Economic Bulletin

December 2019

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1 Introduction

Deceleration in economic activity over the projection horizon

The current projections for the Portuguese economy point to a deceleration in economic activity over the projection horizon, from a rate of change of 2.4% in 2018 to 1.6% in 2022, which implies convergence towards a growth pace close to potential (Table I.1.1).

Table I.1.1 • Projections of Banco de Portugal for 2019-22 | Annual rate of change, in percentage (except where otherwise noted)

	% of GDP 2018	EB December 2019					EB December 2019	EB June 2019		
		2018	2019 (p)	2020 (p)	2021 (p)	2022 (p)	2019 (p)	2019 (p)	2020 (p)	2021 (p)
Gross domestic product	100	2.4	2.0	1.7	1.6	1.6	2.0	1.7	1.6	1.6
Private consumption	64.8	3.1	2.3	2.1	1.9	1.7	2.3	2.6	2.0	1.7
Public consumption	17.0	0.9	0.5	0.8	0.8	0.8	0.5	0.5	0.5	0.5
Gross fixed capital formation	17.6	5.8	7.3	5.4	4.8	4.3	7.2	8.7	5.8	5.5
Domestic demand	99.9	3.3	3.1	2.6	2.2	2.0	2.9	3.5	2.3	2.2
Exports	43.5	3.8	2.8	2.6	2.8	3.0	2.3	4.5	3.1	3.4
Imports	43.4	5.8	5.4	4.6	4.2	3.9	4.6	8.0	4.3	4.4
Contribution to GDP growth, net of imports (in p.p.) (a)										
Domestic demand		1.7	1.5	1.3	1.2	1.1	1.6	1.3	1.1	1.0
Exports		0.8	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5
Employment (b)		2.3	1.0	0.8	0.4	0.1	0.9	1.3	0.8	0.4
Unemployment rate		7.0	6.3	5.9	5.6	5.6	6.4	6.3	5.7	5.3
Current plus capital account (% of GDP)		1.4	0.4	0.7	0.9	0.0	0.5	0.1	0.2	0.2
Trade balance (% of GDP)		0.8	-0.6	-1.2	-1.7	-2.1	-0.7	-0.5	-0.7	-1.1
Harmonized index of consumer prices		1.2	0.3	0.9	1.2	1.4	0.4	0.9	1.2	1.3

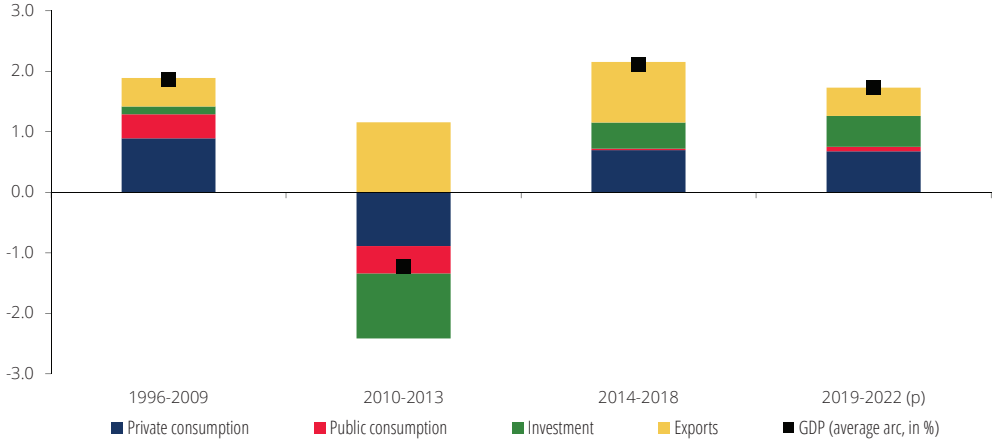
Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) –projected, (p.p.) – percentage points. For each aggregate, this table shows the projection corresponding to the most likely value, conditional on the set of assumptions considered. (a) The demand aggregates net of imports are obtained by subtracting an estimate of the imports needed to meet each component. The import content calculations were based on 2015 data. For more information, see the Box "Update of the import content of global demand for the Portuguese economy" in the March 2019 issue of the *Economic Bulletin*. (b) Total employment, in number of persons according to the national accounts concept.

These projections are part of the Eurosystem's December 2019 projection exercise, and as such are conditional on a series of external assumptions common to all euro area countries (Chapter 2). According to these assumptions, the external environment of the Portuguese economy has become less favourable in 2019, with the growth pace of world GDP and trade projected to recover modestly over the remainder of the projection horizon. However, there is uncertainty surrounding this recovery, in particular for world trade (Box 1). World trade decelerated over the course of 2018 and in the first half of 2019, reflecting interconnected causes such as the announcement and adoption of protectionist measures and the prevalence of high levels of political uncertainty, combined with a maturing global business cycle, with impact on investment and industrial activity.

Portugal has also experienced a slowdown in exports and manufacturing. In contrast, the services sector has remained relatively resilient, allowing the labour market situation to remain favourable.

In this context, the deceleration in activity in 2019 reflects the maintenance of buoyant domestic demand – in particular the acceleration in GFCF across all institutional sectors – and lower export growth. Over the remainder of the projection horizon, the main contribution to activity growth continues to be associated with domestic demand, although decreasing progressively. Private consumption is projected to decelerate – in line with disposable income – as well as GFCF, which will nevertheless continue to grow fairly strongly. The expansion of activity should also continue to be supported by a rise in exports, but its contribution to GDP growth over the projection horizon is projected to be lower than observed, on average, in recent years, in a context of a loss of momentum in world trade (Chart I.1.1).

Chart I.1.1 • Contributions (net of imports) to GDP growth | In percentage points and percentage



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

Developments in domestic and external demand translate into higher growth in imports than in exports, resulting in an increase in the goods and services account deficit over the projection horizon. The current plus capital account balance is expected to post a surplus on average over the projection period, increasing in 2020-21, as a result of transfers from European institutions, and declining at the end of the horizon with the partial unwinding of these effects. Employment is expected to grow further, although at a gradually slower pace. This reflects a context of limitations to the increase in labour supply, due partly to a maturing business cycle. The unemployment rate will remain on a downward path, from 7% in 2018 to 5.6% in 2022.

GDP growth in Portugal is projected to maintain a positive differential *vis-à-vis* the euro area in 2019-22, which is however declining gradually over the projection horizon. In part, the narrowing of this differential reflects the GDP growth recovery in the euro area at the end of the projection horizon,[1] as a result of an acceleration in exports in 2021-22.

Inflation in Portugal is expected to remain moderate over the projection horizon. A number of idiosyncratic factors contributed to the reduction of inflation to a particularly low figure in 2019 (0.3%). Even after the unwinding of these effects, inflation is projected to remain relatively low given

1. According to the December 2019 Eurosystem projections, GDP growth in the euro area is projected to stand at 1.2% in 2019 and 1.1% in 2020, accelerating to 1.4% in 2021 and 2022.

the behaviour of some of its usual determinants, particularly wages, and stand at 1.4% at the end of the horizon. This description fits also the inflation projection for the euro area[2] (Box 2).

Current projections for 2019 are virtually unchanged from those released in the October *Economic Bulletin*.[3] For 2020, projections for GDP growth were revised upwards slightly compared with the June issue, as a result of stronger growth in private and public consumption. The revision of private consumption reflects more favourable developments in real disposable income. In turn, the revision of public consumption stems from the assumption of higher public expenditure growth over the projection horizon, in a context where budget outturn in 2019 has been more favourable than previously expected and the State Budget for 2020 was not available as at the cut-off date for this Bulletin. Conversely, projections incorporate a downward revision to growth in exports compared with the June issue of the *Economic Bulletin*, owing to updated assumptions underlying external demand for Portuguese goods and services.

Inflation projections have been revised downwards slightly against the October *Economic Bulletin* and more considerably against the June issue, particularly for 2019-20. These revisions largely reflect the incorporation of the observed HICP information and the downward revision of assumptions on oil prices in euro.

The risks surrounding the current GDP projections are on the downside and mainly externally driven, associated with the possibility of a heightening of protectionist tensions or pass-through of the recent weakness in manufacturing to the other sectors of activity. Inflation risks are broadly balanced. In this case, upside risk factors are associated with possible further rises in the minimum wage in 2021-22 and tariff increases, and are offset by the downward impact of less favourable activity developments.

2 External environment and technical assumptions of the projections

Sharp deceleration in world trade in 2019, followed by a moderate recovery

The external environment of the Portuguese economy became less favourable over the past year. World economic activity, which had decelerated in 2018, slowed down even further in the first half of 2019, with recent indicators pointing to continuing subdued growth in the second half of the year. The slowdown in GDP was broadly based geographically, affecting advanced economies and more sharply emerging market economies, amid growing trade tensions, deteriorating confidence and increased economic and political uncertainty (Chart I.2.1). In sectoral terms, the slowdown was more marked in manufacturing, especially car production.

2. Inflation in the euro area is expected to stand at 1.2% in 2019, 1.1% in 2020, 1.4% in 2021 and 1.6% in 2022, according to the December 2019 Eurosystem projections.
3. Current projections for 2019 cannot be directly compared to those presented in the June issue of the *Economic Bulletin*. The difference between GDP growth in 2019 projected now and that projected in June largely reflects the revision of the national accounts series in September (see the Box entitled "Revision of the national accounts and balance of payments statistics" in the October 2019 *Economic Bulletin* of Banco de Portugal).

According to the projection exercise's external environment assumptions, world GDP growth is expected to decline from 3.6% in 2018 to 2.7% in 2019 – one of the lowest rates recorded since the international financial crisis – gradually recovering in the next two years. In 2022 world GDP is expected to grow by 3.1%, i.e. still below the pre-crisis global average (Table I.2.1).[4] The assumptions for world GDP growth continue to rely on three assumptions. Firstly, on lower cyclical momentum and the reduction in economic policy stimuli at the end of the projection horizon in the main advanced economies. Secondly, on the gradual transition of the Chinese economy to a lower growth path. Thirdly, on the ability of various emerging market economies to recover from the GDP growth levels of the recent past, in particular India, Brazil, Mexico and Turkey. World GDP growth was revised downwards from the assumptions underlying the projections of the June 2019 Bulletin.

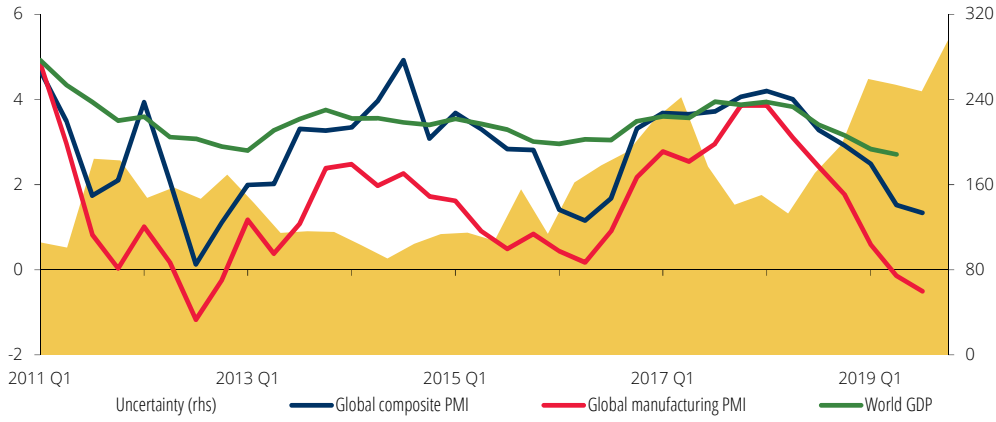
Table I.2.1 • Projection assumptions

		EB December 2019					Revisions compared to EB June 2019			
		2018	2019	2020	2021	2022	2018	2019	2020	2021
International environment										
World GDP	yoy	3.6	2.7	2.9	3.1	3.1	0.0	-0.4	-0.5	-0.2
Euro area GDP	yoy	1.9	1.2	1.1	1.4	1.4	0.1	0.0	-0.3	0.0
World trade	yoy	4.2	0.6	1.4	2.6	2.9	0.1	-0.8	-1.7	-0.8
External demand	yoy	3.3	1.9	2.1	2.5	2.7	0.1	-0.4	-0.9	-0.6
Oil prices in dollars	aav	71.1	63.8	59.6	57.4	56.8	0.0	-4.3	-6.2	-5.3
Oil prices in euros	aav	60.2	57.0	54.0	52.0	51.5	0.0	-3.6	-4.7	-4.0
Monetary and financial conditions										
Short-term interest rate (3-month EURIBOR)	%	-0.3	-0.4	-0.4	-0.4	-0.3	0.0	-0.1	-0.1	-0.2
Implicit interest rate in public debt	%	2.9	2.7	2.6	2.6	2.6	0.0	-0.1	-0.1	0.0
Effective exchange rate index	yoy	2.5	-1.6	-0.7	0.0	0.0	0.0	0.2	-0.7	0.0
Euro-dollar exchange rate	aav	1.18	1.12	1.10	1.10	1.10	0.0	-0.5	-1.4	-1.4

Source: Eurosystem (Banco de Portugal calculations). | Notes: yoy – year-on-year rate of change, aav – annual average value. An increase in the exchange rate corresponds to an appreciation of the euro. The revision in the euro-dollar exchange rate is presented 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 will remain stable over the projection horizon. The technical assumption for oil prices is based on futures markets. Developments in the 3-month Euribor rate are based on expectations implied in futures contracts. The implicit interest rate on public debt is computed as the ratio of interest expenditure for the year (which includes an assumption for the interest rate associated with new issuances) to the simple average of the stock of debt at the end of the same year and at the end of the preceding year.

4. Technical and external environment assumptions as well as projections for euro area GDP and inflation coincide with those in the Eurosystem's projection exercise released on 12 December (see "Eurosystem staff macroeconomic projections for the euro area", December 2019). Technical assumptions include information available up to 20 November.

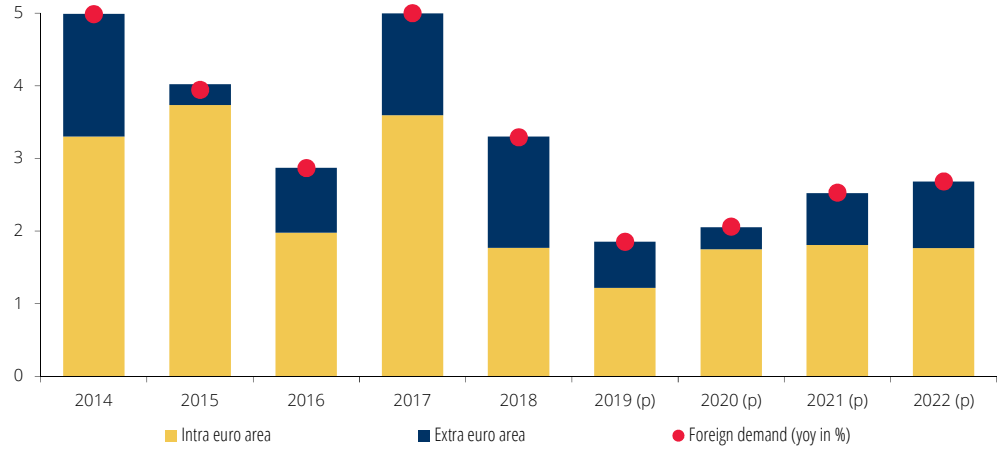
Chart I.2.1 • World GDP, Global Purchasing Managers' Index and global economic policy uncertainty | Year-on-year rate of change and index



Sources: Eurosystem, Markit and www.policyuncertainty.com. | Notes: The global Index is a GDP-weighted average (current prices) of national EPU indices for 20 countries. Each national index reflects the relative frequency of own-country newspaper articles that contain a trio of terms pertaining to economy, policy and uncertainty. PMI-Purchasing Managers' Index is a monthly indicator that summarises purchasing managers' views on the conditions of industry, services, construction and retail. It is presented as a deviation from 50, where a negative value indicates the deterioration of conditions.

Global trade slowed down considerably in the first half of 2019 (Box 1). Projections for world trade point to an annual growth rate of 0.6% in 2019 and modest and gradual acceleration over the remainder of the projection horizon. In this context, after a marked deceleration in 2018, external demand for Portuguese goods and services will continue to slow down in 2019, to 1.9%, reflecting a deceleration in intra- and especially extra-euro area imports (Chart I.2.2). Assumptions of the projection exercise point to a gradual recovery of external demand growth rates, reaching 2.7% in 2022, associated with the contribution from intra-area partners in 2020 and subsequently with an acceleration in extra-euro area demand. Compared to the June issue of the *Economic Bulletin*, projections for external demand for Portuguese goods and services were revised downwards in 2019-21.

Chart I.2.2 • Foreign demand for Portuguese goods and services | Annual rate of change and contributions, in percentage and percentage points



Source: Eurosystem (Banco de Portugal calculations). | Note: (p) projected.

Oil prices followed a markedly upward trend in the first few months of 2019, amid supply-side restrictions, rising by about USD 20 per barrel between January and May (to USD 70 per barrel). Between June and November, oil prices followed a less defined path, standing at around USD 63 per barrel in mid-November. The downward correction of oil prices in this period resulted from a less favourable outlook for the world economy and high uncertainty. Based on the technical assumptions, oil prices are expected to stand at USD 64 per barrel in 2019, i.e. declining by about 10% from the previous year. Expectations implied in futures markets point to further price reductions in 2020 and 2021 (-7 and -4% respectively) and a relative stabilisation in 2022.

