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I Projections for the Portuguese economy: 2022-24

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Box 3 Recent developments in Portuguese inflation and comparison with the euro area

1 Introduction

The Portuguese economy is expected to maintain a growth profile over the projection horizon, against a background of high uncertainty due to Russia's military invasion of Ukraine. Gross domestic product (GDP) will grow by 4.9% in 2022 (4.9% in 2021) and converge in subsequent years to rates closer to the estimated pace of long-term growth: 2.9% in 2023 and 2.0% in 2024 (Table I.1.1). Economic expansion will lead to a rise in employment and a decrease in the unemployment rate.

Inflation will rise to 4.0% in 2022 and will decline to 1.6% in 2023 and 2024. The increase in inflation in 2022 is associated with higher prices for energy and other commodities and continued disruptions in global supply chains. The recovery in demand for services most affected by the pandemic also contributes to the increase in inflation. These effects dissipate over the projection horizon, but are partly offset by increased pressures on wages and prices, in a context of more intensive use of resources in the Portuguese economy.

Table I.1.1 • Projections of Banco de Portugal for 2022-24 | Annual rate of change, in percentage, unless otherwise stated

	Weights 2021	EB march 2022				EB december 2021			
		2021	2022 (p)	2023 (p)	2024 (p)	2021 (p)	2022 (p)	2023 (p)	2024 (p)
Gross domestic product (GDP)	100.0	4.9	4.9	2.9	2.0	4.8	5.8	3.1	2.0
Private consumption	64.2	4.4	3.6	1.9	1.6	5.0	4.8	2.2	1.8
Public consumption	19.2	5.0	1.5	-1.5	-0.1	4.8	1.4	-1.3	-0.1
Gross fixed capital formation	19.7	6.1	9.2	6.0	3.9	4.9	7.2	6.6	3.9
Domestic demand	103.0	5.0	4.3	2.1	1.8	5.1	4.6	2.4	1.9
Exports	42.0	13.0	14.2	7.5	3.8	9.6	12.7	7.8	3.9
Imports	45.0	12.8	12.3	5.5	3.3	10.3	9.3	6.2	3.6
Contribution to GDP growth net of imports (in p.p.) (a)									
Domestic demand		2.5	1.6	1.0	1.0	3.1	2.6	1.2	1.1
Exports of goods		0.9	-0.3	0.5	0.4	1.1	0.2	0.6	0.4
Exports of services		1.5	3.5	1.4	0.7	0.6	3.0	1.2	0.6
Employment (number of persons) (b)		2.1	1.4	0.6	0.4	2.5	1.6	0.5	0.3
Employment (hours worked) (b)		5.0	5.1	2.2	0.4	8.3	4.0	0.6	0.3
Unemployment rate (c)		6.6	5.9	5.7	5.6	6.6	6.0	5.7	5.6
Current plus capital account (% of GDP)		0.7	-0.4	1.8	0.7	0.2	1.8	2.6	1.8
Trade balance (% of GDP)		-2.6	-4.1	-2.7	-2.1	-3.0	-2.1	-1.2	-1.0
Harmonised index of consumer prices		0.9	4.0	1.6	1.6	0.9	1.8	1.1	1.3
Energy goods		7.5	14.2	-2.1	-1.8	7.8	6.3	-1.3	-0.8
Excluding energy goods		0.4	3.1	1.9	2.0	0.4	1.3	1.4	1.5

Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected, p.p. – percentage points. Cut-off date for macroeconomic projections: 10 March. For each aggregate, this table shows the projection corresponding to the most likely value, conditional on the set of assumptions. (a) 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. (b) According to the national accounts concept. (c) In percentage of the labour force.

The invasion of Ukraine by Russia in late February contributes to building up inflationary pressures and to limit the economic momentum in the euro area and Portugal. The conflict has aggravated the rise in the prices of energy commodities and a number of primary goods. The negative impact on activity also stems from a decline in the confidence of households and entrepreneurs, the

turbulence in financial markets, as well as the effects of the sanctions imposed on Russia on trade and financial flows. Underlying the projection exercise is the assumption that the conflict will not escalate and that the impact of these factors will unwind in the medium term.

Economic activity benefits from higher European Union (EU) funds and the maintenance of favourable financial conditions, although the market anticipates a gradual increase in interest rates. The projection is also based on the assumption that global supply constraints will disappear in 2023.

The Portuguese economy converges again with the euro area in the period 2022-24 and continues to record lower inflation rates. The average growth rate of GDP in Portugal in 2022-24 is 0.6 p.p. higher than that projected for the euro area by the ECB in March. As in 2021, HICP developments are more moderate in Portugal, resulting in an inflation differential of -0.7 p.p. on average over the period considered.

The projections are subject to heightened uncertainty and the balance of risks is skewed upwards for inflation and downwards for activity, especially in 2022. The main risk factor is a deterioration in the Portuguese economy's external environment should the conflict in Ukraine escalate. This would imply a build-up of inflationary pressures and a more negative impact on confidence and trade flows – including the possibility of more severe problems in global supply chains. The impact of these risks materialising is illustrated in Box 1, which describes an adverse scenario for the Portuguese economy. The increase in uncertainty is partly offset by an improvement in the epidemiological situation.

Projected GDP growth is lower by 0.9 p.p. in 2022 and 0.2 p.p. in 2023 than envisaged in the December 2021 *Economic Bulletin*, and remains unchanged in 2024. The 2022 revision reflects the smaller growth in the fourth quarter of 2021 and weaker indicators of the first quarter, together with the impact of the loss in purchasing power induced by the rise in inflation and the less favourable assumptions for the external environment. Inflation has been revised upwards, reflecting recent high figures and the upward revision of assumptions for oil and other commodity prices.

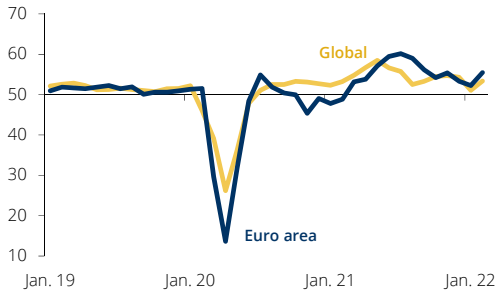
2 External environment, financing conditions and policies

Global economic activity decelerated in the early months of 2022, owing to the impact of the new wave of the pandemic and amid rising inflation. At the end of 2021, the spread of the Omicron variant and the control measures adopted had a moderate and short-lived negative impact on global economic growth. Global and euro area Purchasing Managers Indexes (PMI) declined in December and January, but recovered in February (Chart I.2.1). In the euro area, inflation continued to surprise, rising to 5.8% in February (Chart I.2.2), reflecting the pass-through of higher commodity prices and pressures on production costs from global supply chain disruptions.

The invasion of Ukraine by Russia at the end of February implies a deterioration in the near-term growth outlook for the global economy and increased inflationary pressures. The conflict has led to an intensification of the surge in oil and gas prices in international markets (Chart I.2.4), which reflects Russia's importance in the supply of these commodities. It also translated into an increase in uncertainty and geopolitical risk (Chart I.2.3), with negative effects on financial markets and economic agents' confidence. Russia is not an important trading partner for Portugal, but the

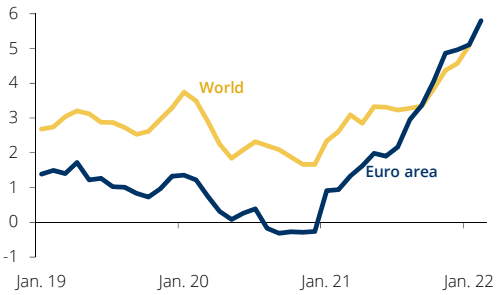
indirect impact via central and eastern European economies has contributed to the deterioration of the external environment. In addition, the conflict may cause renewed disruptions to global value chains, particularly those dependent on Russia's commodities or on freight transport in the region. The recent increase in COVID-19 cases in some Asian economies and the imposition of restrictive measures may also exacerbate these disruptions.

Chart I.2.1 • Global and euro area PMI | Diffusion index



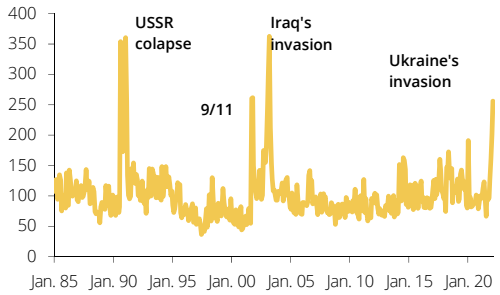
Source: Markit. | PMI is a monthly index that summarizes purchasing managers' views on the conditions of industry, services, construction and retail. Readings below 50 indicate that the conditions have deteriorated.

Chart I.2.2 • Consumer prices – euro area and world | Year-on-year rate of change, in percentage



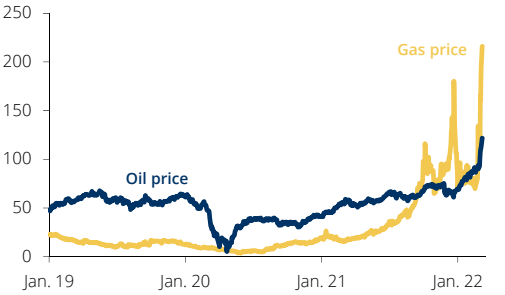
Sources: Eurostat and Refinitiv (Banco de Portugal calculations).

Chart I.2.3 • Geopolitical threats | Index (average between 1985 and 2019 =100)



Source: Economic Policy Uncertainty. | The geopolitical threats index reflects automated text-search results related to adverse geopolitical events in 10 newspapers, including the Financial Times, the Wall Street Journal and the Guardian.

Chart I.2.4 • Oil and gas prices | Euros



Source: Refinitiv. | Notes: Gas price – reference natural gas price per megawatt/hour for the European market (TTF Dutch). Oil price – Dated Brent price (per barrel). Daily values until 07/03/2022.

Despite the negative impact of the conflict in Ukraine, the assumptions for global activity and trade remain favourable over the projection horizon. These assumptions consider that there is no escalation of the conflict and that more adverse risks will not materialise, including interruptions in energy supply from Russia that lead to production halts in Europe, more intense disruptions to global production chains or financial turbulence with an impact on banks. In these conditions, global activity continues to expand in 2022-24, although at a slower pace than anticipated in the December 2021 *Economic Bulletin*. For the euro area, the ECB's March projection exercise points to GDP growth of 3.7% in 2022, 2.8% in 2023 and 1.6% in 2024 (Table I.2.1). The progressively slower pace of growth over the horizon reflects the withdrawal of stimulus policies and labour

market supply restrictions. Constraints on global production chains, which eased somewhat at the beginning of the year, are assumed to fade gradually. Economic growth in the euro area was revised downwards from the December projections, by 0.5 p.p. in 2022 and 0.1 p.p. in 2023, largely associated with the impact of the conflict on energy prices, economic agents' confidence and trade flows.

In the assumptions of the ECB's March projection exercise, external demand for Portuguese goods and services will grow by 5.8% in 2022, 4.6% in 2023 and 3.3% in 2024, reflecting revisions of +0.4 p.p., -0.8 p.p. and -0.1 p.p. respectively, compared to the December issue of the *Economic Bulletin*. The upward revision of external demand in 2022 stems from the effect of stronger than expected global import growth in the second half of 2021.

The recent increase in commodity prices will contribute to keeping headline inflation high in 2022 (Chart I.2.4). The price of oil is expected to increase by 45.7% in 2022 to USD 103.6 per barrel and decrease in the following years, reaching USD 81.7 in 2024. The cost of other commodities also rises further in 2022. A reversal is assumed in the following years. In the euro area, the ECB's projections point to a significant increase in inflation in 2022, to 5.1% (2.6% in 2021), followed by a decline to 2.1% in 2023 and 1.9% in 2024. This profile is highly influenced by the energy component. However, inflation excluding energy will also increase in 2022, to 2.6% (1.5% in 2021), reflecting the indirect effects of rising energy prices, pressures along the production chain associated with disruptions in global supply and a continued recovery in services. Inflation will be lower in 2023 and 2024, 1.8% and 1.9% respectively, with the fading out of the abovementioned factors, partly offset by higher wage pressures associated with a reduction in labour market slack.

