EUROPEAN CENTRAL BANK

EUROSYSTEM

Economic Bulletin

Issue 5 / 2019

Contents

Update on economic and monetary developments

Summary

Incoming information since the last Governing Council meeting in early June indicates that, while further employment gains and increasing wages continue to underpin the resilience of the economy, softening global growth dynamics and weak international trade are still weighing on the euro area outlook. Moreover, the prolonged presence of uncertainties, related to geopolitical factors, the rising threat of protectionism and vulnerabilities in emerging markets, is dampening economic sentiment, notably in the manufacturing sector. In this environment, inflationary pressures remain muted and indicators of inflation expectations have declined. Therefore, a significant degree of monetary stimulus continues to be necessary to ensure that financial conditions remain very favourable and support the euro area expansion, the ongoing build-up of domestic price pressures and, thus, headline inflation developments over the medium term. Accordingly, the Governing Council adjusted its forward guidance on policy interest rates and underlined its determination to act if the medium-term inflation outlook continues to fall short of its aim.

Survey indicators suggest that global economic activity continued to weaken in the second quarter of 2019 and the drop in the global services output Purchasing Managers' Index in June raises the risk of a more broad-based deterioration in the global growth outlook. Global import growth shifted back into positive territory in April after four months of continued contraction, but heightened trade tensions persist. Global inflation decreased in May, driven largely by a slowdown in energy prices.

Since the Governing Council’s meeting in June 2019, euro area long-term risk-free rates have declined amid market expectations of continuing accommodative monetary policy. Sovereign spreads have remained broadly stable, albeit with a large decrease in Italian spreads. Equity prices have increased, supported by the low risk-free rates, and spreads on corporate bonds have decreased. In foreign exchange markets, the euro has depreciated moderately in trade-weighted terms.

Following an increase of 0.2% in the fourth quarter of 2018, euro area real GDP increased by 0.4%, quarter on quarter, in the first quarter of 2019. Incoming economic data and survey information continue to point to somewhat slower growth in the second and third quarters. This mainly reflects the ongoing weakness in international trade in an environment of prolonged global uncertainties, which are particularly affecting the euro area manufacturing sector. At the same time, activity in the services and construction sectors is resilient and the labour market continues to improve. Looking ahead, the euro area expansion will continue to be supported by favourable financing conditions, further employment gains and rising wages, as well as the mildly expansionary euro area fiscal stance and the ongoing – albeit somewhat slower – growth in global activity.

Euro area annual HICP inflation increased to 1.3% in June 2019, from 1.2 % in May, as lower energy price inflation was more than offset by higher HICP inflation excluding food and energy. On the basis of current futures prices for oil, headline inflation is likely to decline over the coming months, before rising again towards the end of the year. Looking through the recent volatility due to temporary factors, measures of underlying inflation remain generally muted. Indicators of inflation expectations have declined. While labour cost pressures have strengthened and broadened amid high levels of capacity utilisation and tightening labour markets, the pass-through of cost pressures to inflation is taking longer than previously anticipated. Over the medium term underlying inflation is expected to increase, supported by monetary policy measures, the ongoing economic expansion and stronger wage growth.

Monetary dynamics remained resilient despite the fading-out of the positive impact of monthly net purchases under the asset purchase programme (APP) and weaker euro area economic growth. Credit to the private sector remained the main source of money creation and the contribution of net external assets also remained strong. The growth rate of loans to non-financial corporations (NFCs) remained relatively robust, benefiting from bank lending rates at new historical lows and favourable bank lending conditions, despite some tightening of credit standards on NFC loans in the second quarter of 2019. In May 2019 the net issuance of debt securities by euro area NFCs moderated after four consecutive months of strong issuance activity. Market debt financing costs for NFCs continue to be very favourable.

Against this overall background, the Governing Council decided to keep the key ECB interest rates unchanged and expects them to remain at their present or lower levels at least through the first half of 2020, and in any case for as long as necessary to ensure the continued sustained convergence of inflation to its aim over the medium term.

The Governing Council confirmed that the Eurosystem will continue reinvesting, in full, the principal payments from maturing securities purchased under the APP for an extended period of time past the date when the key ECB interest rates are lifted, and in any case for as long as necessary to maintain favourable liquidity conditions and an ample degree of monetary accommodation.

The Governing Council also underlined the need for a highly accommodative stance of monetary policy for a prolonged period of time, as inflation rates, both realised and projected, have been persistently below levels that are in line with its aim. Accordingly, if the medium-term inflation outlook continues to fall short of its aim, the Governing Council is determined to act, in line with its commitment to symmetry in the inflation aim. It therefore stands ready to adjust all of its instruments, as appropriate, to ensure that inflation moves towards its aim in a sustained manner.

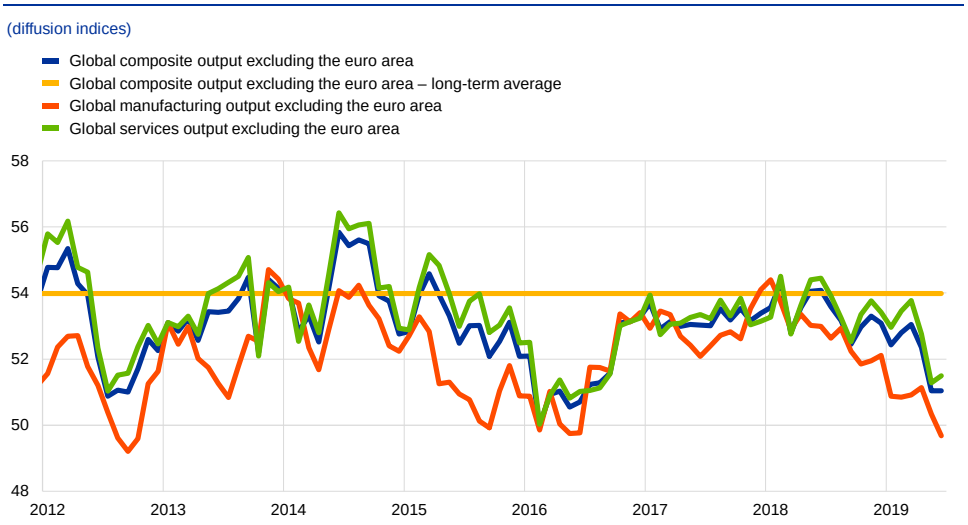
In this context, the Governing Council has tasked the relevant Eurosystem Committees with examining options, including ways to reinforce forward guidance on policy rates, mitigating measures such as the design of a tiered system for reserve remuneration, and options for the size and composition of potential new net asset purchases.

1 External environment

Survey indicators suggest that global economic activity continued to weaken in the second quarter of 2019. The global composite output Purchasing Managers' Index (PMI) excluding the euro area was unchanged in June (see Chart 1), as a marginal increase in services output was offset by a decline in manufacturing. In quarterly terms, however, the PMI declined in the second quarter to 51.5, from 52.8 in the previous quarter (on the back of a drop in both the manufacturing and services indices since March), which is consistent with a softening in global economic activity. The manufacturing output PMI has been decreasing steadily over the past year and in June fell below the 50 threshold indicating a contraction in activity. After a period of relative stability, the services index also declined in the second quarter, but continues to indicate an expansion. Developments were mixed across countries in the second quarter. Among advanced economies, the composite output PMI decreased in the United States and the United Kingdom (in the latter falling below the expansionary threshold in June), while it increased slightly in Japan. In emerging market economies, the composite output PMI remained broadly unchanged in China, while it decreased in India, Russia and Brazil. In Brazil, it fell below the expansionary threshold despite a moderate pick-up in June.

Chart 1

Global composite output PMI



Sources: Haver Analytics, Markit and ECB calculations.
Notes: The latest observations are for June 2019. "Long-term average" refers to the period from January 1999 to June 2019.

The drop in the global services output PMI in the second quarter increases the risk of a more broad-based deterioration in the global growth outlook. Global growth in investment has declined in the last few quarters, mainly as a result of heightened uncertainty and tighter financing conditions (see Box 1). Aggregate private consumption growth has remained more resilient so far, supported by robust labour markets. However, the decline in the second quarter in the services output PMI, which is closely related to consumption, poses downside risks to the latter's near-term outlook. Some support for global economic growth could come from the recent loosening of global financial conditions, driven primarily by market expectations of

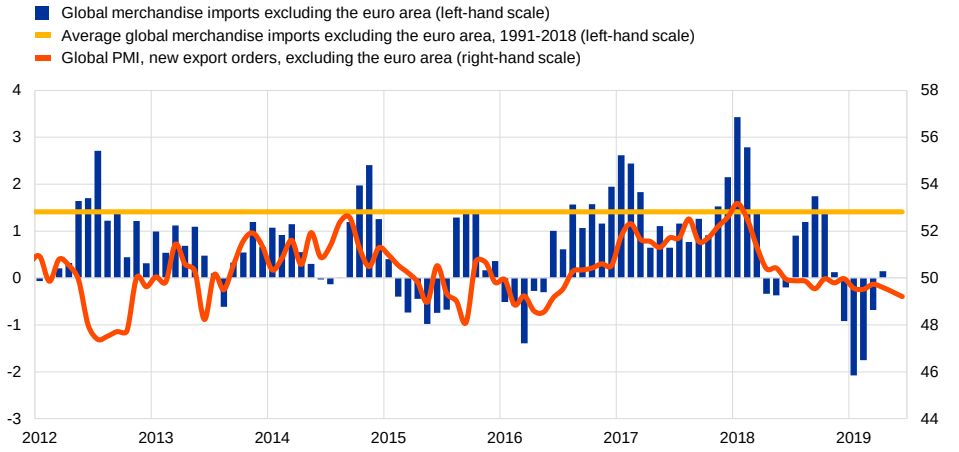
monetary easing in large economies. Nonetheless, risks to the global growth outlook remain to the downside as uncertainty – particularly related to trade tensions – persists.

After four months of continued contraction, global import growth shifted back into positive territory in April. According to data from CPB, global merchandise imports (excluding the euro area) grew marginally in April, following four months of continued contraction (see Chart 2). In emerging economies, imports expanded for the first time in six months (by 0.9%, compared with a drop of 1.0% in March), while in advanced economies they shrank by 0.5%. A wider range of high-frequency trade indicators (also covering May) suggest positive but still weak trade growth in the near term. Nonetheless, the new export orders PMI remained below the expansionary threshold in June (see Chart 2).

Chart 2

Global trade and export orders

(left-hand scale: three-month-on-three-month percentage changes; right-hand scale: diffusion index)



Sources: Markit, CPB Netherlands Bureau for Economic Policy Analysis and ECB calculations.
Note: The latest observations are for April 2019 for global merchandise imports and June 2019 for the PMI.

Heightened trade tensions continue. Trade tensions between the United States and China escalated in May, when the United States announced tariff increases on Chinese imports and China retaliated by raising its tariffs on US imports. At the G20 summit in Osaka at the end of June, however, the two countries reached an agreement to restart trade talks. Moreover, President Trump announced a relaxation of the restrictions on US companies selling equipment to Huawei Technologies which were announced by the US Department of Commerce in mid-May. Other trade issues remain unresolved, however. The US administration has delayed taking a decision on possible increases in car tariffs to mid-November 2019, while talks with the EU on a new trade agreement, announced in July 2018, are still ongoing.

Global inflation decreased in May. Annual consumer price inflation in the Organisation for Economic Co-operation and Development (OECD) countries decreased to 2.3% in May, from 2.5% in April, driven largely by a slowdown in energy prices. Excluding food and energy prices, it slowed marginally to 2.1% in May. Tight labour market conditions across major advanced economies, in particular the United

States, have so far translated into only moderate wage increases, suggesting that underlying inflation pressures remain subdued.

Oil prices have increased marginally since early June. Tensions in the Middle East due to the stand-off between the United States and Iran, as well as the agreement by key oil producers to extend their supply cuts by nine months, have supported the oil price. Nonetheless, downward revisions of the expected demand for oil have eased market tightness and weighed on the price. Among non-oil commodities, metal prices have increased amid supply constraints in the iron ore market, while food prices have remained broadly unchanged.

Economic expansion in the United States remains solid but the pace of growth is likely to decelerate. US real GDP expanded at an annualised rate of 3.1% in the first quarter of 2019, up from 2.2% in the previous quarter. The acceleration in the first quarter reflected an upturn in government spending, private inventories and net exports, which were partly offset by slower private consumption. While overall GDP growth remains supported by strong fundamentals, notably a robust labour market, economic activity is expected to have decelerated in the second quarter of this year as the effects of the fiscal stimulus in 2018 faded and the positive inventory effect reversed. Inflationary pressures remain muted. Annual headline CPI inflation slowed slightly to 1.6% in June, from 1.8% in May. The decline was driven mainly by a sharp drop in energy prices. Inflation excluding food and energy increased marginally to 2.1%.

Economic activity strengthened in Japan in the first quarter of 2019, despite weaker sentiment. Real GDP increased by 0.6% quarter on quarter in the first quarter of 2019, after 0.5% in the previous quarter. Growth was mainly supported by net exports, as imports fell strongly, while domestic demand remained subdued. High frequency indicators point to a strengthening in domestic activity in the second quarter. Private consumption growth increased in April and May; this partly reflected the impact of the extended Golden Week holidays in early May, while the increase in durable goods purchases could reflect frontloading ahead of the VAT hike scheduled for October. Stronger consumption in turn supported imports, which rebounded in the second quarter from the exceptionally low levels recorded in the first. Consumer price inflation declined slightly in May to 0.7% from 0.9% in April, reflecting primarily the anticipated decline in accommodation service prices owing to a steep fall in demand following this year's extension of the Golden Week holidays. Inflation excluding food and energy also moderated in year-on-year terms, to 0.3% from 0.5% in April.

In the United Kingdom, real GDP growth accelerated to 0.5% in the first quarter of 2019 from 0.2% at the end of last year, mainly on the back of Brexit-related stock-building. Domestic demand contributed positively, while net trade reduced GDP growth as imports surged. Business investment increased following four quarters of contraction. A strong quarter-on-quarter growth contribution from inventories, as well as the exceptionally high import growth, reflected increased stockpiling against a background of growing fears of a "no-deal" Brexit at the end of March. Overall, economic activity is expected to remain muted in the coming quarters, given high Brexit-related uncertainty and wider concerns related to global economic developments. Annual CPI inflation was 2.0% in June 2019, unchanged from May.

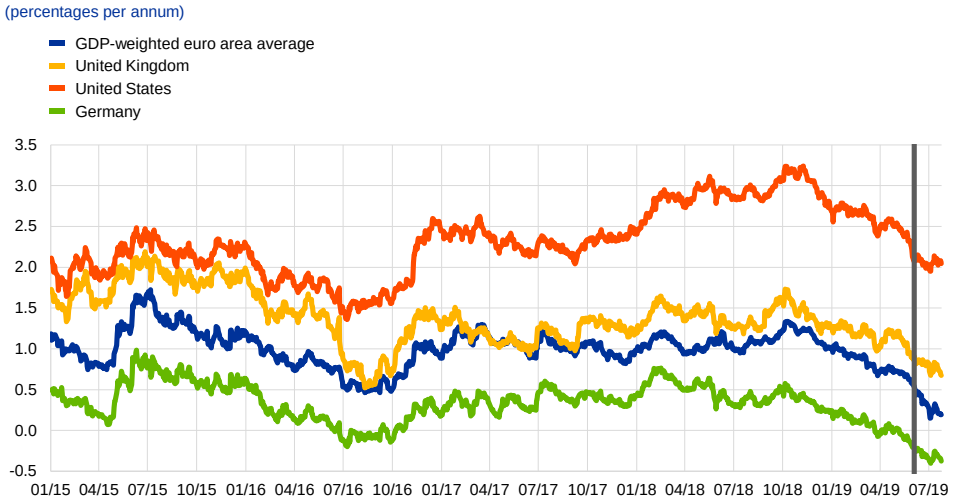
Economic growth in China slowed in the second quarter. Annual real GDP growth declined to 6.2% year-on-year from 6.4% in the first quarter. Final consumption was the main contributor to growth. The decline in its contribution was offset by a rising contribution from capital formation, while the contribution from net exports declined. June data on industrial production, retail sales and fixed-asset investment suggest growth has been picking up, after weaker outcomes in the previous two months. The authorities have indicated they intend to maintain monetary and fiscal support to stabilise growth in line with the official target for 2019 of 6.0%-6.5%. Annual headline CPI inflation was stable in June at 2.7%, while inflation excluding food and energy remained at 1.6%.

2 Financial developments

Long-term sovereign yields have declined in the euro area, continuing the downward trend that started in late 2018. During the period under review (from 6 June to 24 July 2019) the GDP-weighted euro area ten-year sovereign bond yield declined by 29 basis points to 0.19% amid market expectations of continuing accommodative monetary policy (see Chart 3). Ten-year sovereign bond yields in the United States and United Kingdom also decreased over the review period, to around 2.05% and 0.68% respectively.

Chart 3

Ten-year sovereign bond yields



Sources: Thomson Reuters and ECB calculations.
Notes: Daily data. The vertical grey line denotes the start of the review period on 6 June 2019. The latest observation is for 24 July 2019.

Euro area sovereign bond spreads relative to the risk-free OIS rate remained broadly stable, although there was a large decrease in Italian spreads. The spread on German sovereign bonds rose by 8 basis points to -0.27%, while spreads on French bonds remained unchanged at 0.00%. Spanish and Portuguese spreads declined marginally by around 3 basis points, to 0.47% and 0.54% respectively. Following the European Commission's decision not to pursue an excessive deficit procedure against Italy, spreads on Italian sovereign bonds decreased by 77 basis points, to around 1.60%.

Broad indices of euro area equity prices rose amid lower risk-free rates. Over the review period equity prices of euro area financials and non-financial corporations (NFCs) increased by 3.3% and 6.2% respectively. Equity prices were mainly supported by decreasing risk-free rates, reflecting expectations of more accommodative monetary policy, and by positive developments in earnings expectations for NFCs.

Euro area corporate bond spreads narrowed over the review period. In line with the above-mentioned gains in equity prices, the spread on investment-grade NFC bonds relative to the risk-free rate has declined by around 20 basis points since the beginning of the review period to stand at 60 basis points. Spreads on financial sector

debt have also fallen by around 20 basis points to 77 basis points. Overall, although corporate bond spreads are currently higher than the lows reached in early 2018, they remain some 50 basis points below the levels observed in March 2016, prior to the announcement and subsequent launch of the corporate sector purchase programme.

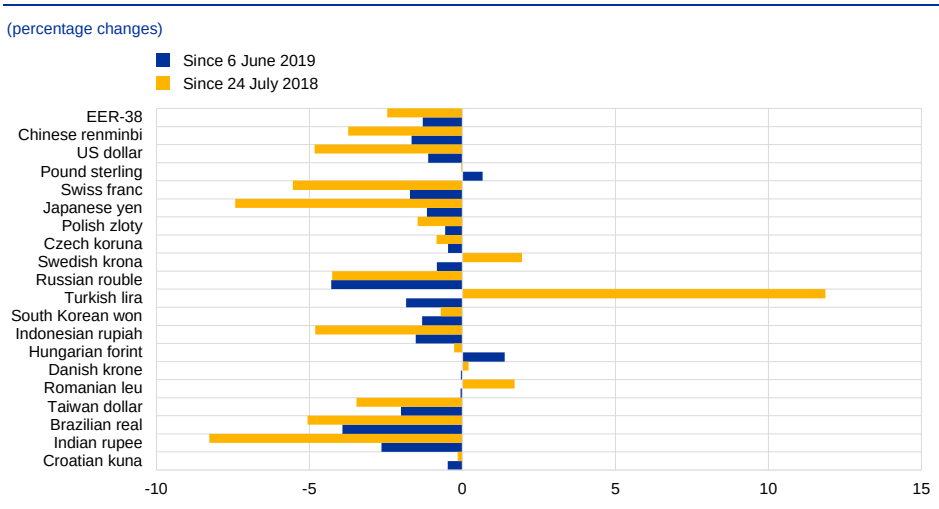
The euro overnight index average (EONIA) stood, on average, at -36 basis points over the review period. Excess liquidity decreased by approximately €199 billion to around €1,705 billion. The decline in excess liquidity mainly reflects an increase in liquidity-absorbing autonomous factors and, to a lesser extent, voluntary repayments in the second series of targeted longer-term refinancing operations (TLTRO II).

The EONIA forward curve shifted further downwards over the review period. The curve reached a low of around -0.6% for horizons slightly longer than one year. Overall, the curve remains below zero for horizons up to 2025, reflecting market expectations of a prolonged period of negative interest rates.

In foreign exchange markets, the euro depreciated in trade-weighted terms over the review period (see Chart 4). The nominal effective exchange rate of the euro, as measured against the currencies of 38 of the euro area's most important trading partners, depreciated by 1.3%. This reflected a weakening of the euro against the US dollar (by 1.1%), the Chinese renminbi (by 1.7%), the Japanese yen (by 1.2%) and the Swiss franc (by 1.7%). The value of the euro also fell vis-à-vis the currencies of most emerging market economies. At the same time, the euro appreciated against the pound sterling (by 0.7%) in the light of the uncertainty around Brexit.

Chart 4

Changes in the exchange rate of the euro vis-à-vis selected currencies



Source: ECB.
Notes: "EER-38" is the nominal effective exchange rate of the euro against the currencies of 38 of the euro area's most important trading partners. All changes have been calculated using the foreign exchange rates prevailing on 24 July 2019.

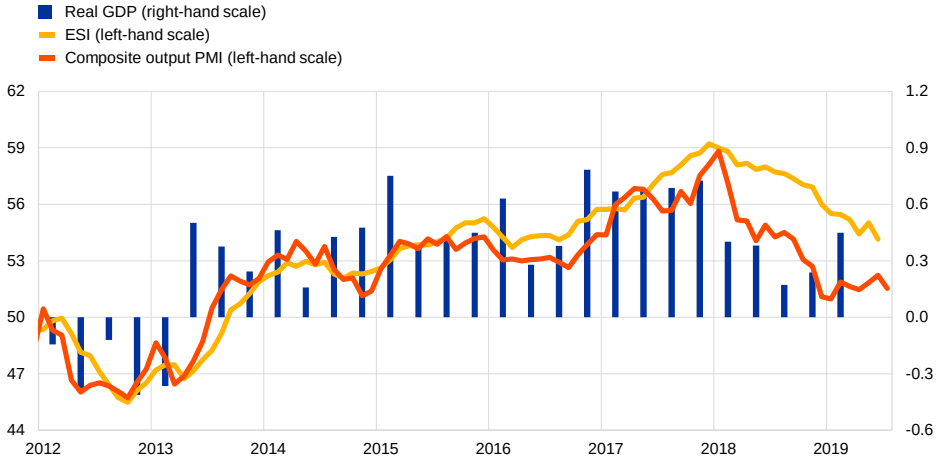
3 Economic activity

Although GDP growth in the first quarter of 2019 was somewhat better than expected, incoming data and survey information point to somewhat weaker growth in the coming quarters. Real GDP increased by 0.4%, quarter on quarter, in the first quarter of 2019, following growth of 0.2% in the final quarter of 2018 (see Chart 5). Domestic demand and net trade contributed positively to GDP growth in the first quarter, whereas the contribution from changes in inventories was neutral. Economic indicators point to ongoing but somewhat slower growth in the second and third quarters of 2019.

Chart 5

Euro area real GDP, Economic Sentiment Indicator and composite output Purchasing Managers' Index

(left-hand scale: diffusion index; right-hand scale: quarter-on-quarter percentage changes)



Sources: Eurostat, European Commission, Markit and ECB calculations.
Notes: The Economic Sentiment Indicator (ESI) is standardised and rescaled to have the same mean and standard deviation as the Purchasing Managers' Index (PMI). The latest observations are for the first quarter of 2019 for real GDP, June 2019 for the ESI and July 2019 for the PMI.

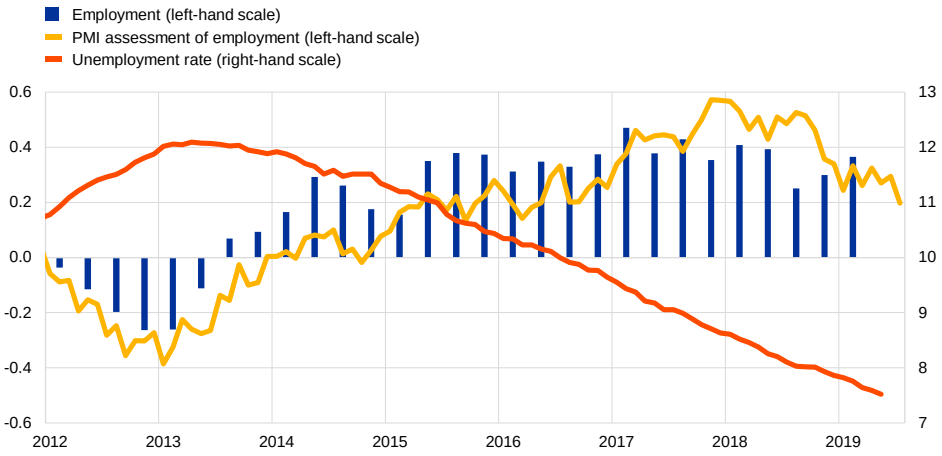
Euro area labour markets remained robust. Employment increased by 0.4% in the first quarter of 2019, up from 0.3% in the fourth quarter of 2018, benefiting from robust output growth. Employment growth was broad-based across countries and sectors. In particular, it remained robust when compared with GDP growth. Employment has risen for 23 consecutive quarters since mid-2013, with the number of people employed increasing by almost 11 million. Meanwhile, productivity per person employed increased by 0.1% in quarter-on-quarter terms in the first quarter of 2019, after small declines in the second half of 2018.

Looking ahead, recent data and survey indicators continue to point to positive employment growth. The euro area unemployment rate stood at 7.5% in May, down from 7.6% in April, and is gradually approaching pre-crisis levels. Short-term survey indicators, despite declining from the high levels recorded in 2018, continue to suggest positive employment growth in the near future.

Chart 6

Euro area employment, PMI assessment of employment and unemployment

(left-hand scale: quarter-on-quarter percentage changes; diffusion index; right-hand scale: percentage of labour force)



Sources: Eurostat, Markit and ECB calculations.
Notes: The PMI is expressed as a deviation from 50 divided by 10. The latest observations are for the first quarter of 2019 for employment, July 2019 for the PMI and May 2019 for the unemployment rate.

Rising employment continues to support household income and consumer spending. Private consumption rose by 0.5%, quarter on quarter, in the first quarter of 2019, following somewhat weaker growth in the previous quarter. Household real disposable income has been largely insulated from the recent growth slowdown. Annual growth of real gross disposable income rose from 1.5% in the fourth quarter of 2018 to 2.7% in the first quarter of 2019. Overall, employment growth has remained resilient during the recent growth slowdown, supporting labour income. In addition, lower direct taxes and social security contributions have contributed positively to households' purchasing power, reflecting fiscal measures in a number of euro area countries (notably in France and Italy). The saving ratio increased further in the first quarter of 2019, as income growth outpaced consumption growth.

Looking ahead, private consumption should continue to grow steadily. Recent data on the volume of retail sales and new passenger car registrations point to higher consumer spending in the second quarter of 2019. Other indicators support the picture of steady consumption dynamics. Consumer confidence, which had been on a broadly declining trend since the end of 2017, stabilised in the first and second quarters of 2019. In July it increased slightly, remaining at a level above its long-term average. The latest survey results also signal further labour market improvements, which should continue to support household income and consumer spending.

Investment growth is expected to remain modest in the near term. Non-construction investment contracted by 1.1% in the first quarter of 2019, quarter on quarter, following robust growth of 1.8% in the fourth quarter of 2018. In contrast, quarterly growth in construction investment accelerated to 1.4% in the first quarter of 2019, supported by dynamic residential investment growth of 0.9%. Overall, gross fixed capital formation saw a slight upward move, increasing by 0.1% in quarter-on-quarter terms. Recent survey results point to a continued moderation of non-construction investment growth. Capital goods sector confidence decreased in

June, reflecting a drop in sentiment, on average, in the second quarter of 2019. Moreover, the monthly industrial production index for capital goods production in April and May stood, on average, at a level below the average seen in the first quarter of 2019. Other indicators, such as new orders and new export orders, are also consistent with muted investment growth in the near term in a context of global uncertainty and weaker foreign demand. In particular, a further increase in uncertainty regarding the outlook for global trade may pose a downside risk to investment growth by dampening orders and production expectations and thus delaying investment decisions. With regard to construction investment, the index for construction production contracted in both April and May while the Purchasing Manager's Index (PMI) and the European Commission's confidence index for the construction sector up to June still pointed to continued – but moderating – growth for construction investment in the second quarter of 2019.

After an upward surprise in the first quarter of 2019, euro area trade does not appear to be gaining momentum. The positive (0.2%) net trade contribution to euro area GDP growth in the first quarter of 2019 was primarily driven by extraordinarily strong exports to the United Kingdom, which were most likely associated with an exceptional increase in inventories by companies in that country in the run-up to the original Brexit date. Available nominal data on euro area trade in goods until May are relatively volatile and point to a worsening of imports and exports in the second quarter of 2019 (-0.5% and -0.4%, respectively, in quarter-on-quarter terms). This decline has mostly been driven by extra-euro area trade developments. In particular, euro area exports to the United Kingdom posted a strong correction in April while exports to the United States, China and Turkey remained subdued. Looking ahead, leading indicators for euro area exports show no clear sign of a bottoming out. The flash PMI for new manufacturing export orders declined to 44.3 in July and remained in contractionary territory. The European Commission's assessment of order books fell to -14.1 in June, its lowest level since November 2013. Shipping indicators, however, provide a more optimistic picture for the coming months.

Incoming data and survey results suggest somewhat weaker growth in the second and third quarters of 2019. This softening of growth can be primarily attributed to weak global trade and the prolonged presence of uncertainties. For instance, although industrial production rose by 0.9% in May, month on month, in April and May it remained on average at a level slightly below the average for the first quarter of 2019. As regards more timely survey data, in the second quarter of 2019 the European Commission's Economic Sentiment Indicator stood, on average, below its average level in the first quarter. Meanwhile, the composite output PMI rose slightly between the first and second quarters, before declining in July.

Looking ahead, the euro area expansion will continue to be supported by favourable financing conditions. In addition, growth should also be underpinned by further employment gains, rising wages, lower energy prices, and the ongoing – albeit somewhat slower – expansion in global activity. The results of the latest round of the ECB Survey of Professional Forecasters, conducted in early July, show that the private sector GDP growth forecasts for 2019, 2020 and 2021 have remained broadly unchanged compared with the previous round conducted in early April.

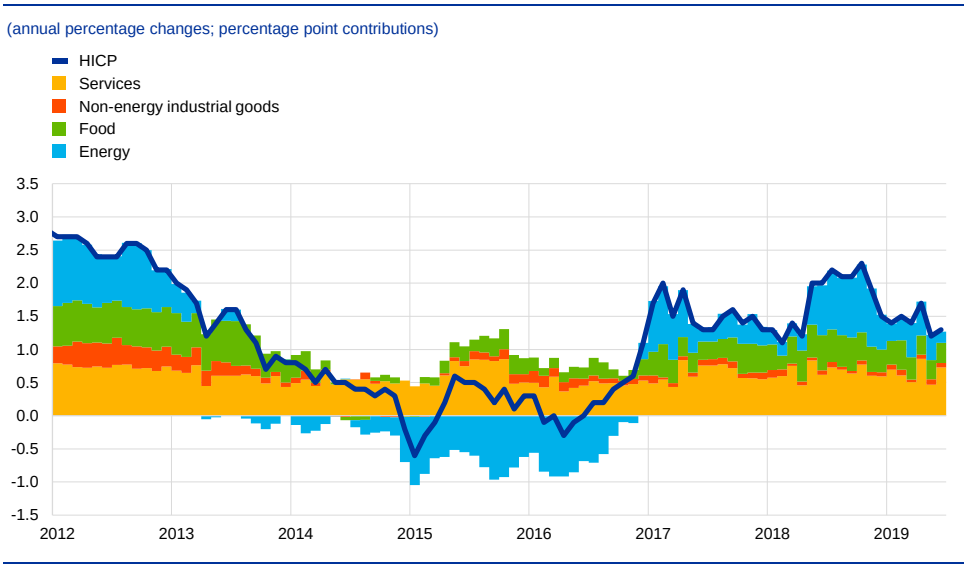
The risks surrounding the euro area growth outlook remain tilted to the downside. This reflects the prolonged presence of uncertainties related to geopolitical factors, the rising threat of protectionism and vulnerabilities in emerging markets.

4 Prices and costs

HICP inflation rose to 1.3% in June 2019, up from 1.2% in May 2019. This increase was attributable mainly to higher HICP inflation excluding energy and food, which more than offset lower energy price inflation.

Chart 7

Contributions of components of euro area headline HICP inflation



Sources: Eurostat and ECB calculations.
Notes: The latest observations are for June 2019. Growth rates for 2015 are distorted upwards owing to a methodological change (see the box entitled "A new method for the package holiday price index in Germany and its impact on HICP inflation rates", *Economic Bulletin*, Issue 2, ECB, 2019).

Measures of underlying inflation remained generally muted and continued to move sideways. HICP inflation excluding energy and food increased to 1.1% in June, up from 0.8% in May. However, this was attributable mainly to calendar effects, particularly evident in the sharp rise in prices of package holidays, which are expected to decline again in July. HICP inflation excluding energy and food is subject to short-term volatility in prices for travel-related items and clothing, which blurs the signals conveyed by this index regarding movements in underlying inflation. Measures that help to abstract from this volatility remained broadly unchanged. For example, HICP inflation excluding energy, food, travel-related items and clothing stood at 1.1% in June, as in the previous month. Signals from other measures of underlying inflation, including the Persistent and Common Component of Inflation (PCCI) indicator and the Supercore indicator,[1] also pointed to a continuation of the broad sideways movement now seen for several quarters.

Supply chain price pressures for HICP non-energy industrial goods declined, but remained well above their historical average in the later stages of the supply chain. The annual rate of change in producer prices for domestic sales of non-food consumer goods was 0.8% in May, down from 0.9% in April, but still above its historical average of 0.55%. Having risen steadily from a low of 0.3% in December

[1] For further information on these measures of underlying inflation, see Boxes 2 and 3 in the article entitled "Measures of underlying inflation for the euro area", *Economic Bulletin*, Issue 4, ECB, 2018.

2018 to 1.7% in April 2019, the corresponding annual rate of change in import prices fell to 1.1% in May. Price pressures also decreased at the very early stages of the pricing chain, with both oil and non-oil commodity prices recording a year-on-year decline.

Wage growth remained robust. Annual growth in compensation per employee stood at 2.2% in the fourth quarter of 2018 and 2.3% in the first quarter of 2019. The outturn for the first quarter of 2019 was affected by a significant drop in social security contributions.[2] Looking through such temporary factors, annual growth in compensation per employee growth has stabilised since mid-2018 at a level slightly above its historical average of 2.1%.[3]

Market-based measures of longer-term inflation expectations remained broadly unchanged, while survey-based expectations decreased slightly. The five-year forward inflation-linked swap rate five years ahead stood at 1.29%, broadly in line with the level that prevailed in early June, but following some notable intra-period volatility (see Chart 8). The market-based probability of deflation remains very contained, despite exhibiting an increasing trend over the review period. At the same time, the forward profile of market-based measures of inflation expectations continues to point to a prolonged period of low inflation, with only a very gradual return to inflation levels that are below, but close to, 2% over the medium term. The results of the ECB Survey of Professional Forecasters (SPF) for the third quarter of 2019 reported point forecasts for annual HICP inflation averaging 1.3%, 1.4% and 1.5% for 2019, 2020 and 2021 respectively. These results represent downward revisions of 0.1 percentage points for each of those years compared with the previous survey round. Average longer-term inflation expectations declined from 1.8% to 1.7%.

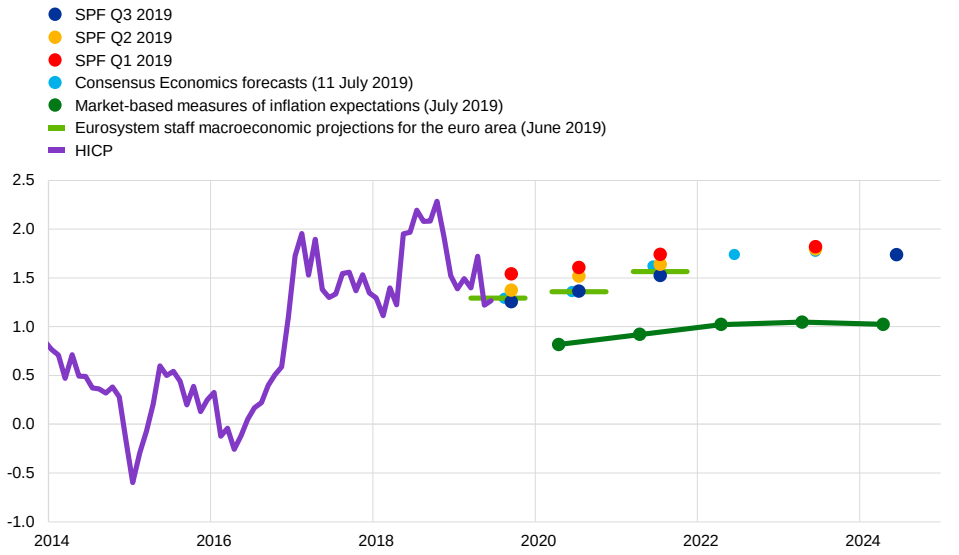
2 This is associated with the tax credit for employment and competitiveness (*crédit d'impôt pour la compétitivité et l'emploi* – CICE) in France, which was replaced by a permanent cut in employers' social security contributions in the first quarter of 2019.

3 The historical average is based on data from the first quarter of 1999 to the first quarter of 2019.

Chart 8

Market and survey-based measures of inflation expectations

(annual percentage changes)



Sources: ECB Survey of Professional Forecasters (SPF), Eurosystem staff macroeconomic projections for the euro area (June 2019) and Consensus Economics.
Notes: The SPF for the third quarter of 2019 was conducted between 1 and 5 July 2019. The market-implied curve is based on the one-year spot inflation rate and the one-year forward rate one year ahead, the one-year forward rate two years ahead, the one-year forward rate three years ahead and the one-year forward rate four years ahead. The latest observations for market-implied inflation are for 24 July 2019.

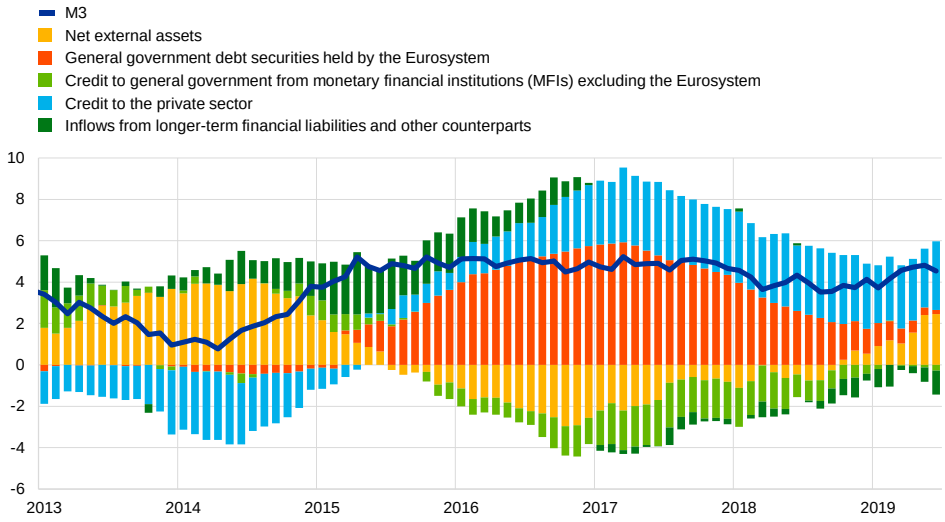
5 Money and credit

Monetary dynamics remained resilient despite the fading-out of the positive impact of monthly net purchases under the asset purchase programme (APP) and weaker euro area economic growth. The annual growth rate of M3 stood at 4.5% in June 2019, down from 4.8% in May, on account of a negative base effect, thus returning to the levels seen in March 2019 (see Chart 9). M3 growth continued to be supported by lower opportunity costs of holding M3. The positive contribution of net purchases under the APP to annual M3 growth has continued to fade out and is now marginal. The narrow monetary aggregate M1 has also continued to grow at a robust pace: its annual growth rate of 7.2% in June 2019, unchanged from May, is one percentage point higher than its local trough in January 2019. Among the M1 components, the annual growth of currency in circulation remained solid, though not exceptionally high by historical standards, pointing to no pervasive substitution into cash. Looking ahead, the current level of real M1 growth continues to indicate that an imminent recession in the euro area is unlikely.

Chart 9

M3 and its counterparts

(annual percentage changes; contributions in percentage points; adjusted for seasonal and calendar effects)



Source: ECB.
Notes: Credit to the private sector includes MFI loans to the private sector and MFI holdings of securities issued by the euro area private non-MFI sector. As such, it also covers the Eurosystem's purchases of non-MFI debt securities under the corporate sector purchase programme. The latest observation is for June 2019.

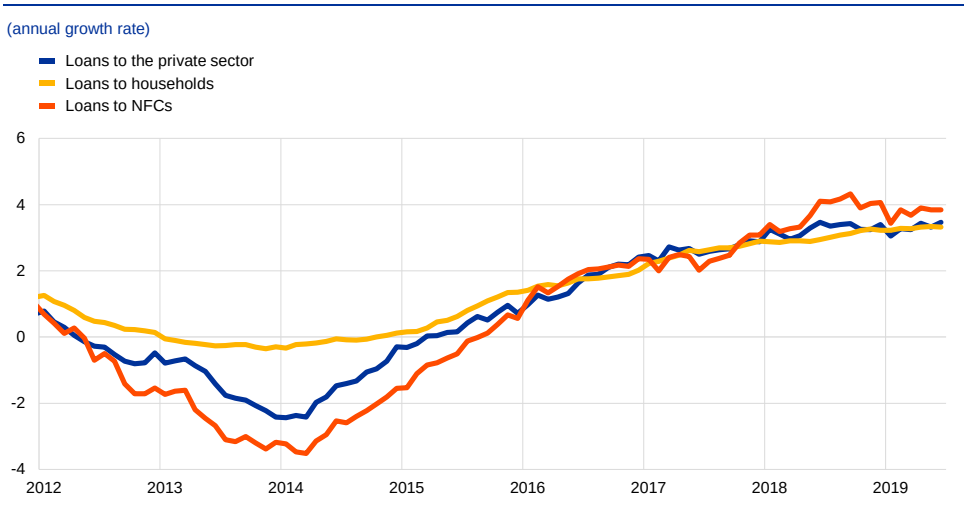
While credit to the private sector remained the main source of money creation, external monetary flows also contributed strongly to money growth. The contribution of credit to the private sector to broad money growth picked up in June 2019, after having stabilised in recent months (see the blue bars in Chart 9), against the backdrop of weaker economic activity overall since the second half of 2018. An important item that compensated for the declining mechanical contribution of the APP in recent months (see the red bars in Chart 9) has been the increase in net external assets (see the yellow bars in Chart 9), which has contributed positively to M3 growth since October 2018. However, the strong increase in the contribution of external monetary flows to annual M3 growth, which coincided with increased interest in the

euro area from foreign investors, tends to be volatile and may therefore not be durable. The contribution from credit to the government from euro area monetary financial institutions (MFIs) excluding the Eurosystem (see the light green bars in Chart 9) to M3 growth remained marginally negative, after having been significantly negative during the period of net purchases under the APP, when banks tended to reduce their government bond holdings. Likewise, the drag from longer-term financial liabilities on annual broad money growth remained small (see the dark green bars in Chart 9).

