ECONOMIC BULLETIN

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I Projections for the Portuguese economy: 2024–26

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1 Projections for the Portuguese economy: 2024–26

The Portuguese economy is expected to grow by 2% in 2024 and 2.3% on average in 2025–26 (Table I.1.1). Economic activity is expected to continue to grow faster than in the euro area, with momentum close to potential, despite an environment characterised by weaker external demand growth and more unfavourable financial conditions than in the years prior to the pandemic (Box 1 — External environment, financing conditions and policies). Inflation is projected to decline to 2.4% in 2024, 2% in 2025 and 1.9% in 2026. Relative to the December 2023 *Economic Bulletin*, economic growth has been revised upwards by 0.8 p.p. in 2024, 0.2 p.p. in 2025-26, and inflation has been revised downwards by 0.5 p.p. in 2024 (Table I.1.1).[1]

The better-than-expected behaviour of economic activity in 2023 largely reflected the resilience of the labour market. Employment continued to increase, sustained by high new job creation, with gains in the higher-paid sectors. The unemployment rate remained low, close to 2019 levels, as did the number of households with unemployed persons. These developments combined with real wage growth had a positive impact on the financial situation of households, with gains in real disposable income in the past three years. Investment continued to grow, while the downward path of public and private debt was maintained. The resilience of the Portuguese economy, an open and strongly integrated economy in the EU, is a distinctive factor in recent years. This resilience reflects the maintenance of financial, fiscal and institutional stability. Structural factors underpinning growth in a more adverse context also include the competitiveness of Portuguese firms and the continued improvement in the labour force skills.

Table I.1.1 • Projections of Banco de Portugal for 2024–26 | Annual rate of change in percentage (unless otherwise stated)

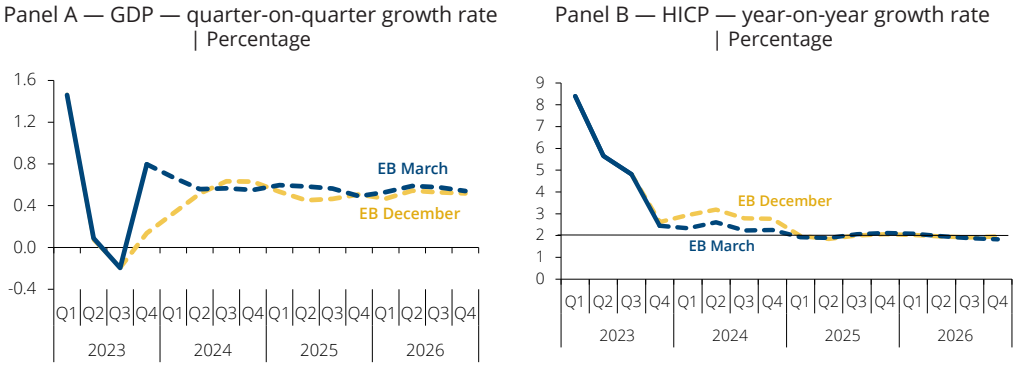
	Weights 2023	EB March 2024				EB December 2023			
		2023	2024 (p)	2025 (p)	2026 (p)	2023 (p)	2024 (p)	2025 (p)	2026 (p)
Gross domestic product (GDP)	100.0	2.3	2.0	2.3	2.2	2.1	1.2	2.2	2.0
Private consumption	62.5	1.6	2.1	1.9	1.8	1.0	1.0	1.7	1.5
Public consumption	17.1	1.2	1.2	0.9	0.9	1.1	1.0	0.9	0.9
Gross fixed capital formation (GFCF)	19.4	2.4	3.6	5.4	4.1	0.9	2.4	5.2	4.1
Domestic demand	99.1	1.4	2.4	2.4	2.1	0.7	1.4	2.2	1.9
Exports	47.4	4.2	3.5	4.0	3.3	4.3	2.4	4.0	3.0
Imports	46.6	2.2	4.2	4.3	3.1	1.3	2.8	4.1	2.8
Employment (a)		0.9	0.7	0.6	0.5	0.8	0.1	0.3	0.3
Unemployment rate (b)		6.5	6.5	6.5	6.5	6.5	7.1	7.3	7.2
Current and capital account (% of GDP)		2.7	3.6	3.9	4.1	3.0	3.5	3.7	4.0
Trade balance (% of GDP)		1.2	1.1	1.2	1.5	1.2	1.3	1.5	1.8
Harmonised index of consumer prices (HICP)		5.3	2.4	2.0	1.9	5.3	2.9	2.0	2.0
Energy		-8.9	3.6	2.2	0.6	-8.8	3.5	0.2	-0.1
Food		9.2	3.0	1.3	1.5	9.2	4.4	2.2	2.1
Excluding energy		6.5	2.3	2.0	2.0	6.6	2.9	2.1	2.1
Excluding energy and food		5.4	2.0	2.2	2.2	5.4	2.3	2.1	2.1

Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. Cut-off date for macroeconomic projections: March 12. The projection corresponds to the most likely value conditional on the set of hypotheses considered. 2023 weights at current prices. (a) According to the National Accounts concept. (b) As a percentage of the labour force.

1. The higher-than-projected increase in GDP in the fourth quarter of 2023 leads to a larger carry-over effect on growth in 2024 which largely explains the upward revision.

Economic activity rebounded in the fourth quarter of 2023, growing by 0.8% quarter on quarter after two quarters of stagnation (Chart I.1.1 — Panel A). The recovery was most visible in private consumption – reflecting the impact of declining inflation on households' purchasing power, as well as the strength of employment and the buoyancy of wages — and in exports, benefiting from improving external demand and additional market share gains. Quarterly growth of 0.7% is projected at the beginning of 2024 — higher than previously expected, in line with available conjunctural indicators — and around 0.6% over the remainder of the horizon (Chart I.1.1 — Panel A). In 2024–26, activity is expected to benefit from the effects of lower inflation, the expansionary impact of the measures in the 2024 State Budget and the anticipated acceleration in external demand (Box 1 — External environment, financing conditions and policies). These factors also support favourable labour market developments, with further projected increases in employment, after the peaks reached in 2023, and a stabilisation of unemployment. Economic growth also reflects the contribution of the expected higher financial implementation of the RRP — which is conditional on the approval of the associated structural reforms — and of the other European funds. The negative impact of the tightness of monetary and financial conditions on activity will persist, but to a lesser extent over the projection horizon.

Chart I.1.1 • Quarterly projections for GDP and inflation

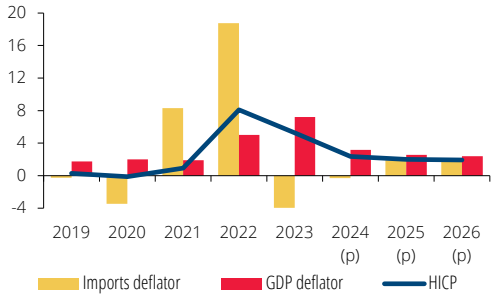


Sources: Banco de Portugal and Statistics Portugal. | Note: The dashed lines correspond to the projected values in the EB of December 2023 and March 2024.

Inflation continued to decline at the end of 2023 and appears to have stabilised in the first quarter of 2024, being projected to reach close to 2% from the beginning of 2025 (Chart I.1.1 — Panel B). Over the course of 2024, temporary effects on the more volatile components will affect inflation. Food prices increased in January on account of the end of zero VAT, a measure designed to be temporary. The energy component also increases in the first half of the year, owing to the rise in the price of electricity in January and base effects. Core inflation (excluding food and energy) is expected to continue to decline throughout 2024, reflecting the lagged pass-through of lower costs of commodities and intermediate goods and lower domestic inflationary pressures associated with the impact of monetary policy. The GDP deflator, a proxy for pressures from wages and profit margins, is expected to grow more moderately in 2024 and beyond, having increased by 7.2% in 2023 (Chart I.1.2). The acceleration in 2023 was the result of a higher contribution from labour costs, reflecting the recovery in the purchasing power of wages (Chart I.1.3). The projected moderation reflects increases in wages adjusted for productivity in line with inflation and lower pressures stemming from the gross operating surplus. Lower domestic pressures, together

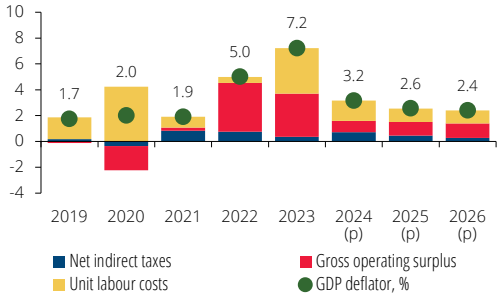
with expected growth of import prices at under 2%, ensure the convergence of inflation to levels consistent with price stability. This profile is similar to that projected by the ECB for euro area inflation.

Chart I.1.2 • HICP, imports deflator and GDP deflator — annual rate of change | Percentage



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

Chart I.1.3 • Decomposition of GDP deflator rate of change (income side) | Percentage and percentage points



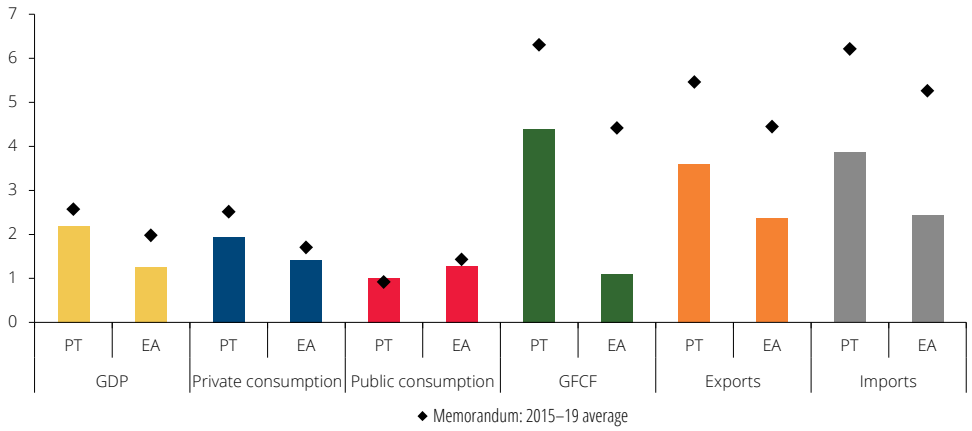
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) — projected.

Risks underlying the projections in this Bulletin are on the downside for activity and balanced for inflation. External risks that may restrain economic growth relate to (i) an escalation of geopolitical tensions and subsequent impact on confidence, trade flows and commodity prices, (ii) weaker external demand growth amid fragmentation of global trade, and (iii) a more pronounced impact from the observed tightening of monetary and financial conditions. There are still domestic risks associated with a scenario of uncertainty in the conduct of economic policy and delays in the implementation of European funds. In the case of inflation, the upside risks associated with turmoil in energy markets are mitigated by the possibility of a larger disinflationary impact of past monetary policy decisions.

Portuguese economic growth is expected to be based on investment and exports, continuing to stand above that projected for the euro area. GDP growth in Portugal exceeded that of the euro area in recent years and is expected to continue to do so over the projection horizon (0.9 p.p. on average) (Chart I.1.4). This differential reflects higher investment growth, supported by inflows from European funds, and a more favourable relative performance from exports. Despite the sharp slowdown in external markets in 2023, the competitiveness of Portuguese firms continued to support market share gains, contrasting with that observed in the euro area.[2] The decline in indebtedness of the various institutional sectors, to ratios as a percentage of GDP close to those in the euro area, contributes to the economy's greater resilience in a context of interest rates higher than those observed in the pre-pandemic years (Chart I.1.5). Economic growth in Portugal is expected to remain consistent with the maintenance of fundamental macroeconomic balances in terms of public and external accounts.

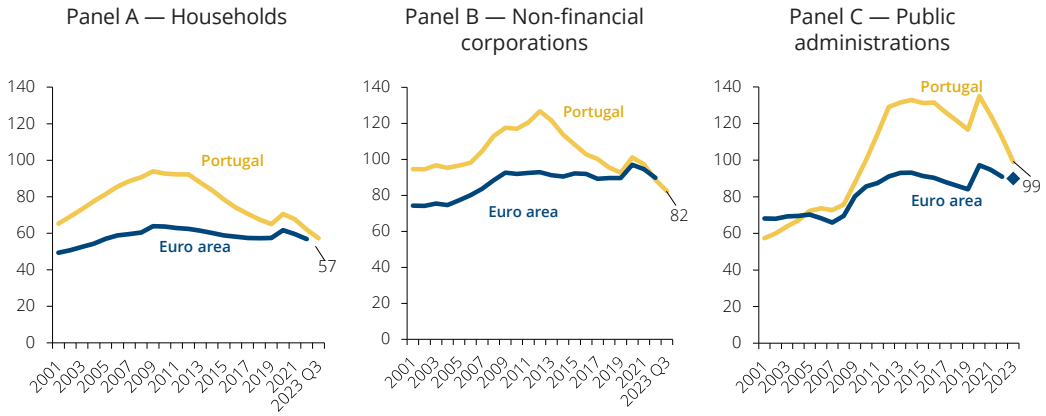
2. See the box entitled "Performance of Portuguese exports of goods and services", *Economic Bulletin*, December 2023.

Chart I.1.4 • GDP and expenditure aggregates in Portugal and the euro area — average rate of change 2024–26 | Percentage



Sources: ECB, Statistics Portugal and Banco de Portugal. | Notes: (p) — projected. The projections for the euro area refer to the ECB staff macroeconomic projection exercise of March 2024.

Chart I.1.5 • Debt of households, non-financial corporations and public administrations in Portugal and the euro area | Percentage of GDP



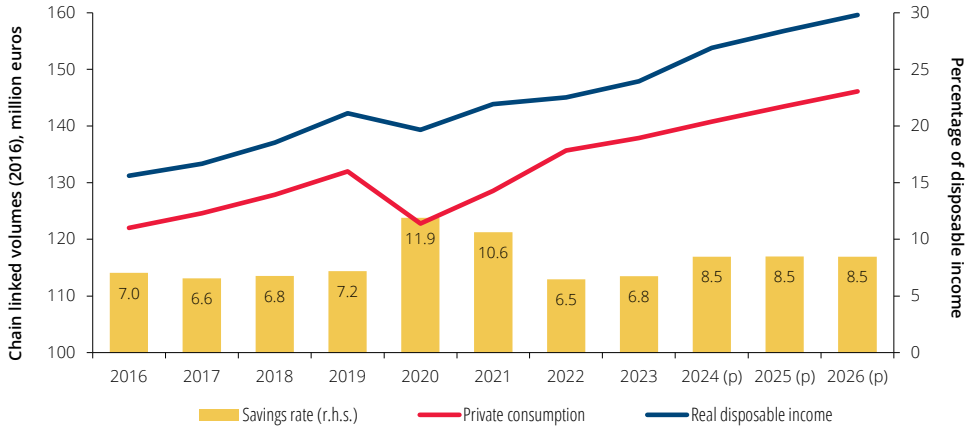
Sources: Banco de Portugal and ECB. | Notes: Consolidated values. The euro area debt series for households and non-financial corporations are annualised (last observation: 2022). For the public administrations debt series, the last observation available for the euro area corresponds to 2023 Q3.