Table I.2.1 • Projection assumptions

		EB March 2022				Revisons *vis-à-vis* EB December 2021			
		2021	2022	2023	2024	2021	2022	2023	2024
International environment									
World GDP	yoy	6.2	4.1	3.5	3.3	0.3	-0.3	-0.3	-0.1
Euro area GDP	yoy	5.4	3.7	2.8	1.6	0.3	-0.5	-0.1	0.0
World trade	yoy	11.0	5.2	4.3	3.5	0.8	0.7	-0.6	-0.2
External demand	yoy	9.5	5.8	4.6	3.3	1.0	0.4	-0.8	-0.1
Oil prices in dollars	aav	71.1	103.6	88.5	81.7	-0.7	26.1	16.2	12.3
Oil prices in euros	aav	60.2	93.4	80.0	73.9	-0.6	24.9	16.1	12.6
Non-oil commodity prices in euros	yoy	29.5	14.1	-6.0	-6.0	-0.3	3.6	-3.8	-3.9
Monetary and financial conditions									
Short-term interest rate (3-month EURIBOR)	%	-0.5	-0.3	0.6	0.8	0.0	0.2	0.8	0.8
Implicit interest rate in public debt	%	1.9	2.0	2.1	2.1	-0.1	0.0	0.2	0.2
Effective exchange rate index	yoy	1.2	-1.8	0.0	0.0	0.0	0.2	0.0	0.0
Euro-dollar exchange rate	aav	1.18	1.11	1.11	1.11	0.0	-1.9	-2.3	-2.3

Source: Eurosystem (Banco de Portugal calculations). | Notes: yoy – year-on-year rate of change, aav – annual average value. Technical and external environment assumptions, as well as projections for euro area GDP and inflation, coincide with those in the ECB's projection exercise released on 10 March ("ECB staff macroeconomic projections for the euro area", March 2022), which include information up to 28 February. Interest rates, exchange rates and oil prices are based on information up to 10 March. Technical assumption for oil prices are based on futures markets. Developments in the 3-month Euribor rate are 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. The implicit rate includes an assumption for the interest rate associated with new issuances. An increase in the exchange rate corresponds to an appreciation. 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 two weeks prior to the cut-off date will remain stable over the projection horizon. The revision in the euro-dollar exchange rate is presented in percentage.

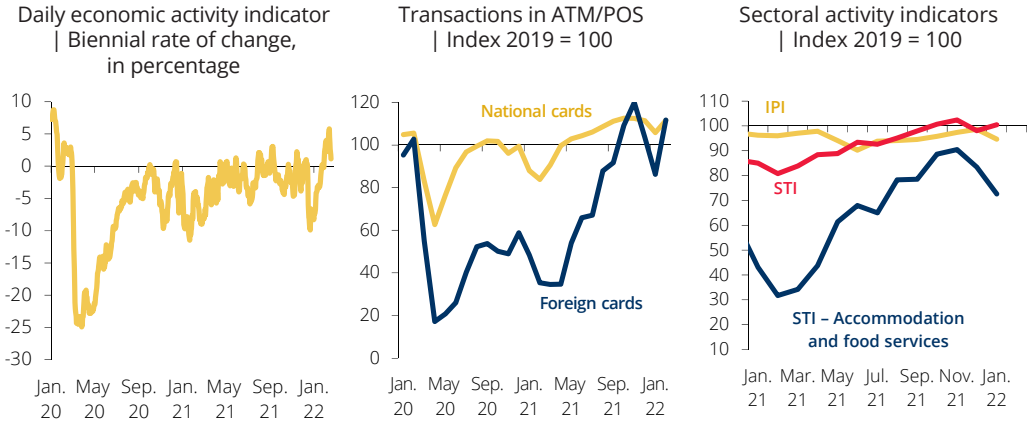
Assumptions about monetary and financial conditions remain favourable, despite the recent increase in financial market volatility induced by geopolitical tensions. These assumptions point to a gradual increase in euro area short-term interest rates, becoming positive in 2023, which had not happened since 2015. These developments are consistent with the normalisation of the ECB's monetary policy against a background of upside risks to prices. The implicit interest rate on Portuguese government debt is revised slightly upwards, standing at around 2%.

With regard to public finances, a no policy-change scenario is assumed taking into consideration the policy measures in place, such as the revision of the general government wage scale. However, this scenario excludes measures already announced that are conditional on approval of the 2022 State Budget, such as the change to personal income tax brackets and the extraordinary increase in pensions. Note that including these measures would have a limited impact in the projections.

3 The Portuguese economy in 2022-24

The projections for the Portuguese economy point to a high growth in 2022, partly reflecting the recovery observed over the previous year, and to a deceleration in 2023-24. At the beginning of 2022, a number of factors affected developments in activity, namely the new wave of COVID-19, constraints on the supply of commodities and increases in their costs, together with the impact of rising inflation on households' purchasing power. These factors explain the volatility of available economic indicators, which point to a reduction in activity in January and a recovery in February (Chart I.3.1). Transactions with Portuguese and foreign cards point to some weakening in private consumption and tourism exports compared with the fourth quarter. In line with these developments, there was a reduction in activity in accommodation and food services. Industrial production also declined in January, partly due to the car sector, which was again affected by constraints in access to raw materials. By contrast, investment indicators accelerated. The recovery in activity is likely to have continued in March, despite the impact of increased geopolitical tensions on agents' confidence, supply chains and inflation. The projection incorporates a quarter-on-quarter GDP growth of 0.1% in the first quarter of 2022 (1.6% in the fourth quarter of 2021).

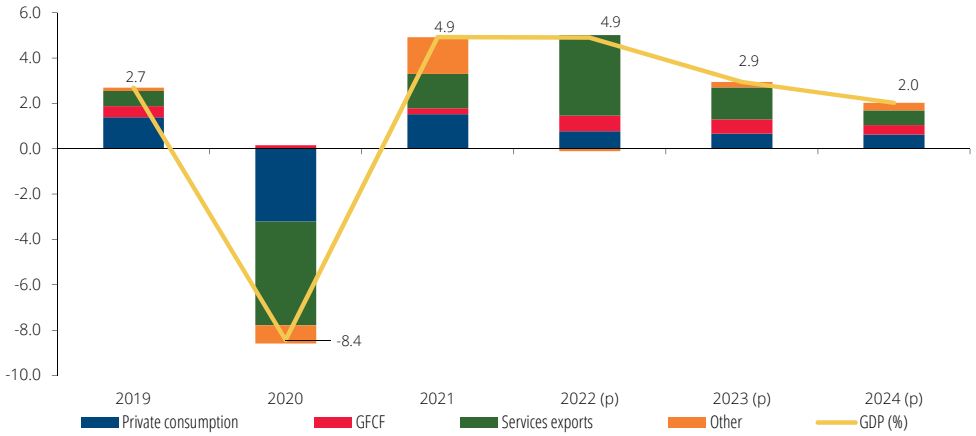
Chart I.3.1 • Short-term economic indicators



Sources: Banco de Portugal, SIBS and Statistics Portugal. | Notes: IPI – Industrial production index. Monthly data is corrected for seasonality and calendar effects. Data for ATM/POS operations and Services Turnover Indices (STI) are deflated.

In the following quarters, despite the negative shock prompted by the conflict in Ukraine, quarter-on-quarter rates of change increase, reflecting the removal of restrictions associated with the pandemic. The recovery over the course of 2021 contributes 3.6 p.p. to growth in 2022, corresponding to the carry-over effect.[1] This effect, together with the intra-annual developments projected for 2022, results in an annual GDP increase of 4.9% in 2022. This growth incorporates a 3.5 p.p. contribution from services exports, largely due to the recovery observed in the second half of 2021 (Chart I.3.2). GDP will exceed pre-pandemic levels in the second half of 2022. In 2023-24, GDP is expected to decelerate to rates of change closer to those estimated for the economy's potential output growth (Box 2).

Chart I.3.2 • Decomposition of GDP growth | Annual rate of change, in percentage, and contributions, in percentage points



Sources: Banco de Portugal and Statistics Portugal. | Note: (p) – projected. The contribution of demand aggregates are net of import content.

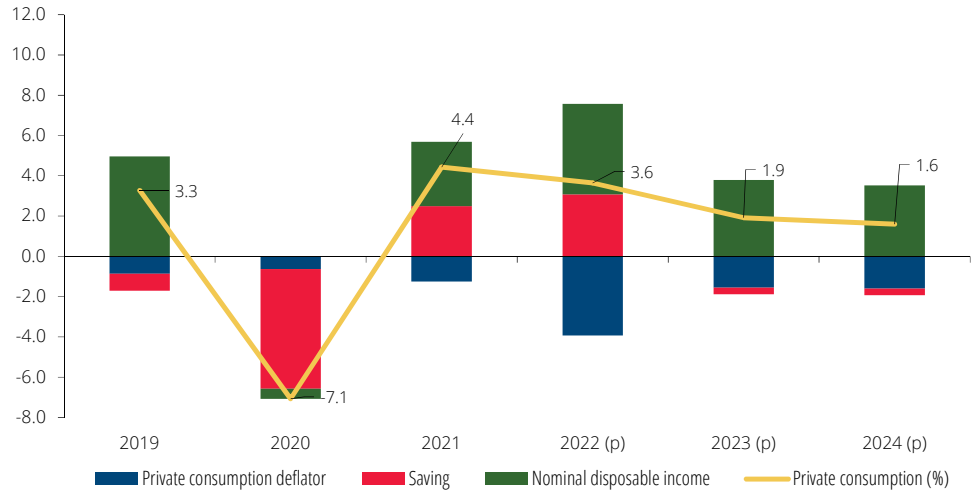
Private consumption will grow at a progressively more moderate pace in the 2022-24 period, underpinned by rising disposable income and favourable financial conditions. Private consumption will grow by 3.6% in 2022 (4.4% in 2021) and decelerate to 1.9% in 2023 and 1.6% in 2024. Nominal disposable income will grow by 3.6% on average over the period 2022-24, reflecting employment growth, albeit gradually smaller, and wage increases. The acceleration in the consumption deflator, however, implies lower real disposable income growth, which contributes negatively to the change in private consumption, particularly in 2022 (Chart I.3.3). In real terms, disposable income will increase on average by 1.3% over the projection period (1.6% in 2021).

The savings rate will decrease to 7.3% in 2022 (10.3% in 2021) and remain relatively stable in 2023 and 2024. The decline in the savings rate in 2022 prolongs the trend that started in 2020 – when this rate reached a historically high level – and occurs against a background where the increase in household wealth during the pandemic may partly contribute to absorbing the impact of the increase in inflation. However, the environment of heightened uncertainty has an opposite impact, as it induces a rise in precautionary savings. Available evidence also suggests that savings

1. The carry-over effect corresponds to the annual GDP growth that would be observed if all quarter-on-quarter rates of change over the year were nil.

accumulated during the pandemic were more concentrated in higher-income households, which have a lower marginal propensity to consume.[2]

Chart I.3.3 • Decomposition of private consumption growth | Annual rate of change, in percentage, and contributions, in percentage points



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. A negative contribution of savings to the change of private consumption implies an increase in savings.

Public consumption is more subdued over the projection period, following strong growth in 2021, as the impact of the pandemic response measures dissipates. Public consumption will grow by 1.5% in 2022 (5.0% in 2021) and decline by 1.5% in 2023 and 0.1% in 2024. These developments incorporate, in 2022, the gradual phasing-out of the containment measures, particularly in the health sector, and a decrease in the effect of the recovery of hours worked in general government. These impacts are partly offset by the implementation of the measures envisaged under the Recovery and Resilience Plan (RRP) with an impact on public consumption, especially concentrated in this year. The projection for 2023 and 2024 reflects the return of general government purchases and sales to pre-pandemic levels and the stabilisation of public employment at the end of the horizon, also reflecting, especially in 2023, the deceleration associated with the RRP.

Buoyant investment in 2022-24 is supported by increased inflows of European funds and favourable financing conditions. Gross fixed capital formation (GFCF) will grow by 7.6% on average in 2022-23 and 3.9% in 2024 (6.1% in 2021), leading to an increase in the economy's private and public capital stock. Investment will also benefit from prospects for a recovery in demand and the gradual unwinding of global supply chain disruptions. Corporate GFCF will grow by 7.2% in 2022 (2.8% in 2021) and decelerate to 5.0% in 2023 and 4.7% in 2024.

Public investment increases as envisaged in the Stability Programme, at an average annual rate of 13.5% over the period 2022-24 (23.1% in 2021). Underlying this development is a significant acceleration, above that observed in recent years, in the implementation of projects financed by European funds, most notably those envisaged in the RRP, and of other structural investments. The reduction in European funds during the transition between Multiannual Financial Frameworks (MFF) is expected to result in a deceleration in public investment in 2024.

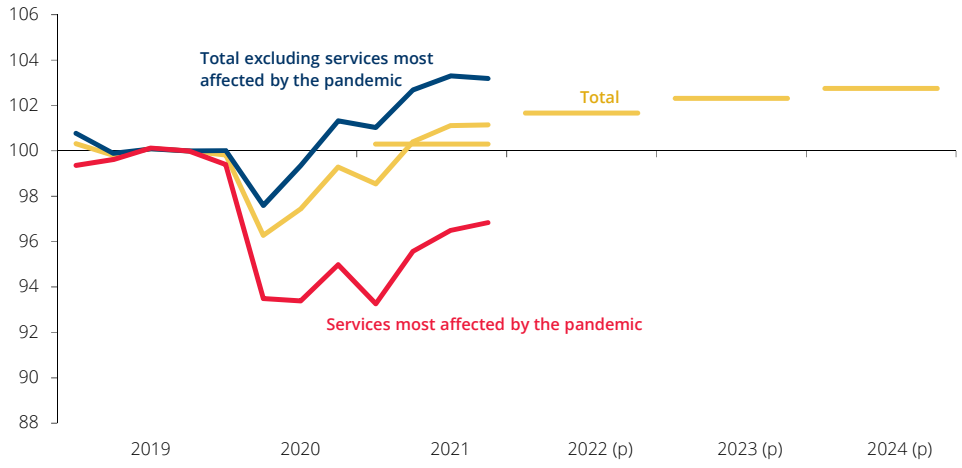
2. See the Box entitled "Developments in economic activity in the third and fourth quarters of 2021" in the December 2021 issue of the *Economic Bulletin*.

