 M1 to 2019 M12

Panel B – 2010 M1 to 2022 M8
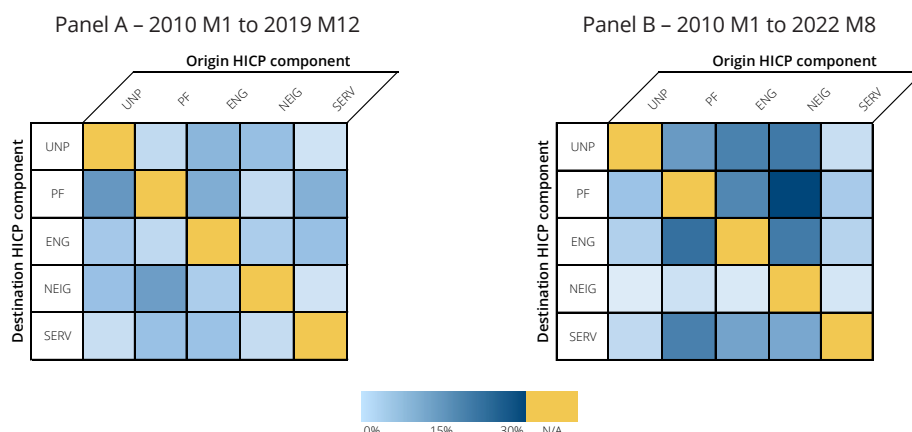
Sources: ECB and Statistics Portugal (calculations by Banco de Portugal). | Notes: The spillover effect is assessed by the proportion of the variance of the year-on-year rate of change in the price of each aggregate that is explained by a shock in each of the HICP components, controlling for common and generalized variations in the economy. The reading of the matrix is as follows: each element of the matrix represents the percentage of the variance of the year-on-year rate of change of the price of the component in the respective row explained by a one standard deviation shock to the year-on-year rate of change of the price of the component in the respective column. For example, in the Panel A, the darkest element corresponds to the row of processed food and the column of unprocessed food, indicating that the bilateral spillover effects of inflation pressures from the second to the first are considerable, as one would expect. The intention is to analyze the indirect effects across categories, so the diagonal elements, which are based on the general impulse response functions (GIRF) of a category to impulses on itself, are omitted. The sample periods considered are 2010 M1 to 2019 M12 (Panel A) and 2010 M1 to 2022 M8 (Panel B). The calculation of the variance decomposition of the forecast errors is done from the GIRFs along the lines of Koop et al. (1996).[20]

18. The method used is based on Diebold, F. X., and Yilmaz, K. (2012) "Better to give than to receive: Predictive directional measurement of volatility spillovers." *International Journal of Forecasting* 28(1), 57-66 and BIS, "Measuring price spillovers across sectors." *BIS Annual Economic Report* 2022 (Box A), 47-49.

19. For further details on the methodology for calculating the trend unemployment rate, see Duarte, C., Maria, J. and Sazedj, S. (2020), "Trends and cycles under changing economic conditions," *Economic Modelling*, Elsevier, Vol. 92(C), 126-146.

20. Koop, G., Pesaran , M. H., e Potter, S. (1996) "Impulse response analysis in nonlinear multivariate models." *Journal of Econometrics* 74(1), 119–148.

In the decade ending in 2019, it is worth noting the effects of shocks to unprocessed food prices on processed food prices and energy prices on food prices as a whole, with magnitudes of about 15% and 20%, respectively. It is also visible that volatility in services prices is barely affected by pressures arising in the prices of goods components. By enlarging the sample period, bilateral spillover effects become more intense. In this case, non-energy industrial goods stand out as the origin of these effects, i.e., through contagion of the remaining categories, mainly influencing food prices. This result is robust to the inclusion of supply constraints indicators as exogenous variables. Energy price shocks also had a significant impact on food inflation developments during this period. Finally, the vulnerability of services prices to effects of shocks to goods prices increased, reaching 46% in total (18% in the shortest period).

The analysis of the aggregate effect of each HICP component as destination and origin of price pressures confirms the recent rise in spillover dynamics. For this assessment, the following were calculated: (i) the total spillover effect with each component as destination ("imported"), i.e. the percentage change in the price of each component that is explained by the change in the prices of the remaining components, and (ii) the total spillover effect of each component as the origin ("exporter") of pressures, corresponding to the percentage of the other categories' price volatility that is explained by each component in a 12-month horizon (Chart C6.2).

In the decade preceding the pandemic, the processed food component was more affected by pressures stemming from other components, with shocks in these components explaining almost 40% of the change unrelated to exogenous variables. Conversely, the energy category "exported" the most indirect effects to other goods and services and was responsible for 30% of their total variance. Food is also crucial in explaining global price variance. By including recent data, non-energy industrial goods play a more prominent role as the origin of inflationary pressures (83%) and the relevance of the effects triggered by processed food (58%) and energy (50%) also increases.