Private consumption will grow on average by 1.9% in 2024–26, amid gains in real disposable income and increased savings. Households' real disposable income, after increasing by 1.9% in 2023, is projected to grow by 4% in 2024 and 1.9% in 2025–26 (Chart I.1.6). These gains are associated with falling inflation and the momentum in wages and social benefits. The reduction of direct taxes will also contribute to the increase in disposable income in 2024–25.

In 2024, subdued growth of private consumption relative to income and the increase in the saving rate reflect the need and opportunity to build up financial buffers in a context of high interest rates. For indebted households, higher interest rates imply a downward adjustment of consumer spending (Box 2 – Households' interest rate and consumption expectations). Households with accumulated wealth and no debt will benefit from higher returns on their financial investments, but the impact on aggregate consumption will tend to be moderate in view of their lower propensity to consume and

the incentive to save owing to higher interest rates. In 2025–26, consumption will grow in line with disposable income, stabilising the saving rate at higher levels than in the pre-pandemic period. These savings figures, combined with weak residential investment, translate into an increase in households' net lending, which should continue to be partly channelled into debt repayment.

Chart I.1.6 • Private consumption, real disposable income and savings rate | Chain linked volumes in million euros and percentage of disposable income



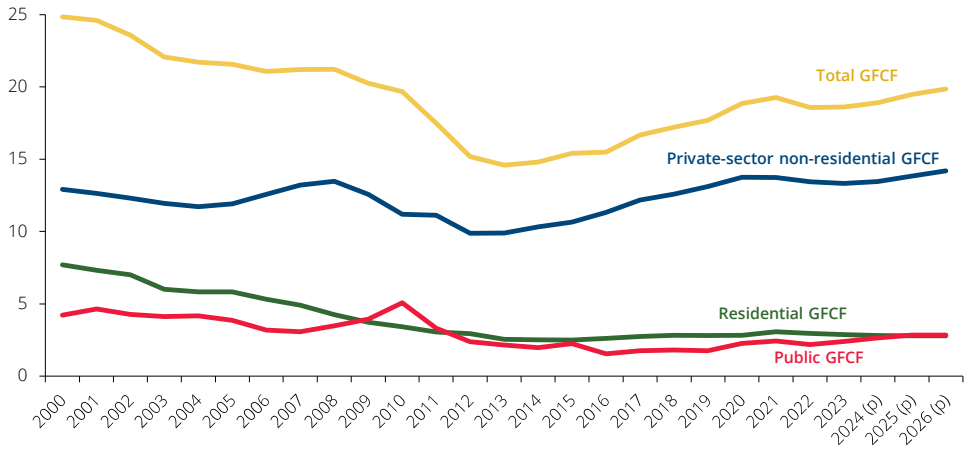
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) — projected.

Investment is expected to accelerate in 2024–26, responding to the recovery in global demand, the gradual easing of financing conditions and the increased boost from European funds (Table I.1.1). In 2023, GFCF grew by 2.4%, penalised by rising interest rates and slowing domestic and external demand. The corporate component increased by 1.5%, residential investment declined by 1%, while there was a significant increase in public investment.

The recent reduction in bank lending to firms does not reflect a tighter credit supply. To a large extent, it has reflected the increase in repayments — in particular by firms which benefited from public guaranteed loans and the credit moratorium — while the flow of new loans remained broadly unchanged (Box 3 — Developments in loans to firms following credit support measures during the pandemic).

Corporate investment is expected to regain momentum, as indicated by European Commission surveys showing an increase in the net percentage of industrial firms planning to increase investment in 2024. The annual growth projected for this component — 3% in 2024 and 5% on average in 2025–26 — reflects the need for investment in physical and technological capital to address the energy and digital transition, as well as the reconfiguration of global supply chains. Over the projection horizon, the share of corporate investment in GDP is expected to reach historically high levels, above that in the euro area (Chart I.1.7). This is a crucial factor in achieving convergence in terms of productivity, income *per capita* and welfare compared with more advanced economies. Public investment is expected to grow by around 11% in 2024-25 and 2.5% in 2026. Residential investment is projected to decline again in 2024 and to recover gradually in the following years, largely reflecting market adjustment to monetary policy decisions (Box 4 — Impact of monetary policy on the housing market in Portugal).

Chart I.1.7 • GFCF as percentage of GDP | Percentage



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) — projected. Investment to GDP ratio, chain linked volumes (2016).

Exports will grow by 3.6% on average in 2024–26 and remain one of the main drivers of growth. Their contribution (net of import content) to the change in GDP will be 0.9 p.p., on average, in the period, which compares with contributions of 0.4 p.p. from investment and 0.7 p.p. from private consumption.

Over the projection horizon, export growth reflects developments in foreign demand and gains in market share, which are more subdued than those in the recent period. This positive performance of Portuguese exporters over the projection period prolongs a favourable path observed since the sovereign debt crisis. In 2023, the 4.2% growth in total exports was sustained by the services component, reflecting the impact of the post-pandemic recovery in global tourism, while the goods component stagnated. The services component is expected to grow annually by 4% in 2024–25 and 3.3% in 2026. In 2024, tourism is expected to remain more buoyant than total exports. The global outlook for the sector remains favourable[3] and, despite high geopolitical risks, services exports will continue to benefit from Portugal's perception as a safe tourist destination. Goods exports are expected to recover, growing by 3.2% in 2024 and 3.7%, on average, in the following years.

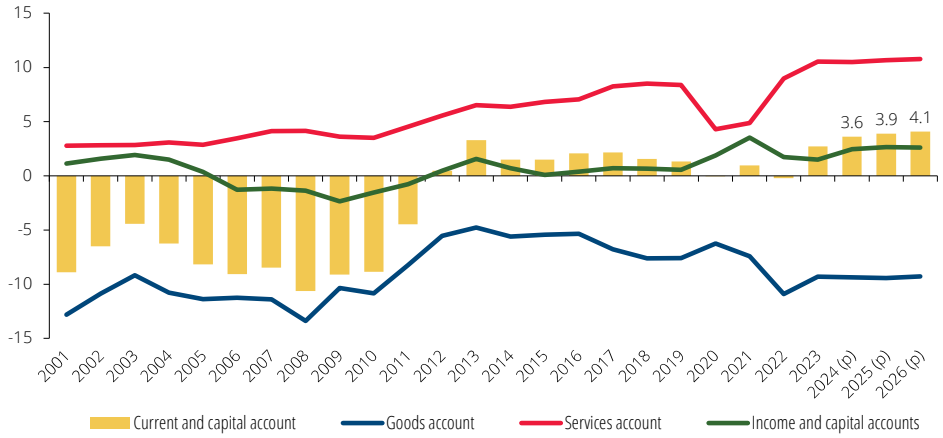
Projections point towards average growth of imports of goods and services similar to that of exports in 2024–26 with slight gains in the terms of trade (0.5 p.p. on average), which has favourable implications for the external balance. The degree of openness of the economy — as measured by the sum of exports and imports as a percentage of GDP (chain-linked volume data, with reference year 2016) — is expected to increase further, reaching 95% at the end of the horizon, compared with 91% in 2023 and 86% in 2019.

The economy is expected to have an average lending capacity of 3.9% of GDP in 2024–26, the highest since the start of the euro area (Chart I.1.8). In 2023, the goods and services account returned to a positive balance of 1.2% of GDP, reflecting improvements in the tourism and goods balances, in the latter case linked to the recovery in the terms of trade. The goods and services balance is projected to increase to 1.5% of GDP in 2026, reflecting a larger surplus in services. The

3. According to the United Nations World Tourism Barometer, international tourist arrivals in 2023 were 12% lower than in 2019 and a full recovery is expected in 2024 (https://www.unwto.org/news/international-tourism-to-reach-pre-pandemic-levels-in-2024).

income and capital account balance is expected to increase by 1.1 p.p. of GDP between 2023 and 2026, as a result of higher net transfers from the EU.

Chart I.1.8 • Current and capital account | Percentage of GDP



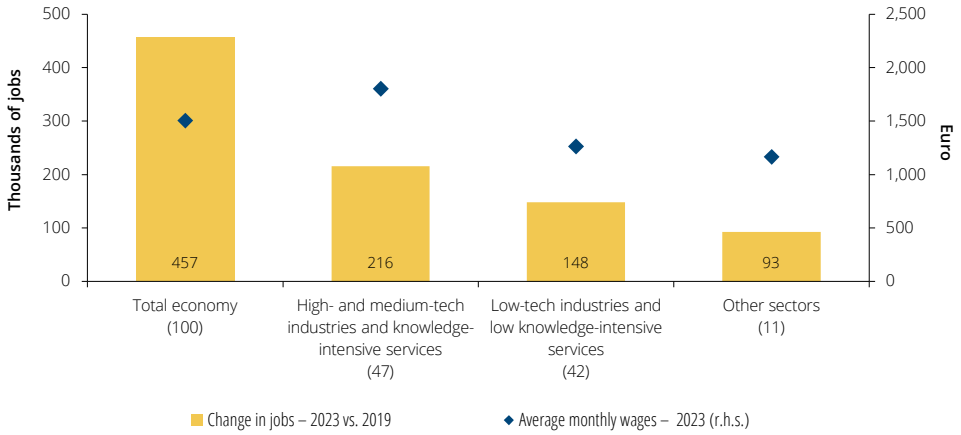
Sources: Banco de Portugal and Statistics Portugal. | Note: (p) — projected.

Developments in the labour market are expected to remain favourable, with increases in employment and real wages. Projected increases in employment extend the upward trend of this variable over the past ten years. The number of jobs in the economy peaked at 4.6 million in 2023, an 11% increase compared with 2019. In this period, almost half of the jobs were created in medium/high-tech industries and knowledge-intensive services, where wages are above the average of the economy (Chart I.1.9).

Employment is projected to grow by 0.7% in 2024 and 0.5% in 2025–26 (Table I.1.1). On the demand side, business surveys show a pick-up in employment expectations at the beginning of the year. Turning to labour supply, net immigration flows and the increase in the participation rate are expected to continue to more than offset the negative natural balance. The unemployment rate is expected to remain stable at around 6.5%. In 2023, long-term unemployment reached the lowest levels in the last decade, as did the number of discouraged individuals or unemployed individuals receiving unemployment benefits. These indicators signal a more flexible and adaptable labour market, consistent with fewer employability difficulties.

After an 8% increase in 2023, average wages in the economy will grow by 4.4% in 2024 and by 3.8% in 2025–26. The slowdown in nominal wages over the projection horizon reflects the expected decline in inflation — with gains in real terms remaining in line with productivity — and is consistent with a catching-up of the share of labour compensation in GDP to pre-pandemic levels.

Chart I.1.9 • Change in jobs between 2019 and 2023 and average monthly wages in 2023 — by technological and knowledge intensity | Thousands and euros



Source: Statistics Portugal (based on information from Social Security and Caixa Geral de Aposentações). | Notes: the information presented on jobs and average wages by technological and knowledge intensity was obtained through classifying companies by economic activity. High- and medium-tech industries and knowledge-intensive services – includes Manufacturing, with the exception of Food, Textiles, Wood and Paper, Water and air transport, Information and communication, Financial and insurance, Consultancy and scientific services, Public administration, Health and education, Artistic activities. Low-tech industries and services that are low knowledge-intensive – includes food, textiles, wood and paper industries and storage services, land transport, accommodation and food services and other services. Other sectors – includes: Agriculture, forestry and fishing, Mining and quarrying, Energy and Construction. The values in brackets correspond to the share of jobs in each sector in the economy's total in 2023.

Box 1 • External environment, financing conditions and policies

The global economy is expected to grow moderately until 2026. The assumptions of the March ECB staff projection exercise point to global growth remaining at 3% over this period, below its 2015–19 average (Table B1.1). This growth will be supported by emerging market economies, while advanced economies, with the exception of the United States, will continue to exhibit low growth rates. In the euro area, activity is expected to grow by 0.6%, but to recover to 1.5% in 2025 and 1.6% in 2026. Underlying these developments is the recovery in real disposable income, the normalisation of financing conditions and higher global trade growth (Table B1.1). Compared to the December projection exercise, economic activity growth in the euro area in 2024 was revised downwards by 0.2 p.p.

Table B1.1 • Projection assumptions

		EB March 2024				Revisions from EB December 2023			
		2023	2024	2025	2026	2023	2024	2025	2026
International environment									
World GDP	yoy	3.1	3.0	3.0	3.0	0.1	0.2	0.0	0.0
Euro area GDP	yoy	0.5	0.6	1.5	1.6	-0.1	-0.2	0.0	0.1
World trade	yoy	0.6	2.3	3.1	3.2	-0.2	-0.4	0.1	0.1
External demand	yoy	-0.5	1.5	3.1	3.1	-0.1	-0.5	0.1	0.2
International prices									
Oil prices	aav	77.5	73.7	69.3	66.8	-0.3	-0.2	-1.3	-1.1
Gas prices (MWh)	aav	40.6	30.0	32.1	29.5	-0.9	-17.4	-12.1	-7.3
Non-oil commodity prices	yoy	-14.5	0.6	2.1	0.1	0.7	3.2	-0.3	-1.6
Competitors' import prices	yoy	-1.3	1.0	2.6	2.4	-0.3	-0.9	0.0	0.2
Monetary and financial conditions									
Short-term interest rate (3-month EURIBOR)	%	3.4	3.4	2.4	2.4	0.0	-0.2	-0.4	-0.3
Implicit interest rate in portuguese public debt	%	2.1	2.3	2.4	2.4	0.0	0.0	0.0	0.0
Effective exchange rate index	yoy	4.9	1.1	0.0	0.0	0.0	-0.3	0.0	0.0
Euro-dollar exchange rate	aav	1.08	1.08	1.08	1.08	0.0	0.0	0.0	0.0

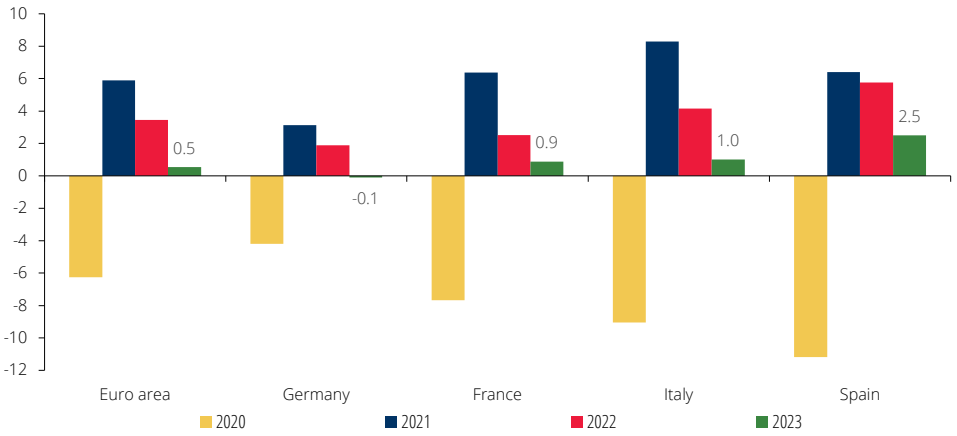
Sources: Banco de Portugal and ECB (Banco de Portugal calculations). | Notes: yoy – year-on-year rate of change, % – in percentage, aav – annual average value, MWh – megawatt-hour. Technical and external environment assumptions, as well as projections for euro area GDP and inflation, coincide with those in the ECB projection exercise released on March 7 ("ECB staff macroeconomic projections for the euro area", March 2024), which include information up to February 12. International prices are in euros. The technical assumption for the price of oil, gas and non-energy commodities is based on futures markets. The import price of competitors corresponds to a weighted average of the export deflators of the countries from which Portugal imports, weighted by their share on total Portuguese imports (for more information, see "Trade consistency in the context of the Eurosystem projection exercises: an overview", *ECB Occasional Paper* 108, March 2010). The evolution of the 3-month EURIBOR is based on expectations implied in futures contracts. The implicit interest rate on public debt is computed as the ratio of interest expenditure for the year to the simple average of the stock of debt at the end of the same year and at the end of the preceding year. An increase in the exchange rate corresponds to an appreciation of the euro. The effective exchange rate of the euro is computed against 41 trading partner countries. Revisions in the euro-dollar exchange rate are in percentage. The technical assumption for bilateral exchange rates assumes that the average levels observed in the two weeks prior to the cut-off date are maintained over the projection horizon.