Euro area short-term interest rates are expected to remain at historically low levels over the whole projection horizon, in a context of postponement of market expectations about a rise in the European Central Bank's (ECB) key interest rates, especially after the series of measures adopted in September. These included the 10 basis point reduction of the interest rate on the deposit facility to -0.5% and the express indication of a strongly accommodative monetary policy stance over an extended period. According to the exercise's technical assumptions, the 3-month EURIBOR should remain at levels close to -0.4% in the projection horizon. The implied interest rate on public debt is expected to decline slightly in 2019 and stabilise at 2.6% over the remainder of the projection horizon. With regard to the foreign exchange market, the projection exercise's assumptions of maintenance of the exchange rate at its current level imply a depreciation of the euro in 2019 and to a lesser extent in 2020, both in nominal effective terms and against the US dollar.

3 Economic activity and prices in Portugal over the 2019-22 projection horizon

According to current projections, GDP is expected to slow down over the projection horizon, from 2.4% in 2018 to 2% in 2019, 1.7% in 2020 and 1.6% in 2021-22. These developments are related to a maturing business cycle and translate into an approximation of the rate of change of GDP to estimated potential growth.

After a minor slowdown in year-on-year terms in the first half of 2019 (to 2%, after 2.2% in the second half of 2018), the GDP growth rate is expected to remain relatively stable in the second half of the year. The projection incorporates Statistics Portugal's flash estimate for GDP growth in the third quarter of 2019, which points to growth stabilising at 1.9% in year-on-year terms and decelerating to 0.3% in quarter-on-quarter terms (compared to 0.6% in the previous two quarters). Underlying the current projection is a stabilisation of GDP growth in year-on-year terms in the fourth quarter, given that the continuing slowdown in GFCF is projected to be offset by stronger growth in exports.

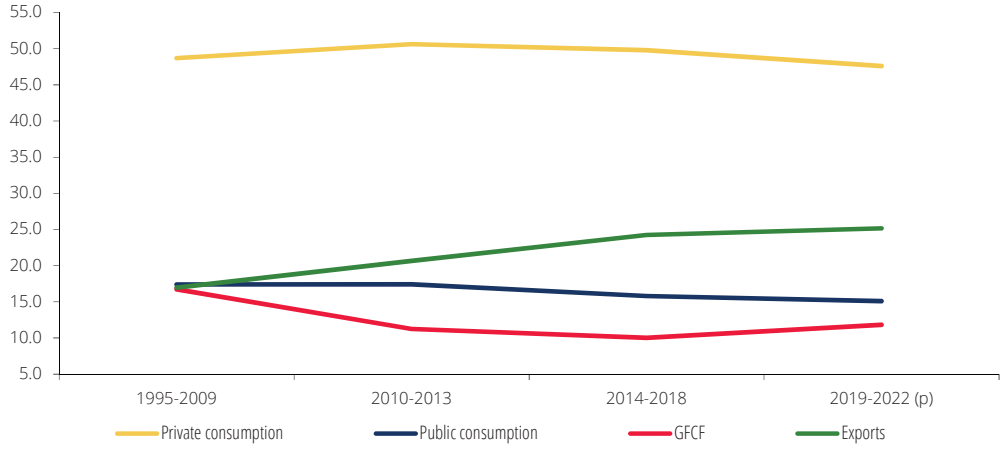
Over the projection horizon, growth in activity should be sustained by buoyant domestic demand and, to a lesser extent, exports. Robust growth in private consumption and strong investment dynamics – particularly in business GFCF – translate into a contribution of domestic demand to GDP growth[5] of 1.5 percentage points (p.p.) in 2019, after 1.7 p.p. in 2018. This contribution is expected to decline over the projection horizon to 1.1 p.p. in 2022, determining the deceleration projected for GDP (Table I.1.1). The contribution of exports (net of import content) to GDP growth

5. Contributions to GDP net of import content, i.e. obtained by subtracting from global demand components an estimate of imports related to each of these components.

is expected to remain fairly stable at around 0.5 p.p. in the period 2019-22, declining compared to the average of previous years (1.0 p.p. in the period 2014-18).

Over the projection horizon, the structure of GDP (nominal and net of import content) will maintain the trends observed in the post-crisis period (Chart I.3.1). Although with lower growth than in the recent past, the importance of exports in the economy will continue to increase. In net terms, private and public consumption account for a smaller share of GDP, partially offset by a slight recovery in the share of GFCF, although to levels which still remain below those seen in the pre-crisis period.

Chart I.3.1 • Weight of expenditure aggregates (net of import content) in GDP | Period average, in percentage



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

Moderate deceleration in private consumption in line with developments in disposable income

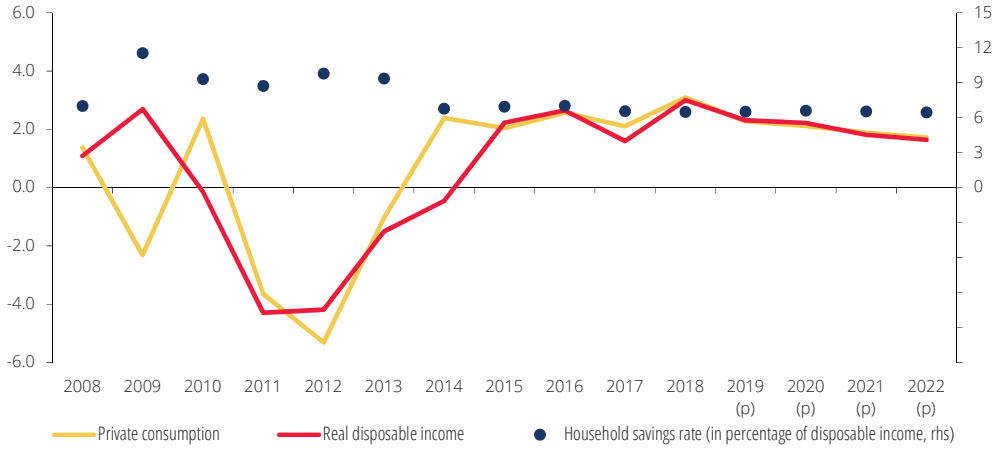
According to the current projection, after robust growth in 2018 (3.1%), private consumption decelerates to 2.3% in 2019 and then gradually to 1.7% in 2022 (Chart I.3.2).

After a year-on-year rate of change of 2.3% in private consumption in the first half of 2019, the projection implies a similar rate of change in the second half of the year.

The projected path of a slight slowdown in private consumption for 2020-22 mainly reflects the profile of the non-durable goods and services component. Average growth in consumption of durable goods is expected to stand close to projected growth in disposable income over the horizon and to be fairly more subdued than in the period 2014-18 (around 11.5% on average). Indeed, although financing conditions remain favourable, the effects of pent-up demand accumulated during the crisis are unwinding, reinforced in the car sector by potential structural changes to consumption.[6]

6. See the box entitled "Car production in Portugal: overview, recent developments and challenges", in the October 2019 issue of the *Economic Bulletin* of Banco de Portugal.

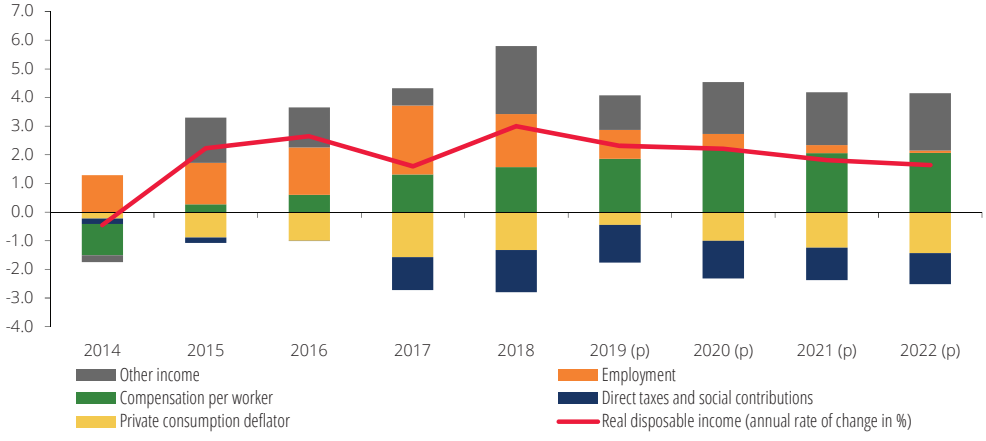
Chart I.3.2 • Private consumption, disposable income and savings rate | Annual rate of change in percentage and level in percentage of disposable income



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

Over the projection horizon, the favourable conditions that have recently sustained growth in consumption are likely to persist, in particular a supportive labour market situation and low financing costs. The profile projected for consumption accompanies developments in real disposable income, implying that the savings rate will remain stable in 2019-22 and is compatible with a continued decline in household indebtedness as a percentage of GDP. The deceleration projected for disposable income largely reflects developments in labour income – namely a slowdown in employment – which are only partially offset by a slight acceleration in compensation per employee (Chart I.3.3). Developments in wages incorporate the impact of the increase in the minimum wage observed in 2019 and approved for 2020. The gradual acceleration in consumer prices helps to limit growth in real disposable income over the projection horizon.

Chart I.3.3 • Contributions to the annual rate of change of real disposable income | In percentage points and percentage



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. The other income includes domestic and external transfers and property income.

Public consumption is projected to grow by 0.5% in real terms in 2019. This represents a deceleration compared to 2018 (growth of 0.9%), which partly reflects a reversal of a one-off effect of expenditure relating to the 2017 wildfires (which had an impact on intermediate consumption in 2018). Public employment is expected to accelerate slightly in 2019. However, the integration into the general government of workers in precarious employment observed since 2018 complicates this estimate. Over the remainder of the horizon, public consumption is projected to grow by 0.8% each year, reflecting an assumption of increased expenditure on goods and services which more than offsets lower growth in public employment.

GFCF continues to grow strongly but slows down over the projection horizon

GFCF is expected to be the most dynamic expenditure component over the projection horizon. After accelerating to 7.3% in 2019, investment is expected to grow at progressively lower rates (4.3% in 2022).

Strong growth in GFCF in 2019 is strongly related to the construction component, influenced by the execution of large infrastructure projects – in some cases related to public investment and benefiting from European Union funding – and buoyant residential construction. After growth of close to 10% year on year in the first half of the year, GFCF is expected to have decelerated in the third quarter, according to the press release of the GDP flash estimate. Current projections point to this deceleration continuing in the last quarter of 2019. The slowdown in the second half of the year reflects a sharp deceleration in transport equipment and other machinery and equipment, with growth in GFCF in construction staying strong and relatively stable year on year.

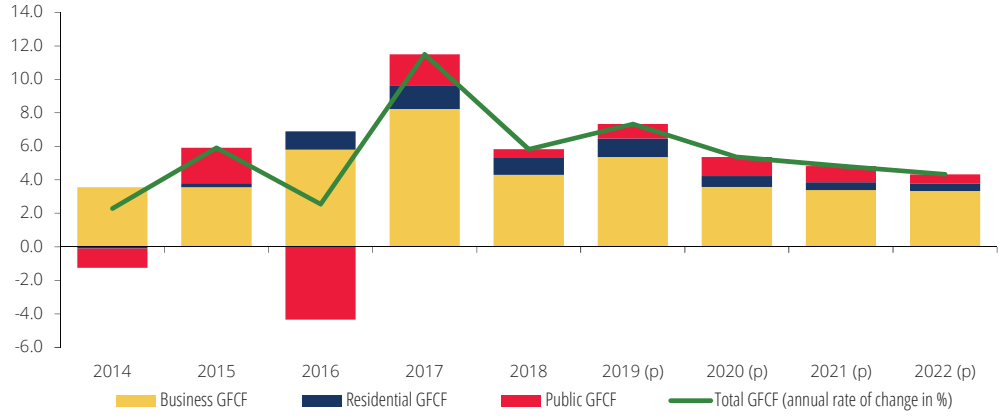
Growth in residential GFCF is expected to remain robust but below growth in total GFCF over the projection horizon. This component is also expected to continue to benefit from the very sharp increase in house prices seen in the recent past.[7] The usual determinants of demand for housing, namely developments in disposable income, financing conditions and the labour market situation are projected to remain favourable over the projection horizon. These factors may be strengthened by demand from non-residents and investors, in particular in the tourism sector. These drivers are projected to justify continued momentum in this segment of GFCF, which is nevertheless expected to decelerate somewhat in 2020-22 compared to 2019.

Business GFCF is expected to continue to make the largest contribution to total GFCF over the projection horizon, given the weight and projected momentum for this component (Chart I.3.4). After increasing strongly in 2019, this GFCF component will likely resume growth in line with its historical elasticity to activity at the end of the projection horizon. The projections are compatible with a continued decline in the indebtedness level of firms as a percentage of GDP. Business GFCF is expected to benefit from a number of investment-friendly factors, in particular a relatively benign outlook for global demand, high capacity utilisation (Chart I.3.5),[8] continued favourable financing conditions and inflows of European Union funds. With the end of the current financial programming cycle, structural funds received from the European Union are expected to increase.

7. Residential real estate prices have shown evidence of overvaluation in aggregate terms since the beginning of 2018 (See Special issue entitled "Methodologies to assess house prices: an application to the Portuguese case", in the December 2019 issue of the *Financial Stability Report* of Banco de Portugal).
8. The indicator for capacity utilisation in total manufacturing declined in the most recent quarter, but this is largely explained by developments in the energy component, which was affected by idiosyncratic factors in 2019. Excluding this effect, the levels of capacity utilisation remain high (close to pre-crisis levels).

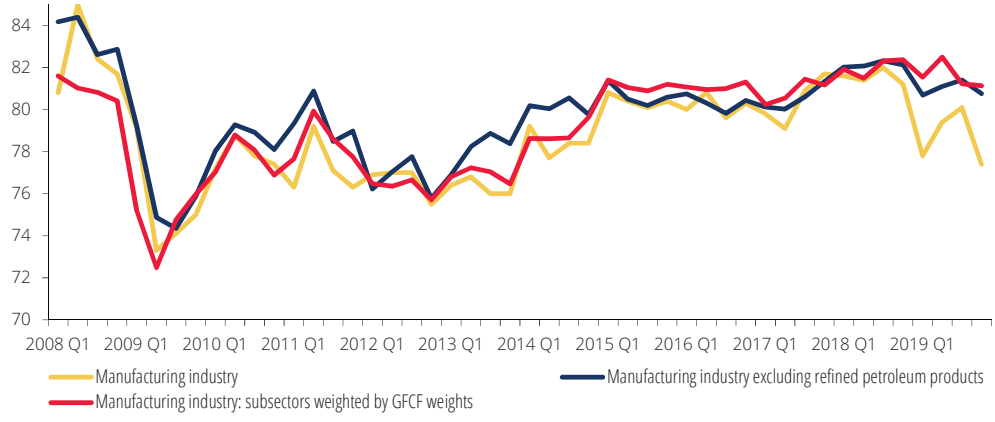
Despite the projected momentum, developments in GFCF are only expected to allow capital per worker to reach at the end of the projection horizon the levels observed in 2013. Projections for this component are subject to downside risks, as recent unfavourable developments in manufacturing in Portugal and at global level and an increase in global uncertainty may have a negative impact on firms' investment decisions. In Portugal, these risks are amplified given that investment is concentrated in a small number of firms and investment by new firms has recently been less dynamic than that of incumbent firms (Special issue "A microeconomic analysis of Portuguese firms' investment from 2006 to 2017" in this issue of the *Economic Bulletin*).

Chart I.3.4 • Contributions to the annual rate of change of gross fixed capital formation | In percentage points and percentage



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

Chart I.3.5 • Productive capacity utilisation rate in manufacturing industry | In percentage



Source: European Commission (Banco de Portugal calculations).

According to projections, public investment accelerates in 2019, increasing by around 10% in nominal terms, in line with the latest official estimate. Over the remainder of the horizon, developments in this GFCF component are expected to accompany the profile projected for inflows of European Union funds, accelerating in 2020 and decelerating thereafter. These funds are expected to co-finance the construction of a number of large public infrastructures, namely in rail and road transport.

Exports projected to grow less than in recent years, reflecting weaker external demand and smaller market share gains

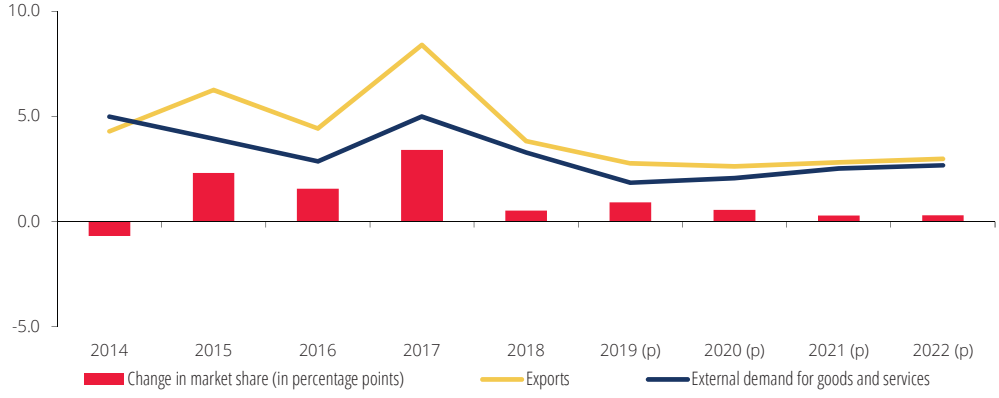
After the buoyancy of the past few years, growth in exports of goods and services is projected to decline to 2.8% in 2019 and 2.6% in 2020 and to increase slightly over the remainder of the projection horizon to reach 3% in 2022. These rates of change are below average growth observed in the period 2014-18 (5.4%).