Residential investment is driven by rising disposable income and the accumulation of savings that occurred during the pandemic period. GFCF in housing will increase by 5.8% in 2022 (8.8% in 2021) and grow by 2.1% in 2023 and 2.0% in 2024. Higher demand by non-residents in some segments and for tourism purposes, in the context of the sector's recovery, may also contribute to the buoyancy of the housing market, with an impact on prices.[3]

Exports will continue to combine the favourable momentum of external demand for goods with the recovery in international tourism flows, assuming that the conflict in Ukraine has limited negative effects. Exports will grow by 14.2% in 2022 (13.0% in 2021) and decelerate to 7.5% in 2023 and 3.8% in 2024. After increasing by 10.5% in 2021, goods exports are expected to grow by 3.6% in 2022 and, benefiting from the assumption of a gradual easing of disruptions in international supply chains, 5.2% in 2023 and 3.2% in 2024 (Table 1.2.1). The improvement in the epidemiological situation and the removal of restrictions on international mobility will lead to strong acceleration in services exports, with the prepandemic level expected to be exceeded in the first half of 2022 and the annual rate of change reaching 38.5% (19.2% in 2021). In the following years, exports will grow more moderately (11.5% in 2023 and 4.9% in 2024).

Imports decelerate over the projection horizon. Average annual growth will decline from 12.3% in 2022 (12.8% in 2021) to 5.5% and 3.3% in 2023 and 2024 respectively. Goods imports reflect expected developments in global demand weighted by import content. The services component is projected to grow very strongly, reflecting developments in tourism.

Chart I.3.4 • Employment | Index, 2019 Q4 = 100



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. Over the projection horizon figures refer to annual averages. Services most affected by the pandemic include wholesale and retail trade services, repair services of motor vehicles and motorcycles, transportation and storage, accommodation and food services, arts, entertainment and recreation services and other services (activity sectors G-I and R-U).

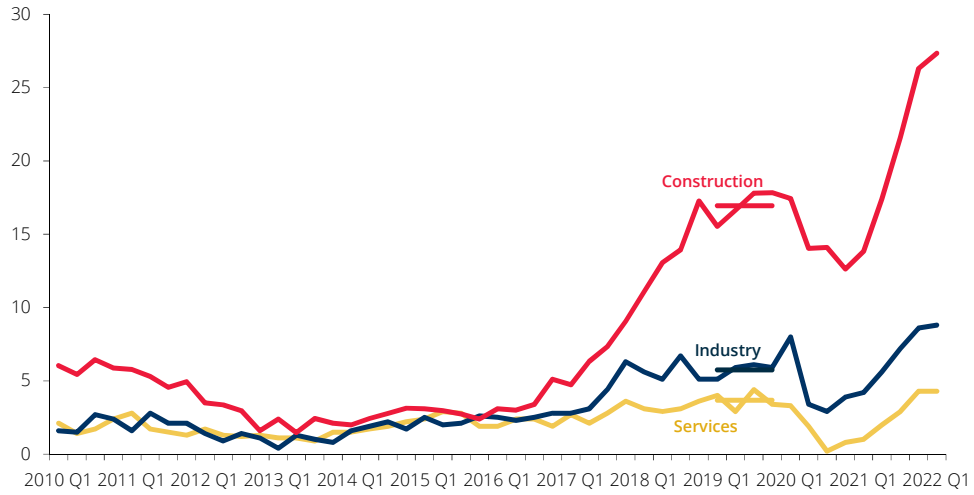
The current and capital account will record a deficit in 2022, reflecting the terms of trade deterioration, but it will return to a surplus in 2023 and 2024, due to the recovery in tourism and a higher inflow of European funds. The current and capital account balance will decline from

3. See the Box entitled "Impact of non-resident investment and tourist accommodation on local house prices" in the December 2021 issue of the *Economic Bulletin*.

0.7% in 2021 to 0.4% of GDP in 2022, standing at 1.8% in 2023 and 0.7% in 2024. The goods and services account deficit will widen in 2022 (to 4.1% of GDP), given the very negative contribution of the terms of trade associated with oil price hikes. In subsequent years, the balance will increase, reflecting the improvement in the services surplus due to expected developments in the tourism sector (Table I.1.1). The balance of the income and capital accounts will stand at 3.7% of GDP on average in 2022-24 (3.3% in 2021). Funds received from the EU are expected to account for around 3.9% of GDP on average in that period (2.2% on average in 2013-19). These funds will include amounts linked to the MFF 2014-20, which is in its final phase, the MFF 2021-27 and the transfers under the new instrument in response to the pandemic crisis (NGEU).

Turning to the labour market, employment will continue to increase, but at a gradually slower pace. Employment will grow by 1.4% in 2022 (2.1% in 2021) and 0.5% on average in 2023-24. Hours worked will also grow, by 5.1% in 2022 (5.0% in 2021) and 1.3% on average in 2023-24. This behaviour of hours worked reverses the adjustment that occurred during the pandemic crisis, which was characterised by a sharp fall in average hours worked per employee and a more subdued fall in employment as a result of the policies implemented. Employment developments reflect the recovery in activity – particularly in the sectors most affected by the pandemic (Chart I.3.4) – and are the result of an increase in the labour force and a reduction in the number of unemployed and discouraged individuals, albeit with declining contributions.

Chart I.3.5 • Shortage of skilled labour force as a factor limiting activity | Share in total of each sector



Source: European Commission. | Notes: In the case of construction, the figure for 2022 Q1 aggregates the January and February data. The average value for 2019 was highlighted over the quarterly values of each sector.

The unemployment rate is forecast to decline to 5.9% in 2022 (6.6% in 2021) and 5.7% and 5.6% in the following two years, respectively. The recovery in the labour market has been faster than anticipated, leading to successive downward revisions to unemployment rate projections over the course of 2021. In the fourth quarter of 2021 the labour underutilisation and unemployment rates were 1.3 p.p. and 0.5 p.p. lower than in 2019, the former having reached a ten-year low. Recent developments in these indicators suggest a reduction in employment's margin for growth

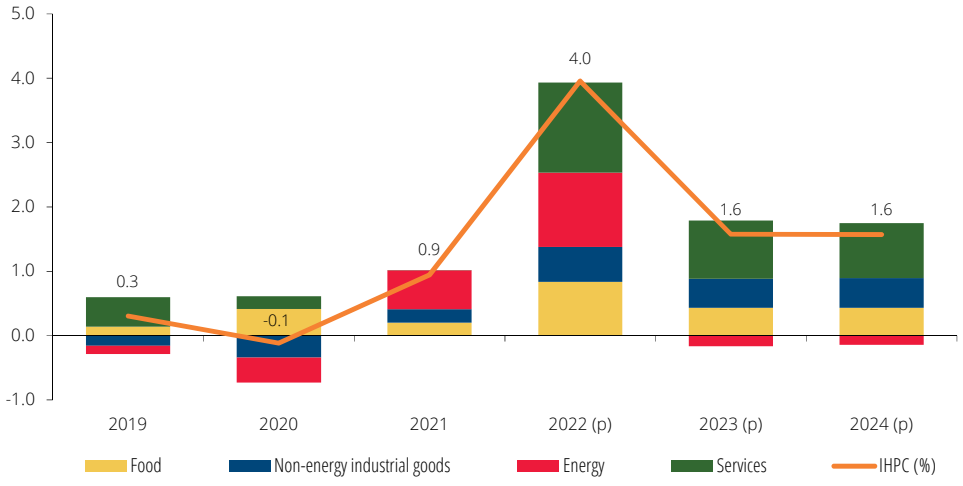
through inclusion of unemployed or discouraged individuals. The participation rate in Portugal has followed an upward trend, driven by the trend of higher participation of older age groups, partly reflecting the growing weight of higher levels of education. As economic expansion continues, supply constraints in the labour market should intensify. In the European Commission's Opinion Surveys, the percentage of firms reporting recruitment problems as a factor limiting production has been increasing since mid-2020 and was above that observed before the pandemic in early 2022 in all sectors, most notably construction (Chart I.3.5).

Average wage growth in the private sector stands at 4.0% in the period 2022-24, slightly lower than in the pre-pandemic years. The more moderate wage growth compared to the pre-pandemic period reflects the recovery of low-wage jobs that leads to negative composition effects on total wages. This effect is offset by higher wage pressures linked to a reduction in the resources available in the labour market and the higher inflation environment.

Inflation is expected to rise to 4.0% in 2022 and decrease to 1.6% in 2023-24, rates higher than those observed in the past nine years. The rise in inflation this year prolongs the trend observed from mid-2021 and early 2022, based on factors common to the euro area (Box 3 and Special issue). In addition to increasing external pressures on goods prices, due to higher international commodity prices and disruptions in global distribution chains, services prices rose throughout 2021 as demand in tourism-related sectors picked up.

The behaviour of the energy component largely influences the inflation profile. The contribution of energy goods to the change in the headline HICP will increase to 1.2 p.p. in 2022 (0.6 p.p. in 2021), turning slightly negative in the period 2023-24, in line with the oil price assumptions (Chart I.3.6 and Table I.2.1).

Chart I.3.6 • HIPC and aggregates | Annual rate of change, in percentage, and contributions, in percentage points



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

Excluding energy goods, the HICP is projected to accelerate to 3.1% in 2022 (0.4% in 2021) and settle at 2.0% in 2023-24, reflecting the reduction in slack in the economy. The normalization of services prices influences the increase in 2022, particularly in tourism-related services following

the expected recovery in demand. Services contribute 1.4 p.p. to the annual average rate of change in the HICP in 2022 (after a nil contribution in 2021). In the short term, external pressures on prices of non-energy goods – food and industrial – build up, partly reflecting the impact of the conflict in Ukraine. Non-energy import deflators will increase by 8.7% in 2022 (3.1% in 2021), and grow more moderately in the period 2023-24 (1.3% on average), as disruptions in global supply chains phase out. Domestic inflationary pressures become more prominent over the projection horizon. The output gap is estimated to turn positive in 2023-24 and the unemployment rate to remain below the trend rate over the whole projection horizon (Box 2). Underlying the projection is a recovery of profit margins in 2022-24 after the fall in recent years.

4 Conclusion

The armed conflict in Ukraine has created an economic, social and geopolitical framework of unpredictability. The outlook for Portuguese economic growth in the period 2022-24 was revised downwards and inflation will be substantially higher. Geopolitical instability implies that the magnitude of the economic impact of the conflict is uncertain, involving the risk of more adverse scenarios materialising.

Economic policy responses at both domestic and European level are crucial to mitigate the macroeconomic impact of the shock and ensure sustained growth. The implementation of RRP-related projects has a major impact on the current projection. The magnitude of the financial stimulus and the deadlines for carrying out the plan are major challenges to its implementation. It is crucial that Portugal proves its capacity to absorb the available resources and that these resources materialise into a permanent increase in productive capacity.

The Portuguese economy maintains important longterm challenges to extend its convergence towards European income levels, in the context of a digital and climate transition financed by European funds. Continuing to increase the skills of the labour force and productivity is paramount to attaining these objectives.

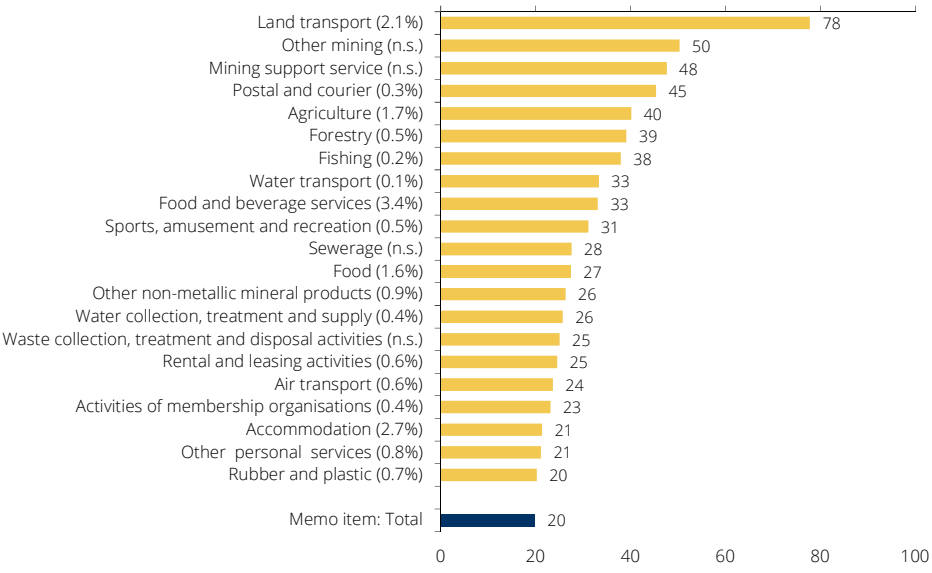
Box 1 • The economic implications of the war in Ukraine in an adverse scenario

The Russian invasion of Ukraine and the sanctions imposed by several countries have an impact on commodity prices, trade flows, financial conditions and agents' confidence. This Bulletin's projections incorporate an assessment of these effects on the Portuguese economy, based on assumptions with a cut-off date of 10 March. However, there is great uncertainty about the evolution of the conflict, implying downward risks to activity and upward risks to prices for Portugal and the world. This box considers a scenario in which the economic fallout from the conflict is more pronounced.