Chart C6.2 • Destinations and sources of spillover effects from inflation pressures by HICP aggregate for an horizon of 12 month | Percentage

Panel A – Destinations of effects

Panel B – Sources of effects

■ 2010 M1 to 2019 M12   ■ 2010 M1 to 2022 M8
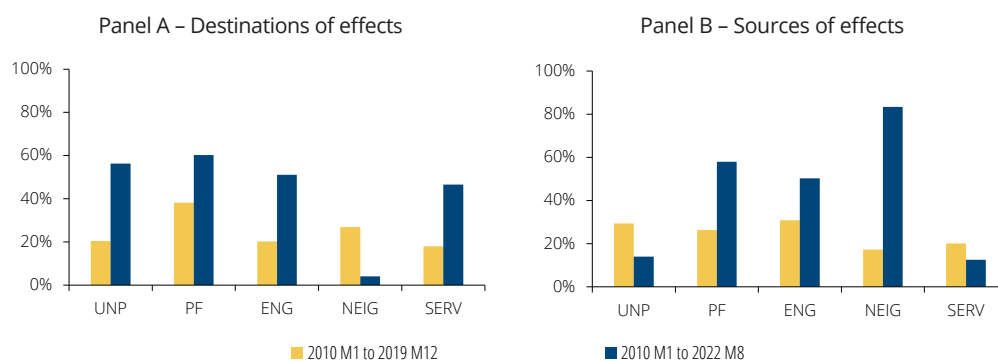
Sources: ECB and Statistics Portugal (calculations by Banco de Portugal). | Notes: Destinations of effects are calculated by summing the non-diagonal elements of each row of the matrix (Panel A). Sources of effects are calculated by summing the non-diagonal elements of each column of the matrix (Panel B). Two sample periods were considered: 2010 M1 to 2019 M12 and 2010 M1 to 2022 M8. The model specification is identical to that presented in the note to chart C6.1.

II Special issue

On Public Policy Analysis
at the Banco de Portugal

On Public Policy Analysis at the Banco de Portugal[1]

Knowledge sharing and a more enlightened public debate are one of the Banco de Portugal's strategic guidelines. The Banco de Portugal's technical expertise allows it to promote a better-informed public debate on economic and financial policy. This sharing contributes to increasing confidence in the performance of public institutions, which is vital in a context of greater demands and public scrutiny.

The Banco de Portugal's research agenda identifies five priority topics in line with its statutory mission and the fulfilment of its strategic objectives: (i) central bank policies in a changing environment; (ii) functioning of the markets and of the Portuguese economy; (iii) growth, resilience and equity of the Portuguese economy; (iv) climate change, demography and other ongoing transformations; and (v) development of new analytical models and tools.

Public policies analysis is common to all these topics and is particularly relevant in studying the growth, resilience and equity of the Portuguese economy and its process of convergence with the euro area. Discussing and studying public policy-related issues allows to inform and advise policymakers on the design of policies targeting current challenges, such as promoting intra- and intergenerational equity or the transition to a greener and more digitalised economy. As public policies largely affect the allocation of scarce resources, it is essential to understand the different effects on the economy and society. Financial and opportunity costs associated with public policies emphasise the importance of good practices in their design, implementation and evaluation. The analytical methods developed in economics are crucial to identifying the direct and indirect effects of public policies.

The design of public policies combines qualitative and quantitative technical information with complex economic, social and political issues. This complexity, and the need to establish empirical regularities independent of each country's or region's specific context, contributed to the development of empirical models and research methods that seek to identify the effects of policies, commonly referred to in the literature as treatment effects. The study of the impact of policies depends on data availability, often only made available with a time lag. Data compilation and production, such as the database of public incentive schemes made available to researchers by the Banco de Portugal through its micro-data research laboratory (BPLIM), facilitates the in-depth study of economic policies' effects.

There is no single definition for public policies. They allow policymakers to intervene in the economy to correct market failures, increase social welfare and redistribute income. Therefore, any policy that affects society is considered a public policy, such as the provision of public goods through health, education, justice and defence; income redistribution and social protection; and the promotion of economic growth and job creation. The national minimum wage, measures to support birth rates, progressive income taxation or tax incentives for firms investing in research and development are examples of public policies.

Public policies assume greater importance in times of crisis, as demonstrated during the COVID-19 pandemic. The pandemic triggered the need for public intervention in several

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1. Prepared by Sónia Félix and Sharmin Sazedj.

areas and showed the importance of synergies between different institutional sectors. Public health policies, such as general lockdowns and mandatory mask-wearing, contributed to tackling the spread of the virus. Initially, education policies made it possible to adjust educational methods to the lockdown period and subsequently to promote learning recovery. In turn, support measures for firms, such as furlough schemes, support for fixed costs and the suspension of tax payment obligations, protected the productive capacity of the economy. Public and private initiative loan moratoria and government-backed credit lines allowed firms to meet their immediate liquidity needs and to build up liquidity buffers. Households' liquidity needs were also eased by loan moratoria and increased social transfers. These national economic policy measures, complemented by European monetary, prudential and supervisory policy measures, mitigated the impacts of the pandemic shock on firms and households. However, it is important to know the economic costs and benefits of public support programmes, namely by comparing them with those of other countries and through accurate analyses of the counterfactual no-support scenario.