In 2019, weaker growth in exports is the result of a slowdown in external demand. Developments in exports throughout the year were affected by a number of idiosyncratic factors, in particular several halts in refinery activity over the course of the first three quarters of the year, with an impact on energy exports. Following year-on-year growth of 2.3% in the first half of the year, real exports of goods and services are projected to accelerate slightly in the second half of the year, reflecting a strong recovery in energy exports in the last quarter and stronger growth in services exports.

Market share gains in exports in 2019 are estimated to be slightly higher than in 2018 (Chart I.3.6). In the first half of 2019, Portuguese goods exporters continued to record external market share gains, which, similarly to 2018, were highly concentrated in the car sector. In addition, ongoing very buoyant growth in tourism suggests continued share gains in this segment.

Over the remainder of the horizon, the profile of exports accompanies developments in the indicator of external demand for Portuguese goods and services. The projection points to additional, although increasingly smaller, market share gains over the period 2020-22 (Chart I.3.6). These stem from tourism exports, although gains are expected to be smaller than in previous years.[9] This phenomenon contributes to prolong the trend of relative increase in the share of tourism in total exports of goods and services.

Chart I.3.6 • Exports of goods and services, foreign demand and market share | Annual rate of change in percentage and change in percentage points



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

Uncertainty surrounding the outlook for global trade and the recent importance to Portuguese exports of sectors whose demand has high income elasticity – such as the car industry or tourism

9. In 2022 activity in this sector is expected to record a positive impact from the World Youth Days taking place in Portugal during that year.

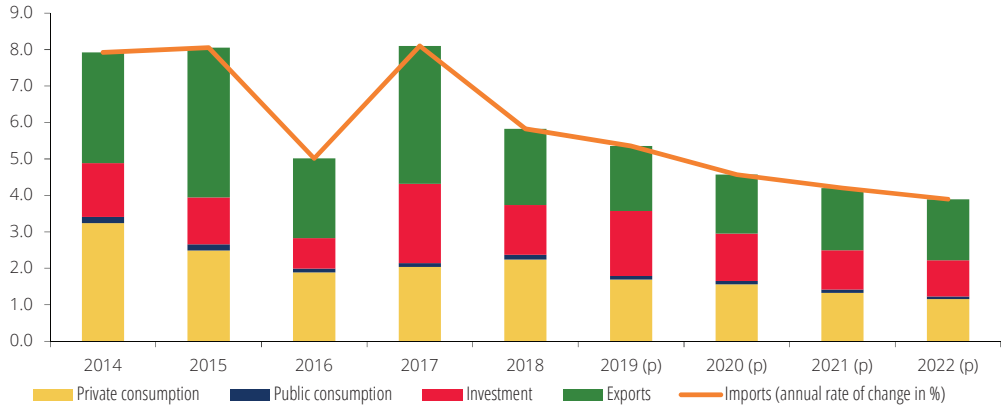
services – imply that exports are a component particularly exposed to the external risks underlying the current projection (Chapter 4).

Gradual deceleration in imports over the projection horizon

Imports are expected to follow a path of gradual deceleration over the projection horizon, moving from 5.4% in 2019 to 3.9% in 2022. These developments are broadly in line with the usual elasticity to global demand weighted by import content.[10] Imports penetration, measured as the ratio of import to global demand growth rates, is expected to increase by around 2 p.p. per year on average over the projection period, a less robust pace than observed in the recent past (4.2 p.p. on average in the period 2014-18).

A breakdown of imports by global demand components according to their import content shows that in 2019 the slowdown in imports reflected the deceleration in exports – namely non-energy goods – and in private consumption, in particular the sharp slowdown observed in durable goods consumption, which has a high import content (Chart I.3.7). For the period 2020-22, the main highlight is the declining contribution made by investment, reflecting a deceleration in business GFCF.

Chart I.3.7 • Breakdown of imports by global demand components | Contributions in percentage points and annual rate of change in percentage



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

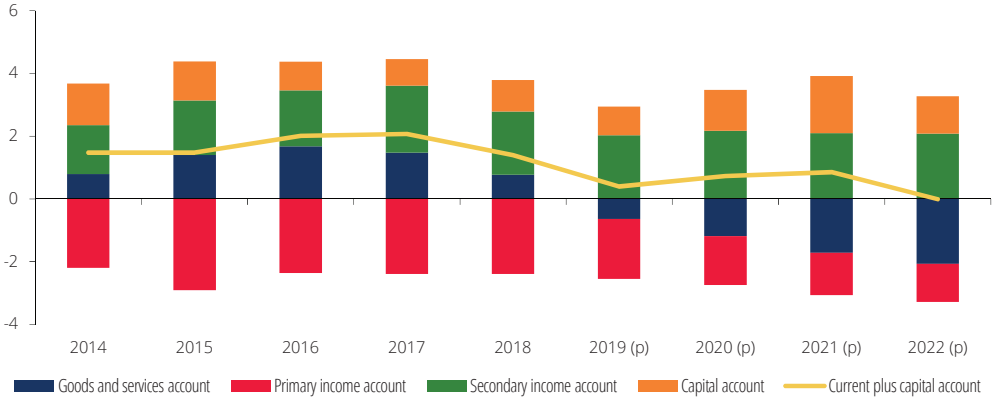
Despite the projected deceleration, the weight of imports in GDP is expected to continue to increase. Together with an increase in the share of exports, this implies a continued trend of increase in the trade openness of the Portuguese economy over the projection horizon, which will reach around 92% in 2022, still remaining below the levels observed in economies with similar characteristics.[11]

10. However, some quarterly instability was observed in this relationship throughout 2019 inter alia as a result of energy imports due to the temporary closure of a number of refineries.
11. For a description of the methodology used for a cross-country comparison, see the box entitled "Trade openness of the Portuguese economy: recent developments and outlook" in the June 2017 issue of the *Economic Bulletin* of Banco de Portugal. Trade openness is measured as the sum of exports and imports in nominal terms as a percentage of GDP.

Decline in the economy's net lending, with the goods and services account balance deteriorating and the other accounts improving

According to current projections, net lending of the Portuguese economy, measured by the combined current and capital account balances, should stand at 0.5% of GDP on average over the projection horizon, compared to 1.7% in the period 2014-18 (Chart I.3.8). The annual profile of the current plus capital account is expected to display some variability, explained to a large extent by developments in inflows and outflows with European institutions. The goods and services account is expected to record a deficit in 2019, which should increase over the projection period (from -0.6 to -2.1% of GDP), while the balance of the combined income and capital accounts is projected to be clearly positive and above that observed in recent years.

Chart I.3.8 • Current plus capital account | In percentage of GDP



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

The profile projected for the goods and services account – negative balances from 2019 onwards, after a period of surpluses from 2013 to 2018 – reflects developments in the goods account, which is projected to have progressively larger deficits, prolonging developments observed since 2017. Unfavourable developments in the goods account are strongly related to robust real growth in imports, with particularly buoyant developments in imports of capital goods over the past two years. Over the projection horizon, a growth profile supported by a larger relative contribution from domestic demand suggests this trend is likely to continue. In turn, after a sharp increase in the past few years (from 3.5% of GDP in 2010 to 8.3% in 2018, largely owing to highly buoyant tourism exports), the services account surplus in percentage of GDP is expected to decline slightly in 2019 and broadly stabilise over the remainder of the projection period.

The primary income account deficit as a percentage of GDP is expected to gradually decline over the projection horizon, benefiting from persistently low interest rates and a downward trend in public debt interest. The profile of the capital account balance is projected to be affected by a positive one-off effect in 2021 related to the reimbursement by the European Financial Stability Facility of amounts paid by Portugal under the Economic and Financial Assistance Programme. Developments in the combined

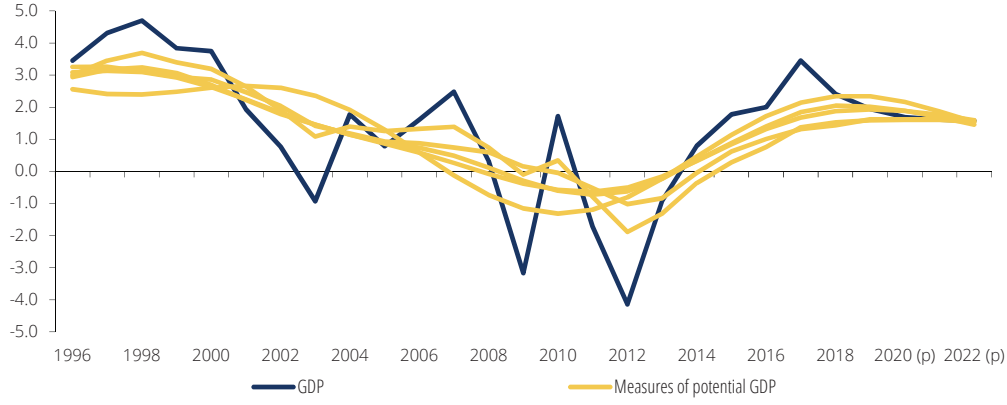
income and capital accounts also reflect the expected rise in inflows of European Union funds over the projection horizon (larger inflows are expected to occur in 2020 and 2021).[12]

GDP growth close to potential

Developments projected for economic activity in Portugal must be assessed taking into account its potential growth, which reflects the amount of inputs available in the economy and the efficiency of the use of these resources (total factor productivity). Potential growth of the Portuguese economy remains affected by constraints to input growth and to productivity increases, notably adverse demographic developments, high levels of indebtedness (which limit investment) and the still relatively low levels of human capital.

Over the projection period, GDP growth is expected to converge to 1.6%, very close to average estimates for potential GDP growth (Chart I.3.9). In this maturing business cycle phase, projected growth suggests that the output gap will remain positive over the projection period, as observed since 2017.

Chart I.3.9 • GDP and potential GDP | Annual rate of change, in percentage



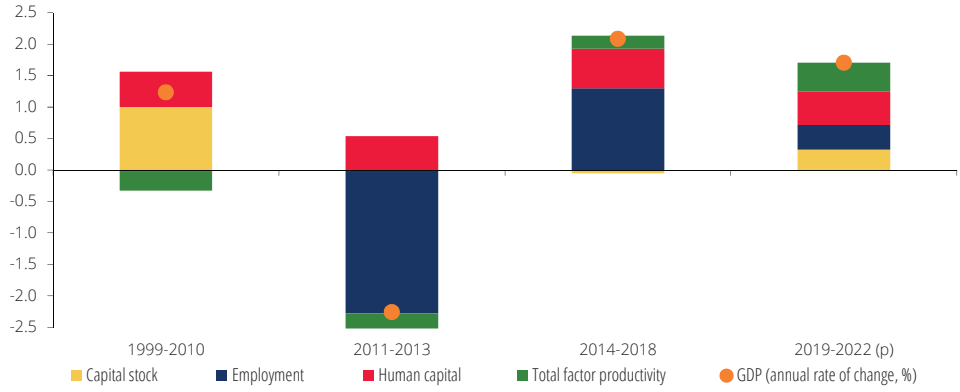
Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. The measures used in the calculation of potential output are: Hodrick-Prescott filter, Baxter and King filter, Christiano and Fitzgerald filter, calculations based on a Cobb-Douglas production function and calculations based on an unobserved components model. For a detailed description of the potential output measures see: Special issue "Potential output: challenges and uncertainties", *Economic Bulletin*, December 2017; Duarte, Maria and Sazedj (2019), "Potential output: How does Portugal compare with the euro area over the last 40 years?", *Banco de Portugal Economic Studies*, vol. V, n.º 2 and Braz, Campos and Sazedj (2019), "The new ESCB methodology for the calculation of cyclically adjusted budget balances: an application to the Portuguese case", *Banco de Portugal Economic Studies*, vol. V, n.º 2.

In the recovery period 2014-18, growth resulted from the use of resources available in the labour market, after a period of recession characterised by high underutilisation of this input. In addition to very dynamic developments in employment, GDP growth also resulted to a lesser extent from a positive contribution of human capital accumulation, measured by average education levels. Growth in employment considerably above that of physical capital resulted in a decline in the capital per worker ratio, which may have affected developments in productivity. Over the projection horizon, employment is estimated to still make a positive, albeit smaller, contribution to GDP growth, against the background of a decline in labour market slack. In addition, the contribution of the capital stock is expected to increase and productivity to recover gradually. These dynamics translate into relatively

12. For a more in-depth analysis, see the box entitled "Impact of EU funds on the current and capital account: Portugal 2020 in perspective", in the March 2019 issue of the *Economic Bulletin* of Banco de Portugal.

similar contributions to GDP growth from inputs (employment and capital) and productivity (Chart I.3.10). A positive aspect of the analysis is the significant positive contribution of human capital to GDP growth over all subperiods under review, reflecting a gradual increase in the qualification levels of the labour force.

Chart I.3.10 • Breakdown of the growth in real GDP | Average rate of change in percentage and contributions in percentage points



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. The growth accounting exercise of GDP is based on a Cobb-Douglas production function. The measures of human capital were constructed from the data of Barro and Lee (2013) 'A new data set of educational attainment in the world, 1950-2010', *Journal of Development Economics 104*, pp. 184-198. For Portugal, these series were annualized and extended using the profile of the average years of education of employment of *Quadros de Pessoal* (until 2012), the Labour Force Survey of Statistics Portugal (from 2013 to 2015) and the projections available in http://www.barrolee.com/.

Slowdown in employment and decline in the unemployment rate to historically low levels

Employment is expected to continue to grow over the projection horizon, but at a gradually slower pace. The projected annual growth rate declines from 1.0% in 2019 to a marginal rate of change of 0.1% in 2022. Employment growth mostly reflects the absorption of workers from unemployment and to a lesser extent a minor increase projected for the labour force, despite an ongoing slightly downward trend in total population. The factors that have contributed to recent positive developments in the labour force are expected to persist over the projection horizon, i.e. a rise in the female participation rate, an increase in the average retirement age and a positive balance in migration flows.[13] More subdued growth in employment over the projection period should be assessed against a background of labour supply constraints related to the maturing business cycle and adverse demographic conditions over the medium term (a declining and gradually ageing population).

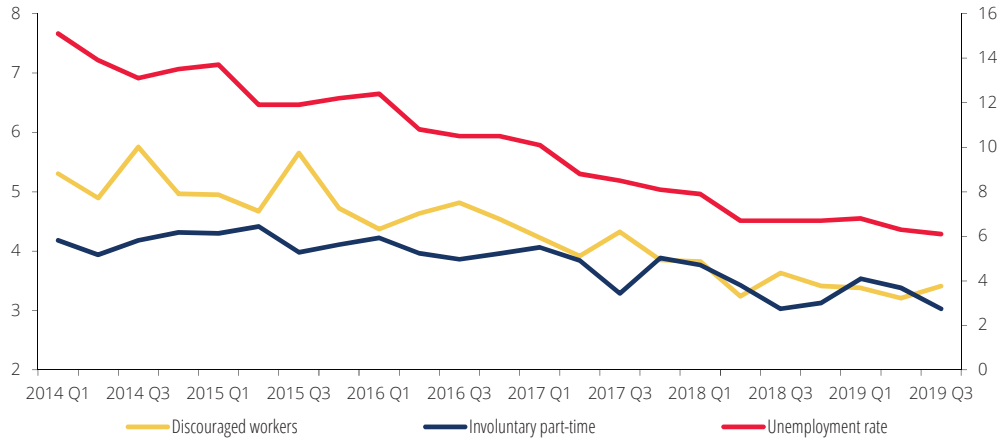
According to the projections, the unemployment rate will continue to decline, albeit at a slower pace than in the past few years, to stand at 5.6% at the end of the projection period. In addition to the unemployment rate, which in 2019 is expected to be the lowest since 2003, standing below its trend level,[14] other indicators suggest that the underutilisation of the labour input has gradually declined

13. Indeed, the recovery of foreigner immigration flows has contributed positively to the labour supply in Portugal in the recent period. See the box entitled "The contribution of foreign population to labour force developments in Portugal" in the October 2019 issue of the *Economic Bulletin* of Banco de Portugal.

14. This trend level corresponds to the NAWRU, which stands for Non-Accelerating Wage Rate of Unemployment. For further details on the method used to calculate the NAWRU, see Duarte, Maria and Sazedj (2019), "Potential output: How does Portugal compare with the euro area over the last 40 years?", *Banco de Portugal Economic Studies* vol. V, No 2.

in the past few years (Chart I.3.11). Particularly important are the decline observed since 2014 in the number of discouraged workers (sub-group of inactive workers who are not actively seeking work but are immediately available for work) and the number of workers working part-time but available for full-time work. These indicators suggest an increasingly smaller margin for an increase in employment via the incorporation of unemployed individuals or the transition of individuals from inactivity to employment.