This scenario assumes the imposition of additional sanctions on Russia and extended geopolitical tensions, causing further commodity price hikes, disruptions in global value chains, amplified financial frictions and heightened uncertainty. An interruption of Europe's gas imports from Russia is also considered, with the effects dissipating as substitution with other energy sources takes place. However, the price of gas remains high over the projection horizon. The international environment is in line with the severe scenario published by the ECB in March.

This scenario has an impact through various channels. One transmission channel is the increase in the prices of imported commodities, in particular oil and gas, which has a negative impact on economic activity and increases consumer prices. The loss of household purchasing power implies a reduction in private consumption. On the supply side, these developments imply an increase in production costs, constraining activity, particularly in those sectors where consumption of these commodities is high. The most energy-intensive sectors include land transport, some mining and quarrying, agriculture, forestry, fishing and food service activities (Chart C1.1). Although the share of natural gas in total energy consumption has been increasing in Portugal, it remains below that of the euro area (11% and 14% respectively).

Chart C1.1 • Sectors with higher average energy intensity in 2018 | Percentage



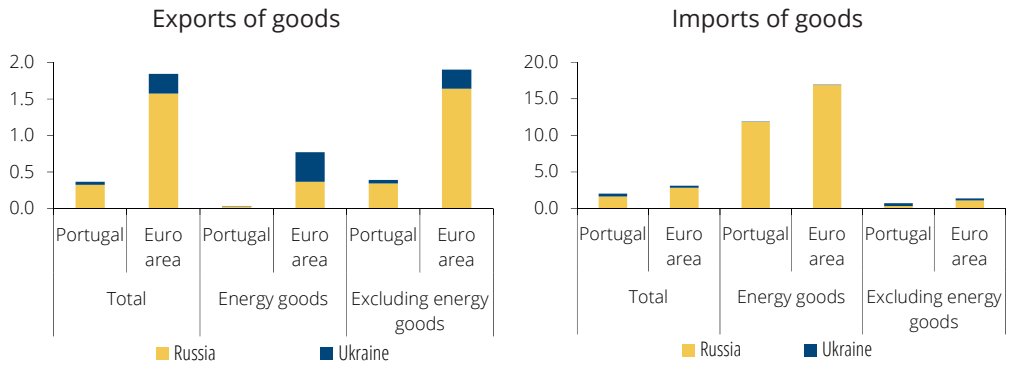
Sources: Amador, J. (2022), "Energy mix and intensity in Portugal: Portraits from aggregate and firm-level data ", Banco de Portugal, *Economic Studies*, volume VIII – No. 1 and Statistics Portugal. | Notes: Energy intensity approximated by the weight of energy expenditures in the GVA of firms (average ratio in the sector). The values in brackets represent the weight of each sector in the total nominal GVA in 2019. N.s.: Not specified.

The intensification of supply-side constraints represents a second transmission channel. Logistic and transport difficulties in the region, the introduction of new sanctions or retaliation by Russia

– with an impact on the supply of gas to the euro area – and the destruction of productive structures imply production halts in some sectors and a shortage of several products, leading to a decline in private consumption, investment and exports. These developments amplify disruptions to global value chains. However, firms' ability to adapt – made clear during the pandemic – mitigates the impact of this type of shocks in the medium term.

Trade is the third transmission channel. Direct links between Portugal and the two countries at war are limited; exports to Russia and Ukraine accounted for 0.4% of Portugal's exports of goods on average in 2015-19, and imports accounted for 2% of goods imports (Chart C1.2). Exposure is highest for energy (oil and natural gas) and food (cereals), of which Russia and Ukraine are major global suppliers. Between 2015 and 2019, energy imports from Russia accounted for around 12% of Portugal's imports of such goods and imports of cereals from Ukraine accounted for almost 17%. In the euro area, direct exposure is higher than in Portugal, particularly in central and eastern European countries. Energy imports from Russia accounted for 17% of total euro area imports between 2015 and 2019. Hence, the indirect effect via exposure of important trading partners may be significant for Portugal. Finally, external demand for Portuguese firms incorporates the impact of shocks on global activity.

Chart C1.2 • Trade flows of goods with Russia and Ukraine, average share in 2015-19 | Percentage



Source: Eurostat (Banco de Portugal calculations).

Lastly, channels operating through uncertainty and possible financial tensions were taken into account. The first implies a reduction in consumption and investment, associated with higher precautionary savings and delayed decisions involving large expenditures. Deteriorating financial conditions result in higher interest rate spreads and risk premia, which reinforce the impact of the increase in uncertainty.

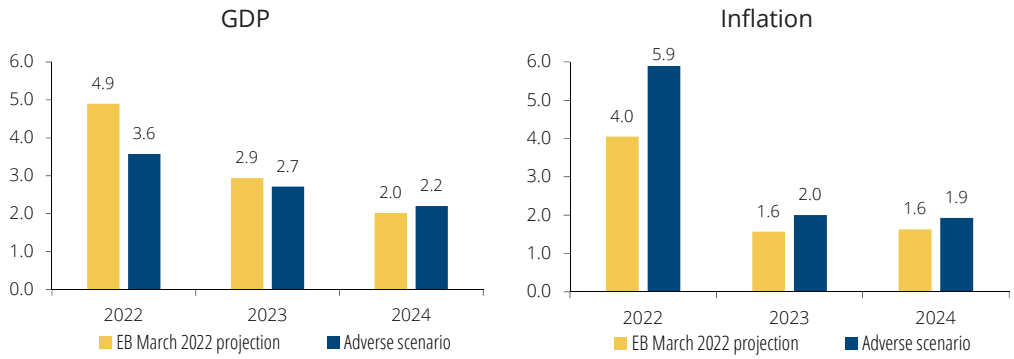
The adverse scenario was implemented using the main projection models, the inflation forecasting model (Monthly Inflation Model – MIMO) and the medium-term macroeconomic model ('M' model). In particular, six shocks were considered:

- Oil prices are around 20% higher than envisaged in this Bulletin's projections for 2022, and gas prices are around 100% higher. Thereafter, oil prices gradually converge to those assumed in the projections for 2023;
- Prices of other imported goods, which include food, are around 2% higher than envisaged in the projections for 2022, also reverting in subsequent years;
- Greater supply disruptions, with shortages of specific commodities and intermediate goods resulting in negative impacts on output and demand;

- Decrease in external demand directed to Portuguese firms compared to the projection for 2022 and 2023, 1.3% and 0.9% respectively;
- Greater uncertainty and lower confidence, with adverse effects on consumption and investment decisions; a shock with a negative impact on activity of 0.5 p.p. was assumed in 2022, calibrated on the basis of models estimated in Manteu and Serra (2017);[4]
- Spreads on bank interest rates and sovereign yields increase by around 150 basis points, as assumed in the ECB's scenario, and asset prices fall. The effects of the shocks are assumed to be more pronounced in 2022 and to fade over the projection horizon.

The shocks implemented imply a reduction in the annual GDP growth rate compared to the projections in this Bulletin of 1.3 p.p. in 2022 and 0.2 p.p. in 2023, with a positive impact in 2024 (Chart C1.3). In this scenario, activity comes to a halt, on average, over 2022. The 3.6% annual rate of change in GDP stems exclusively from the carry-over effect from the past year, given the intra-annual growth profile observed in 2021.[5] In 2024, GDP will be about 1.3% lower than in this Bulletin's projections, reflecting a partial recovery in activity at the end of the projection horizon associated with the reversal of part of the shocks assumed in this adverse scenario.

Chart C1.3 • GDP and inflation in Portugal as projected in the *Economic Bulletin* March 2022 and in the adverse scenario | Annual rate of change in percentage



Source: Banco de Portugal.

In this adverse scenario, inflation reaches 5.9% in 2022, 2% in 2023 and 1.9% in 2024, respectively 1.8 p.p., 0.4 p.p. and 0.3 p.p. higher than in this Bulletin's projection. Higher inflation stems mainly from the rise in import prices and its direct and indirect effects on consumer prices. Lower demand helps offset these effects, albeit to a limited extent. As the oil and, to a lesser extent, gas markets normalise, the sharp increases in energy prices are reverted.

Instability in the geopolitical situation results in the possibility of more severe scenarios, associated with an escalation or longer duration of the military conflict, with consequences that are difficult to assess. Conversely, a swift resolution of the conflict would have positive effects on activity and imply a lower path for inflation, a scenario not considered in this Bulletin. Note that the adverse scenario does not take into account any additional national or European economic policy measures that could mitigate the macroeconomic impact of the shock.

4. See Manteu and Serra (2017), "Impact of uncertainty measures on the Portuguese economy", *Banco de Portugal Economic Studies*, Vol. III, No. 2. The calculations considered an increase in the synthetic indicator of uncertainty for the Portuguese economy similar to that recorded by the composite indicator of financial stress for Portugal in the period from 1 to 11 March, which already incorporates the impact of the war in Ukraine.
5. The carry-over effect corresponds to the annual GDP growth that would be observed if all quarter-on-quarter rates of change over the year were nil.

Box 2 • Potential output of the Portuguese economy: recent developments and projections

Potential output is an indicator used to gauge the level of production when the economy uses inputs consistent with sustained growth and stable inflation. In the long run, the difference between real output and potential output – the output gap – is nil and the growth rate of potential output determines the growth rate of economic activity. In the short term, the output gap depends on the degree of use of available resources, which constrains existing inflationary pressures on the economy.

Potential output is an unobserved variable that can be estimated using several methodologies and there is a high degree of uncertainty surrounding its estimates. The specific features of the pandemic crisis and the difficulty in discerning its more permanent effects amplify this uncertainty. This box documents recent developments in the Portuguese economy's potential output and the outlook for the coming years.[6]

The pandemic crisis created supply and demand effects. The measures imposed by the authorities to prevent the spread of the virus have halted, on the supply side, the full and efficient use of inputs. Available estimates point to a 0.5% reduction in the Portuguese economy's potential output in 2020 and a 1.5% recovery in 2021 (Chart C2.1), suggesting a relatively contained impact of the crisis on long-term productive capacity. Projections suggest that potential output will increase by 2.2% in 2022 and 1.8% in 2023 and 2024. These figures correspond to an approximation to the path projected before the outbreak of the pandemic, with an estimated decline of around 2.0% at the end of the horizon compared to the counterfactual projection (Chart C2.2).

Chart C2.1 • Potential output growth and contributions | In percentage and p.p.

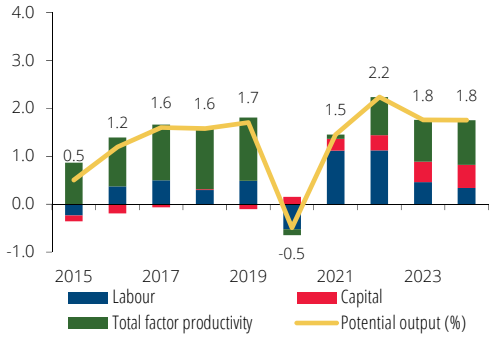
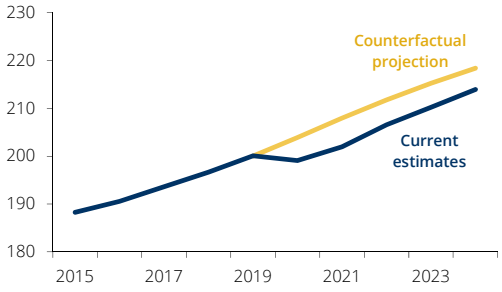


Chart C2.2 • Potential output – current estimates vs. counterfactual scenario | Constant prices in billion of euros



Source: Banco de Portugal. | Notes: Potential output, computed with a Cobb-Douglas production function, is determined by the observed level of the capital stock (total economy) and by the trend levels of labour (measured in hours) and the production factors' efficiency (total factor productivity). The labour component combines the effects from the working-age population growth (between 16 and 64 years old) and the estimated trends for the participation rate, unemployment rate and average hours worked. For details on the methodology for calculating potential product, see Braz, Campos and Sazedj (2019), " The new ESCB methodology for the calculation of cyclically adjusted budget balances: an application to the Portuguese case ", Banco de Portugal, *Economic Studies* – Vol. 5, No. 2. The counterfactual projection represents the expected scenario before the pandemic, and is based on the extrapolation of the projections underlying the exercise presented in the December 2019 issue of the *Economic Bulletin* and the current version of actual data observed until 2019.

6. For more details on the challenges to estimating and using potential output, see the Special issue "Potential output: challenges and uncertainties" in the December 2017 issue of the *Economic Bulletin.*

The pass-through channels of the crisis and subsequent recovery of the Portuguese economy for potential output can be analysed by the contribution of the production factors underlying the chosen methodology (Chart C2.1). The contribution of labour, measured in hours, largely explains the fall in potential output in 2020, with disruptions caused by the pandemic crisis implying a reduction in the potential number of hours worked. The use of remote work limited this impact, but only for technology-ready firms with compatible production processes and with sufficient demand to keep the operation running.

In 2021 and 2022, labour makes an important positive contribution to potential growth, associated with a gradual normalisation of hours worked per employee towards pre-pandemic levels, a recovery in the participation rate and a further decline in the trend unemployment rate, which remains on the downward path that started after the 2011-13 recession. This unemployment rate (estimated under the assumption that it will not trigger an acceleration in wages) declines from 7.2% in 2021 to 6.8% in 2022, suggesting that the pandemic has not structurally affected the labour market.