Developments in economic activity in the euro area were considerably uneven across countries in 2023 (Chart B1.1). Dispersion of growth between euro area countries is likely to be partly associated with its productive structure, amid negative shocks on industry and greater resilience in services. Recent data from Purchasing Managers' Indexes suggest that the evolution of economic activity remained differentiated in the first quarter of 2024.

Global trade in goods and services is expected to grow at a rate of around 3.0% in 2024–26, following an increase of 0.6% in 2023 (Table B1.1). The elasticity of global trade to global GDP has been low in recent years, particularly in 2023. Between 2019 and 2023, cumulative global trade growth stood at around 11%, below cumulative global GDP growth (14%) in a context of heightened geopolitical tensions, with the war in Ukraine and more recently in the Middle East, as well as trade

tensions between the United States and China. The weakness in trade in 2023 was exacerbated by the shift in global demand towards services — with lower import content than expenditure on goods — and the fall in industrial activity, the sector most heavily involved in international trade. External demand for Portuguese exports fell by 0.5% in 2023, but is expected to recover, growing 1.5% in 2024 and 3.1% in 2025–26, a pace closer to that observed in 2015–19. Like global trade, the growth projected for foreign demand was revised downwards in 2024.

Chart B1.1 • GDP — euro area and major countries | Annual rate of change



Source: Eurostat (Banco de Portugal calculations).

Global inflation is projected to continue to decline gradually over the projection horizon. In the euro area, Eurosystem projections point to a decrease in headline inflation from 5.4% in 2023 to 2.3% in 2024, standing below 2.0% in 2026. This projection reflects a downward revision. Inflation excluding energy and food was also revised downwards and is expected to stand at 2.6%, 2.1% and 2.0% in 2024, 2025 and 2026 respectively.

Expectations implicit in futures contracts point to short-term interest rates declining further in the coming quarters. On annual average terms, the three-month EURIBOR is expected to fall to 3.4% in 2024 and to 2.4% in 2025–26 (Table B1.1). The short-term interest rate was revised downwards in 2024-26. The implicit interest rate on Portuguese debt is expected to increase from 2.1% in 2023 to 2.3% in 2024 and 2.4% in 2025–26, reflecting the replacement of debt issued at lower interest rates before 2022 with debt issued at the expected interest rates for the coming years, which are higher.

Box 2 • Households' interest rate and consumption expectations

Monitoring consumer expectations plays an important role in the conduct of monetary policy and, in particular, in assessing its transmission to the economy. In this context, the European Central Bank (ECB) launched the Consumer Expectations Survey (CES) in January 2020, aiming to collect detailed information on consumers' perceptions and expectations regarding the economic environment of their country and their household on a monthly basis.[4] Data for Portugal are available from April 2022 and include the responses of 1,114 individuals, on average, per month. The CES expands the set of high-frequency information for monitoring the Portuguese and European economy.

The financial situation of Portuguese consumers over the recent cycle of increases in the key ECB interest rates is characterised using data from the survey, sorting them into those with mortgages and those without (who may or may not be homeowners). The first group represents 39% of the complete sample and presents a higher percentage of consumers with tertiary education and a higher average annual income (Table C2.1). In addition, an estimate of the elasticity of real consumption to changes in expectations for interest rates on mortgages and on savings accounts is calculated, evaluating their impact on each type of household. The analysis focuses on the period between April 2022 and December 2023.

Chart C2.1 shows that, until March 2023, individuals' perceptions regarding their own households' financial situation remained stable. In the second half of 2023, net percentages, obtained by subtracting the percentage of respondents answering a deterioration from the percentage of respondents indicating an improvement, gradually improved for total consumers. Concerning their expectations for the next 12 months, net percentages improved in 2023, from -35% at the end of 2022 to -17%. Consumers with mortgages outstanding were consistently more pessimistic in net percentages. A similar result is found looking at expectations for the next 12 months, although the proportion of consumers with a negative outlook is smaller.

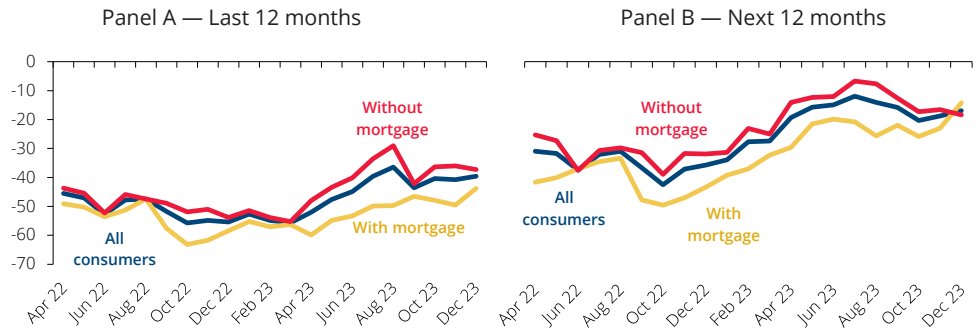
Table B2.1 • Characteristics of the surveyed consumers | Mean values and percentage

	With mortgage	Without mortgage	All consumers
Age (years)	41.5	40.6	40.9
Education (with higher education)	57%	51%	54%
Yearly income (euro)	25,562.9	21,894.9	23,330.3
Savings in the last 3 months (euro)	1,011.5	1256.8	1,157.6
Number of aggregates	1,599 (39%)	2,487 (61%)	4,086 (100%)

Source: Consumer Expectations Survey (ECB). | Note: The mean values for age, income and savings are computed with the mean value of each bracket. For age, there are four brackets: 18-34, 35-54, 55-70 and +70. For education, there are three possible respondes: Primary Education, Secondary Education and Higher Education. For the yearly income and for savings there are 10 possible brackets. The classification by housing type for each consumer is done with the question: "Which of the following describes your (and your family's) main place of residence?".

4. The ECB Consumer Expectations Survey is conducted monthly online with a rotation panel of approximately 19,000 individuals from 11 euro area countries: Belgium, Germany, Ireland, Greece, Spain, France, Italy, the Netherlands, Austria, Portugal and Finland. Additional information on this survey can be found in the following publications: ECB (2021), "ECB Consumer Expectations Survey: An Overview and First Evaluation", ECB *Occasional Paper Nr. 287* and Georgarakos, D., amd G. Kenny (2022), "Household spending and fiscal support during the COVID-19 pandemic: Insights from a new consumer survey", *Journal of Monetary Economics*, 129(2022), S1–S14.

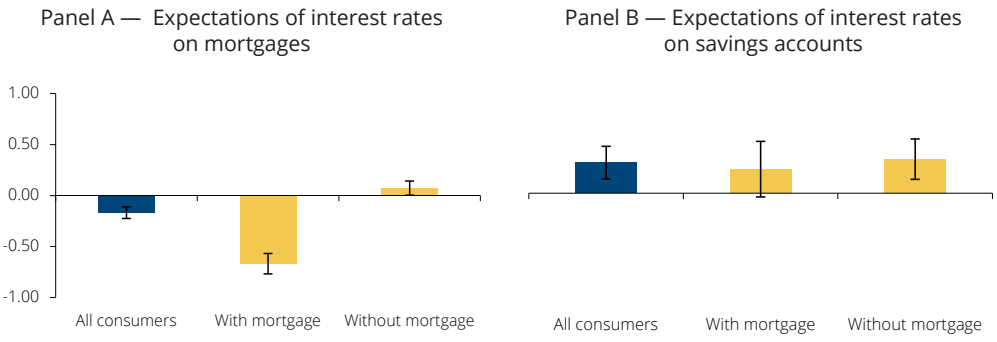
Chart B2.1 • Consumers' financial situation in Portugal in total and by housing type | Net percentage



Source: Consumer Expectations Survey (ECB). | Notes: The corresponding questions are, respectively: "Do you think your household is financially better off or worse off now than it was 12 months ago?" (Panel A) and "And looking ahead, do you think your household will be financially better off or worse off in 12 months from now than it is today?" (Panel B). The classification by housing type for each consumer is done with the question: "Which of the following describes your (and your family's) main place of residence?". The net percentage is calculated as the difference between the percentage of "better off" and "worse off" responses. The presented statistics are calculated using monthly weights that ensure the representativeness of the sample with the demographic structure of the population.

A panel regression was estimated to compute the elasticities of real spending expectations to changes in expectations of interest rates on mortgages and interest rates on savings accounts for consumers with or without mortgages. This regression includes changes in real spending growth expectations over the next 12 months, derived from the difference between the expected nominal change in consumption and expectations for the inflation rate as a dependent variable. In addition to expectations for interest rates on mortgages (Panel A) and on savings accounts (Panel B), the regression includes the expected real income growth and fixed effects at the individual level as an explanatory variable. These variables are reported quantitatively in the CES.

Chart B2.2 • Impact of an increase of 1 pp in interest rate expectations on spending expectations in the next 12 months | Percentage points



Sources: Consumer Expectations Survey (ECB) and calculations by Banco de Portugal. | Notes: Each bar shows the elasticity of real spending expectations to a 1% change in expectations of interest rates on mortgages (Panel A) and interest rates on saving accounts (Panel B). Confidence ints are: "By what percent do you expect your household spending on all goods and services to change during the next 12 months compared with your spending in the past 12 months?" for expectations about nominal consumption growth; "By about what percentage do you expect the total net income (that is after tax and compulsory deductions) of your household to change?" for expectations about nominal income growth; "In 12 months from now, what do you think will be the interest rate on mortgages in the country you currently live in?" for expectations for interest rates on mortgages, and "In 12 months from now, what do you think will be the interest rate on savings accounts in the country you currently live in?" for expectations for interest rates on savings accounts. Only responses to the last two questions were considered between the 5th and 95th percentiles for each country and month.

Chart C2.2 shows in each panel the estimated coefficients for a model that integrates all individuals without distinction and another model in which consumers are divided between those with mortgages and those without. On average, expectations for spending growth decline by 0.2 percentage points (p.p.) in response to a 1 p.p. increase in expectations for interest rates on mortgages, as shown in Panel A. The results also confirm that respondents with mortgages are the most reactive when there are changes in interest rate expectations for this type of credit. The effect is positive but very slight for those without loans for house purchase. On the other hand, in Panel B, expectations for spending growth increase by 0.3 p.p. in response to a 1 p.p. increase in expectations for savings accounts rates. This result stems from the reaction of consumers without mortgages and higher savings in recent months. For the other group, the estimated coefficient is not statistically significant.

Box 3 • Developments in loans to firms following credit support measures during the pandemic

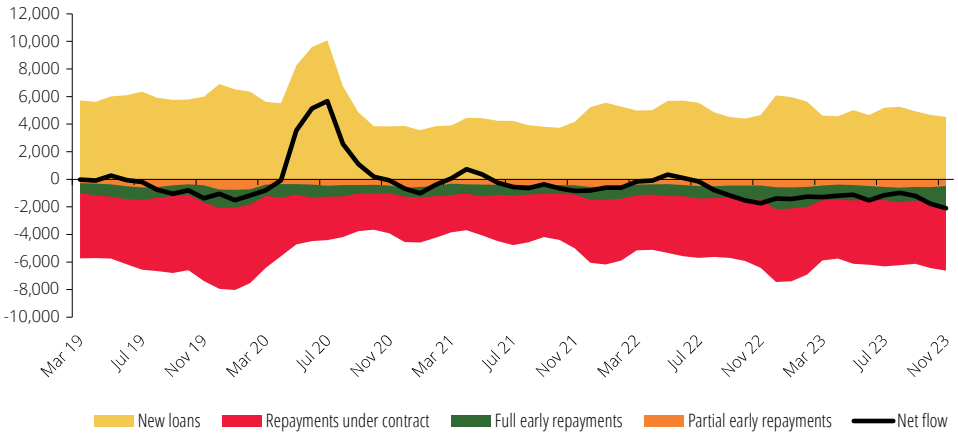
The public guaranteed credit lines in place during the pandemic led to strong growth in loans to firms, and the credit moratorium, in turn, allowed the suspension of interest payments and principal repayments between March 2020 and December 2021. These measures enabled firms to maintain or strengthen liquidity positions during the pandemic. In the most recent period of monetary policy tightening, the total amount of loans granted by resident banks to firms has been declining. Data from the Central Credit Register (CRC) allows to analyse whether this development varies across firms, depending on whether or not they benefited from such support measures.

To assess this issue firms were divided into four groups: (i) firms with public guaranteed loans that benefited from the moratorium, (ii) firms with public guaranteed loans that did not benefit from the moratorium, (iii) firms without public guaranteed loans that benefited from moratorium and (iv) firms without public guaranteed loans that did not benefit from moratorium. These firms accounted respectively for 27%, 12%, 23% and 38% of the total loans recorded in the CRC in November 2023. Most firms that did not benefit from any measure were eligible for both because they were micro, small or medium-sized enterprises, with no record of default for the previous 90 days at the beginning of March 2020 (Table C3.1).

Developments in the net flow of loans to non-financial corporations can be broken down into new loans, contractual repayments, partial early repayments and total early repayments. Since the start of the ECB's cycle of interest rate hikes in July 2022, new loans to non-financial corporations have remained broadly stable (Chart C3.1). However, repayments increased, so the change in the stock of loans (net flow) became negative.

This largely reflects developments in loans to firms with public guaranteed loans that also benefited from moratorium and, to a lesser extent, loans to firms benefiting from only one of these support measures (Chart C3.2, Panels A to C). In these firms, the repayments set out in the contract increased as of the end of 2021. This is determined by the start of the repayment of most of the public guaranteed credit lines granted during the pandemic, which had an 18-month grace period, as well as by the end of moratorium in December 2021.