Euro area non-financial corporation (NFC) loan growth remained relatively robust, benefiting from bank lending rates at new historical lows. The annual growth rate of MFI loans to the private sector (adjusted for loan sales, securitisation and notional cash pooling) increased to 3.5% in June 2019, from 3.3% in May (see Chart 10). After having moderated until January 2019 (to 3.4%), annual NFC loan growth remained unchanged at 3.8% in June 2019. This development has been in line with the lagging cyclical pattern of NFC loans with respect to real economic activity and the slowdown in aggregate demand observed over the course of 2018. NFC loan growth, however, remained not far from its September 2018 peak of 4.3%. Loans to households grew at an annual rate of 3.3% in June 2019, unchanged from May. Overall, loan growth continued to benefit from historically low bank lending rates and the overall favourable supply of bank loans. In addition, banks have made progress in consolidating their balance sheets, although the volume of non-performing loans remains substantial in some countries and may have led to tighter lending conditions, as also indicated by the July 2019 euro area bank lending survey (see below).[4]

Chart 10

Loans to the private sector



Source: ECB.
Notes: Loans are adjusted for loan sales, securitisation and notional cash pooling. The latest observation is for June 2019.

According to the euro area bank lending survey, credit standards for loans to enterprises tightened amid concerns about the economic outlook. While banks had expected a slight net easing in the previous survey round, credit standards (i.e.

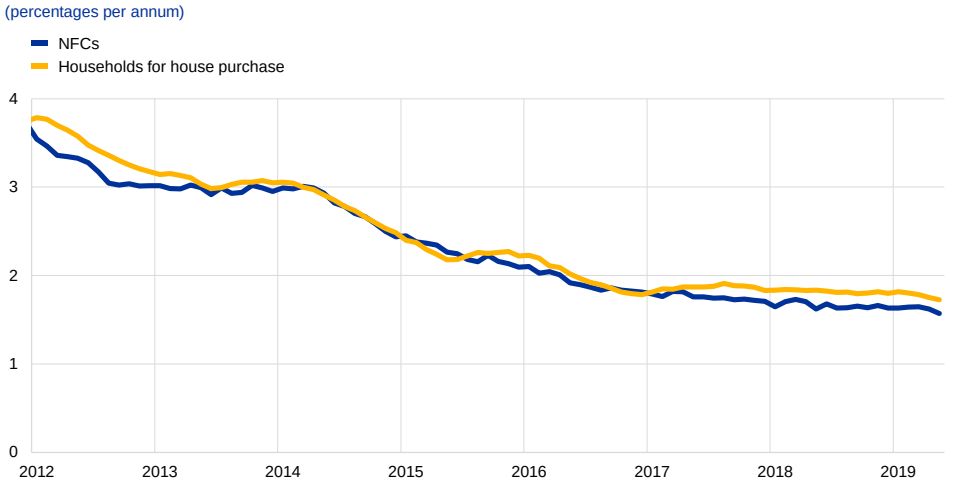
[4] See also Chapter 3 of the "Financial Stability Review", ECB, May 2019.

banks' internal guidelines or loan approval criteria) for loans to enterprises tightened in the second quarter of 2019, marking the end of the net easing period that had begun in 2014. The net tightening of banks' loan approval criteria was driven mainly by a tightening contribution of risk perceptions related to a deterioration in the general economic and firm-specific situation, whereas competition exerted pressure in the opposite direction. At the same time, credit standards for households remained broadly unchanged. Loan demand, as reported in the survey, increased across all loan categories in the second quarter of 2019. Although financing needs for fixed investment and the low level of interest rates were supportive for NFC loan demand in the second quarter of 2019, financing needs for inventories and working capital were not, reflecting this factor's sensitivity to the business cycle. Demand for housing loans continued to increase in the second quarter of 2019, supported by the low interest rate level and housing market prospects, which were still improving. Euro area banks also indicated that they had improved access to retail and wholesale funding in the second quarter of 2019, in particular for debt securities. Banks stated that the impact of regulatory or supervisory actions and non-performing loans also had a tightening effect on credit standards. The tightening impact of non-performing loans was less pronounced than in the previous semester, but banks expect some reversal over the next six months.

Very favourable bank lending rates continued to support euro area economic growth. In May 2019 the composite bank lending rates for both loans to NFCs and housing loans reached new historical lows of 1.57% and 1.73% respectively (see Chart 11). These rates have fallen significantly and by more than market reference rates since the ECB's credit easing measures were announced in June 2014. They have also declined by more than 40 basis points since February 2016, i.e. just before the last cut of the deposit facility rate (by 10 basis points to -0.4%). The reduction in bank lending rates for loans to NFCs and for loans to small firms (assuming that very small loans of up to €0.25 million are primarily granted to small firms) was particularly significant in those euro area countries that were most exposed to the financial crisis. Overall, this indicates a more uniform transmission of monetary policy to bank lending rates across euro area countries and firm sizes.

Chart 11

Composite bank lending rates for NFCs and households

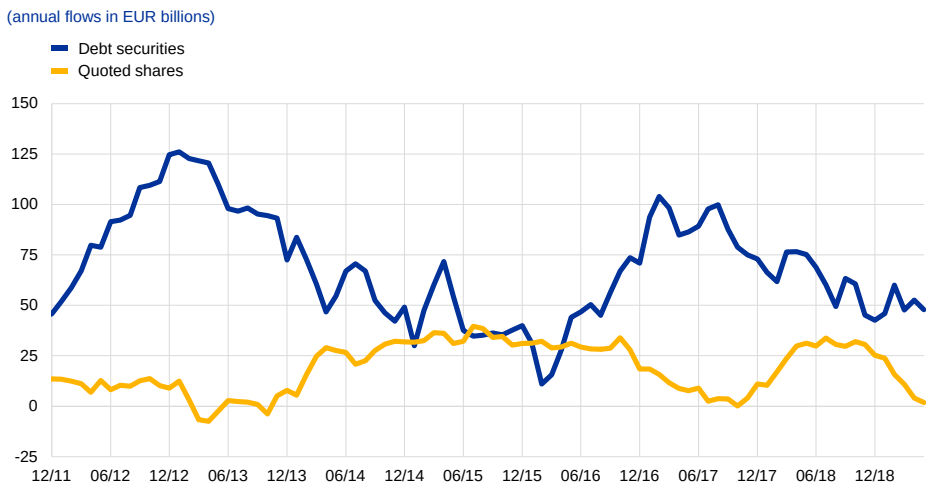


Source: ECB.
Notes: Composite bank lending rates are calculated by aggregating short and long-term rates using a 24-month moving average of new business volumes. The latest observation is for May 2019.

In May 2019 the net issuance of debt securities by euro area NFCs moderated after four consecutive months of strong issuance activity. The latest ECB data indicate that, on a net basis, the total flow of debt securities issued by NFCs moderated in May 2019, but remained positive, as has been the case since the beginning of 2019. The increase in the cumulated net flow of issuance in the first five months of 2019 was in line with the seasonal pattern observed over the last few years. Furthermore, the five-month cumulated increase in 2019 was the highest since 2012. From a more medium-term perspective (see Chart 12), the annual flows of debt securities remain low owing to subdued issuance activity in 2018. In May 2019 the annual net issuance of debt securities was slightly below €50 billion, which is close to the level at which the annual flows of debt securities seem to have settled since November 2018. Available market data suggest that net flows of debt securities issued continued to be relatively strong in June 2019 but remained virtually flat in July. In May 2019 total net issuance of quoted shares by NFCs turned slightly negative, thus continuing its downward trend that had started at the end of 2018 and was only broken temporarily in April 2019. As a consequence of this persistent weakness, in May 2019 the annual flows of net issuance of quoted shares were the lowest on record since October 2017.

Chart 12

Net issuance of debt securities and quoted shares by euro area NFCs



Source: ECB.
Notes: Monthly figures based on a 12-month rolling period. The latest observation is for May 2019.

Financing costs for euro area NFCs increased marginally in May 2019 after having declined continuously since the end of 2018. The overall nominal cost of external financing for NFCs, comprising bank lending, debt issuance in the market and equity finance, stood at 4.5% in May 2019 and is projected to have also remained stable at that level in June and July. The cost of financing in July 2019 is estimated to be only 9 basis points above the historical low of April 2019 and much below the levels observed in the summer of 2014. The estimated increase in the cost of financing since April 2019 is entirely accounted for by the increase in the cost of equity that was only partially balanced by further declines in the cost of market-based debt, which in July 2019 is estimated to have settled at its historical low. Since April the increase in the cost of equity has been due to a rise in the risk premium, reflecting recurrent global trade tensions and Brexit-related risks, among other things. More recently, the cost of equity has declined slightly, owing in part to ensuing expectations of further monetary easing.

Boxes

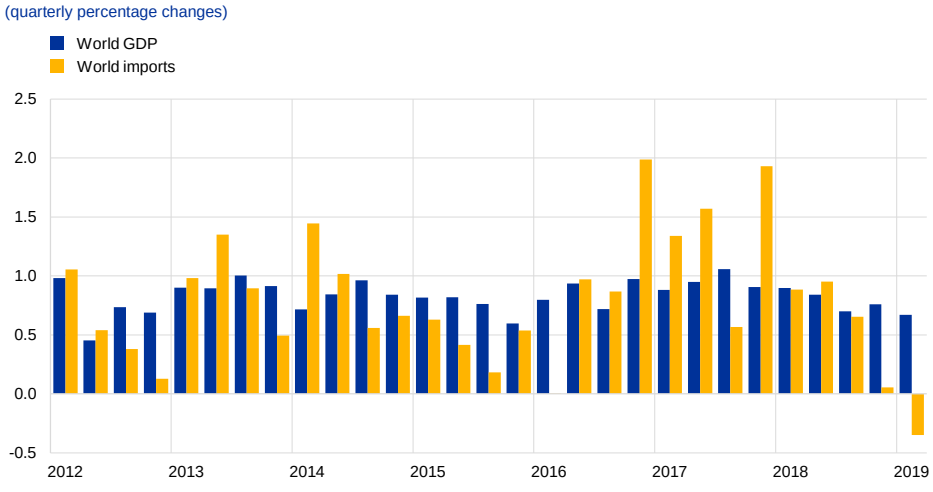
1 What is behind the decoupling of global activity and trade?

Prepared by Alina Bobasu, Simona Manu and Lucia Quaglietti

This box looks at the softness in global trade observed since the second half of 2018, focusing in particular on the causes of its decoupling from economic activity. Having already slowed in the third quarter of 2018, world trade contracted at the turn of the year (see Chart A). The deceleration was broad-based across regions. Trade deteriorated particularly sharply in China and in emerging Asia, which had recorded strong increases in 2017, but it also weakened in Latin America, Japan and the United States in the first quarter of 2019 (see Chart B). In contrast, import growth surged in the United Kingdom, probably owing to stock building by UK firms in the face of Brexit-related uncertainty. While global GDP growth has also slowed, the decline was less pronounced than for world trade. Due to significant movements in the most import-intensive categories of expenditure, such as investment and inventories, over the business cycle, trade can be subject to larger swings than activity (see Chart A). For example, world trade remained subdued in the period from the second quarter of 2014 to the third quarter of 2015, while in 2017 it significantly outstripped global activity growth. The decline in trade observed in recent quarters may reflect several factors. These include cyclical and compositional factors, but also influences stemming from rising trade tensions between the United States and China.[5] This box aims to shed light on the reasons behind the recent weakness in global trade and its decoupling from activity.

Chart A

World imports and world GDP



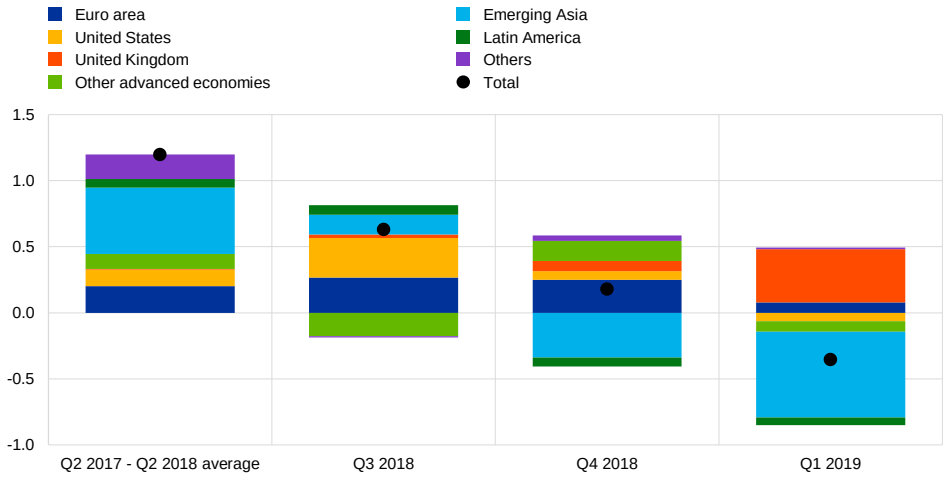
Sources: Haver Analytics and ECB calculations.

[5] For a detailed discussion of the macroeconomic implications of rising protectionism, see the article entitled "The economic implications of rising protectionism: a euro area and global perspective", *Economic Bulletin*, Issue 3, ECB, 2019.

Chart B

World imports

(quarterly percentage changes)



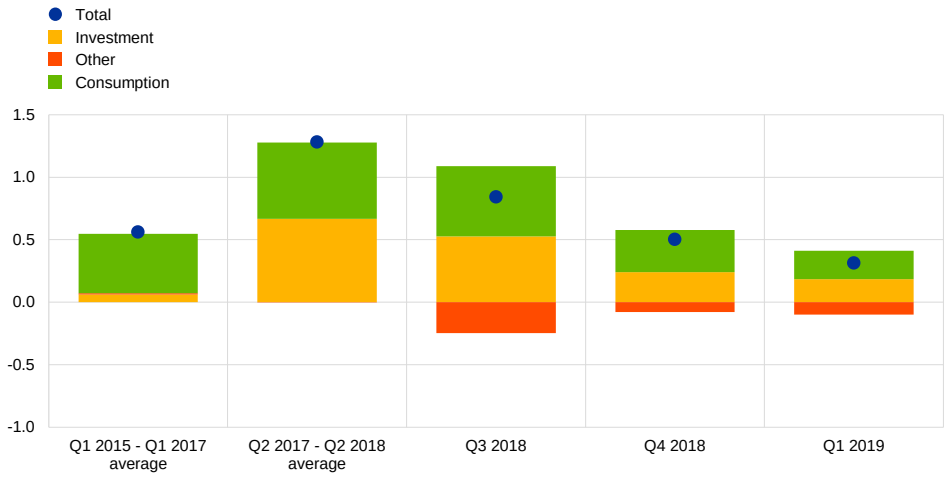
Sources: Haver Analytics and ECB calculations.

The decoupling of global trade and activity apparent since the second half of 2018 largely reflects a weakening of global investment, although consumption also softened at the turn of the year. Estimates from standard import-demand models suggest that both the previous rise in global trade in 2017 and the most recent slowdown since mid-2018 can be accounted for by large fluctuations in global investment (see Chart C). The recent decline has also occurred on the back of a fall in consumption in some emerging market economies (EMEs).

Chart C

World imports (excluding the euro area)

(average quarterly percentage changes)



Sources: World Input-Output Database (WIOD), Haver Analytics and ECB calculations.
Notes: Aggregation of 17 countries representing approximatively 65% of euro area foreign demand. China is not included in the sample. Due to the smaller sample composition, the aggregate of world trade differs from that shown in Charts A and B. Contributions are obtained from individual countries' error-correction models. The models relate import volumes to domestic demand components, commodity prices and relative import prices. Following Bussière et al., "Estimating Trade Elasticities: Demand Composition and the Trade Collapse of 2008-2009", *American Economic Journal: Macroeconomics*, Vol. 5(3), 2013, measures of import intensity-adjusted demand (IAD) are computed, by weighting the components of domestic demand according to their import content derived from global input-output tables. In order to capture long-term factors, such as shifts in non-price competitiveness or changes in trade openness, non-linear deterministic trends are also included in the long-run relationships. The long-term coefficient of the elasticity of imports to domestic demand is restricted to one. "Other" includes contributions from relative prices, the trend and unexplained factors.

The slowdown in investment is likely to have been accentuated by a number of headwinds weighing on the global economy. In order to shed further light on the drivers of the recent slowdown in investment globally, two Bayesian panel vector autoregressive models are estimated, one for advanced economies (AEs) and one for EMEs. The methodology accounts for cross-country heterogeneity,[6] while the identification, based on sign restrictions, allows four main drivers of investment over time to be identified: uncertainty, financing conditions, demand shocks and supply shocks. The results of the models suggest that heightened uncertainty and tighter financing conditions explain to a large extent the slump in investment in both AEs and EMEs in the second half of 2018 (see Chart D). Weaker EME demand prospects amplified the slowdown.

From an output perspective, the deceleration in global investment has been mirrored by a sharp decline in manufacturing production. Much of the weakness in the global economy in recent quarters has been concentrated in the industrial sector, and within that in manufacturing output. In contrast, growth in the services sector has proved to be more resilient overall, although Purchasing Managers' Index (PMI) indicators softened in the second quarter of this year. In the second half of 2018, industrial production contracted in Japan, in the euro area and in some Latin American countries. More recently, industrial production has also been slowing in the United States and China. Overall, countries with a larger industrial sector, greater exposure to industrial commodities and/or a heavy reliance on exports in GDP experienced sharper growth slowdowns. The investment and manufacturing cycles tend to be

6 For a detailed explanation of the benchmark methodology and data, see the box entitled "Investment dynamics in advanced economies since the financial crisis", *Economic Bulletin*, Issue 6, ECB, 2017.

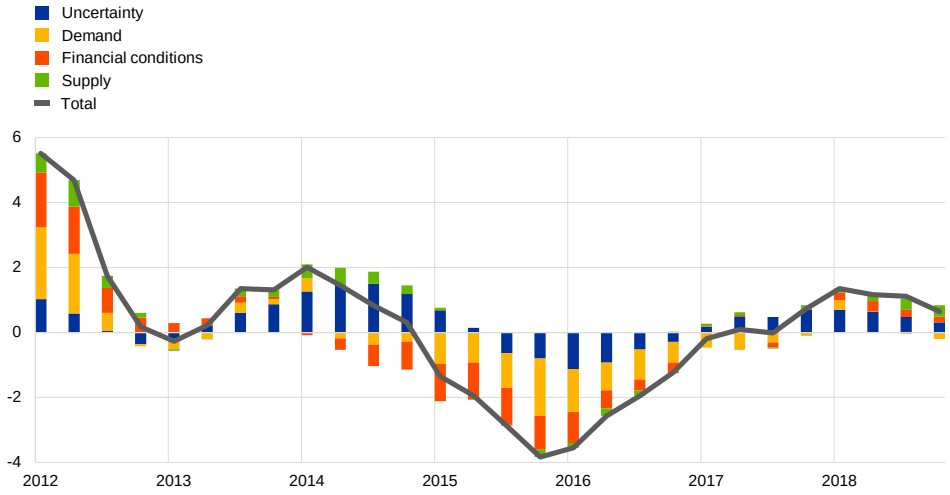
closely intertwined. Production in the manufacturing sector is highly capital-intensive, with capital goods forming a large part of manufacturing output. Therefore, it is not surprising that the slowdown in investment has been mirrored by a sharp decline in manufacturing output globally.

The global manufacturing slowdown was particularly pronounced in the electronics and automotive sectors and was also associated with a strong decline in trade flows in both sectors. As far as the automotive sector is concerned, the weakness at the global level partly reflected temporary factors, such as the bottlenecks in car production following the introduction of the new Worldwide Harmonised Light Vehicle Test Procedure (WLTP). However, medium-term structural trends, such as increasing environmental concerns and policies, may also have played a role. In addition, in China, the tax rebates on car purchases, which helped boost car sales in 2015-17, came to a halt in 2018. The weakness in the electronics cycle might relate to a slowing technological cycle in Asia, following a period of expansion in 2017 related to substantial investment in data centre capacity globally.

Chart D

Decomposition of changes in investment – main drivers

(annual percentage changes, percentage point contributions)



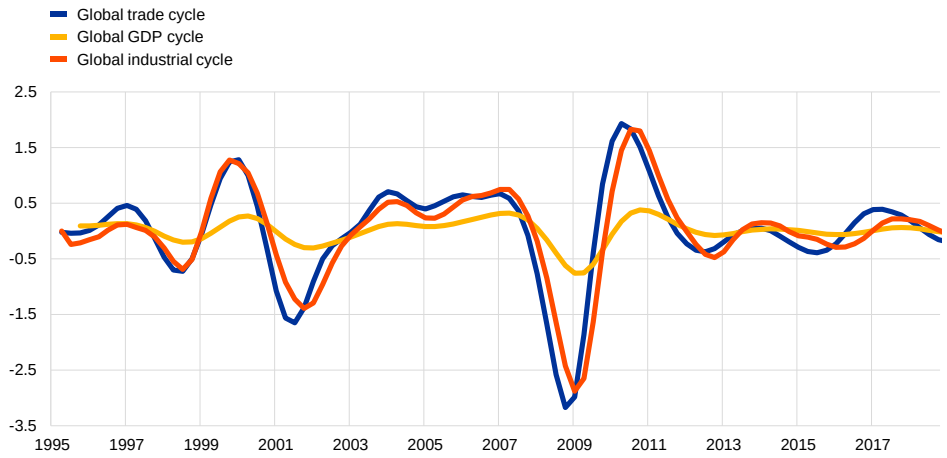
Sources: Haver Analytics and ECB calculations.
Notes: The chart is based on two Bayesian panel vector autoregressive models, one for advanced economies and one for emerging economies. This framework allows for cross-country heterogeneity. The countries included in the estimations are Canada, Japan, the United Kingdom, the United States, China, Turkey, Mexico and Brazil. The following variables are included: uncertainty, measured by the dispersion of growth expectations among professional forecasters; financial conditions indices; expected growth; business investment; and price developments. Structural shock identification is achieved by means of zero and sign restrictions. Global investment is shown in deviation from trend/steady state and is based on an aggregation of country-specific results based on GDP weights.

Manufacturing and trade cycles tend to be highly correlated. This implies that swings in manufacturing output can have a significantly larger impact on global trade than on activity. The manufacturing sector remains highly trade-intensive, as imports of manufacturing goods account for more than 50% of total gross global imports, but only make up 20% of total world value added. Hence, a sharp slowdown in manufacturing output leads to a more pronounced decline in global trade than in global GDP. ECB staff analysis indicates that industrial and trade cycles tend to be highly correlated, with world industrial output generally displaying higher trade elasticity than global GDP (see Chart E).

Chart E

Global trade and industrial cycles

(quarterly percentage changes)



Sources: Haver Analytics and ECB calculations based on Borin et al., "The cyclicality of the Income Elasticity of Trade", *Working Papers*, No 1126, Banca d'Italia, July 2017.
Notes: Cycles are obtained by simple Hodrick-Prescott (HP) filtering on log GDP, trade and industrial production. The latest observation is for the fourth quarter of 2018.

Despite some signs of recovery, global trade is likely to remain more subdued than activity in coming quarters. High frequency indicators of world trade point to some recovery in the near term. However, this is expected to be mild, with trade growth picking up only gradually owing to a subdued outlook for investment in many economies. In addition, downside risks to the outlook for trade have partially materialised in recent months due to the implementation of higher tariffs, and the threat of a further escalation of trade tensions persists.

2 Services trade liberalisation and global imbalances: a critical review of the empirical evidence

Prepared by Georgios Georgiadis and Andrej Mijakovic

It is widely acknowledged that trade liberalisation raises aggregate welfare in the long run.[7] Trade liberalisation within the framework of multilateral cooperation has been a key factor driving global economic prosperity. Trade integration helped to drive economic growth in advanced and developing economies in the second part of the 20th century, thereby also helping to lift hundreds of millions of people out of poverty.

However, trade liberalisation has been asymmetric in that it has focused on goods rather than services. In this context, liberalisation of services trade may also be expected to raise welfare in the long run. Beyond its effects on welfare, it has recently been argued by some in international fora such as the G20 that services liberalisation may also reduce global imbalances – i.e. the dispersion of current account surpluses and deficits across economies. This box critically reviews the rationale and empirical evidence underpinning this claim.

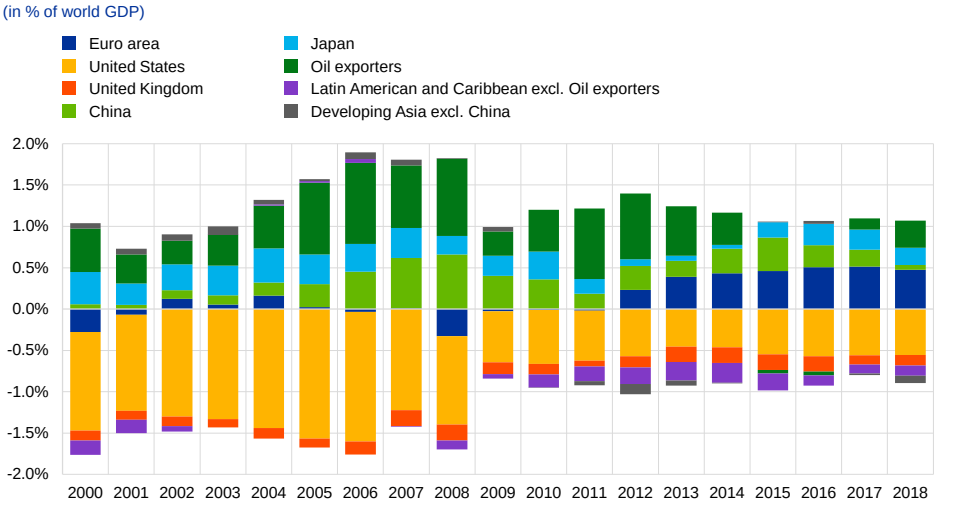
Global imbalances have been stable overall in recent years, although their composition has changed somewhat (see Chart A). After a period of rising imbalances in the early 2000s, the global financial crisis triggered first a compression, then a rotation in global imbalances from emerging market economies (EMEs) towards advanced economies. Since then, the magnitude of global imbalances has remained broadly stable. Looking ahead, in its latest World Economic Outlook the IMF projects a gradual reduction in global imbalances, primarily driven by the fading surpluses of oil exporters, the euro area and Japan.[8]

7 See for example *Making trade an engine of growth for all*, staff of the International Monetary Fund, World Bank and World Trade Organization, 2017.

8 See *World Economic Outlook: Growth Slowdown, Precarious Recovery,* International Monetary Fund, 2019.

Chart A

Evolution of current account surpluses and deficits across countries



Sources: IMF World Economic Outlook and ECB staff calculations.
Notes: Oil exporters include Algeria, Angola, Ecuador, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Norway, Qatar, Russia, Saudi Arabia, UAE and Venezuela.

As large and persistent current account deficits have preceded several financial crises that spilled over to other economies, global imbalances warrant monitoring. Large and persistent current account deficits may raise economies' dependence on global financial markets and accentuate their vulnerability to swings in investor sentiment. Indeed, large and persistent current account deficits have historically often preceded financial crises. Moreover, many of these crises spilled over to other debtor economies, and even affected creditor economies. Therefore reducing global imbalances is perceived to be an important way to foster global economic and financial stability.

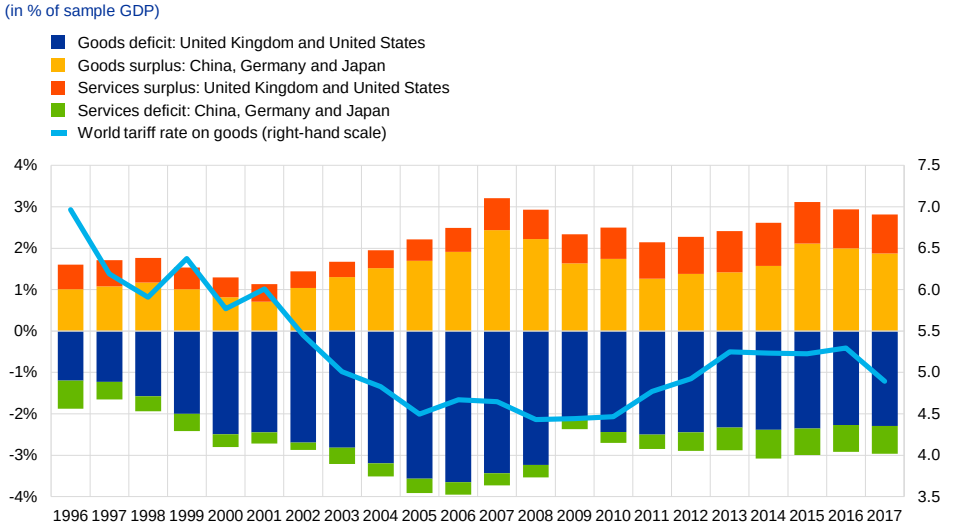
It has recently been argued that asymmetric trade liberalisation since the 1990s – i.e. the reduction of tariffs for goods but not for services – has contributed to global imbalances. Specifically, the argument rests on two pillars. First, it is argued that since the inception of the World Trade Organization (WTO) in 1995 the cost of trading goods has decreased substantially due to sizeable cuts in tariff rates. In contrast, the cost of trading services has remained broadly unchanged over the same time period. Second, it is argued that as a result of such asymmetric trade liberalisation, economies with a comparative advantage in goods manufacturing (services) experience a rise (fall) in their current account balances (see Chart B).

Economic theory suggests that trade policy does not affect current account balances in the long run. The current account balance reflects a country's net foreign lending, i.e. domestic savings minus domestic investment. So for any policy to affect the current account, it must affect intertemporal saving and spending decisions. A change in trade policy which raises a country's permanent income will cause a commensurate increase in its spending in every period and thus have no effect on net saving in any given period. In terms of the trade balance, the positive shock to demand for domestic goods relative to foreign ones would shift their relative price, leaving net exports unchanged in relative terms.

However, particular features of the economic environment, such as consumption habits or investment adjustment costs, can delay the reversion to the long-run equilibrium. Against this background, it is possible in principle that the liberalisation of services trade could affect global imbalances temporarily, by raising the current account balances of economies with a comparative advantage in services rather than manufactured goods and reducing those of economies with a comparative advantage in manufacturing.

Chart B

Trade liberalisation and current account imbalances of selected countries



Sources: IMF Balance of Payments Statistics and World Development Indicators.
Notes: Sample GDP refers to the cumulative GDP of China, Germany, Japan, the United Kingdom and the United States. The world tariff rate is constructed as a GDP-weighted average of country-level tariff rates. Tariffs refer to applied tariffs covering all traded goods.

Testing the hypothesis that liberalising services trade would reduce global imbalances requires the use of an empirical model for the determination of the current account balance that controls for fundamentals and policies. Given that in such a model the variable to be explained would be the current account balance relative to GDP, the analysis would implicitly also account for the effects of trade policy on output.

The IMF's External Balance Assessment (EBA) regression model is a widely established methodological framework for assessing the effects of fundamentals and policies on the current account.[9] The IMF's EBA model is based on a panel regression that analyses the relationship between a country's current account balance relative to GDP, on the one hand, and economic fundamentals as well as policies, on the other hand. This model is used among other things for the assessment of countries' external positions in IMF Article IV Reports and the IMF External Sector Report. It should be mentioned that because the IMF's EBA model is specified in a reduced form, the individual transmission channels that give rise to the general equilibrium cannot be traced back. At the same time, by virtue of its

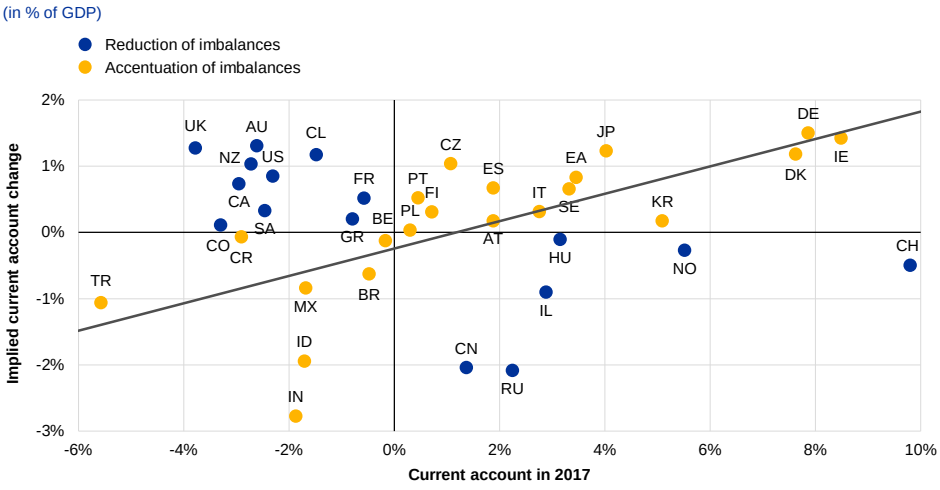
[9] For an in-depth discussion, see: "External Balance Assessment (EBA) Methodology: Technical Background", *IMF Working Paper,* No 13/272, IMF, 2013.

reduced form the EBA model can be used to analyse the effects of a wide range of fundamentals and policies that affect the current account.

The results found using this model suggest that liberalising services trade would reduce current account deficits in some debtor economies. As in Joy et al. (2018)[10] the IMF's EBA regression model is augmented with an index for services trade restrictiveness constructed by the OECD.[11] Then, a counterfactual analysis of a reduction in barriers to services trade is considered, in which all countries are assumed to reduce their services trade restrictiveness to the level of the least restrictive country.[12] Changing the values of the right-hand side variables in the fitted EBA regression model then implies corresponding changes in the predicted current account balance relative to GDP. Given that the EBA model also controls for the business cycle, the counterfactual results are best interpreted as medium-term effects. The results – largely in line with those in Joy et al. (2018) – suggest that the current account deficits of debtor economies such as the United Kingdom and the United States would be reduced by 1.2 and 0.8 percentage points relative to GDP, respectively (see Chart C). Moreover, China's current account surplus would turn into a moderate deficit, moving closer to balance in absolute terms.

Chart C

Current account effects of liberalising services trade at the country level



Sources: IMF World Economic Outlook and ECB staff calculations.
Notes: The implied current account change (y-axis) refers to the change in current accounts following a liberalisation of services trade, where services trade is liberalised to the level of the least restrictive country, in all countries. Current account in 2017 (x-axis) refers to the actual current account in 2017. The grey line indicates the regression line.

However, the counterfactual analysis also suggests that for a large number of countries a reduction of services trade restrictions would not reduce current

10 See Joy, M., Lisack, N., Lloyd, S., Reinhardt, D., Sajedi, R. and Whitaker, S., "Mind the (current account) gap", *Bank of England Financial Stability Paper,* No 43, 2018.

11 The OECD's Services Trade Restrictiveness Index provides a snapshot of services trade barriers in 22 sectors across 44 countries.

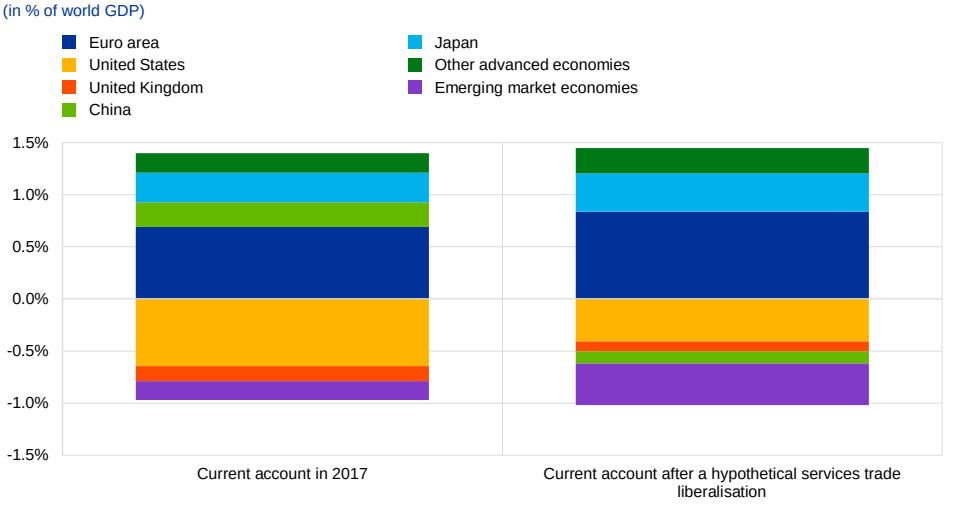
12 Due to data availability restrictions, the counterfactual is based on the 2017 values of the services trade restrictions indicators.

account imbalances, but would actually increase them further (see Chart C).[13] In particular, the liberalisation of services trade in this counterfactual exercise would raise the current account balances of some countries which already exhibit surpluses, such as Germany and Japan, and exacerbate pre-existing deficits in many EMEs. The reason for this finding is that in general advanced economies have already liberalised services trade substantially, while EMEs tend to have more restrictions in place. Accordingly, advanced economies would gain access to relatively more new export markets than EMEs, thereby improving their services trade balances while worsening those of EMEs.

Overall, the counterfactual analysis suggests that while the concentration of countries' current account imbalances would be reduced, the magnitude of global imbalances would remain largely unchanged overall (see Chart D). The Hirschman-Herfindahl index of concentration of countries' current account imbalances – especially deficits – measured as a share of world GDP is reduced by 25%, while the magnitudes of cumulative surpluses and deficits are essentially unchanged.[14] For example, as mentioned above, the current account deficit of the United States, which accounts for a large share of global, cumulated current account deficits, would be reduced and – given that the overall magnitude of current account deficits is unchanged in the counterfactual – distributed across a larger number of countries.

Chart D

Global current account balances before and after services trade liberalisation



Sources: IMF World Economic Outlook and ECB staff calculations.
Notes: The implied current account change refers to a scenario in which services trade is liberalised to the level of the least restrictive country in the sample for all countries. World GDP refers to the aggregate GDP of the 37 countries included in the sample.

While the analysis of flow imbalances, as presented in this box, provides one perspective on the discussion regarding global imbalances, a comprehensive

13 These findings are in line with recent empirical evidence which highlights the feeble link between trade barriers and current accounts, see for example: *Effective Trade Costs and the Current Account: An Empirical Analysis*, IMF, 2019, or *External Sector Report: Tackling Global Imbalances amid Rising Trade Tensions*, IMF, 2018.

14 The Hirschman-Herfindahl index is defined as the sum of squared shares. In the context above, it is defined as the sum of the squared current account imbalances relative to world GDP. If a few entities account for most of the total, then the index has a high value, reflecting stronger concentration.

assessment of the effects of services trade liberalisation would also have to include an analysis of stock imbalances. For example, an economy's current account moving from a balanced position to a surplus following services trade liberalisation may be stabilising, although it raises the current account imbalance when the economy exhibits large initial external debt stocks. This could be an important element in assessing the effects of services trade liberalisation, as despite the compression in flow imbalances stock imbalances have continued to widen since the global financial crisis. Another caveat is that with the rise of multinational firms it has become increasingly difficult to measure and interpret current account imbalances.[15]

Overall, the evidence available so far suggests that while services trade liberalisation may further foster global economic prosperity and alleviate imbalances in a few prominent economies, it should not be expected to significantly reduce flow imbalances from a global perspective, even temporarily. While services trade liberalisation could reduce current account imbalances temporarily for some countries, the evidence available also suggests that this would not result in a sizeable reduction in global imbalances.

[15] See for example *External Sector Report*, International Monetary Fund, 2019.

3 Euro area foreign direct investment since 2018: the role of special purpose entities

Prepared by Virginia di Nino

In 2018 gross foreign direct investment (FDI) flows in the euro area experienced a reversal for the first time since the inception of the euro.[16] FDI flows have decreased on both the liability side and the asset side since early 2016, when gross flows accounted for around 9% of euro area GDP (see Chart A).[17] In 2018 FDI liability flows became positive, suggesting disinvestments of either foreign parents outside the euro area or affiliates resident in the euro area, then FDI asset flows turned negative, implying disinvestments of either parents resident in the euro area or foreign affiliates outside the euro area. It is important to track gross flow dynamics as they can signal changes in international market conditions.[18] Like other mature and developed economies, the euro area tends to be a net foreign lender and, despite the reversal in gross flows, it posted net FDI outflows (gross asset flows minus gross liability flows) within the historical range in 2018. Cumulated gross FDI flows continued the reversal in early 2019 but they may be beginning to normalise. Liabilities gross flows recently recorded a recovery, which resulted in net capital inflows in the euro area, although this is likely to be temporary.

16 This box discusses evidence obtained from a four-quarter sum of foreign direct investment flows. It is common practice to assess sums or average developments as these smooth out some of the volatility of the high-frequency foreign direct investment data. Developments in quarterly data were also checked and the major findings still qualitatively hold.

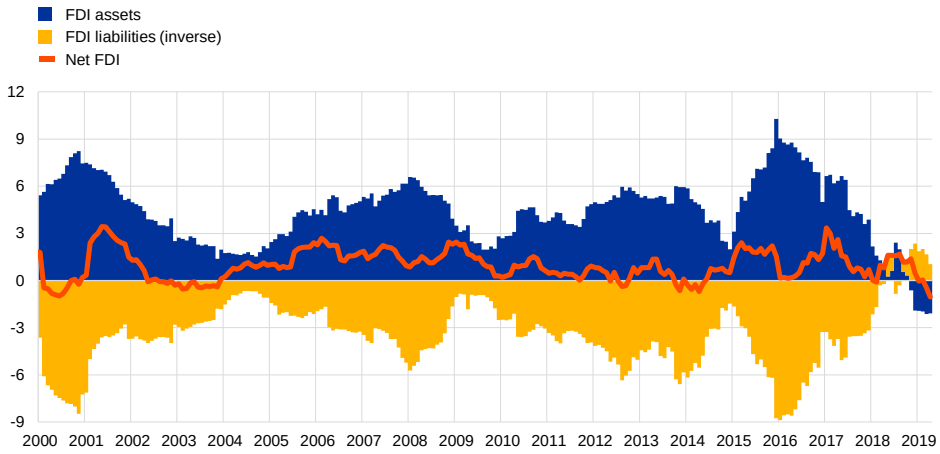
17 On an asset/liability basis, direct investment is classified according to whether the investment relates to an asset or a liability for the country compiling the statistics. For example, a country's liabilities include foreign parents' equity investments in affiliates resident in that country because those investments represent claims that foreigners have on assets in the reporting country. On the same basis, in the compilation of FDI statistics, parent companies resident in a euro area country and investing in debt issued by their affiliates resident outside of the euro area are assets for the euro area. See "Implementing the latest international standards for compiling foreign direct investment statistics: Asset/liability versus directional presentation", OECD, December 2014.

18 Extensive literature has shown that certain characteristics of the recipient country, such as size, productivity and economic growth dynamics, cultural and colonial ties, and distance and quality of institutions, are important determinants of net FDI. Similarly, another strand of the literature has shown that net FDI is relevant for the productivity and economic growth of emerging countries. On the other hand, a drying-up of gross capital flows, both in emerging countries and in developed economies, may precede the onset of a financial crisis. This was the case for the bursting of the "dot-com bubble" in 2001, the global financial crisis of 2008 and the European debt crisis in 2012.