The trend in hours worked in 2023-24 contributes moderately to potential growth. A relative stabilisation of hours per worker and a trend unemployment rate of around 6.6% are assumed. The participation rate remains on an upward path, but with moderate increases, reflecting a higher participation of women in the labour market, the trend increase in retirement age and higher levels of education. The assumptions for the working age population include a stabilisation in the projection period, which contrasts with the population decline of the previous decade. Adverse trends for the natural population change have been counteracted by net immigration flows. Preserving positive flows in the coming years, or even strengthening them, is an important factor for the sustained growth of the Portuguese economy.

Investment displayed unusual strength during the pandemic crisis, against the background of the fall in economic activity and compared with other economies. Together with the high pace of investment growth in 2015-19, these developments ultimately turned into a positive contribution of capital to potential output growth in 2020, in contrast to previous years. The contribution of capital to potential growth increases over the projection period, with the expansion of capital stock being favoured by higher public and private investment, largely supported by European funds, most notably those of the NGEU.

The contribution of the total factor productivity trend to potential growth recovers over the period 2022-24, following the fall estimated during the pandemic and, in particular, the lockdowns. Fears associated with the spread of the virus and the adopted containment measures implied disruptions in the functioning of global labour and product markets. These disruptions affected labour mobility, led to the partial or total closure of firms and prevented the production of certain services (especially tourism services, in Portugal). The negative impact on human capital accumulation was limited, however, by the shift in employment between 2019 and 2021 towards higher-skilled occupations. Over the projection horizon, the easing of these disturbances leads to a more efficient use of inputs. Such developments are reinforced by the pandemic stimulating the faster dissemination of new technologies and greater investment in R&D and in the digitalisation of the economy. European funds also drive investment in these areas. Continuing the process of reallocation of resources to more productive sectors and firms – which may be sharper in the wake of a crisis with very asymmetric sectoral impacts – and improving efficiency based on human capital, associated with the trend for higher education levels, are other factors supporting the positive contribution of trend productivity.

The relatively contained impact of the pandemic crisis on potential output in 2020-21 translated into a significant underutilisation of resources in the economy, with a very negative output gap being estimated (Chart C2.3). In the labour market, the observed unemployment rate remained below the trend rate (Chart C2.4), largely reflecting the impact of public policies supporting employment. Large GDP growth over the projection horizon – and relative to potential output – implies an output gap at -0.5% of potential output in 2022 and at 0.7% in 2023-24. These results point to a reduction in spare capacity in the Portuguese economy, which in turn increases price pressures. In the labour market, the unemployment gap, measured by the difference between observed and trend unemployment rates, is projected to remain at around -1 p.p. This implies continued upward pressure on wage costs in the coming years.

Chart C2.3 • GDP and potential output | Constant prices in billion of euros

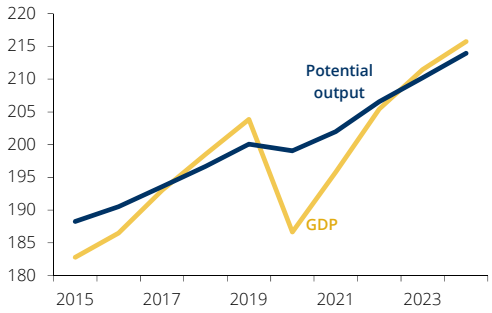
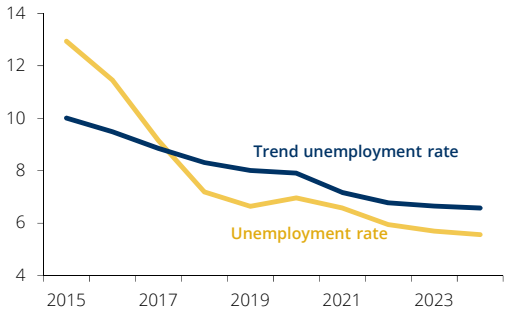


Chart C2.4 • Unemployment rate and trend unemployment rate | In percentage of the labour force



Sources: Banco de Portugal and Statistics Portugal. | Notes: For details on the methodology for computing the trend unemployment rate, see Duarte, Maria and Sazedj (2020), "Trends and cycles under changing economic conditions," *Economic Modelling*, Elsevier, Vol. 92(C).

Box 3 • Recent developments in Portuguese inflation and comparison with the euro area

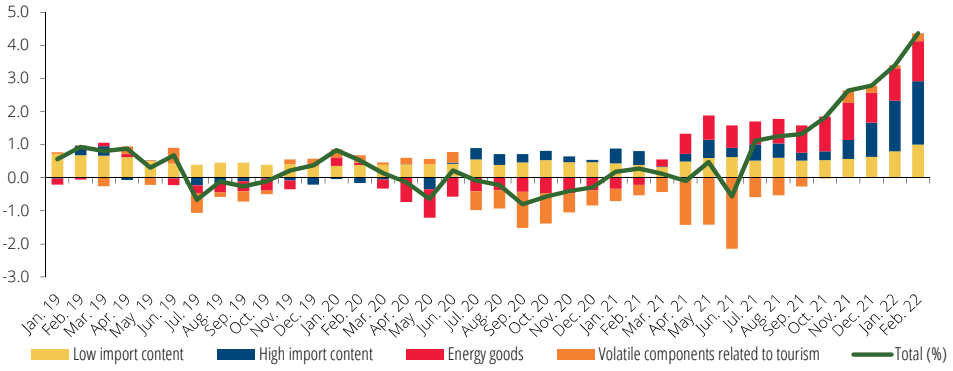
Inflation in Portugal, as in the euro area, increased significantly in 2021 and at the beginning of 2022. As measured by the year-on-year change in the HICP, the inflation rate in Portugal stood at 4.4% in February 2022, which compares with -0.3% in December 2020 (0.7%, on average, in 2018-19).

The rise in inflation reflected common factors (see the Special issue). External pressures on goods prices increased, reflecting a strong and broad-based rise in international commodity prices – particularly oil and natural gas – and the impact of global supply chain disruptions on prices of several goods and transport costs. Consequently, the year-on-year rate of change in the deflator of Portuguese imports of goods rose from -4.4% to 16.6% between the fourth quarter of 2020 and the fourth quarter of 2021 (from -1.1% to 11.2%, excluding fuel). These developments were reflected in the prices of non-energy industrial goods in Portugal.

In the case of services, the impact of the gradual reopening of some sectors in the second half of the year, particularly those related to tourism, was a relevant factor in price pressures. In Portugal, demand for this type of service was highly impacted by contagion fears and health restrictions, which resulted in strong downward pressures on consumer prices of these services in 2020, heightened in the first half of 2021, due to the effect of the imputation of prices in the same period a year earlier. In the second half of 2021, international tourism recovered – moving closer to pre-pandemic levels, which likely supported a normalisation of prices in the sector.

A decomposition of observed inflation shows that the recent rise in inflation in Portugal largely reflects the components of high import content and energy (Chart C3.1). The rise in inflation of 4.7 p.p. between December 2020 and February 2022 reflected a contribution of 1.6 p.p. of energy goods and 1.9 p.p. of high import content HIPC basket items. This component covers mainly food and non-energy industrial goods, whose prices accelerated in recent months reflecting global supply disruptions and the rise in commodity prices. The contribution of tourism-related services prices also increased, by 0.7 p.p. in the period. The contribution of low import content items – the prices of which are more influenced by internal inflationary pressures – remained relatively stable until December, but became more pronounced at the beginning of 2022 (a 0.5 p.p. increase between the end of 2020 and February 2022).

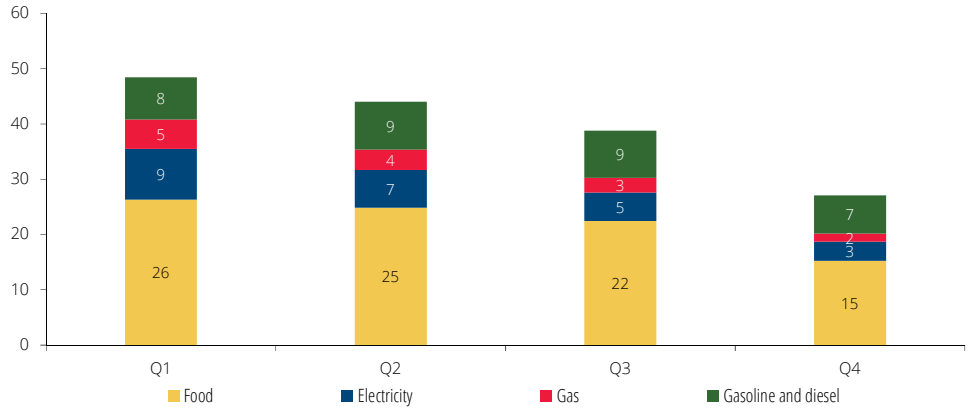
Chart C3.1 • HICP in Portugal – year-on-year rate of change and contributions | Percentage and percentage points



Sources: Eurostat and Statistics Portugal (Banco de Portugal calculations). | Notes: The import content includes direct and indirect content of the private consumption in 2017 and was estimated with the correspondence of the products of the HICP basket (considering 4-digit COICOP) and the nomenclature of products of the national accounts at the most detailed level available of the import contents (82 products). The HICP components of high import content corresponds to the components caracterized by an estimated import content above 20% in the consumption expenditures.

The recent rise in food and energy prices represents a shock to purchasing power that is more marked for households in lower expenditure quartiles. Consumption of these goods by households with fewer financial resources represents almost 50% of their total spending (Chart C3.2).

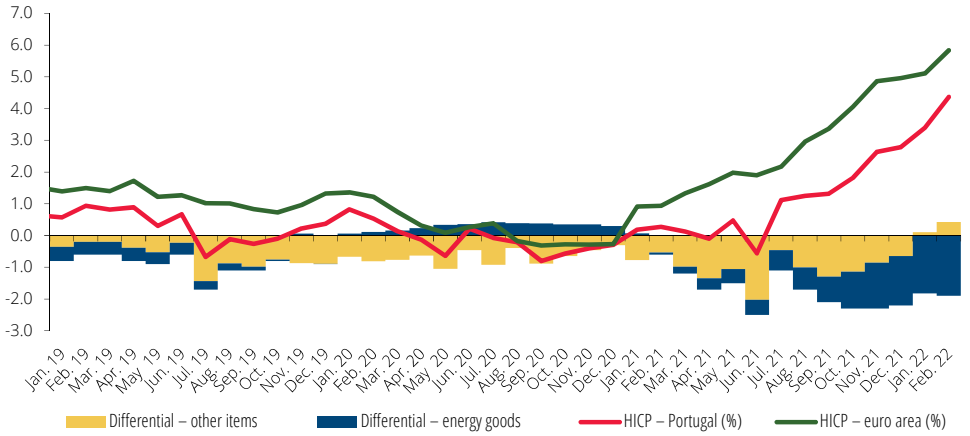
Chart C3.2 • Weight of food and energy in total expenditure of households in 2015, by quartile of average expenditure | Percentage



Sources: Statistics Portugal – IDEF 2015/2016 (Banco de Portugal calculations). | Note: Total expenditure corresponds to monetary expenditure.

The rise in inflation was more contained in Portugal than in the euro area (Chart C3.3). However, when excluding energy, the increase in inflation in Portugal was slightly higher. In Portugal, the year-on-year rate of change in the HICP excluding energy rose from 0.1% in December 2020 to 2.1% in December 2021 (3.4% in February 2022), while in the euro area it increased from 0.5% to 2.8% (3.0% in February 2022).

Chart C3.3 • HICP in Portugal and the euro area – year-on-year rate of change and differential | Percentage and percentage points



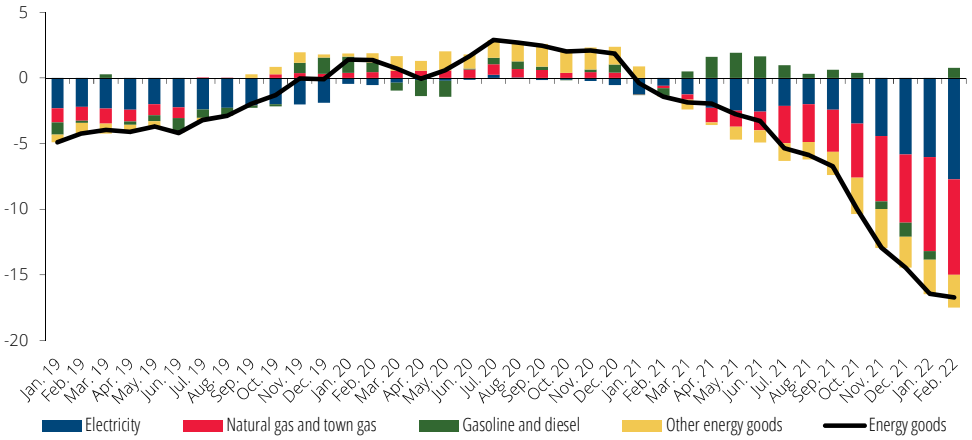
Sources: Eurostat and Statistics Portugal.

The deceleration of energy prices in Portugal mainly reflected developments in electricity and gas prices. In 2021, the average annual change in electricity consumer prices was 0.7% in Portugal and 9.6% in the euro area, explaining about half the differential *vis-à-vis* the euro area of -5.5 p.p. in the

energy aggregate in 2021 (Chart C3.4). The contribution of natural gas and town gas to this differential was -2.3 p.p., with prices decreasing 2.3% in annual average terms in Portugal and increasing 11.4% in the euro area. Consumer prices of these energy sources mainly reflect differences in the structure and functioning of national markets, including price regulation.