Chart B3.1 • Loans to non-financial corporations — Breakdown of monthly net flows | Sum of the last three months, in millions of euros



Source: Banco de Portugal. | Notes: Net flow corresponds to the difference between new loans and total repayments. Overdrafts, credit cards, credit overruns, revolving credit, factoring and confirming are excluded from the analyses.

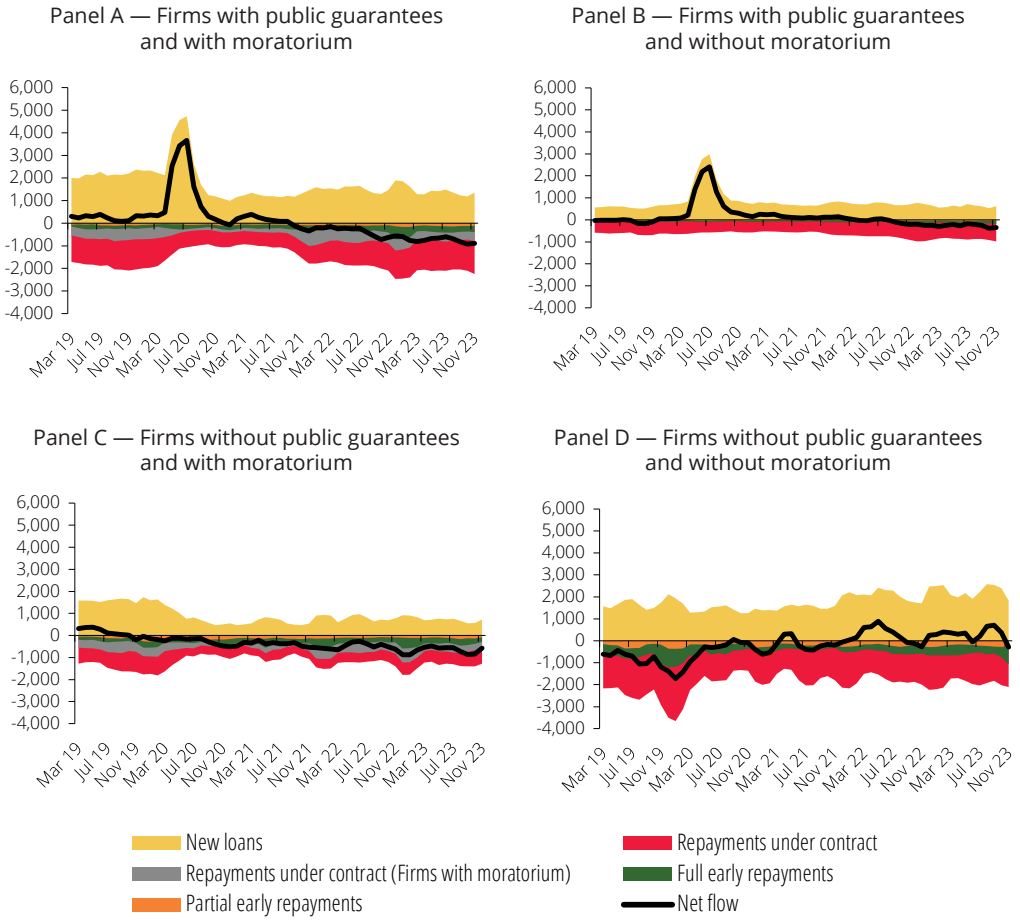
Table B3.1 • Firm Characteristics by group in 2019 | Mean values

	With public guarantees and with moratorium	With public guarantees and without moratorium	Without public guarantees and with moratorium	Without public guarantees and without moratorium	
				Total	Eligible
Total assets (1000 euros)	1,875.6	934.5	1,209.6	917.3	822.9
Turnover (1000 euros)	1,673.9	1,066.7	708.1	683.0	627.9
Number of workers	16.6	10.5	7.5	6.4	6.8
Total Debt (1000 euros)	636.0	193.6	434.6	203.5	176.1
Exporting firms	0.651	0.444	0.337	0.292	0.292
Age	16.7	15.2	13.3	14.0	13.7
EBIT/Assets (%)	4.5	6.8	3.0	5.1	5.5
Debt/Assets (%)	33.9	20.7	35.9	22.2	21.4
Number of firms	24,200	30,805	34,123	132,229	123,697

Source: Banco de Portugal. | Notes: Central Balance Sheet Database. Firms are classified into four groups: (i) firms benefited from public guarantee programs as well as from the moratoriums, (ii) firms benefited from public guarantee programs but did not benefit from the moratoriums, (iii) firms that did not benefit from public guarantee programs but benefited from the moratoriums and (iv) firms that benefited neither from public guarantee programs nor from the moratoriums. The last group includes the subset of firms that benefited neither from public guarantee programs nor from the moratoriums, but were eligible for both measures. EBIT/Assets and Debt/Assets are calculated as the weighted average.

By contrast, the group of firms that did not benefit from the support measures showed positive net flows from the end of 2021 (Chart C3.2, Panel D). These flows reflect an increase in new loans along with stable repayments. These firms, which are on average smaller and less likely to be exporters, are the only group with a recent increase in net borrowing. Developments in credit flows were similar for the sub-group of firms eligible for the two measures that used neither (Chart C3.3).

Chart B3.2 • Breakdown of monthly net loan flows | Sum of the last three months, in millions of euros

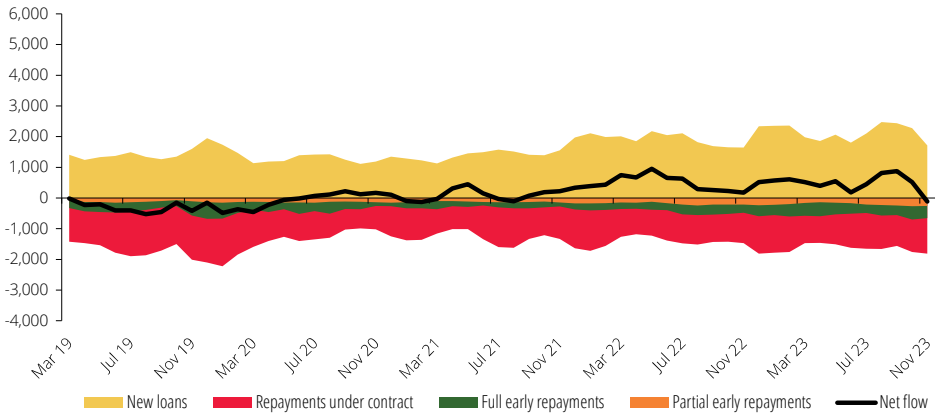


Source: Banco de Portugal. | Notes: Firms are classified into four groups: (i) firms benefited from public guarantee programs as well as from the moratoriums, (ii) firms benefited from public guarantee programs but did not benefit from the moratoriums, (iii) firms that did not benefit from public guarantee programs but benefited from the moratoriums and (iv) firms that benefited neither from public guarantee programs nor from the moratoriums. Net flow corresponds to the difference between new loans and total repayments. Overdrafts, credit cards, credit overruns, revolving credit, factoring and confirming are excluded from the analyses.

In general, firms that benefited from moratorium (with or without public guaranteed loans) contributed most to negative net flows (Chart C3.4). Note also that across the four groups under review, the total amount of early repayments (total and partial) increased after the start of the ECB's interest rate hike cycle, but its contribution to loan developments is small.

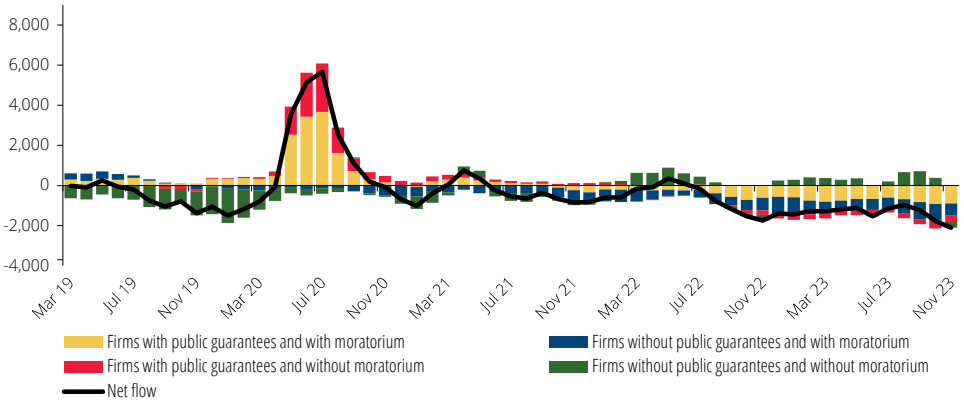
In conclusion, the recent reduction in total bank lending to firms was mainly driven by an increase in repayments by firms whose liquidity positions were reinforced by government support schemes during the pandemic. For its part, the flow of new loans did not change substantially, despite the context of strong increases in interest rates by the ECB.

Chart B3.3 • Breakdown of monthly net loan flows: Eligible firms without public guaranteed credit and without moratorium | Sum of the last three months, in millions of euros



Source: Banco de Portugal. | Notes: Net flow corresponds to the difference between new loans and total repayments. Overdrafts, credit cards, credit overruns, revolving credit, factoring and confirming are excluded from the analyses.

Chart B3.4 • Loans to non-financial corporations — Breakdown of monthly net flows | Sum of the last three months, in millions of euros



Source: Banco de Portugal. | Notes: Firms are classified into four groups: (i) firms benefited from public guarantee programs as well as from the moratoriums, (ii) firms benefited from public guarantee programs but did not benefit from the moratoriums, (iii) firms that did not benefit from public guarantee programs but benefited from the moratoriums and (iv) firms that benefited neither from public guarantee programs nor from the moratoriums. Net flow corresponds to the difference between new loans and total repayments. Overdrafts, credit cards, credit overruns, revolving credit, factoring and confirming are excluded from the analyses.

Box 4 • Monetary policy impact on the housing market in Portugal

Changes in policy interest rates have a direct impact on the financing costs of real estate purchases, thereby influencing transactions and prices in this sector. Interest rate changes also affect investors and households' confidence and constrain their investment decisions in the housing market. In the case of homeowners, changes in property prices have a direct impact on the value of their assets, which can affect their future economic choices. In addition, an increase in interest rates may increase construction costs, thereby contracting housing supply in the market.

What has been the impact of monetary policy decisions on the Portuguese housing market dynamics? This impact is assessed focusing on how prices and number of transactions responded to unexpected changes in monetary policy in the euro area. These unexpected changes, labelled monetary policy shocks, have been identified by movements in financial markets. The approach uses movements of overnight index swap rates around ECB decisions to identify such shocks. In theory, as the ECB's expected monetary policy decisions should already be incorporated into these rates, changes around policy announcements capture only the unexpected part of these decisions.[5] The analysis seeks to describe the behaviour of real estate prices and number of transactions in response to a monetary shock, including as control variables the lags of the shocks, prices and transactions, as well as one-year risk-free interest rates, GDP and euro area HICP. The estimates use data from the first quarter of 2009 to the second quarter of 2023.[6]

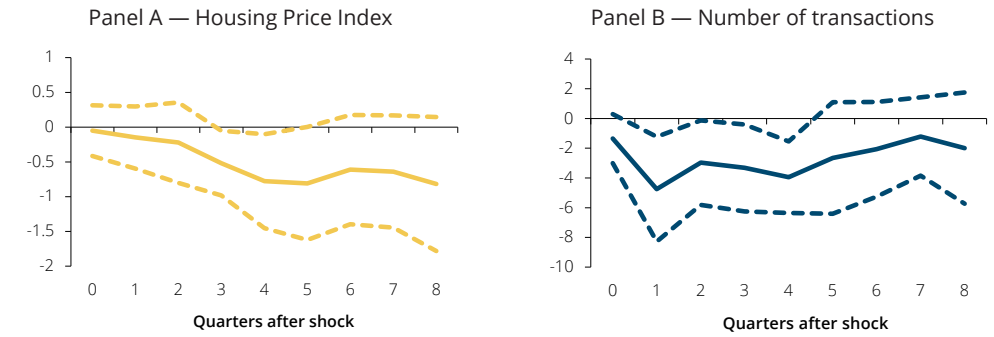
Chart C4.1 shows the response of the housing price index and of the total number of transactions to a one-standard-deviation monetary policy shock. A one-standard-deviation monetary policy shock corresponds, in the same quarter, to around a 17 basis points increase in one-year risk-free interest rates in the euro area. However, it is important to emphasize that the exercises analyse the impact of unexpected shocks. In this sense, the magnitude of the estimated shocks and of the increase in key interest rates is not directly comparable, as most movements of the latter are expected movements. The impact of the shocks is negative, i.e. an increase in interest rates implies a reduction of prices and number of transactions. It should be noted that the impact is faster and stronger on the number of transactions, while prices show greater rigidity. The maximum impact of the shock on transactions is -4.75% one quarter after the interest rate increase, while on prices it is -0.8% after four quarters.[7] This decrease in prices and number of transactions points to a stronger contraction of demand over supply in the market equilibrium after the shock.

It is also interesting to see whether there are differences between the segments of new and existing dwellings. The average value of transactions of new dwellings is considerably higher than that of transactions of existing dwellings (50% higher in the third quarter of 2023), suggesting that agents purchasing new dwellings have higher income. Therefore, agents trading existing dwellings may be more sensitive to changes in interest rates.

The response of prices appears to be similar, with a slightly larger drop in the prices of new dwellings (Chart C4.2). Regarding the number of transactions, the negative impact one quarter after the shock appears to be similar for both segments. However, transactions of new dwellings recover quickly, and the effect becomes statistically insignificant, while the impact on transactions of existing dwellings is more persistent.