Chart A

Euro area foreign direct investment

(as a percentage of GDP; 12-month moving sum)



Sources: ECB, Eurostat and ECB Staff calculations.
Note: Net FDI is the difference between gross assets and gross liabilities; positive values represent net capital outflows and negative values represent net capital inflows. The latest observation is for April 2019.

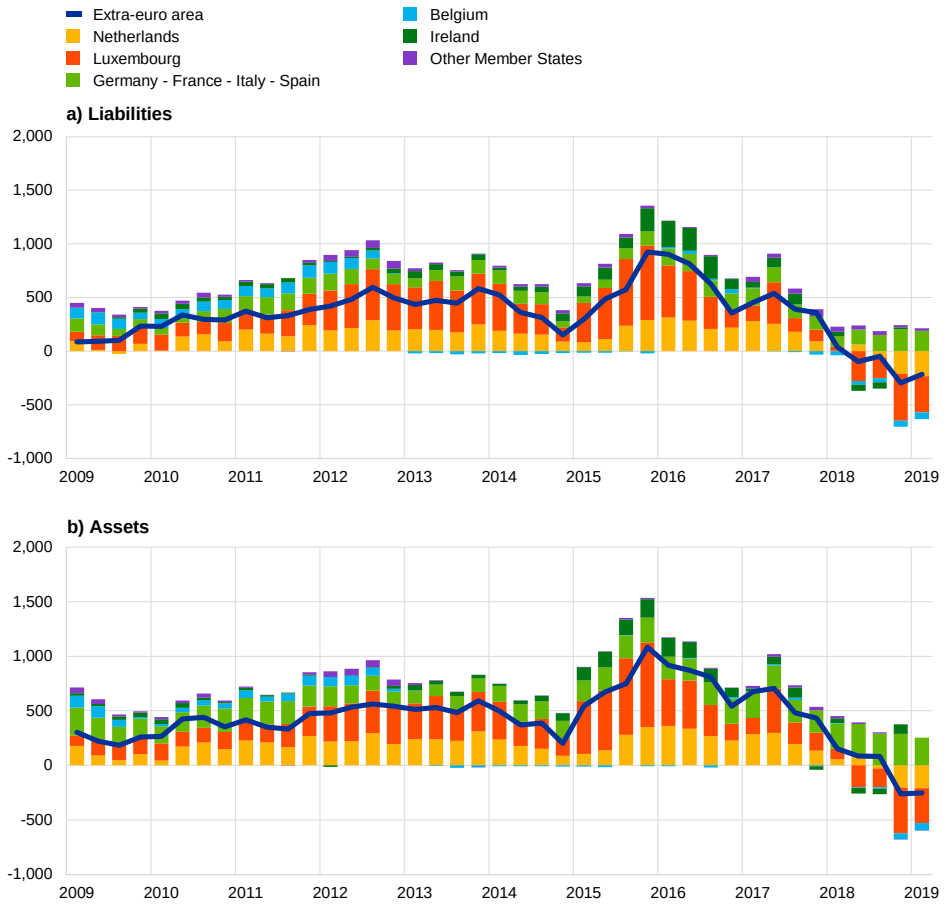
Regarding the geographical composition, gross flows to Luxembourg and the Netherlands accounted for the bulk of the reversal in liabilities in 2018, although Ireland and Belgium also contributed significantly.[19] The decomposition by destination indicates that the retrenchment reflected a reversal in the liabilities of Luxembourg, the Netherlands and, to a lesser extent, Ireland and Belgium. On the contrary, the other euro area Member States continued to attract inward FDI in 2018 and in the first quarter of 2019 (see panel (a) of Chart B).

[19] The analysis focuses on the liabilities/inward side as it triggered the reversal of flows, although the narrative would not change if the asset side were to be discussed.

Chart B

Euro area foreign direct investment transactions by Member State

(EUR billions, four-quarter moving sum)



Sources: ECB and ECB staff calculations.
Notes: Foreign direct investment transactions of euro area Member States vis-à-vis intra- and extra-euro area countries. Other Member States refers to the other euro area Member States not depicted in the chart. The line "Extra-euro area" refers to total transactions vis-à-vis counterparties outside the euro area. The latest observations are for the first quarter of 2019 and for the fourth quarter of 2018 for Ireland.

The geographical breakdown suggests that the transactions of special purpose entities (SPEs)[20] set up by multinational enterprises may have played an important role in the retrenchment in gross FDI (see Chart C). SPEs do not typically conduct traditional FDI operations such as mergers and acquisitions or

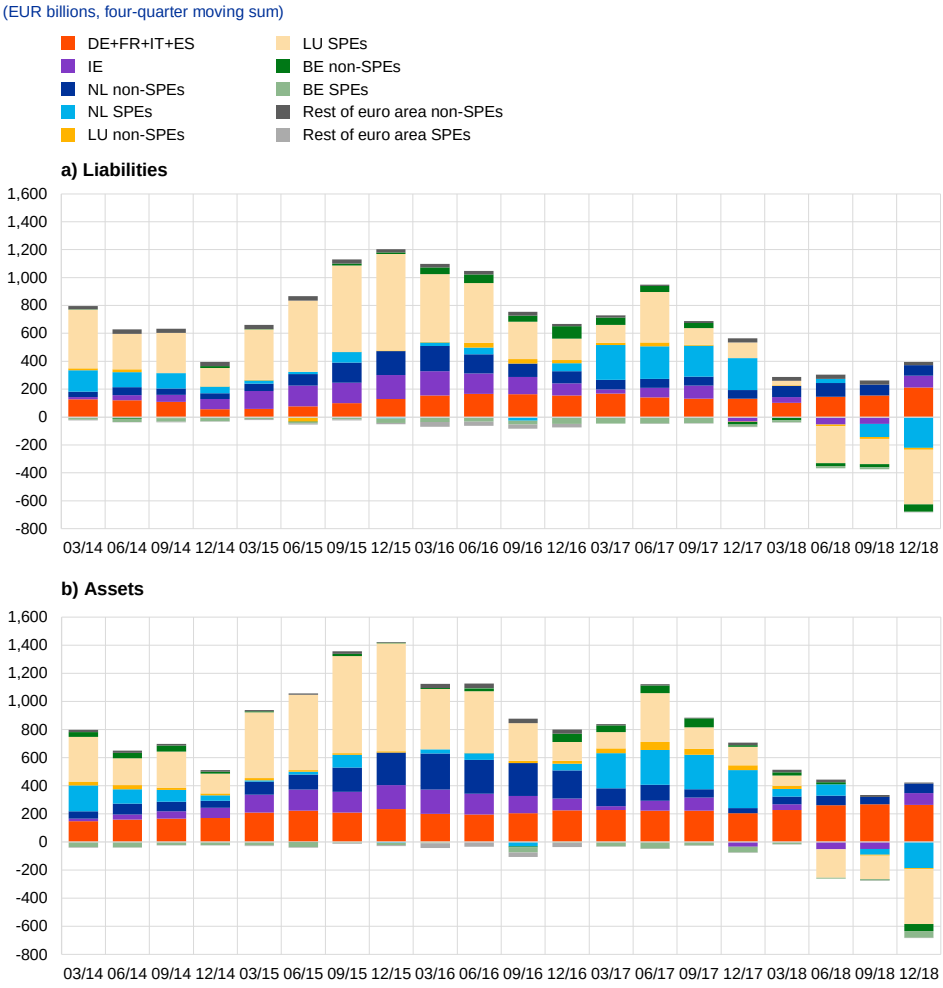
[20] According to the International Monetary Fund (IMF) "a special purpose entity, resident in an economy, is a formally registered and/or incorporated legal entity recognized as an institutional unit, with no or little employment up to maximum of five employees, no or little physical presence, and no or little physical production in the host economy. They are directly or indirectly controlled by non-residents and established to obtain specific advantages provided by the host jurisdiction with an objective to (i) grant its owner(s) access to capital markets or sophisticated financial services; and/or (ii) isolate owner(s) from financial risks; and/or (iii) reduce regulatory and tax burden; and/or (iv) safeguard confidentiality of their transactions and owner(s). Special purpose entities transact almost entirely with non-residents and a large part of their financial balance sheet typically consists of cross-border claims and liabilities" (excerpt from the Final Report of the IMF Task Force on Special Purpose Entities, International Monetary Fund, October 2018). Recent literature on the role of SPEs includes Blanchard, O. and Acalin, J., "What does measured FDI actually measure?", PIEE Policy Brief, 2016; Dellis, K., Sondermann, D. and Vaanstenkiste, I., "Determinants of FDI inflows in advanced economies: Does the quality of economic structures matter?", *Working Paper Series*, No 2066, ECB, Frankfurt am Main, May 2017; Lane, P. and Milesi-Ferretti, G.M., "International Financial Integration in the Aftermath of the Global Financial Crisis", IMF Working Paper 17/115, International Monetary Fund, 2017.

greenfield investments, and instead funnel capital flows. Therefore, mergers and acquisitions involving euro area countries tend to generate financial flows that pass through the economies hosting a large number of SPEs. In the euro area SPEs are prevalently located in Luxembourg, the Netherlands, Ireland and Belgium. As SPEs act as a vehicle, the countries in which they are located become transit economies for these types of operations and the final destination of foreign investments lies elsewhere. Transit FDI has two main effects on countries where the operations of SPEs result in a pass-through of capital: it tends to inflate gross flows and generate a very high degree of co-movement between asset and liability flows. The reversal episode seems to be closely tied to transit FDI for two reasons: (i) gross asset flows were also considerably affected and experienced a reversal (see panel (b) of Chart B)[21]; and (ii) the four largest euro area economies (Germany, France, Italy and Spain) – where inward FDI usually only finances real activity and the corporate tax regimes do not favour the creation of corporate structures such as SPEs – did not experience any marked decline in FDI flows, either in gross terms or in net terms (Chart B and Chart C).

[21] The IMF makes a distinction between tax havens and countries with substantial real economic activity that also host a large number of foreign affiliates and SPEs. Such "conduit countries" offer a favourable tax and investment regime for foreign investment, making them a preferred hub for multinationals to base their foreign affiliates and redirect their profits from the economies with "heavier" taxation where the profits were originally generated. In the literature it has been argued that FDI in conduit countries that is related to the activity of SPEs should be considered as income subject to tax in the country where it was generated. For this reason, SPE flows are used to extend the offshore investment matrix and are included in the estimation of the tax base erosion. The base erosion is calculated based on FDI in countries with similar economic activity and on the share of SPEs relative to total FDI stocks. See Bolwijn R., Casella, B. and Rigo, D., "An FDI-driven approach to measuring the scale and economic impact of BEPS", *Transnational Corporations*, Vol. 25, No 2, 2018, pp. 107-144.

Chart C

Euro area foreign direct investment transactions by resident SPEs and non-SPEs



Sources: ECB and ECB staff calculations.
Notes: The chart shows the FDI transactions of resident special purpose entities (SPEs) and resident non-special purpose entities (non-SPEs) according to the asset/liability principle for countries where the breakdown between the two types of entities is available (namely the Netherlands, Luxembourg and Belgium). A breakdown is not available for Ireland, despite a large number of SPEs operating in the country. In Germany, France Italy and Spain, the FDI flows of SPEs are not separately reported given the limited activity of the relatively small number of entities operating in these countries. "Rest of euro area" includes all euro Member States except Belgium, Germany, Estonia, Ireland, Spain, France, Italy, Cyprus, Luxembourg, Malta, the Netherlands and Slovakia. The latest observation is for the fourth quarter of 2018.

The United States was the main driver of the reversal in gross FDI flows.[22] The decomposition of flows by main partner country shows that the United States accounted for the bulk of the reversal episode, especially on the liability side.[23] Inflows to the euro area from offshore centres and outflows from the euro area to offshore

[22] See "FDI in Figures", OECD, April 2019, June 2019 and Emter, L., Kennedy, B. and McQuade, P., "US profit repatriations and Ireland's Balance of Payments statistics", *Quarterly Bulletin*, Central Bank of Ireland, April 2019.

[23] The Bureau of Economic Analysis (BEA) reported around USD 300 billion of repatriated earnings in the first quarter of 2018 and about USD 170 billion in the second quarter. See the box entitled "Effects of the 2017 Tax Cuts and Jobs Act on Components of the International Transactions Accounts" in US International Transactions Third Quarter 2018, Bureau of Economic Analysis, December 2018. According to the United Nations Conference on Trade and Development (UNCTAD), these amounts largely correspond to the contraction in Europe-US liabilities. See "Global foreign investment flows dip to lowest levels in a decade", Global Investment Trends Monitor No 31, United Nations Conference on Trade and Development, January 2019.

centres show a similar disinvestment pattern on both sides, with two main differences with respect to the United States. Disinvestments only started in the second part of 2018 and were larger on the asset side, which, for the euro area, resulted in net FDI inflows from offshore centres and net FDI outflows to the United States. A common rationale for these capital movements is that certain measures included in the US corporate tax reform[24] may have played an important role in driving gross flows to and from the euro area.[25] Liability and asset flows of offshore centres to/from the euro area have also been affected as they tend to reflect the activity of the intermediary entities resident in these countries, whose transactions offset part of the outflows from the United States.

The repatriation of foreign earnings by US multinationals mainly affected FDI flows to Europe, whereas developing economies (excluding offshore centres) have been largely unaffected (see Chart D).[26] There are several factors contributing to the asymmetric behaviour of US multinationals. First, Europe remains the main recipient of US funds. At the same time, mergers and acquisitions represent the largest share (about 70%) of total euro area gross FDI inflows and outflows but only a minor share of the gross FDI inflows and outflows of emerging economies (around 20-30% respectively). Greenfield investments are, however, prevalent in developing economies. The decomposition of investment by type of financial instrument shows that SPEs have primarily contributed to the flow reversal through a divestment in equity FDI in the euro area, while reinvested earnings were unaffected. Debt FDI was affected, albeit to a lesser extent as volumes of debt FDI gross flows in the countries concerned (Luxembourg, the Netherlands, Belgium and Ireland) are normally smaller than those of equity FDI gross flows. Therefore, the different composition of the FDI flows is likely to have limited the opportunities for US multinationals to carry out such operations to the same extent in emerging economies.

[24] The US corporate tax reform, signed by President Donald Trump on 22 December 2017, creates incentives for the repatriation of deferred profits held by US multinationals abroad through the switch from a worldwide corporate tax system to a territorial tax system. Under the reform, repatriated profits of US multinationals from their foreign affiliated companies are in principle no longer taxable in the United States and are subject to a one-off mandatory repatriation tax. Moreover, the reform has improved the tax attractiveness of the United States relative to Europe (through a reduction in the statutory corporate tax rate and more favourable deduction rules for new investment) and introduced several new anti-base erosion measures. See the box entitled "The macroeconomic impact of the US tax reform", *Economic Bulletin*, Issue 1, ECB, 2018.

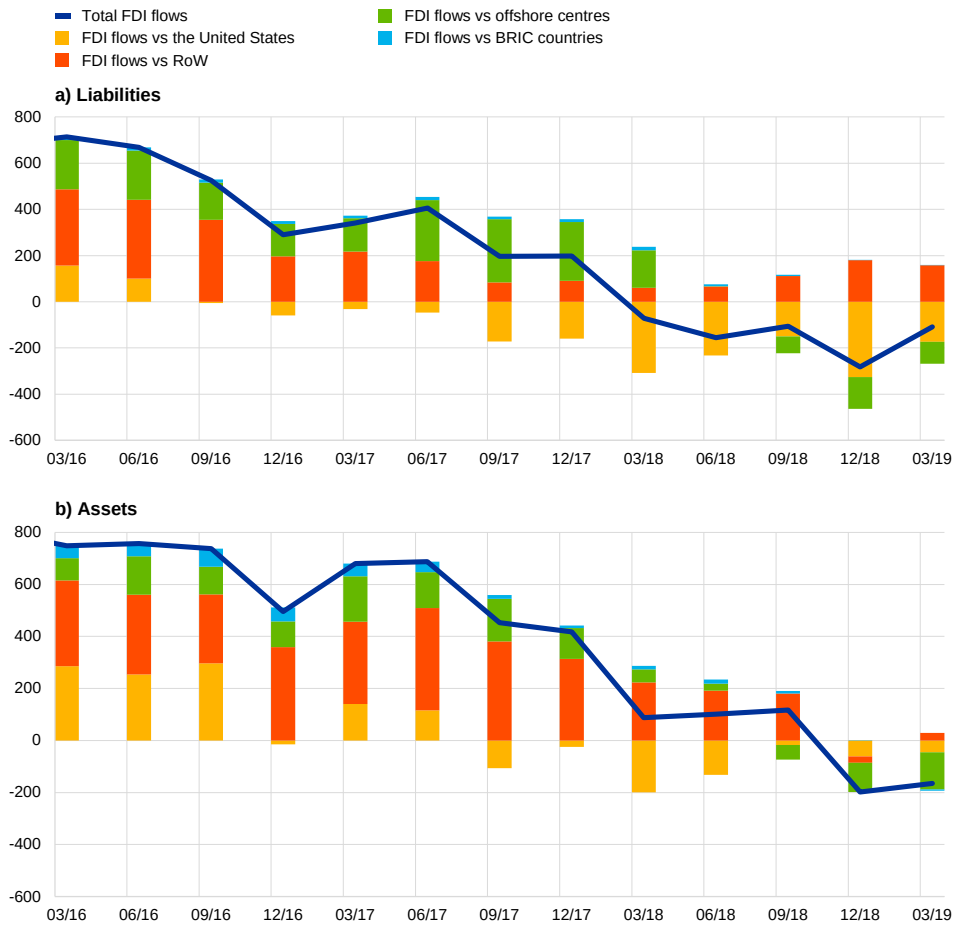
[25] For an empirical analysis and potential effects of the recent US corporate tax reform, see De Simone, L., Piotroski, J.D. and Tomy, E.R., "Repatriation Taxes and Foreign Cash Holdings: The Impact of Anticipated Tax Reform", *Review of Financial Studies*, November 2018.

[26] For a detailed discussion of gross inflows and outflows by main region, see "World Investment Report 2019", United Nations Conference on Trade and Development, June 2019. Inward and outward gross flows expanded in Asia and in Africa, while the decline in transition economies and Latin America is linked to the economic conditions of the main economies in these regions.

Chart D

Decomposition of euro area foreign direct investment flows by partner country: United States, offshore centres, BRIC countries and rest of the world

(EUR billions, four-quarter moving sum of transactions)



Sources: ECB and ECB staff calculations.
Notes: Rest of the world (RoW) includes all countries except the United States, the financial offshore countries and the BRIC group, which comprises Brazil, Russia, India and China. The latest observation is for the first quarter of 2019.

Reverse investments accounted for less than one-third of the overall FDI retrenchment. FDI flows can be classified according to the balance sheet criterion (i.e. assets vs liabilities) or the directional criterion (i.e. inward flows vs outward flows).[27] An important difference between the two reporting systems is that the asset-liability measure is adjusted by subtracting intragroup and intra-fellow reverse investment flows to obtain inward and outward FDI statistics.[28] The reverse investment measure is, therefore, the difference between the two classifications and can be calculated in the same way for the liability side and the asset side. A change in

27 The asset-liability criterion reports whether investments relate to an asset or a liability for the reporting country, while the directional presentation organises the flows according to the direction of the investments for the reporting country (outward vs inward). FDI data based on the directional principle are only available on a quarterly basis starting from 2013.

28 Reverse investments consist: (i) on the liability side, of equity in and lending to foreign parents by resident affiliates; and (ii) on the asset side, of equity in and lending to resident parents by foreign affiliates. Currently a broad measure of reverse investment is used, which also includes so-called "intra-fellow flows", i.e. flows between enterprises that do not have a direct investment relationship themselves but that have a direct investor in common; such enterprises are called fellow enterprises.

this measure can signal that US parent companies disinvested or repatriated profits through their affiliate-fellow enterprises resident in the euro area. However, it can also indicate that euro area parent companies recalled home profits held at their affiliate-fellow enterprises resident in the United States or disinvested in the country.[29] Bearing these definitions in mind, approximately one-third of the contraction in gross FDI liabilities in the euro area in 2018 was due to reverse investments.[30]

In conclusion, the episode of reversal of gross FDI flows in the euro area seems to have been primarily related to the activity of SPEs. When disentangling flows pertaining to SPEs from the flows of other resident companies,[31] it appears that SPEs are solely responsible for the aggregate contraction in euro area FDI flows on the liability side (Chart C). It seems that mergers and acquisitions and greenfield investments remained resilient in 2018, which suggests that these flows are unlikely to have had negative implications for real activity thus far. However, while the situation may normalise going forward, it is still too early to assess the possible effects of transit FDI on real activity in the euro area over the longer term.

29 Transactions between fellow enterprises are now included in FDI statistics following the adoption by the IMF of the sixth edition of the balance of payments and international investment position manual (BPM6), as they likely result from the influence of the common direct investor.

30 In Luxembourg, which accounts for the greatest part of the retrenchment, reverse investments are responsible for around 34% of the gross liabilities reversal at the end of 2018. In Belgium reverse investments are the sole cause of the reduction in liabilities. Conversely, disinvestments from the Netherlands and Ireland were driven purely by a drop in inward investment, with no significant evidence of intra-group or intra-fellow equity and lending transactions.

31 The breakdown of FDI assets and liabilities for SPEs is not available for Ireland. It can be assumed, however, that the strong positive correlation (0.94) between SPE liability flows and inward FDI flows also holds in this country. This statistical regularity, which is obtained from a panel regression on Luxembourg, the Netherlands and Belgium, proves rather stable over time and when computed on a subset of countries. This provides a useful tool to obtain an approximate estimation of SPE flows for countries currently not reporting the breakdown, provided that statistics on inward and outward flows are available. The activity of other resident entities is only marginally related to reverse and inward investments. Finally, gross liability flows of other resident and special purpose entities and reverse and inward investments are unrelated.

4 Sources of economic policy uncertainty in the euro area: a machine learning approach

Prepared by Andrés Azqueta-Gavaldón, Dominik Hirschbühl, Luca Onorante and Lorena Saiz

Global policy uncertainty has recently increased and remains relatively high. Uncertainty about global trade disputes, the economic challenges stemming from climate change and geopolitical factors are contributing to increased levels of policy-related uncertainty in Europe. Understanding the sources and dynamics of uncertainty which hits the economy is valuable for policymakers, including central banks. Firms are particularly sensitive to uncertainty when making their investment decisions.[32] In response to uncertainty shocks, they may reduce their investment, hiring or orders for foreign intermediates, leading to a deceleration in trade and aggregate investment. Consumers, in turn, may react to increased uncertainty by postponing consumption and increasing precautionary savings, as reflected in the rise in the household saving rate in 2018. This can lead to a contraction in international trade and domestic economic activity.[33]

In this box, an indicator of economic policy uncertainty (EPU) is presented which applies unsupervised machine learning techniques to newspaper articles. While there has been a recent rise in uncertainty measures, conventional techniques fail to fully capture country-specific characteristics. The economic policy uncertainty index developed by Baker, Bloom and Davis (2016)[34] (the BBD approach) is produced by counting the number of press articles describing policy uncertainty issues using a list of keywords. However, individual components of policy uncertainty are not identified with this method, since the list of keywords retrieves all articles without regard to the specific source of uncertainty (i.e. fiscal, monetary or trade policy uncertainty). To dig into the different sources of uncertainty, the approach described in Azqueta-Gavaldón (2017a, 2017b)[35] is used. This approach applies a machine learning algorithm (latent Dirichlet allocation, LDA)[36] to all news articles containing words related to "economy" and "uncertainty".[37] LDA is unsupervised in the sense that the algorithm infers the themes in the set of documents without any labelling of the

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32 See Gulen, H. and Ion, M., "Policy Uncertainty and Corporate Investment", *The Review of Financial Studies*, Vol. 29(3), 2016, pp. 523-564.

33 See Handley, K. and Limão, N., "Trade and Investment under Policy Uncertainty: Theory and Firm Evidence", *American Economic Journal: Economic Policy*, Vol. 7(4), 2015, pp. 189-222, and the article entitled "The impact of uncertainty on activity in the euro area", *Economic Bulletin*, Issue 8, ECB, 2016.

34 See Baker, S., Bloom, N. and Davis, S., "Measuring Economic Policy Uncertainty", *Quarterly Journal of Economics*, Vol. 131, No 4, 2016, pp. 1593-1636.

35 See Azqueta-Gavaldón, A., "Developing news-based Economic Policy Uncertainty index with unsupervised machine learning", *Economics Letters*, Vol. 158, 2017a, pp. 47-50; and Azqueta-Gavaldón, A., "Financial investment and economic policy uncertainty in the UK", IML '17 Proceedings of the 1st International Conference on Internet of Things and Machine Learning, 2017b.

36 See Blei, D.M., Ng, A.Y. and Jordan, M.I., "Latent Dirichlet Allocation", *Journal of Machine Learning Research*, Vol. 3, 2003, pp. 993-1022.

37 To come up with words related to "uncertainty" and "economy" the word2vec algorithm was used: a two-layer neural net for parsing text that turns each word into a vector. The words most similar in the vector space to the words "uncertainty" and "economy" are then selected. See Mikolov, T., Sutskever, I., Chen, K., Corrado, G.S. and Dean, J., "Distributed Representations of Words and Phrases and their Compositionality", in Burges, C.J.C., Bottou, L., Welling, M., Ghahramani, Z. and Weinberger, K.Q. (eds.), *Advances in Neural Information Processing Systems 26 (NIPS 2013)*, 2013, pp. 3111-3119.

articles or training of the model before the articles are classified. LDA analyses a set of documents and allocates words to topics on the basis of how often they occur together in the same document. In other words, a topic is a set of related words that frequently occur together. Each document, in turn, can be represented as a "mixture of topics", where the topics are those defined by the allocation of words.[38] LDA is more robust than other techniques because it is not dependent on the ex ante choice of specific keywords. In addition, words that frequently occur together in a document are assigned to the same topic, which is what makes the results of LDA more intuitive than those of similar techniques. The only choice the modeller needs to make is the number of topics into which to divide the corpus of documents.

Topics framed by the LDA characterise sub-components of policy uncertainty in an intuitive and language-independent manner. The LDA algorithm is run on a total of 171,107 news articles collected from the most popular newspapers in Germany, France, Italy and Spain during the period from January 2000 to May 2019. Table A shows the most representative words per category retrieved by the algorithm for each country. As can be seen, the lists of words that form each topic seem coherent in the sense that it is not difficult to infer the topic from the words, even across different languages. One caveat of the analysis is that the LDA algorithm used is static, i.e. the selected words are the same over the whole sample period.[39]

The EPU index series built using unsupervised machine learning closely resembles the BBD EPU index series in the euro area, although the levels of some peaks differ. In order to validate this method, Chart A compares the aggregate euro area uncertainty index (built by aggregating each individual EPU category across each country)[40] with the BBD EPU index. The indices are highly correlated (at 0.85), and both spike during the Iraq War (March 2003), the European sovereign debt crisis (2010-2014) and the announcement of the results of the referendum on Britain's membership of the EU (Brexit) (June 2016). While the similarities are strong, the most significant spike in the BBD index occurs during the month of the Brexit referendum (June 2016), while in the LDA-based index it takes place during the sovereign debt crisis (August 2011).

38 The prior distributions for the weights of each topic within a document and for the probability of each word being assigned to a topic are drawn from a Dirichlet probability distribution.

39 Given that the set of words that characterise a topic might change over time, a dynamic LDA algorithm would be more suitable for categorising new data (i.e. future news articles).

40 Building the EPU indices for each country required several steps. First, each article was labelled according to its most representative topic (the topic with the highest percentage in the article). Second, a raw count of the number of articles on each topic in each month was produced. Since the number of articles is not constant over time, each raw time series was divided by the total number of articles.

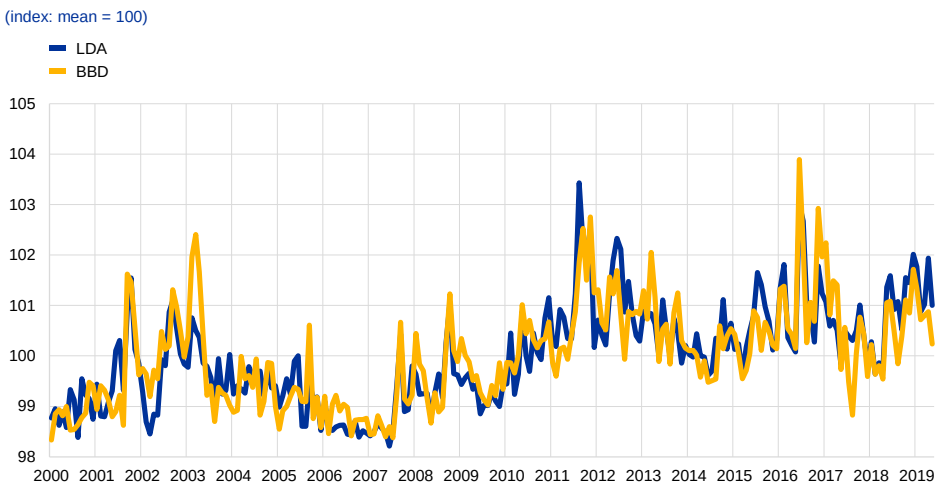
Table A

Most relevant words identified by the LDA in each category

EPU category	Germany Articles = 10,979	France Articles = 31,434	Italy Articles = 74,144	Spain Articles = 54,550
Monetary	ezb, euro, griechenland, europa, draghi, italien, zone, währungsunion, land, mario	taux, économie, euro, monétaire, bce, banque, inflation, baisse, ralentissement, croissance	banca, bce, spread, monetaria, debito, draghi, tassa, centrale, eurozona, titoli, inflazione	tipos, bce, monetaria, inflación, draghi, euro, interés, banco, economía
Fiscal		fiscal, impôt, dépense, finance, budget, milliard, taxe, retrait, déficit, publique, réforme, prélever	fiscale, manovra, bilancio, pubblico, spesa, taglio, deficit, padoan, commissione	gobierno, ley, medidas, pensiones, fiscal, reforma, impuestos, presupuestos
Political	spd, cdu, merkel, koalition, grün, csu, fdp, kanzlerin, schäuble, partei, minister	ministre, président, sarkozy, gouvernement, chef, france, macron, réforme, élysée	renzi, pd, salvini, premier, voto, partito, elettorale, lega, politica, palazzo, presidente, legale	pp, rajoy, psoe, cataluña, partido, elecciones, voto, gobierno, presidente
Geopolitical	russland, russisch, iran, ukraine, putin, sanktion, syrien, israel, rubel, arabisch, krim, irak, barrel, konflikt	militaire, iran, armée, arabie, iranien, syrie, turquie, sécurité, irak, guerre, terrorisme, immigration, migrer, réfugié, russie, ukraine	terrore, libia, siria, iran, arabia, iraq, guerra, militari, russia, cinese, sanzione, jihad, saudita, tunisia, sunnita, curdo	irán, siria, turquía, saudí, guerra, ejército, irak, militar, arabia, refugiados, islámico
Manufacturing/trade	china, usa, global, trump, weltwirtschaft, zoll, strafzoll, iwf, weltweit, import, protektionismus	produit, agriculture, commerce, lait, viande, industriel, exportation, producteur, automobile, véhicule, psa	trump, auto, fiat, diesel, automobilistico, prodotto, industria, settore, esportazione, competitività, pmi, manifattura, mercato, paese	china, rusia, mundial, pekín, aranceles, comercio, unidos, comerciales, ventas, diésel, fabricantes, seat
European regulation	eu, brexit, britisch, london, pfund, austritt, brüssel, binnenmarkt, votum, parlament, kommission	européen, europe, union, ue, brexit, grec, bruxelles, britannique, allemagne, paye, irlande, euro, commission, referendum, zone	europea, ue, germania, tedesco, unione, grecia, merkel, migranti, bruxelles, brexit, voto, referendum, populismo, partito	europea, ue, bruselas, grecia, unión, comisión, comunitario, eurozona, socios, brexit, referéndum
Domestic regulation	arbeit, arbeitnehmer, hartz, iv, arbeitslos, job, rente, einkommen, deutschland, beschäftigt, reform, ausbildung, studium	syndicat, texte, cgt, salarié, syndical, tribunal, juridique, commission, emploi, entreprise, travail, embauche	paga, pensione, gentiloni, università, pdl, scuola, sindacato, contratto, sindacale, lavoro, sentenza, tribunale	justicia, tribunal, supremo, deuda, bancos, crisis, rescate, laboral, sindicatos, ugt, universidades
Energy		énergie, électricité, edf, gaz, nucléaire, pétrolier, baril, réacteur, carbone, alstom	ambientale, carbone, energia, climatico, elettricità, inquinanti, petrolio, gas, barile, petrolifero	energía, climático, emisiones, carbón, gases, electricidad, contaminación

Source: ECB staff calculations.
Note: Before running the algorithm, articles were pre-processed: stopwords (e.g. “me”, “or”, “the” “a”) and punctuation were removed; each word was converted into lower case; and all the words were converted into their root (stemming). This table shows whole words instead of the root.

Chart A
Euro area LDA-based EPU index and BBD EPU index



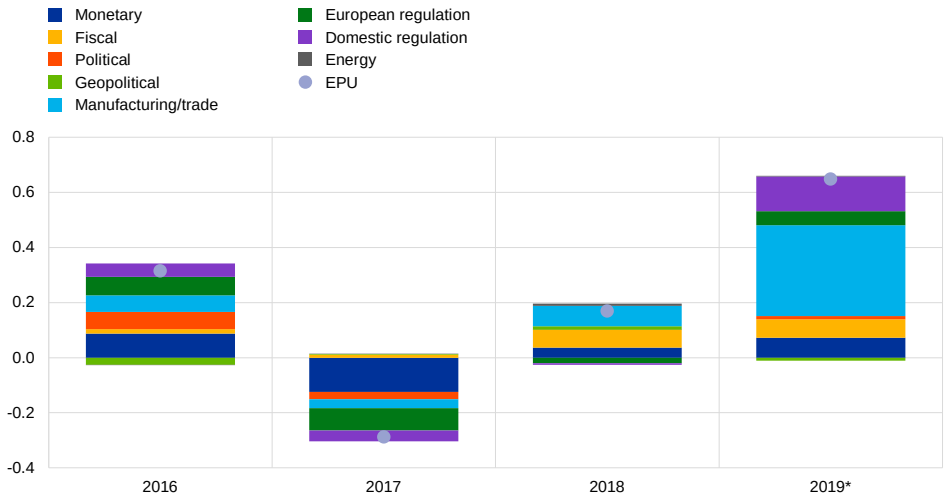
Sources: Economic Policy Uncertainty website (www.policyuncertainty.com) and ECB staff calculations.
Notes: The euro area LDA-based EPU index is composed of the four country EPU indices (equally weighted). Each individual index is derived from the number of news articles whose most representative topic is one of the eight categories listed in Table A divided by the total number of news articles containing the word "today" ("heute", "aujourd'hui", "oggi", "hoy"). The BBD EPU index corresponds to the average EPU index for Germany, France, Italy and Spain taken from the Economic Policy Uncertainty website. Each final time series is standardised with a mean of 100 and one standard deviation.

The sub-components of the index suggest that since 2016, trade, domestic regulation and fiscal policy have been the main sources of policy uncertainty (see Chart B). The contributions of individual uncertainty components to overall economic policy uncertainty have been quite dynamic since 2016. In the year of the Brexit referendum (2016), the main drivers of policy uncertainty in the euro area were related to monetary policy, European regulation and trade. By contrast, in 2017 a reduction in policy uncertainty was explained by a big drop in uncertainty related to monetary policy. The last time the ECB cut interest rates was in 2016, when it also stated that rates would remain at current or lower levels for an extended period, thereby clarifying future interest rate policy for a relatively long time ahead. As for 2018, and so far in 2019, a steady and pronounced increase in the euro area EPU index can be observed, driven in particular by trade-related uncertainty, but also to some extent by uncertainties related to domestic regulation (e.g. uncertain effects of new emission standards) and fiscal policy (e.g. enforcement of EU budget rules in some Member states). These appear mainly to reflect (i) global trade disputes involving the United States and China that are likely to affect euro area exports/imports; (ii) uncertainties surrounding the Brexit negotiations; and (iii) concerns regarding domestic and fiscal policies in some euro area countries. They do not appear to reflect uncertainties associated with the conduct of monetary policy.

Chart B

Contributions by topic to changes in economic policy uncertainty in the euro area

(average annual percentage changes and percentage point contributions)



Source: ECB staff calculations.
Note: * For 2019 the annual contribution is based on the period from January to May 2019.

5 What is behind the change in the gap between services price inflation and goods price inflation?

Prepared by Luigi Ferrara

Services price inflation tends to be much higher than non-energy goods price inflation. This tendency has not only been a feature of the euro area economy over the past 20 years but has also been observed in the US economy. The gap and its variation over time, which implies a changing speed in the evolution of relative prices, indicate that aggregate inflation developments typically reflect more than a generalised change in the purchasing power of money. Understanding the nature of the demand and supply forces that underlie relative price developments is an important element of inflation analysis. Against this background, this box reviews some of the features and sources of the gap between services price inflation and non-energy industrial goods price inflation in the euro area.[41]

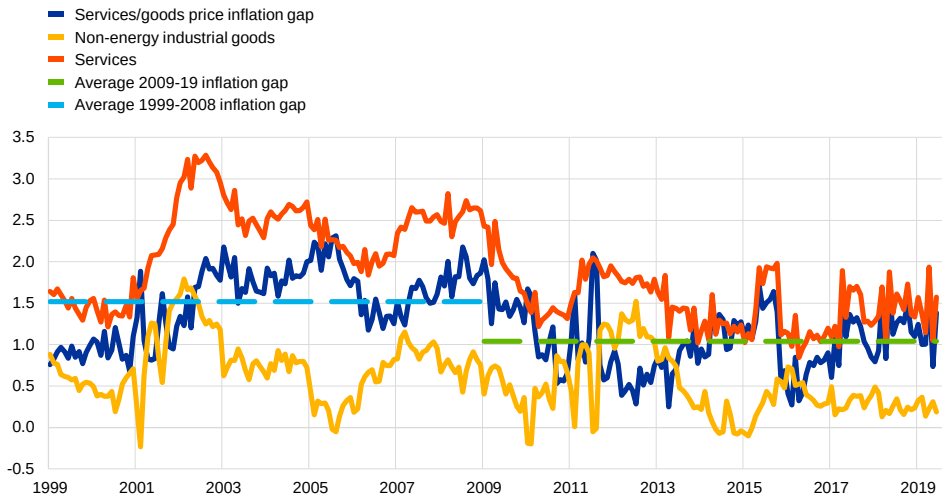
The gap between services price inflation and goods price inflation has narrowed in the period following the financial crisis. Since 1999, HICP services price inflation in the euro area has been, on average, 1.9%, whereas non-energy industrial goods price inflation has been about 0.6%. The gap between the two rates has been positive at all times during the past 20 years (see Chart A). However, the gap declined from an average of 1.5 percentage points in the period 1999-2008 to an average of 1 percentage point in the period 2008-19. The narrower gap reflects a larger decline in average services price inflation (2.3% to 1.5%) than in average non-energy industrial goods price inflation (0.7% to 0.5%) from the first period to the next. These developments have occurred against the backdrop of a different demand environment in the euro area since the crisis. In open economies, a higher level of demand typically benefits the price of non-tradable services more than the price of tradable goods. It is therefore likely that the larger decline in services price inflation than in non-energy industrial goods price inflation has to some extent reflected the weaker demand conditions in the euro area after the crisis. The focus of this box, however, is on the role of unit labour costs and import prices in explaining relative inflation developments in services and non-energy industrial goods.

41 For an analysis of the inflation gap in the euro area up to 2008, see the box entitled "Why is services inflation higher than goods inflation in the euro area?", *Monthly Bulletin*, ECB, January 2009. This feature is also discussed in Cœuré, B., "The rise of services and the transmission of monetary policy", speech given at the 21st Geneva Conference on the World Economy, 16 May 2019.

Chart A

Services and goods price inflation and the gap between the two

(annual percentage changes and percentage points)



Sources: Eurostat and ECB calculations.
Notes: The services/goods price inflation gap is the difference between the annual rates of change in the HICP components services and non-energy industrial goods. The spike in services price inflation in 2015 is due to Eurostat's methodological changes to the treatment of package holiday prices in Germany.

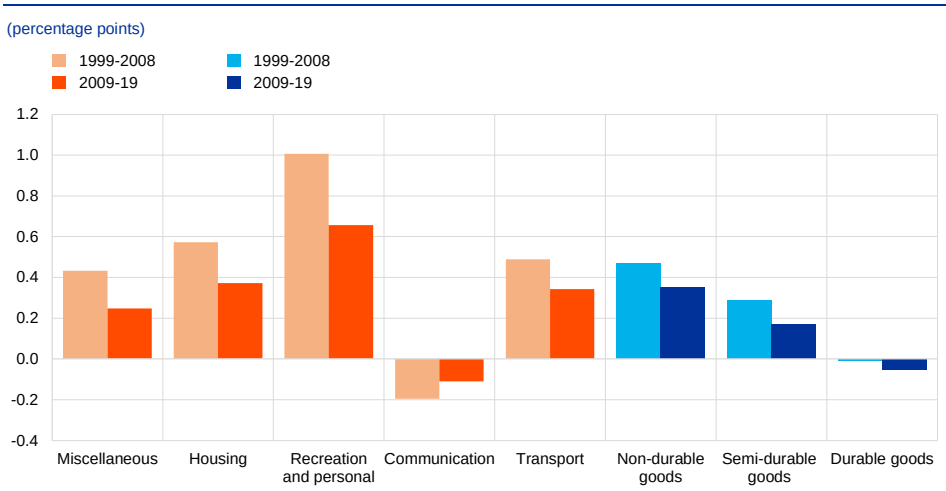
The decline in services and non-energy industrial goods price inflation is fairly broad based in terms of the respective sub-components. Chart B shows this in terms of their contributions to services and non-energy industrial goods price inflation respectively, with the changes from the first period to the second largely reflecting changes in inflation rates rather than changes in the weights of components.[42] With the exception of communication services, all sub-components have recorded lower average contributions to services and non-energy industrial goods price inflation in the post-crisis period than previously (see Chart B). The less negative average inflation rate for communication services is, to a large extent, accounted for by a less pronounced trend decline in the price of telephone services and equipment. This slower trend decline likely reflects some fading out of the longer-term impact of large-scale liberalisation of the telecommunications sector and of the IT revolution in the early 2000s. The drop in the average contribution of miscellaneous services to overall services price inflation is largely due to developments in medical and education services, including the abolition of medical fees and education fees over a number of years in some euro area countries. The main driver of the smaller contribution to inflation from recreation and personal services has been the slowdown in restaurant services prices growth; this likely reflected a drop in demand in some countries in the aftermath of the crisis but also specific tax reductions in others. The decline in the contribution from transportation services reflected lower price increases for car maintenance and repair, which were likely linked to the car scrapping schemes introduced following the crisis and the associated renewal of the stock of cars and

[42] The average weight of household services declined by 0.2 percentage points over the two periods and the weights of recreation and transportation services by 0.1 percentage points, while the average weight of miscellaneous services increased by 0.3 percentage points and that of communication services remained unchanged. Within non-energy industrial goods, the average weight of durables declined by 0.2 percentage points, that of non-durables increased by 0.2 percentage points and that of semi-durables remained unchanged.

reduced need for repairs in subsequent years. Lower rent inflation has been the main driver of the decline in the contribution from housing services inflation.[43] The declines in the contributions from the non-energy industrial goods sub-components have been more muted than those for services. The decrease in the contribution from non-durable goods has reflected price developments in different goods, especially those for personal care. The decline in semi-durable goods inflation has mirrored slower price dynamics in both clothing and non-clothing items. Slower car and furniture price increases, the latter particularly relevant in countries that experienced the pre-crisis housing boom, have been behind the slowdown in durable goods inflation. A factor that is likely to have dampened price dynamics across a broad range of non-energy industrial goods is an increase in competition, fostered by the rapid growth of online businesses. On the whole, this granular perspective suggests that the changes in the inflation gap between services and non-energy industrial goods may reflect both general factors and the accumulation of idiosyncratic developments for individual euro area countries and HICP items.