Upward pressures on prices became broader throughout 2021 and at the beginning of 2022. Looking at the distribution of year-on-year rates of change in HICP items, between December 2020 and February 2022, there was an increase in the share of items with rates over 2% in Portugal, from 20.2% to 62.8%. In the euro area, this share increased from 15.6% to 65.5%. Monetary policy will continue to play a decisive role in anchoring price developments in the medium term in the euro area, Portugal included.

Chart C3.4 • Differential of the rate of change of energy goods prices in Portugal and the euro area | Percentage points



Sources: Eurostat and Statistics Portugal.

II Special issue

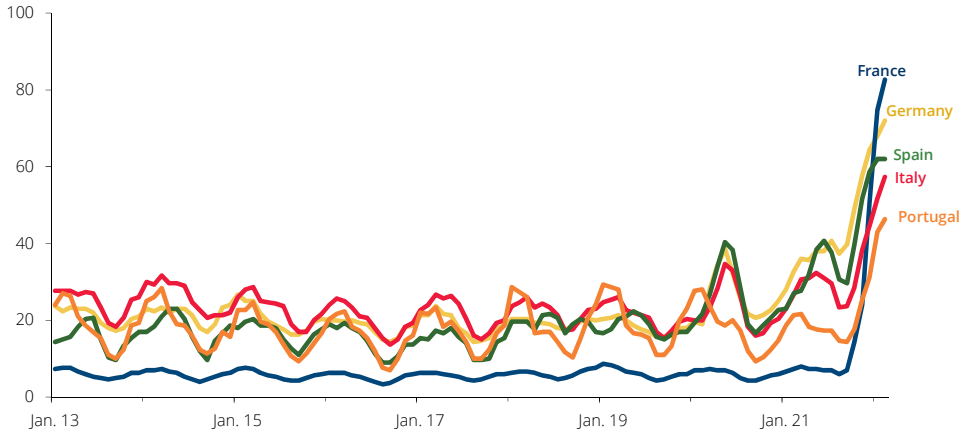
Why is inflation higher in the euro area?

Why is inflation higher in the euro area?

Introduction

Euro area inflation has been rising since early 2021 and has reached a record high since the start of the monetary union. This upward trend, which contrasts with the protracted period of low inflation before the pandemic, has been at the heart of the economic debate, in particular because of the implications for the monetary policy stance in the euro area. The sharp rise in inflation has also been of growing concern to the public at large (Chart 1), mainly due to its impact on real household income. This growing concern emerged after several years of relative inattention to inflation developments, which is common in advanced economies characterised by stable inflation over long periods.[1]

Chart 1 • Searches for the word "inflation" on Google | Index (100 = maximum value of searches in each country since the beginning of the series in January 2004)



Source: Google Trends (Banco de Portugal calculations). | Notes: Searches for the word "inflation" in the official language of each country. 3-month moving average. Data until February 2022.

In this context, it is important to understand why inflation is higher in the euro area. The aim is to understand what factors have been driving price developments since early 2021. Concomitantly, the inflation behaviour is interpreted in the light of economic theory, by highlighting mechanisms present in contemporary macroeconomic models that, under certain circumstances, may explain the rising inflation. Based on the various arguments put forward, a discussion is presented on the factors that may affect inflation developments in the euro area. Furthermore, comparisons are made with countries such as the United States and Japan to put developments in the euro area inflation into perspective.

1. See for example Coibion et al. (2020).

The debate on euro area inflation is of utmost relevance for Portugal. Many of the drivers of the rising inflation in the euro area are global factors with an impact on the Portuguese economy. Moreover, inflation developments in the euro area are a key element in the monetary policy decisions of the Governing Council of the European Central Bank, which affect economic activity and prices in the euro area.

Inflation developments in the euro area

In the years leading up to the pandemic, euro area inflation was persistently low. The economic recovery following the 2010-12 sovereign debt crisis was not matched by an increase in inflation. Between 2013 and 2019, average inflation – measured by the change in the Harmonised Index of Consumer Prices (HICP) – stood at 1.0%, clearly below the ECB's objective (Chart 2). This phenomenon took academics and policy-makers by surprise and prompted a debate on the rationale behind it. The weakening of the wage-price pass-through channel, the globalisation, the technological innovation and the persistence of low interest rates for a protracted period are frequently mentioned in literature as explanatory factors.[2]

Chart 2 • HICP in the euro area | Year-on-year growth rate in percentage

Source: Eurostat.

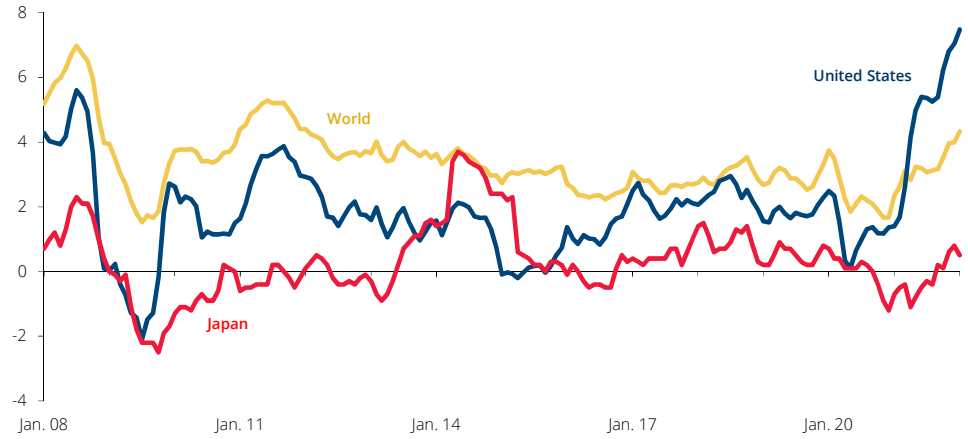
The pandemic put a downward pressure on euro area inflation in 2020. Demand shocks and supply shocks occurred at the same time. On the one hand, the lockdown measures adopted to contain the pandemic led to a drop in confidence among economic agents and in aggregate demand. On the other hand, a large number of businesses had to limit their operations or even close down, thus restricting supply. There is evidence that demand shocks were the dominant drivers.[3] Against this background, inflation dropped and even turned negative in the second half of 2020. When discussing inflation dynamics in 2020, it is important to bear in mind that the containment measures put in place that year and the halting of certain activities made it difficult to ascertain the price of

2. For further details see the Box entitled "Low inflation in the euro area: possible causes", *Economic Bulletin*, December 2019.
3. See the Box entitled "Developments in inflation and the pandemic: demand shocks versus supply shocks", *Economic Bulletin*, May 2021.

several goods and services. Some of them stopped being transacted during lockdown periods, such as accommodation services or international flights. As a result, the prices of some products (15% of the HICP basket, on average between April and December 2020) were imputed based on different methodologies, thus creating some difficulties in the interpretation of inflation measures.

Since early 2021, inflation has increased in the euro area and worldwide. In the euro area, inflation hit around 5% in late 2021 and early 2022. This is above the previous series peak of 4.1% in mid-2008, which occurred in a context of rising international commodity prices, in particular oil prices. The inflation spike since the beginning of 2021 has been broad-based across all euro area countries and also in the rest of the world, suggesting the influence of global factors. Across advanced economies the rise was particularly strong in the United States, where inflation stood close to 7% at end-2021 and early 2022 (Chart 3). In the case of Japan, the rise in inflation was subdued, having remained below the Bank of Japan's target of 2%.

Chart 3 • Consumer price index | Year-on-year growth rate in percentage

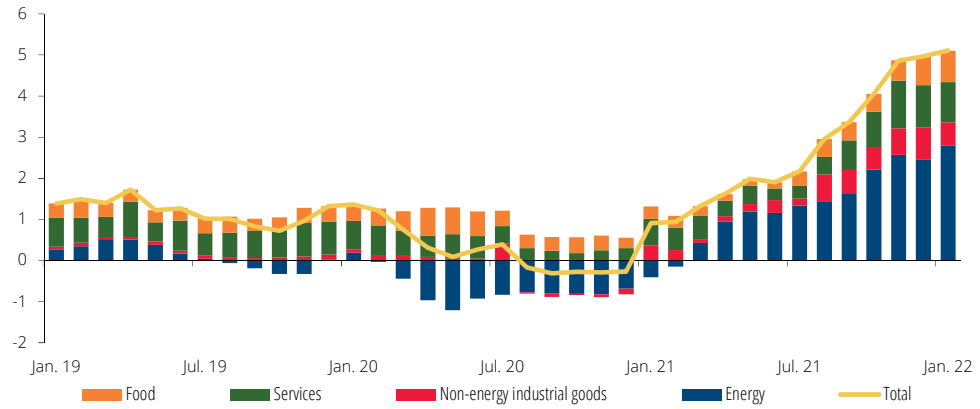


Source: Refinitiv (Banco de Portugal calculations). | Note: World – weighted average (by the GDP of each country) of 63 countries.

By HICP components, energy goods made a major contribution to the increase in euro area inflation. The year-on-year rate of change of this component reached historical highs by the end of 2021 and early 2022, meaning that a component with a weight of around 10% in the HICP basket contributed around half to overall inflation (Chart 4). This increase is mostly explained by developments in liquid fuel prices, but developments in gas and electricity prices, which historically represent a residual contribution, also played a relevant role. By the end of 2021 and early 2022, price growth for these three components had peaked since the inception of monetary union.

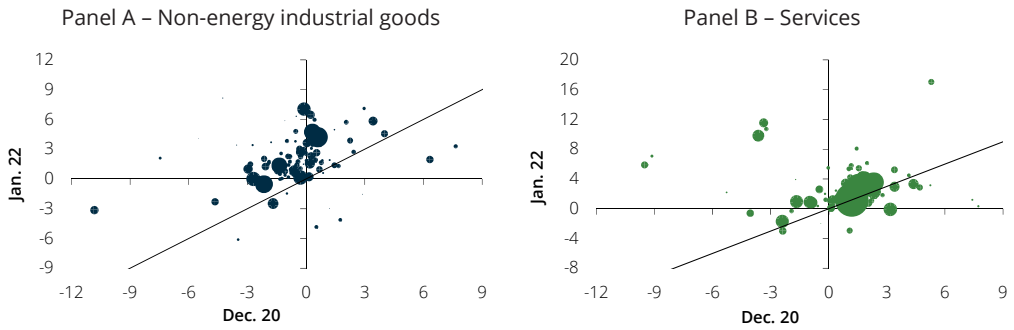
The inflation spike was not confined to the usually more volatile items but was relatively broad-based. In January 2022, 80% of the items weighted by their respective share in the HICP basket showed a price change above the figure observed at end-2020 and 59% showed a price change above 2%. Both inflation of the more volatile products and core inflation rose (Chart 2). Non-energy industrial goods prices recorded a sharp and broad-based acceleration (2.7 p.p. between December 2020 and January 2022) in terms of items (Chart 5 – Panel A). The growth rate in prices for services also increased (1.7 p.p. between December 2020 and January 2022), but less broadly based (Chart 5 – Panel B).

Chart 4 • Decomposition of the euro area HICP | Year-on-year growth rate in percentage and contributions in percentage points



Source: Eurostat.

Chart 5 • Price of non-energy industrial goods and services in the euro area | Year-on-year growth rate in percentage



Source: Eurostat (Banco de Portugal calculations). | Notes: The dimension of each dot represents the weight of the corresponding item on the HICP. The line displayed is in the diagonal axis, representing an equal inflation rate in January 2022 and in December 2020.

Factors affecting price developments in 2021

Price developments in the euro area in 2021 were affected by a mismatch in the markets, between a strong rebound in demand, especially for certain products, and supply dynamics that were more subtle and subject to various temporary constraints. The different phases of the pandemic crisis were characterised by atypical, strong and unusual fluctuations, particularly in private consumption, conditioned by the pandemic and the health and economic measures taken to address it. Demand in the euro area and internationally recovered strongly after the first pandemic wave. However, supply has not shown the same dynamics, and recovered more slowly and in a limited way. This imbalance mainly affected certain goods and services, conditioning their prices and even their availability in international markets, including in the euro area.

The significant increase in the international prices of energy commodities conditioned energy price developments in the euro area.[4] This increase has also indirectly affected the price of many

4. See the Box entitled "Rising commodity prices in 2021", *Economic Bulletin*, December 2021.

other goods and services that use these commodities in their production. In general, the increase in energy commodity prices in 2021 will have reflected the robust recovery in global demand that was not fully matched by supply. In the case of oil, the Organisation of the Petroleum Exporting Countries has agreed on an only moderate rise in its production from August onwards, following significant cuts in 2020. At the same time, US production has not recovered as expected due to a more conservative investment policy after the heavy losses in 2020. In the case of gas, supply was curtailed by low reserves available in the euro area following a longer period of low temperatures in the winter of 2020-21, geopolitical tensions and pandemic-related constraints that postponed maintenance projects. In February 2022, the conflict between Russia and Ukraine pushed up the price of energy commodities. At end-February, the price of oil was around 50% higher than the average price in 2018-19, before the onset of the pandemic crisis.