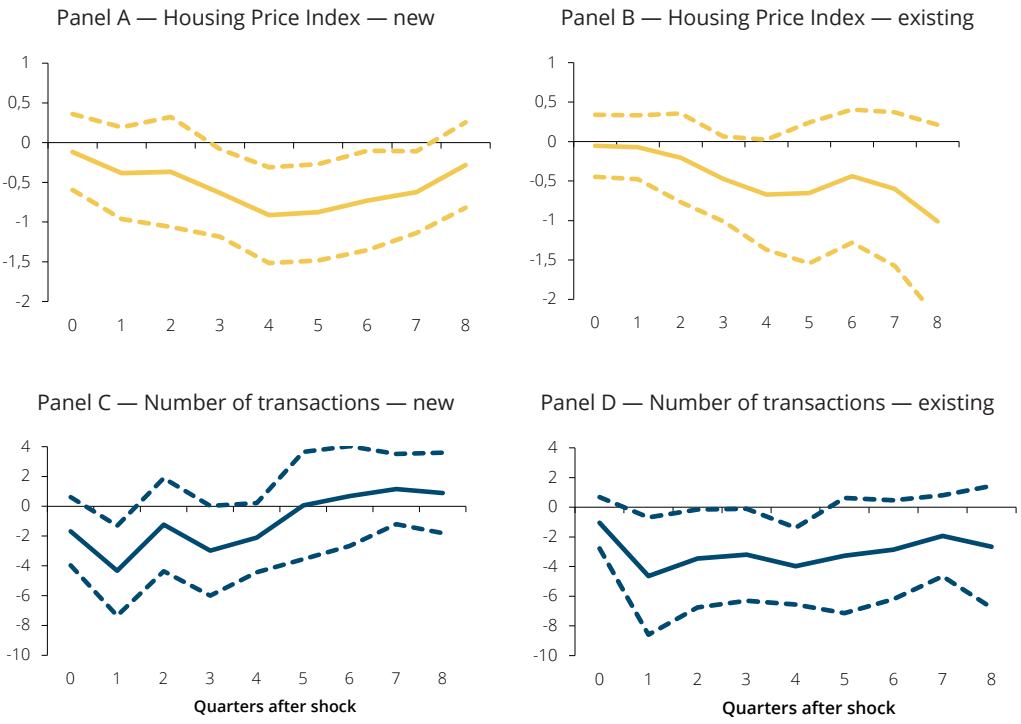
5. A more comprehensive explanation of the shocks used can be found in Jarociński, Marek, and Peter Karadi. "Deconstructing monetary policy surprises — the role of information shocks." *American Economic Journal: Macroeconomics* 12.2 (2020): 1-43.
6. The impact on the housing market has been estimated using the local projections methodology (see Jordà, Òscar. "Estimation and inference of impulse responses by local projections." *American Economic Review* 95.1 (2005): 161-182).
7. While the exercise is not perfectly comparable, Battistini et al. (2022) estimate a larger impact on euro area house prices. The authors estimate that, roughly two years after a 1 p.p. increase in interest rates on loans for house purchases, prices fall by around 5%. In addition, the authors estimate real estate investment to fall by around 8%, five quarters after the shock. However, they estimate that the fall could reach 15% if the shock occurs in an environment of low interest rates. See Battistini, Niccolò, Johannes Gareis, and Moreno Roma. "The impact of rising mortgage rates on the euro area housing market." Economic Bulletin, ECB, Issue 6, Box 4 (2022).

Chart B4.1 • Impact of a monetary policy shock on the housing price index and total number of transactions | Percentage



Source: Banco de Portugal calculations. | Notes: The simulated shock is a one standard deviation shock, which corresponds to an increase of 17 basis points in 1-year risk-free interest rates. The dashed line shows the 90% confidence interval. The confidence intervals were calculated using heteroscedasticity robust standard errors.

Chart B4.2 • Impact of a monetary policy shock on the housing price index and total number of transactions of new and existing houses | Percentage



Source: Banco de Portugal calculations. | Notes: The simulated shock is a one standard deviation shock, which corresponds to an increase of 17 basis points in 1-year risk-free interest rates. The dashed line shows the 90% confidence interval. The confidence intervals were calculated using heteroscedasticity robust standard errors.

This way, the monetary policy tightening cycle initiated by the ECB in July 2022 – characterised by both expected and unexpected policy changes – is likely to have contributed to the recent reduction in housing transactions in Portugal and, to a lesser extent, to the behaviour of prices (which have not decreased but decelerated). There has also been a smaller reaction of transactions of new dwellings, which is in line with the results described above.

II Special issue

Welfare and GDP *per capita* in Portugal compared to the EU

Welfare and GDP *per capita* in Portugal compared to the EU[1]

Assessing a country's economic performance, understood as the living standard of its citizens, is a major aim of economic analysis. GDP *per capita* adjusted for purchasing power parities (i.e. corrected for price level differences across countries) has been the preferred indicator for this analysis, as it tends to be a good proxy for the population's living standard and is easy to compare between countries. However, this indicator does not account for relevant dimensions of wellbeing such as health, education, leisure, or environmental quality.[2] Including these aspects in the analysis makes it possible to avoid an excessive focus of public policies on increasing the country's income, and to encourage measures with a direct impact on citizens' quality of life.

To address the limitations of GDP *per capita*, a number of alternative indicators of wellbeing have been developed in recent decades (Fleurbaey and Blanchet, 2013). Composite indices – such as the United Nations' Human Development Index and the OECD's Better Life Index – are one example. While these indices have the advantage of being comprehensive by encompassing both objective and subjective dimensions, they lack economic interpretation. Additionally, there is arbitrariness in selecting and aggregating the indicators. The measure proposed by Jones and Klenow (2016) is another approach and it covers dimensions of consumption, leisure time, life expectancy and inequality. This measure is based on the concept of an individual's expected lifetime utility in each country, and this theoretical basis is an advantage over other approaches (Box 1).

This Special issue assesses the living standards of Portuguese citizens in comparison to their EU peers in 2022, based on the calculation of the welfare index proposed by Jones and Klenow (2016). Moreover, it examines welfare trends in Portugal and the EU between 1995 and 2022, comparing them with that of *per capita* income.

The results show that Portugal's welfare index stood at 87% of the EU's in 2022, reflecting lower consumption, more hours worked and higher inequality, only partially offset by higher life expectancy. The assessment of living standards in Portugal in comparison with the EU based on this indicator is more favourable than that suggested by GDP *per capita*. The analysis also shows Portugal's welfare catching up with the EU average between 1995 and 2022, a trend only interrupted during the sovereign debt crisis.

1. Prepared by João Amador, Cristina Manteu and Ana Sequeira.
2. For a more in-depth discussion on GDP *per capita* limitations and the various wellbeing dimensions, see, for instance, Stiglitz, Sen and Fitoussi (2009) and subsequent works by Stiglitz, Fitoussi and Durand (2018a) and Stiglitz, Fitoussi and Durand (2018b).

Beyond GDP *per capita*: the welfare approach by Jones and Klenow

The welfare index proposed by Jones and Klenow (2016) uses data on consumption, leisure time, life expectancy at birth and consumption inequality in each country. Under this approach, detailed in Box 1, the welfare of an economy depends on individuals' opportunities for consumption and leisure over their lifetime. In order to compare economies, the relative valuation of consumption and leisure is assumed not to differ across individuals of different countries. Individuals' wellbeing is greater the higher their consumption and leisure time. As in Jones and Klenow (2016), the consumption measure considers the sum of private and public consumption.[3] Public consumption is a proxy for the value of public services which individuals benefit from (e.g. education, health, justice and public safety). Wellbeing is also greater if life expectancy is high, because individuals have more time to enjoy consumption and leisure. Individuals face uncertainty about future consumption. Being risk-averse, they penalise the wellbeing lost from being in the lower deciles of consumption distribution more than they value the increase in wellbeing from being in the upper deciles. Therefore, their wellbeing is greater the less unequal the country is.

Significant differences in the above criteria – consumption, leisure, life expectancy and consumption inequality – could imply that two countries with very close GDP *per capita* could have different welfare indices.

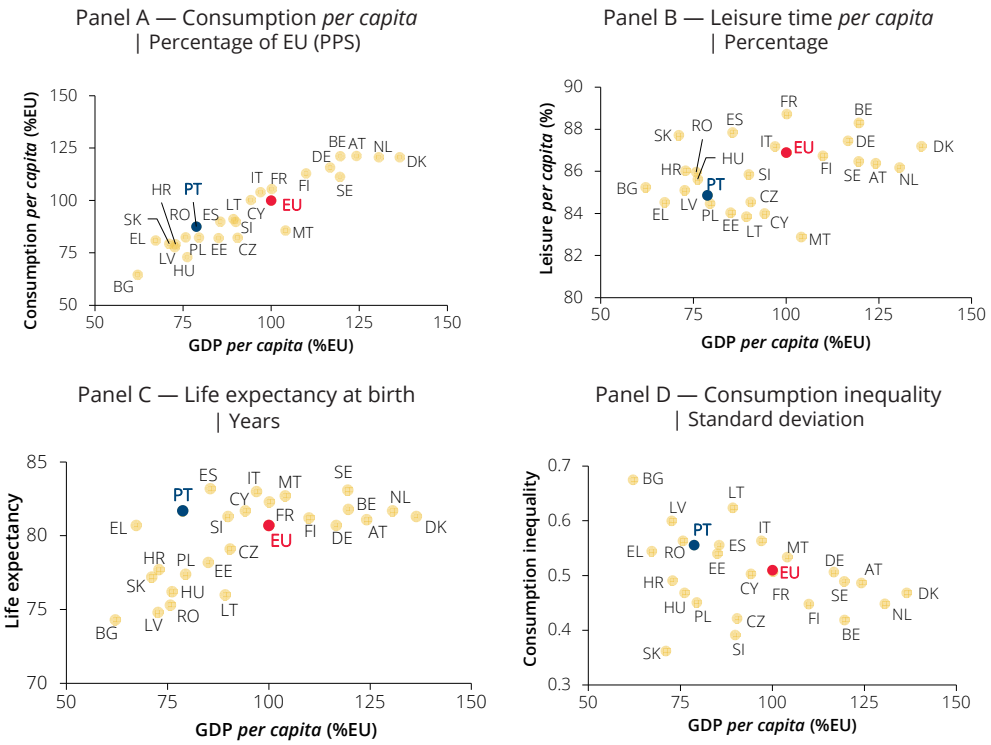
The proposed indicator is based on the equivalent consumption concept and is calculated in relative terms compared to the EU allowing the following question to be answered: what proportion of EU consumption would make an individual indifferent between living in the EU or in a specific country i ? In other words: keeping levels of leisure, life expectancy and inequality unchanged, what proportion of EU consumption would deliver the same expected utility as the values in country i? When the welfare measure (λ_i) is less than one, the welfare of country i is lower than the EU average (and welfare is higher than in the EU when λ_i is greater than unity). The logarithm of this parameter ($\log \lambda_i$) can be broken down into the contribution of differences compared to the EU in consumption, leisure, life expectancy and inequality (Box 1, equation 4).

In order to correct for price level differences across countries, consumption and GDP data adjusted for purchasing power parities (PPS) are used in the computation of the welfare index and in the comparison with GDP *per capita*. This adjustment is relevant when comparing economies, as higher-income countries typically have higher prices.

Chart 1 illustrates the four variables that compose the welfare index, showing their heterogeneity across countries in 2022. Except for consumption, the other measures do not show any clear correlation with GDP *per capita*, highlighting the importance of considering them when measuring welfare.

3. The results would remain qualitatively similar if only private consumption was considered in the welfare index calculation.

Chart 1 • Consumption, leisure, life expectancy and inequality in 2022



Sources: Eurostat, World Bank, UNU-WIDER and Banco de Portugal calculations. | Notes: Luxembourg and Ireland have been omitted from the chart due to scale considerations. Consumption (private and public) *per capita*, adjusted for purchasing power parities. Leisure time *per capita* is calculated as the proportion of available time (while awake) spent on leisure and home production. Specifically, the number of hours spent on leisure and home production is calculated by subtracting the total hours worked *per capita* from the total hours available per person (16 hours per day multiplied by 365 days per year). The leisure *per capita* is high because hours worked are divided by the total population (rather than by the number of workers). Consumption inequality measured by the standard deviation (a higher value corresponds to higher inequality). For more details, see Box 1.

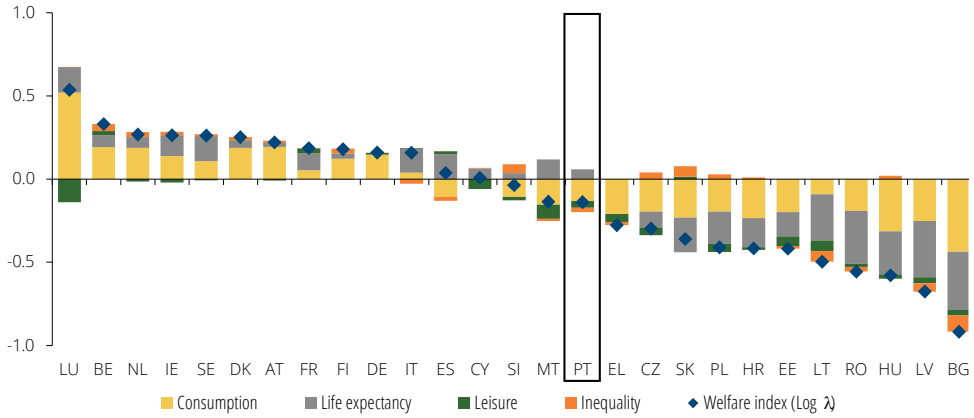
Welfare and GDP *per capita* in 2022: comparison across EU countries

The welfare indices (in logarithm) computed for EU countries in 2022 and their respective contributions are displayed in Chart 2. Luxembourg, Belgium, and the Netherlands are among the countries with the highest levels of wellbeing, while Bulgaria, Latvia and Hungary are at the opposite end.

Consumption is one of the key components behind differences in wellbeing in relation to the EU. The relevance of this aggregate to welfare (to the detriment of GDP) was primarily advocated by Nordhaus and Tobin (1972), considering that the ultimate goal of productive activity is to provide the highest sustainable levels of consumption possible. Luxembourg, Austria, Belgium, the Netherlands and Denmark have the highest *per capita* consumption rates in the EU.

Life expectancy emerges as a relevant factor in the group of countries with lower wellbeing than the EU. The contribution of this factor is particularly negative in countries with lower life expectancy at birth, especially in Bulgaria, Latvia and Romania. Heterogeneity is lower in leisure time and consumption inequality *per capita*, resulting in smaller contributions to the welfare gap compared with the EU in 2022.

Chart 2 • Welfare index and contributions of the four components in 2022 | Logarithm of the welfare index

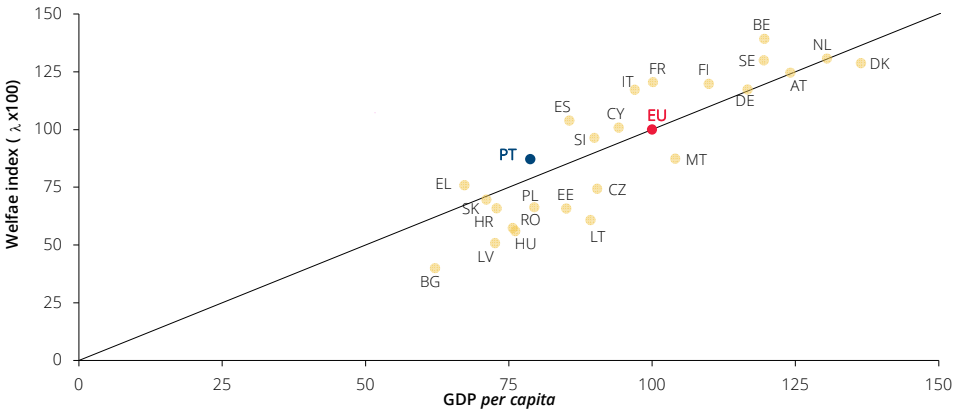


Source: Banco de Portugal calculations. | Notes: Data adjusted for purchasing power parities (PPS). The welfare index (λ) is a relative measure compared to the EU: a positive (negative) logλ implies that the country's welfare is higher (lower) than that of the EU. For details on the decomposition of log λ into the various contributions see Box 1, equation 4.