The public policy sphere goes beyond the national level. The pandemic highlighted the importance of coordinating national and supra-national policies. This coordination contributed to a swifter recovery of economic activity compared to previous crises. Amidst the measures adopted in the European Union, of note is the European Investment Bank's funding, targeted at small and medium-sized enterprises, and the issuance of European debt, which made the temporary support instrument to mitigate unemployment risks in an emergency (SURE) and the new temporary recovery mechanism known as Next Generation EU possible. In turn, the adoption of the Temporary State Aid Framework and the suspension of budgetary rules eased the coordination of national policies and the implementation of discretionary measures to stimulate the economy by all member states.

This Special issue revisits recent research by the Banco de Portugal on public policy issues. Over the past three years, this research has focused on the impact of policies directed at poverty, inequality and social protection, education and training, tax policies, competition and regulation policies, and pandemic shock mitigation policies.

Poverty, inequality and social protection

"The outstanding faults of the economic society in which we live are its failure to provide for full employment and its arbitrary and inequitable distribution of wealth and incomes."

John M. Keynes

Inequality represents one of the most complex challenges of contemporary society. Studying social inequality in its various components, such as income, generational or gender inequality, is essential to assess the impact of public policies on the economic and social welfare of the country. Alves, Cardoso and Monteiro (2020) characterise the evolution of income and consumption inequality in Portugal between 1995 and 2015 and see a downward trend, despite Portugal remaining in the top third of countries with the greatest inequality in the European Union. Redistributive public policies in terms of social welfare allow for a reduction in these inequalities. The authors show that the contribution of social transfers (excluding pensions) to reducing income inequality increased substantially.

Policies to tackle child poverty stand out among public policies to mitigate inequalities given their role in breaking the cycle of poverty and systemic inequality. Narazani, Riscado and Wemans

(2022) analyse the impact of social support and tax benefits on combating child poverty, by using the EUROMOD microsimulation model. The authors analyse the effectiveness and efficiency of the family allowance, the social integration income (Rendimento Social de Inserção – RSI) and the tax deduction per dependent person in reducing the poverty gap. Results suggest that the family allowance is currently the most effective benefit in tackling poverty, although this stems from the higher budgetary cost associated with the benefit. Through a simulation that reinforces the three benefits by 0.1% of GDP, it appears that the RSI stands out as the most efficient and effective instrument, as it addresses the target population better. However, the authors show that RSI is also the instrument that triggers the highest disincentives towards the labour market.

In the same line of study of the impact of social transfers on combating poverty, Hernández, Picos and Riscado (2022) use EUROMOD to investigate the impact of different guaranteed minimum income schemes in Spain and show that an increase in the coverage of these social benefits, complemented by an increase in its amounts, effectively reduces poverty.

Within the social protection-related literature, studies seeking to identify the determinants of the optimal social insurance level have also emerged. Amador and Rodrigues (2021) develop a theoretical model that incorporates public social insurance against shocks such as unemployment, illness or disability periods, as well as changes in the number of dependent children or elderly. In this model, agents make consumption and investment decisions and allocate resources to an insurance scheme that makes transfers in case of adverse shocks. The authors conclude that consumer opportunity costs increase with the number of inactive members per household, resulting in more investment, less consumption and, therefore, lower insurance. Furthermore, they show that heightened uncertainty, expressed by higher variance of shocks, increases optimal social insurance. However, if adverse dependency shocks are associated with positive technological shocks, the increase in optimal social insurance is smaller.

The role of education in reducing inequality

Social protection includes policies beyond social transfers. Public services in health and education have significant redistributive impacts and are important in breaking poverty cycles, which often linger for generations. Intergenerational transmission of poverty in Portugal is high (Diogo, 2021) and there is a strong relationship between wages and parental education (Causa and Johansson, 2010). An analysis based on data from the ad hoc module of Statistics Portugal's 2019 Survey on Income and Living Conditions shows a strong intergenerational transmission of education in Portugal: around 73% of the offspring of higher-educated parents have also completed tertiary education whereas less than 20% of the offspring of parents with up to basic education hold a tertiary degree (Banco de Portugal, 2022). Thus, education policies promote a more inclusive and less unequal society.

Hartog, Raposo and Reis (2022) study the impact of secondary vocational training on wage differentiation. The authors suggest that the benefits of vocational education depend on an ability to adapt the curriculum to market and technological changes. Another important aspect for the design of public policies in education is training in financial matters. Financial literacy is a major tool to empower consumers with the knowledge they need to mitigate any adverse impact on their personal finances, in particular at times of change in the economic cycle. Thus, economic agents make informed financial decisions, aware of the underlying risks, therefore making the economy more resilient. Reis and Wemans (2022) analyse the financial literacy of young people in Portugal using data from the 2018 Programme for International Student Assessment (PISA). Results suggest

that around 15% of young Portuguese experience considerable difficulties in this area, with a clear relationship between financial literacy and the socio-economic context, highlighting the importance of policies fostering equal opportunities for young people.