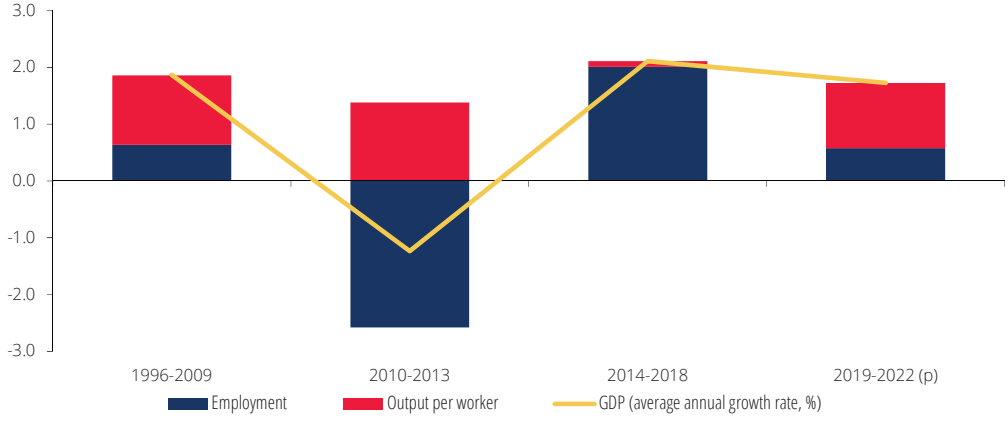
Chart I.3.11 • Indicators of labour market slack | Percentage of total labour force



Source: Statistics Portugal (Labour Force Survey and Monthly Estimates of Employment and Unemployment) (Banco de Portugal calculations). | Notes: Discouraged workers are the inactives who are not actively seeking work but are immediately available for work, involuntary part-timers are the individual that have a part-time job because they didn't find a full-time job. The unemployment rate is obtained from the monthly estimates of employment and unemployment and is seasonally adjusted.

In this context of limitations to employment growth, an increase in productivity becomes the crucial factor for growth in the Portuguese economy. Projected developments in GDP and employment are expected to translate into stronger growth in apparent labour productivity in the period 2019-22, after a marginal average increase in the period 2014-18 (Chart I.3.12).

Chart I.3.12 • Contributions of output per worker and employment to the annual rate of change of real GDP | In percentage points and percentage



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. Employment is measured in number of persons, according to the national accounts concept.

Output per worker in Portugal continues to be low when compared with the euro area, inter alia owing to relatively low levels of education and capital per worker. Projected productivity growth is related to a number of factors, such as the gradual recovery and build-up of the productive capital stock available to workers (which is a slow-moving process by nature), and the better allocation of resources in the Portuguese economy.

Higher growth in nominal wages

The improved labour market situation and pressures arising from limitations to an increase in supply have led to greater buoyancy in nominal and real wages in the recent past. Indeed, compensation per employee has accelerated since the end of 2017, increasing by an average of 2.8% in year-on-year terms in the first three quarters of 2019 (Statistics Portugal data on regular gross earnings per employee).[15]

Average growth in nominal wages is anticipated to stand at 3.1% over the projection horizon, above that seen in the past few years. Projected growth for 2019 and 2020 is influenced by an update in the minimum wage (an increase of 3.4% in 2019 and 5.8% in 2020). In the public sector, developments in wages include the gradual reversal of general government wage freezes (which started in 2018 and whose effects extend over the projection horizon), as well as the technical assumption of wage updates in the public sector in line with inflation in 2020-22.

The profile of developments in nominal wages translates into a sharper acceleration in real wages in 2019 owing to a considerable decline in inflation this year. In the period 2020-22, real wages are projected to grow at an average annual rate of around 2%, i.e. above expected productivity gains.

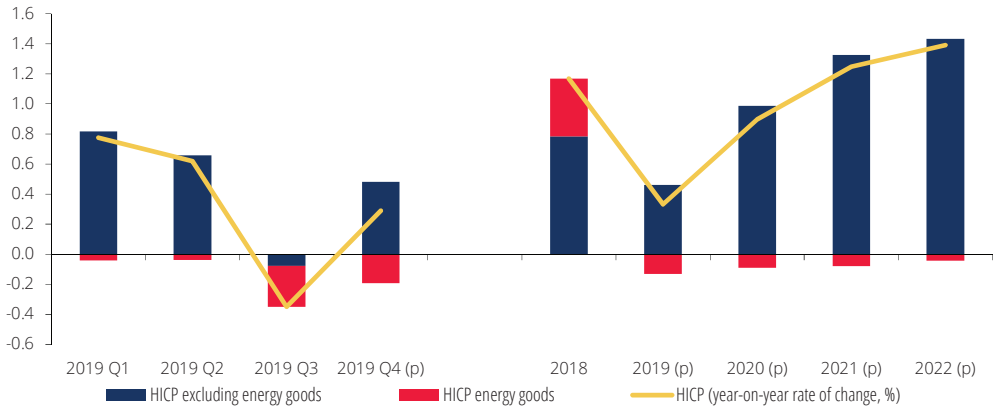
Gradual increase in inflation after a sharp decline in 2019

Inflation, measured by the rate of change in the HICP, is expected to decrease markedly in 2019 – from 1.2% to 0.3% – and projected to gradually increase over the remainder of the projection horizon to 1.4% in 2022. Taking into account recently published Eurosystem projections, these price developments in Portugal imply a gradual decline in the negative inflation differential *vis-à-vis* the euro area.

In 2019 the reduction in inflation largely reflected developments in energy prices (a contribution of -0.5 p.p. to the decline projected for inflation) (Chart I.3.13). The drop in energy prices this year is in line with the decline in oil prices, which is likely to continue, albeit more moderately, in the period 2020-22, according to the assumptions of the projection exercise (Chapter 2). In addition, the decrease in energy prices in 2019 also reflected the decline in electricity and gas prices stemming from administrative measures with an impact on regulated market segments and from a decline in VAT rates. The energy HICP is expected to post negative changes in 2019-22, which will become gradually smaller (from -1.7% in 2019 to -0.5% in 2022).

15. See Statistics Portugal press release "Gross monthly earnings per employee (Social Security and Caixa Geral de Aposentações – Data analysed by Statistics Portugal) September 2019". In terms of collective bargaining, the year-on-year rate of change in negotiated wages stood at 3.2% on average from January to October 2019.

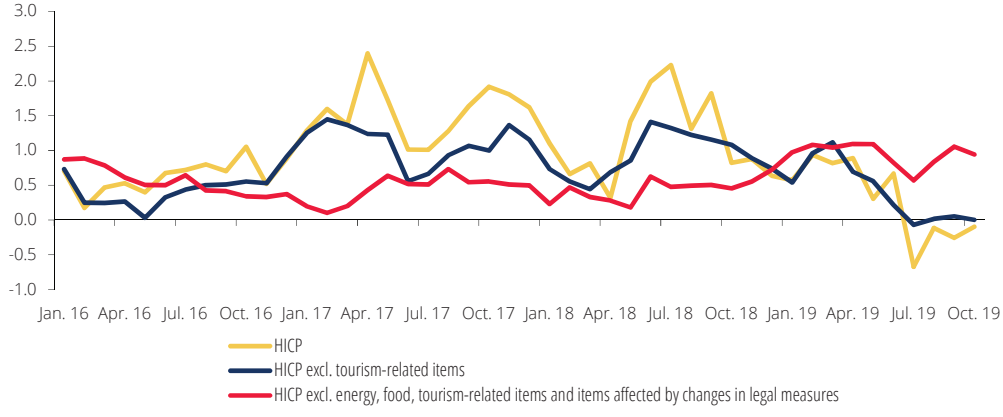
Chart I.3.13 • Contributions to the annual rate of change of HICP | In percentage points and percentage



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

In 2019 the decline in inflation also reflected a deceleration in non-energy prices. This deceleration is partly explained by a number of legislative measures which resulted in sharp drops in the prices of a number of goods and services. Mention should be made to the increase in the general government contribution for public transportation (a drop in the prices of travel cards), the decline in higher education tuition fees and the reduction in the prices of school textbooks after the entitlement to free school textbooks was extended to all years of secondary education.[16] In addition, the prices of tourism-related items, in particular accommodation prices, decelerated considerably after growing sharply in the past two years.[17] Using an indicator that excludes from the HICP the prices of more volatile items – energy and food prices and tourism-related services – and prices affected by administrative changes suggests that underlying inflation remains low in Portugal (Chart I.3.14).

Chart I.3.14 • HICP and specific effects | Year-on-year rate of change, in percentage



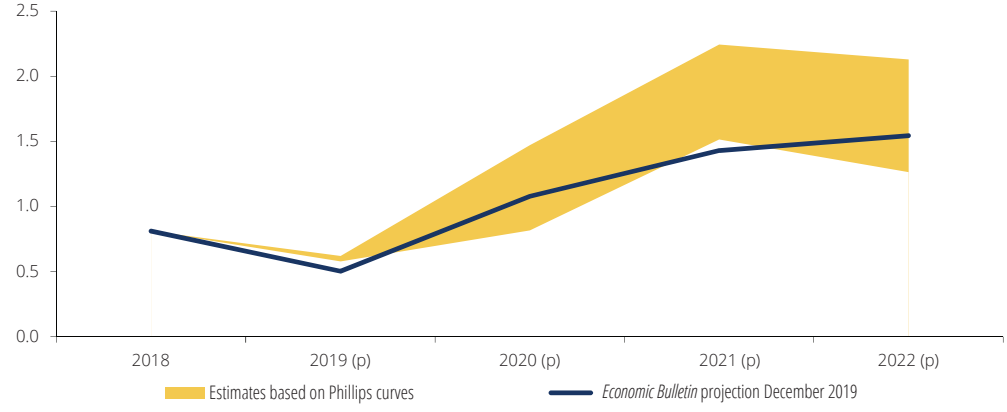
Source: Statistics Portugal (Banco de Portugal calculations). | Note: The tourism-related items include accomodation, package holidays and passenger transport by air. Items affected by legal measures include eletricity, natural gas, education text books, communications, passenger transport and terciary education.

16. The estimated impact of these administrative changes on the rate of change in the HICP is -0.3 p.p. in 2019 (data up to October).
17. The approximated contribution of tourism-related services to the rate of change in the HICP is -0.1 p.p. in 2019 (January to October average), compared to 0.2 p.p. in the previous year.

Inflation excluding energy is expected to increase in the period 2020-22, against a background of a subdued increase in domestic and external inflationary pressures. At international level, assumptions point to an acceleration in non-energy import prices (average annual growth of around 1.8% in 2020-22, following a change that was close to zero in 2019). According to Eurosystem projections, inflation in the euro area – where the Portuguese economy's main trading partners are located – also follows an upward path over the projection horizon. At domestic level, unit labour costs are projected to continue to grow at close to 2% in the period 2020-22, with more robust growth in compensation per employee partially offset by increases in productivity.

Subdued developments projected for inflation occur against a backdrop of dynamic wages, but also of slowdown in economic activity and weak inflation expectations. Inflation projections for Portugal are close to the lower bound of the estimates obtained from a set of Phillips curves (Chart I.3.15). In addition to the idiosyncratic factors mentioned above, these developments are likely related to more gradual price adjustments than in the past to pressures stemming from a decrease in available resources in the economy, in a context of contained corporate profit margins and low inflation expectations. This environment of low actual and projected inflation also describes the euro area and has fuelled a debate on the main causes of this phenomenon (Box 2).

Chart I.3.15 • HICP excluding food and energy | Annual rate of change, in percentage



Sources: Banco de Portugal and Statistics Portugal. | Notes: (p) – projected. The models of Phillips curves considered include a measure of import prices and several measures of economy's cyclical positon. This measures inlude the output gap associated to potential GDP obtained with Hodrick-Prescott filter, Baxter and King filter, Christiano and Fitzgerald filter, calculations based on a Cobb-Douglas production function, calculations based on a model of un-observed components, and also the unemployment. For further details, see Serra, S. (2018) "Is the Phillips curve dead? – results for Portugal", *Banco de Portugal Economic Studies*, 4 (2).

4 Uncertainty and risks

The projections presented in this Bulletin represent the scenario deemed most likely, based on the set of assumptions set out in Chapter 2. This central scenario may be affected by a set of

risks and uncertainties, which could involve deviations from these assumptions or the possibility of events occurring that have not been considered in the projections.

Downside risks to activity and broadly balanced risks to inflation

The main risk factors to economic activity in Portugal result largely from the possibility of a less favourable international environment than that considered in the projections. The most noteworthy of the risks with potential negative effects at global level is the possibility of an intensification of the trade barriers due to tensions between China and the United States and the potential extension of these barriers to other countries and sectors, for example new tariffs on car exports from the European Union. There is also the possibility of a slowdown in global economic activity, associated with the pass-through of recent weakness in manufacturing to the other sectors of activity, especially services. The risk of the United Kingdom's withdrawal from the European Union with no deal remains, with potential negative effects in terms of trade, finance and confidence on the other EU countries. Also considered was a risk of instability in global financial markets, as a result of a sudden increase in risk aversion associated with weaker than expected developments in advanced or emerging economies. In addition, there is still a risk of worsening geopolitical tensions, particularly in the Middle East and especially between the United States and Iran. The risks identified may interact and, should they materialise, mutually strengthen one another.

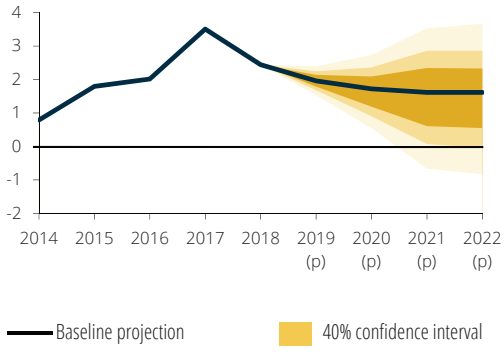
Regarding price developments over the projection horizon, a risk was considered regarding the possible de-anchoring of inflation expectations in the euro area, reflecting the current prolonged period of low inflation and the downward trend in inflation expectations observed recently. With an opposite sign impact, a domestic risk related to the possibility of minimum wage rises in 2021 and 2022 was identified.

The materialisation of these risks implies more unfavourable developments in external demand for Portuguese goods and services than considered in these projections. At domestic level, these risks imply lower than projected investment and private consumption. The possibility of a minimum wage increase translates into higher than projected wage developments in 2021-22.

The quantified analysis of the combination of risk factors described above implies downside risks to real GDP growth over the whole projection horizon and broadly balanced risks to inflation (Charts I.4.1 and I.4.2).[18]

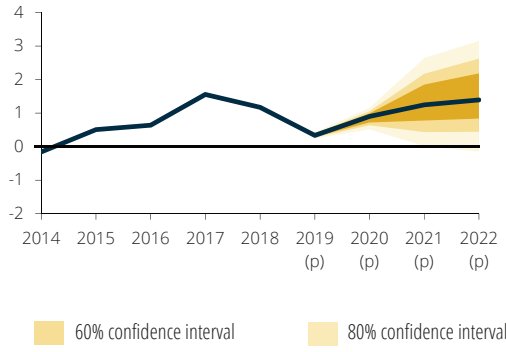
18. Given the proximity of the end of the year, no specific risk factors were considered for 2019. However, a margin of uncertainty surrounding the central scenario was considered, in line with previous forecast errors.

Chart I.4.1 • Gross domestic product | Rate of change, in percentage



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

Chart I.4.2 • Harmonized index of consumer prices | Rate of change, in percentage



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

5 Conclusions

According to the projections in this *Economic Bulletin*, the Portuguese economy will continue to expand but at a more moderate pace. Projected growth rates for economic activity in the 2019-22 period are lower than those registered on average for the recent recovery period. A part of this development is the result of a less favourable external environment. Global trade and external demand for Portuguese goods and services are projected to grow over the projection horizon at a slower pace than that observed in the 2014-18 period, in an environment of increased worldwide uncertainty, which translates into more modest export growth. The downside risks to the current GDP projections are essentially associated with the external environment. The growth of domestic demand in the projection period is expected to remain close to that registered in the recent past, with business investment expected to stay buoyant. As a result, the goods and services account balance will once again present deficits following the surpluses recorded in 2013-18. The Portuguese economy's net lending capacity is expected to persist over the projection horizon, albeit at lower levels than those observed in recent years, which requires monitoring in a context of still very high levels of external indebtedness.

Furthermore, the projected deceleration in GDP is the result of a maturing business cycle – also observed in other advanced economies – whereby growth levels move closer to the economy's potential growth pace. Continuing to weigh on potential growth are structural constraints such as adverse demographic developments and aspects that limit growth in productivity per worker, particularly continuing low levels of physical and human capital per worker. These structural constraints should be the main priorities of economic policy, considering not only the quantity but also the quality of production factors. In this context, particular focus should be given to productivity enhancing measures. Against the background of limitations to increases in labour supply, productivity becomes the crucial factor for growth in the Portuguese economy and for its resilience against the challenges of the coming decade, which also include rapid ongoing technological transformation and environmental sustainability.

Box 1 • Global trade: recent developments and outlook

Following robust growth registered in 2017, global trade slowed down in 2018, a trend which became more pronounced in the first half of 2019. This box describes the recent developments in global trade and the assumptions related with its future evolution, emphasising the uncertainty underlying these projections.