Chart B

Average contributions of the respective sub-components to services and goods price inflation rates



Sources: Eurostat and ECB calculations.
Notes: Red bars show services sub-components and blue bars show non-energy industrial goods sub-components.

Wages and productivity are typically seen as some of the main general factors behind the gap between services price inflation and goods price inflation. This can be seen by looking at production sectors and making a broad association between manufacturing and the production of non-energy industrial goods on the one hand, and between market services and the production of consumer services on the other hand. Over the past two decades, productivity growth in the euro area has been much stronger in the manufacturing sector than in the market services sector, whereas for wage growth this was much less the case. A high wage growth relative to productivity growth in the services sector is in line with the Balassa-Samuelson effect, whereby the relatively high wage growth in the manufacturing and tradable goods sectors spills

[43] For a discussion, see the box entitled "Rent inflation in the euro area since the crisis", *Economic Bulletin*, ECB, Issue 4, 2019.

over to the market services sector with its non-tradable goods. The importance of wage growth in determining services price increases is strengthened by the different cost structure of the two sectors. Labour costs are estimated to have represented about 40% of the cost structure in services and about 20% in industry excluding energy and construction in both 2008 and 2016.[44] Looking at the synthesis of wages and productivity in terms of unit labour cost growth, the decline in the gap between services price inflation and goods price inflation in the post-crisis period has coincided with the corresponding decline in the gap between the unit labour cost growth of the two sectors. There has been a large decline (of about one-half of a percentage point) in average unit labour cost growth in the services sector in the post-crisis period, while average unit labour cost growth in manufacturing has remained stable across the two periods. Although average growth in wages (compensation per employee) and productivity declined in both sectors, the decline in wage growth has been much larger than that of productivity in the services sector (see Chart C).

Chart C

Unit labour cost growth – sectoral developments

Sources: Eurostat and ECB calculations.
Notes: Labour productivity is shown on an inverse scale. Market services are defined as services excluding public administration, education, health and social services.

Another general factor explaining the gap between services price inflation and goods price inflation is the different exposure to import price developments. The direct import content of non-energy industrial goods is about 12%, compared with about 1% for services. These ratios remained broadly unchanged between 2005 and 2017.[45] A comparison of the GDP deflator (a broad measure of domestic price developments) with the import deflator (a broad measure of foreign price

[44] These estimates are obtained from the euro area input-output tables provided by Eurostat by dividing compensation of employees by the total costs of the sectors (where total costs comprise: foreign and domestic inputs of goods and services; taxes less subsidies; and compensation of employees).

[45] These estimates are based on Eurostat's input-output tables, which provide the breakdown across sectors for private consumption and imports of final consumer goods and services for the years 2005-17. The ratio between the import content of the two sectors would likely be smaller if the indirect import content – which represents intermediate imported inputs used for the production of domestic goods and services – were also included, as it tends to be larger for services than for goods.

developments) shows that the latter has generally been more subdued and saw a stronger decline between the pre- and post-crisis periods (the average increase in the GDP deflator fell from 2.0% to 1.1%, while that of the import deflator fell from 1.8% to 0.6%).[46] The subdued foreign cost growth has thus likely had a considerably larger dampening impact on non-energy industrial goods price inflation than on services price inflation. This may help to explain why non-energy industrial goods inflation has, on average, been only 0.5% in the post-crisis period. However, these developments have contributed to a widening rather than a narrowing of the gap between services price inflation and non-energy industrial goods price inflation. This suggests that the factors behind the diminishing gap were more on the services side.

One more general factor that may have operated largely on the services side is the evolution of administered prices excluding food and energy. Most of these administered prices are typically part of the services components of the HICP, rather than the non-energy industrial goods components. The lower average growth rate of administered prices excluding food and energy in the post-crisis period has thus contributed to the decline in the gap between services price inflation and goods price inflation (the average growth of administered prices has been 1.7% since 2009, compared with an average of 2.0% during the period 2001-08).[47]

Overall, the narrowing gap between services price inflation and goods price inflation helps to explain the lower HICP inflation excluding food and energy. The change in the gap seems to have largely reflected the relatively high decline in unit labour cost growth in the services sector that has dampened services inflation. Services accounted for 0.37 percentage points of the 0.5 percentage point decline in average HICP inflation excluding energy and food from 1.6% in the pre-crisis period to 1.1% in the period since 2009. However, HICP inflation excluding food and energy would have declined even more had the weight of the services component not changed. While the decline in inflation between the two periods was stronger for services than for non-energy goods, the average services price inflation rate remained visibly higher. The increase of the weight of services in HICP inflation excluding energy and food, from an average of 57% in the period 1999-2008 to an average of 61% in the period 2009-19, thus gave more prominence to the higher inflation rate of services in underlying inflation developments.

46 Developments in the effective exchange rate of the euro do not support the narrowing of the inflation gap since, on the whole, the second period has seen a depreciation of the exchange rate, although the second period has been marked – like the first one – by large fluctuations in the euro exchange rate. Similarly, import prices for non-food consumer goods have increased by 1.1%, on average, since 2009, whereas they declined by 0.3%, on average, in the period 2006-08 (no data are available before 2006).

47 The impact of changes in indirect taxes has been similar on services price inflation and non-energy industrial goods price inflation.

6 Country-specific recommendations for economic policies under the 2019 European Semester

Prepared by Nico Zorell

On 5 June 2019 the European Commission issued its annual policy recommendations for EU Member States under the 2019 European Semester. The European Semester is the EU's annual policy coordination cycle. In this respect, the country-specific recommendations (CSRs) are a source of guidance for Member States when designing their economic and fiscal policies for the following year. This box examines all policy recommendations addressed to euro area countries, with the exception of those pertaining to fiscal policy.[48]

The 2019 recommendations call on Member States to strengthen their economic resilience and growth potential. The implementation of well-designed structural reforms is essential for reducing vulnerabilities in euro area countries, rendering those countries better able to withstand economic shocks.[49] Reforms are also needed to meet structural challenges facing euro area countries, including digitalisation and demographic change.

The 2019 CSRs cover structural policies and policies related to labour markets, public administration and the financial sector. According to the Commission's CSR classification, the majority of euro area countries received recommendations in each of the broad policy areas covered (see Chart A). The number of euro area countries with CSRs in the "public administration and business environment" category remained broadly stable. However, within this category more countries received CSRs related to the business environment and judicial system this year, which appears warranted given the importance of high quality institutions for resilience and long-term growth.[50] As in 2018, the "labour market, education and social policies" category remains a priority. Within this category, recommendations related to workers' skills and lifelong learning gained importance, reflecting the increasing challenges posed by digitalisation. By contrast, only a few countries received CSRs on wage-setting arrangements. Although favourable economic conditions have led to a decline in unemployment rates over recent years, the negative effects of limited labour market adaptability in some euro area countries could become more apparent when the economic cycle turns.

Overall, the 2019 CSRs place greater emphasis on investment-enhancing structural policies and financial sector policies. In contrast to last year, in 2019 all euro area countries received at least one CSR related to the Commission's "structural policies" category, covering, inter alia, regulatory frameworks, competition, network industries, and research and innovation. This in part reflects the focus of this year's CSR package on identifying structural investment bottlenecks. This focus should be seen in the context of broader efforts by the Commission to strengthen the link

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48 For details of the 2019 CSRs related to fiscal policy, see the box entitled "Priorities for fiscal policies under the 2019 European Semester" in this issue of the *Economic Bulletin*.

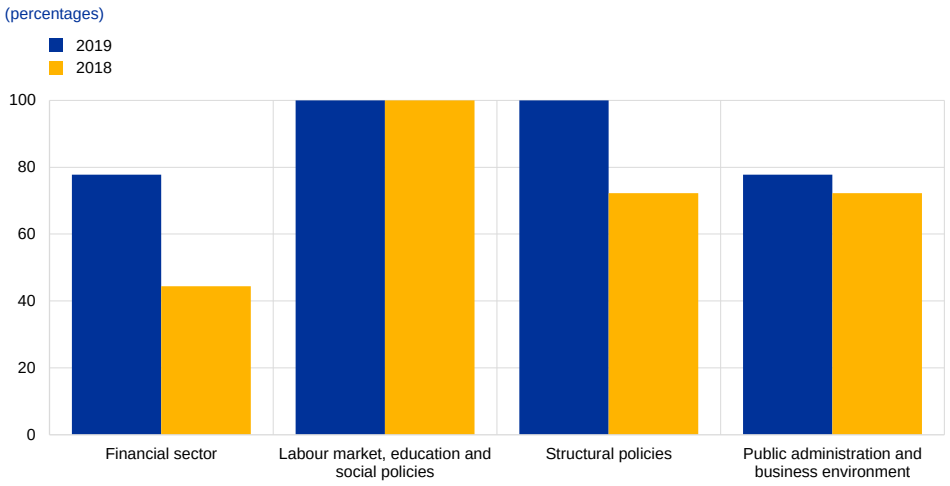
49 See Masuch, K., Anderton, R., Setzer, R. and Benalal, N., "Structural policies in the euro area", *Occasional Paper Series*, No 210, ECB, June 2018.

50 See Masuch et al., op. cit., Chapter 5.

between the European Semester and the EU budget, in particular the cohesion funds. The share of euro area countries receiving CSRs aimed at the "financial sector" category also increased in 2019, driven partly by recommendations related to the housing market. Specifically, the CSRs call on several Member States with dynamic house price growth to alleviate supply bottlenecks and market distortions, with a view to preventing the build-up of vulnerabilities.

Chart A

Share of euro area countries receiving CSRs broken down by broad policy area



Source: ECB calculations based on the 2018 and 2019 CSRs.
Notes: The chart shows the share of euro area countries receiving CSRs broken down into broad policy areas, based on the European Commission's classification. "Financial sector" policies relate to financial services, the housing market, access to finance and private sector indebtedness; "labour market, education and social" policies include employment protection, active labour market policies, wage-setting frameworks, lifelong learning and health care; "structural" policies include research and innovation, competition, regulatory frameworks and network industries; "public administration and business environment" policies include business environment, civil justice and anti-corruption measures. CSRs for public finances and taxation are not included. For the sake of comparability across time, the chart excludes Greece. In 2018 the country did not receive CSRs as it was under an economic adjustment programme. It has been under enhanced surveillance since August 2018 and is therefore now part of the European Semester.

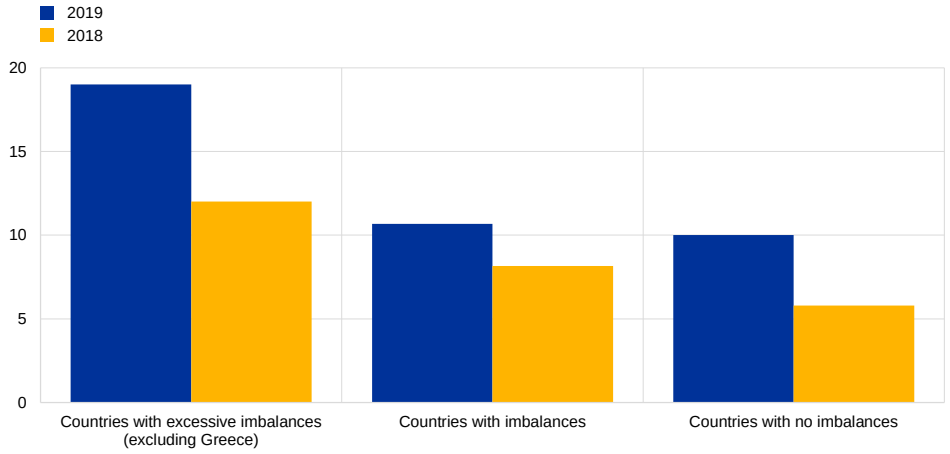
Overall, the 2019 CSRs for countries with excessive macroeconomic imbalances cover a broader range of policy areas than those for other countries.[51] Chart B shows the average number of policy areas covered by the CSRs across three groups of euro area countries, with the groups corresponding to the Commission's assessment as to whether a country has excessive macroeconomic imbalances, imbalances or no imbalances.[52] The Commission's analysis suggests that the average number of policy areas for countries with excessive imbalances is higher than for other euro area countries and that this gap widened compared with 2018.

[51] According to Regulation (EU) No 1176/2011 of the European Parliament and of the Council of 16 November 2011 on the prevention and correction of macroeconomic imbalances, the term "imbalances" means any trend giving rise to macroeconomic developments which are adversely affecting, or have the potential adversely to affect, the proper functioning of the economy of a Member State or of the economic and monetary union, or of the Union as a whole. The term "excessive imbalances" means severe imbalances, including imbalances that jeopardise or risk jeopardising the proper functioning of the economic and monetary union.

[52] Under the macroeconomic imbalance procedure, there are three possible outcomes: "no imbalances", "imbalances" or "excessive imbalances". If the European Commission identifies imbalances, the country concerned will receive policy recommendations designed to address them. When the imbalances are assessed as being so severe that they are found to be "excessive", the Commission can take further action by recommending that the Council activate the excessive imbalance procedure.

Chart B

Average number of policy areas covered by the CSRs across country groups



Source: ECB calculations based on the 2018 and 2019 CSRs.
Notes: The chart shows the average number of policy areas covered by the CSRs across country groups, based on the European Commission's disaggregated mapping of the CSRs into 26 policy areas (such as "housing market", "research and innovation" and "civil justice"). CSRs for public finances and taxation are not included. The country groups are based on the Commission's assessment under the EU's macroeconomic imbalance procedure (MIP). The composition of the country groups was stable in 2018 and 2019. For the sake of comparability across time, the chart excludes Greece. In 2018 the country did not receive CSRs as it was under an economic adjustment programme. It has been under enhanced surveillance since August 2018 and is therefore now part of the European Semester.

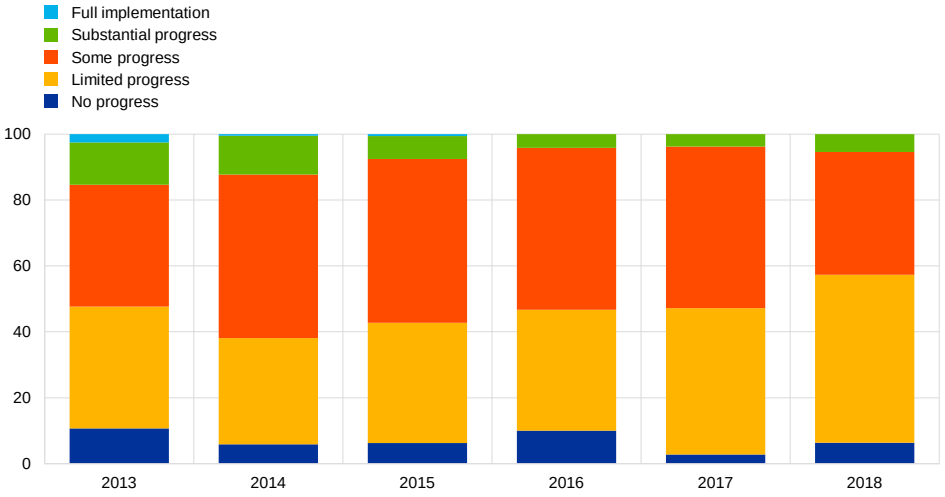
Continued weak CSR implementation by Member States, including those with excessive imbalances, remains a challenge.[53] In February 2019 the European Commission concluded that none of the 2018 CSRs for euro area countries had been "fully" implemented. "Substantial" progress was only visible for around 5% of the CSRs. The remaining 95% of policy recommendations had either not been implemented or, at best, had been implemented to "some" extent. The CSR implementation record has therefore continued to deteriorate in line with the trend seen over recent years (see Chart C). Moreover, countries with excessive imbalances do not seem to have taken further decisive policy action to step up the implementation of their CSRs.

In order to reap the full benefits of the ECB's monetary policy measures, other policy areas must contribute more decisively to raising the longer-term growth potential and reducing vulnerabilities. In particular, the implementation of structural reforms needs to be substantially stepped up, with the 2019 CSRs serving as the relevant signpost. While the CSRs provide important guidance to all countries, the corrective arm of the macroeconomic imbalance procedure (MIP) might offer a well-defined process to assist the most vulnerable countries, in particular. In addition, a more rigorous prioritisation of CSRs according to their macro-critical relevance could encourage compliance with the MIP and also help incentivise countries to take firmer ownership of structural reforms. If appropriately designed and implemented, EU tools offering financial support and technical expertise for important structural reforms could also help to provide the right incentives for such reforms and national ownership.

[53] For more details, see the box entitled "The European Commission's 2019 assessment of macroeconomic imbalances and progress on reforms", *Economic Bulletin*, Issue 2, ECB, 2019.

Chart C

CSR implementation over the period 2013-18 in euro area countries



Source: ECB calculations based on the European Commission's Country Reports.
Notes: The chart shows the implementation of (non-fiscal) CSRs for the year given as assessed by the European Commission in the overview table of each Member State's Country Report published the following year. "Full implementation" signifies that the Member State has implemented all measures needed to address the CSR appropriately; "substantial progress" signifies that the Member State has adopted measures that go a long way in addressing the CSR, most of which have been implemented; "some progress" signifies that the Member State has adopted measures that partly address the CSR, and/or it has adopted measures that address the CSR but a fair amount of work is still needed to fully address it as only a few of the adopted measures have been implemented; "limited progress" signifies that the Member State has announced certain measures but these only address the CSR to a limited extent, and/or it has presented non-legislative acts, yet with no further follow-up in terms of implementation; and "no progress" signifies that the Member State has not credibly announced or adopted any measures to address the CSR.

7 Priorities for fiscal policies under the 2019 European Semester

Prepared by Stephan Haroutunian, Sebastian Hauptmeier and Nadine Leiner-Killinger

On 5 June the European Commission issued its 2019 European Semester Spring Package of policy recommendations for EU Member States. The package includes country-specific recommendations (CSRs) for economic and fiscal policies in 2020 for all Member States.[54] It also contains recommendations regarding the implementation of the European Union's Stability and Growth Pact (SGP) for some countries.[55] With regard to fiscal policies, the recommendations are based on the Commission's 2019 spring forecast and its assessment of countries' policy plans as reflected in the updates of the stability and convergence programmes released in April. This box examines the fiscal policy recommendations addressed to the euro area countries. The examination shows that in countries with high levels of government debt, building buffers to strengthen resilience in cyclical downturns remains a priority for fiscal policies. At the same time, countries that have achieved sound fiscal positions could utilise some fiscal space for measures to support economic growth.

The 2019 Spring Package confirms the pattern of a significant divergence of fiscal positions across countries. According to the European Commission's 2019 spring forecast, seven euro area countries are assessed to have reached sound fiscal positions with underlying budgetary positions close to or above their medium-term budgetary objectives (MTOs) at the beginning of 2019 (see Chart A). This helps to reduce government debt ratios, provides policy space for measures aimed at raising potential output growth, and bolsters the resilience of public finances ahead of a possible downturn. At the same time, a number of countries are still some distance away from their MTOs, most notably countries with government debt-to-GDP ratios of more than 90%. They remain vulnerable to an economic downturn and financial market volatility.

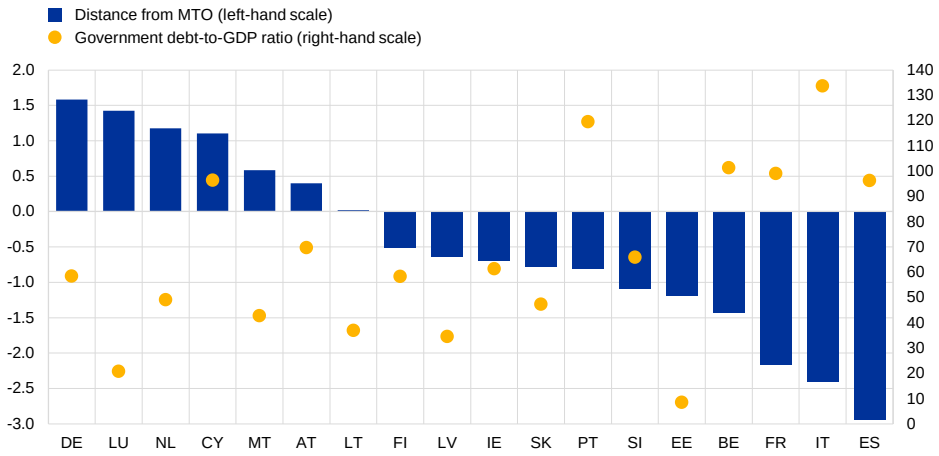
54 See also the box entitled "Country-specific recommendations for economic policies under the 2019 European Semester" in this issue of the Economic Bulletin.

55 The CSRs were finalised and adopted by the Economic and Financial Affairs Council on 9 July 2019.

Chart A

Distance from MTOs and levels of general government debt in 2019

(percentages of GDP)



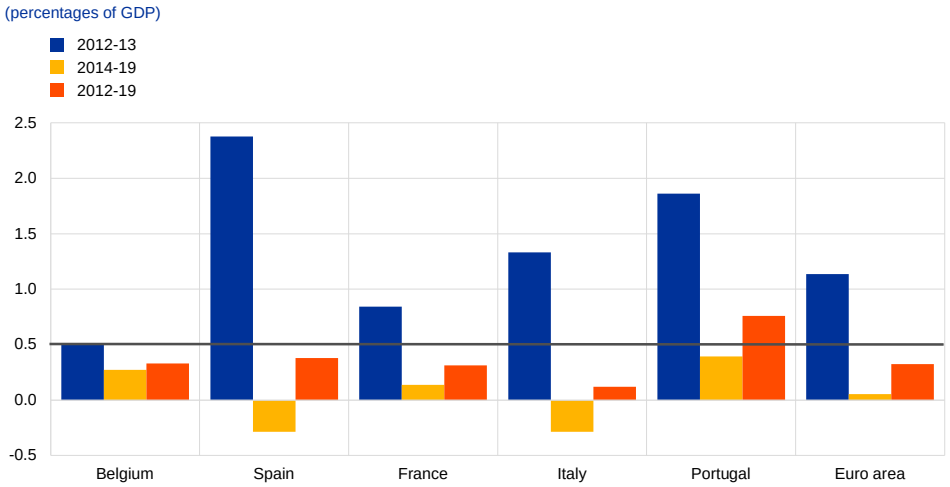
Sources: European Commission (AMECO database) and ECB calculations.
Notes: The distance from a country's MTO is measured as the difference between the structural balance and the MTO. Countries no further than 0.25% of GDP from their MTOs are considered to have reached them (see also the 2019 edition of the European Commission's Vade Mecum on the Stability and Growth Pact). The chart excludes Greece, which does not have an MTO for 2019. Following its exit from the economic adjustment programme, Greece has set an MTO for the period 2020-22.

In most cases, the distance from the MTO in countries with high levels of government debt reflects overall limited adjustment progress in recent years. As shown in Chart B, most euro area countries with government debt above 90% of GDP implemented large fiscal adjustments in 2012-13, as measured by the change in the structural balance. This indicator comprises headline budget balances net of the impact of the economic cycle and one-off measures. For some countries with high levels of government debt, the adjustments exceeded the requirements under the SGP, in part reflecting financial market pressures. Thereafter, in the period 2014-19 fiscal adjustment slowed considerably. It remained below the SGP's benchmark requirement of 0.5% of GDP in all these countries, except Portugal, which has come closest to its MTO within this group (see Chart A).[56] Conversely, the structural budgetary positions of Spain and Italy have deteriorated over recent years, thus widening the gaps vis-à-vis their MTOs. Moreover, the overall limited improvement in structural balances in recent years tends to overstate the efforts actually undertaken by governments. This is because declines in government interest expenditure as a percentage of GDP, as well as revenue windfalls reflecting extraordinary revenue increases during the past economic expansion, have contributed to favourable developments in structural balances.

[56] According to the 2019 stability and convergence programmes, a few countries have updated their MTOs. Luxembourg has raised its MTO for 2020 by 1 percentage point and Italy's has been raised by 0.5 percentage points. In contrast, Portugal, Slovenia and Slovakia have lowered their MTOs for 2020.

Chart B

Change in structural balances of countries not at their MTOs and with debt above 90% of GDP



Sources: European Commission (AMECO database) and ECB calculations.
Notes: The horizontal line refers to the benchmark requirement under the SGP for an annual improvement in the structural balance of 0.5% of GDP. The chart excludes Greece, which did not set an MTO during this period.

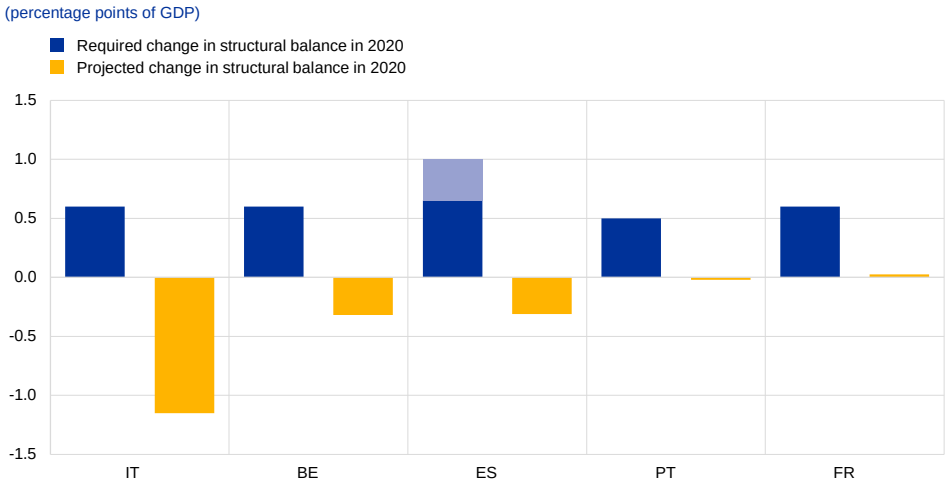
While the CSRs set fiscal policy priorities for 2020 that differ across countries, they all emphasise the need to achieve a more growth-friendly composition of public finances. Countries that have not yet achieved their MTOs are advised to align their fiscal adjustment efforts with the requirements of the SGP. This is consistent with the need for countries with high debt and remaining fiscal gaps to build fiscal buffers that would ensure their resilience if downside risks to the economy materialise. However, it would require sizeable additional fiscal adjustment measures on the part of such countries (see Chart C). Given the asymmetric nature of the SGP, countries that have achieved their MTOs do not receive a recommendation regarding the use of policy space accumulated under its rules. Germany is recommended, "while respecting" the MTO, to "use fiscal and structural policies to achieve a sustained upward trend in private and public investment" which is in line with government plans. Countries with available fiscal space could utilise part of it to support economic growth. Moreover, the recommendations generally emphasise the need for a more growth-friendly composition of public finances to enhance potential output growth, for example, through increasing the quality of investment in infrastructure and education, taking into account differing needs across countries.

On 5 June 2019 the European Commission also issued recommendations for some euro area countries regarding the implementation of the SGP. The Commission adopted reports for Belgium, France, Italy and Cyprus under Article 126(3) of the Treaty on the Functioning of the European Union in which it assesses their compliance with the Treaty's deficit and debt criteria. In the case of Belgium, the report concludes that at the current juncture it is not possible to fully determine whether the debt criterion is complied with, mainly owing to uncertainty regarding the extent to which an increase in advance corporate income tax payments collected in 2017 and 2018 is of a structural nature. For France, the report concludes that the deficit and debt criteria should be considered as currently complied with. For

Italy, the report concluded that a debt-based Excessive Deficit Procedure (EDP) was warranted, after assessing all relevant factors and notably, among them, the non-compliance with the requirement under the SGP's preventive arm in 2018, the risk of a significant deviation in 2019, and a projected headline deficit above 3% of GDP in 2020. On 3 July 2019 the Commission concluded that an EDP was no longer warranted for Italy at this stage. It took account of the mid-year budget for 2019 as well as a decree-law adopted by the Italian government on 1 July, which provided for an additional structural effort of 0.45% of GDP in 2019. Based on this information, the Commission assessed Italy to be broadly compliant with the requirements under the preventive arm of the SGP in 2019. It stated that it would closely monitor the execution of the amended 2019 budget and would assess the compliance of the 2020 draft budgetary plan with the SGP in the autumn. For Cyprus, the Commission considers that no further steps towards a decision on the existence of an excessive deficit should be taken, despite the deficit having breached the 3% of GDP threshold in 2018 as a result of one-off support to the financial sector. This is because Cyprus exceeded its MTO in 2018 and is projected to be fully compliant with all SGP requirements in 2019 and 2020. Finally, the Commission recommended that the EDP for Spain be abrogated, based on the 2018 budget outcome, and the Economic and Financial Affairs Council adopted a corresponding decision on 14 June 2019.

Chart C

Adjustment requirements under the SGP in 2020 for euro area countries not at their MTOs



Sources: European Commission (AMECO database) and ECB calculations.
Notes: The structural effort requirements for each year are enshrined in the CSRs. For 2020, they are quantified in the CSRs for fiscal policies under the 2019 European Semester. The area shaded light blue within the bar for Spain reflects the fact that the agreed adjustment requirement is lower than foreseen under the preventive arm matrix. The Commission forecast for 2020 is based on a "no policy change" scenario, as countries' budgets for that year are not yet available.

Looking ahead, the forthcoming review of the changes to the EU fiscal framework conceived during the economic and financial crisis (the "two-pack" and "six-pack" legislative packages) should be used to strengthen the incentives for building fiscal buffers in good times. First, it would be useful to review the EDP procedure with a view to better promoting the achievement of structural (rather than nominal) adjustment requirements under the corrective arm of the SGP. Second, the effectiveness of the SGP's debt rule in reducing government

debt towards sound levels should be improved, thus strengthening the role of the debt-to-GDP ratio as an anchor of the fiscal framework. Third, for the credibility of the fiscal surveillance exercise, it is important that predictability is increased such that clearer conclusions can be reached regarding compliance with the rules. In this context, the assessment of compliance with the requirements under the preventive arm of the SGP should be reviewed. This includes situations in which the achievement of adjustment requirements under the expenditure rule[57] and the structural balance approach leads to conflicting signals.

[57] The expenditure rule is based on an expenditure aggregate which excludes interest spending, expenditure on EU programmes fully matched by EU funds revenue, and cyclical elements of unemployment benefit expenditure (for details, see the 2019 edition of the European Commission's Vade Mecum to the Stability and Growth Pact). Countries that have not yet achieved their MTOs must ensure that this expenditure aggregate grows at a rate below a multi-annual reference rate of potential output growth. Any growth in the expenditure aggregate that exceeds this reference rate must be matched by discretionary revenue measures that yield additional tax revenue.

Articles

1 Global value chain participation and exchange rate pass-through to export and import prices

Prepared by Georgios Georgiadis and Johannes Gräb

Many studies suggest that advanced economies' import prices have become less sensitive to exchange rate movements over the last few decades. Since exchange rate movements would in this case result in smaller changes in trade prices and quantities, exchange rates would have also become less important in the transmission of domestic and international shocks, which has important implications for monetary policy and the way it is transmitted to the economy. This article suggests that part of the likely decline in exchange rate pass-through to import prices is a result of the rise of global value chains. As production increasingly relies on imported intermediate goods, production costs and hence export prices become more sensitive to exchange rate changes. However, this effect also increasingly offsets the variation in import prices caused by exchange rate changes. Hence the existence of cross-country production linkages may amplify exchange rate pass-through to export prices but thereby dampen exchange rate pass-through to import prices.

1 Introduction

The degree to which exchange rate changes feed through to import prices is commonly referred to as the "exchange rate pass-through" to import prices. Assuming that export prices are rigid or even fixed in the exporter's currency, a depreciation of the importer's currency implies that import prices in that currency increase. However, the amount by which import prices in local currency change in response to a given change in the exchange rate may vary. The extent to which they react is the degree of exchange rate pass-through to import prices. Understanding and assessing this pass-through is essential for monitoring and forecasting domestic inflation, and hence for the calibration of monetary policy.

A salient feature of advanced economies during the last few decades has been a likely decline in exchange rate pass-through to import prices.[58] A wide range of estimates suggest that the sensitivity of many advanced economies' import prices to changes in their nominal effective exchange rates has decreased since the late 1990s.

[58] See Campa, J. and Goldberg, L., "Exchange Rate Pass-Through into Import Prices", *The Review of Economics and Statistics,* Vol. 87, No 4, 2005, pp. 679-690; Marazzi, M., Sheets, N., Vigfusson, R., Faust, J., Gagnon, J., Marquez, J., Martin, R., Reeve, T. and Rogers, J., "Exchange-Rate Pass-through to U.S. Import Prices: Some New Evidence," *International Finance Discussion Paper,* No 833, Board of Governors of the Federal Reserve System, 2005; Ihrig, J., Marazzi, M. and Rothenberg, A., "Exchange-rate Pass-Through in the G-7 Countries," *International Finance Discussion Paper,* No 851, Board of Governors of the Federal Reserve System, 2006; Sekine, T., "Time-varying exchange rate pass-through: experiences of some industrial countries," *BIS Working Paper,* No 202, 2006; and the article entitled "Exchange rate pass-through into euro area inflation", *Economic Bulletin*, Issue 7, ECB, 2016.

Another striking feature of the global economy during the last few decades has been the rise of global value chains. The increasing dispersion of stages of production was spurred by a number of factors. The decline in costs of transportation and logistics allowed firms to take advantage of large wage differences between advanced and emerging market economies through the internationalisation of supply chains. Advances in information and communication technologies in turn made the complex coordination of production processes at distance possible.[59] Moreover, the adoption of trade-liberalising policies over the past few decades created an environment conducive to the creation of globalised production chains.

The fragmentation of production chains across borders has been accompanied by an increase in the cross-border flow of intermediate goods. The regional dispersion of the research and development underlying the iPod, the manufacturing of its components, their assembly, as well as the sale and distribution of the iPod in local markets is a well-known example of production chain fragmentation;[60] another example is the role of Germany as the regional hub in "Factory Europe". A consequence of fragmenting production chains internationally is a continuous rise – at least until the eruption of the global financial crisis – in the share of trade accounted for by intermediate goods relative to that of final goods. Trade in intermediate goods and services now accounts for a very large share of overall trade flows in goods and services.[61]

Global value chains may have a wide range of economic effects. Several studies have explored the effects of global value chains by looking at the increased fragmentation of production across borders. Drawing on newly developed input-output tables, a series of studies have developed frameworks to measure trade in valued added and an economy's and individual sectors' integration in global value chains.[62] Building on these insights, other studies have looked at the economic implications of global value chains. For example, participation in global value chains appears to boost growth,[63] amplify cross-country monetary policy spillovers,[64] strengthen supply-side interlinkages and thus

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59 See, for example, Baldwin, R., "Global supply chains: why they emerged, why they matter, and where they are going", in Elms, D. and Low, P. (eds.), "Global value chains in a changing world", WTO Secretariat, 2013, pp. 13-59; and *World Investment Report 2013 – Global Value Chains: Investment and Trade for Development*, United Nations Conference on Trade and Development (UNCTAD), 2013.

60 See Dedrick, J., Kraemer, K. and Linden, G., "Who profits from innovation in global value chains? A study of the iPod and notebook PCs", *Industrial and Corporate Change*, Vol. 19, No 1, 2010, pp. 81-116.

61 One estimate is that intermediates account for, respectively, 56% and 73% of overall trade flows in goods and services, see Miroudot, S., Lanz, R. and Ragoussis, A., "Trade in Intermediate Goods and Services", *OECD Trade Policy Papers*, No 93, OECD Publishing, 2009.

62 See, for example, Hummels, D., Ishii, J. and Yi, K.-M., "The nature and growth of vertical specialization in world trade", *Journal of International Economics*, Vol. 54, No 1, 2001, pp. 75-96; Trefler, D. and Zhu, S.C., "The structure of factor content predictions", *Journal of International Economics*, Vol. 82, No 2, November 2010, pp. 195-207; Johnson, R. and Noguera, G., "Accounting for intermediates: Production sharing and trade in value added", *Journal of International Economics*, Vol. 86, No 2, 2012, pp. 224-236; or Koopman, R., Wang, Z. and Wei, S.-J., "Tracing Value-Added and Double Counting in Gross Exports", *American Economic Review*, Vol. 104, No 2, 2014, pp. 459-94.

63 See "Trade Interconnectedness: The World with Global Value Chains", *Policy Paper*, International Monetary Fund, 2013.

64 See Georgiadis, G., "Determinants of global spillovers from US monetary policy", *Journal of International Money and Finance*, Vol. 67, Issue C, 2016, pp. 41-61.

increase inflation correlations,[65] render an economy's income distribution more uneven and raise current account surpluses (or lower current account deficits).[66]

This article examines the role of global value chain participation in exchange rate pass-through to import and export prices.[67] The mechanism posited has two components. First, the exchange rate pass-through to the export prices of an economy's trading partners is strengthened by their increased use of intermediates imported from that economy (i.e. their increased participation in global value chains). Second, the greater pass-through to its trading partners' export prices leads to a weakening of the economy's exchange rate pass-through to import prices.

The mechanism can best be described by an example in which the world consists of only two economies, namely Home and Foreign. For simplicity, it is assumed that export prices are fixed in the currency of the producer and that firms' mark-ups are constant. The currency of Home depreciates against the currency of Foreign. If there are no global value chains, production costs in Foreign are not affected by an appreciation of its currency against the currency of Home, as all intermediate inputs used in production are sourced domestically. As a consequence, exchange rate pass-through to export prices in Foreign is zero. In Home, however, the same appreciation of the currency of Foreign implies a one-for-one increase in import prices, i.e. exchange rate pass-through to import prices in Home equals unity. So if the currency of Foreign appreciates by 10% against the currency of Home, export prices in Foreign are unchanged and import prices in Home rise by 10%.

Exchange rate pass-through to export and import prices changes in the presence of global value chains. With value chain integration, exchange rate pass-through to export prices in Foreign is positive rather than zero, and exchange rate pass-through to import prices in Home is less than one. For example, suppose half of the inputs in Foreign production are imported from Home. A 10% appreciation of the currency of Foreign implies a reduction in its production costs by 5%, so it can cut its export prices by 5%. The decline in Foreign's export prices offsets part of the rise in import prices paid by Home that is implied by the depreciation of its currency against the currency of Foreign. Specifically, because Foreign's export prices have been cut by 5% following the depreciation of Home's currency, import prices in Home increase by less than 10%. Most importantly, the reduction in exchange rate

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65 See Bems, R. and Johnson, R., "Demand for Value Added and Value-Added Exchange Rates", *American Economic Journal: Macroeconomics*, Vol. 9, No 4, 2017, pp. 45-90.

66 See Brumm, J., Georgiadis, G., Gräb, J. and Trottner, F., "Global Value Chain Participation and Current Account Imbalances", *Journal of International Money and Finance,* forthcoming; and Gunnella, V., Fidora, M. and Schmitz, M., "The impact of global value chains on the euro area economy", *Occasional Paper Series*, No 221, ECB, 2019.

67 For more details see Georgiadis, G., Gräb, J. and Khalil, M., "Global value chain participation and exchange rate pass-through," *Working Paper Series*, ECB, forthcoming. A similar mechanism (although the focus is on export quantity elasticities) is explored in Ahmed, S., Appendino, M. and Ruta, M, "Global value chains and the exchange rate elasticity of exports," *The B.E. Journal of Macroeconomics*, Vol. 17, No 1, 2017, pp. 1-24.

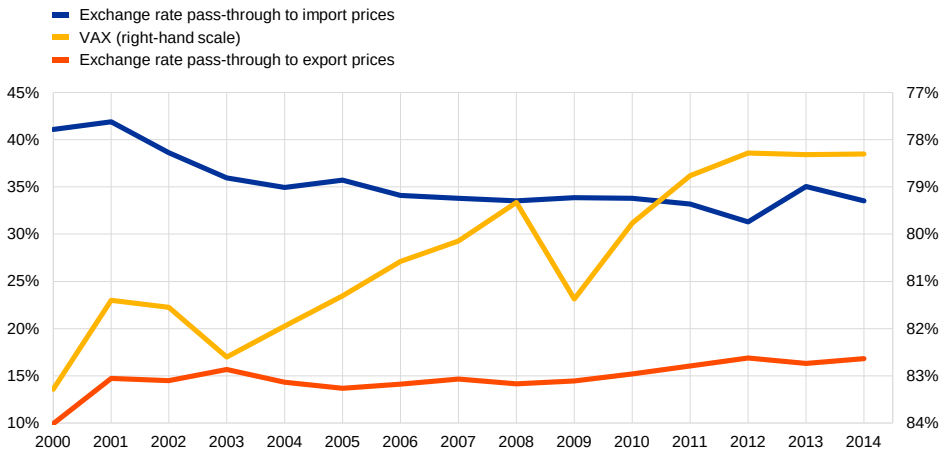
pass-through to import prices in Home depends on the degree of Foreign's value chain participation with Home.[68]

Since 2000, as advanced economies have increased participation in global value chains, the evidence suggests that their exchange rate pass-through has declined for import prices and increased for export prices (see Chart 1). The estimated exchange rate pass-through to import prices for the early 2000s is around 42%, i.e. a 10% nominal effective exchange rate depreciation was followed by an increase in import prices by 4.2% on average across advanced economies. For the late 2000s, the figure is estimated to have fallen to around 30%. Global value chain participation of advanced economies rose in the same period, with the ratio of domestic value added to gross exports – the VAX ratio – falling from 83% to 78%. A smaller VAX ratio indicates that a larger share of the value added embedded in an economy's gross exports was created using imports rather than domestically produced intermediates.[69]

Chart 1

Developments in exchange rate pass-through to export and import prices and global value chain participation of advanced economies

(left-hand scale: elasticity; right-hand scale: ratio, inverted scale)



Source: ECB calculations.
Notes: Cross-country unweighted averages of both estimated exchange rate pass-through to export and import prices and the VAX ratio. The VAX ratio represents the ratio of an economy's domestic value added to gross exports. The countries included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United States and the United Kingdom.

The article presents empirical evidence, consistent with the mechanism described above, that changes in exchange rate pass-through to export and import prices are in part due to an increase in global value chain participation. In particular, the evidence suggests that economies which have participated increasingly in global value chains have exhibited rising exchange rate pass-through to export prices; in turn, economies whose trading partners have become increasingly

68 Of course, if Home also uses intermediates imported from Foreign, the same mechanism that produces a decline in exchange rate pass-through to import prices in Home carries over to import prices in Foreign. However, it can be shown that, in general equilibrium after all rounds of adjustment, exchange rate pass-through to import prices still declines and exchange rate pass-through to export prices still rises as economies participate more in global value chains.

69 See Gunnella et al., op. cit., for a discussion of the VAX ratio as an indicator of global value chain participation. See also Section 2.2 for more details.

integrated in value chains with them have exhibited falling exchange rate pass-through to import prices.

The finding that global value chain participation may reduce economies' exchange rate pass-through to import prices has important implications for the conduct and transmission of monetary policy. In particular, when exchange rate pass-through to import prices is low, an exchange rate depreciation may lead to only very limited expenditure-switching effects under which exports would rise and imports would fall.[70] Moreover, the associated pressures on import prices, and hence consumer prices, would be minor. Overall, in a low import price pass-through environment exchange rate movements are accompanied by smaller changes in import prices and quantities, reducing the role played by the exchange rate channel in transmitting domestic and international shocks.