For the future

Public policies in tackling poverty, reducing inequalities and social protection are of particular importance in fostering social welfare. In the near future, policies will inevitably have to address some of the challenges heightened by the recent pandemic crisis. The generation that stepped into the labour market in the last decade has experienced two severe crises in less than 10 years, with potential impacts on their entire future labour market trajectory, making public policy analysis and definition more demanding. Studies in this area should also focus on structural challenges such as population ageing. On the one hand, it is important to analyse the public policies that aim to reverse this trend, such as birth incentives. On the other, policies addressing the direct consequences of ageing populations need to be studied. These latter include the impact on social security systems, as well as the redefinition of policies providing better living conditions to an increasing number of elderly people.

Tax policy

"While optimal tax theory itself takes no position on how intrinsically desirable public spending or redistribution are, it does insist that however much revenue taxation raises and however much redistribution the system achieves, it should do it with as little cost to efficiency as possible. To achieve that, the tax system has to be seen as a whole."

Richard Blundell

Tax policy allows to raise the revenue needed to finance State expenditure and represents a key instrument for the fulfilment of its distributive and stabilising functions, when used in a fair and efficient manner. The tax system can create incentives or disincentives affecting economic agents' decisions, which impact on the economy. Labour income tax for example affects households' choices between leisure and work, capital income tax affects savings and investment decisions, taxes on production and imports influence consumer decisions, and corporate taxes affect firms' hiring and investment decisions and, ultimately, their location decisions.

Chari, Nicolini and Teles (2022) develop a dynamic model for cross-border trade to study how countries should cooperate on tax and trade policies in a globalised context. The authors suggest that several equilibria are Pareto efficient with different tax combinations.[2] Results show that the optimal equilibrium is characterised by a free market for goods, services and capital. The choice of the national tax system, such as corporate income taxes, may act as a restriction on capital mobility, therefore free trade agreements should be complemented with tax agreements. The authors show that household asset income – including interest, dividends and capital gains – can be taxed at a common country-specific rate in an optimal equilibrium. Corporate income taxes lead to distortions in capital accumulation and capital allocation across countries. Still, a

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2. An equilibrium is said to be Pareto efficient if, and only if, no other equilibrium exists that is better for at least one of the agents and no worse for the others.

non-zero tax can be optimal provided that it is constant over time or across countries and the tax base excludes investment expenditure.

This outcome is also documented in Teles (2021), where the author studies the basics of housing taxation. Based on research on optimal capital taxation, which concludes that capital accumulation should not be distorted (e.g. Chari, Nicolini and Teles, 2020), the author suggests that the same principle should apply to housing. A lack of distortion of capital accumulation does not mean that capital cannot be taxed, but that tax should be levied on pre-existing capital rather than on future capital. This can be done by fully deducting investment expenditure. Finally, the author concludes that taxing real estate, rentals or introducing other taxes that distort real estate capital accumulation is not desirable, and that the only taxes that are necessary are taxes on labour income and/or value added taxes on all consumer goods and services, housing included.

Braz, Cabral and Campos (2022) characterise corporate income taxation in Portugal. The results show that Portugal is one of the euro area countries where the top statutory corporate income tax rate is highest. Although the general rate has been cut over time, tax progressivity has been increasing and collection is very concentrated on a small number of large firms. The authors show that the effective tax rate is negatively associated with financial leverage and capital intensity, thus consistent with the deductibility of interest expenses and fixed asset depreciation in the tax code. The results on firm size and productivity suggest that larger and/or more productive firms may have a greater tax planning ability, which allows them to reduce their tax burden up to a certain threshold.

Economic policies to mitigate the effects of carbon emissions

Climate change is one of the most important challenges faced today. Policies to lessen its effects have gained prominence in public discussion and in the debate on the most appropriate design of economic policy in this area. Emissions of carbon dioxide and other greenhouse gases represent a negative global externality that distorts the private cost of production vis-à-vis social cost. Thus, allowing the free functioning of the market does not lead to efficient results and public policies gain prominence to promote social well-being. In this context, tax policy stands out, especially carbon taxation, as one of the most efficient instruments to fight climate change.

Research at the Banco de Portugal has contributed to a better understanding of the economic impacts of climate change and to the study of policy measures to mitigate these effects. Literature identifies direct and indirect effects of climate change on the economy. The direct effect is associated with a higher frequency of extreme weather events, e.g., flooding, droughts and storms. These extreme weather events can impact on prices and incomes, trade flows, capital stock, obsolescence of assets and labour allocation (Adão et al., 2022). In turn, indirect effects result from adaptation to climate change and implementation of mitigation policies.