The welfare index in Portugal stood at 87% in 2022, which means that consumption in the EU would have to fall by 13% to be indifferent for a citizen to live in Portugal or in an economy with the characteristics of the EU average. All factors, with the exception of life expectancy – higher in Portugal – contribute to the lower standard of living compared to the EU. The difference in consumption *per capita* is the largest contributor to the negative gap.

Comparing the welfare index with GDP *per capita* is relevant given the central role played by the latter indicator in the analyses. The correlation between the two measures is high, confirming that GDP *per capita* is a good proxy for welfare (Chart 3). However, the assessment of the standard of living in each country may differ depending on the measure used. For instance, based on GDP *per capita*, the standard of living in Spain and Italy is below the EU average, but it is above when the welfare index is used. More broadly, when using the welfare index, the assessment is more favourable in 11 countries, remains unchanged in two and deteriorates in the remaining 14.

Chart 3 • Welfare index and GDP *per capita* in 2022 | Percentage of the EU



Sources: Eurostat and Banco de Portugal calculations. | Notes: Data adjusted for purchasing power parities. Luxembourg and Ireland have been omitted from the chart due to scale considerations (their figures are available in Table 1).

These deviations can be broken down into the contributions of the four variables that make up the welfare index. The results show that discrepancies between the welfare index and GDP *per capita* are mostly explained by differences in the share of consumption and average life expectancy (Table 1).

Table 1 • Welfare Index and GDP *per capita* in 2022 and decomposition of the difference between the two measures

	Welfare index (λ x100)	GDP *per capita* (EU = 100)	Log ratio	Decomposition			
				Life expectancy	Consumption share in GDP	Leisure	Inequality
	[1]	[2]	log ([1] / [2])				
European Union	100	100	0	0	0	0	0
Luxembourg	171	257	-0.41	0.15	-0.42	-0.14	0.00
Belgium	139	120	0.15	0.07	0.01	0.02	0.04
Netherlands	131	131	0.00	0.06	-0.08	-0.01	0.03
Ireland	130	235	-0.59	0.13	-0.72	-0.02	0.02
Sweden	130	120	0.08	0.15	-0.07	-0.01	0.01
Denmark	129	136	-0.06	0.04	-0.12	0.01	0.02
Austria	125	124	0.00	0.03	-0.02	-0.01	0.01
France	121	100	0.19	0.10	0.05	0.03	0.00
Finland	120	110	0.09	0.03	0.03	0.00	0.03
Germany	117	117	0.01	0.00	-0.01	0.01	0.00
Italy	117	97	0.19	0.14	0.07	0.01	-0.03
Spain	104	86	0.19	0.15	0.05	0.02	-0.02
Cyprus	101	94	0.07	0.06	0.06	-0.06	0.00
Slovenia	96	90	0.07	0.04	0.00	-0.02	0.05
Malta	87	104	-0.17	0.12	-0.19	-0.09	-0.01
Portugal	**87**	**79**	**0.10**	**0.06**	**0.11**	**-0.04**	**-0.02**
Greece	76	67	0.12	0.00	0.19	-0.05	-0.02
Czechia	74	90	-0.20	-0.09	-0.09	-0.05	0.04
Slovakia	70	71	-0.02	-0.21	0.11	0.01	0.06
Poland	66	79	-0.18	-0.19	0.04	-0.05	0.03
Croatia	66	73	-0.10	-0.18	0.08	-0.02	0.01
Estonia	66	85	-0.26	-0.15	-0.04	-0.06	-0.02
Lithuania	61	89	-0.38	-0.28	0.02	-0.06	-0.06
Romania	57	76	-0.28	-0.32	0.09	-0.02	-0.03
Hungary	56	76	-0.31	-0.26	-0.04	-0.02	0.02
Latvia	51	73	-0.36	-0.34	0.07	-0.04	-0.05
Bulgaria	40	62	-0.44	-0.35	0.04	-0.03	-0.10

Sources: Eurostat and Banco de Portugal calculations. | Notes: Data adjusted for purchasing power parities. Positive/negative values of the log ratio correspond to countries with a welfare index (λ) higher/lower than GDP *per capita* (both as a percentage of the EU). The use of the logarithm function allows for the additivity of contributions. For details on this decomposition, see Box 1.

The assessment of the standard of living in Portugal based on the welfare index is more favourable than that resulting from GDP *per capita*. Portugal rises from 20th in the ranking based on GDP *per capita* to the 16th position using the welfare measure (which is 8 p.p. closer to the EU average). The higher share of consumption in GDP in Portugal and the higher life expectancy drive this outcome, more than offsetting the negative effects of higher inequality and higher hours worked than in the EU.

The opposite movement – that is, a greater distance from the EU average than suggested by GDP *per capita* – occurs in most countries in central/eastern Europe, reflecting lower life expectancy and, to a lesser extent, shorter leisure hours (Table 1). The assessment of living standards also deteriorates in Luxembourg and Ireland as a result of a lower share of consumption in GDP compared to the EU average.[4]

Welfare and GDP *per capita*: evolution in 1995–2022 and convergence

The methodology used allows (i) the comparison of welfare dynamics over time and (ii) the decomposition of their differentials *vis-à-vis* GDP *per capita* developments into the contributions of the four dimensions mentioned above (Table 2). In this case, the comparison considers the welfare index for a specific country at an initial and a final point in time, rather than comparing the welfare index of a country to that of the EU at a specific point in time (Box 1). The analysis of welfare and GDP *per capita* on growth rates considers chain-linked volume data to remove price fluctuations.[5]

Between 1995 and 2022, welfare increased in all EU countries, with average annual growth in real terms ranging from 1.4% in Italy to 6.3% in Estonia. Increases in consumption and, to a lesser extent, in life expectancy were the main drivers of these developments. The countries with the highest growth rates are to a large extent those that have joined the EU at a later stage, having significantly benefited during this period from trade gains inherent to access to the single market, the adoption of European legislation and from specific cooperation and funding programmes. In Portugal, average welfare growth was 2.7% per year, reflecting an increase in consumption *per capita* and in life expectancy (each added 1.3 percentage points) and, to a lesser extent, a decline in inequality. The contribution of the change in leisure was nil.

In the EU, welfare rose by 2.4% on average per year, about 1 p.p. above the average growth in GDP *per capita*. This positive gap also occurred in most EU countries, mainly reflecting an increase in life expectancy, which more than offset the – almost universal – decrease in the share of consumption in GDP. In other words, the welfare gain associated with the possibility of enjoying a longer life outweighed the loss caused by less consumption (as a share of income) and, in some cases, of leisure time.[6] In Ireland, Bulgaria and Malta, the decrease in the share of consumption and the increase in hours worked (and inequality in the case of Bulgaria) outweighed the effect of lower mortality, leading to a negative gap between welfare growth and GDP *per capita*. In Portugal, the gap between the average growth of both measures stood at 1.5 p.p. – the third largest across EU countries.

4. GDP *per capita* in these countries is much higher than consumption *per capita* – in Luxembourg, due to the significant weight of the financial sector and, in Ireland, due to the presence of multinational firms.
5. Developments over time in welfare and GDP *per capita* in real terms *vis-à-vis* the EU do not differ substantially from those obtained using data adjusted for purchasing power parities, as differences in price developments across countries tended to be limited over this period.
6. Between 1995 and 2022, life expectancy increased by 5 years in the EU (from 76 to 81 years), while the consumption share in GDP dropped from 77% to 73%.

Table 2 • Welfare Index and GDP *per capita* growth between 1995 and 2022, and decomposition of the difference | Percentage and percentage points

				Decomposition			
	Welfare index	GDP *per capita*	Difference	Life expectancy	Consumption share in GDP	Leisure	Inequality
Estonia	6.3	4.1	2.2				
Romania	5.7	3.6	2.1	1.1	0.9	0.2	0.0
Latvia	5.7	4.6	1.1	1.8	-0.5	-0.1	-0.1
Lithuania	5.2	4.9	0.3	1.3	-0.6	-0.3	-0.1
Poland	4.8	4.0	0.8	1.0	-0.4	-0.1	0.3
Ireland	4.1	4.6	-0.4	1.7	-2.3	-0.1	0.3
Slovakia	3.8	3.4	0.5	1.0	-0.6	0.0	0.1
Croatia	3.7	3.0	0.7	1.1	-0.3	-0.2	0.1
Slovenia	3.6	2.4	1.2	1.4	-0.4	0.0	0.2
Hungary	3.5	2.8	0.7	1.2	-0.4	-0.1	0.0
Czechia	3.0	2.2	0.8	1.2	-0.3	0.0	0.0
Bulgaria	3.0	3.2	-0.2	0.6	-0.3	-0.2	-0.4
Cyprus	2.8	1.7	1.1	0.9	0.3	-0.1	0.0
Portugal	**2.7**	**1.3**	**1.5**	**1.3**	**0.0**	**0.0**	**0.2**
Malta	2.7	2.9	-0.2	1.1	-1.0	-0.3	0.0
Finland	2.4	1.7	0.8	1.1	-0.2	-0.1	-0.1
European Union	**2.4**	**1.4**	**0.9**	**1.1**	**-0.2**	**0.0**	**0.0**
Luxembourg	2.3	1.4	0.9	1.6	-0.2	-0.4	-0.1
Denmark	2.3	1.2	1.1	1.5	-0.3	0.0	-0.1
Belgium	2.1	1.3	0.9	1.2	-0.3	-0.1	0.1
Netherlands	2.1	1.5	0.6	1.0	-0.3	-0.1	0.1
Spain	2.1	1.2	0.9	1.1	-0.1	-0.1	0.0
Sweden	2.1	1.8	0.3	1.0	-0.5	0.0	-0.1
France	2.0	1.0	1.0	1.0	0.0	0.0	0.0
Germany	1.9	1.2	0.8	1.0	-0.1	0.0	0.0
Austria	1.8	1.2	0.6	1.0	-0.3	0.0	0.0
Greece	1.7	0.8	0.9	0.6	0.2	-0.1	0.2
Italy	1.4	0.5	0.9	1.1	0.0	0.0	-0.1

Sources: Eurostat and Banco de Portugal calculations. | Notes: Rates of change were computed using chain-linked volume data, in euros.

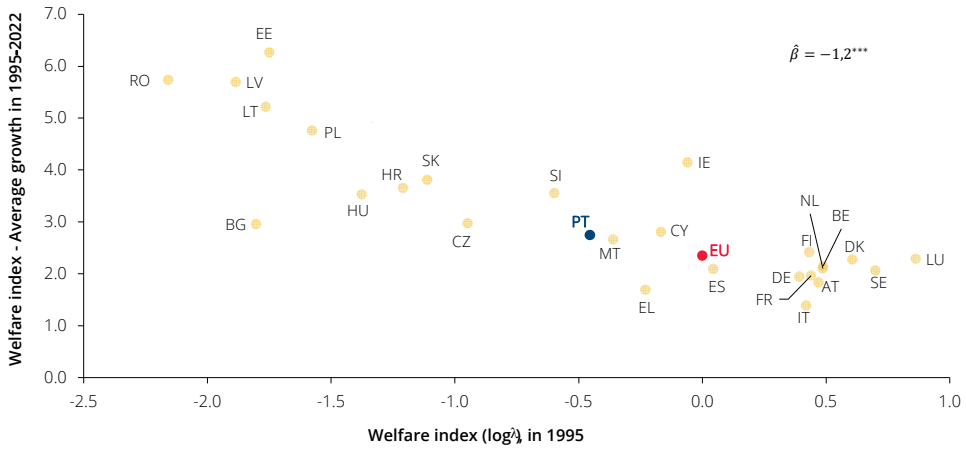
The results presented may be used to assess the real convergence process in the EU, that is, to what extent there has been a long-lasting convergence of welfare across countries.

Beta (absolute) convergence assesses whether countries with a low initial standard of living grow faster on average than countries with a higher standard of living. Empirically, this translates into an expected negative correlation between countries' initial welfare and their average growth rates. Estimating the regression between EU countries' welfare in 1995 and their average changes between 1995 and 2022 confirms the existence of absolute beta convergence in the EU over this period. Developments in welfare in the Member States that joined the EU at a later stage play a key role in this outcome (Chart 4).

In Portugal, the welfare index shows an upward trend between 1995 and 2022 – whether measured in purchasing power parity or in real terms – pointing to a convergence process between the country and the EU (Chart 5). This contrasts with the analysis based on GDP *per capita*, where no progress in catching up with the EU was observed between 1995 and 2022.[7]

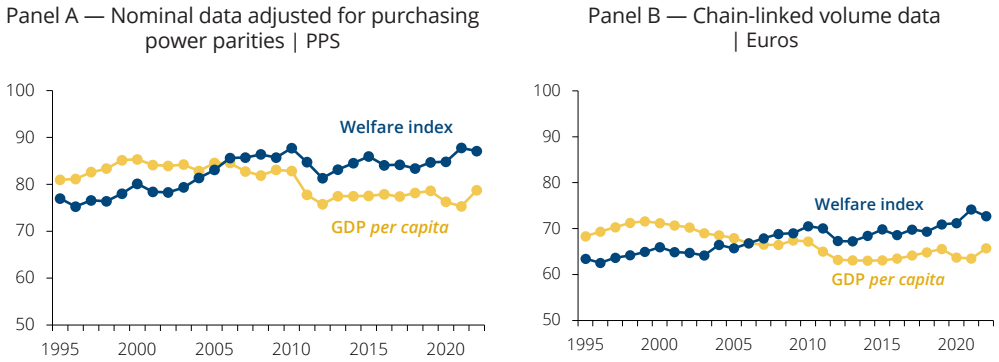
7. For a more detailed analysis of the convergence process within the EU and Portugal *vis-à-vis* the EU based on GDP *per capita*, see the Banco de Portugal (2019).

Chart 4 • Absolute beta convergence in the EU over the period 1995-2022 | Welfare index: logarithm and rate of change, chain-linked volume data, in euros



Source: Banco de Portugal calculations. | Notes: $\hat{\beta}$ denotes the beta coefficient estimated with robust errors. *** denotes statistical significance at 1% level. A negative and statistically significant estimated beta coefficient indicates absolute beta convergence. The results hold when the equation is estimated using purchasing power parity adjusted data.

Chart 5 • Welfare index and GDP *per capita* in Portugal between 1995 and 2022 | Percentage of the EU



Sources: Eurostat and Banco de Portugal calculations. | Notes: For analysing specific points in time, purchasing power parities adjusted data is recommended (chart on the left), corresponding to the analysis developed in the first section of this Special Issue. For assessing developments over time, it is preferable to use volume data to exclude price effects (chart on the right).

Limitations to the approach by Jones and Klenow

The consumption-equivalent measure of welfare presented in this Special issue represents a step forward compared to the analysis based exclusively on GDP *per capita*. However, it should be noted that this indicator does not cover all relevant welfare dimensions. In particular, Jones and Klenow (2016) acknowledge that the benefits from the quality of the natural environment, public safety or political freedom are not considered.

The welfare index calculation depends on methodological assumptions and the calibration of some parameters (Box 1). However, a robustness analysis, considering parameter values in the vicinity of those used, confirms that the results remain qualitatively similar.