The article is structured as follows: Section 2 reviews the evolution of exchange rate pass-through to import and export prices as well as global value chain participation over the last few decades for advanced economies. Section 3 discusses the mechanism through which global value chain participation may affect economies' exchange rate pass-through to export and import prices. Section 4 reports results from an analysis of cross-country data that sheds light on the relevance of participation in global value chains for exchange rate pass-through to export and import prices. Section 5 concludes.

2 The evolution of exchange rate pass-through to export and import prices and participation in global value chains

2.1 Exchange rate pass-through to export and import prices

Exchange rate pass-through to export and import prices is estimated to vary considerably across countries. When estimated in a single regression over the full sample period, without accounting for possible time-variation by means of rolling window regressions, exchange rate pass-through to export and import prices exhibits considerable cross-country differences (see Box 1 and Chart 2). For example, while changes in the nominal effective exchange rate are estimated to have translated into a change in export prices equivalent to almost 70% of the exchange rate change within the same quarter in Denmark, export prices in Norway are estimated to have hardly changed. Similarly, while Denmark's import prices are estimated to have reflected

[70] For a discussion see Rodnyansky, A., "(Un)Competitive Devaluations and Firm Dynamics," *Cambridge Working Papers in Economics*, No 1888, University of Cambridge, 2018.

65% of changes in the nominal effective exchange rate, the figure for Japan is less than 10%.[71]

Box 1
Estimating exchange rate pass-through to export and import prices

In the empirical literature exchange rate pass-through is estimated as the impact of exchange rate changes on import and export prices, controlling for other factors that may affect trade prices, such as exporters' production costs or local demand.[72] Accordingly, in this article exchange rate pass-through to export prices is estimated on the basis of country-specific rolling-window regressions[73]

$$\Delta p_{it}^{x} = \alpha_{i,\tau}^{x} + \sum_{j=1}^{p} \beta_{ij,\tau}^{x} \Delta p_{i,t-j}^{x} + \gamma_{i,\tau}^{x} \Delta e_{it} + \sum_{j=0}^{p} \delta_{ij,\tau}^{x} \Delta p_{i,t-j}^{ppi} + \sum_{j=0}^{p} \omega_{ij,\tau}^{x} \Delta y_{i,t-j}^{\omega} + \epsilon_{it,\tau}^{x} \quad (1)$$

where Δp_{it}^{x} denotes the quarter-on-quarter log change of the export price unit value of economy *i* at time *t*, Δe_{it} is the quarter-on-quarter log change of economy *i*'s nominal effective exchange rate, Δp_{it}^{ppi} is the quarter-on-quarter log change of the producer price index of economy *i*, and Δy_{it}^{ω} is the quarter-on-quarter log change of the (trade-weighted) average of trading partners' GDP. Analogously, exchange rate pass-through to import prices is estimated on the basis of the country-specific rolling-window regressions

$$\Delta p_{it}^{m} = \alpha_{i,\tau}^{m} + \sum_{j=1}^{p} \beta_{ij,\tau}^{m} \Delta p_{i,t-j}^{m} + \gamma_{i,\tau}^{m} \Delta e_{it} + \sum_{j=0}^{p} \delta_{ij,\tau}^{m} \Delta p_{i,t-j}^{x*} + \sum_{j=0}^{p} \omega_{ij,\tau}^{m} \Delta y_{i,t-j} + \epsilon_{it,\tau}^{m} \quad (2)$$

where Δp_{it}^{m} is the quarter-on-quarter log change of the import price unit value of economy *i* at time *t*, Δp_{it}^{x*} is the quarter-on-quarter log change of the (trade-weighted) average of trading partners' export prices as a proxy for their production costs, and Δy_{it} is the quarter-on-quarter log change of GDP of economy *i*. Equations (1) and (2) are estimated on rolling windows τ = 1, 2,…, *T* for 20 advanced economies[74] for the period from 1991 to 2014 to obtain a sample of time-varying, country-specific estimates of exchange rate pass-through to export and import prices. Each rolling window spans a period of ten years. The first window is from 1991 to 2000, and the last window from 2005 to 2014. The interest centres on short-term – i.e. within one quarter – exchange rate pass-through to export and import prices, and hence the exchange rate is included only as the contemporaneous logarithmic first difference.[75] The estimated exchange rate pass-through to export and import prices for economy

[71] The pass-through estimates for the euro area countries are not directly comparable with those for other advanced economies in the sample owing to the inclusion of intra-euro area trade prices in euro area countries' import and export price data used for the regression. Specifically, because the export and import price data include prices of exports (imports) to (from) other euro area countries while the nominal effective exchange rate does not include exchange rates against other euro area countries, exchange rate pass-through to export and import prices is systematically underestimated for euro area countries relative to non-euro area countries. However, this underestimation is fully accounted for by the inclusion of country fixed effects in the second stage regression in Section 4, at least if the underestimation has not changed over time.

[72] See Campa, J. and Goldberg, L., op. cit; Vigfusson, R., Sheets, N. and Gagnon, J., "Exchange Rate Passthrough to Export Prices: Assessing Cross-Country Evidence", *Review of International Economics*, Vol. 17, No 1, 2009, pp. 17-33; Bussière, M., Delle Chiaie, S. and Peltonen, T., "Exchange Rate Pass-Through in the Global Economy: The Role of Emerging Market Economies," *IMF Economic Review,* Vol. 62, No 1, 2014, pp. 146-178; Burstein, A. and Gopinath, G., "International Prices and Exchange Rates", in Gopinath, G., Helpman, E. and Rogoff, K. (eds.), *Handbook of International Economics*, Vol. 4, 2014, pp. 391-451.

[73] For details see Georgiadis, G., Gräb, J. and Khalil, M., op. cit.

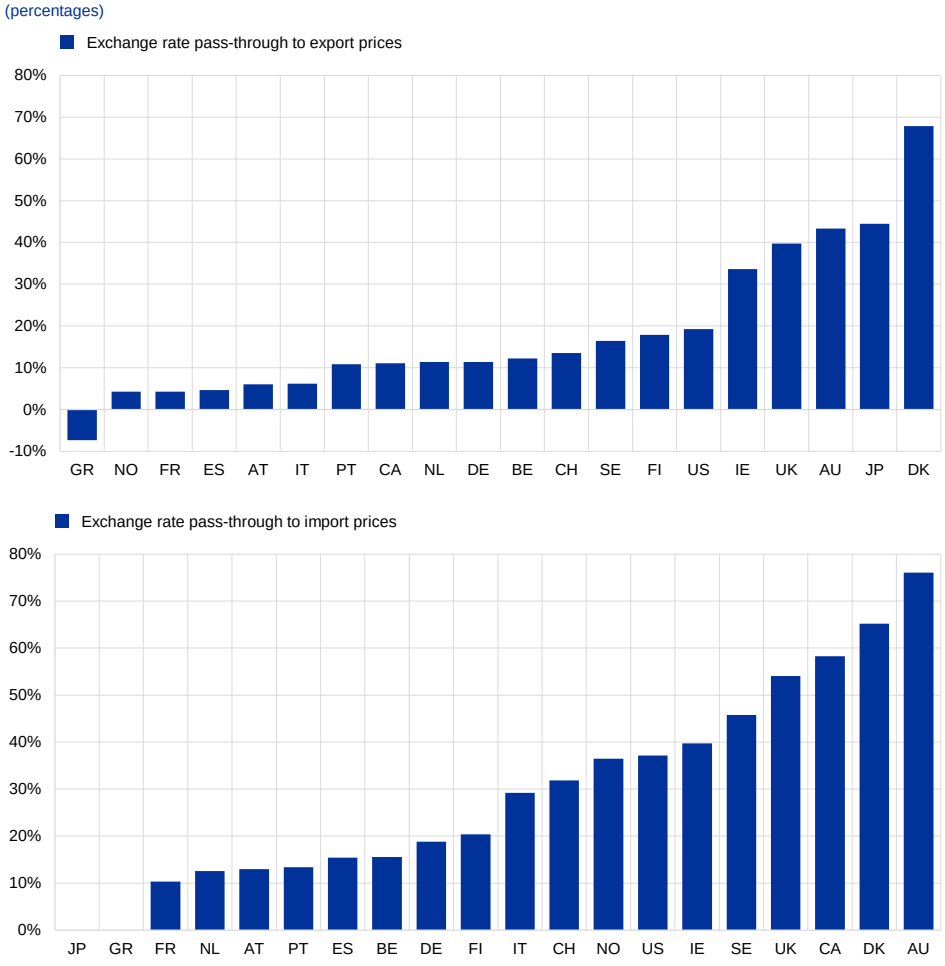
[74] The countries considered are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United States and the United Kingdom.

[75] Serial correlation in Δp_{it}^{x} is accounted for by lags of the right-hand side variables other than the exchange rate.

i and rolling window τ are given by the point estimates of $\gamma_{i,\tau}^{x}$ for export and $\gamma_{i,\tau}^{m}$ for import prices. The exchange rate is defined in terms of domestic currency per unit of foreign currency, so that an increase in the exchange rate represents a depreciation of the domestic currency. Thus, positive values of the estimates of $\gamma_{i,\tau}^{x}$ and $\gamma_{i,\tau}^{m}$ represent positive exchange rate pass-through to export and import prices, respectively.[76]

Chart 2

Estimates of short-term (one-quarter) exchange rate pass-through to exports and imports across advanced economies



Source: ECB calculations.

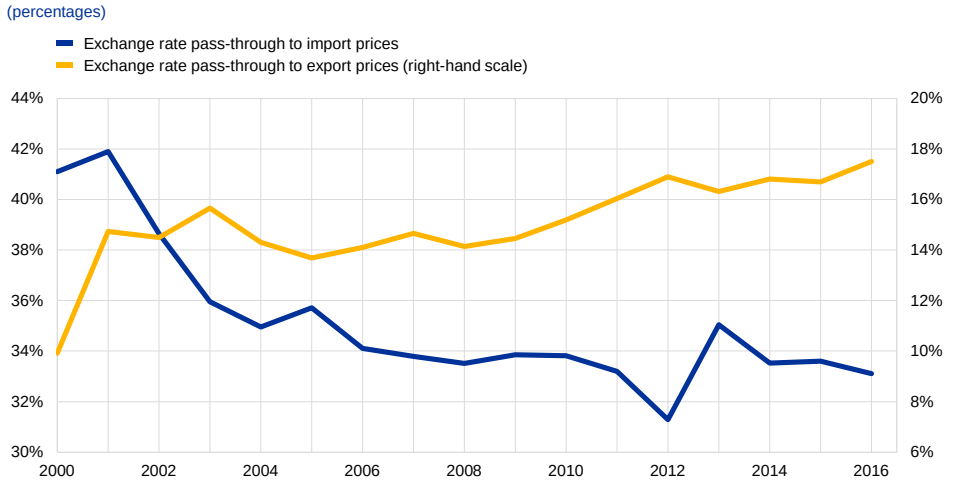
Exchange rate pass-through to export and import prices in advanced economies is estimated to have changed over time. When estimated using country-specific rolling-window regressions, average advanced economy exchange rate pass-through to export prices appears to have increased over time. By contrast,

[76] The sample includes those economies for which data on global value chain participation are available in the World Input-Output Database (WIOD; see below). Quarterly data on import and export price indices and world GDP growth are obtained from the OECD. Data on nominal effective exchange rates, domestic GDP growth and producer price inflation are taken from the IMF's International Financial Statistics.

exchange rate pass-through to import prices appears to have fallen (see Chart 3). The latter finding is consistent with evidence found in existing literature.[77]

Chart 3

Average short-term (one-quarter) exchange rate pass-through to export and import prices over time for advanced economies



Source: ECB calculations.
Notes: Cross-country unweighted averages of the estimated exchange rate pass-through to export and import prices. The countries included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United States and the United Kingdom.

2.2 Global value chain participation

Measuring global value chain participation is challenging. One widely-used measure that indicates how much a country is using imports in its production of exports is an economy's ratio of domestic value added to gross exports, the "VAX" ratio. Low values of the VAX ratio indicate that a large share of an economy's gross exports reflect value added through foreign inputs. The production of the iPod may again serve as an illustrative example. While the iPod is exported from China, the actual value added in China is very limited, consisting mainly of low-skilled assembly services. The major part of the value is sophisticated intermediate inputs produced by firms in the United States, Japan, South Korea and Taiwan.[78] Hence, China has a low ratio of domestic value added to gross exports of the iPod and is, according to this

[77] For evidence on the decline in the euro area's exchange rate pass-through to extra-euro area import prices see Özyurt, S., "Has the exchange rate pass through recently declined in the euro area?", *Working Paper Series*, No 1955, ECB, 2016.

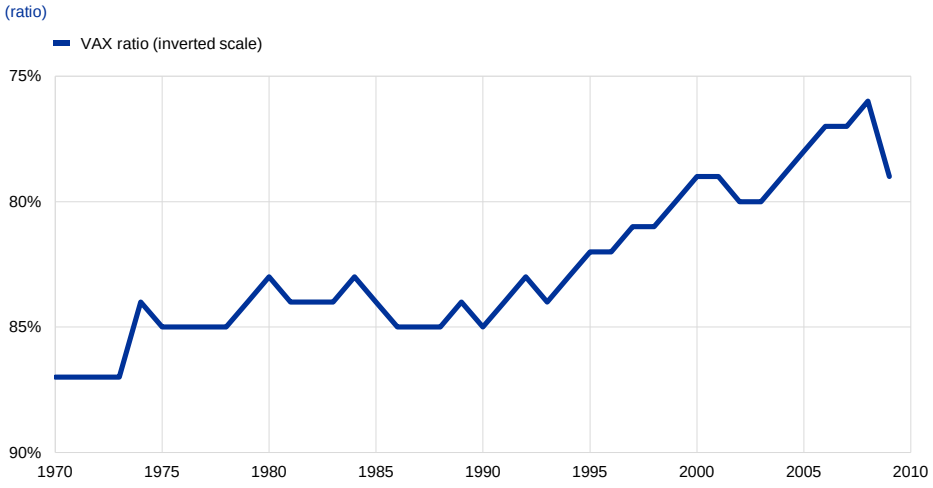
[78] See Dedrick et al., op. cit.

metric, participating to a large degree in the global value chain underlying the iPod. The VAX ratio can be constructed using data from the World Input-Output Database.[79]

Global value chain participation has risen significantly since the 1970s. Historical data on the VAX ratio show that there has been a secular decline in the ratio of domestic value added to gross exports, which reflects a rise in global value chain participation (see Chart 4). An increasingly large share of economies' gross exports thus represents imported value added, i.e. imported intermediates that are used in the production of exports.

Chart 4

Global value chain participation between 1970 and 2009



Source: Johnson, R. and Noguera, G., "A Portrait of Trade in Value-Added over Four Decades", *The Review of Economics and Statistics*, Vol. 99, No 5, 2017, pp. 896-911.

Very recently, in the aftermath of the global financial crisis, measures of global value chain participation have pointed to a slowdown in the rise in global value chains.[80] As the levelling off in the expansion of global value chain participation has been geographically widespread, the causes of the slowdown are unlikely to be country or region-specific (see Chart 5). Possible explanations that have been put forward include reductions in the length of firms' supply chains aimed at improving risk management (for example in response to the 2011 earthquake in Japan), the

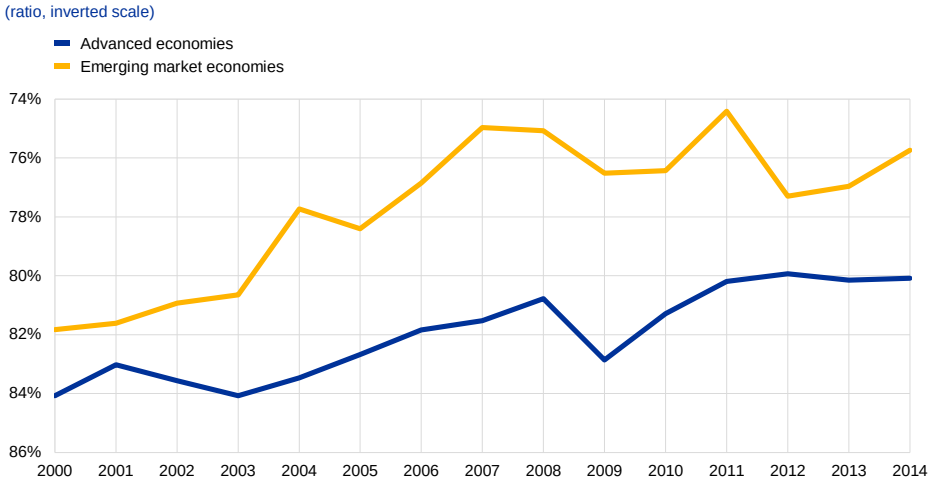
[79] The World Input-Output Database (WIOD) provides global input-output tables at annual frequency in two editions for a large number of countries and sectors. The 2013 edition covers the period from 1995 to 2011 and the 2016 edition the period from 2000 to 2014. Unfortunately, the two editions are not consistent in terms of country and sector coverage. For this reason, the data from the two WIOD editions can in general not be combined to construct consistent measures of global value chain participation for the entire period from 1995 to 2014. Various other concepts and metrics have been proposed to measure trade in value added and global value chain participation on the basis of global input-output tables. See Timmer, M., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G., "An Illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production", *Review of International Economics*, Vol. 23, No 3, 2015, pp. 575-605; Timmer, M., Los, B., Stehrer, R. and de Vries, G., "An Anatomy of the Global Trade Slowdown based on the WIOD 2016 Release", *GGDC Research Memorandum*, No GD-162, *Groningen Growth and Development Center*, 2016.

[80] See also IRC Trade Task Force, "Understanding the weakness in global trade – What is the new normal?", *Occasional Paper Series*, No 178, ECB, 2016.

introduction of local content requirements as well as other regulatory measures, and changes in the composition of demand.[81]

Chart 5

The rise in global value chain participation as reflected in the decline in the VAX ratio



Source: ECB calculations.
Notes: The VAX ratio reflects the ratio of an economy's domestic value added to gross exports.

3 The impact of participation in global value chains on exchange rate pass-through to export and import prices

The use of imported intermediates in the context of global value chain participation may affect the sensitivity of trading partners' production costs and export prices to exchange rate changes, and hence exchange rate pass-through to import prices. As explained above, when production in Foreign uses intermediate inputs imported from Home, an appreciation of the currency of Foreign against the currency of Home reduces Foreign's production costs. This fall in production costs in Foreign may translate into a reduction in export prices. The drop in Foreign's export prices dampens the rise in Home's import prices that is caused by the depreciation of its currency. The testable prediction from this line of thought is that economies which participate to a larger extent in value chains with the rest of the world by using imported intermediates should exhibit greater exchange rate pass-through to their export prices, and that economies should exhibit lower exchange rate pass-through to their import prices when the intermediates they produce are used by the rest of the world in its production.

The mechanism through which exchange rate pass-through to import prices is modified by global value chain participation also arises in general equilibrium. A standard structural two-country general equilibrium model with imported intermediates used in production predicts that under producer-currency pricing – i.e. when export prices are sticky in the currency of the producer – Home's exchange rate pass-through to export prices increases with its global value chain participation, i.e. it

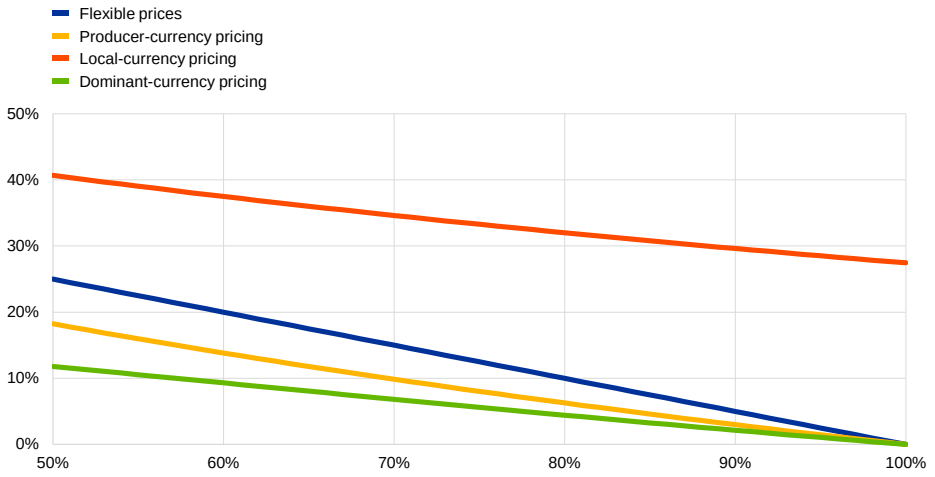
[81] See also *World Economic Outlook*, International Monetary Fund, October 2016.

increases with a lower Home VAX ratio (see Chart 6).[82] Similarly, the model predicts that Home's exchange rate pass-through to import prices falls with Foreign's global value chain participation, i.e. it falls with a lower Foreign VAX ratio (see Chart 7).

Chart 6

Exchange rate pass-through to export prices and global value chain participation (VAX ratio) under alternative assumptions for export pricing

(y-axis: exchange rate pass-through to export prices; x-axis: VAX ratio)



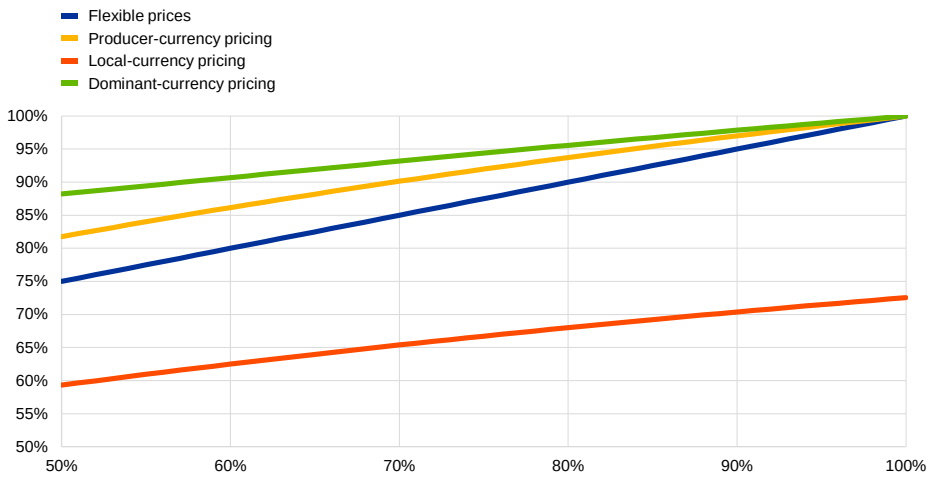
Source: ECB calculations.
Notes: The slope of the relationship between the VAX ratio and exchange rate pass-through to export prices depends on relative country size. In this chart, Home and Foreign are assumed to be of equal size. Under producer-currency pricing, export prices are sticky in the currency of the producer/exporter; under local-currency pricing, export prices are sticky in the currency of the importer; and under dominant-currency pricing, export prices are sticky in US dollars regardless of the trading partners involved.

82 The model is a standard two-country open-economy New Keynesian dynamic stochastic general equilibrium model. Production requires labour and an intermediate input goods bundle, which consists of domestically produced and imported intermediate inputs subject to imperfect substitution. Variation in the VAX is simulated by varying the degree of home bias in production inputs as well as country size. For details see Georgiadis, G., Gräb, J. and Khalil, M., op. cit.

Chart 7

Exchange rate pass-through to import prices and trading-partners' global value chain participation (VAX ratio) under alternative assumptions for export pricing

(y-axis: exchange rate pass-through to import prices; x-axis: trading partner's VAX ratio)



Source: ECB calculations.
Notes: The slope of the relationship between the VAX ratio and exchange rate pass-through to import prices depends on relative country size. In this chart, Home and Foreign are assumed to be of equal size. Under producer-currency pricing, export prices are sticky in the currency of the producer/exporter; under local-currency pricing, export prices are sticky in the currency of the importer; and under dominant-currency pricing, export prices are sticky in US dollars regardless of the trading partners involved.

The relationships between global value chain participation and exchange rate pass-through to export and import prices do not change qualitatively under alternative assumptions for the export pricing paradigm. Recent research has highlighted the empirical relevance of local-currency and dominant-currency pricing as alternatives to producer-currency pricing.[83] Under producer-currency pricing export prices are sticky in the currency of the producer, while under local-currency pricing export prices are sticky in the currency of the importer and under dominant-currency pricing, export prices are sticky in the currency of a third country, typically the US dollar. Although the mechanisms linking global value chain participation and exchange rate pass-through to import and export prices may differ somewhat across different export pricing paradigms, higher levels of home (trading-partner) global value chain participation are associated with a higher (lower) exchange rate pass-through to export (import) prices for all pricing paradigms (see Chart 6 and Chart 7). This even applies to the case of flexible prices, under which the currency in which export prices are invoiced is immaterial.

83 For local-currency pricing see in particular Betts, C. and Devereux, M., "Exchange rate dynamics in a model of pricing-to-market", *Journal of International Economics,* Vol. 50, No 1, 2000, pp. 215-244; as well as Devereux, M. and Engel, C., "Monetary Policy in the Open Economy Revisited: Price Setting and Exchange-Rate Flexibility", *The Review of Economic Studies,* Vol. 70, No 4, 2003, pp. 765-783; and for dominant-currency pricing, Gopinath, G., "The international price system", *Jackson Hole Symposium Proceedings*, 2016; Casas, C., Diez, F., Gopinath, G. and Gourinchas, P.-O., "Dominant Currency Paradigm: A New Model for Small Open Economies," *IMF Working Paper*, No 17/264, 2017; as well as Boz, E., Gopinath, G. and Plagborg-Møller, M., "Global Trade and the Dollar," *IMF Working Paper*, No 17/239, 2017.

4 Empirical evidence on the effect of global value chain participation on exchange rate pass-through to export and import prices

The role of the rise in global value chain participation in the change in exchange rate pass-through to export and import prices over time is analysed in a panel regression framework. The time-varying, country-specific estimates of exchange rate pass-through to export and import prices estimated in Section 2 using rolling-window regressions are used as the dependent variable in the second step of the analysis. The explanatory variables on the right-hand side of the equation include the VAX ratio as a measure of economies' global value chain participation (see Box 2).

Box 2
Analysing determinants of time-variation in exchange rate pass-through

Panel regressions are used to gauge the role of the rise in global value chain participation in the change in exchange rate pass-through to export and import prices over time (see Section 4). First, the time-varying estimates of exchange rate pass-through to export prices $\hat{\gamma}_{i\tau}^{x}$ obtained from the rolling-window regressions in equation (1) in Box 1 are related to the home economy's degree of global value chain participation in the panel regression

$$\hat{\gamma}_{i\tau}^{x} = \alpha_i^x + \delta_\tau^x + \gamma^x vax_{i\tau} + \chi_1^x fuel_{i\tau}^x + \chi_2^x tfp_{i\tau} + \boldsymbol{X}_{i\tau}^x \boldsymbol{\theta}^x + u_{i\tau}^x \quad (3)$$

where $vax_{i\tau}$ is the home economy's VAX ratio and $\boldsymbol{X}_{i\tau}^x$ is a vector of additional controls that include trade openness (measured as the ratio of imports to GDP) as well as the volatility in domestic inflation and the nominal effective exchange rate.[84,85] The regression also controls for unobserved, time-invariant country-specific characteristics, α_i^x, that may have a bearing on cross-country differences in exchange rate pass-through. These country fixed effects capture, for example, cross-country differences in the structure of invoicing currencies for exports and imports (see the discussion on Charts 6 and 7), which changes only very slowly over time.[86] The regression also controls for the effects of unobserved, time-varying factors that are common to all countries, δ_τ^x. These time fixed effects capture, for example, the fact that estimated exchange rate pass-through and global value chain participation fell synchronously across countries during the global financial crisis. Finally, the regression controls for two other factors that have been suggested to have contributed to the change in exchange rate pass-through in the literature: the share of energy in export and import bundles, $fuel_{i\tau}^x$, and the rise in globalisation and hence competitive pressures

84 The estimates of exchange rate pass-through used as dependent variables are generated regressands, which is less problematic than in case of generated regressors as this does not imply correlation between an explanatory variable and the regression error by construction.

85 See Taylor, J., "Low inflation, pass-through, and the pricing power of firms", *European Economic Review*, Vol. 44, No 7, 2000, pp. 1389-1408, as well as Frankel, J., Parsley, D. and Wei, S.-J., "Slow Pass-through Around the World: A New Import for Developing Countries?", *Open Economies Review*, Vol. 23, No 2, 2012, pp. 213-251.

86 Another variable that is likely to be captured to a large degree by country fixed effects is the share of trade within a country's own currency area. When the role of imported intermediate inputs in amplifying the exchange rate effect on export prices is considered, the effect only matters if the imported intermediate input is from an economy which has a different currency. For example, for a German producer, using inputs imported from the Netherlands would not have any effect on the exchange rate pass-through, whereas inputs from China would amplify it.

among exporters, measured by an economy's total factor productivity, $tfp_{i\tau}$.[87,88] The time index τ refers to the respective ten-year rolling window in the overall sample period 1991 to 2014.[89]

Analogously to the specification for export prices above, time-varying estimates of exchange rate pass-through to import prices obtained from the rolling-window regressions in equation (2) in Box 1 are related to the degree of global value chain participation of economy *i*'s trading partners, $vax^*_{i\tau}$,

$$\hat{\gamma}^m_{i\tau} = \alpha^m_i + \delta^m_\tau + \gamma^m vax^*_{i\tau} + \chi^m_1 fuel^m_{i\tau} + \chi^m_2 \Delta_{tp} tfp_{i\tau} + \boldsymbol{X}^m_{i\tau}\boldsymbol{\theta}^m + u^m_{i\tau} \quad (4).$$

The results are consistent with the hypothesis that increasing global value chain participation has contributed to the rise in estimated exchange rate pass-through to export prices. The results from the regression that explores the relationship between the country-specific, time-varying estimates of exchange rate pass-through to export prices and countries' increase in global value chain participation – reflected in a reduction in their VAX ratio – are reported in Table 1, column 1 (see also Box 1). The negative and statistically significant coefficient estimated for the VAX ratio is consistent with the hypothesis that a greater role for imported intermediates in production has rendered export prices more sensitive to exchange rate changes.

Table 1

Panel regression results showing the relationship between global value chain participation and changes in the estimated exchange rate pass-through to import and export prices

	Export prices	Import prices
Home VAX ratio with rest of the world	-1.032***	
Rest-of-the world VAX ratio with Home		0.325***
Exported fuel share	-0.001**	
Imported fuel share		0.002**
Home total factor productivity	0.003	0.297**
Country fixed effects	Yes	Yes
Time fixed effects	Yes	Yes

Sources: ECB calculations.
Notes: Significance levels: *** p < 0.01, ** p < 0.05. Inference is carried out on the basis of Driscoll-Kraay standard errors which are robust to heteroscedasticity and autocorrelation as well as cross-section dependence. The VAX ratio reflects the ratio of an economy's domestic value added to gross exports.

87 See Campa, J. and Goldberg, L., op. cit.; Gust, C., Leduc, S. and Vigfusson, R., "Trade Integration, competition, and the decline in exchange-rate pass-through", *Journal of Monetary Economics*, Vol. 57, No 3, 2010, pp. 309-324; and Amiti, M., Itskhoki, O. and Konings, J., "Importers, Exporters, and Exchange Rate Disconnect", *American Economic Review*, Vol. 104, No 7, 2014, pp. 1942-78.

88 The bilateral trade weights for the construction of variables which correspond to averages of an economy's major trading partners are taken from the Bank for International Settlements. Data on total factor productivity measured at constant prices is taken from the Penn World Table database. The share of fuel imports (exports) in total imports (exports) is taken from the World Bank's World Development Indicators database. The sample used for the estimations spans the period from 2000 to 2014.

89 Since the estimates of exchange rate pass-through are obtained from overlapping sample periods in the first stage, residuals in the second stage regressions are serially correlated. This is taken into account by inference that is robust to serial correlation of the residuals.

The results are also consistent with the hypothesis that the increasing degree of global value chain participation has contributed to the decline in the estimated exchange rate pass-through to import prices. The regression results are consistent with the hypothesis that an increased degree of global value chain participation on the part of economy *i*'s trading partners – reflected in a reduction in the latter's VAX ratio, $vax_{i\tau}^{*}$ – reduces the sensitivity of Home import prices to exchange rate changes (Table 1, column 2). The estimates are also consistent with the hypothesis that a decline in the share of energy in total imports and an increase in competitive pressures among exporters in the context of greater globalisation have contributed to the reduction of estimated exchange rate pass-through to import prices, as argued in existing literature.[90,91]

Because the regression framework does not identify structural innovations that have underpinned the rise in global value chain participation, it is difficult to quantify the latter's historical contribution to the overall variation in estimated exchange rate pass-through over time. However, assuming that changes in global value chain participation are exogenous and uncorrelated with changes in other potential determinants of exchange rate pass-through (which may well not be the case), a rough calculation is possible. Under these assumptions, the observation that the VAX ratios of the economies in the sample considered have fallen on average by about 5 percentage points, together with the relevant coefficient estimate in column 1, Table 1, would imply that the rise in global value chain participation has raised exchange rate pass-through to export prices by 5 percentage points – which is very close to the 7 percentage point increase actually estimated. Similarly, the observation that the rise in the integration of the rest of the world in value chains with the economies considered in the sample as reflected in a fall in the VAX ratios on average by about 4 percentage points, together with the relevant coefficient estimate in column 2, Table 1, would imply that the rise in global value chain participation has reduced exchange rate pass-through to import prices by 1.3 percentage points, which is around 20% of the overall decline.

5 Conclusion

The decline in exchange rate pass-through to import prices in advanced economies, documented in several contributions to the literature, has important monetary policy implications. In an environment with limited exchange rate pass-through to import prices, expenditure-switching effects in response to exchange rate depreciations are muted and exchange rate depreciations are associated with only minor increases in import and hence consumer price inflation. It is thus important to understand the mechanisms that have given rise to this decline.

90 Because real total factor productivity is measured as an index, the country-specific trading-partner average cannot be calculated. However, given that such averages will be very similar across economies in the sample, they are absorbed in the period fixed effects.

91 Available panel data on currency invoicing shares suggest that invoicing patterns have remained broadly unchanged over time. Accordingly, there is little evidence to suggest that changes in exchange rate pass-through relate to changes in pricing paradigms.

This article has examined the impact of economies' participation in global value chains on their exchange rate pass-through to export and import prices. The empirical evidence suggests that global value chain participation increases economies' exchange rate pass-through to export prices and reduces pass-through to import prices. Some evidence suggests that in the years following the Great Recession and especially after the trade slowdown observed in 2011, the pace of global value chain expansion has decelerated and the strengthening of production chains has become more important at the regional level. It is therefore possible that the decline in exchange rate pass-through due to the expansion of global value chain participation has also slowed.

2 Social spending, a euro area cross-country comparison

Prepared by Marta Rodríguez-Vives and Linda Kezbere

At a time of high government indebtedness, low structural economic growth and ageing populations, a key element in today's policy debate is the role of government in providing its services and distributing resources to society. Government decisions on tax and social benefit systems have an important bearing on macroeconomic performance in the euro area. This article focuses on how social spending on individual households or on the provision of collective goods and services is organised in euro area countries. Choices made concerning the level and structure of social spending are country-specific and reflect societal policy preferences. The aim of this article is to review government social spending across euro area countries and how it has evolved since the pre-crisis period. It also zooms in on the different social insurance systems in euro area countries in terms of pensions and health and looks at spending on education. We devote particular attention to the analysis of pensions, as pensions represent the biggest social spending item in all countries. The article suggests that countries should look for policies and reforms to ensure the sustainability of social spending, especially in view of ageing populations and possible negative economic shocks.

1 Introduction

Inequality is now at the centre of the international policy agenda because growing inequalities have the potential to undermine future economic development and reduce intergenerational social mobility and social cohesion. In particular, government decisions on tax and social benefit systems have a large bearing on macroeconomic performance. In this context, policymakers are seeking to identify the most coherent composition of public finances to foster "inclusive growth". The policy guidelines on fiscal and structural reforms under the country-specific recommendations (CSRs)[92] issued under the European Semester are also supportive of the inclusive growth agenda.

Public finance theory divides government functions into allocation, stabilisation and distribution.[93] First, governments intend to achieve an efficient use of resources in the economy. Second, fiscal policies are important in stabilising income and consumption over the economic cycle.[94] Third, fiscal policies are also instrumental in mitigating income inequality resulting from market forces (market

92 See the CSRs issued for individual countries on the European Commission website. The recommended reforms are aimed at boosting jobs and economic growth, while maintaining sound public finances and social fairness in euro area countries.

93 See Musgrave, R.A., *The Theory of Public Finance: A Study in Public Economy*, McGraw Hill, New York, 1959.

94 The impact of fiscal policy on the economy is not limited to discretionary fiscal policies alone. During recessions, tax receipts automatically decline and unemployment-related spending increases, while other government expenditure is largely unaffected, giving rise to "automatic fiscal stabilisers". Such automatic stabilisers also help to support aggregate demand during downturns. Other structural or temporary fluctuations in government revenue or expenditure will also have an impact on aggregate expenditure and income.

inequality). Redistribution can be measured as the percentage reduction in market income inequality due to direct government action (via direct taxes and cash transfers).

Social spending can be defined as government expenditure on social protection, education and health.[95] These resources are intended to relieve households of the financial burden of a number of risks and basic needs. In practice, a large part of social spending is in the form of social transfers in cash made directly to individual households, such as pensions, unemployment and sickness benefits and social assistance benefits. Other spending is provided in kind, either on a collective basis, i.e. directly produced and distributed by the government, or on an individual basis, distributing market goods and services to individual households (or reimbursing the costs thereof). As explained in Box 1, these different ways of providing public goods and services have a significant impact – directly or indirectly – on household disposable income and, consequently, on consumption.

Social spending can be analysed by using classification of the functions of government (COFOG) data.[96] The delineation of social spending includes distributive expenditure on social protection and pre-distributive expenditure that supports long-term growth (e.g. education and, to a lesser extent, health). Investment in infrastructure is also conducive to growth, according to economic literature, but it does not fall within our categorisation of social spending.

Social spending represents the largest component of government expenditure in all euro area countries, and pension payments make up the largest share. Social spending has increased steadily since 2001,[97] both in nominal terms and as a percentage of total government expenditure, albeit with some volatility expressed as a percentage of GDP during the crisis period. In the euro area in 2017, social spending accounted for, on average, around 70% of total government expenditure (see Table 1) and amounted to 31% of GDP, or €3.5 trillion. Social protection is by far the largest component of social spending in euro area countries, accounting for, on average, 42% of total government expenditure and around 20% of GDP. There are clear differences between countries in the level of social protection, which accounts for one third of total government expenditure in Malta and Latvia and approximately half in Finland and Germany. The main component in every country is expenditure on pensions (old age and survivors'), which averages 12.4% of GDP, followed by sickness and disability, families and children, unemployment and social housing. Despite the pension reforms undertaken in many euro area countries, pensions represent the main burden for governments. On the other hand, euro area countries have contained expenditure on health and education in recent years. Expenditure on health and education,

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95 This definition, which includes the government functions with the largest social impact on households, is chosen for the purpose of this article. A range of definitions of social spending are in use, from a narrow one including only social transfers in cash or in kind associated with social protection, to wider definitions that also include environmental protection, housing and community amenities, and recreation, culture and religion.

96 The latest available COFOG data refer to 2017. The data are in nominal terms, i.e. comparisons over time also reflect inflation differentials, and comparisons of levels across countries reflect price level differences. See "The functional composition of government spending in the European Union", *Monthly Bulletin*, ECB, April 2009.

97 Data on social protection, health and education expenditure are available from 2001 for the euro area and for most euro area countries.

respectively, represents on average 7.1% and 4.5% of GDP (or 15% and 9.6% of total government expenditure).

Table 1

Breakdown of social spending by COFOG function (euro area, 2017)

COFOG category	EUR billions	Percentage of total government expenditure	Percentage of GDP
Total social spending	3,522.6	66.8	31.4
Health	793.0	15.0	7.1
Education	508.6	9.6	4.5
Social protection	2,221.1	42.1	19.8
of which sickness and disability	309.0	5.9	2.8
of which pensions (old age and survivors')	1,388.4	26.3	12.4
of which family and children	190.5	3.6	1.7
of which unemployment	172.3	3.3	1.5
of which housing	42.2	0.8	0.4

Source: Eurostat.

There is no one-size-fits-all optimal level of social spending as a share of the economy. The optimal composition of social spending takes into account microeconomic factors (e.g. the efficiency of social spending systems) and macroeconomic factors (e.g. the size of the fiscal multipliers). This is an argument for growth-friendly fiscal instruments, based on the underlying idea that the composition of public finances has an impact on long-term output. It involves political choices and societal preferences – such as the optimal size of government,[98] the fiscal governance framework, and the tax system to finance social spending. It also has implications for debt sustainability, interaction with other economic policies, demography and existing political capital for implementing fiscal-structural reforms in a satisfactory manner. In fact, political pressure to reverse reforms that burden older citizens could grow as a consequence of the increasing age of the median voter. In addition, as the ratio of contributors to beneficiaries shrinks, questions of intergenerational fairness arise.

Social insurance systems and the way public goods and services are provided differ substantially across euro area countries. Countries' systems did not converge over the last decade, as societal preferences are different. Some countries have a "public-integrated model" which links budgetary financing with providers of goods and services that are part of the general government sector. In other countries, the government predominantly purchase the goods and services from market producers under a "public-contract model". Therefore social spending is represented differently in national accounts across countries, affecting the interpretation of cross-country comparisons. Estimates of social security pension obligations are also diverse across countries, depending on whether pension schemes are more publicly or privately organised. In general, a majority of euro area countries have significant

98 There is huge variation in performance and efficiency across countries, but studies tend to suggest a benchmark expenditure-to-GDP ratio of around 30-35% of GDP in advanced economies. See Afonso, A. and Schuknecht, L., "How 'big' should government be?", *EconPol Working Papers*, No 23, European Network for Economic and Fiscal Policy Research, March 2019.

publicly organised schemes, while the Netherlands and, to a lesser extent, Ireland also have considerable private pillars.

As a consequence of this diversity, a comprehensive assessment of social spending requires the analysis of microeconomic data and tax systems in individual countries. Aggregate data need to be interpreted with caution and complemented with further studies. For instance, it is important to monitor closely the costs incurred in the provision of public services and to further analyse the efficiency of public spending in the context of spending reviews (i.e. how to maximise the economic effect of spending using the available resources). Regarding the tax systems in place, apart from the progressivity of direct and indirect taxes and the efficiency of the tax administration, there is widespread use of tax exemptions on pensions, health or housing in euro area countries. It is difficult to calculate the impact of these exemptions on the government accounts and their mitigating effect on income distribution. However, that is outside the scope of this article.[99]

This article is structured as follows: Section 2 analyses the evolution of social spending since the pre-crisis years and its linkages to household disposable income and consumption; Section 3 discusses the distributive function of public finance in euro area countries, with a descriptive analysis of the differences in social insurance systems and a focus on pensions as the largest social spending item in every euro area country; and Section 4 concludes.