The deceleration in imports since 2018 was broadly based across non-euro area countries (the year-on-year growth rate fell from 3.7% in the second half of 2018 to 1.2% in the first half of 2019),[19] being especially pronounced in Asian economies. In the euro area (excluding Ireland),[20] the pace of growth in imports fell throughout 2018 (the year-on-year rate of change fell from 5.5% in the second half of 2017 to 2.7% in the second half of 2018) and remained virtually unchanged in the first half of 2019.

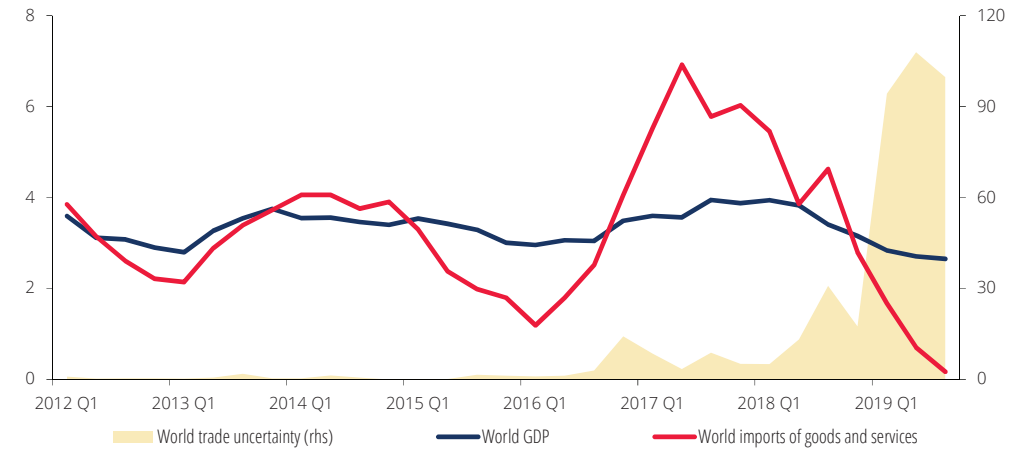
The deceleration profile of global trade flows of goods and services is associated with a combination of interrelated factors, especially heightening trade tensions. Since the beginning of 2018, the United States has implemented various protectionist measures, particularly a growing set of tariffs applicable to imports from China, followed by multiple retaliatory rounds.[21] The worsening of trade disputes has had a direct negative effect on global trade through an increase in import costs and an adjustment of global production chains. Indirectly, it was also reflected in a slowdown in investment and industrial activity at a global level through deteriorating economic sentiment and increased global uncertainty (Chart C1.1).[22] The recent evolution in global trade also reflects other factors, namely disruptions in the motor vehicle sector at global level,[23] structural change in the growth pattern of the Chinese economy towards a greater weight of domestic demand and weakening of Asian imports due to the deceleration of industrial technology in the region.[24]

However, the deceleration in global GDP was smaller than that of imports, in a context of resilience of other components of domestic demand – private consumption, in contrast with investment, has shown robust growth rates – and activity sectors typically less dependent on imports.[25] Thus, the slowdown in global imports in the first half of 2019 marked a decoupling between GDP growth rates and global imports, with the elasticity between these aggregates registering values clearly below 1. Between 2010 and 2018, this elasticity stood at around 1, a value far below that observed in the period prior to the global financial crisis. Various explanations have been offered for this reduction in elasticity between growth in global trade and GDP. Standing out are

19. In the case of the United Kingdom, all economic activity has been strongly influenced by its process of withdrawing from the European Union, with imports having been on a downward trajectory since mid-2016.
20. Imports of intellectual property assets have very significantly affected Irish import data, causing some distortions in the euro area aggregate.
21. Bown, Chad P. (2019) "US-China Trade War Tariffs: An Up-to-Date Guide", Peterson Institute for International Economics.
22. For details, see "Scenario Box 1.2. Trade Tensions: Updated Scenario", *World Economic Outlook*, IMF, October 2019.
23. For details, see Box 1.1. "The Global Automobile Industry: Recent Developments and Implications for the Global Outlook", *World Economic Outlook*, IMF, October 2019.
24. China and other important Asian economies, including Japan, are closely linked by trade flows associated with value chains in the production of computers and other electronic devices. There is evidence of a loss of dynamism in the global technological cycle since the beginning of 2018, which could result from sector-specific structural factors, such as the global market's increasing saturation of certain products, such as smartphones, or cyclical factors, for example launch cycles of new models. For more information, see the Box entitled "What the maturing tech cycle signals for the global economy" in the *Economic Bulletin*, ECB, Issue 3/2019.
25. For more information, see the Box entitled "What is behind the decoupling of global activity and trade?" in the *Economic Bulletin*, ECB, Issue 5/2019.

the fall in the weight of investment in global demand, rise in protectionism and the increasing importance of emerging market economies (typically having lower elasticity) on global activity.[26]

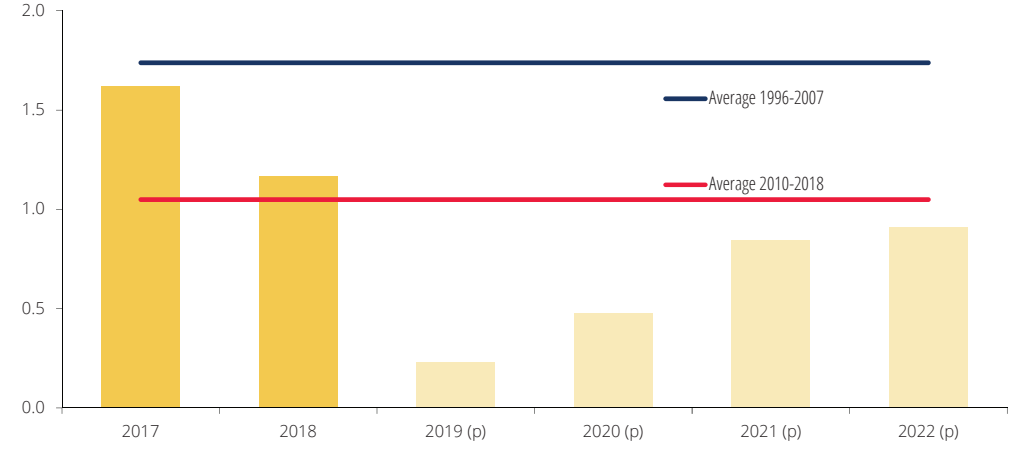
Chart C1.1 • Global activity and trade | Year-on-year growth rate and uncertainty index



Sources: Eurosystem and Ahir, Bloom e Furceri (2018) "The World Uncertainty Index", mimeo. | Note: World trade uncertainty measures uncertainty related to trade based on the number of times uncertainty-related terms are mentioned in the Economist Intelligence Unit (EIU) country reports.

Over the projection horizon, this elasticity is assumed to remain below 1, despite the expected recovery in global trade (Chart C1.2). Historically, the projected recovery of global imports is relatively moderate[27] and its outlook is surrounded by considerable uncertainty.

Chart C1.2 • Global trade elasticity

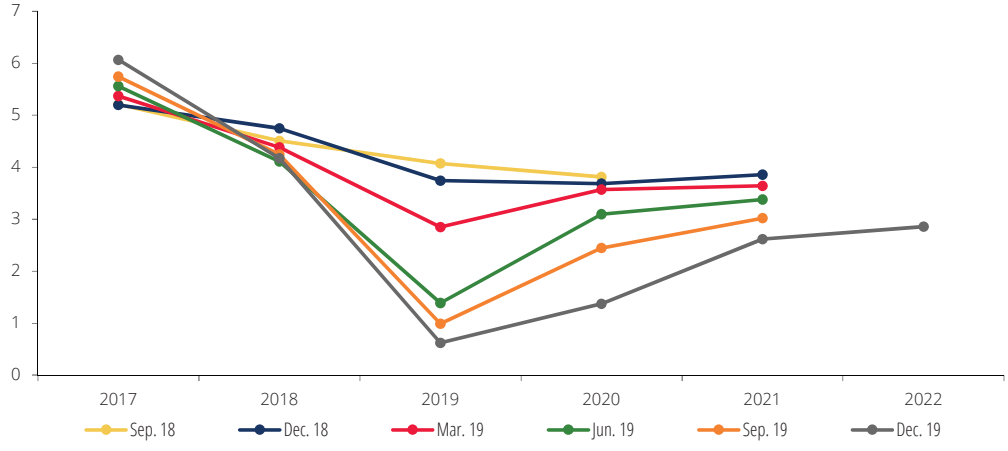


Source: Eurosystem. | Notes: Trade elasticity calculated as the ratio of annual world imports growth to annual world GDP growth. Lighter-colored columns refer to the December 2019 projection horizon. (p) - projected.

26. For more information see the article "Understanding the weakness in global trade What is the new normal?", *ECB Occasional Paper* , September 2016 and the article "Understanding the weakness in global trade", Economic Brief of the European Commission, Issue 33 of January 2018.
27. The profile of the latest projections of the European Commission (1.4%, 2.3% and 2.6%) and the IMF (1.1%, 3.2% and 3.8%) for global import growth in 2019-21 is also moderate in historical terms.

Since the end of 2018 there have been significant downward revisions of growth projections for global imports for the period 2019-21 (Chart C1.3) and the recovery has been successively delayed. Whilst in March 2019 the projection assumptions forecast a recovery beginning in the third quarter of this year, it is currently assumed that this recovery will start only at the beginning of 2020. However, high frequency indicators continue to point to the continued weakness of international trade in the short term.[28] It is worth noting that the current assumptions suggest that trade tensions will not increase until the end of the projection horizon. Despite the negotiations that took place in October suggesting moderation in the tensions between the United States and China, the future of international trading relations remains very uncertain. An upsurge in this conflict and more general increase in protectionism constitute one of the main risks to this projection, as its materialisation may have very significant consequences on economic activity and global trade.[29] Portugal, with its growing openness to external markets, is particularly exposed. A less favourable evolution of external demand for Portuguese goods and services would translate into a more adverse scenario for the growth of the Portuguese economy compared with the projections presented in this Bulletin.[30]

Chart C1.3 • Revisions of global imports growth forecasts | Annual growth rate



Source: ECB/Eurosystem. | Notes: Each line represents the assumed path of global imports growth in each projection exercise.

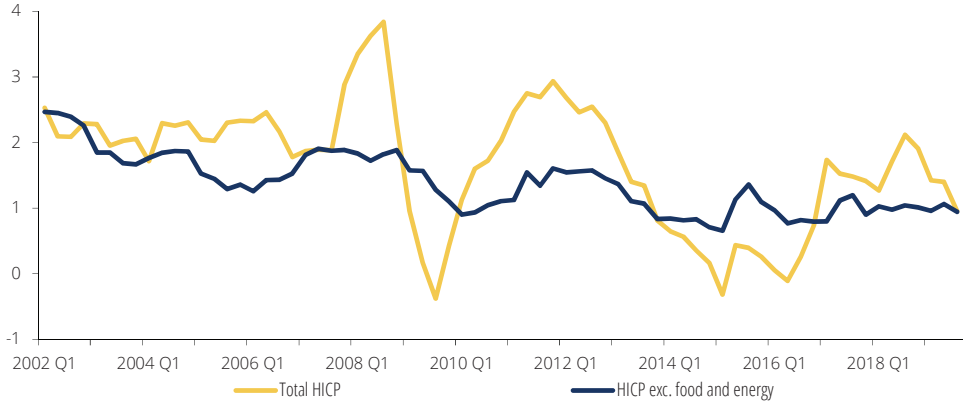
28. Monthly data from the global Purchasing Managers' Index for manufacturing – New export orders (IHS Markit) remain below 50, suggesting a contraction in global trade.
29. See Box "Macroeconomic impact of a rise in global protectionist tensions", *Economic Bulletin*, Banco de Portugal, June 2018.
30. See Box "Sensitivity analysis of the projections to adverse external demand shocks" *Economic Bulletin*, Banco de Portugal, March 2019.

Box 2 • Low inflation in the euro area: possible causes

In recent years Portugal has shown particularly contained inflation levels, and the projections presented in this bulletin indicate this trend is expected to persist over the projection horizon, despite some recovery. These developments are directly related to the prevailing low inflation in the euro area as a whole, especially underlying inflation[31] (Chart C2.1). This period of low inflation was not anticipated, and successive projections carried out by the European Central Bank (ECB) and the Eurosystem overestimated underlying inflation (Chart C2.2).

In the context of a monetary union, the evolution of inflation in its member states as a whole acts as a nominal anchor for individual countries,[32] and it is therefore relevant to analyse this prolonged period of low inflation in the euro area. The purpose of this box is to present and discuss the main arguments used in the economic literature to explain the low inflation observed in the euro area.

Chart C2.1 • Total HICP and HICP excluding food and energy in the euro area | Year-on-year rate of change, percentage



Source: Eurostat (Banco de Portugal calculations). | Notes: Due to methodological changes in the computation of the inflation of package holidays in Germany, the total HICP inflation rates and the HICP excluding food and energy inflation rates are distorted during 2015.

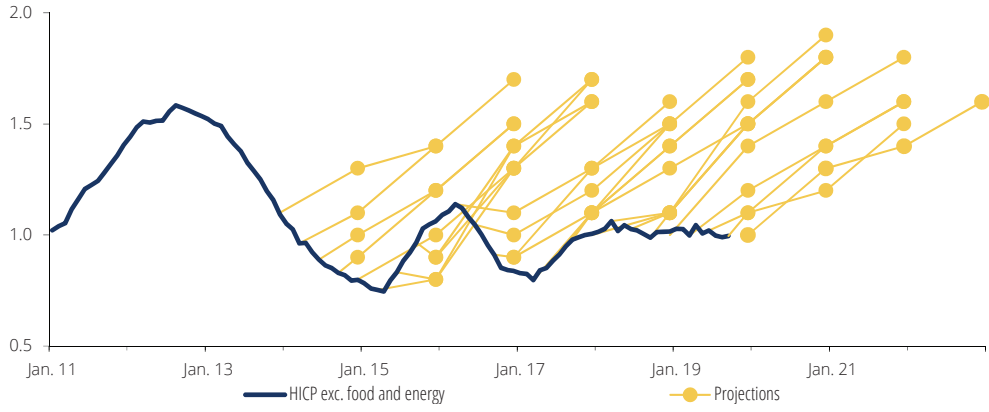
A first argument is linked to an incorrect measurement of the cyclical position of the economy (slack). The transmission process of economic shocks to inflation is usually described by a Phillips curve relationship, where inflation will be higher the higher the output compared to its potential level or, in other words, the lower the unemployment rate compared to its natural rate. However, the measures traditionally used to assess the cyclical position of the economy (such as the output gap or the unemployment level) may be underestimating the existing slack. Some authors argue that after the international financial crisis, the level of the natural unemployment rate in advanced economies may be lower due to demographic factors and less labour market rigidities (e.g. Pereira da Silva, 2019). This would imply that these economies would require a more pronounced economic recovery to generate inflationary pressures. However, the sharp drop in

31. Inflation measure that excludes the most volatile components, particularly food and energy.

32. Over time, each country's inflation may be above or below the euro area average. Total inflation in Portugal has been below the euro area average since August 2018. For further details see Chapter 7 of the October 2019 *Economic Bulletin* of Banco de Portugal and this *Economic Bulletin's* main text.

the unemployment rate in the euro area to levels near or even below those recorded in 2008[33] appears to call this argument into question. At the same time, wage growth in the euro area has made a significant recovery since 2017, signalling fewer available resources in the labour market.

Chart C2.2 • HICP excluding food and energy in the euro area - observed and projected
| Year-on-year average rate of change (last 12 months) and annual rate of change, percentage



Sources: Eurostat and ECB/Eurosystem (Banco de Portugal calculations). | Notes: See note on graph C2.1. Each line displays the projections made on the date that the line starts for the annual rate of change of the HICP excluding food and energy.

The weakening of the pass-through channel of wage costs to prices has also been explored in the literature. Under normal conditions, higher wages imply an increase in costs for firms that end up being reflected in prices charged to consumers. However, Bobeica et al. (2019) show that the pass-through of wage costs to inflation in the euro area may be lower and slower in periods of subdued inflation. At the same time, firms may be accommodating the increase in labour costs by reducing their profit margins. In fact, some authors show that the higher the firms' profits, the lower the pass-through (e.g. IMF, 2019). Thus, according to this literature, monetary authorities should maintain the rather accommodative policy stance over a prolonged period of time for economic conditions to remain favourable and wages to continue to grow until inflation begins to converge towards higher values

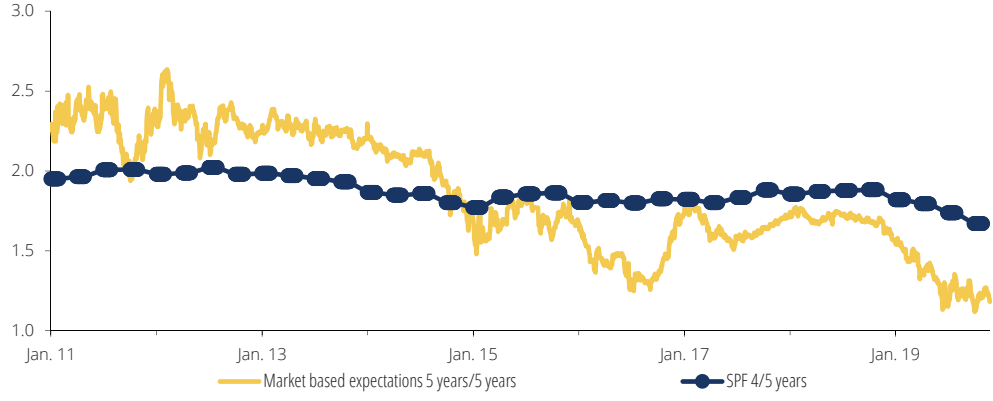
Together with these domestic factors, global developments may also have played a role in the low inflation of the euro area. As part of the globalisation process, the increase in world trade has strengthened the significance of imported goods and services in consumer habits, the price of which is subject to greater competition. At the same time, integration into global value chains allows firms to import parts and components at lower prices and relocate part of their production to geographical areas where costs are lower, which makes it possible to lower the price of their products. Several authors have tried to quantify the importance of these global factors for euro area inflation but results are inconclusive. Some authors find evidence of their relevance (e.g. Forbes, 2019) while others show that these factors do not significantly contribute to explaining inflation in the euro area when compared with domestic factors (e.g. Ciccarelli and Osbat, 2017 and Abdih et al., 2018).