One of the simplifying assumptions adopted is that consumption remains constant throughout the life of an individual. However, lower consumption *per capita* at a given point in time may be associated with higher investment rates, and this higher capital accumulation may translate into higher income and consumption in the long run, which is not captured by the adopted approach. Therefore, the calculated indices may underestimate welfare in countries with high levels of savings and may overestimate them where current consumption levels are not sustainable. Nevertheless, Jones and Klenow (2016) point out that most of the observed cross-country differences in consumption-to-GDP ratios reflect persistent differences and not transition dynamics. This persistence is also generally observed in the group of EU countries over the period under review.

Final considerations

Welfare developments in Portugal compared to the EU show a convergence process over the past 27 years. The catching-up of Portuguese welfare with the EU average reflected an improvement in relative terms in all components, with particular emphasis on the increase in life expectancy and the reduction of inequality.

Deepening the convergence process requires maintaining the relative improvement in the dimensions reviewed. The outlook for consumption is linked to that for output growth, depending on the maintenance of favourable conditions for the accumulation of inputs and incorporation of technological advances, as well as continued commitment to improve the skills of the population and the functioning of markets. Progress in these areas, together with diversifying sources of economic growth, have contributed to a more sustainable increase in incomes and living standards for the Portuguese people. Increasing life expectancy and leisure time, as well as reducing inequality, should also remain part of economic policy-making process given their impact on sustainable growth and wellbeing in the medium and long term.

References

Banco de Portugal (2019). "Real convergence in the European Union and the relative performance of the Portuguese economy." Special issue, December *Economic Bulletin*.

Fleurbaey, M. and Blanchet, D. (2013). *Beyond GDP: Measuring Welfare and Assessing Sustainability*. Oxford: Oxford University Press.

Jones, C. I. and Klenow, P. J. (2016). "Beyond GDP? Welfare Across Countries and Time," *American Economic Review*, Vol 106, No 9. 2426-2457.

Nordhaus, W. D. and Tobin, J. (1972). "Is growth obsolete?," Economic Research: Retrospect and Prospect Vol. 5: *Economic Growth*, 1-80. Cambridge, MA: National bureau of Economic Research, Inc.

Stiglitz, J. E., Sen A., and Fitoussi, J. P. (2009). *Report by the Commission on the Measurement of Economic Performance and Social Progress*.

Stiglitz, J. E., Fitoussi, J. P. and Durand, M. (2018a). "Beyond GDP: Measuring What Counts for Economic and Social Performance," *Sciences Po publications*, Sciences Po.

Stiglitz, J. E., Fitoussi, J. P. and Durand, M. (2018b). "For Good Measure: Advancing Research on Well-Being Metrics Beyond GDP," *Sciences Po publications*, Sciences Po.

Box 1 • Jones and Klenow welfare approach: methodology and data used

Methodology

The methodology to assess welfare proposed by Jones and Klenow (2016) assumes that there is a representative individual in each country whose preferences are represented by a utility function. The expected lifetime utility (U) of this individual is given by:

$$U = E \sum_{a=1}^{100} \beta^a \, u(C_a, l_a) \, S(a) \qquad (1)$$

corresponding to the sum of utility in each year of life — u (flow utility), which depends on consumption C_a and leisure l_a — adjusted for a discount/impatience factor (β) and the probability of the individual surviving to age a, $S(a)$. The individual considers the probability of being alive in the future to establish his or her preferred consumption path, smoothed over time.

A simplified version of this approach – which may be calculated using macroeconomic data[8] — assumes that the flow utility (u) is given by:

$$u(C, l) = \bar{u} + \log C + v(l) \qquad (2)$$

where $\overline{u}$ is linked to the basic value of life[9], $\log C$ represents the logarithm of consumption *per capita* and $v(l)$ the utility of leisure.[10] Given that the representative individual is chosen randomly from the population, his or her consumption depends on the distribution of this variable at a point in time. This distribution is assumed to be lognormal, independent of age and mortality, with mean c_i and variance σ_i^2. It is also assumed that consumption remains constant throughout life, the discount factor β is equal to one and leisure is the same and determined for individuals of different ages. These assumptions allow the expected lifetime utility of the individual in country i to be simplified to:

$$U_i = e_i \, (\bar{u} + \log c_i + v(l_i) - \frac{1}{2} \sigma_i^2) \qquad (3)$$

where e_i is the life expectancy at birth (in years) in country i and the expression in brackets is the expected utility in each year. This methodology assumes that the specification of the individual's preferences is the same in all countries.

Calculating the welfare index in country i as an equivalent consumption measure involves determining the consumption adjustment (λ_i) necessary for the utility in country i to match that of the reference country (in this Special issue, the EU).

8. Jones and Klenow (2016) show that the simplifying assumptions allowing the use of macroeconomic data do not have a significant impact in the results. The welfare indices thus obtained are a good proxy for the indices derived from microeconomic data (using representative population surveys).
9. The constant term of the flow utility is calibrated from the value of the remaining life of a 40-year-old in the US, according to Jones and Klenow (2016).
10. The utility of leisure is consistent with a constant Frisch elasticity of labour supply: $v(l) = -\theta \frac{\varepsilon}{1+\varepsilon} (1-l)^{\frac{1+\varepsilon}{\varepsilon}}$ where ε corresponds to Frisch elasticity of labour supply, $(1-l)$ is the labour supply and θ is the weight of leisure on the utility (or the weight of disutility from working). According to Jones and Klenow (2016), it is assumed that $\theta = 14$ e $\varepsilon = 1$.

Considering the logarithm of this measure $(\log \lambda_i)$, it is possible to obtain an additive decomposition of the contributions of the factors determining the welfare of country i compared to the EU average:

$$\log \lambda_i = \frac{e_i - e_{EU}}{e_{EU}}\left(\bar{u} + \log c_i + v(l_i) - \frac{1}{2}\sigma_i^2\right) \quad \text{Life expectancy}$$

$$+ \log c_i - \log c_{EU} \quad \text{Consumption}$$

$$+ v(l_i) - v(l_{EU}) \quad \text{Leisure} \qquad (4)$$

$$- \frac{1}{2}(\sigma_i^2 - \sigma_{EU}^2) \quad \text{Inequality}$$

The logarithm of the ratio of welfare to *per capita* GDP may also de decomposed $(log\ ratio = \log \frac{\lambda_i}{\tilde{y}_i}, com\ \tilde{y}_i \equiv y_i/y_{EU})$. The components of the previous decomposition remain the same, except for the consumption component, which now measures deviations in the share of consumption in GDP between the country i and the EU $(\log {\bar{c}_i}/{y_i} - \log {\bar{c}_{EU}}/{y_{EU}})$. A country with a consumption share lower than the EU's will have lower wellbeing than suggested by income, leaving the other factors unchanged.

The methodology also allows welfare growth to be calculated between two periods. In this case, the country's comparison is not with the EU average, but with the country itself in an earlier year. Dividing by the number of years (T), the average growth rate of the consumption-equivalent welfare measure (g) can be obtained:

$$g_i \equiv -\frac{1}{T}\log \lambda_i \qquad (5)$$

which can be broken down into the contributions of changes in life expectancy, consumption, leisure and inequality, as in equation (4).

Data

Table B1.1 • Data description and sources

Variable	Description	Source
y_i	Gross Domestic Product *per capita*	
	GDP at current prices adjusted for purchasing power parities Real GDP, chain-linked volumes, reference year 2015 (million euros) Total population (millions of individuals)	Eurostat
c_i	Consumption (private and public) *per capita*	
	Private and public consumption at current prices adjusted for purchasing power parities Real Private and public consumption, chain-linked volumes, reference year 2015 (million euros) Total population (millions of individuals)	Eurostat
l_i	Leisure time *per capita*, measured as the difference between total available hours and working hours.	
	Obtained by subtracting the hours worked per capita from the total hours available per person (5840 = 365 days x 16 hours an individual spends awake each day). The total hours worked are divided by the total population (rather than by the number of workers). Total hours worked (millions of hours) Total population (millions of individuals)	Eurostat
e_i	Life expectancy at birth, in years	Eurostat, Banco Mundial
σ_i^2	Variance of the consumption logarithm	
	Obtained from Gini indices (3-year centred moving averages), under the assumption of lognormal distribution of consumption. For countries where Gini indices for consumption are not available, an imputation is made based on the indices available for income.	UNU-WIDER (World income inequality database)

III Policy insights

Evidence from PISA on the skills of Portuguese students

Evidence from PISA on the skills of Portuguese students[1]

Education plays a crucial role in public policies, with a decisive impact on social welfare and prospects for economic growth. Monitoring education indicators is key to designing effective public policies. International comparison provides an indication of the relative position of students from each country in terms of acquired knowledge, even considering the limitations associated with measuring skills in a context of high diversity of education systems, teaching methods and cultural backgrounds.

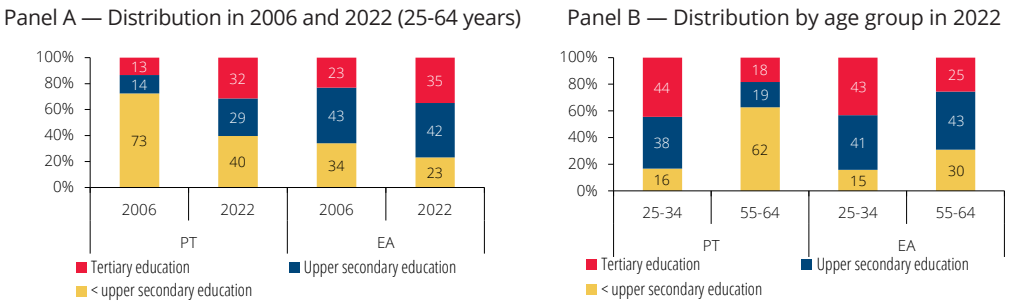
This Policy Insights discusses the results of the main international programme for assessing student's knowledge — PISA (Programme for International Student Assessment), developed by the OECD. Since 2000, literacy has been assessed every three years for a representative sample of 15-year-old students (approximately 6,000 students in Portugal) in three areas: reading, mathematics and science. In addition to an international comparison, this analysis explores improvements observed in the Portuguese results until 2018 and the deterioration observed in the latter cycle of the programme. The analysis will focus on the results obtained in mathematics, which was the main domain tested in the 2022 PISA.

Schooling of young Portuguese people has rapidly converged towards the euro area average.

Over the past two decades, the share of the Portuguese population aged between 25 and 34 with secondary education has rapidly converged towards the euro area average, while Portugal's negative gap even virtually closed (Chart 1).

The evolution of levels of education in Portugal indicates a strong improvement in human capital, but is essentially a measure of quantity, and should be put into context using quality indicators. International studies, such as PISA, make it possible to assess the skills acquired by students, complementing country-specific studies.

Chart 1 • Education of the adult population in Portugal and the euro area | In percentage



Source: Eurostat.

1. Prepared by Hugo Reis, Sharmin Sazedj and Lara Wemans.

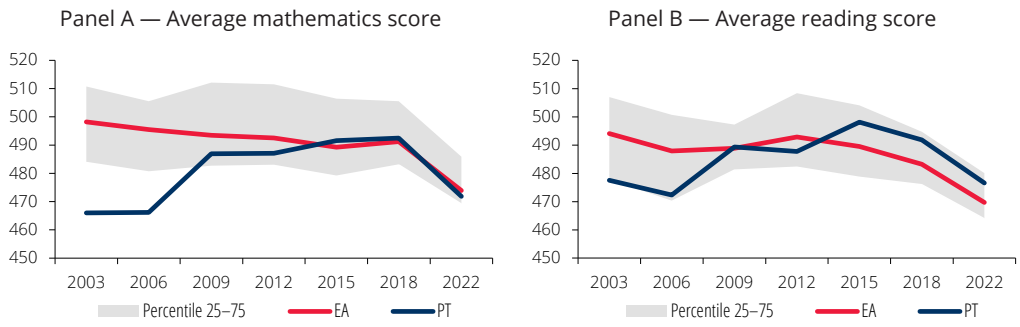
By 2018, there had been significant improvements in the skills of Portuguese students, which were almost fully reversed in 2022.

From 2006 to 2018 the performance of Portuguese students in PISA showed very significant improvements (Chart 2). These improvements were in contrast with a deteriorating trend in the results for the euro area average. The negative gap disappeared in mathematics and there is now a positive gap in reading, with results for Portugal close to the 75th percentile.

The 2022 PISA (delayed by one year due to the COVID-19 pandemic) showed a sharp drop in the skills of 15-year-olds compared to 2018 in most participating countries. In Portugal, the average score in mathematics decreased by 20 score points, a drop which is not statistically different from that seen in the euro area (17 score points). This is equivalent to what a student learns on average during one school year.[2] The downward trend in reading had already started in the previous cycle and was accentuated in this edition, with a 15-point reduction similar to that seen in the euro area (14 score points). Portugal therefore continues to have a positive gap in comparison to the euro area, where results have deteriorated since 2015.

From the students' scores, the OECD creates categories linked to the set of tasks they are able to perform, identifying low-performing students, namely those without the basic skills needed to fully participate in society, and top-performing students. As in 2006, in 2022 approximately 30% of Portuguese students lacked basic skills in mathematics and between 6% and 7% were top-performing students (Chart 3). Between 2009 and 2018, the share of low performers stood at about 24%, while the share of top performers hovered around 11%, close to the euro area. In contrast, in 2006 Portugal had a higher share of students without basic skills compared to the euro area and a lower share of top performers. Subsequently, Portugal showed an improving trend and the euro area a slight deterioration in these indicators, making it possible to close the gap. In 2022 the deterioration seen in Portugal was similar to that of the euro area.

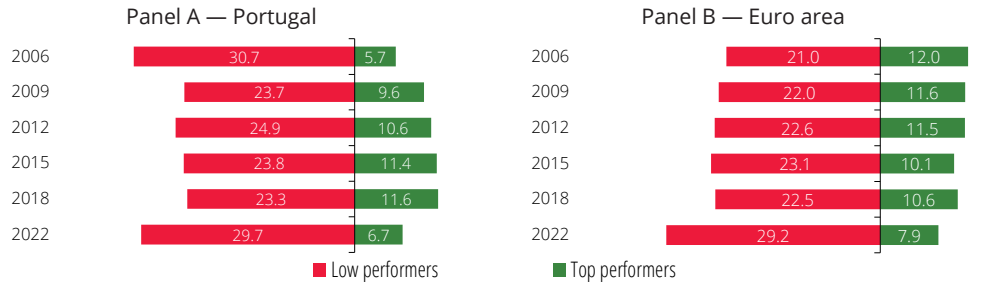
Chart 2 • PISA results in Portugal and the euro area | In score points



Sources: OECD and Banco de Portugal calculations. | Notes: The euro area average is a simple average of the countries considered in the 2022 OECD report. The countries not considered are the following: Luxembourg in all years; Croatia, Estonia, Lithuania and Slovenia in 2003; Cyprus until 2009; Malta until 2006 and in 2012; Austria in 2009; and Spain in 2018.