Cavalcanti, Hasna and Santos (2020) quantify the aggregate and distributional effects of a carbon tax. The taxation of carbon-intensive activities affects relative prices, leads to replacement effects across inputs and consequently, to the reallocation of factors across sectors. The authors point out that the aggregate effect on the economy depends on the magnitude of the tax and the productive structure of the country. A simulation for several countries shows that introducing a 32.3% tax, estimated to be the tax needed for the United States to achieve the original Paris Agreement pledge, reduces GDP by 0.5% to 2%, depending on the country and the allocation of revenues. Hasna, Lourenço and Santos (2022) use this model for Portugal and estimate a maximum cost of 1.7% of GDP for a 32.9% tax (without reallocation of revenues in the economy), allowing for a 30 to 40% reduction in emissions, in line with the original Paris Agreement target. These

aggregate impacts have very asymmetric effects across sectors and individuals, the adverse effect being stronger in more energy-intensive sectors and among skilled workers in those sectors, who do not reallocate to other sectors (Cavalcanti et al., 2020 and Hasna et al., 2022).

In the European Union, the main mechanisms for mitigating fossil fuel emissions are carbon taxes and tradable emission permits that set an aggregate amount of carbon emissions. Adão et al. (2022) compare the efficiency of these instruments and highlight the advantages of using both simultaneously, warning that the implementation details of the mechanisms are potentially more important than the conceptual differences between them. Using a theoretical model calibrated with data for Portugal, based on Adão, Narajabad and Temzelides (2021), the authors compare the carbon tax with policies that contribute to an increase in renewable energy production. Results point to a greater effectiveness of the tax in reducing carbon emissions, compared to technological innovation in renewable energy. However, the best result is obtained when both policies are applied simultaneously.

For the future

The ageing population and the need to modernise education and health systems create further pressure on public services. The design of the tax system should consider that an effective increase in tax revenue is important as well as how it is generated. The complexity of the tax code, its role in mitigating inequality, the risk of creating distortions and the need to adapt the tax system to current market challenges, such as globalisation, digitalisation and climate change, highlight the importance of studies that inform policy design in this area.

Competition and regulatory policies

"Competition is a public good and must be seen as a fundamental asset that contributes to a balanced and fair society and a market where opportunities are for everyone."

<div align="right">Portuguese Competition Authority</div>

Product market competition plays a key role in economic growth and social well-being. Competition-friendly policies boost the creation of firms, the growth of viable firms and the exit of unviable firms from the market. This competitive dynamic contributes to the creative destruction process, which results in market selection and the reallocation of resources from less productive to more productive firms.

Insolvency and enterprise restructuring regimes

Restrictions on the creative destruction process are associated with resource misallocation in economies, preventing the reallocation of scarce resources to the most productive firms. Evidence for Portugal shows that the misallocation of labour and capital inputs has contributed to slower productivity growth over the last decade (Reis, 2013; Dias, Marques and Richmond, 2016; Gouveia and Osterhold, 2018; Dias and Marques, 2021). A major aspect of the misallocation problem is the existence of institutional arrangements that allow unviable firms to stay in the market – commonly referred to in literature as 'zombie' firms. These firms contribute negatively to aggregate productivity, as they are less productive. They also contribute negatively to an efficient allocation of resources in the economy, by attracting resources and distorting the market. Against this background, insolvency and enterprise restructuring mechanisms emerge as pivotal policies to reducing barriers to firms' exit from the market.

In Portugal, despite recent improvements, insolvency filings are lengthy and costly. Personal costs incurred by entrepreneurs setting up businesses that are not successful are higher in Portugal than in most OECD countries (OECD, 2018), while judicial efficiency is relatively low in Portugal (OECD, 2019).

Research at the Banco de Portugal has contributed to a better understanding of the corporate insolvency and restructuring system in Portugal. Pereira and Wemans (2022) analyse the length of insolvency filings in Portuguese courts and show that they increase with firms' size, the amount of fixed assets and liabilities, activity in the construction sector and the existence of real collateral debt guaranteed.

Analysis at firm level shows that restructuring is associated with an increase in workers' salaries in the years following the restructuring, limiting human capital depletion and contributing to better firm-worker matches (Bonfim and Nogueira, 2021).

The pandemic affected insolvency and restructuring mechanisms by suspending the obligation to file for insolvency, introducing support measures for restructuring and cutting court fees. Indirectly, support measures, including loan moratoria, prevented insolvency filings. Nogueira (2022) describes developments in insolvency filing during the COVID-19 pandemic and analyses the impact of support measures for firms on the number of insolvency filings. Notwithstanding the fact that the literature shows a negative historical correlation between firms' economic activity and insolvency and restructuring filings, the number of new filings remained in line with the historical average in 2020 and fell below average in 2021. The suspension of the obligation to file for insolvency does not explain the falling number of filings, whereas the results of a natural experiment suggest that loan moratoria avoided new insolvency filings.