2 The evolution of the composition of social spending in the euro area

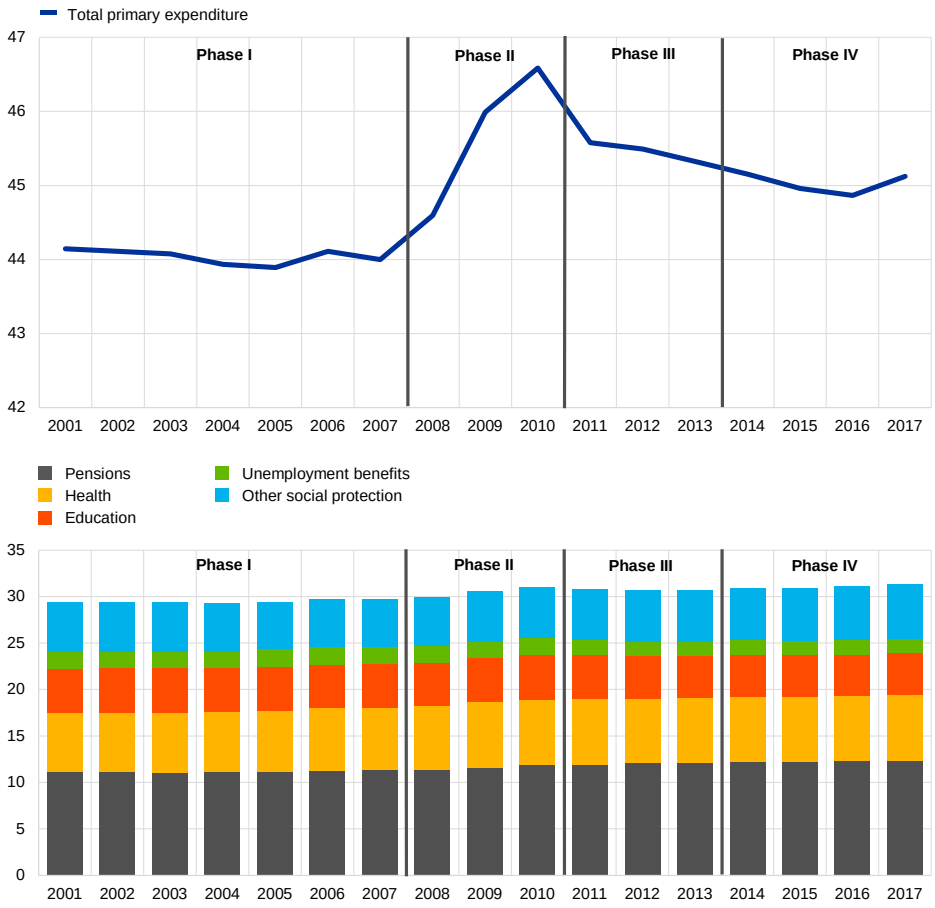
The euro area has witnessed an increase in both its overall and its social expenditure-to-GDP ratio, albeit with some volatility during the crisis period. Chart 1 illustrates trends in cyclically adjusted primary expenditure relative to GDP and the social spending categories at euro area level during the period 2001-2017. During the pre-crisis phase (Phase I), primary expenditure (i.e. total government expenditure minus interest payments) was relatively stable. During the financial crisis, the sharp deterioration in GDP in 2008-2010 was accompanied by a temporary spending stimulus (Phase II). This was reflected in the increase in the cyclically adjusted primary expenditure ratio. After the financial crisis peaked in 2010, the primary expenditure ratio started declining (Phase III), reflecting euro area countries' adjustment policies in view of rising debt sustainability concerns. Since the normalisation of fiscal policies in 2014 (Phase IV), the primary expenditure ratio has remained stable at around 45% of GDP, one percentage point of GDP above the pre-crisis level.

[99] A recent micro-simulation study suggests that the revenue cost of pension-related tax expenditure is heterogeneous, ranging from very sizeable foregone revenues in the Baltic countries and Portugal (more than 13% of old age pension expenditure), to a neutral impact in Spain and Luxembourg, and extra revenue of 1% in Malta and almost 5% of old age pension expenditure in Greece (due to the solidarity tax). See Barrios, S., Moscarola, F.C., Figari, F. and Gandullia, L., "Size and distributional pattern of pension-related tax expenditures in European countries", *JRC Working Papers on Taxation and Structural Reforms*, No 06/2018, European Commission, November 2018.

Chart 1

Euro area cyclically adjusted primary expenditure and breakdown of social spending

(percentages of potential GDP at current prices)



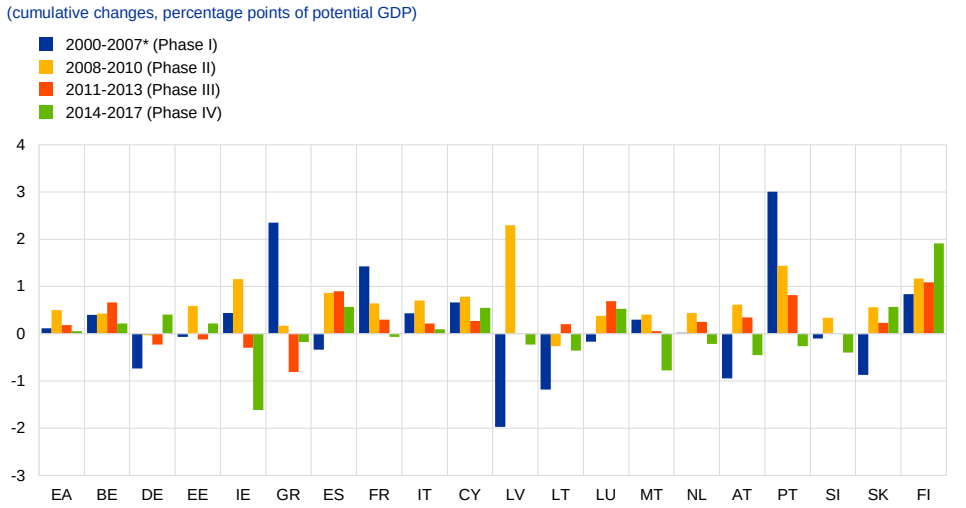
Sources: European Commission (AMECO and Eurostat) and ECB calculations.
Notes: Phase I is the pre-crisis period (2001-2007). Phase II is the first part of the crisis (2008-2010), when most countries responded with emergency expenditure increases. Phase III is the consolidation phase (2011-2013), although some countries had already started consolidating before then (e.g. Latvia in 2009). Significant progress in reducing fiscal imbalances was achieved by 2013. Phase IV is the post-crisis period (since 2014). In several countries the consolidation period continued beyond 2013 (e.g. Greece, Cyprus). Pensions include old age and survivors' pensions. Unemployment benefits data are cyclically adjusted.

Pension spending in the euro area generally rose faster than potential GDP as a result of ageing populations. As shown in Chart 2, before the onset of consolidation, increases in pension expenditure as a percentage of potential GDP (Phases I and II) were particularly strong in Portugal, Greece, France and Finland. On the other hand, several countries experienced increases below the increases in their potential GDP, particularly during the period 2000-2007 (Phase I). This was the case for Latvia, Lithuania, Austria, Slovakia, Germany and Spain in particular. During the consolidation period (Phase III), increases in pension expenditure relative to potential GDP continued in a majority of countries, while reductions occurred notably in Greece and Ireland. However, these reductions were smaller than the increases in the years before. Germany and Estonia also witnessed drops in pension expenditure as a percentage of potential GDP. After 2013, pension expenditure continued increasing faster than potential GDP in about half of euro area countries, most notably in

Finland.[100] This reflects the rising share of older people in the population, but also the effects of the previously legislated pension reforms and lower potential GDP growth in the post-crisis period. Looking ahead, at the euro area aggregate level substantial changes in the old-age dependency ratio are projected, moving from over three working-age people for every person aged 65 or over to only around two working-age people by 2070.[101] Pressure from an ageing society will therefore continue to limit governments' fiscal room for manoeuvre in the coming years.

Chart 2

Government pension expenditure in euro area countries



Sources: European Commission (AMECO and Eurostat) and ECB calculations.
Notes: Pensions include old age and survivors' pensions. Cumulative changes in percentage points of potential GDP refer to the ratio of nominal pension expenditure based on COFOG data (numerator) to nominal potential GDP (denominator) calculated using real potential GDP at 2010 reference levels (AMECO database) and the GDP deflator. Potential output estimates for Ireland are heavily influenced by the activities of large multinational enterprises (MNEs) and therefore subject to a particularly high degree of uncertainty.
* Data for Germany and Lithuania start from 2001; data for Belgium, Greece, Italy, Latvia, Malta Slovakia, Finland and the euro area start from 2002.

The impact of policy changes after the onset of the crisis is most visible for health expenditure, as growth in health spending is slowing down in most countries and in the euro area as a whole. As illustrated in Chart 3, significant increases in expenditure on health as a percentage of potential GDP were recorded in a majority of euro area countries in the period before the consolidation, leading to a rise in the health expenditure ratio at the euro area level. Only Germany and Slovenia saw health expenditure growth slightly below that of potential GDP. The start of the crisis marked a trend shift, as most countries experienced a slowdown in health spending which also continued in many countries in the consolidation and post-consolidation periods. Since the crisis, health expenditure has grown less than potential GDP for at least some of the time in a majority of countries.

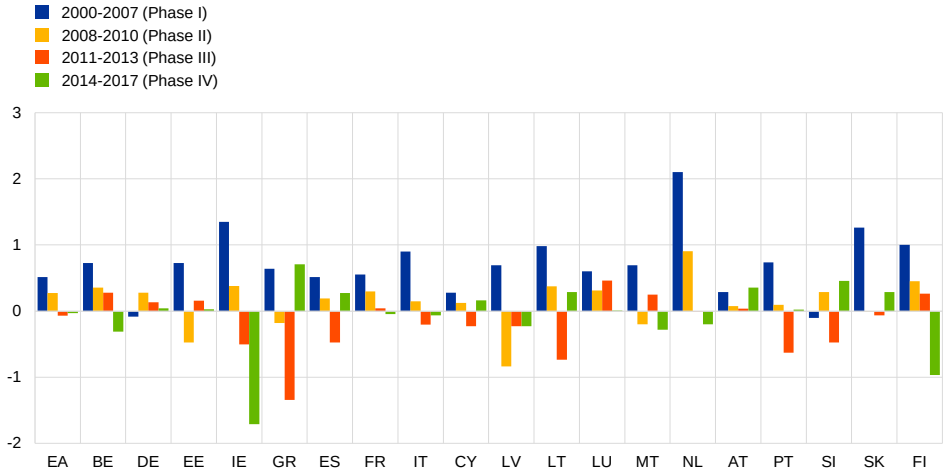
[100] The role of pension reforms in the consolidation process and beyond, which is of special interest since these reforms might have particularly positive effects on long-term growth if they increase labour force participation, is explained in detail in Section 3.

[101] At the euro area level, by 2070 the proportion of people aged 65 or over is expected to rise from 20% to 29% of the population, while the proportion aged 80 or over will increase from 6% to 13%, becoming almost as large as the young population (15%). By contrast, those aged 15-64 (the working-age population) will shrink from 65% to 56%. The old-age dependency ratio (people aged 65 or above relative to those aged 15-64) is projected to increase from 30.9% to 51.8% over the period 2016-2070. See the population projections database on Eurostat's website.

Chart 3

Government expenditure on health in euro area countries

(cumulative changes, percentage points of potential GDP)

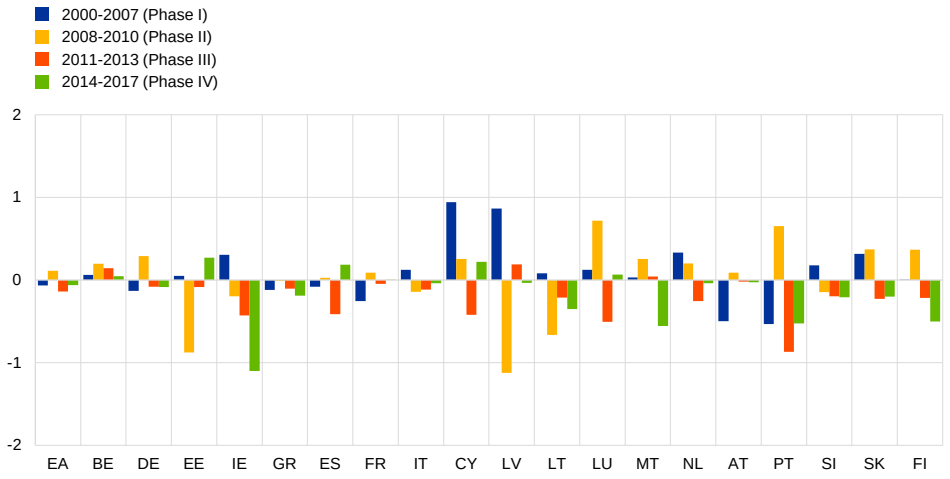


Sources: European Commission (AMECO and Eurostat) and ECB calculations.
Notes: Cumulative changes in percentage points of potential GDP refer to the ratio of nominal health expenditure based on COFOG data (numerator) to nominal potential GDP (denominator) calculated using real potential GDP at 2010 reference levels (AMECO database) and the GDP deflator. Potential output estimates for Ireland are heavily influenced by the activities of large MNEs and therefore subject to a particularly high degree of uncertainty.

Education spending, which is generally considered to be conducive to long-term economic growth, has slowed down in a majority of euro area countries since the consolidation period. Increases in expenditure on education as a percentage of GDP were recorded before the consolidation period, mainly in Cyprus, Latvia, Ireland, Slovakia and the Netherlands (see Chart 4). During the crisis, and even more widely during the consolidation period, there was a general drop in education expenditure growth, with a number of countries recording growth rates below that of potential GDP, mainly related to cuts in compensation of employees (wages of teachers and educators). In the period 2014-2017, the dynamics of expenditure on education relative to potential GDP continued to be contained in most countries, particularly in Ireland, Malta, Portugal and Finland.

Chart 4
Government expenditure on education in euro area countries

(cumulative changes, percentage points of potential GDP)



Sources: European Commission (AMECO and Eurostat) and ECB calculations.
Notes: Cumulative changes in percentage points of potential GDP refer to the ratio of nominal education expenditure based on COFOG data (numerator) to nominal potential GDP (denominator) calculated using real potential GDP at 2010 reference levels (AMECO database) and the GDP deflator. Potential output estimates for Ireland are heavily affected by the activities of large MNEs and therefore subject to a particularly high degree of uncertainty.

Other components of social spending also show diverging trends. In particular, the behaviour of unemployment benefits is very heterogeneous across time and countries, mainly due to its economic stabilisation function. While expenditure on unemployment benefits generally increased in the pre-crisis period and in the first part of the crisis (2008-2010), it has tended to decrease since 2011. Unemployment rose significantly in most countries in the wake of the global financial crisis, but the rise in unemployment was much sharper and longer-lasting in some countries (e.g. Greece, Spain and Italy) than in others (e.g. Germany and the Netherlands). Expenditure on sickness and disability, families and children, social housing and combating social exclusion were on a decreasing trend before the crisis years (up to 2005), but have since increased steadily. This was in particular on account of expenditure related to social exclusion, such as social assistance for those at high risk of poverty or in difficult circumstances. The rest of this article focuses on analysing the three main components of social spending, namely pensions, health and education.

Box 1
Social spending and household disposable income and consumption

Government expenditure on social functions has an impact on household disposable income and consumption. Final consumption of households[102] is the total amount of goods and services bought by households for everyday use. It is the largest GDP expenditure component in the euro area (around 54% of GDP in 2018).

A large part of the social spending of government consists of social transfers to households, either in cash or in kind. Social transfers in kind can be provided in two ways: purchased market

[102] Final consumption of households also includes an estimate of consumption of services provided by owner-occupied dwellings.

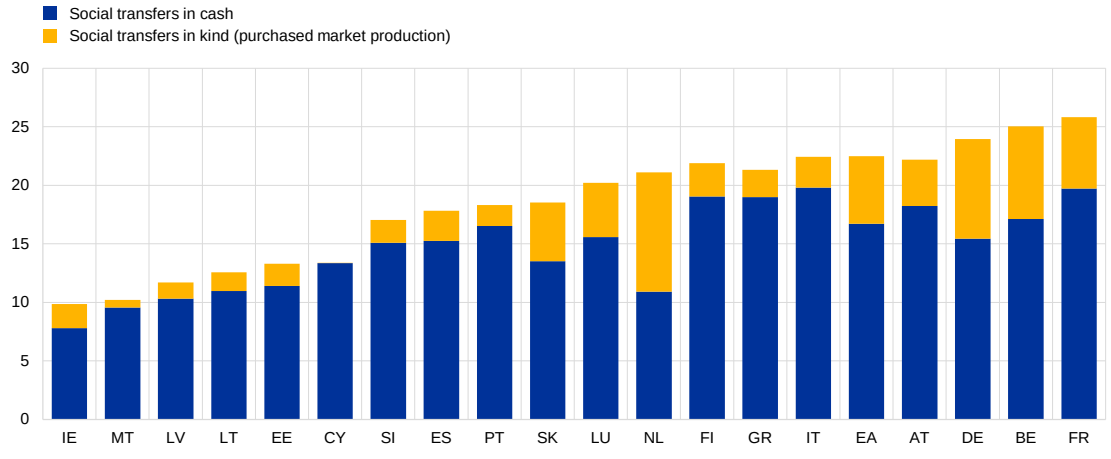
production or government output. In the former case, the government buys goods and services from market producers and provides them to individual households either free of charge or at reduced prices, such as reimbursements of healthcare costs or rent costs. In the latter case, government output is provided directly to the households, including transfers of a collective nature, such as health and education services financed and provided directly by the government. Costs related to social transfers of a collective nature include compensation of employees, consumption of fixed capital, and intermediate consumption of goods and services used to produce them. By convention, social transfers in kind are part of government final consumption.

In 2017 for euro area countries, social transfers directly targeting individual households ranged between 9.9% of GDP (in Ireland) and 25.8% of GDP (in France) (see Chart A). Social transfers are mainly paid in cash (blue bars in Chart A). However, for some euro area countries (the Netherlands, Slovakia, Germany, Belgium, Luxembourg and France), social transfers in kind purchased on the market (yellow bars) represent more than one fifth of total social transfers.

Chart A

Government social transfers in cash and in kind (2017)

(percentages of GDP)



Source: Eurostat.

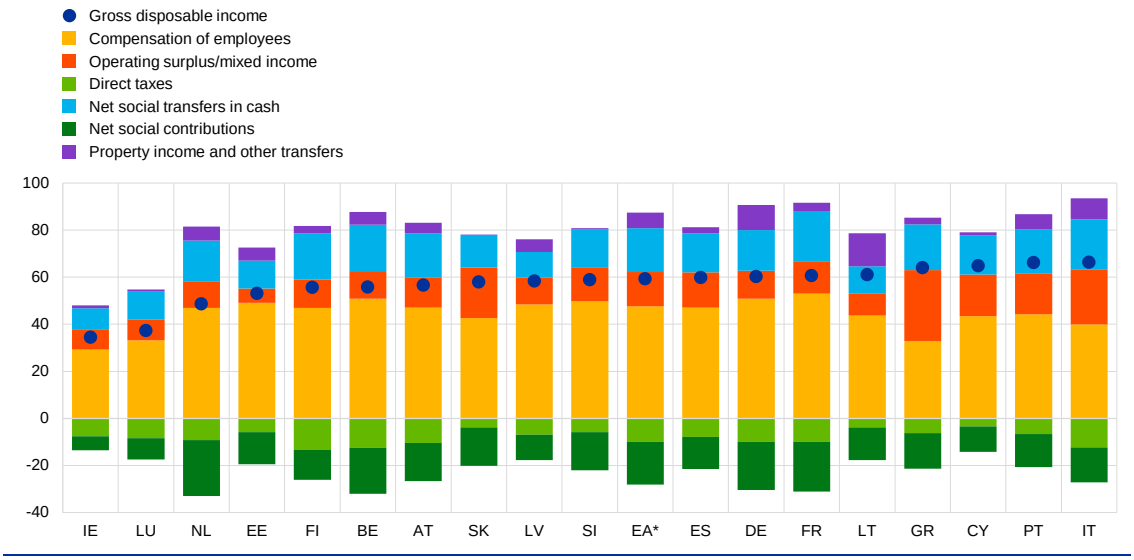
Increases in social transfers in cash directly raise household gross disposable income that can be used either for final consumption or for saving. Chart B shows the components of household disposable income as a percentage of GDP in euro area countries in 2017. In euro area countries in 2017, net social transfers in cash received by households ranged between 9% and 22% of GDP, of which the bulk was paid by government[103] (above 80% in most euro area countries). Only in the Netherlands is the share of government-paid benefits significantly lower (around 60%), owing the importance of the second (private) pension pillar for the payment of pension benefits (see Box 2).

[103] Social transfers in cash are also paid to households by financial and non-financial corporations (e.g. second-pillar pension benefits, sickness and disability pay and family and health benefits for their employees) and by non-profit institutions serving households (NPISH).

Chart B

Household gross disposable income and its components

(percentages of GDP)



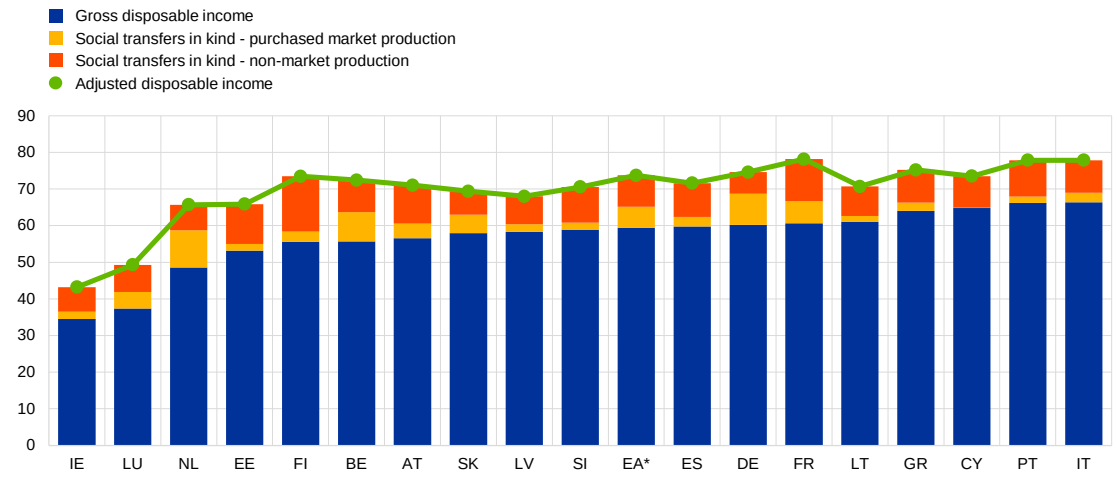
Source: Eurostat.
Notes: Data for Malta are not available.
* The euro area aggregate excludes Malta.

To adjust for the effects that the different recording practices for social transfers in cash and in kind have on household disposable income, a supplementary aggregate for the households sector (the "adjusted disposable income of households") can be derived by adding social transfers in kind to household disposable income (for euro area countries in 2017, see Chart C). Social transfers in kind range from around 9% to 18% of GDP and boost significantly the adjusted disposable income of households. The euro area average is 14% of GDP. Payments in kind consisting of purchased market production are higher in some countries (the Netherlands, Germany, Belgium and France) than in others. This also relates to the chosen social insurance financing model (see Section 3 for different health financing schemes).

Chart C

Household gross disposable income and adjusted disposable income (2017)

(percentages of GDP)



Source: Eurostat.
Notes: Data for Malta are not available.
* The euro area aggregate excludes Malta.

3 Zooming-in on the social systems in the euro area

The social systems chosen by euro area countries, and the reforms of those systems, have an effect on government spending patterns and levels. How much countries spend on health or education reflects a wide spectrum of market, political and social factors, as well as diverse financing and organisational structures of their national systems. Cross-country comparisons of government social spending need to be interpreted with care in view of the different social systems and models that exist. This section provides an overview of the different pension, healthcare, and education systems in the euro area and how government expenditure might be affected by the choice of a particular model.

Pensions

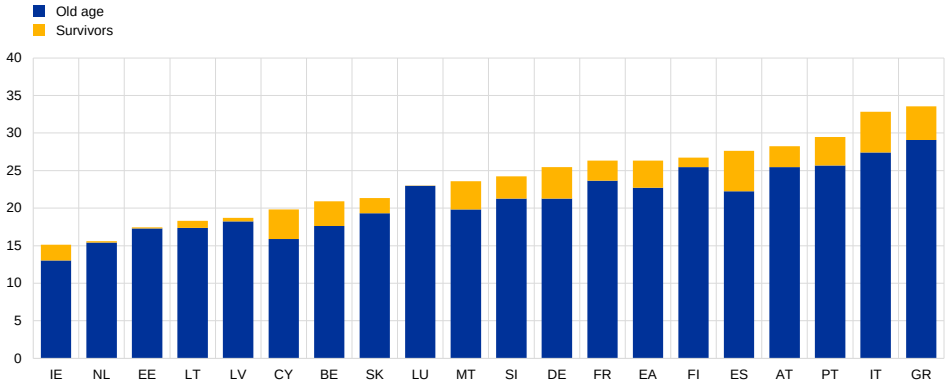
The set-up of pension systems varies significantly across euro area countries. This can be attributed both to historical differences and to the different stages they are at in the pension system reform process. In particular, how pension systems are organised into public and private schemes has an impact on sustainability risks. In all euro area countries, government-managed pension schemes play an important role in the provision of pension benefits. In 2017, government expenditure on old age and survivors' pensions[104] ranged from 15.1% of total government expenditure in Ireland to 33.5% in Greece (see Chart 5).

[104] While in several countries disability pensions are part of the social security scheme, these data are excluded for comparability reasons, because in COFOG data disability benefits are reported together with other sickness benefits.

Chart 5

Government expenditure on pensions (2017)

(percentages of total government expenditure)



Source: Eurostat.

Pension systems are traditionally divided into three pillars.[105] The first pillar consists of a mandatory public social security scheme based on the pay-as-you-go (PAYG) principle. It is usually a defined-benefit scheme, but notional defined-contribution or points systems also exist in euro area countries. Such PAYG schemes often include old age, survivors' and disability pensions. The second pillar includes social insurance schemes that are employment-related and generally set up by employers for their employees. These schemes are mainly funded, and can be either defined-benefit or defined-contribution plans. Funded and unfunded schemes for government employees are also included in the second pillar. Voluntary private schemes make up the third pillar, but are not part of social insurance.[106] These are important in countries where the government encourages such saving schemes by providing additional financial support, such as subsidies or tax incentives (e.g. Germany, Luxembourg, Italy, Malta, Austria, Portugal and Slovakia).

In addition, there may be schemes aimed at poverty alleviation that provide a basic pension or social assistance independently of employment-related contributions. These schemes are usually not part of the social insurance system, but the expenditure on these benefits may be included in pension expenditure.

Table 2 summarises the pension schemes in euro area countries under the first and second pillars. All euro area countries have first-pillar pension schemes covering large parts of the workforce. These are by far the largest source of government expenditure on old age, survivors' and disability pensions. In most euro

105 Pension schemes can be classified along several dimensions. In addition to the three pillars, they can be either unfunded, where current benefits are financed by current contributions, or funded, where current contributions are invested to fund future benefits. Pension schemes can also be broken down into defined-benefit and defined-contribution schemes. In defined-benefit schemes, the benefits are determined by a formula, either alone or with a guaranteed minimum amount payable (ESA 2010 17.57). In defined-contribution schemes, the benefits are defined exclusively in terms of the level of the fund built up from the contributions and the increases in value that result from the investment of such funds (ESA 2010 17.54).

106 The contributions to these saving schemes are made from disposable income of households. The benefits paid out are not part of government expenditure, but rather life insurance and annuity entitlements of households. Life insurance and annuity entitlements consist of financial claims that life insurance policy holders and beneficiaries of annuities have against corporations providing life insurance (ESA 2010 5.174).

area countries these schemes are defined-benefit schemes. In three countries (Ireland, Greece and the Netherlands) retirement benefits are paid at a flat rate, irrespective of the contributions or other criteria determining the level of benefits. This flat rate pension can be supplemented by other public or private schemes. A few countries also have notional defined-contribution or points systems.[107]

Table 2

First and second-pillar pension schemes in euro area countries

	Pillar 1	Pillar 2		
	Mandatory social security schemes	Other employment-related social insurance schemes		
	Unfunded PAYG	For government employees, unfunded[1]	Funded	
			Managed by government	Privately managed
BE	DB	DBG		DB, DC
DE	PS	DBG		DB, DC, DBG
EE	DB	DBG		DC
IE	Flat rate	DBG		DC, DB
GR[2]	Flat rate + DB + NDC	DBG		DC, DB
ES	DB	DBG		DC, DB
FR	DB + PS	DBG		
IT	NDC			DC, DB
CY[3]	PS	DBG		DC, DB
LV	NDC	DBG		DC, DB
LT	PS	DBG		DC
LU	DB	DBG		DC, DB
MT	DB	DBG		
NL	Flat rate	DBG		DC, DB, DBG
AT	DB	DBG		DC, DB
PT	DB	DBG	DC	DC, DB, DBG
SI	DB		DC	DC
SK	DB	DBG		DC
FI[4]	DB			DC, DB

Sources: European System of Central Banks (ESCB); Eurostat: Pensions in National Accounts, Table 29 factsheets; European Insurance and Occupational Pensions Authority (EIOPA): Database of pension plans & products in the EEA: Statistical Summary, December 2014; European Commission (Directorate-General for Economic and Financial Affairs): The 2018 Ageing Report.
Notes: PAYG – pay-as-you-go; DB – defined-benefit; PS – points; DC – defined-contribution; NDC – notional defined-contribution; DBG – defined-benefit scheme for government employees.
1) These schemes are a cross between a government pension scheme (first pillar) and an occupational pension scheme (second pillar). For the purposes of this article, they are included in the second pillar as an employment-related scheme, but shown separately from the other schemes in that pillar.
2) The NDC in Greece is an auxiliary mandatory pension scheme.
3) The scheme (defined-benefit) for government employees covers all permanent employees hired on or before 1 October 2011.
4) The first-pillar scheme is partly funded.

In addition, the outflows from the unfunded schemes for government employees that are in place in almost all euro area countries (except Italy, Slovenia and Finland) and the funded pension schemes managed by government that exist in Portugal and Slovenia are also part of government expenditure on pensions. There are no funded employment-related pension schemes in France or Malta.

107 In points systems, benefits are determined on the basis of pension points earned on the basis of years and amounts of contributions or other criteria.

A new dataset on accrued-to-date pension entitlements in social insurance was published by Eurostat at the end of 2018. The new dataset offers information on the different pension schemes in place in EU countries (first and second pillars) at the end of 2015, and improves comparability between countries. Data are available for all euro area countries except Greece and Luxembourg. Although the data refer to the pension entitlements of households, they also illustrate the relative importance of pension schemes relating to government expenditure. Box 2 explains the new dataset and its possible uses.

Box 2
Accrued-to-date pension entitlements of households across euro area countries

Prepared by István Vincze

Eurostat published a new comprehensive and harmonised dataset on pension entitlements in social insurance at the end of 2018.[108] The new dataset aims to establish complete and consistent coverage of social insurance pension entitlements (first and second pillars) and to ease comparability across countries.[109] It contributes to the understanding of household wealth, irrespective of how the national pension systems are organised. It also supplements information on government finances. At the same time, it should be stressed that the results are neither a direct measure of the sustainability of unfunded pension schemes nor of countries' overall fiscal sustainability.[110] For that purpose, the concept of pension entitlements needs to be extended to also include entitlements that will be accrued in the future (implicit liabilities) as compared with future social contributions and tax payments (implicit assets).[111] At the European level, the impact of pension schemes on the sustainability of public finances is measured in the Economic Policy Committee's Ageing Report on the basis of complex estimations of future pension contributions and benefits, as well as demographic changes.[112]

The new dataset covers pension schemes classified in the first and second pillars of the three-pillar presentation traditionally used for a comprehensive description of retirement income systems. It brings information on the second-pillar pension schemes already included in the "core" national accounts framework (ESA 2010) together with information on unfunded government pension schemes and social security pensions (first pillar). Third-pillar saving schemes are not included in the new dataset, as they are voluntary.

Table A provides an overview of the pension schemes classified on the basis of a set of criteria. First, pension schemes are split into non-general government schemes (columns A to C) and general government schemes (columns D to H), depending on the classification of the entity that retains the ultimate responsibility for any deficit in funding. The pension schemes are further broken down into defined-contribution schemes (columns A and D) and

[108] The reporting requirements are defined in Table 29 of the ESA 2010 Transmission programme of data: "Accrued-to-date pension entitlements in social insurance".

[109] The first results are published on Eurostat's website.

[110] See also Mink, R., Rodríguez-Vives, M., Barredo, E. and Verrinder, J., "Reflecting pensions in National Accounts – Work of the Eurostat/ECB Task Force", paper prepared for the 30th General Conference of the International Association for Research in Income and Wealth (IARIW), August 2008.

[111] See the article entitled "Entitlements of households under government pension schemes in the euro area – results on the basis of the new System of National Accounts", *Monthly Bulletin*, ECB, January 2010.

[112] See the article entitled "The economic impact of population ageing and pension reforms", *Economic Bulletin*, Issue 2, ECB, 2018.

defined-benefit schemes (columns B and E to H). Pension schemes set up by general government as an employer for its own employees are grouped in columns E to G and are split into funded schemes administered either by a pension fund (column E) or by general government (column F) and unfunded schemes (column G). Unfunded national social security pension schemes are grouped in column H.

Table A

Classification of pension schemes covered by the new dataset

Recorded	Core national accounts						Not in the core national accounts		Total pension schemes
Pension manager	Non-general government			General government					
Pension fund type	Defined-contribution schemes	Defined-benefit and hybrid schemes	Total	Defined-contribution schemes	Defined-benefit schemes for general government employees			Social security pension schemes	
					Classified in financial corporations	Classified in general government	Classified in general government		
	A	B	C	D	E	F	G	H	I

Pension entitlements are recorded in this table on an accrued-to-date basis. This approach takes into account pension benefits to be paid in the future to people who have already retired and to people of working age based only on the contributions they have made to date (contingent liabilities).[113]

For defined-benefit pension schemes, actuarial calculations are needed to estimate the present value of the accumulated pension entitlements. Such calculations rely on various assumptions,[114] such as the discount rate, wage growth and demographic variables, which have an impact on the final result. The choice of these assumptions has been harmonised insofar as possible across all euro area countries in order to achieve better cross-country comparability. A real discount rate of 3% (nominal discount rate of 5%) is used to estimate the present value of all future pension benefits to be paid (2015 is the base year for the first publication of this set of data). Wage growth is important because future pension benefits will generally be calculated as a share of final salary, average salary over a period of employment or lifetime earnings. The wage growth assumptions (reflecting productivity growth per capita) of the Ageing Working Group provide the basis for a harmonised approach and preserve the inevitably heterogeneous growth paths across euro area. Future life expectancy plays an equally important role, as it determines the average expected number of years the pension benefits will need to be paid. Eurostat's most recent population projections (EUROPOP2015)[115] are used for the assumptions on future life expectancy, fertility rates, mortality rates and migration.

Social security pensions (column H) form the largest part of the total estimated stock of pension entitlements, ranging from 86% of 2015 GDP (in Ireland)[116] to 333% (in Italy), with

[113] See Mink, R. and Rodríguez-Vives, M. (eds.), "Workshop on Pensions – 29-30 April 2009 – European Central Bank", ECB/Eurostat, 2010.

[114] Detailed guidance on the assumptions to be made can be found in the ECB/Eurostat Technical Compilation Guide for Pension Data in National Accounts.

[115] Data and related additional information can be found on Eurostat's website.

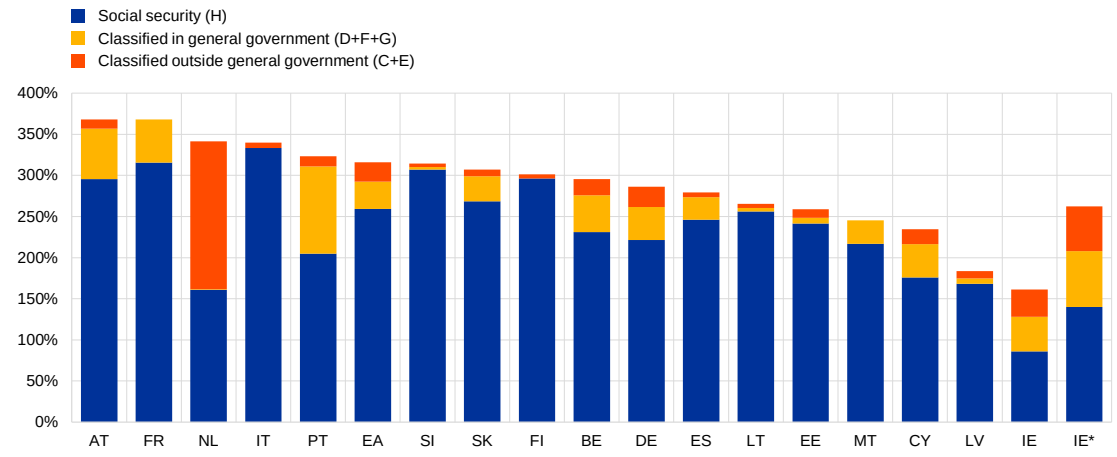
[116] The GDP of Ireland is significantly elevated by the effects of globalisation. In order to exclude such effects, modified gross national income can be used as an alternative indicator for the size of the Irish economy. The ratio of total estimated stocks of pension entitlements to modified gross national income is 262%, with stocks accumulated in social security pension schemes accounting for 140%.

most of the countries showing values of above 200% (see Chart A). Stocks accumulated in other pension schemes managed by general government (columns D+F+G) show values of up to 60% of GDP in most countries, with the exception of Portugal (106%). This category also includes pension schemes created by general government explicitly for its own employees. Italy, Slovenia and Finland have no pension schemes created by general government explicitly for its own employees. The third category consists of pension schemes not managed by general government. The stocks of pension entitlements accumulated in these schemes are limited, except in the Netherlands, where they account for more than 50% of the total stock of pension entitlements.

Chart A

Breakdown of total estimated stocks of pension entitlements (end of 2015)

(percentages of GDP)



Source: Eurostat.
Notes: Accrued-to-date pension entitlements data for Greece and Luxembourg have not yet been published and are not included in the euro area aggregates. Two columns are shown for Ireland, in the second of which (IE*) modified gross national income is used as the denominator.

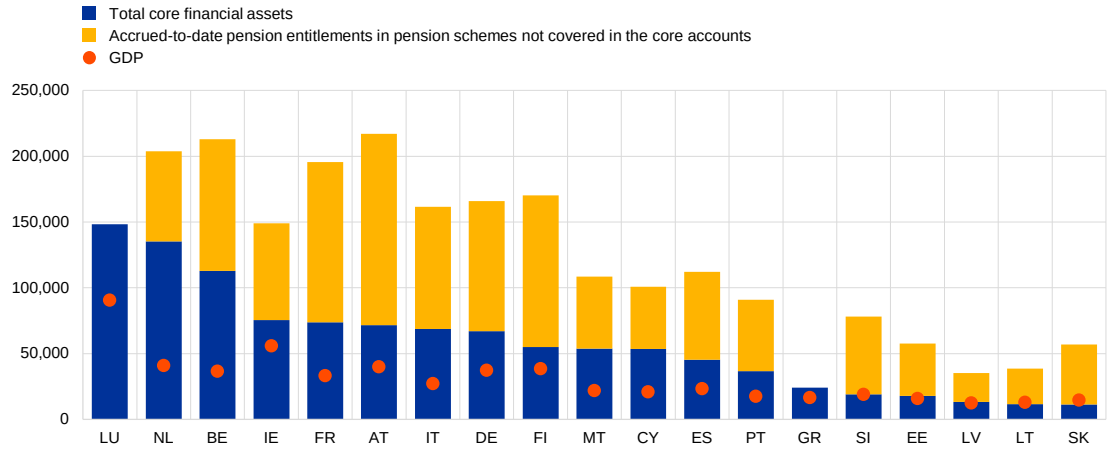
The new data can help to provide an indication of household wealth by combining total household financial wealth, as recorded and published in the core national accounts (ESA 2010), and the accumulated pension entitlements not recorded in the core national accounts (columns G and H). Financial wealth accumulated in the core national accounts and stored in various types of financial instrument – mostly deposits, debt securities, equity and employment-related pension entitlements other than social insurance (second-pillar pension schemes) – and life insurance (third-pillar pension schemes) ranges from €11,000 per capita in Slovakia to €148,000 per capita in Luxembourg.[117] Adding pension entitlements accumulated in social security schemes gives an indication of the maximum potential household wealth in euro area countries.

[117] In addition, non-financial assets, such as real estate, can be used to accumulate wealth for old age. These are in particular relevant in countries with high rates of home ownership, but their impact on total wealth is not further detailed in this article.

Chart B

Comparison of accrued-to-date social security pension entitlements and financial wealth of households (end of 2015)

(EUR per capita)



Sources: ECB and Eurostat.
Note: Accrued-to-date pension entitlements data for Greece and Luxembourg have not yet been published.

Pension reforms in a majority of euro area countries in the last decade have focused on raising the retirement age. In several countries the retirement age is linked or will be linked to changes in life expectancy (e.g. in Belgium, Estonia, Greece, Italy, Cyprus, the Netherlands, Malta, Portugal, Slovakia and Finland). Table 3 shows the statutory retirement age in euro area countries in 2019 along with the early retirement age and average effective age of retirement, which takes into account people retiring early or late. In several euro area countries the retirement age is different for men and women, but there is a trend towards equalising them in future in most countries.

Incentives for retiring earlier or later than the statutory retirement age influence the effective age of retirement. Some countries allow early retirement with full benefits once a sufficient number of years of contributions have been accumulated. In over half of euro area countries, however, early retirement results in reduced pension benefits, while there may be additional benefits for deferring retirement beyond the normal retirement age. The average effective age of retirement is below the statutory retirement age in most countries, indicating that early retirement schemes are widely used.

In addition to increases in the retirement age linked to life expectancy, there may be additional, sometimes automatic, sustainability measures built into the pension systems. Many countries apply formulae that closely link pension entitlements to the contributory career. The aggregate replacement ratios[118] in Table 3 show that the pension income from all three pension pillars replaces between 33% of working age income (in Ireland) and 86% (in Luxembourg). In Ireland and the

[118] The ratio of income replacement from pension benefits shows how much of the income earned by a working person in the pre-retirement years is replaced by pension benefits. The replacement ratio is above 60% in Greece, Spain, France, Italy, Luxembourg, Austria, Portugal and Slovakia. The particular rules applied may determine whether pensioners will be in a higher or lower percentile of the income distribution when they retire.

Netherlands, a large part of the statutory state pension (first pillar) is a flat rate pension that is not related to the pre-pension income, which also explains the low shares of old age pension expenditure in total government expenditure (see Chart 5 above).[119] In the rest of the countries, the levels of pension benefits depend on the length of career and contributions made either in the whole working life or the most recent or best number of years.