2. Awisati, F. and Givord, P. (2021), *How much do 15-year-olds learn over one year of schooling?* estimate, on the basis of a sample of the countries that take part in PISA, that, on average, the learning gain in mathematics is one-fifth of a standard deviation over a year of schooling, accounting for 20 score points in the PISA results.

Chart 3 • Low and top performers in mathematics | In percentage



Sources: OECD and Banco de Portugal calculations. | Notes: The euro area average is a simple average of the countries considered in the 2022 OECD report.

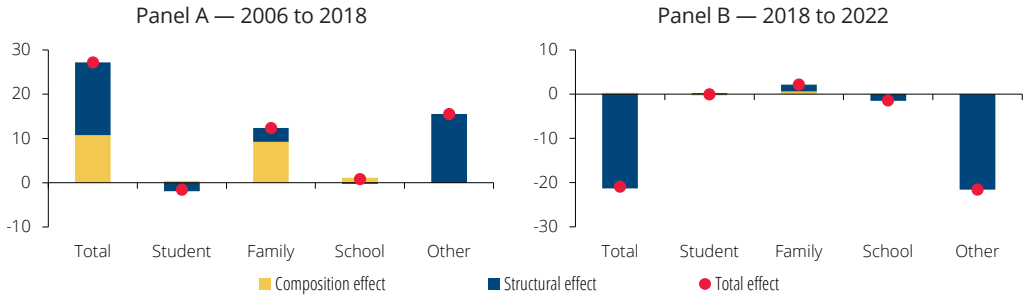
The increase in the level of parents' education has had a major impact on the evolution of Portuguese students' results.

To analyse the evolution of the skills of Portuguese students in greater detail, this analysis uses a methodology that breaks down the difference between the average score at the beginning and the end of the period into two effects: composition and structural. The composition effect measures the impact of changes in the observed characteristics of students, households and schools over time, under the assumption that the return associated with these characteristics remains constant. The structural effect reflects differences in the return associated with these characteristics and in the impact of unobserved factors, i.e. what would happen if the observed characteristics remained unchanged.

Between 2006 and 2018, a positive composition effect is identified as a result of the increase in the share of mothers with upper secondary education (from 36% to 59%). This effect explains around 33% of the evolution of results (Chart 4A). This effect adds to the structural effect which, in the absence of exogenous shocks, can be interpreted as having originated from the education system.

Between 2018 and 2022, as would be expected given the short period of time, changes in observed characteristics have a reduced explanatory power and the drop is mainly due to the structural effect associated with unobserved factors (Chart 4B).

Chart 4 • Decomposition of the change in PISA results in Portugal | In score points



Sources: Statistics Portugal and Banco de Portugal calculations.
Notes: The decomposition is computed as $Y_t - Y_{t-1} = (X_t - X_{t-1})b_t + X_{t-1}(b_t - b_{t-1})$, where Y is the average of the scores, X are the means of the variables, b are the estimated coefficients, t is the final year of the period and t-1 the initial year.The regressions control for student characteristics (gender and age), family characteristics (immigrant status, mother with secondary education and more than 100 books at home) and school characteristics (private school and urban context). For the period from 2018 to 2022, the inclusion of more school variables (proportion of teachers with a master's degree and school in which principals stated that teaching is greatly affected by the lack of teachers) does not significantly change the results. Regressions are weighted using the final weights per student.

Although the aggregate composition effect is small, there was a slight positive impact associated with the household as a result of a continued increase in the parents' education level (+3.5 score points). Also with regard to household characteristics, the variable associated with the share of students with immigration background (with both parents born abroad) had a negative composition effect (-1.1 score points), as this share increased (from 7% to 11%) and these students have on average lower results. In contrast, the structural effect associated with this variable was positive, as in 2022 the impact of belonging to an immigrant household decreased significantly compared to 2018. This points to an improvement in terms of equality of opportunity in the Portuguese education system for such students.

Considering the increase in the years of schooling of young adults, the convergence of the education level of the parents of 15-year-old students towards the euro area average is expected to continue to contribute to an improvement in the results of Portuguese students in the medium term.

The decline in results in 2022 was broad-based across euro area countries, with potentially persistent effects on human capital.

The results of the 2022 assessment cycle reflect the skills of students who were subject to strong disruptions to schooling during the pandemic period for the first time. While none of the euro area countries improved their results in 2022, there were differences in the extent of the declines in mathematics, with no relation to the countries' starting point in terms of students' skills or developments up to 2018. Students in Croatia, Malta, Lithuania and Ireland , dropped less than 10 score points, while students in the Netherlands and Germany, saw falls of more than 25 score points (Chart 5).

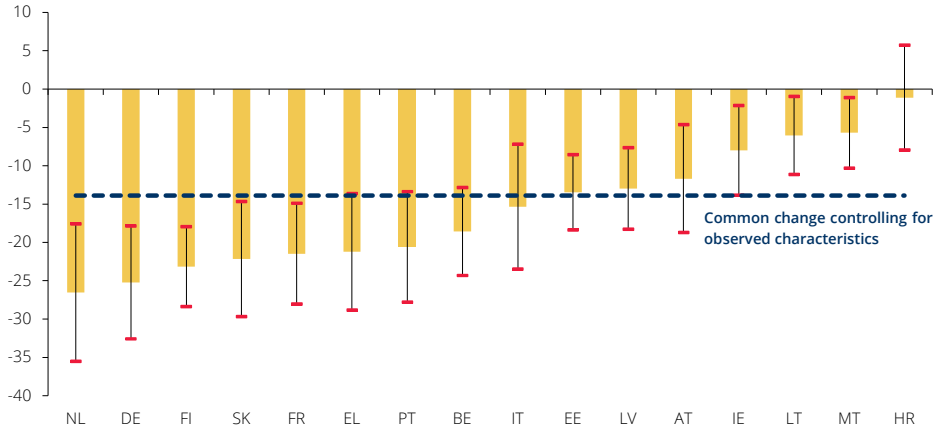
The correlation between the average decline in scores and the number of school closure days during the pandemic is very low, indicating that other constraints may have been more relevant. The effect of the duration of closure depends on the follow-up of students during this period, the learning recovery policies that followed and a number of interactions with other characteristics of the education system. Indeed, developments cannot be attributed exclusively to disruptions caused by the pandemic or the responses that followed, given that (i) the latter two cycles already showed a declining trend, which was sharper in the other euro area countries than in Portugal, (ii) the results reflect the students' entire academic record up to the assessment and not only the previous two years. To sum up, at this point in time it is not possible to identify precisely how students' results would have evolved without this shock.

Nevertheless, it is possible to estimate – in a simplified way – the size of the shock common to the euro area countries, as measured by the variation in results that is not explained by the observed characteristics of students, households and schools. The estimated common size of the shock is approximately 14 score points, close to the observed average decline.

Disentangling the impact of the pandemic from the effects of other unobserved factors requires more detailed information on disruptions to schooling and the heterogeneity of the interventions that followed. Irrespective of this assessment, the decline in students' skills signals a deterioration in the quality of human capital, which, if not recovered until adulthood, could have adverse impacts on the country's growth potential.[3]

3. For a discussion of these impacts, see the OECD report *The Economic Impacts of Learning Losses* by Eric A. Hanushek and Ludger Woessmann.

Chart 5 • Change in mathematics results in 2022 in euro area countries | In score points



Sources: OECD and Banco de Portugal calculations. | Notes: The 95% confidence intervals for the estimates of the average drop in results in each country are marked in red, taking into account the uncertainty associated with measuring skills and extrapolating the sample to the total population. The common change controlling for observed characteristics corresponds to the year fixed effect calculated in a regression of mathematics results in 2018 and 2022 including country and year fixed effects and the following explanatory variables: student characteristics (gender and age), family characteristics (immigrant status, mother with secondary education and more than 100 books at home) and school characteristics (private school, urban context, proportion of teachers with a master's degree, school in which principals stated that teaching is greatly affected by the lack of teachers). For all variables, an interaction term with the country is also included.

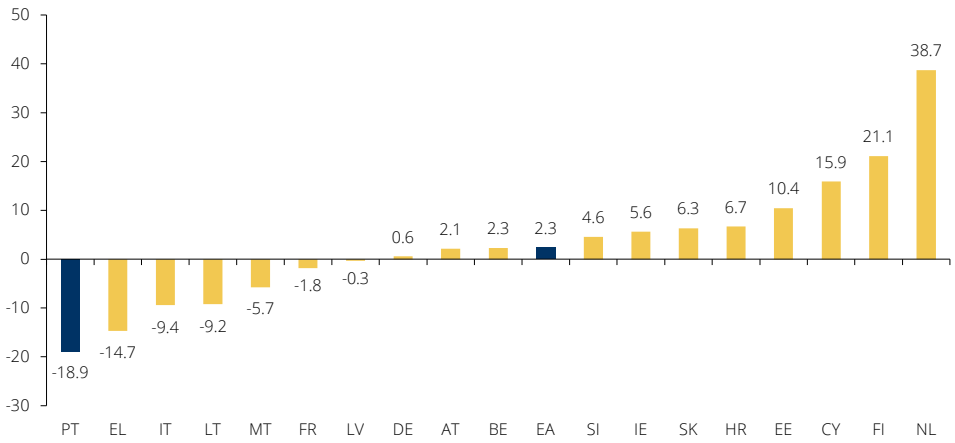
Portugal stands out from the other euro area countries by recording, in 2022, the largest reduction in the gap between the scores of the top and the bottom deciles.

The decline in Portugal between 2018 and 2022 was not homogeneous throughout the distribution of scores. The fall was more moderate at the 10th percentile (-6 score points) and more marked at the 90th percentile (-25 score points), narrowing the gap between the highest and lowest-performing students. In contrast, most euro area countries experienced more significant falls in the 10th percentile, which reached 47 score points for the Netherlands.

Thus, the 2022 results in Portugal were characterised by a significant decline in their dispersion, which contrasts with the euro area average. The interdecile range in Portugal decreased by 18.9 score points, showing the largest reduction in this group of countries (Chart 6).

The decline in dispersion in Portugal was linked to disparities among students in the same school rather than students in different schools. Only 20% of the variability of students' results in Portugal is attributed to differences between schools, less than half that of the euro area. In Portugal, the variability of results stems mainly from disparities within each school, justifying a stronger focus on policies targeted at specific groups of students contrasted with policies focusing exclusively on the lowest-performing schools.

Chart 6 • Change between 2018 and 2022 in the gap between the last and first decile of mathematics scores | In score points



Sources: OECD and Banco de Portugal calculations. | Notes: The euro area average is a simple average of the countries considered in the 2022 OECD report.

In 2022 students' worse performance was broad-based across socio-economic status, but the premium associated with this status increased for the highest-performing students.

With schools closing during the pandemic shock, one of the issues most discussed was that this would be more detrimental to the learning of students in households with lower socio-economic status, thereby reducing equality of opportunity in education.

The mother's level of education and the number of books at home are recurrently used in economics of education literature to indirectly measure a household's socio-economic background. Taking these variables into account, students with a low socio-economic status were classified as those with up to 100 books at home and whose mothers did not complete upper secondary education. At the other extreme, students whose mothers completed upper secondary education and with more than 100 books at home are considered to have a high socio-economic status.

Socio-economic background is clearly linked to students' PISA results. In Portugal, students with a high socio-economic status score 90 score points (a standard deviation) higher than students with a low socio-economic status. Between 2018 and 2022, both groups experienced similar falls. This cross-cutting decline in average terms does not indicate that the effect of the pandemic was necessarily independent of a household's socio-economic status as there may be other factors which offset a possible asymmetry of this shock's effects.

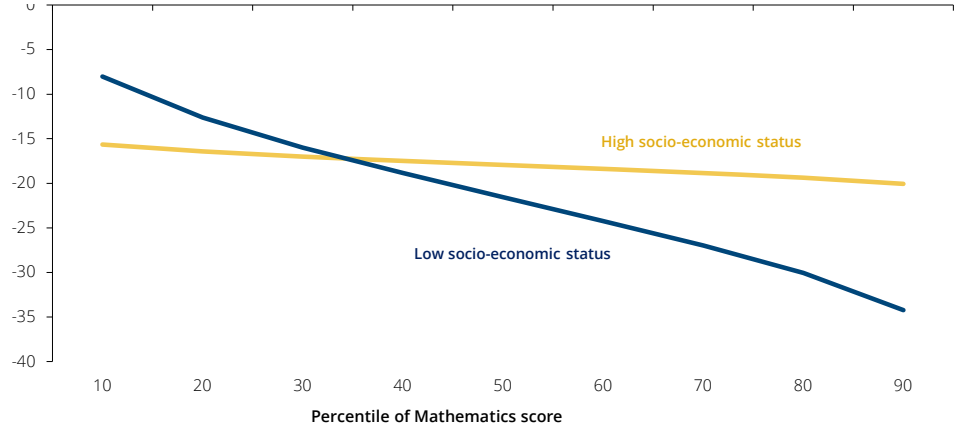
To analyse the evolution of these two groups of students in greater detail, a methodology was used to measure the variation in results at different points of the distribution, controlling for the observed characteristics of students, households and schools.

For students from more favourable economic backgrounds, the drop was close to the average decline (20 score points) for all performance levels. For students from households with a low socio-economic status, the performance of students with weaker results was less affected – falling by 8 score points in the first decile – while top-performing students saw very sharp declines, reaching 34 score points

in the last decile (Chart 7). This result indicates that the decline in the dispersion of students' results was concentrated in students with lower socio-economic status, pointing to a possible increased ability to limit the loss of knowledge of the most disadvantaged and underperforming students.

The difference between the declines observed in the two groups corresponds to the change in the socio-economic status premium. Among students with high skills, this premium increased in 2022, i.e. a more favourable family background made it possible to mitigate the decline in the score. Among students with low or medium skills, the change in the premium was not statistically significant.

Chart 7 • Change in mathematics results in 2022 by socio-economic status along the distribution | In score points



Sources: OECD and Banco de Portugal calculations. | Notes: Quantile regressions control for: student characteristics (gender and age), family characteristics (immigrant status, mother with secondary education and more than 100 books at home) and school characteristics (private school, urban context). Regressions are weighted, using the final weights per student, and run separately for each plausible value.

The urgency of learning recovery increases the pressure on education policies in the coming years.

The results of the 2022 PISA for Portugal and the euro area confirm the diagnosis of a decline in students' skills that had already been observed in other national and international assessments. This decline in skills has persistent effects on human capital, with economic impacts that will only become visible in the medium term with the integration of current students in the labour market.

Evidence that the economic return on investment in the quality of education declines with the level of education highlights how urgent learning recovery is. This line of research supports the commitment to high-quality educational programmes that target a comprehensive range of skills as early as possible during a lifetime. Thus, learning recovery starting from younger age groups should be a priority for education policy in the coming years, designing interventions aimed at improving results across all areas, including non-cognitive skills, and student well-being.

Education is an essential tool to improve the economic and social welfare of future generations. It is therefore essential to guarantee that education policies underpin the strong investment that Portuguese society has made in recent decades in educational attainment, while ensuring its quality. Decisions taken now affect the opportunities of the current generation of students to succeed and will also have a decisive impact on their children's educational performance.