The impact of the increase in energy commodity prices in international markets was heightened by climate change mitigation measures. In the market where allowances issued by the European Union (EU) for greenhouse gas emission in certain sectors are traded, the price per tonne of carbon dioxide equivalent rose from around €30 at the end of 2020 to around €90 at the start of 2022.[5] This increase partly reflects a faster rate of annual reduction in the number of allowances made available. It is difficult to separate the contribution of rising allowance prices to the increase in the growth rate of electricity prices experienced by the consumer (from 0.4% in December 2020 to 27.3% in January 2022). There is some evidence that this rise in electricity prices (which has a weight of around 3% in the HICP basket) will have mainly reflected the rise in gas prices, given that electricity generation in some economies makes extensive use of this commodity. The impact of climate change mitigation measures was relatively limited, although heterogeneous across countries.[6]

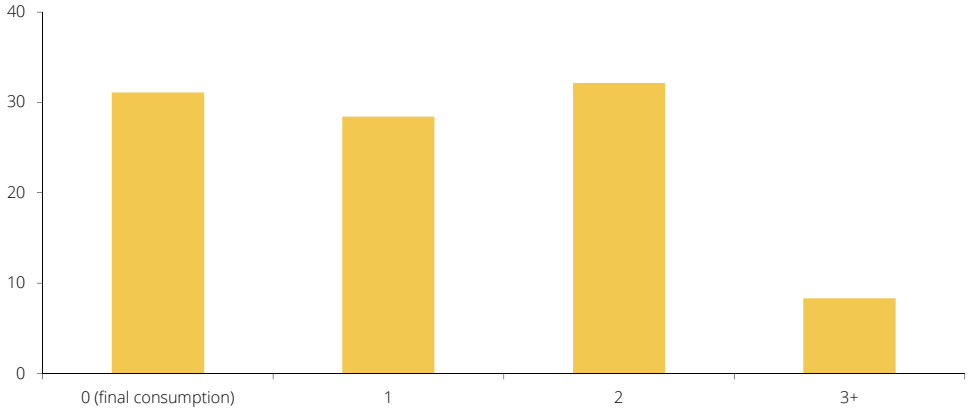
Price developments in the euro area were also influenced by persistent constraints in the global supply of various non-energy goods. The rapid recovery in global demand and a shift in spending from services to goods meant that many firms found it difficult to respond to the sharp and sudden rise in the number of orders. Concurrently, there were disruptions in the international transportation of goods. All these factors led to major disturbances in global value chains, resulting in a significant increase in import prices in the euro area and shortages of certain imported products. A striking example is semiconductors. The unit value of electronic integrated circuits imported by the euro area rose by more than 40% between the third quarter of 2019 and the third quarter of 2021. At the same time, imports fell by around 20%. The limited supply response of these goods to the increase in demand was partly driven by weak investment in this sector, before and during the pandemic.

A significant share of imported goods affected by disruptions in supply is used in upstream stages of the manufacturing process, holding back the manufacture of several goods in the euro area. By isolating those imported goods experiencing a particularly high increase in their unit value compared to the pre-pandemic period (top 10% of distribution) and, concomitantly, a decline in the amount imported, a wide diversity can be found in their categorisation. For example, disruptions have affected chemicals, foodstuffs, machinery, electrical equipment and materials, metals and materials such as wood and plastics. Some of these goods tend to be used

5. For a detailed description of how the EU emissions trading system works, see the Special issue on "Climate change and the economy", *Economic Bulletin*, October 2021.
6. See for example Pacce, Sánchez and Suárez-Varela (2021).

in upstream stages of the production chain (Chart 6). Specifically, around 70% of these goods are transformed on average at least once before their final use and around 40% are transformed at least twice. Thus, constraints in their global supply can be expected to cause disruptions in domestic supply of a large number of other goods. This assumption is supported by the qualitative results of the European Commission surveys. In all manufacturing sectors, the percentage of firms reporting shortages of material or equipment as a limiting factor on their production at the end of 2021 was above the long-term average and the values observed in the years preceding the pandemic (Chart 7– Panel A). These production constraints appeared to be particularly strong in the automotive, electrical and computer equipment and plastics industries, with over 70% of firms reporting material or equipment shortages.

Chart 6 • Goods imported by the euro area with particularly severe supply disruptions: distribution of the average number of times that each good is transformed before its final use | Percentage

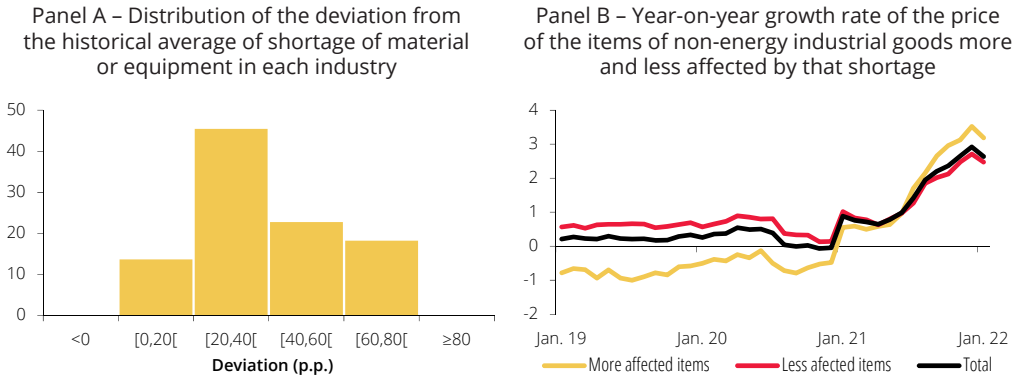


Sources: COMEXT database, Antràs et al. (2012) and U.S. Bureau of Economic Analysis (Banco de Portugal calculations). | Notes: Goods imported by the euro area (excluding fuels, extra-euro area) with particularly severe supply disruptions – goods of the combined nomenclature with a particularly high unit value increase (last decile of the distribution) in 2021 Q3 relative to 2019 Q3 and, simultaneously, a decrease in the imported quantity. Average number of times that each good is transformed before its final use – approximation based in Antràs et al. (2012).

Restrictions on domestic production driven by global supply constraints seem to have made a relevant contribution to the acceleration in non-energy industrial goods prices. To illustrate the impact of material or equipment shortages on the acceleration in non-energy industrial goods prices in the euro area, a breakdown of this aggregate was made, where the goods most affected by these shortages are distinguished from the remainder. The year-on-year rate of change in the most affected goods price, which was historically negative, rose by around 4 p.p. from December 2020 (Chart 7 – Panel B). As regards the other goods, this increase was also significant, but of a smaller magnitude (2.3 p.p.). The broad-based acceleration in the price of non-energy industrial goods should also partly reflect the indirect effects of the rise in the price of energy commodities required for their production. Quantifying these effects is complex and estimates tend to vary depending on the method used.[7] The transmission to consumer prices and the time horizon over which it occurs depend on factors such as the cyclical position of the economy, its production structure and competitive pressures in each market.

7. See for example ECB (2010).

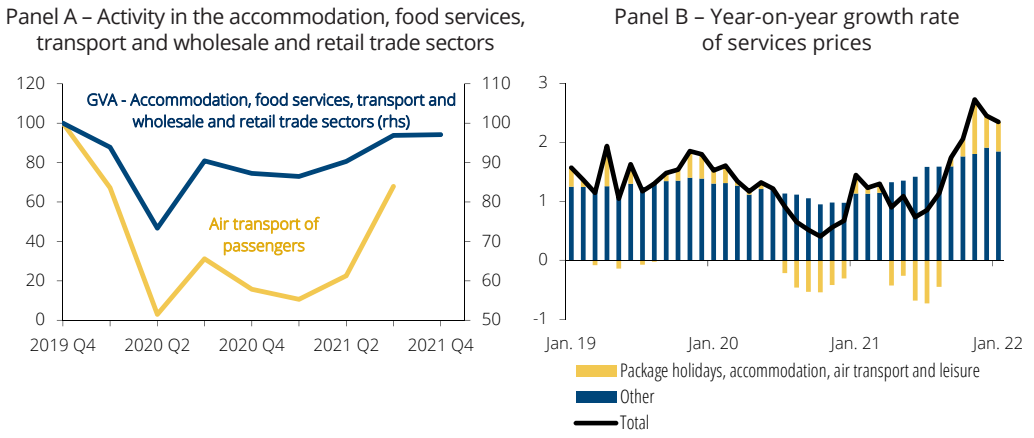
Chart 7 • Shortage of material or equipment and price of non-energy industrial goods (excluding clothing and footwear) in the euro area | Percentage



Sources: European Commission, Eurostat and RAMON database (Banco de Portugal calculations). | Notes: Panel A – deviation of the percentage of firms operating in each manufacturing sector that reported shortage of material or equipment in 2021 Q4 relative to the average in 1991-2019. Panel B – more affected items: the industries producing them have a deviation relative to the historical average in the top quartile. The correspondence items-industries is based on conversion tables between statistical classifications. When one item corresponds to more than one industry, the average deviation was considered. Less affected items: remaining items, excluding "purchase of pets", "software" and "water supply", for which no correspondence was obtained.

The strong recovery in demand for some services since the second half of 2021 has also conditioned price developments in the euro area. Some sectors such as tourism, air transport and leisure services were particularly affected by the pandemic containment measures and only recorded a more sustained recovery in the second half of 2021 (Chart 8 – Panel A). Since then, the year-on-year rate of change in these services prices has risen significantly, explaining around 70% of the year-on-year rise in services prices (Chart 8 – Panel B). The growth rate of prices for the remaining services also rose in this period, but less markedly. Services were the component of the HICP basket with the highest share of imputed prices in 2020 and early 2021. As such, the interpretation of services price developments is all the more difficult.

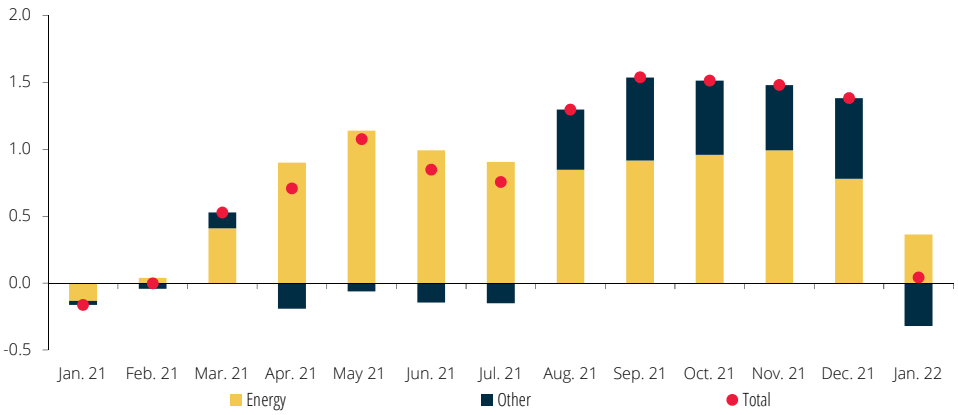
Chart 8 • Services in the euro area: indicators of activity and prices | Index (2019 Q4 = 100), year-on-year growth rate in percentage and contributions in percentage points



Source: Eurostat (Banco de Portugal calculations). | Notes: Panel A – GVA: Gross Value Added. Air transport of passengers that boarded in euro area countries (data available until 2021 Q3). Panel B – package holidays, accommodation, air transport and leisure services had a 10% weight on the HICP basket of services in 2021.

Finally, the increase in the annual rate of change in euro area prices in 2021 was influenced by statistical effects. Euro area inflation is usually presented as the rate of change in one month's HICP compared with the HICP for the same month one year earlier. As a result, atypical price developments in one period affect inflation dynamics in the same period the following year. This statistical effect is referred to as base effect. Cumulatively, base effects contributed 1.4 p.p. to the rise in inflation between December 2020 and December 2021, accounting for about one quarter of that increase (Chart 9). Energy goods was the hardest hit component, reflecting an unusual and sharp fall in energy prices in 2020, especially in March and April. If the rate of change in energy prices were calculated using as a base month the same month in 2019, the contribution of the energy component to total inflation at end-2021 would be around one-third, instead of close to one-half. The non-energy industrial goods and services price developments described above have also been influenced by base effects, partly due to a temporary VAT cut in Germany in the second half of 2020. With the exclusion of the low prices of 2020 from the calculation of the year-on-year rate of change of the HICP in early 2022, the impact of base effects will have lost importance. Inflation in January already reflected this normalisation, which was, however, more than offset by a strong and higher than usual rise in prices that month.

Chart 9 • Cumulative impact of base effects on euro area inflation | Percentage points



Source: Eurostat (Banco de Portugal calculations) | Notes: The base effect can be defined as the contribution to the change in the year-on-year growth rate in a particular month that stems from the deviation of the month-on-month rate of change in the base month (the same month one year earlier) from its usual value. This effect for each month and component was computed subtracting the month-on-month rate of change of the HICP from the respective average in 2015-2019 in the respective month. The cumulative impact is equal to the sum of the monthly impact since January 2021.

Interpreting rising inflation in the light of economic theory

Understanding inflation's behaviour calls for its interpretation in the light of mechanisms contained in macroeconomic models.[8] This section focuses on inflation as a phenomenon characterised by a broad-based increase in the level of prices and not merely as a change in relative prices. This exercise is not intended to provide an explanation for inflation, but rather to outline plausible and not mutually exclusive scenarios for a broad-based price increase to occur.