Public procurement

Public procurement in Portugal represents a significant share of the economic activity. It is therefore essential that public procurement procedures are efficient, encourage competition and ensure that public funds are used efficiently.

Promoting competition and efficiency in public procurement is of the utmost relevance in the current context of recovery and resilience of the Portuguese economy and implementation of public support.

Bonfim et al. (2021) show that during the sovereign debt crisis in Europe, banks with greater exposure to firms involved in public procurement reduced their lending more than banks less exposed to such firms. This decrease in lending was common to firms with and without public procurement contracts. Moreover, firms in relationships with affected banks grew less and invested less. These results show that public procurement may exacerbate the effects of a sovereign debt crisis by cutting credit granted by banks exposed to firms with public procurement contracts.

Measures to support corporate financing

One of the instruments used to support firms is the provision of public guarantees that allow them to borrow at more favourable prices and term conditions by easing collateral problems. This instrument is especially important for small and medium-sized enterprises (SMEs), which rely heavily on bank credit as a financing source (Farinha and Félix, 2015). However, these programmes can contribute to increasing the market power of some firms and thus harm productivity growth in the long run.

Bonfim, Custódio and Raposo (2021) analyse the impact of a support programme for SMEs – PME Líder – on employment and investment of firms that have benefited from the programme. The PME Líder programme allows eligible firms to access bank credit subsidised by public guarantees and a public credit rating, reducing financial frictions for such firms. The authors show that the programme has contributed to increased investment and employment in the SMEs that benefited from the programme. The impact of the programme was more pronounced in the years of the financial crisis and sovereign debt crisis.

For the future

Competition policies driving the entry and exit of firms from the market, such as insolvency and enterprise restructuring schemes combined with workers' protection policies, promote the reallocation of inputs to viable and productive firms and contribute to long-term productivity gains. Furthermore, policies promoting competition in accessing public procurement, particularly in the context of the national economic recovery plan, prevent the market power of some firms from increasing. Public support should be proportionate, well targeted and based on objective criteria, to avoid the spread of zombie firms and resource misallocation in the economy. These challenges open lines of future research.

Public policies in the context of the COVID-19 pandemic

"Given the nature of the crisis, all hands should be on deck, all available tools should be used."

Christine Lagarde

The COVID-19 pandemic was an unprecedented economic and public health shock. The exogenous nature of the initial shock, the comprehensive response of policymakers and the radical change in incentives that influence the action of economic agents have prompted a literature aimed at identifying the macroeconomic impact of the pandemic shock and what policies are most appropriate to limit the effects of the shock on firms and households.

As a result of the pandemic crisis, the Portuguese government adopted fiscal policy measures to support firms and households, complementary to supranational policy measures – monetary, prudential, regulatory and fiscal (Banco de Portugal, 2020b). The first measures were announced as recently as March 2020, and they were further developed and adapted to the pandemic developments. These support measures encompassed the simplified furlough regime and the support for progressive resumption of activity, loan moratoria, government-backed credit lines and other fiscal support measures, such as the suspension of some tax obligations.

Research by the Banco de Portugal's technical staff contributed to understand the implications of the crisis on firms and households, the propagation channels, and the impact of policy responses adopted by the authorities.

The results of the Fast and Exceptional Enterprise Survey (COVIDIREE) conducted by the Banco de Portugal and Statistics Portugal (INE), disclosed in April 2020, allowed the analysis of the pandemic's short-term impact on firms. The daily economic activity indicator (DEI) launched in January 2021 also helped inform policy decisions using high-frequency data that capture very short-term economic developments (Lourenço and Rua, 2020). The availability of microeconomic information, typically with some time lag, allowed a more thorough analysis of the pandemic's impact on firms and households.

Firm support programmes

The contraction in demand for goods and services as a result of containment measures, surge in uncertainty and disruption in global value chains led to the closure or sharp drop in activity of a significant number of firms.

The substantial drop in firms' sales and difficulty in rapidly adjusting their cost structures led to liquidity shortfalls. Félix, Moreira and Silva (2021) estimate that fixed operating costs account for, on average, 15% of Portuguese firms' sales, higher in smaller firms and in firms in service-related sectors. The impact of the crisis on firms' liquidity was mitigated by national fiscal policy measures complemented by supranational policies.

The first analyses on the impact of the pandemic on firms' financial positions and the impact of measures to mitigate the effects of the pandemic – in particular the simplified layoff scheme and loan moratoria – consisted of a simulation of short-term impacts. Simulation results showed that these measures would allow firms to significantly reduce their liquidity shortfalls caused by a downturn in activity (Banco de Portugal, 2020a).