Table 3

Retirement age, incentives for early/deferred retirement, income replacement ratio and proportion of population of pension age

	Latest pension reform year	Statutory retirement age (early retirement age) 1 January 2019, men / women, if different	Incentives		Average effective age of retirement 2012-2017, men / women	Aggregate replacement ratio 2017 (percentages)	Percentage of population aged 65+ 2018 (percentages)
			Penalty for early retirement	Bonus for deferred retirement			
BE	2015	65 (63)			62/60	50	19
DE	2019	65.6 (63)	X	X	64/63	46	21
EE	2010	63.5 (60.5)	X	X	66/65	45	20
IE	2018	66			66/64	33	14
GR	2016	67 (62)	X		61/60	62	22
ES	2013	65.7 (65)	X	X	62/62	69	19
FR	2014	67 (62)	X	X	61/61	68	20
IT	2018	67 ([1])			62/61	71	23
CY	2012	65 (63)	X	X	66/61	43	16
LV	2014	63.5 (61.5)	X		63/62	43	20
LT	2019	63.8 (58.8) / 62.7 (57.7)	X	X	63/62	43	20
LU	2012	65 (57)			60/61	86	14
MT	2016	63 (61)		X	63/63	56	19
NL	2015	66.3			64/63	52	19
AT	2012	65 (60) / 60	X	X	63/61	64	19
PT	2007	66.4 (60)	X	X	70/66	67	22
SI	2012	65 (60)	X	X	62/61	46	19
SK	2019	62.5 (60.5) / [2] ([2])	X	X	61/59	62	16
FI	2014	63 (61)	X	X	64/63	53	21

Sources: Latest pension reform year and Statutory and early retirement age: European System of Central Banks (ESCB); Incentives: European Commission (The 2018 Ageing Report); Average effective age of retirement: OECD estimates based on the results of national labour force surveys; Aggregate replacement ratio: Eurostat (EU-SILC database); Percentage of population aged 65+: Eurostat.
Notes: The average effective age of retirement is the sum of each age of retirement weighted by the proportion of all withdrawals from the labour force occurring at that age during a five-year period. The aggregate replacement ratio is the ratio of the median individual gross pension of the 65-74 age cohort to the median individual gross earnings of the 50-59 age cohort, excluding other social benefits.
1) Early retirement is possible at any age, provided at least 43 years and 1 month (for men) or 42 years and 1 month (for women) of contributions have been accumulated.
2) The retirement age is reduced for women who have raised children, depending on the number of children.

In addition, the evolution of the benefit ratios during retirement is determined by the indexation rules. Most euro area countries apply indexation to pension benefits. This is linked to price, wage or GDP increases or a combination thereof. On the other hand, there are sustainability mechanisms to reduce pension benefits based on life expectancy at the time of retirement or on the ratio of contributions to pensions

[119] However, participation in second-pillar pension schemes is widespread and provides additional income in retirement in the Netherlands and, to lesser extent, in Ireland (see Box 2).

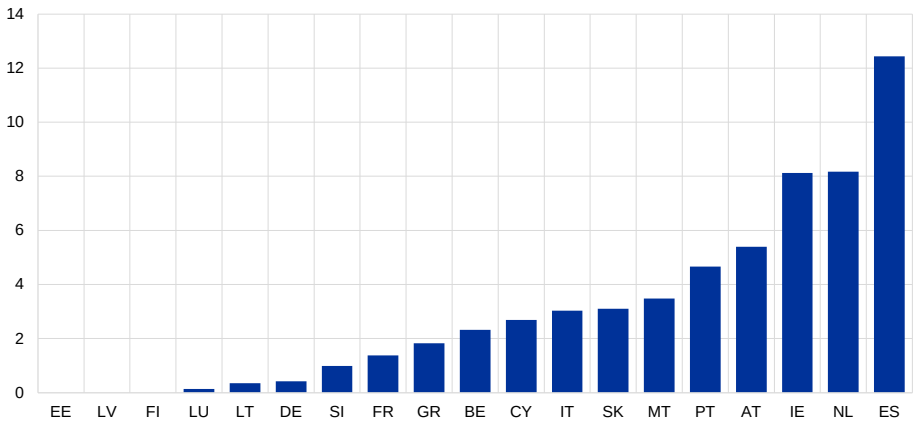
in Germany, Finland, Spain, Italy, Latvia and Portugal (see The 2018 Ageing Report[120]).

Most euro area countries also provide minimum pensions that are often income-tested or means-tested. This implies that the benefit is provided only if the person's income or wealth is below a certain threshold. Minimum pensions are meant to alleviate the risk of poverty in old age and are part of social assistance. Among euro area countries, the highest proportion of means-tested old age pension expenditure is in Spain (12%, see Chart 6), followed by Ireland and the Netherlands (both above 8%). On the other hand, in several countries there is no means-testing (Estonia, Latvia and Finland) or very little paid out after means-testing (Luxembourg, Lithuania and Germany). However, most means-tested expenditure is related to benefits linked to social exclusion, such as social assistance payments, which are also paid beyond retirement age.

Chart 6

Expenditure on means-tested old age pensions (2016)

(percentages of total government expenditure on old age pensions)



Source: Eurostat.

Health

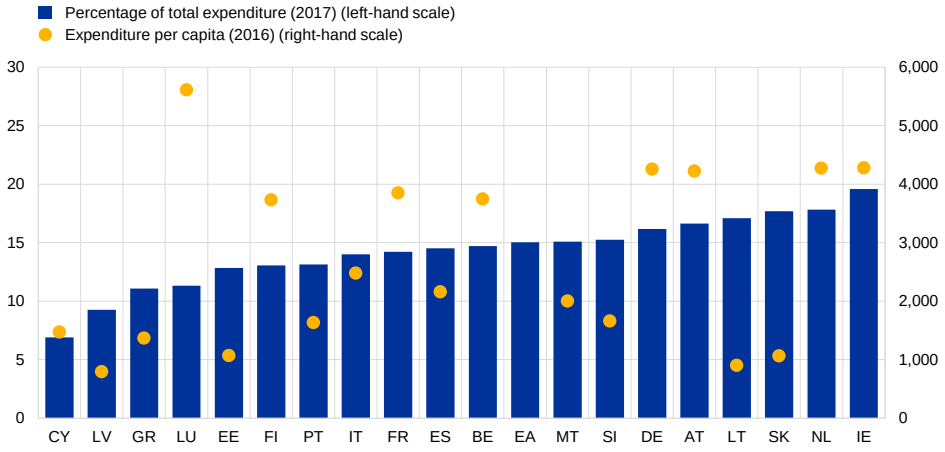
Public health expenditure is the second highest category of government expenditure in the euro area, amounting to 15% of total expenditure in 2017. It ranges from 7% in Cyprus to 20% in Ireland (Chart 7). In euro terms, the highest expenditure per capita in 2016 (over €4,000) was in Luxembourg, Germany, Austria, the Netherlands and Ireland, while it was below €1,000 per capita in Latvia and Lithuania.

120 "The 2018 Ageing Report – Economic & Budgetary Projections for the 28 EU Member States (2016-2070)", *Institutional Paper*, No 079, European Commission, May 2018.

Chart 7

Government expenditure on health (2017)

(left-hand scale: percentages of total government expenditure; right-hand scale: EUR per capita)



Source: Eurostat.
Note: Data per capita for Malta are for 2015.

Healthcare expenditure is shared between government and households in different proportions, depending on the healthcare financing schemes in the different countries. Direct government financing is more common in countries where there is universal healthcare funded by the government. This means that health services are provided and paid for directly by the government, with hospitals managed by the government (whether owned or rented) and medical staff paid by the government. In other countries financing may be provided mainly through mandatory health insurance, where the government is not the direct provider of the healthcare services and instead buys them from private providers. Both direct government financing and mandatory health insurance are usually part of government expenditure. Government expenditure may also be complemented by private health insurance arrangements and payments directly from households (out-of-pocket expenses).

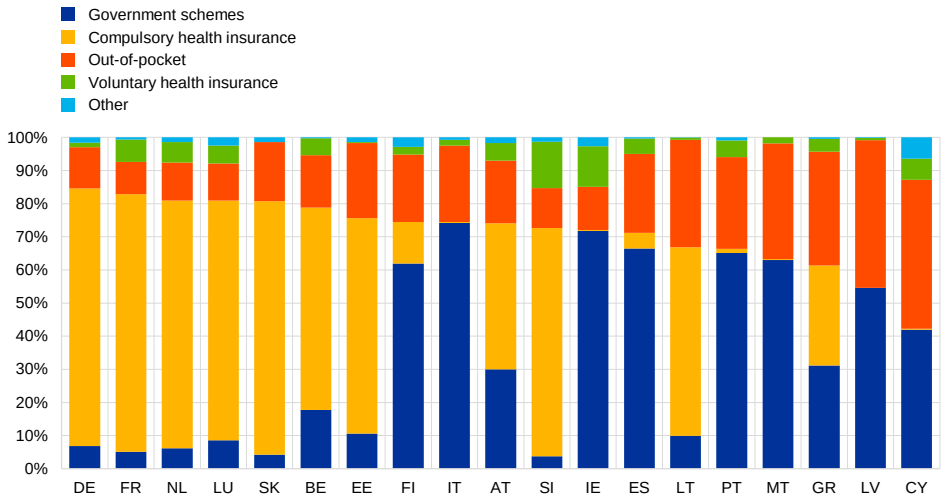
In 2016 direct government financing and mandatory health insurance accounted for over 50% of total health expenditure in all euro area countries except Cyprus (42%).[121] In about half of all euro area countries, the main financing of health expenditure was through mandatory health insurance, as shown in Chart 8 (Germany, France, the Netherlands, Luxembourg, Slovakia, Belgium, Estonia, Austria, Slovenia and Lithuania). However, in Finland, Italy, Ireland, Spain, Portugal, Malta and Latvia, direct government financing made up the majority of the health expenditure. In Greece, health financing is broadly divided among government financing, mandatory insurance and out-of-pocket expenses of households, while in Cyprus it is almost equally divided between direct government financing and out-of-pocket expenses of households. In four countries – Malta, Greece, Latvia and Cyprus – out-of-pocket expenses of households cover over one-third of health spending. In Slovenia and Ireland, voluntary health insurance finances over 10% of total health expenditure.

[121] See *Health at a Glance: Europe 2018: State of Health in the EU Cycle*, OECD/EU, November 2018.

Chart 8

Sources of financing of health expenditure (2016)

(percentages of total)



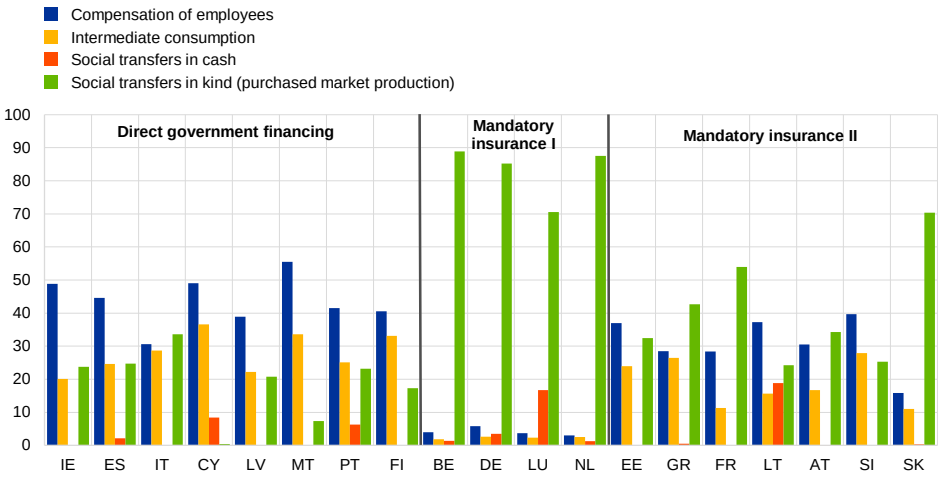
Sources: OECD (Health at a Glance: Europe 2018); OECD Health Statistics 2018; Eurostat Database; World Health Organisation Global Health Expenditure Database.
Note: Countries are ranked by the combined share of government schemes and compulsory health insurance in current health expenditure.

Differences in healthcare financing models also have an impact on government health expenditure. Chart 9 shows the expenditure categories for government health expenditure for three groups of euro area countries – one group mainly directly government financed and two groups with mandatory health insurance financing. For the countries where health expenditure is predominantly directly financed by government (Ireland, Spain, Italy, Cyprus, Latvia, Malta, Portugal and Finland), the share of compensation of employees in total health expenditure is quite high, ranging from 30% to 55%. At the same time, the share of intermediate consumption spending, i.e. expenditure related to purchases of goods and services used in the production of final health services, is also significant (20%-37%). Social transfers related to health expenditure that are predominantly provided in kind (reimbursements of purchases of medical goods and services) are relatively low in these countries.

Chart 9

Health expenditure by category in different financing models (2017)

(percentages of total health expenditure)



Source: Eurostat.
Note: The chart is divided into three sections: Direct government financing (health expenditure is predominantly directly financed by government); Mandatory insurance I (hospitals are not part of the government sector); Mandatory insurance II (public hospitals are part of the government sector).

The countries where the government health expenditure is financed mainly through mandatory health insurance can be distinguished according to whether public hospitals are recorded as part of the government sector for statistical purposes. The first group (Belgium, Germany, Luxembourg and the Netherlands) have a very low percentage of expenditure on compensation of employees (3%-6%) and intermediate consumption (2%-3%). These numbers are explained by the fact that hospitals, including public hospitals, are regarded as market producers, providing their services on a commercial basis. Therefore, their expenditure is not part of government expenditure on health. The largest part of the expenditure (over 70%) is in the form of social transfers in kind, composed of reimbursements and payments from health insurance companies for medical goods and services provided to households. In the second group of countries that finance government health expenditure mainly through mandatory health insurance (Estonia, Greece, France, Lithuania, Austria, Slovenia and Slovakia), the structure of health expenditure is different, as the public hospitals are part of the government sector. Thus the shares of compensation of employees (16%-40%) and intermediate consumption (11%-28%) in total health expenditure are higher than for the first group and social transfers in kind are generally lower. An exception is Slovakia, where social transfers in kind are above 70%.

Going forward, healthcare reforms may affect wages of medical and non-medical personnel, prices of medical goods and capital investment, and there may be legislated changes in targets for future healthcare expenditure.

Education

Government expenditure makes up the bulk of education spending in all euro area countries. It is complemented by private spending by organisations, other

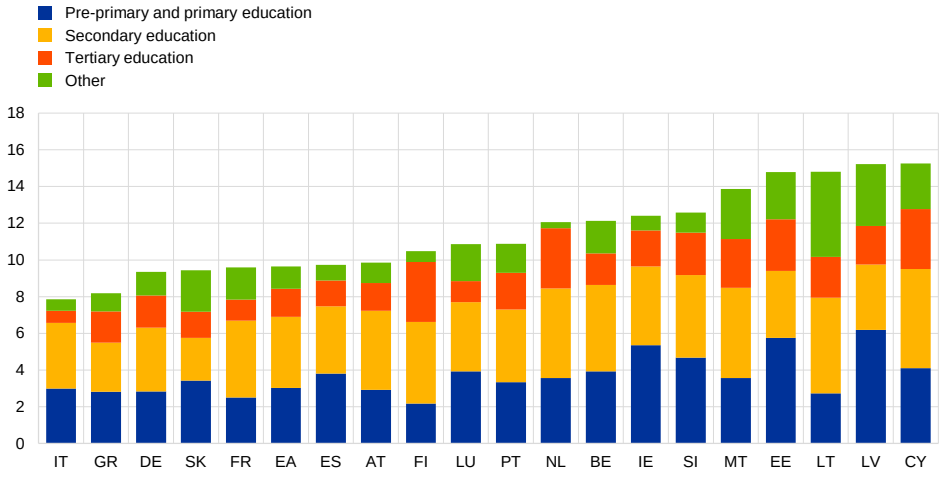
non-educational entities and households. The contribution from private expenditure is much higher in tertiary education, such as university programmes, than in lower levels of education. In Cyprus, Spain, Italy, the Netherlands and Portugal, the share of private expenditure in tertiary education exceeds 30%.[122]

In the euro area, the average share of government expenditure on education was around 10% in 2017, ranging from 7.9% in Italy to over 15% in Latvia and Cyprus (see Chart 10). The bulk of expenditure is on pre-primary, primary and secondary education, with less spent on tertiary education. This is associated with nearly full enrolment rates in primary and secondary education, due to compulsory education. But even at pre-primary level (age four and above) enrolment rates in all euro area countries are close to or above 80%.[123] In Finland and the Netherlands expenditure on tertiary education is above 3% of total government expenditure.

Chart 10

Expenditure on education by level of education (2017)

(percentages of government expenditure)



Source: Eurostat.

All euro area governments spend significant shares of total education expenditure on compensation of employees – around 60%-80%. This is in particular the wages and salaries of teachers and other teaching staff. Other large expenditure categories are intermediate consumption and investment. Social transfers play a much smaller role in education than in health and social protection, accounting for about 4.8% of total expenditure on education in the euro area.

The decline in rates of growth in education spending discussed in Section 2 may not necessarily translate fully into reduced expenditure per student, as young people constitute a declining share of the population. While Section 2 showed a clear trend towards containing expenditure in education, gains in the efficiency of growth-enhancing expenditure may nonetheless lead to better outcomes

122 Joint collection of education data by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Institute for Statistics (UIS), the Organisation for Economic Co-operation and Development (OECD) and Eurostat.

123 See “Education and training in the EU – facts and figures”, Eurostat, 2018.

overall. Moreover, some of the countries which made the biggest cuts in expenditure on education after the financial crisis also had the biggest increases during the boom period that preceded it.

4 Conclusions

The composition and levels of social spending vary significantly across countries. The trends identified at the euro area level are heterogeneous at national level, reflecting differences in starting positions and societal preferences. Overall, countries have not converged in terms of the architecture of their social systems over the last decade. Cross-country comparisons confirm that to secure fiscal sustainability in line with the Stability and Growth Pact, while balancing economic stabilisation and equity objectives, countries need to pursue differentiated fiscal policies commensurate with the architecture of their social system. The policy guidance contained in the CSRs issued annually under the European Semester is also relevant in this context. The CSRs highlight the tailored reforms needed to tackle the key challenges in each Member State in the next 12-18 months.

Changes in euro area public expenditure since 2001 illustrate the risks that fiscal vulnerabilities pose to the sustainability of growth-friendly expenditure policies. Pension expenditure is at a historical peak in several Member States and will grow further in many countries in the absence of reforms. The ageing impact will peak when the baby-boomer generation has retired, which will be around 2040 in some euro area countries, but later in others. Countries with public PAYG pension systems will be particularly strongly affected, posing questions regarding intergenerational fairness, as the ratio of contributors to beneficiaries is shrinking and recent estimates of accrued-to-date liabilities in social security amount to more than 200% of GDP in most countries. Moreover, ageing is expected to lead to an increase in health expenditure and a decline in labour supply, growth and innovation, while precautionary savings are potentially rising.

Many countries need to build fiscal buffers, resist the tendency to reverse previous sustainability-enhancing reforms of their social security systems and undertake further reforms as needed to strengthen their national arrangements. This is particularly relevant in view of the fiscal-structural reform proposals of the CSRs for countries with already high government debt ratios and only limited fiscal space. Particular attention should be devoted to ensuring there are sufficient resources for education, as such spending has been shown to have positive effects on long-term economic growth. To safeguard sustainable health systems, further policy action will be needed to make health systems more efficient. Recommendations also call for further improvement in the targeting and efficient use of resources in all social spending categories. Additional structural reforms to increase labour force participation are also generally recommended in the CSRs.

3 Understanding the crypto-asset phenomenon, its risks and measurement issues

Prepared by Maria Teresa Chimienti, Urszula Kochanska and Andrea Pinna

This article discusses the crypto-asset phenomenon with a view to understanding its potential risks and enhancing its monitoring. First, it describes the characteristics of the crypto-asset phenomenon, in order to arrive at a clear definition of the scope of monitoring activities. Second, it identifies the primary risks of crypto-assets that warrant continuous monitoring – these risks could affect the stability and efficiency of the financial system and the economy – and outlines the linkages that could cause a risk spillover. Third, the article discusses how, and to what extent, publicly available data allow the identified monitoring needs to be met and, by providing some examples of indicators on market developments, offers insights into selected issues, such as the availability and reliability of data. Finally, it covers selected statistical initiatives that attempt to overcome outstanding challenges.

1 Introduction

The ECB has been analysing the crypto-asset phenomenon with a view to identifying and monitoring potential implications for monetary policy and the risks crypto-assets may pose to the smooth functioning of market infrastructures and payments, as well as for the stability of the financial system.[124] This task begins with the development of a monitoring framework to provide the data and insights that are necessary to continually gauge the extent and materiality of evolving crypto-asset risks with a view to ensuring preparedness for any adverse scenarios.

For its monitoring activities, the ECB relies to a great extent on publicly available third-party aggregated data. A great deal of aggregated information is available on public websites, which can provide, for instance, metrics for crypto-asset networks, estimates of market capitalisation, prices and trading volumes on crypto-exchanges and the amount of funds raised when a crypto-asset is offered to the public in “initial coin offerings” (ICOs). These sources differ with regard to the methodologies they use, the completeness of data coverage and access to the underlying raw information, to name but a few areas. Processing the underlying raw information (when available) brings with it considerable uncertainty about data availability and quality owing, in part, to a lack of regulation of some players along the crypto-asset value chain, whose unsupervised activity in a borderless environment often hinders access to reliable information. Statistics and supervisory reporting mechanisms do not generally cover crypto-assets (e.g. the exposures of supervised institutions to these assets).

[124] In 2018 the ECB established the Internal Crypto-Assets Task Force (ICA-TF), with a mandate to deepen the analysis of crypto-assets. For a summary of the outcome of the ICA-TF’s analysis, see “Crypto-assets: Implications for financial stability, monetary policy, and payments and market infrastructures”, *Occasional Paper Series*, No 223, ECB, Frankfurt am Main, May 2019.

Building a crypto-asset monitoring framework on this basis requires caution on account of the data issues, and a stepwise approach to filling gaps. First, it is important to identify monitoring needs based on an accurate characterisation of crypto-assets that allows the scope to be clearly defined. On this basis, once the relevant data sources have been identified, data can be collected and quality checks applied to ensure data quality and the consistency of methodologies and definitions. Whenever possible, the ECB complements aggregated data with granular breakdowns to enable the calculation of customised indicators. Nevertheless, important gaps remain unaddressed in the current framework, such as data on financial institutions' exposures. Further work is also needed to extract relevant insights from the public networks.

This article is organised as follows. Section 2 describes the characteristics of the crypto-asset phenomenon, in order to arrive at a clear definition of the scope of monitoring activities. Based on this characterisation, Section 3 aims to identify the relevant crypto-asset risks and the economic connections, "gateway" functions and other channels through which these risks may spread to the financial system and the broader economy. Section 4 discusses the indicators for monitoring crypto-assets, based on publicly available data, the availability and reliability of data (including examples based on selected indicators for monitoring market developments), data gaps and ongoing statistical initiatives that attempt to overcome outstanding challenges. Finally, the article offers a number of conclusions and points to the way forward for monitoring crypto-assets.

2 Characterising elements of crypto-assets

The phenomenon of crypto-assets can be defined and analysed from different perspectives, namely their underlying technology, their features and the economic implications that such assets[125] may have. Whereas the use of cryptography is implicit in the choice of the term "crypto"-asset, traditional assets such as money and financial instruments can also be recorded by means of the same technology – typically distributed ledger technology (DLT). Therefore, DLT is not a factor in differentiating the new phenomenon from other assets that are recorded digitally via more traditional technologies. Moreover, the issuer of any digitally recorded asset is, in principle, free to change the technology used for its recording. This implies that the use of DLT as a defining element of crypto-assets would hamper the comparability of data over time and limits its informational content.

To ensure the consistency of its analysis over time and across technologies, the ECB has chosen to define crypto-assets[126] as "a new type of asset recorded in digital form and enabled by the use of cryptography that is not and does not represent a financial claim on, or a liability of, any identifiable entity." The focus is therefore on the regulatory, economic and business dimension of

[125] In this article the term "asset" is used to refer to something of value to some market participants. It is not used in a legal or accounting sense.

[126] See "Crypto-assets: Implications for financial stability, monetary policy, and payments and market infrastructures", ibid.

crypto-assets as a new asset class, rather than on the use of technologies that are currently needed for its existence but are not specific to it. The fact that a crypto-asset does not constitute a claim on any identifiable entity means that its value is supported only by the expectation that other users will be willing to pay for it in the future, rather than by a future cash flow on which users can form their expectations.

The main characterising element of a crypto-asset is that it is not a claim on either an issuer or a custodian. However, its users attach value to it because they believe that: i) its supply will remain limited, and ii) market participants will agree on who is entitled to sell any of the units in circulation. Scarcity of a crypto-asset and the possibility to prove who can dispose of each of its units allow the existence of a crypto-asset market, where users on the supply side can offer their units for sale and users on the demand side are willing to bid.

A trusted bookkeeper would normally support such beliefs by keeping a central record of how many units of an asset have been issued and who holds them at any point in time. Market participants might try to sell units they do not own or to sell units they own a number of times. That can be difficult when dealing with physical goods, whose counterfeiting requires specific skills and physical resources and can typically be vetted by experts, who can differentiate a duplicate from a genuine asset. When an asset is in digital form, counterfeiting is as easy and as cheap as copying and pasting. For this reason, in the case of assets in digital form, a trusted central party is usually tasked with controlling the number of units (notary function) and is responsible for keeping track of who owns what (bookkeeping function).

Cryptographic techniques are used to replace the trusted bookkeeper in the recording of crypto-assets, with a view to: i) ruling out any unexpected increase in crypto-assets issued on a distributed ledger, and ii) getting the network of users to agree on who owns what (further eliminating the need for a trusted bookkeeper). A distributed ledger is essentially a record of information – or database – that is shared across a network of users, eliminating the need for a central party to deal with the validation process. The key innovation brought by DLT is the ability to distribute the validation of the recording of new assets, and of their subsequent transfer, among a set of users who do not necessarily trust one another and may have conflicting incentives. The network of users can be unrestricted and can allow anybody to take part in validation, with no proof of identity required, as is typically the case for crypto-assets. Validation requires a voting process among DLT network users, whose individual voting power depends on the specific protocol used and should prevent the formation of coalitions able to take control of the network.

In the case of unrestricted DLT networks, which are generally used for recording crypto-assets, there is no clear governance. In fact, distributed validation is typically the only governance tool available to agree on who owns what number of units. That hinders the usability of the crypto-asset. To the extent that the validation mechanism aims to prevent a single user (or a relatively small coalition of users) from being able to modify the content and functioning of a distributed ledger, coordinating any change is difficult. Even when a sufficient number of users agree to update the protocol used, other users are free to decide whether to accept the new rules or continue with the old ones. If this happens, a “fork” will

emerge, whereby two sets of users rely on different sets of information on individual holdings and may never reconcile their views.

Any asset in digital form can be recorded by means of DLT, without necessarily differing from its non-DLT equivalents in terms of economic impact and legal nature – hence the same regulation could potentially apply. Recording an asset on a distributed ledger does not change its economic characteristics or the set of attached risks that warrant scrutiny by regulators. Assets that constitute a claim on an identifiable entity do not fall under the definition and analysis of crypto-assets in this paper, regardless of the technology used for their bookkeeping. This paper does not therefore cover private financial assets such as financial instruments and funds in the form of electronic money, or commercial bank money. Neither does it cover central bank money in the form of banks' reserves, cash, or the widely researched but yet theoretical concept of a central bank digital currency.

3 Crypto-asset risks and linkages that warrant monitoring

The financial system may be subject to risks from crypto-assets to the extent that both are interconnected; spillover effects may also be transmitted to the real economy. In particular, crypto-assets may have implications for financial stability and interfere with the functioning of payments and market infrastructures, as well as implications for monetary policy. ECB analysis[127] shows that, while these risks are currently contained and/or manageable within the existing regulatory and oversight frameworks, links with the regulated financial sector may develop and increase over time and have future implications. The discharge of the Eurosystem's responsibilities, namely to define and implement monetary policy and to promote the smooth operation of payment systems, as well as the Eurosystem's tasks in the areas of banking supervision and financial stability, may be affected. Accordingly, the analysis concludes that the ECB should continue monitoring crypto-assets, raise awareness of their risks and develop preparedness for any future adverse scenario. This section aims to: i) provide an overview of risks stemming from crypto-assets, and ii) identify the main connections that may facilitate the transmission of these risks to the financial system and the economy, with a view to informing and calibrating monitoring efforts.

Crypto-asset risks primarily originate from: i) the lack of an underlying claim, ii) their (partially) unregulated nature, and iii) the absence of a formal governance structure.

i) Since crypto-assets have no underlying claim, such as the right to a future cash flow or to discharge any payment obligation, they lack fundamental value. This makes their valuation difficult and subject to speculation. As a result, crypto-assets may experience extreme price movements (volatility risk), thereby exposing their holders to potentially large losses. Depending on the circumstances of a possible price crash, the effects may be passed on to the creditors of the holders (if the positions involve leverage) and other entities.

[127] See "Crypto-assets: Implications for financial stability, monetary policy, and payments and market infrastructures", ibid.

ii) Crypto-assets, as defined in this article, can hardly fulfil the characteristics of payment and financial instruments[128] and, as such, fall outside the scope of current regulation.[129] Given that they are unregulated, their holders do not benefit from the legal protection associated with regulated instruments. For instance, in the event of bankruptcy or hacking of a crypto-asset service provider that controls access to customers' holdings of crypto-assets (e.g. custodian wallet providers), the holdings would neither be subject to preventive measures (e.g. safeguarding and segregation) nor benefit from schemes or other arrangements to cover any losses incurred. In view of the current state of law, there is limited scope for public authorities to regulate crypto-assets.[130] Any such intervention may be further complicated by the lack of governance and distributed architecture of crypto-assets (see below), as well as their cross-border dimension.

iii) As the use of DLT allows crypto-assets to dispense with an accountable party, the roles and responsibilities for identifying, mitigating and managing the risks borne in the crypto-asset network cannot be (clearly) allocated. From this characteristic derive, among others, heightened money laundering and terrorist financing risks, to the extent that there is no central oversight body responsible for monitoring and identifying suspicious transaction patterns, nor can law enforcement agencies target one central location or entity (administrator) for investigative purposes or asset seizure.[131] In view of the lack of formalised governance, it may also be difficult to address operational risks, including cyber security risks, and the risk of fraud. In fact, in the broader crypto-asset ecosystem, the provision of certain services (e.g. trading) is often centralised. In such cases, the service providers can be identified and held accountable. However, this is not always possible in decentralised models, which minimise or do away with the role of intermediaries.

The extent to which the financial system and the economy may be exposed to crypto-asset risks depends on their interconnectedness. In particular, i) holdings of crypto-assets, ii) investment vehicles, and iii) retail payments represent the main linkages between the crypto-asset market on the one hand and the financial systems and the broader economy on the other hand.

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128 In its "Report with advice to the European Commission on crypto-assets" (January 2019), the European Banking Authority (EBA) states that, to qualify as e-money, assets must satisfy the definition of electronic money as set out in the second Electronic Money Directive (Section 2.1.1). In particular, the assets must represent a claim on the issuer (thereby excluding crypto-assets as defined in this article). In parallel, the European Securities and Markets Authority (ESMA) considers that assets like bitcoin are unlikely to qualify as financial instruments (see ESMA's "Advice: Initial Coin Offerings and Crypto-Assets", paragraph 80, January 2019).

129 With the exception of anti-money laundering and countering the financing of terrorism (AML/CFT) requirements under the fifth EU anti-money laundering directive, Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU (OJ L 156, 19.6.2018, p. 43).

130 Following the EBA's and ESMA's advice (see footnote 5), the European Commission's Vice-President Dombrovskis announced in his speech at the Eurofi High-level Seminar 2019 in Bucharest, Romania, that the Commission had initiated a feasibility study on a possible common regulatory approach at the EU level.

131 See "Virtual Currencies – Key Definitions and Potential AML/CFT Risks", Financial Action Task Force, June 2014. Subsequently, the Financial Action Task Force updated the International Standards to clarify their application to virtual assets and virtual asset service providers by amending Recommendation 15, "New Technologies", and by adding two new definitions to the FATF Glossary.

i) Individuals and financial institutions, including credit institutions/investment firms, payment institutions and e-money institutions, are not prohibited by EU law from holding or investing in crypto-assets.[132] Crypto-assets can be accessed by anyone with an internet connection, with no need to open an account with a crypto-asset service provider. Financial institutions may invest in crypto-assets and/or engage in trading and market making activities. Credit institutions may also provide credit to clients to acquire crypto-assets or loans collateralised with crypto-assets, as well as lend to entities that deal with crypto-assets. Moreover, financial institutions can provide other crypto-asset-related services (e.g. custody services) that may result in enhancing the accessibility and fostering the use of crypto-assets, thereby incentivising crypto-asset holdings and investments. These activities may be motivated, among other things, by financial institutions' interest in applications relying on DLT.

ii) Derivatives and investment vehicles connect investors with the crypto-asset market without them having to hold crypto-assets directly. Investment vehicles include exchange-traded products (ETPs) and contracts for difference (CFDs) that track crypto-asset prices. In addition, ICOs – a largely unregulated way for firms to raise capital by generating new crypto-assets in a way similar to initial public offerings – have started to raise interest among investors since 2017, motivated by high returns on investment. It should be noted, though, that these "coins" may vary significantly in terms of their characteristics and functions: for instance, they may offer forms of investment in a company that may be linked to securities, or merely grant access to (future) products/services offered by the issuer. Suffice it to say, for our purposes, that these "coins" may not qualify as crypto-assets as defined in Section 2, to the extent that they have an issuer.

iii) Under certain circumstances, crypto-assets may be used for retail payments. Use cases range from merchant payments, international remittances and business-to-business (B2B) cross-border payments, to micro-payments and machine-to-machine (M2M) payments,[133] and may be driven by DLT-driven efficiency gains as these segments are generally characterised by complexities and high costs. It should be noted that, while holders of crypto-assets can transfer crypto-asset units without an intermediary by accessing directly the decentralised crypto-asset network, user convenience has led to the emergence of service providers that facilitate the use of crypto-assets for payments, e.g. by handling payments on behalf of merchants that accept crypto-assets and by reducing their exposure to price volatility. Often, though, end-users still make and/or receive payments in national currency(ies) and are not required to hold crypto-asset balances, whereas the role of crypto-assets is limited to enabling a back-end channel for the transaction, particularly in cross-border payments.[134]

New and existing intermediaries provide the "gateway" functions that facilitate the interconnections between crypto-assets on the one hand and the economy

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132 See "Report with advice for the European Commission on crypto-assets", ibid.

133 See "2nd Global Cryptoasset Benchmarking Study", Cambridge Centre for Alternative Finance, 2019.

134 The "Global Cryptocurrency Benchmarking Study" by the Cambridge Centre for Alternative Finance (2017) reported that 86% of participating payment companies were using bitcoin as their primary "payment rail" for cross-border transactions.

and financial markets on the other hand. Within the broader crypto-asset-related activities, gateway functions describe the activities that enable the inflows and outflows of crypto-assets from the crypto-asset market to the financial systems and the economy, i.e. crypto-asset trading and custody/storage. Other functions (e.g. mining) or services (e.g. promotion of ICOs) are out of scope, because they live exclusively within the crypto-asset ecosystem. Payment services, in turn, rely on the gateway functions to foster the use of crypto-assets as a means of exchange.

Trading platforms provide the on-off ramps for users to buy and sell crypto-assets[135] in exchange for either fiat currencies or other crypto-assets. Trading platforms may differ in their business models and the services they provide. Some trading platforms may publish market quotes based on their clients' trading activity and, by doing so, facilitate price formation. Trading platforms may also be distinguished based on whether or not they hold crypto-assets on behalf of their clients, and execute trades on their books as opposed to the DLT network(s). Some centralised platforms may provide custody services beyond what is needed to execute/settle a trade, in which case they also act as custodian wallet providers (see below) on a permanent basis.

Custodian wallet providers allow the storage of cryptographic keys that are used to sign crypto-asset transactions. The involvement of a custodian wallet provider is generally requested by crypto-asset investors because of its convenience and on the premise that cryptographic keys will be stolen less easily than from a personal device. Custodian wallets can be either hosted online (also called "hot wallets", entailing the storage of keys on a device that is connected to the internet that allows the initialisation of transactions at any time) or offline (also called "cold wallets", entailing the storage of keys with no connection to the internet until the user needs to authorise a transaction). Hot wallets are vulnerable to hacking via the internet. Cold wallets, on the other hand, are less convenient to use frequently but are protected from hackers and can also be kept in devices that can be physically locked in vaults. In some cases, the custodian directly holds the crypto-asset units via its cryptographic key on behalf of the investor.

The size and extent of the interconnections and gateways described above may have implications for the stability of the financial system, monetary policy and the safety and efficiency of payments and market infrastructures:[136]

- Potentially large and unhedged exposures of financial institutions to crypto-assets could have financial stability implications, all the more so since there is currently no identified prudential treatment for crypto-asset exposures of financial institutions. In its statement on crypto-assets, while conceding that banks currently have very limited direct exposures, the Basel Committee on Banking Supervision (BCBS) sets expectations for banks that acquire

[135] See "2nd Global Cryptoasset Benchmarking Study", ibid.

[136] For an assessment of these implications, see "Crypto-assets: Implications for financial stability, monetary policy, and payments and market infrastructures", ibid. In fact, crypto-assets may have broader risk implications – for example, they may weaken financial system integrity and lend themselves to money laundering and the financing of terrorism – and raise consumer/investor protection concerns. These risks are not the primary focus of the ECB's analysis.

crypto-asset exposures or provide related services, including due diligence, governance and risk management, disclosure and supervisory dialogue.[137] The European Banking Authority (EBA) also foresees the development of a monitoring template that competent authorities can issue to financial institutions to identify and measure the level and type of crypto-asset activity.[138]

- In an extreme scenario, if euro cash and electronic payment instruments hypothetically gave way to crypto-assets for retail payment transactions, there could be significant implications for monetary policy and economic activity.[139] However, given the characteristics of the crypto-asset phenomenon, particularly high price volatility, it is difficult to envisage crypto-assets fulfilling the role of a monetary asset in the near future. Having said that, new developments aiming to mitigate volatility risks (i.e. "stablecoins") may prove more attractive or suitable for payment use cases.

- Finally, financial market infrastructures (FMIs), particularly payment systems, securities settlement systems and central counterparties, carry the risks of crypto-assets and may act as channels for the transmission of these risks through the financial system. First, financial market infrastructures may be exposed to risks from their participants' crypto-asset activities to the extent that adverse crypto-asset market conditions or other adverse events may compromise participants' ability to meet their obligations. In this case, crypto-asset market-based shocks could be passed from one participant or infrastructure to another/others. Second, financial market infrastructures may pose risks if they clear crypto-asset-based products or use crypto-assets for settlement, collateral or investment. As it currently stands, European law effectively limits the usage of crypto-assets as settlement assets in financial market infrastructures and sets requirements for collateral or investments that crypto-assets do not currently meet.[140] Moreover, for EU central counterparties to clear crypto-asset products, they would need to obtain authorisation from their national authorities subject to demonstrating how risk management requirements were to be fulfilled in the light of the specific characteristics to be addressed.

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137 See "Statement on crypto-assets", Basel Committee on Banking Supervision, 13 March 2019.

138 See "Report with advice for the European Commission on crypto-assets", ibid.

139 In "Crypto-assets: Implications for financial stability, monetary policy, and payments and market infrastructures", ibid, see Section 4.1 entitled "Potential implications for monetary policy".

140 In particular, crypto-assets are not on the list of central counterparties' eligible collateral of the Commission Delegated Regulation (EU) 2016/2251 of 4 October 2016 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories with regard to regulatory technical standards for risk-mitigation techniques for OTC derivative contracts not cleared by a central counterparty (C/2016/6329) (OJ L 340, 15.12.2016, p. 9–46). Similarly, permitted central counterparties' investments do not contemplate crypto-assets under Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories (OJ L 201, 27.7.2012, p. 1–59). In "Crypto-assets: Implications for financial stability, monetary policy, and payments and market infrastructures", see Section 4.4 entitled "Risks to financial market infrastructures".

4 Current issues in measuring the crypto-asset phenomenon

To properly assess crypto-asset risks and their potential impact on the financial system and the economy, it is necessary to complement the qualitative analysis on the linkages described (see Section 3) with quantitative information. On the one hand, the public nature of crypto-asset DLT networks generally ensures transparency, i.e. transaction data are open for the public to see and verify. On the other hand, the decentralised and (partially) unregulated nature of crypto-asset activities makes it difficult to obtain specific data (e.g. the number of individual users) and to organise systematic data collection efforts. In this context, public websites that track crypto-asset prices only provide a rough indication of market trends. Overall, available data on crypto-assets are neither complete nor fully reliable for the purposes of monitoring market trends to the degree of detail necessary to gauge their risks. Moreover, they only allow the monitoring of global trends with very limited country segregation. This section will discuss the current shortcomings in data collection and analysis, providing concrete examples, and will propose possible options to overcome major constraints.

4.1 Stepwise approach to the monitoring framework of crypto-assets

Publicly available aggregated data already provide some tools for measuring crypto-asset risks and their linkages with the regulated financial system. These data, subject to passing quality checks and being complemented with other data from commercial sources, provided the basis of a crypto-asset dataset as the first step in the ECB approach to monitoring this phenomenon. Using application programming interfaces (APIs)[141] and big data technologies, it has been possible to create an automated set of procedures for collecting, handling and integrating several data collections with a view to deriving customised indicators. The ECB collected data from publicly available and commercial data providers considering available documentation, coverage and the availability of very granular aggregates or raw data. The granularity of data, coupled with applied data quality control measures, enabled the calculation of customised and methodologically consistent indicators. Preparing consistent indicators required the development of mappings and the harmonisation of information.[142]

Crypto-asset indicators tailored to this monitoring exercise have been grouped in four categories covering i) markets, ii) gatekeepers, iii) linkages, and iv) ICOs.

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141 APIs enable users to access data providers' databases by means of an automated set of queries provided via Hypertext Transfer Protocol (HTTP – the protocol underlying internet websites) and return data.

142 For example, the calculation of the market capitalisation required to cross-map and harmonise identifiers and naming conventions for crypto-assets as data from different providers needed to be integrated in order to use circulating supply as a preferred component for this indicator. Harmonisation of units also added an extra layer of complexity, as it required synthetic exchange rates to be calculated for all crypto-assets covered in the dataset.

i) Market indicators cover pricing and trading information, including derivatives markets. The monitoring tool allows selecting any crypto-asset or a group of crypto-assets from a pool of over 2,000 assets currently traded and constructing indicators on prices, traded volumes and market capitalisation in selected units of fiat or crypto-assets. Furthermore, it includes indicators focusing on trading vis-à-vis fiat currencies. With respect to derivatives, the indicators offer a detailed overview of bitcoin futures contracts traded on the institutionalised exchanges of the Chicago Mercantile Exchange (CME) and the Chicago Board Options Exchange (CBOE).

ii) The indicators on gatekeepers cover trading platforms and wallets, as well include some information on payments. The indicators on trading platforms show trading volumes and pricing by selected platform or a set of platforms grouped according to their country of incorporation, fees option, centralisation or decentralisation feature and other factors. Additionally, indicators on arbitrage have been developed. With respect to wallets, information on the classification of wallets by type, supported crypto-assets and security features are collected. The payment segment contains indicators on the number and locations of ATMs supporting crypto-assets, which are those that enable the user to buy and sell a particular crypto-asset against fiat currencies. Moreover, some information on cards supporting crypto-assets is included. Such cards enable payment in fiat currencies using crypto-assets as a deposit. Furthermore, some indicators based on on-chain transactions are provided.

iii) An important category of indicators aims to cover to the extent possible the linkages of the crypto-asset markets with the financial systems and the real sector of the economy. The indicators from this category cover for example ETPs offering exposures to crypto-assets and indicators based on statistics on holdings of securities[143].

iv) The final part concerns the indicators for ICOs, i.e. amount of funds raised and features, e.g. their legal form, the underlying blockchain and the country of incorporation.