In the light of a Phillips curve, the behaviour of inflation is consistent with the rapid recovery of economic activity when economies reopened. In macroeconomic models with price adjustment

8. For a detailed description of these mechanisms, see for example Castillo-Martinez and Reis (2019).

frictions, there is a relationship between nominal variables, such as inflation, and real variables, such as unemployment or economic output, called a Phillips curve (e.g. Roberts, 1995). This relationship, historically established by the observed correlation between these variables (Phillips, 1958), is also used in statistical models with different specifications to explain cyclical variations of inflation around a long-run value (e.g. Eser et al., 2020). On an interpretation based on the Phillips curve, rising inflation in the euro area is consistent with the rapid and sharp recovery in economic activity. The 6.5% fall in GDP in the euro area in 2020 was followed by a 5.3% growth in 2021, as economies reopened – the highest growth since the formation of the monetary union. At the same time, the increase in unemployment associated with the pandemic crisis was quickly corrected, with the unemployment rate reaching minimum values by the end of 2021 and beginning of 2022. While this mechanism may explain the inflation behaviour, two major questions arise. The first is what is the time horizon over which the relationship that the Phillips curve establishes between inflation and real variables is verified. In the long period of low inflation that preceded the pandemic, this relationship does not seem to have been evident – the so-called "excessive disinflation puzzle" (e.g. Constâncio, 2015). The second question is how best to use the Phillips curve to understand the evolution of inflation in a pandemic context, characterised by a combination of supply and demand shocks that created heterogeneous cyclical conditions in different sectors of the economy (e.g. Baqaee and Farhi, 2020).

The economic recovery was partly driven by fiscal stimuli, which may have contributed to the rise in inflation. In response to the pandemic crisis, and in addition to monetary policy interventions, euro area governments implemented measures to support households and firms. In 2020, these measures will have represented, on average, 4% of the GDP of euro area countries. Part of this support was maintained in 2021, to support a still fragile economic recovery. The fiscal stimuli provided by all these measures boosted domestic demand and may have had an inflationary impact in the short run, especially if coupled with an accommodative monetary policy (e.g. Coenen et al., 2012; Debrun et al., 2021). At the same time, the Next Generation EU programme, a temporary EU recovery facility worth over €800 billion, was announced and started to be implemented. This programme, still at an early stage of implementation, will foster the economic recovery in the coming years. This interpretation of rising inflation assumes greater relevance in the United States, where fiscal stimulus during the pandemic was greater than in the euro area and the household income support programmes were reflected in a stronger recovery of domestic demand. In the euro area, support measures were predominantly employment protection measures, namely in the form of short-time working arrangements and subsidies for the firms most affected by the pandemic.

A fiscal expansion combined with concerns about public debt sustainability could also explain inflation's behaviour. The intertemporal government budget constraint implies that the real value of debt is equal to the expected value of future primary surpluses, just as the value of a stock is equal to the discounted value of future dividends. For this restriction to be satisfied, an expansionary fiscal policy without expectations of higher primary balances in the future may lead to an inevitable rise in the price level (e.g. Sims, 1994; Woodford, 1995; Cochrane, 2022). In the euro area, the government debt ratio has risen 14 p.p. since the onset of the pandemic, reaching in 2021 its highest level since the inception of monetary union (100% in the first quarter). Theory does not suggest any close relationship between inflation and current debt, rather it stresses the economic agents' assessment of the materialisation of future surpluses that guarantee the sustainability of debt. In that sense, inflation behaviour could be interpreted in the light of this mechanism only against a backdrop of debt sustainability concerns. This interpretation hardly seems consistent with agents' expectations that take into account the euro area institutional framework, which is very clear in its aim of ensuring the sustainability of government debt by imposing fiscal rules. Also, the fiscal consolidation and the concomitant downward path of the government debt ratio in several euro area countries in the run-up to the pandemic seem to make this interpretation less relevant.

Interest rates below the natural interest rate are consistent with an increase in inflation. According to economic theory, in a scenario where the real interest rate resulting from monetary policy is below the natural interest rate, the monetary policy stance would be expansionary. This expansionary nature would be consistent with an increase in inflation. In a context of economic rebound, inflation expectations have risen in the euro area. This rise will have put downward pressure on the *ex ante* real interest rate, which is equal to the nominal interest rate minus inflation expectations. In this sense, a scenario where the real interest rate resulting from monetary policy is below the natural interest rate has become more likely. The major challenge to this interpretation lies in the fact that the natural interest rate is a theoretical and abstract concept and therefore not directly observable. While the concept is of high importance for macroeconomic analysis and, in particular, in the monetary policy sphere, its use is challenged by the uncertainty surrounding its estimates, which vary substantially depending on the model and time horizon used. Additionally, it is also unclear what the impact of the pandemic will be on the natural interest rate (e.g. Jordà, Singh and Taylor, 2022). It is therefore difficult to infer the position of the real interest rate resulting from monetary policy with respect to the natural rate.

An excess supply of money could also be consistent with rising inflation. Since the onset of the pandemic, monetary aggregates have recorded higher growth rates than in previous years. If the increase in the growth rate of money supply is higher than the expected increase in demand for money, a higher inflation rate could be observed (e.g. Friedman and Schwartz, 1963). However, an excess supply of money is difficult to infer empirically, even assuming that inflation is a monetary phenomenon. For example, the high monetary growth since the start of the pandemic also reflects an increased demand for cash and deposits, in a context of uncertain economic prospects and health restrictions that have reduced consumption opportunities and increased savings. Moreover, the close relationship between money growth and inflation, once observed in many countries, has weakened since central banks began to adopt inflation targeting strategies (e.g. Teles, Uhlig and Valle e Azevedo, 2016). This weakening may be a consequence of a successful monetary policy in controlling inflation. In theory, this relationship can be even weaker when nominal interest rates are close to the effective lower bound, as is the case in the current context. In this situation, the opportunity cost of holding money becomes negligible and it can play the role of store of value (similar to government debt) without loss of interest. Consequently, the demand for money becomes undistinguishable from the demand for government debt and the growth of money may become less informative of inflation behaviour.

Constraints on future inflation developments

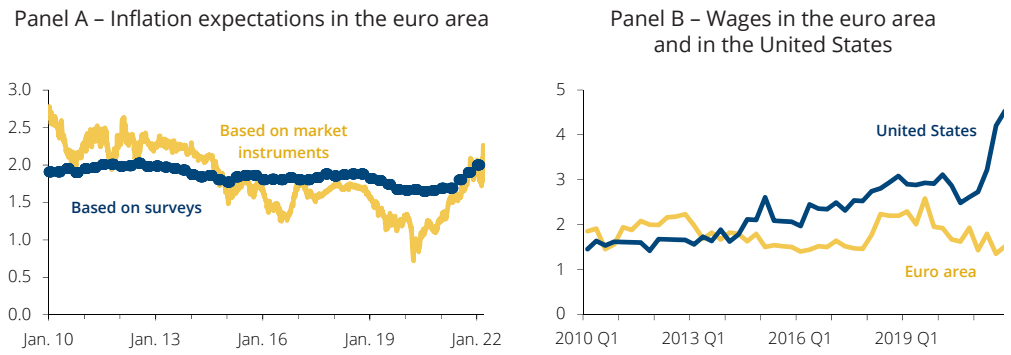
Uncertainty about future inflation behaviour in the euro area is high, even in the short term. Part of that near-term uncertainty stems from the pace of normalisation of the specific factors that have conditioned price developments in 2021. Geopolitical tensions and disruptions in global value chains have been more persistent than initially anticipated and their pace of resolution in the future is uncertain. Beyond the short term, economic theory provides important guidance on the conditions that can make rising inflation persistent and highlights the importance of closely monitoring a range of indicators.

Monitoring inflation expectations is of utmost importance. The ability to affect longer-term inflation expectations is widely recognised in economic theory as a requirement for central banks to achieve

their inflation goals, although models often do not explain how they are formed and what causes them to vary over time.[9] Empirically, inflation expectations cannot be directly observed, and it is necessary to use survey or financial market measures to provide indications of their evolution.[10] In the euro area, such indicators suggest that longer-term expectations are at levels in line with the ECB price stability objective (Chart 10 – Panel A). However, it is important to emphasise that these indicators have shortcomings. Measures based on financial instruments include risk premia, and therefore their direct interpretation may be incorrect. This shortcoming is overcome when expectations are obtained from surveys. However, surveys measuring longer-term inflation expectations tend to be addressed primarily to professional forecasters, whose forecasts may not accurately reflect the expectations of households and firms that are particularly relevant for monetary policy conduct.

It is also important to monitor wages' behaviour. Rising inflation may give rise to persistent inflationary pressures if workers seek to compensate for their loss of purchasing power through higher wages and employers grant such compensation hoping that they can raise prices. Measures commonly used to monitor wage developments, such as the year-on-year rate of change in compensation per hour or per employee, have been very volatile since the onset of the pandemic. This volatility mirrors the different employment support measures implemented in euro area countries, whose impact on wage indicators depends on the specificities of each measure, as well as sharp variations in the number of hours worked per employee. These factors make it difficult to interpret the evolution of wage indicators. Even so, the available indicators less affected by these distortions suggest that, so far, wage growth in the euro area has been contained (Chart 10 – Panel B). In the United States, by contrast, wage pressures appear to be more significant in a context of tight labour supply.

Chart 10 • Inflation expectations and wages | Year-on-year growth rate



Sources: ECB, Refinitiv and U.S. Bureau of Labor Statistics (Banco de Portugal calculations). | Notes: Panel A – surveys: Survey of Professional Forecasters; inflation 4/5 years ahead. Market instruments – average inflation over a 5-year period that starts in 5 years; data until 7 March 2022. Panel B – euro area: negotiated wages. United States: index that measures costs with wages and salaries supported by the employer (Employment Cost Index).

9. See for example Carvalho et al. (2021).
10. See for example Gomes, Iskrev and Ribeiro (2021) and Hilscher et al. (2022).

Monetary policy will continue to play an important role in inflation developments. The Governing Council considers that price stability is best maintained by aiming for a 2% inflation over the medium term. The medium-term stance provides room for unavoidable short-term deviations of inflation from the objective as well as for lags and uncertainty in the transmission of monetary policy to the economy and inflation. Given available data, the current monetary accommodation is deemed necessary by the Governing Council to stabilise inflation at 2% over the medium term. In any case, the Governing Council has reiterated that, given the current environment of uncertainty, it is important to stay flexible and keep options open in conducting monetary policy, and that it will remain alert to the data and carefully assess the implications for the medium-term inflation outlook. The Governing Council has also reaffirmed that it stands ready to adjust all of its instruments, as appropriate, to ensure that inflation stabilises at its objective over the medium term.

Economic theory stresses the importance of monitoring long-term policy interest rate expectations. According to the so-called Fisher relation, in the long run the real interest rate is equal to the nominal interest rate minus the inflation rate. This relation highlights the importance of closely monitoring long-term policy interest rate expectations, as higher expectations can be consistent with higher inflation in the long run. At present, these expectations (obtained through financial instruments or based on surveys) are that rates will remain low, despite some normalisation. In turn, recent estimates for the natural real interest rate in the euro area are often between -1% and 1%.[11] Consistency between inflation, policy interest rates and the natural real interest rate does not therefore validate a regime of high inflation over the long term.

Final remarks

Understanding inflation behaviour in the current environment is challenging. The shock of unique nature that hit the world economy has resulted in heightened uncertainty, ongoing adjustments in the behaviour of households and firms, and unusual fluctuations in economic activity that were heterogeneous across sectors, which makes price developments complex to understand. HICP inflation soared over the past year, mainly driven by a higher contribution from energy prices. In several countries, including Portugal, the impact on household disposable income was partly cushioned by fiscal measures implemented to ease the economic and social costs of inflation.

Economic theory points to different mechanisms that may explain the recent increase in inflation. The rapid recovery of economic activity and the concomitant response of fiscal and monetary policies may explain the rise in inflation. As there are different mechanisms that are consistent with this rise, it is particularly difficult to distinguish the relative importance of different drivers.

In the current context of high uncertainty, the close monitoring of indicators that may signal risks to price stability over the medium term will continue to be of paramount importance. Uncertainty about the future behaviour of inflation in the euro area is high, even in the short term. This uncertainty is partly related to the pace of resolution of disruptions in global value chains and future energy price developments, which are difficult to forecast. Such uncertainty is compounded by the Russia-Ukraine conflict. Beyond the short term, economic theory provides important guidance

11. See for example the Special issue: "The natural interest rate: from the concept to the challenges to monetary policy", *Economic Bulletin,* March 2019 and the most recent estimates obtain from the methodology of Holston, Laubach and Williams (2017) available at https://www.newyorkfed.org/research/policy/rstar.

on the conditions that may turn the inflation increase persistent, to which the Governing Council will continue to pay particular attention in pursuing its price stability objective. In particular, economic theory stresses the importance of monitoring developments in inflation expectations, wages and policy interest rate expectations. At the same time, a comparison of the inflation dynamics and inflation expectations in the euro area with those in other economies, now and in the past, as well as of the different ways in which to conduct monetary policy, may contribute to a deeper understanding of inflation behaviour in the euro area.

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