33. In October 2019 the unemployment rate in the euro area was 7.5%, which was the same as in July 2008.

In line with the above argument, technological innovation can also have an impact on inflation on a global scale. The higher use of the internet for shopping (e-commerce) favours the comparison of prices for the same good or service, increasing competition between firms and reducing their power to increase prices without losing a large portion of customers. Some authors show that change in online product prices may be lower than price change in the traditional retail sector (e.g. Goolsbee and Klenow, 2018, using data for the United States). Technological innovation can also reduce production and distribution costs for firms by exerting a downward pressure on prices (see e.g. Coffinet and Perilaud, 2017).

A common feature of all the arguments presented is that the euro area has been exposed to a series of negative shocks (sovereign debt crisis, oil price shocks in 2014 and 2018 and the recent economic deceleration) since the financial crisis in 2007-08, which contributed to keeping inflation low. During this period, and in order to address many of these shocks, the ECB's Governing Council decided to lower the key ECB interest rates into negative territory.[34] This proximity to the effective lower bound on interest rates may raise questions about the ability of conventional policy instruments to change the monetary policy stance, which in itself can affect the inflation expectations of economic agents (e.g. Amano et al., 2019). As can be seen in Chart C2.3, measures for longer-term inflation expectations, whether measured by market instruments or reported in surveys,[35] have been declining since 2013 and reached a historical low in 2019, below the ECB's price stability objective.

Chart C2.3 • Longer-term inflation expectations in the euro area | Year-on-year rate of change, percentage



Sources: ECB and Refinitv. | Notes: Market based expectations measured by inflation linked swaps refer to the 5 year average inflation evaluated 5 years from now. Measure of the Survey of Professional Forecasters refer to the average point forecast of the participants for total HICP 4 or 5 years ahead.

Low inflation expectations can create a vicious circle as they are simultaneously cause and consequence of lower inflation rates. This is also discussed in the literature and is often presented as a determining factor for the high level of inflation persistence observed in the current period (e.g. Ciccarelli and Osbat, 2017).

34. The rate on the deposit facility has been in negative territory since June 2014.
35. The ECB's Survey of Professional Forecasters in this case.

Finally, there are also arguments in the literature that uphold that inflation in the euro area remains low because interest rates have been low for a prolonged period of time and they are expected to persistently remain so. This literature uses the well-known Fisher relation[36] to argue that persistent low inflation levels are consistent and expected, given the persistent nature of the current framework of low nominal interest rates (e.g. Williamson, 2018, Uribe, 2018 and Valle e Azevedo et al, 2019).

Identifying the individual contribution of each of these factors to the evolution of inflation in the euro area is a complex exercise. Nevertheless, the set of arguments put forward suggests that inflation in the euro area will tend to remain below the ECB's target, which poses significant challenges to the conduct of monetary policy in the near future.

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36. This equation states that in the long term the nominal return of an investment is equal to the sum of its real return and inflation.

II Special issue

A microeconomic analysis of Portuguese firms' investment from 2006 to 2017

A microeconomic analysis of Portuguese firms' investment from 2006 to 2017

Introduction

The slow pace of capital accumulation and the low level of capital per worker are recurrently mentioned among the structural weaknesses of the Portuguese economy. There is also the perception that such weaknesses have intensified during the recession in the early years of this decade, a trend that the expansion in recent years has only managed to reverse to a limited extent (see, for example, European Commission, 2019). However, a more in-depth knowledge of the process of capital accumulation can only be gathered by using firm-level data. Such a knowledge will allow a better diagnosis of problems and a more appropriate policy formulation. For example, when implementing an investment incentive policy, it is important to know in which segment of investment distribution the targeted firms are, in order to estimate the likely magnitude of the effects. The purpose of this Special issue is to study investment of Portuguese firms in tangible assets in a number of sectors and to analyse its dynamics, between 2006 and 2017.

The Special issue starts with the presentation of some stylised facts about how firms invest, followed by a more detailed analysis of investment distribution, placing particular emphasis on the interaction with cyclical developments in the period reviewed. After a description of the variable's distribution as a whole, it is useful to focus the analysis on its upper segments, comprising the firms that undertake the bulk of investment. Then differences in capital accumulation between firms already established and those created in more recent years are assessed, continuing to emphasise the heterogeneity over the distribution. Finally, a description of the investment profile throughout the firms' lifecycle is presented.

Data and methodology

The series of investment in tangible assets were calculated within a broader exercise that sought to assemble consistent series of capital stocks and flows, such flows comprising, besides investment, other changes in volume. The methodology underlying this exercise was the "perpetual inventory method", whereby capital stock is obtained as an accumulation of capital flows, deducting depreciation of capital at the beginning of the period.[1]

The basic data come from the Simplified Business Information (IES) for the years 2006 to 2017. The information reported by the firms in the IES is of an accounting nature, and efforts have been made

1. The perpetual inventory method formula is $K(t)=(1-d)K(t-1)+I(t)+OCV(t)$, where K is the capital stock, I investment, OCV the other changes in volume and d the depreciation rate, where t indexes the year of the variables.

to use the definitions of national accounts to construct the series, wherever possible.[2] However, the microeconomic perspective here adopted, favouring a measure of the capital available for firms to use in the productive process, entails a few exceptions. In particular, unlike in national accounts, land has been included in capital goods. Additionally, the work focused on tangible assets. In fact, a similar treatment of intangible assets raises specific issues, especially in terms of conceptual definitions and their translation into accounting items, as well as valuation and depreciation rules, which are beyond the scope of the exercise.

An important aspect in the period covered concerns the change in the rules underlying information reporting by firms that until 2009 was compiled in accordance with the *Plano Oficial de Contas* (POC), which gave rise to the *Sistema de Normalização Contabilística* (SNC), as from 2010. Among the methodological changes brought about by the new system are the reporting of assets net of depreciation and the generalisation of asset valuation at market prices. Furthermore, capital goods used by firms under concessions are recorded in SNC as intangible assets, while, in POC, such goods were directly recorded in the concessionaire's balance sheet as tangible assets.

In applying the perpetual inventory method, the capital stock has been anchored, as a rule, at the nil value prevailing at the time the firm was created, or at the value recorded in the first year the firm was observed, when its creation took place before the period considered. The capital stock for the subsequent years was recursively obtained on the basis of information on flows and an assumption about economic capital depreciation (see below). However, in the case of firms that already existed in the POC period and were still active in the SNC period, series were anchored in the first year available in the SNC (i.e., 2010), and capital flows for the previous years have been de-cumulated. In those cases, the SNC capital stock level was taken as the anchor, as this system better reflects economic reality and it is the current benchmark for business accounting.

As tangible assets are reported by asset type in IES, one uses depreciation rates that are asset- and sector-specific, which have been taken from the OECD STAN database. Capital flows are valued at the prices of the year in which they occurred and must be inflated to 2017 prices, the benchmark year, prior to the application of the perpetual inventory method (EU KLEMS database deflators were used until 2014, and national accounts ones subsequently). Furthermore, the value of the anchor stock, if not nil, was assumed to be at the prices of the year it concerned, an assumption more appropriate in the SNC period, given the market price valuation, than in the POC period.

Corrections have been made to the original investment series, differentiated between POC and SNC, as regards sales of capital goods, which are recorded as negative investment, to value them in line with the economic amortisation rates assumed.[3] In contrast, no corrections were made regarding changes in the delimitation between tangibles and intangibles from POC to SNC, given the difficulties in quantifying them (in the sectors considered - see below - such changes do not substantially disturb the analysis).

The whole analysis in this Special issue considers five sectors separately: (i) manufacturing industry, (ii) construction, (iii) trade, accommodation and food services, (iv) transportation and storage, and (v) communication, administrative and consultancy services. The financial and insurance sectors and the sectors producing, fully or partly, non-market services, such as public administration, health and

2. The investment series analysed in this article correspond, in national accounts, to the narrow concept of gross fixed capital formation.
3. In the accounting information in IES, such sales are valued gross of depreciation, in POC, and net of tax depreciation, in SNC.

education, have been excluded. Agriculture and mining have also been excluded, given the limited coverage in the IES, as well as real estate, owing to the difficulties in measuring capital flows on the basis of accounting data, and energy, gas and water, highly affected by the abovementioned change in the delimitation between tangible and intangible fixed assets in SNC. As regards the relative importance of sector investment flows in the data, manufacturing industry accounts for about 30 per cent of total, trade, accommodation and food services for close to 30 percent, communication, administrative and consultancy services for 25 percent, transportation for nearly 10 percent and construction for around 7 percent.

General overview

A well-documented stylised fact in the literature on firm-level investment in several countries is its extremely volatile nature (see, for example, Disney, Miller and Pope, 2018, Gourio and Kashyap, 2007, and Doms and Dunne, 1994). In fact, firms do not generally invest on an ongoing basis, but commonly have periods of low or nil investment, punctuated by peaks (referred to in the literature as spikes), where the variable assumes considerable amounts. Such a behaviour is linked to the very nature of capital accumulation: a particular investment project, such as the construction of a factory or a significant machinery acquisition, often requires high levels of investment over the course of a year or two that are not maintained in subsequent years.

Table 1 presents a first set of statistics intended to highlight the volatility of micro-level investment in Portugal, namely the proportion of firms that have invested and firms that have not, on an annual basis, in each of three periods of equal extent into which the sample was subdivided. There is also a small number of firms with negative annual investment values, i.e. with sales exceeding acquisitions of capital goods (not shown). The first of the three periods considered corresponds roughly to the years that preceded the economic and financial crisis (2006-2009), the second to the recessive period that followed (2010-2013) and the third to the economic recovery years (2014-2017), making it possible to highlight how firms' investment has interacted with the economic cycle in Portugal. Table 1 also shows the proportion of firm/year pairs featuring investment spikes, measured by an investment rate (ratio between investment in a given year and the capital stock at the beginning of the same year) above 20%, as usually defined in the literature. Such a proportion is called the investment spike rate.

In the period prior to the crisis, investment assumed positive values in about half of the firm/year pairs in all sectors considered, falling slightly behind in construction and transportation. The highest figures, around 60%, were recorded in manufacturing industry and communication, administrative and consultancy services. In the downturn phase, the proportion of firms/year showing positive values tumbled down in all sectors, with falls ranging from around 7 percentage points (transportation) to 16 percentage points (communication, administrative and consultancy services). In the most recent period, the importance of firms with positive investment amounts has remained, in some sectors, close to the values during the recession, while in others it has slightly decreased. In most sectors, nearly two thirds of the firms made no investment in a given year, during that period; in the manufacturing industry, this figure was slightly lower, at about half. In respect to investment spike rates, pre-crisis figures, which ranged from 27% to 37%, depending on the sector, were not recovered, currently ranging from 16% to 23%. Therefore, there are fewer firms investing strongly relative their capital stock.

Table 1 • Proportion of firms with positive and nil investment, as a percentage, investment spike rate and average investment rate, as a percentage of capital stock

	Prop. of firms		Prop. of spikes	Average annual investment rate over period (proportion of firms in the brackets)			
	Inv>0	Inv=0		under 1%	1% to 5%	5% to 20%	over 20%
			Manufacturing industry				
2006-2009	60.8	33.6	31.4	30.2	9.9	17.8	42.1
2010-2013	51.2	48.4	19.2	34.9	14.1	21.9	29.2
2014-2017	50.8	48.9	20.8	36.6	11.5	20.8	31.1
			Construction				
2006-2009	45.0	49.8	31.5	37.8	6.7	11.5	44.1
2010-2013	30.3	69.3	15.6	49.0	9.6	14.1	27.3
2014-2017	30.7	69.0	17.7	50.6	7.5	12.2	29.7
			Trade, accommodation and food services				
2006-2009	51.3	44.0	27.2	36.9	10.1	14.5	38.5
2010-2013	40.5	59.2	16.7	42.0	12.8	17.2	28.0
2014-2017	37.2	62.5	16.0	48.5	10.9	14.7	25.9
			Transportation and storage				
2006-2009	42.1	51.3	32.0	41.3	4.5	8.0	46.1
2010-2013	35.6	64.0	21.0	40.3	7.1	14.3	38.2
2014-2017	37.6	62.1	22.6	41.1	5.6	14.5	38.7
			Communication, administrative and consultancy services				
2006-2009	57.1	38.3	36.7	29.7	7.9	13.1	49.3
2010-2013	41.5	58.2	21.1	37.1	10.8	16.6	35.6
2014-2017	36.9	62.9	20.0	42.4	9.5	15.6	32.6

Source: Banco de Portugal calculations based on IES. | Note: Statistics in the first three columns are calculated for firm/year pairs. The average annual investment rate (last four columns) is calculated by firm in each of the three periods. Investment spikes occur in years in which the investment rate is over 20%.

The above statistics, taking the year as a reference, underline the volatility of firm-level investment but give an incomplete view of the investment effort. In fact, investment expenditure is often multi-annual, and different volatility degrees are compatible with the same level of expenditure over a longer period. Consider two firms with a similar initial capital stock and undertaking a four-year investment plan, of the same overall amount. Those two firms can implement such a plan with very different annual flows: one of them may carry out almost the whole investment in one year, i.e. it will have an investment spike in that year and an almost nil investment in the remaining ones, while the other firm may do so spending approximately uniform amounts.

Table 1 (right-hand side) shows brackets for firms' average investment rates throughout each of the previously defined time periods, to take better account of the multi-annual character of investment expenditure.[4] Four brackets were considered, that can be read as follows: a firm with average annual rates of 10% would increase its capital stock by approximately 50% by maintaining this investment rate for 5 years, while a firm with average investment rates of 20% would double it. The firms in the first bracket (average rate below 1%) are those which have hardly invested over the period considered.

This smoother perspective suggests a less negative outlook for investment, notably throughout the economic downturn phase and the subsequent boom. During these two periods, about half of the firms in manufacturing industry, transportation and communication, and administrative and

4. The average investment rate was calculated considering the years for which the firm existed in the database, which allows to include firms with no observations for all years in each period.

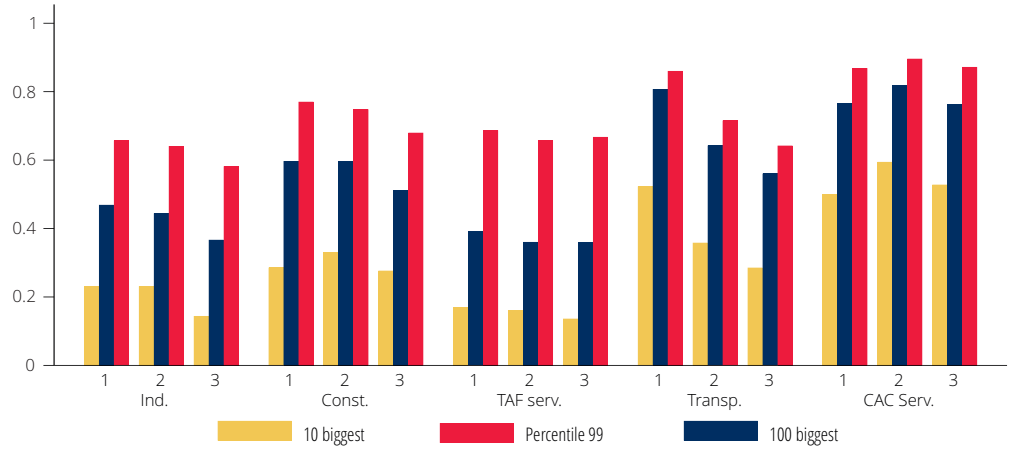
consultancy services are in the third and fourth brackets, having thus made investments of some or great importance relative to their capital. The corresponding proportion for the remaining sectors stands at 40%.

Nevertheless, a group of firms, ranging from one third in manufacturing industry to half in construction, have hardly invested during the recent economic boom. In general, in line with the previous analysis, it appears that average investment rates have not recovered when the economy re-entered a boom cycle. As explained below, this evidence - concerning firms as a whole - reflects, in part, the investment upturn profile, which was not uniform throughout its distribution, but rather concentrated in the upper quantiles.

Concentration of investment

Another stylised fact about investment in Portugal is its high degree of concentration. Chart 1 shows the proportion of the overall aggregate by sector that was carried out by, respectively, the 10 largest firms, the 100 largest firms and the last percentile of the variable's distribution[5], on an annual basis.