These first analyses on the impact of the crisis and policies were extended and reinforced as microeconomic information became available. In October 2020, the Special issue of the *Economic Bulletin* presented an analysis of the pandemic's immediate implications (Banco de Portugal, 2020c). The first part of this analysis addresses the authorities' policy responses while the second part looks at aspects related to the sectoral structure of the economy and firms' responses to the pandemic's challenges. Fiscal policy was mainly expenditure-driven, with labour income and job maintenance support measures, as well as an increase in social transfers. Economic policy measures with no direct budgetary impact, such as government-backed credit lines and loan moratoria, were also important in mitigating the impact of the crisis on firms. Government-backed credit lines accounted for about half of the loans granted to firms by resident financial institutions over the second quarter of 2020 and public and private debt moratoria covered about 30% of corporate loans in the first half of the year.

The economic impact of the COVID-19 pandemic on Portuguese firms was heterogeneous. The analysis of the pandemic's impact in accordance with firms' growth rates in the pre-pandemic period – between 2016 and 2018 – shows that firms with the highest growth rate were those most affected by the crisis and the most likely to make use of the simplified layoff regime, the loan moratorium and government-backed credit lines (Banco de Portugal, 2020d). The resource allocation to high growth firms contributes to aggregate productivity and to a sustained economic recovery.

The support measures for firms helped to mitigate the effect of the shock on firms' financial standing. The analysis of firms' liquidity included in the Quarterly Survey of Non-Financial Corporations (ITENF) pinpointed that firms' liquidity increased in 2020, reflecting a significant decline in operating costs and investment (Banco de Portugal, 2021a). This increase was more significant for smaller firms, for those less affected by the pandemic and for firms that made use of moratoria and government-backed credit lines. While policies to support firms helped mitigating firms' liquidity needs, the duration of the shock may justify the increase in some firms' equity. A simulation exercise showed that this capital increase was more important for firms in a financially fragile position or those that were particularly affected by a drop in sales (Banco de Portugal, 2021b). In another simulation exercise, the share of firms with negative equity in 2023 is estimated to be lower in firms that applied for government-backed credit lines (Banco de Portugal, 2021f).

A result in the literature on the impact of recessions on firms' productivity dynamics is the reallocation of resources from less productive firms to more productive firms (cleansing effect).

Kozeniauskas, Moreira and Santos (2022) show that the impact of the COVID-19 pandemic on firms differed according to firms' productivity. In line with the theory that support policies for firms limited the cleansing effect on the economy, the authors show that more productive firms reduced employment less and are less likely to apply for support measures than less productive firms, but they also show that the crisis didn't increase the exit of less productive firms from the market. Mateus and Neugebauer (2022) characterise firms that applied for support measures according to their credit risk and show that firms that have made use of government-backed credit lines had a lower credit risk than firms that applied for loan moratorium. The authors also demonstrate that firms with a higher credit risk paid higher interest rates and received smaller loans than more creditworthy firms.

Disruption in international production chains caused by the COVID-19 pandemic led to the collapse of international trade flows in goods and services. Amador, Gouveia and Pimenta (2021) use monthly data on Portuguese firms' trade, provided by Statistics Portugal, to analyse the impact of containment measures on nominal trade flows throughout 2020 and the first half of 2021. The authors show that the containment measures adopted in different countries reduced firms' exports and imports. Moreover, the negative impact of containment measures on trade flows is more important for large firms and firms that are more integrated in global value chains.

Overall, the combination of different policy instruments allowed the pandemic shock to be addressed. However, while the effects of the shock were temporary for some firms, for others they were more protracted, thus threatening their viability. Against this background, insolvency and restructuring mechanisms for viable firms are particularly relevant to ensure the efficient allocation of limited resources and boost Portuguese economy' recovery and resilience.

Household support programmes

The link between households and firms is at the basis of economic organisation. The impact of the pandemic on businesses reflected in household income and consumption decisions. Firms' shutdown and the significant number of workers in layoff led to a cut in disposable income.

A simulation exercise of the impact of the pandemic on household income in a partial equilibrium framework indicated that income support policies – the simplified layoff and the extraordinary support to the reduction in economic activity of the self-employed worker – enabled the mitigation of the negative effect of the pandemic on households (Banco de Portugal, 2020a). On the impact of the moratorium, the study concludes that moratoria on loan repayments have greater impact than moratoria on rents and that, in general, moratoria have a more favourable impact on lower-income and younger households.

Further analysis on the impact of loan moratoria targeted at households concluded that they cushioned the impact of falling disposable income, in particular of households with a weaker financial position, and typically with higher propensity to consume (Banco de Portugal, 2020c).

The COVID-19 pandemic disproportionately affected some population groups. In a study on the Brazilian context, Brotherhood et al. (2022) used data on mobile phone use to prove that social distancing was less observed in slums after the onset of the COVID-19 pandemic, and that the number of deaths was higher in areas geographically close to slums. The authors thus show that the most vulnerable were disproportionately affected by the pandemic, contributing to increased income and health inequality. By using a theoretical model, the authors simulated the impact of different policies: reallocation of existing medical resources, confinement and money transfers. The simulation results show that intensive care unit centralisation helps to significantly cut the number of deaths, while confinement measures at home only help to delay the development of

the pandemic if no other measures (e.g., vaccines) are taken. Finally, money transfers have an important impact on slum residents.

Employment support measures

The pandemic crisis demanded strong adaptability from firms and the use of remote working was one of the strategies adopted to ensure business continuity when on-site work was not possible. In sectors included in the COVID-IREE survey, remote working was used by about half of firms in the second quarter of 2020 and covered approximately 21% of workers (Banco de Portugal, 2020c). According to the microeconomic data from Statistics Portugal's Employment Survey, around 60% of workers in the information and communication sectors, financial activity, education, and consultancy, technical and scientific activities were working from home in the second quarter of 2020.

The labour income and job maintenance support measures helped mitigate the impact on the labour market. Of these measures, the simplified layoff regime stands out for its direct budgetary impact. Based on a simulation exercise, the difference between the expected and the observed reduction in employment in the absence of this measure was estimated to be between 9 and 20 p.p., depending on the sector of activity. The analysis concluded that this measure was key in preserving employment and reducing firms' short-term liquidity needs (Banco de Portugal, 2020c). These employment support measures contributed to the fact that the impact of the pandemic crisis on flows between employment and unemployment was far less than that during the sovereign debt crisis (Banco de Portugal, 2021c).

The impact of the crisis on different economies depends to a large extent on the sectoral composition of firms and employment. In Portugal, the crisis has contributed to major changes in sectoral employment composition, in particular to growth in construction and a fall in industry and services (Banco de Portugal, 2021c). The greater relative concentration of young workers in the most affected sectors of activity was reflected in a greater fall in employment in this age group and in prolonged schooling and training (Banco de Portugal, 2021e). Restrictions on mobility and the reduction of labour supply channels increased the number of discouraged people who, in normal times, would be classified as unemployed (Banco de Portugal, 2021d).

Policies for containing a pandemic outbreak

The COVID-19 pandemic also affected people from different age groups differently. Brotherhood et al. (2020) investigate the importance of population age composition during the COVID-19 pandemic. The authors consider an epidemiological model with the possibility of choosing work and non-work social distancing. In equilibrium, older individuals socially distance themselves substantially. Thus an optimal lockdown confines the young more. The strictness and economic costs of lockdowns depend on the possibility of teleworking.

The surge of two pandemics and several epidemic outbreaks in the past twenty years emphasises the importance of studying appropriate responses. Brotherhood and Santos (2022) show that optimal policy prescriptions for mitigating the effects of a pandemic depend, to a large extent, on individual behaviour and the emergence of new variants. The authors adapt the model of Brotherhood et al. (2022) and discuss the impact of age-specific vaccination programmes and new virus variants on COVID-19 pandemic developments. If older people choose to protect themselves endogenously, the policymaker will choose to vaccinate younger people first, as this group is highly socially interactive. However, the outcome may be different if new variants of the infection emerge. In this case there is a lower number of deaths through the vaccination programme for older adults first, as the new variants are particularly dangerous for this age group.

Final remarks

The Banco de Portugal is committed to being an institution of reference in Portugal, acting in accordance with its public service mission, underpinned by principles of accuracy in its analyses and research. Timely and rigorous economic analyses, promoting the public debate and advising on public policy design, are a major tool for achieving the Bank's mission.

During times of crisis it is important to analyse the transmission channels, identify the most vulnerable segments, seek solutions and thus contribute to the informed design of public policies. During times of growth, it is important to identify the risks, structural constraints and solutions that promote inclusive and sustainable growth and contribute to the resilience and convergence of the Portuguese economy within the European context. Fostering economic literacy contributes to increasing the confidence of the Portuguese people in the work carried out by the Bank.

The Banco de Portugal's research agenda identifies key issues for the growth and resilience of the Portuguese economy. Challenges associated with economic recovery and major global trends open new lines for research for the coming years.

Despite the economic rebound in the aftermath of the COVID-19 pandemic, geopolitical tensions and deglobalisation patterns pose new challenges to economies. The disruption of value and distribution chains for goods and services, and the impact on financial and energy markets have had major effects on business activity and household income. Balancing the need to take additional measures to boost the economy, while benefiting from European funds, and maintaining sustainable public finances over the medium term is a major challenge. The design of appropriate policies in a context of limited resources plays a key role in this challenge and should not be dissociated from financial and environmental sustainability issues.

Energy transition and digital transformation represent opportunities and challenges with important economic implications, requiring new research lines. Barriers and risks associated with transformation processes highlight the importance of policies targeted at the most vulnerable segments. In particular, new concerns arise about the ability of agents to adapt to rapid changes in the labour market and in society. The analysis of new forms of business and work organisation, and the interaction between technology and employment, is key to the design of responses targeted at these challenges. Against this background, policies fostering investment in new skills and training throughout the professional career that are complementary to technological progress, are particularly relevant.

Finally, inequality and income and wealth distribution are central to the topic of economic growth and its sustainability and should play a key role in designing public policies.

These issues will still be a cause of concern for the Banco de Portugal in the future.

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