Chart 1 • Proportion of total sector investment by firms in each of the groups indicated in (1) 2006-09, (2) 2010-13 and (3) 2014-17 | As a percentage



Source: Banco de Portugal calculations based on IES. | Note: Firms in each group are determined by sector and year.

On average, firms in the last percentile represented approximately two thirds of overall investment in the manufacturing industry and trade, accommodation and food services, about three quarters in construction and transportation, and 90% in communication, administrative and consultancy services. Considering the 100 firms that invested most in each sector, such a proportion ranges from 30% to 70%. Furthermore, by restricting the scope to the top 10 investing firms, these still account for about 12% of investment in trade, accommodation and food services, 17% in the manufacturing industry, 21% in construction, 27% in transportation and almost 50% in communication, administrative and consultancy services. Finally, it should be noted that firms in the last quintile (not shown) undertake almost the whole investment - from 97% to 99%, depending on the sector and the year. Nevertheless,

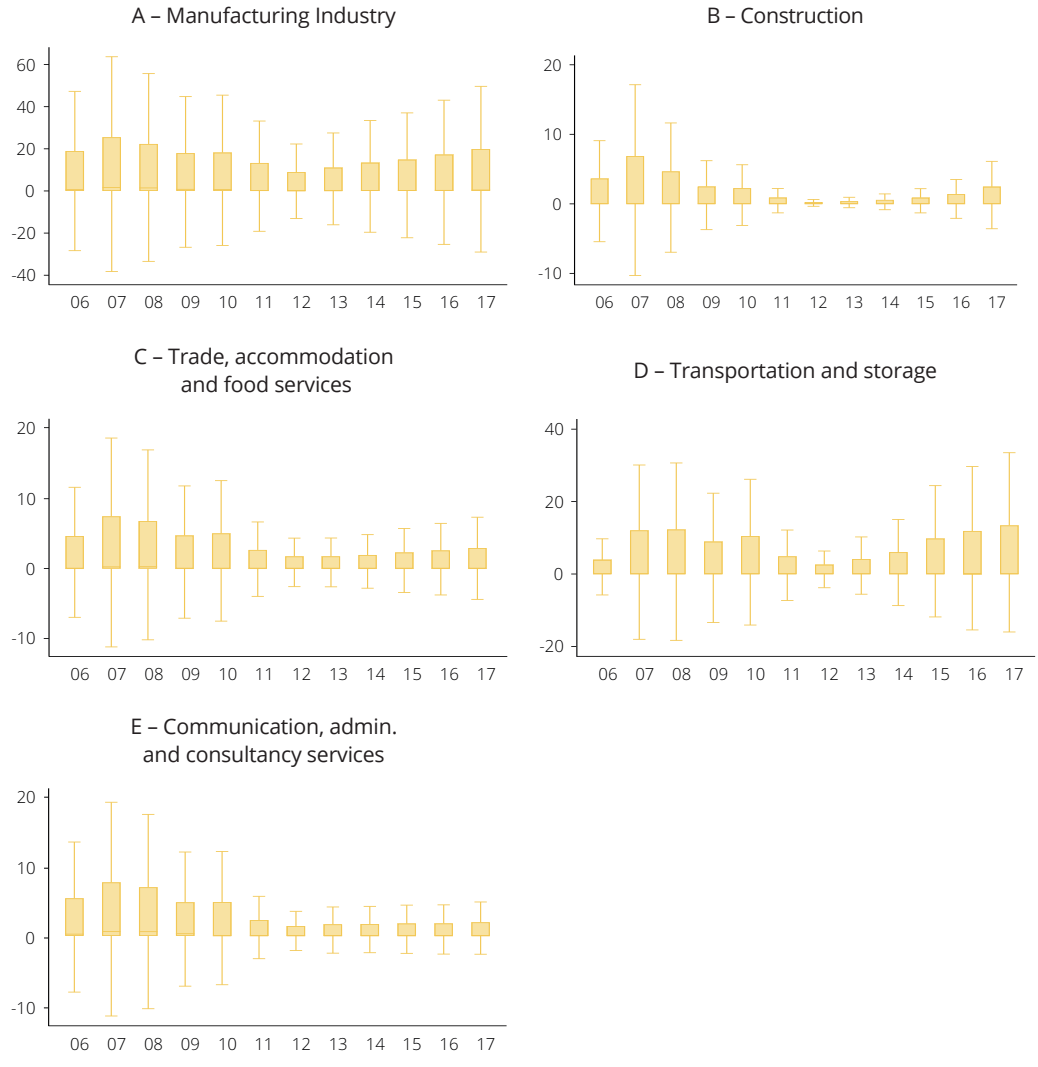
5. On annual average, the number of firms in the last percentile is 389 in the manufacturing industry, 444 in construction, 1312 in trade, accommodation and food services, 186 in transportation and 546 in communication, administrative and consultancy services.

there has been some downward trend in investment concentration in industry, construction and transportation, which, as shown below, is associated with a negative evolution of capital spending by the largest investors in those sectors, during the downturn and recovery periods.

Distribution of investment

The box plots in Chart 2 show the developments in the distribution of investment for all firms in the five sectors considered, yielding a characterization of the productive structure as a whole.

Chart 2 • Distribution of investment from 2006 to 2017 | In thousands of euros at 2017 prices



Source: Banco de Portugal calculations based on IES. | Note: The chart represents a box plot, in which the central box shows the values from the 25th percentile to the 75th percentile (interquartile range) and the horizontal line corresponds to the median of the distribution (50th percentile). The plot excludes outliers i.e. values lower than the difference between the 25th percentile and 1.5 times the interquartile range, or higher than the sum of the 75th percentile and 1.5 times the interquartile range.

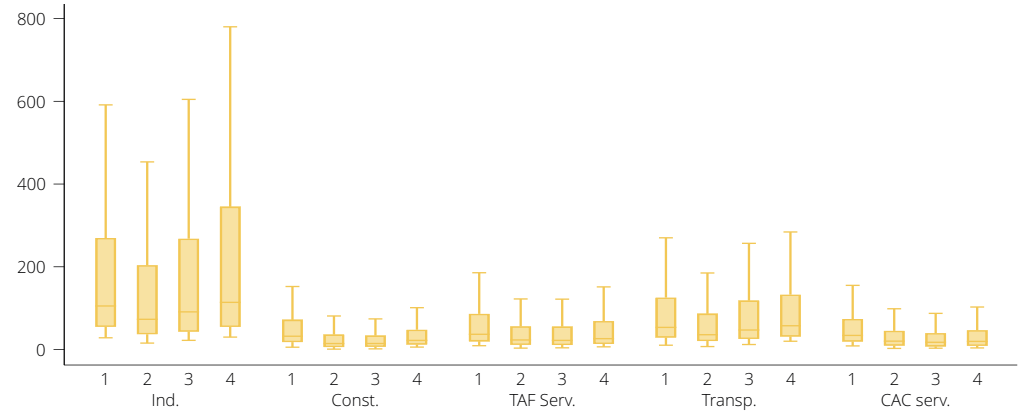
The prevailing structural feature of this distribution is a large number of firms investing little or nothing and, at the same time, a strong positive skew. As shown in Table 1, the bulk of firms with positive investment in the pre-crisis period and all such firms in recent years are already above

the median of the distribution. Thus, in the plots, the horizontal line, corresponding to the median, is either close or coincides with the lower limit of the central box, corresponding to the 25th percentile. On the other hand, the importance of investments made by top investors originates a very long right tail (not shown in the box plot). Given the variable's distribution profile, the plots for all firms (Chart 2) practically do not comprise the upper quintiles, where the firms that undertake almost the whole investment are. Thus, Chart 3 presents box plots similar to the previous ones, but only for firms above the 80th percentile of investment.

During the downturn there was a shift to the left along the positive-valued segment, accompanied by an increase in nil values, which translated into a compression of the distribution (Chart 2). Such a development highlights the marked pro-cyclical character of capital accumulation. The left-shift movement is also visible for firms in the upper quintile (Chart 3). The intensity of the reduction in investment varied according to sectors, being relatively weaker in manufacturing industry and particularly strong in construction. The recovery during the economic upturn is visible in all sectors, but, in 2017, levels remained noticeably below the pre-crisis period in construction, communication, administrative and consultancy services and, to a lesser extent, in trade, accommodation and food services.

In the box plots it is also evident the reduction in absolute dispersion (which can be measured by the central bar)[6] during the downturn phase, a development that was partially reversed during the recovery. A lower investment dispersion in the downturn may be explained by the fact that firms mainly undertook capital replacement during that period, not starting new major projects.

Chart 3 • Distribution of investment, **values above the 80th percentile**, in (1) 2006-09, (2) 2010-13, (3) 2014-16 and (4) 2017 | In thousands of euros at 2017 prices



Source: Banco de Portugal calculations based on IES. | Note: The chart represents a box plot above the 80th percentile, in which the central box shows the values from the 85th percentile to the 95th percentile and the horizontal line corresponds to the 90th percentile. The plot excludes outliers i.e. values lower than the difference between the 85th percentile and 1.5 times the range between 85th and 95th percentiles, or higher than the sum of the 95th percentile and 1.5 times that same range. The firms above the percentile 80th are selected by sector and year.

As regards amounts invested per firm, there are sector differences that should reflect the different capital intensities. For example, the 90th percentile of annual investment for the whole period considered was around 90,000 euros in manufacturing industry, 45,000 in transportation, 25,000

6. Absolute dispersion in the last quintile can be measured by the range between the 95th and 85th percentiles, similar to the interquartile range for the distribution as a whole.

in services sectors and 20,000 in construction. In the 99th percentile, the values amount to 1.5 million euros in industry, 700,000 in transportation and 250,000 to 350,000 in the remaining sectors.

Aggregate investment throughout the distribution

The evolution of the distribution quantiles has a relative nature and may hide important dynamics related to the creation and disappearance of firms. For example, if in a given sector the number of firms decreases evenly throughout the distribution, the respective quantiles will not change substantially, but aggregate investment, both for the firms as a whole and in the various distribution segments, will decrease. To take account of time variation in the number of firms throughout distribution, Chart 4 shows aggregate investment made by three groups of firms: (i) below the 90th percentile, covering the bottom half of firms making almost all of the investment; (ii) between the 90th and 99.75th percentiles, covering the bulk of firms in the upper half and (iii) above the 99.75th percentile, comprising the top investors.[7]

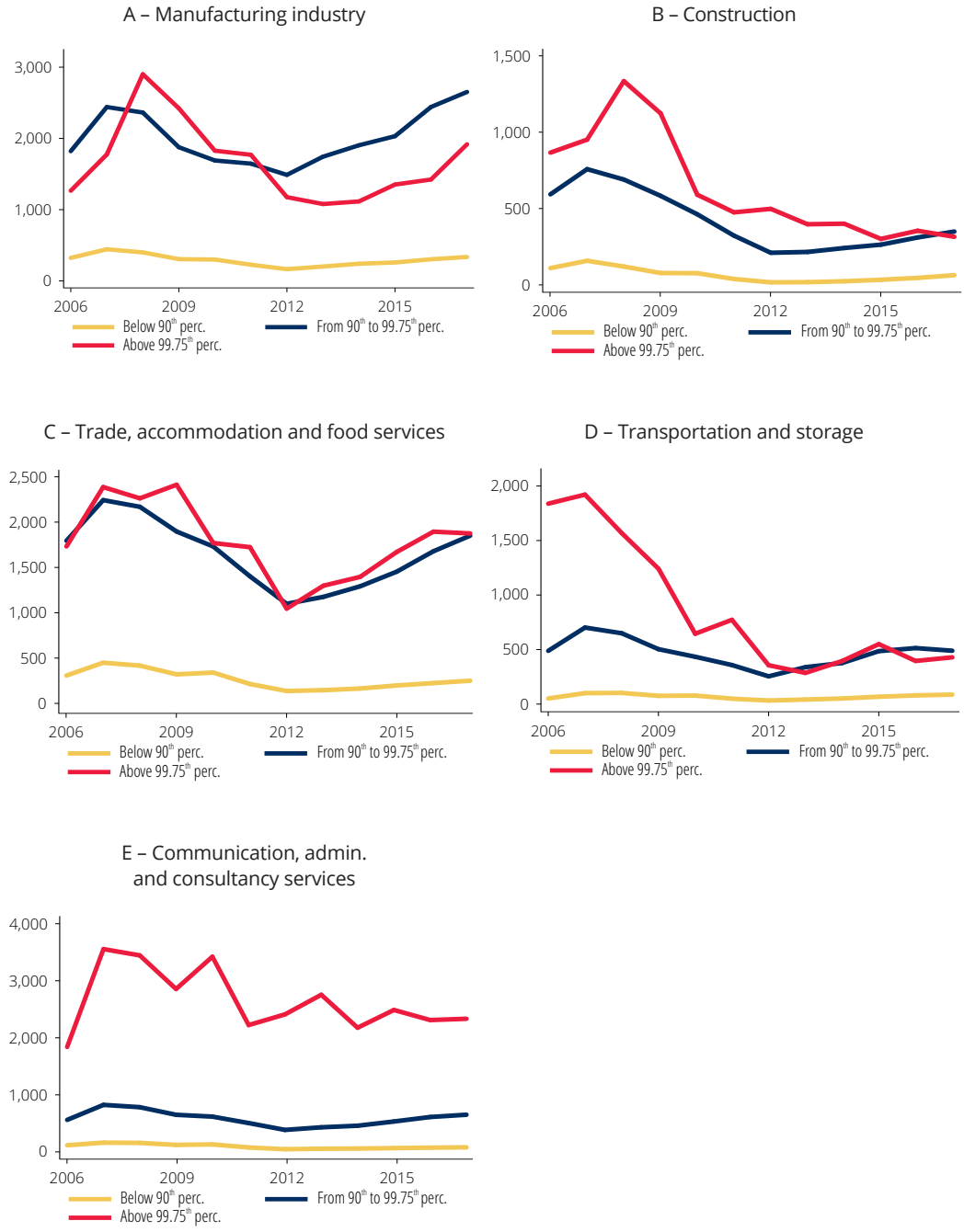
The pattern of investment recovery is heterogeneous across sectors and, within those, across distribution segments. In the last decile, and excluding top investors, the recovery profile is common to all sectors. Manufacturing industry stands out due to a particularly positive evolution in this segment, with an increase in investment of about 25% in 2017 compared to the pre-crisis period as a whole (2006-2009). Corresponding aggregates in trade, accommodation and food services, transportation and communication, administrative and consultancy services are at 80 to 90% of pre-crisis levels. In the case of construction, recovery is less obvious, the investment of this group of firms in 2017 being at about half the value in the years preceding the crisis.

Focusing the analysis on the largest investors in each sector (above the 99.75th percentile), only in industry and trade, accommodation and food services is there a pattern of investment recovery, in the economic boom phase, the variable attaining, in 2017, respectively, 90% and 85% of the pre-crisis figures. In transportation and construction there was no recovery following the sharp falls during the recession, with the level in the last year considered well below that of 2006-2009.[8] In communication, administrative and consultancy services there has been no investment recovery among top investors either, but the fall, during the crisis, had been less sharp (a 20% decrease in 2017, compared to the pre-crisis years as a whole).

Below the 90th percentile, covering the bottom half of the firms undertaking almost all of the investment, in the next to last decile, capital expenditure in 2017 reached, or is close to, pre-crisis values in transportation and industry. In the remaining sectors, the aggregate stands at 30% to 40% below.

7. In the first group, each year, the firms with negative investment have not been considered.
8. In transportation, this evolution may be influenced by the change in recording of expenditure related to concessions from tangible assets, in POC, to intangible assets, in SNC, as from 2010, as the original series were not corrected in this respect and the analysis in this article is only focused on tangible assets.

Chart 4 • Aggregate investment by firms below the 90th percentile, between the 90th and 99.75th percentiles and above the 99.75th percentile of investment distribution | In millions of euros at 2017 prices



Source: Banco de Portugal calculations based on IES. | Note: In the first group, firms with negative investment have been excluded.

Young firms and incumbent firms

In investment dynamics, it is interesting to distinguish between the behaviour of firms well established in the market (incumbent) and newcomers. In fact, the latter can be expected to show

specific investment patterns, either because of a different sensitivity to the economic cycle or, primarily, because they are at a different stage of their lifecycle (as discussed in the next section). In the analysis that follows, one considers, on the one hand, incumbent firms in the whole period, i.e. those created before 2006 and still active in 2017. This is a stable and resilient group that survived a severe crisis period. On the other hand, one considers young firms, i.e. all those created over the period 2006-2017.[9] For the total number of firms in the database (i.e. firms existing at least for one year), incumbent firms represent about a quarter of the total and young firms about half. Plots in Chart 5 show investment evolution for the 75th, 90th and 99th percentiles for each of these two groups.

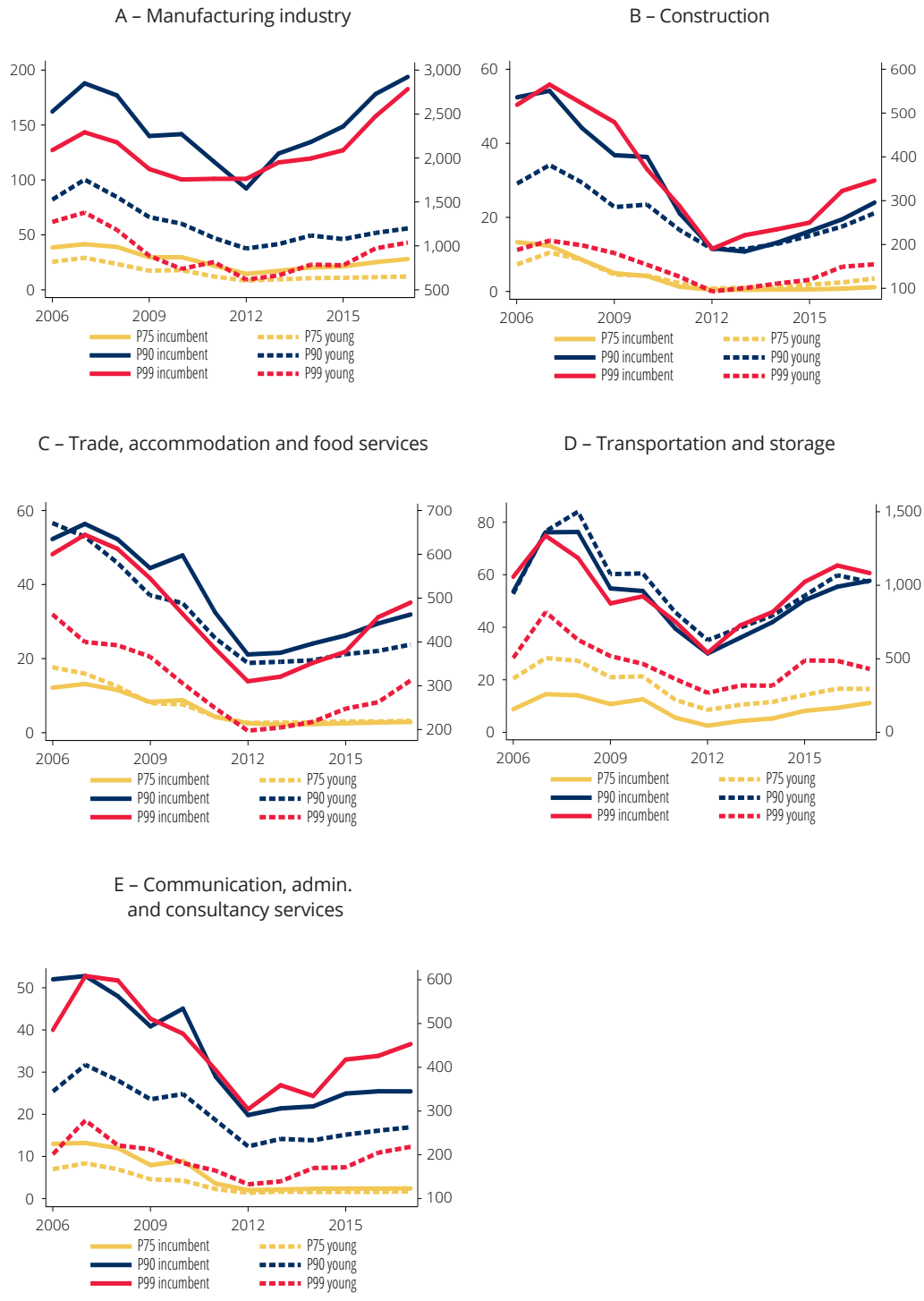
Results show that both incumbent and young firms' investment was seriously affected during the recessive period, in the various distribution points. In the booming phase, investment of incumbent firms in the last decile stands out for its dynamism, particularly in the manufacturing industry, transportation and trade, accommodation and food sectors. In the first of these sectors, 2017 levels exceeded those at the beginning of the period considered. In recent years, young firms in the last decile of their investment distribution were lagging behind incumbent firms as regards capital accumulation, except for those in trade, accommodation, and food services. Therefore, the developments detailed in the foregoing section for firms above the 90th percentile of investment (top investors excluded), largely reflect the incumbent firms' behaviour.

In the lower segment, around the 75th percentile, developments in the incumbent firms' investment have been weaker than those in the upper segment, with no recovery whatsoever in construction, trade, accommodation and food services, and communication, administrative and consultancy services. Newcomers to the market, at the corresponding points of their investment distribution, have not fared better in the recent period either.

The plots in Chart 6 compare again the developments in incumbent and young firms' investment but differentiating them according to the year of creation, which makes it possible to highlight the interaction with the cyclical position of the economy. Prior to the crisis, around the 75th percentile, the initial capital of young firms was aligned with the upper part of the area bounded by incumbent firms' investment, at that percentile. However, moving up in the distribution, initial capital tended to be increasingly within that area, approaching its lower bound. Additionally, even at the 75th percentile, investment of new firms converged to such lower bound over the initial years.

9. For young firms, a condition for survival until 2017 was not imposed, as this would cause a strong positive selection effect in the initial years under review, to the extent that in those years the group of young firms would have been confined to the best among those established at that time. It should be noted that the non-imposition of this condition also implies some bias, in the opposite direction, as such selection is, in this case, gradual, as time elapses. However, the effect is now mitigated by the entry in the group of the firms created in the meantime.

Chart 5 • Investment of incumbent and young firms in the percentiles 75th and 90th (left scale) and 99th (right scale) of the respective distributions | In thousands of euros at 2017 prices

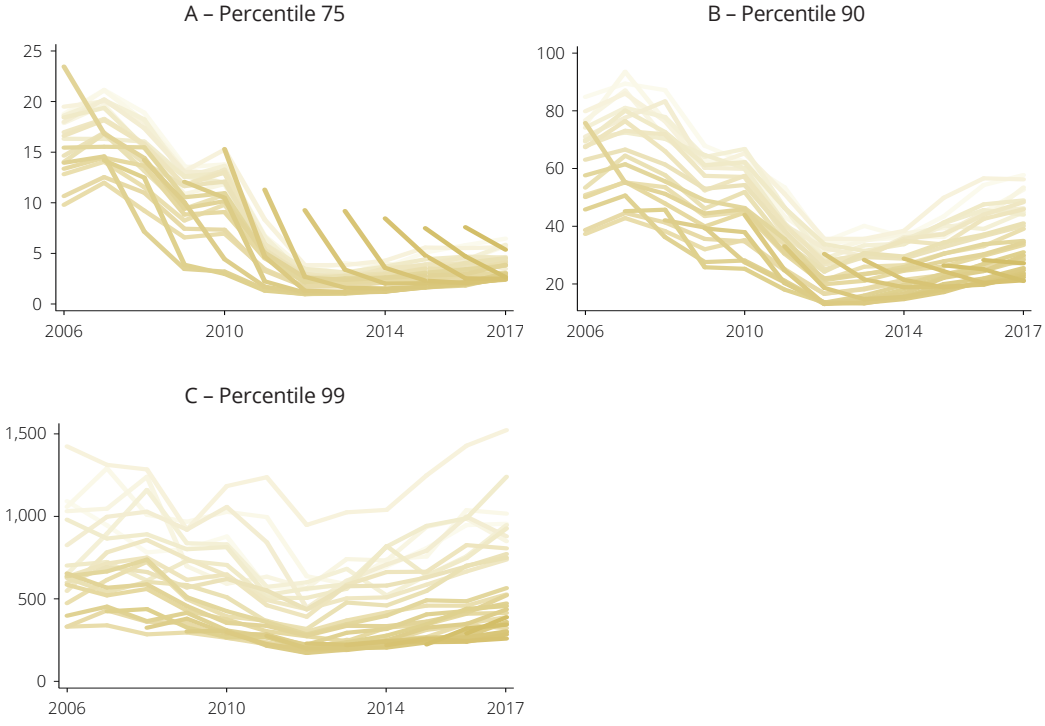


Source: Banco de Portugal calculations based on IES.

During the economic downturn, in the 75th percentile, the initial capital of new firms dropped, in absolute terms, but less sharply than incumbent firms' investment. This might have resulted from

technological constraints requiring a minimum capital when firms enter the market, thus creating rigidity against a fall below a certain threshold. In the higher percentiles, no such differentiation occurred between the two groups. During the economic boom, around the 75th percentile of the distributions concerned, there is no investment upturn both for incumbent and young firms. In the upper segments, investment of firms created in the meantime has not kept pace with the recovery of investment of well-established firms (in line with the evolution presented in Chart 5). Moreover, initial capital of new firms, in particular at the 90th percentile and below, has fallen short of that in the pre-recession period. A breakdown by sector (not shown) indicates that this is particularly visible in services, but also occurs in industry.

Chart 6 • Investment of incumbent and young firms, by creation year (from 1988 to 2017), in the 75th, 90th and 99th percentiles of the respective distributions | In thousands of euros at 2017 prices



Source: Banco de Portugal calculations based on IES. | Note: The tone of lines becomes darker as the year of creation approaches 2017.

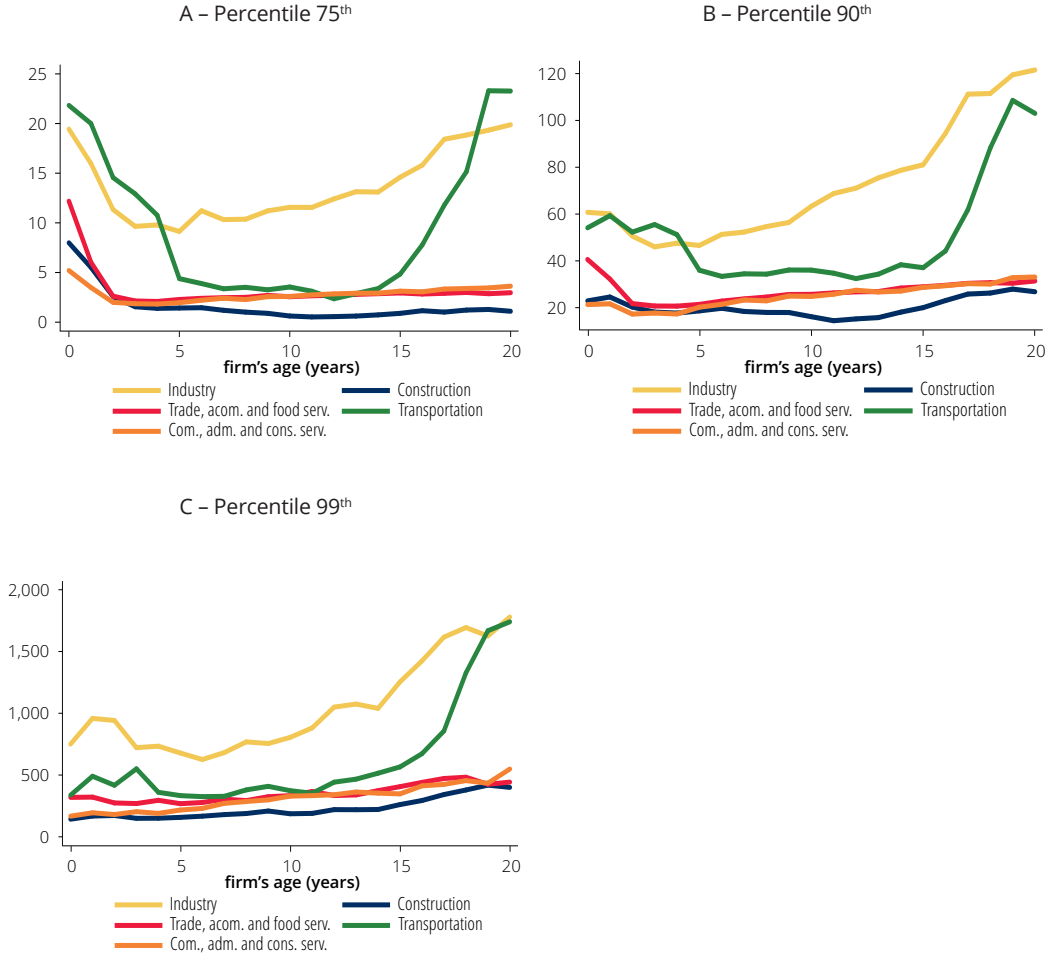
Another point to highlight is the association between investment dispersion and the business cycle. The area bounded by incumbent firms' investment has shortened during the recession, the same kind of evidence as in charts 2 and 3.

Profile of investment over the lifecycle

Firms' investment is influenced by their lifecycle. Businesses tend to grow as they age, and theories about this phenomenon link that growth to factors such as investment in new technologies, entry into new markets, product diversification and financial frictions (see, for example, Hsieh and Klenow, 2014). The profile of capital accumulation should evolve in line with this pattern, but may also be differentiated between sectors according to their specific technologies.

Chart 7 presents the 75th, 90th and 99th percentiles of the distribution of investment according to the firm's age, showing a different profile across sectors. In industry and transportation, there is an approximate U-pattern at the 75th percentile, with investment rapidly decreasing from initial capital, and then reverting to an upward trend, from around the 5th year of age in first case, and the 15th year in the second one. This U-pattern, which may be explained by the capital depreciation and replacement cycle, fades away in the upper quantiles, albeit some growth is still visible after about a decade and a half of age. In the services sectors, there is also an initial downward profile, followed by an increase at a linear pace in the maturity phase, more intense in higher percentiles, suggesting a more constant rate of capital replacement. In construction, there is a similar pattern, but with greater irregularity over time. Capital stock has also a growing profile throughout the firm's lifecycle (not shown) across all sectors.

Chart 7 • Investment of firms over the lifecycle by year of age in the 75th, 90th and 99th percentiles of the respective distributions | In thousands of euros at 2017 prices

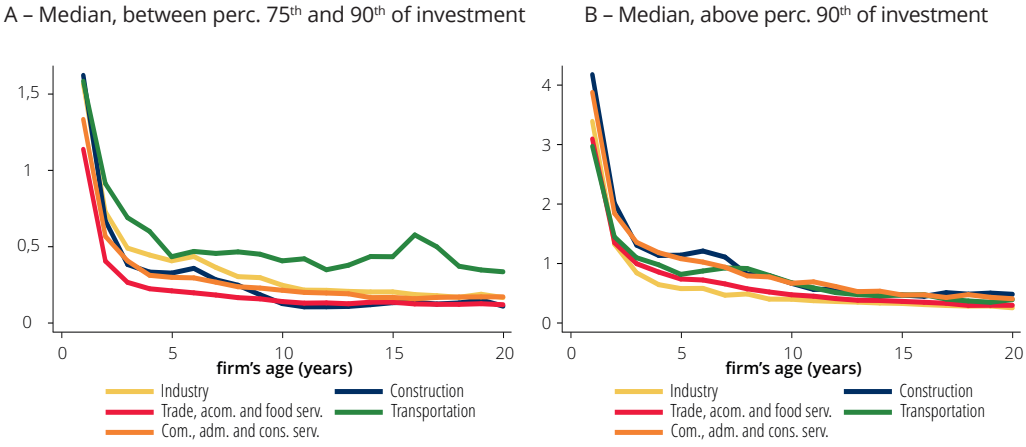


Source: Banco de Portugal calculations based on IES.

It is interesting to examine what the age-profile of investment in Chart 7 implies in terms of investment rates, i.e. measured in capital stock ratios. Chart 8 shows the evolution of the median investment rates for two groups formed, respectively, by firms at between the 75th and 90th percentiles

of investment and above the 90th percentile, by sector and age. Firstly, the differences between sectors in Chart 7 are largely explained by their capital intensity measured up by the capital stock; when this is considered, by taking investment rates, sectors become much closer to each other. The investment rate shows a decreasing pattern over the firms' lifetime. In its initial phase, the median of this rate stands between 1% and 1.5%, in the first group, and 3% and 4% in the second one, followed by a sharp fall up to the fourth or fifth year, respectively, to values close to 0.5% and 1%, which then goes on at a slower pace throughout the lifetime. Therefore, even in periods of investment growth, such growth is not intense enough to allow the investment rate to increase.

Chart 8 • Investment rate over the lifecycle of firms that are, by sector and age, (A) between the 75th and 90th percentiles of investment and (B) above the 90th percentile | As a percentage of capital stock



Source: Banco de Portugal calculations based on IES.

Concluding remarks

This Special issue analysed Portuguese firms' investment in tangible assets between 2006 and 2017. Conclusions may be summarised as follows:

- Investment is heavily concentrated, with firms in the last quintile of the distribution in each sector accounting for almost the overall aggregate, while firms in the last percentile account for at least two thirds.
- The distribution of investment, with a profile that is transversal to the various sectors, is characterised by a high proportion of nil values and a strong positive bias; firms investing in a given year are typically already above the median. These features became more evident during the recessive period, in the early years of this decade, without a reversal during the boom phase. During the recession, the positive-valued segment of investment distribution shifted to the left, in line with the strongly cyclical character of the variable, and the distribution visibly compressed.
- The recovery of investment during the boom phase was uneven across sectors and, within those, across segments of the variable's distribution. In the last decile of sector distributions, excluding top investors, the upturn has been particularly strong in industry, but it has also extended to other sectors, except for construction. Among the top investors in each sector, the recovery has

been narrower, as it has been confined to industry and trade, accommodation and food services. In the next to last decile, encompassing the lower half of the firms undertaking almost all of the investment, the recovery of the variable has been equally less visible, being in this case restricted to industry and transportation.

- Investment of firms created during the 2006-2017 period has been less buoyant during the economic boom than that of incumbent firms, despite some sector heterogeneity.
- The investment profile of firms over the lifecycle is differentiated across sectors, with a rising profile in the firms' maturity phase, more marked in industry than in services. The investment rate shows a downward trend throughout firms' lifetime, less intense as they age.

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