However, there are still important gaps in the data, particularly relating to certain interlinkages and to payment transactions, including the use of layered protocols (see Section 4.2). First, a major data gap exists with respect to the interlinkages with the real and financial sectors, including the amount of banks' or financial corporations' direct holdings of crypto-assets and information on lending for purposes of investing in crypto-assets. Another area concerns transactions with cards supporting crypto-assets, sales of merchants accepting crypto-assets and the value of withdrawal transactions from crypto-asset ATMs. Finally, an analysis of the information on transactions using layered protocols is required to capture the actual extent of the use of crypto-asset DLT networks for settlements. The dataset for the crypto-asset monitoring framework is, by definition, a constantly evolving product, as it has to keep up with changing monitoring needs, reflecting rapid changes in the market, while remaining proportionate to the potential risks posed by the crypto-asset market.

[143] See Securities holdings statistics on the ECB's website for more information.

As a second step in the development of a monitoring framework for crypto-assets, it is envisaged that major data gaps should be closed. Overall, the first step in the data processing cycle has been completed, paving the way for the next steps covering further work on indicators and data, which would close the identified data gaps. Actions derived from feedback from this data processing cycle are expected to enhance the data and analytical infrastructure. Work will continue to further develop the indicators based on the granular data from trading platforms, blockchains and official data collections and statistics on the crypto-asset market, consistent with the monitoring needs and proportionate to the potential risks posed by this market.

4.2 Availability and reliability of data on on-chain, off-chain and layered protocol transactions

To assess the availability and reliability of data on crypto-assets, it is important to differentiate between "on-chain" and "off-chain" crypto-asset transactions. On-chain crypto-asset transactions are those recorded directly on a distributed ledger. Off-chain transactions are recorded either on the book of an institution, for instance in the case of trading platforms, or in a private network of users that use the distributed ledger of a crypto-asset to record the net transactions among participants only at a later stage.

On-chain transactions

Information concerning on-chain data is often publicly available, although its analysis can be complex. Most DLT protocols differ from the record-keeping that is typical of financial accounts systems, where an amount of an asset is transferred by reducing the sender's account by that precise amount and by crediting it to the receiver's account. Crypto-assets are usually transferred in a way similar to that of cash transactions: when a user receives a quantity of crypto-assets, those units are not divisible and have to be sent all together in a future transaction.[144] Therefore, a sender needs to specify what part of the crypto-asset units jointly obtained in a previous transaction should be transferred to the receiver(s) and what part should come back as "change".

Identifying the value of a crypto-asset transaction and whether different crypto-asset wallets belong to the same individual (or institution) is currently a difficult task. However, it is likely to become even more challenging in the future. Change can either be allocated to the same wallet from which the transaction originated or be routed to another wallet controlled by the sender.[145] A number of initiatives are being developed by the community of crypto-asset users to make

144 These indivisible units are sometimes called "unspent transaction outputs" (UTXOs).

145 Understanding which part of the outputs of a transaction is the intended transfer and which constitutes change to the sender is not trivial. See Athey, S., Parashkevov, I., Sarukkai, V. and Xia, J., "Bitcoin Pricing, Adoption, and Usage: Theory and Evidence", *Working Paper*, No 3469, Stanford Graduate School of Business, August 2016.

identification of these transactions more difficult. Such initiatives include the possibility of a number of senders combining their crypto-asset transactions.[146]

On-chain data recorded on the distributed ledger of a crypto-asset can refer to transactions in other assets, which are recorded and transferred by means of an associated layered protocol. While the distributed ledger is typically used to record only one "native" crypto-asset, its transactions can be used to record free-form text. Concretely, this text can contain the confirmation that other assets have been transferred using a distinct protocol.[147] Since a superficial analysis of the on-chain transaction would only disclose a negligible transaction in the native crypto-asset, one needs to interpret the transaction knowing the details of the layered protocol in order to conclude that possibly a sizeable transaction has occurred in the second asset.

Off-chain transactions

Various methodological choices are applied in constructing and supplying the very rudimentary information of the price and market capitalisation of a crypto-asset. In general terms, the aggregated price information of a crypto-asset is determined, among other things, by the selection of trading platforms, the underlying trading volumes, conventions concerning the 24-hour close-of-business time, factors to address low liquidity levels, failures of trading platforms, data and connectivity. Without applying any selection criteria, pricing of crypto-assets is very disperse.[148] Pricing information feeds further into the calculation of the market capitalisation indicator, together with the crypto-asset supply information for which various options exist.

Off-chain transactions are a growing phenomenon that aims to overcome the constraints of distributed ledgers used for crypto-assets. In an unrestricted DLT network, the validation of new transactions has to be costly to preserve the integrity of the system and relatively slow to allow sufficient time for all users to agree on the latest valid set of transactions before a new one is validated. "Channels" have been introduced as a solution for clusters of users to settle transactions faster among themselves and, as in net deferred settlement typical of some market infrastructures, only use the unrestricted distributed ledger for the "ultimate" settlement of net transactions.

Pricing and trading information

Even when a business related to crypto-assets is covered by regulation, as should be the case with crypto-asset trading platforms, there are instances where no accountable party takes the role of operator. This is true of some trading platforms that are "decentralised", since they rely on validation by DLT network users to execute a trade. Moreover, trades agreed on decentralised trading platforms typically involve the mutual transfer of two assets, which are settled as two individual transactions that can hardly be identified as constituting a single trade.

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146 See Pay-to-Endpoint and Coinjoin initiatives.

147 The same approach could be used to record and transfer either traditional assets or crypto-assets.

148 See Makarov, I. and Shoar, A., "Trading and Arbitrage in Cryptocurrency Markets", May 2018.

One of the main differentiating factors with respect to trading activities and the resulting pricing are the fee characteristics of crypto trading platforms. Among trading platforms, those with zero-fee or transaction-fee mining features might be problematic in the context of pricing and trading volume data reliability. On zero-fee platforms, traders are able to trade freely without fees, regardless of how many trades they make, which may lead to higher trading volumes. Similarly, trading platforms with a transaction-fee mining feature offset transaction fees with trading platform native tokens. A reward of this nature might incentivise traders to trade more to receive tokens that offer valuable options as voting rights on the platform or a dividend. Both of these forms can lead to market manipulation of simultaneously selling and buying the same asset to create misleading and artificial market activity, also called wash trading.

Low liquidity, unusual price spikes and erratic trading behaviour in the round-the-clock market also contribute to the challenges of pricing crypto-assets. Unlike any other market, the crypto-asset market operates 24 hours per day, with no standardised "close of business" time. Data aggregators provide lower frequency data, e.g. daily, in line with their preferred time frame convention, which may not coincide with that of other providers. To address the issue of low liquidity, data providers adjust the contributions of the prices achieved on the less liquid exchanges in the overall indicator of a price of a crypto-asset. Unusual spikes and erratic trading behaviour are also corrected using boundaries or other exclusion criteria based on benchmarks supported by, for example, website traffic indicators and expert judgement. The issue contributing to the difficulty in getting reliable data covers also the lack of standard naming convention for crypto-assets and their identifiers.

The uninterrupted provision of data by trading platforms might be affected by technical issues related to the substantial risks of cyberattack, fraud and hacking.[149] In cyberattacks, such as denial-of-service attacks, the perpetrators seek to make a machine or network resource unavailable to its intended users by disrupting the service of a host connected to the internet. This is typically accomplished by flooding the targeted machine or resource with requests. The hacking of user or platform accounts may lead to the bankruptcy of trading platforms, especially those with unsuitable technological infrastructures operating in a legally uncertain global virtual environment. Theft, cybercrime and other criminal activities have affected an estimated 6% of the total supply of bitcoin and do not include the unreported cases of individuals who have lost bitcoins to hackers. With respect to the interruption of data provision, typical issues that data aggregators or exchanges experience take the form of service outages, connectivity errors and unstable APIs.

Market capitalisation information

In order to calculate market capitalisation the price of a crypto-asset has to be complemented with information on the aggregate supply, which can be measured in several ways. Specifically, four main measures of supply can be

[149] See Moore T. and Christin, N., "Beware the Middleman: Empirical Analysis of Bitcoin-Exchange Risk", in: Sadeghi, A.R. (ed.) *Financial Cryptography and Data Security*, Lecture Notes in Computer Science, Vol. 7859, Springer, Berlin, Heidelberg, 2013. The authors have found that transaction volume is positively correlated with a breach. At the same time, average transaction volume is negatively correlated with the probability that a trading platform will close prematurely.

distinguished: i) circulating supply, ii) total supply, iii) maximum supply, and iv) variations of inflation-adjusted supply, which take into account future supply within a specific time horizon (usually five years). Circulating supply is the best approximation of the units of a crypto-asset that are circulating in the market or are in the hands of the general public. Total supply is the total number of units of a crypto-asset in existence at a given moment in time. In addition to circulating supply, total supply includes those units that are locked, reserved or cannot be sold on the public markets and excludes units that have been verifiably burned. Maximum supply is the approximation of the maximum amount of units that will ever exist in the lifetime of this crypto-asset and is pre-determined by the protocol used. In the case of inflation-adjusted supply, an additional supply scheduled, for example, for the next five years is added to the circulating supply. Finally, for some crypto-assets, maximum supply does not exist, as there is no limit implied by the protocol.

Bitcoin futures and crypto-asset exchange-traded products in Europe

Information provided by reliable sources, such as institutionalised exchanges trading bitcoin futures or ETPs, may not be fully comparable due to differences in the specifications of the underlying contracts or investment pools. Bitcoin futures are traded on trading platforms, such as BitMEX and BitflyerFX, as well as on the institutionalised exchanges, i.e. CBOE and CME. Bitcoin futures on the institutionalised exchanges differ with respect to contract units, price limits, margin rates and tick sizes, thereby rendering the prices quoted by the two exchanges not strictly comparable.[150] Further differences stem from different settlement bases and underlying cut-off times.[151] ETPs traded on the institutionalised exchanges, for instance the SIX Swiss Exchange[152] or Nasdaq Nordic[153] in Europe, offer exposures to bitcoin and Ethereum and are priced based on various sources.[154]

Aggregated indicators on crypto-assets

A wide variety of indicators aims to represent the total market of crypto-assets. These indicators are provided on the internet either by commercial[155] or non-commercial websites, which supply crypto-asset-related information, funds investing in crypto-assets,[156] or research groups[157] and academics.[158] For such

150 For example, for bitcoin futures traded at CME the contract units and settlement date are five bitcoin and mid-month, compared with one bitcoin and end-month in the case of CBOE.

151 Contracts traded on the CME are settled based on the Bitcoin Reference Rate (BRR) index, which aggregates bitcoin trading activity across a representative sample of bitcoin exchanges between 15:00 and 16:00 GMT. Contracts traded on CBOE are settled based on the price obtained from the Gemini exchange at 16:00 GMT on the final settlement date.

152 For more information on the ETPs traded, see SIX Swiss Exchange.

153 See tracker certificates.

154 For example, Amun ETPs follow the methodology of CryptoCompare's Aggregate Pricing Index (CCCAGG). XBT Provider AB, issuer of crypto-asset trackers, follows pricing on specified platforms, i.e. OKCoin, Kraken, Bitstamp, Bitfinex, ItBit, Gemini and GDAX for bitcoin, and Poloniex, Kraken, Bitfinex, GDAX and Gemini for Ethereum, which also fulfil several selection criteria (e.g. markets are required (i) to publish, on a continuous and regular basis, bid-ask spreads and the last price in USD; (ii) not to be declared unlawful; (iii) to represent at least 5% of the total 30-day cumulative volume for all the platforms; and (iv) to settle fiat currency and transfers within seven and two local business days respectively).

155 See, for example, Bloomberg Galaxy Crypto Index or CryptoCompare's Aggregate Pricing Index (CCCAGG).

156 See, for example, Bitwise Cryptoasset Index Methodology.

157 See, for example, CCI30 Crypto Currency Index 30.

indicators, the most important methodological choices include the coverage of crypto-assets and pricing sources, index rebalancing and weighting schemes. With respect to the selection of crypto-assets, market capitalisation is the main criterion used. Pricing sources are selected based on their liquidity, reliability and fulfilment of various selection criteria, e.g. compliance with anti-money laundering policies. Weighting schemes are also based on market capitalisation, often applying caps and trading volumes. Rebalancing is carried out periodically, typically on a monthly frequency, but can also be in close to real time.

Summing up, two aspects for future work emerge from the analysis of issues concerning measuring the crypto-asset phenomenon. The first is to deal with the complexity and growing challenges of analysing on-chain and layered protocol transactions. With respect to off-chain transactions, given the many methodological options, further analysis should focus on increasing the availability and transparency of the reported data and the methodologies used, harmonising and enriching metadata, and developing best practices for indicators on crypto-assets.

4.3 Selected measurement issues with rudimentary indicators of crypto-asset market developments

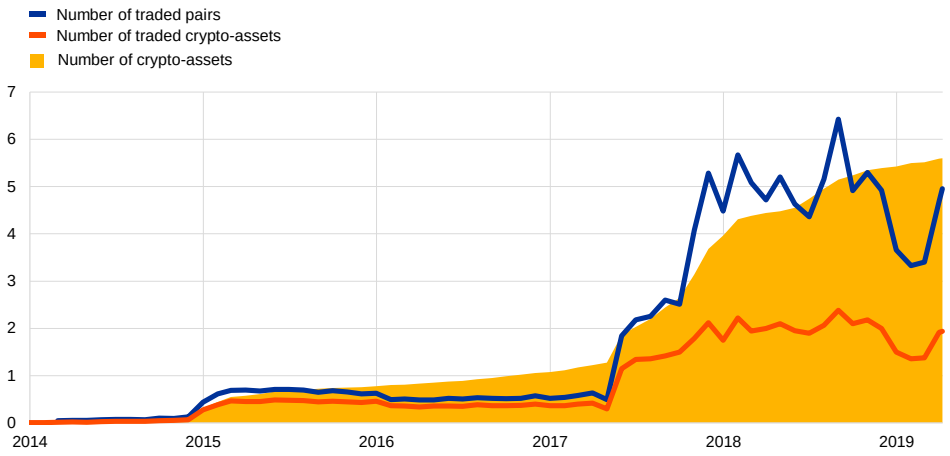
While one of the basic indicators of the size of the crypto-asset market that is often used is the growing number of crypto-assets created over time, only a fraction of these crypto-assets is traded persistently. Out of the thousands of crypto-assets created so far, around 35% have been recently traded on trading platforms (see Chart 1) and 5% have been traded every day since the beginning of 2018. Similar developments can also be observed when looking at the indicator of the number of trading pairs. The number of crypto-assets traded on a daily basis (i.e. within 24-hour intervals) recovered from lows of around 1,300 at the turn of 2018 and 2019 to reach just over 2,200 in April 2019. April 2019 numbers are relatively close to the record high of 2,456 crypto-assets traded on a daily basis, recorded in September 2018. From a trading persistency perspective, around 700 crypto-assets have been traded every day since the beginning of 2019, one-third of them since the beginning of 2018. In terms of trading pairs, recent numbers point to more than 5,100 pairs traded on a daily basis, up from the 3,000 pairs traded in the first quarter of 2019. Every day since the beginning of 2019, 1,603 pairs have been traded, one-third of this amount since the beginning of 2018.

[158] For example, CRIX, Index for Cryptocurrencies, Simon Trimborn, Wolfgang Karl Härdle, *Journal of Empirical Finance*, Volume 49, December 2018, pp. 107-122.

Chart 1

Traded crypto-assets

(April 2019; thousands)



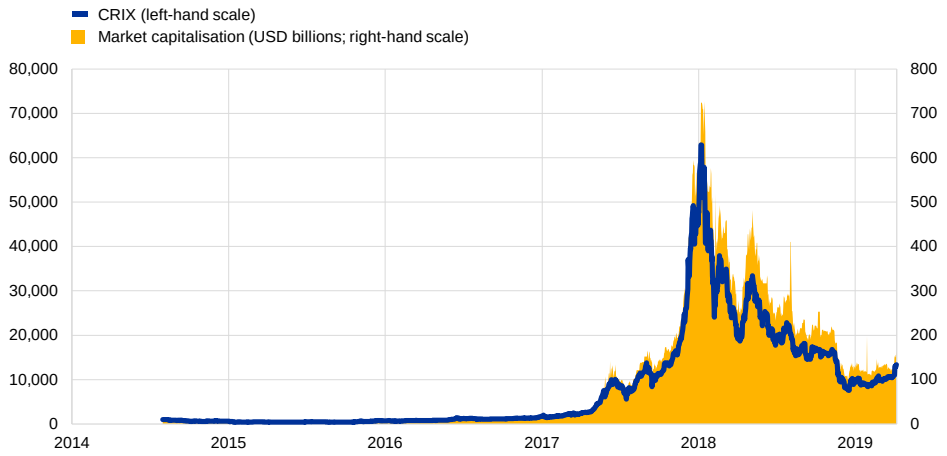
Sources: Cryptocompare and ECB calculations.

If another indicator, market capitalisation, is used for gauging the size of the crypto-asset market, the size varies by 20%, depending on whether the circulating supply or the maximum supply is chosen as the underlying measure. Recent market capitalisation based on the circulating supply (estimated at USD 165 billion) has returned to 2017 levels, having peaked at the end of 2018, strongly mirroring developments in the pricing of crypto-assets as measured, for example, by the CRIX index[159] (see Chart 2). Three-quarters of the total market capitalisation is accounted for by five crypto-assets, which also make up half of the total circulating supply of crypto-assets (see Chart 3). Market capitalisation of bitcoin alone constitutes 50% of the total, while its total circulating supply amounts to slightly less than one-third of the total for crypto-assets. Prices of these five crypto-assets strongly shaped the general pricing trends of the total crypto-asset markets. Using the maximum supply of crypto-assets to calculate the market capitalisation would mean a 20% increase in the indicator value, with half of this attributed to bitcoin. In line with the bitcoin protocol, the maximum supply of bitcoin would be reached in 2140.

[159] CRIX, Index for Cryptocurrencies, ibid.

Chart 2

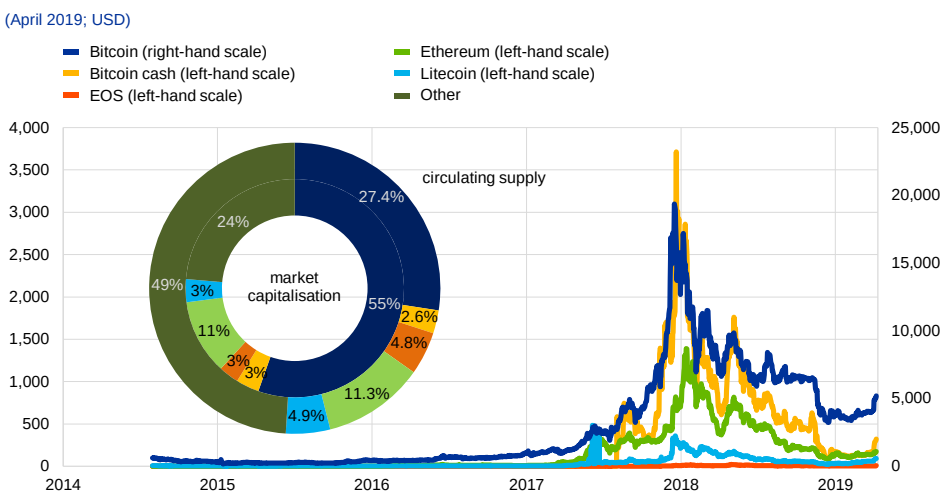
Market capitalisation and crypto-asset price index



Sources: Cryptocompare, CRIX, Coinmarketcap and ECB calculations.
Note: Market capitalisation is based on the circulating supply.

Chart 3

Prices, market capitalisation and circulating supply of selected crypto-assets



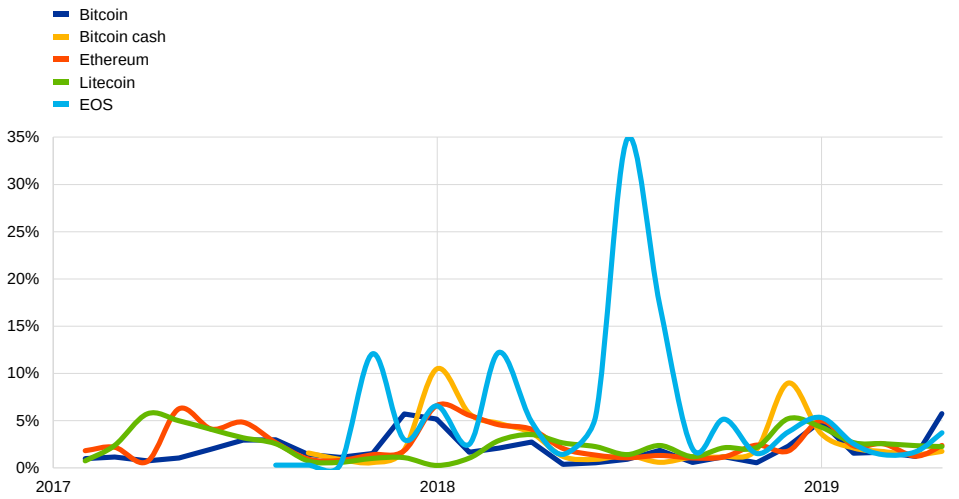
Sources: Cryptocompare, Coinmarketcap and ECB calculations.

The total market pricing and market capitalisation trends were strongly shaped by the aggregate prices of each of the five aforementioned crypto-assets, which on a disaggregated basis fluctuated significantly across trading platforms. Disregarding differences in the trading and transaction fees of various platforms, as well as transaction processing times and potential price movements between transactions, the price heterogeneity for crypto-assets is significant (see Chart 4). The normalised interquartile ranges of the prices of five major crypto-assets traded versus the US dollar picked up in April 2019, although they did not reach end-2018 levels of around 5% and 9% (the latter for bitcoin cash). The dispersion of the prices of each of these crypto-assets across trading platforms have decreased in 2019, compared with 2018 levels and peaks around the turn of the year.

Chart 4

Price dispersion for selected crypto-assets

(April 2019)



Sources: Cryptocompare and ECB calculations.
Note: The interquartile ranges of prices of crypto-assets across trading platforms are normalised by the average price across platforms weighted by trading volumes.

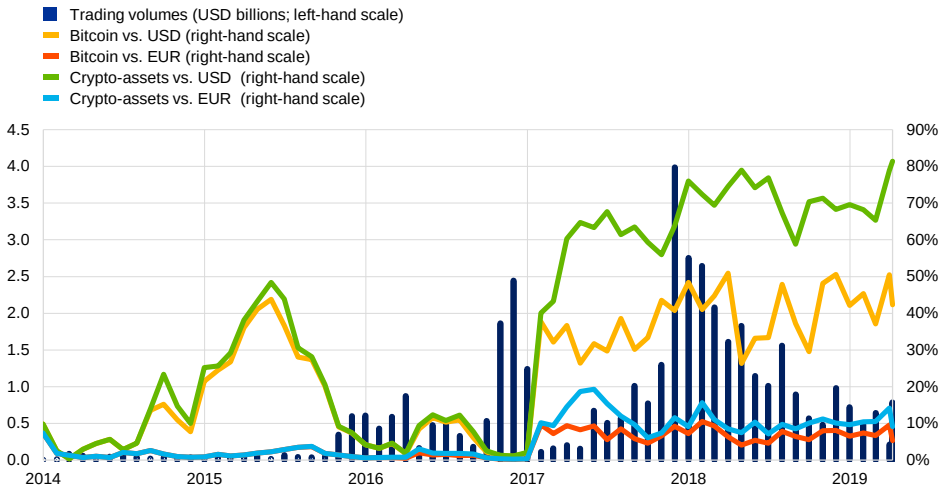
Trading activity vis-à-vis fiat currencies on the crypto-asset platforms has remained buoyant, albeit at lower levels historically, while wash trading is considered to be significant. From the central bank perspective, it is important to monitor the volumes of crypto-assets that are cleared in euro and in other fiat currencies. Trades of crypto-assets cleared in euro hovered broadly around 10% of all trades vis-à-vis fiat currencies, compared with an increasing share of up to 81% for the US dollar. Half of the volumes vis-à-vis fiat currencies were recorded for bitcoin. The trades took place, by and large, on centralised trading platforms. However, activity on decentralised trading platforms seems to be picking up but still accounts for less than 1% of trading volumes. From the geographical perspective, trades on platforms located in Europe amounted to 24% of all trading, with the highest trading volumes recorded on platforms in Malta and the United Kingdom, while trades on platforms not attributed to a country accounted for 30% of trading volumes. With respect to wash trading, some analyses[160] point to the very high number of trades affected by this market manipulation.

[160] See, for example, https://www.sec.gov/comments/sr-nysearca-2019-01/srnysearca201901-5164833-183434.pdf.

Chart 5

Trading volumes vis-à-vis USD, euro and other fiat currencies

(April 2019)



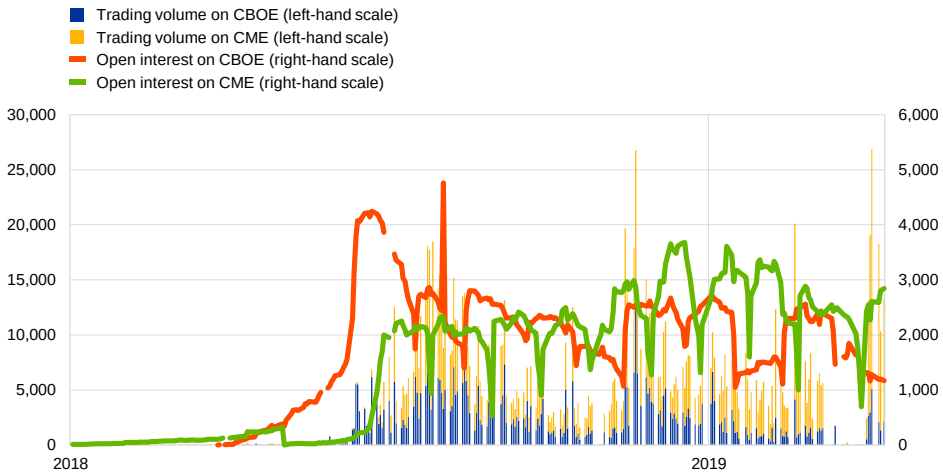
Sources: Cryptocompare and ECB calculations.

On institutionalised exchanges, trading activity of bitcoin futures and ETPs with underlying crypto-assets peaked in April 2019; however, CBOE suspended trading of bitcoin futures, while trading activity of ETPs on the SIX Swiss Exchange is anaemic. The bitcoin futures market has declined slightly since the end of 2018. Trading volumes peaked strongly, though, on the CME exchange in April 2019, following the CBOE announcement of the suspension of the upcoming future contracts, citing improvements in the approach towards crypto-currency derivatives as a reason (see Chart 6). Turning to trading activity for ETPs on European exchanges, as measured by the number of trades, while activity is buoyant on the Nasdaq Nordic, reaching more than 17,000 trades in April, trading on the SIX Swiss Exchange is weak (see Chart 7).

Chart 6

Trading volumes and open interest of bitcoin futures

(April 2019)

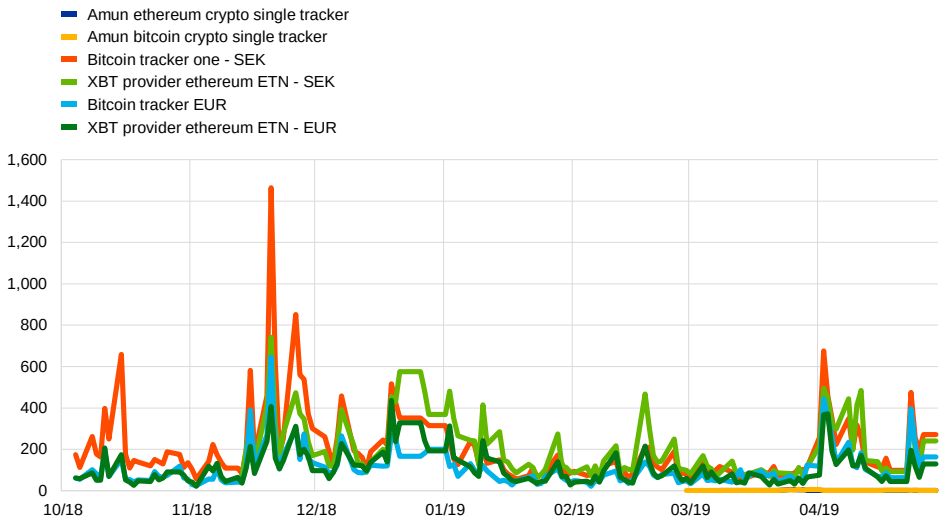


Sources: Bloomberg and ECB calculations.
Note: Trading volumes and open interest refer to the current contracts for the forthcoming month.

Chart 7

Trades of ETPs on the European institutionalised exchanges

(April 2019; number of trades)



Sources: Bloomberg and ECB calculations.

While no hard data are available for purchase transactions of goods or services with settlement in crypto-assets, some indicators on the usage of crypto-assets point to activity picking up slightly. This is reflected in the growing number of ATMs supporting crypto-assets, an increase in the options of cards with crypto-asset features, new wallets with expanded coverage of crypto-assets and a growing interest by merchants in accepting crypto-assets. The number of ATMs supporting crypto-assets is growing, with the largest numbers in the United States and Canada (2,643 and 625 respectively). The number of similar ATMs in Europe is approaching 1,000, which constitutes a 20% share of these ATMs worldwide, the biggest presence

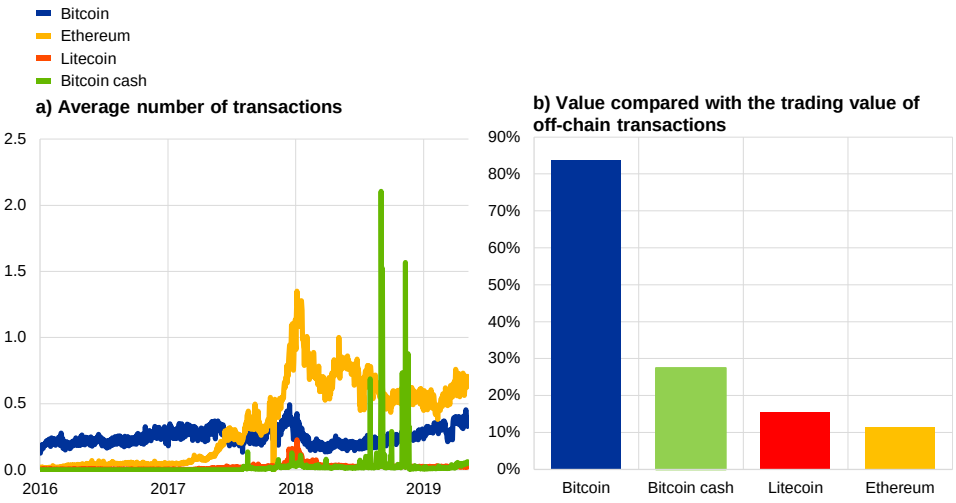
being in the United Kingdom and Spain. With respect to cards supporting crypto-assets, there are a few new options of cards in Europe that can be loaded with major crypto-assets, e.g. bitcoin, Ethereum or litecoin. Regarding wallets, the majority are targeting the major crypto-assets and are becoming more multi-asset-oriented, with some supporting close to 100 crypto-assets. For the majority of wallets, users control their private keys as opposed to the less popular options of storing private keys with a third party. Despite the reportedly growing interest of merchants in accepting crypto-assets as a form of payment,[161] no hard data on underlying transactions are available. However, purchase transactions of goods or services with settlement in crypto-assets in Europe are estimated to be insignificant.

The number of on-chain transactions for major crypto-assets is growing, but it only gives a partial view of total crypto-asset transactions as off-chain transactions are not taken into account. The number of transactions per day on the bitcoin blockchain shows a steady increase since spring 2018. Transactions on the Ethereum blockchain are currently at the 0.5 million level, after peaking in January 2018 at 1.3 million per day. Transactions on the bitcoin cash blockchain recently showed an upward trend, from 4,000 to 38,000 transactions per day. This followed a few extreme spikes in winter 2018 after the split of this crypto-asset. Finally, transactions on the litecoin blockchain remained rather stable at around 25,000 transactions per day. Comparing the values of the transactions recorded on these blockchains with the trading values on trading platforms, the on-chain transactions account for a small fraction of the value of off-chain transactions (see Chart 8).

Chart 8

On-chain transactions for selected crypto-assets

(April 2019; left panel: millions/day; right panel: percentages)



Sources: Bitinfocharts, Cryptocompare and ECB calculations.

Overall, selected indicators show that the crypto-asset market is resilient, but analysis should be interpreted with caution on account of uncertainties related especially to significant price dispersion, wash trading and the unavailability of

[161] "What drives bitcoin adoption by retailers", *Working Paper*, No 585, De Nederlandsche Bank, 2018.

hard transaction data. Despite the broad decline in the off-chain prices of crypto-assets, following a peak at the end of 2018, in the crypto-asset market a high number of crypto-assets continue to be traded every day on the trading platforms and activity is stable on some institutionalised exchanges. This assessment can also be supported by the growing values of on-chain and off-chain transactions per day for major crypto-assets. On the other hand, price dispersion of crypto-assets across trading platforms is substantial, driven to some extent by wash trading. Moreover, the lack of detailed information on crypto-asset transactions hinders analysis.

4.4 Statistical initiatives to improve information on crypto-assets

Statistical issues related to crypto-assets, also within the broader topic of fintech, have been followed by the central bank community, for example the Irving Fisher Committee (IFC) on Central Banking Statistics.[162] Specifically, the IFC has set up a working group on fintech data issues[163] whose objective is to analyse and make possible recommendations for central bank statistics. The aim of the IFC's work is twofold. First, it is to take stock of existing data sources and assess central banks' additional information needs, which should be addressed through the IFC survey of the member central banks. Second, it is to investigate key data gaps, together with the costs and benefits of initiatives to address them, and provide guidance for developing adequate statistical definitions.

Furthermore, the statistics community[164] **has started to investigate the statistical classification of crypto-assets in the System of National Accounts (SNA), which may have significant implications on the measurement of GDP and other key indictors and provide further insight into crypto-asset-related activities.** National accounts are a data source for various economic indicators, such as GDP and its components and derived indicators, which provide insight, for example, into the size of the economy and the main drivers of economic activity. The statistical classification of crypto-assets and related activity in the SNA may significantly impact key indicators, including the GDP for some countries, depending on the method chosen.[165] Complexity in the statistical classification of crypto-assets derives from the very characteristic of crypto-assets not representing a financial claim on, or a liability of, any identifiable entity. Developing harmonised statistical treatment of crypto-assets in line with the general national accounts guidance for income, value generation, asset creation and accumulation would provide further insight and help to address existing data and analytical challenges.

Within the European System of Central Banks (ESCB), the ECB has established an informal network on crypto-asset data to analyse options to enhance information on crypto-assets. Following on from the initial internal work at the ECB, an informal network of representatives from the ESCB was created to analyse the

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162 For more information see the BIS website.

163 See "2018 IFC Annual report", Irving Fisher Committee on Central Bank Statistics, Bank for International Settlements, March 2019.

164 For example, within the Expert Group on National Accounts of the United Nations Statistical Commission.

165 See, for example, "How to deal with Bitcoin and other cryptocurrencies in the System of National Accounts?", OECD, 2018 and "Treatment of Crypto Assets in Macroeconomic Statistics", IMF, 2018.

options for addressing identified crypto-asset data gaps. The work of the network focuses on the improvement of the existing data and indicators, investigation into new sources for analysis and closer collaboration on analytical work covering statistical issues. In the medium term, the network plans to reflect also on the issues related to the classification of crypto-assets in central bank statistics.

Statistical initiatives involving central banks can provide valuable contributions to closing the identified crypto-asset data gaps in the future. There has been no comprehensive global initiative for developing and compiling statistics on crypto-assets in a structured way before. In the future, central banks can provide input with respect to the new data sources for information on the interlinkages of crypto-assets. Drawing from the available tools, central banks could contribute to closing data gaps via initiatives towards increased availability and transparency of data, indicators and methodologies, best practices, as well as potential statistical compilations.

5 Conclusions

Crypto-assets are enabled by DLT and characterised by the lack of an underlying claim. In the light of the implications they might have for the stability and efficiency of the financial system and the economy, and also for the fulfilment of the Eurosystem's functions, crypto-assets warrant continuous monitoring. To this end, the ECB has set up a dataset based on high-quality publicly available aggregated data complemented with other data from some commercial sources using API and big data technologies. However, important gaps and challenges remain: exposures of financial institutions to crypto-assets, interlinkages with the regulated financial sectors and payment transactions that include the use of layered protocols are all examples of domains with prominent data gaps.

The challenges in measuring the phenomenon of crypto-assets are diverse and relate both to on-chain and off-chain data. Specifically, it is hard to retrieve public data on segments of the crypto-asset market that remain off the radar of public authorities; some relatively illiquid trading platforms may be affected by wash trading; and there is no consistency in the methodology and conventions used by institutionalised exchanges and commercial data providers. Moreover, new and unexpected data needs may well arise with further advancements in crypto-assets and related innovation.

Statistical initiatives by the ECB and the central banking community are expected to provide a valuable input to efforts aimed at closing the data gaps associated with crypto-assets. Looking ahead, the ECB will continue to work on indicators and data by dealing with the complexity and growing challenges encountered in analysing on-chain and layered protocol transactions. Furthermore, investigation will continue regarding the new data sources for information on interlinkages of crypto-assets. With respect to the off-chain transactions, amid a multitude of methodological options, further work will focus on increasing the availability and transparency of the reported data and the methodologies used, harmonising and enriching the metadata and developing best practices for indicators on crypto-assets.

Statistics

Contents

Further information

ECB statistics can be accessed from the Statistical Data Warehouse (SDW):	http://sdw.ecb.europa.eu/
Data from the statistics section of the Economic Bulletin are available from the SDW:	http://sdw.ecb.europa.eu/reports.do?node=1000004813
A comprehensive Statistics Bulletin can be found in the SDW:	http://sdw.ecb.europa.eu/reports.do?node=1000004045
Methodological definitions can be found in the General Notes to the Statistics Bulletin:	http://sdw.ecb.europa.eu/reports.do?node=10000023
Details on calculations can be found in the Technical Notes to the Statistics Bulletin:	http://sdw.ecb.europa.eu/reports.do?node=10000022
Explanations of terms and abbreviations can be found in the ECB's statistics glossary:	http://www.ecb.europa.eu/home/glossary/html/glossa.en.html

Conventions used in the tables

-	data do not exist/data are not applicable
.	data are not yet available
...	nil or negligible
(p)	provisional
s.a.	seasonally adjusted
n.s.a.	non-seasonally adjusted

1 External environment

1.1 Main trading partners, GDP and CPI

	GDP [1] (period-on-period percentage changes)						CPI (annual percentage changes)						
	G20	United States	United Kingdom	Japan	China	Memo item: euro area	OECD countries		United States	United Kingdom (HICP)	Japan	China	Memo item: euro area [2] (HICP)
							Total	excluding food and energy					
	1	2	3	4	5	6	7	8	9	10	11	12	13
2016	3.3	1.6	1.8	0.6	6.7	1.9	1.1	1.8	1.3	0.7	-0.1	2.0	0.2
2017	3.8	2.2	1.8	1.9	6.8	2.4	2.2	1.8	2.1	2.7	0.5	1.6	1.5
2018	3.7	3.0	1.4	0.8	6.6	1.9	2.6	2.1	2.4	2.5	1.0	2.1	1.8
2018 Q2	0.9	1.0	0.4	0.6	1.7	0.4	2.5	2.0	2.7	2.4	0.7	1.8	1.7
Q3	0.8	0.8	0.7	-0.6	1.6	0.2	2.9	2.2	2.6	2.5	1.1	2.3	2.1
Q4	0.7	0.5	0.2	0.5	1.5	0.2	2.7	2.3	2.2	2.3	0.8	2.2	1.9
2019 Q1	0.8	0.8	0.5	0.6	1.4	0.4	2.1	2.1	1.6	1.9	0.3	1.8	1.4
2019 Jan.	-	-	-	-	-	-	2.1	2.2	1.6	1.8	0.2	1.7	1.4
Feb.	-	-	-	-	-	-	2.1	2.1	1.5	1.9	0.2	1.5	1.5
Mar.	-	-	-	-	-	-	2.3	2.1	1.9	1.9	0.5	2.3	1.4
Apr.	-	-	-	-	-	-	2.5	2.2	2.0	2.1	0.9	2.5	1.7
May	-	-	-	-	-	-	2.3	2.1	1.8	2.0	0.7	2.7	1.2
June	-	-	-	-	-	-	.	.	1.6	2.0	0.7	.	1.3

Sources: Eurostat (col. 3, 6, 10, 13); BIS (col. 9, 11, 12); OECD (col. 1, 2, 4, 5, 7, 8).
1) Quarterly data seasonally adjusted; annual data unadjusted.
2) Data refer to the changing composition of the euro area.

1.2 Main trading partners, Purchasing Managers' Index and world trade

	Purchasing Managers' Surveys (diffusion indices; s.a.)									Merchandise imports [1]		
	Composite Purchasing Managers' Index						Global Purchasing Managers' Index [2]					
	Global [2]	United States	United Kingdom	Japan	China	Memo item: euro area	Manufacturing	Services	New export orders	Global	Advanced economies	Emerging market economies
	1	2	3	4	5	6	7	8	9	10	11	12
2016	51.6	52.4	53.4	50.5	51.4	53.3	51.7	52.0	50.1	1.2	1.4	1.0
2017	53.2	54.3	54.7	52.5	51.8	56.4	53.8	53.8	52.8	5.8	3.1	7.7
2018	53.4	55.0	53.3	52.1	52.3	54.6	53.1	53.8	50.9	4.3	3.1	5.2
2018 Q3	53.1	54.8	53.9	51.5	52.1	54.3	52.6	53.2	49.8	1.7	0.5	2.5
Q4	53.1	54.7	51.4	52.3	51.5	52.3	52.0	53.5	49.9	-0.9	1.6	-2.5
2019 Q1	52.8	54.8	50.6	50.6	51.5	51.5	50.9	53.4	49.6	-0.7	-0.2	-1.0
Q2	51.5	51.8	50.5	50.8	51.6	51.8	50.4	51.8	49.4	.	.	.
2019 Feb.	52.8	55.5	51.5	50.7	50.7	51.9	50.9	53.5	49.5	-1.7	0.8	-3.4
Mar.	53.1	54.6	50.0	50.4	52.9	51.6	50.9	53.8	49.7	-0.7	-0.2	-1.0
Apr.	52.4	53.0	50.9	50.8	52.7	51.5	51.1	52.8	49.6	0.1	-1.1	0.9
May	51.0	50.9	50.9	50.7	51.5	51.8	50.3	51.3	49.4	.	.	.
June	51.0	51.5	49.7	50.8	50.6	52.2	49.7	51.5	49.2	.	.	.
July	.	.	.	.	.	51.5	.	.	.	.	.	.

Sources: Markit (col. 1-9); CPB Netherlands Bureau for Economic Policy Analysis and ECB calculations (col. 10-12).
1) Global and advanced economies exclude the euro area. Annual and quarterly data are period-on-period percentages; monthly data are 3-month-on-3-month percentages. All data are seasonally adjusted.
2) Excluding the euro area.

2 Financial developments

2.1 Money market interest rates

(percentages per annum; period averages)

	Euro area [1]					United States	Japan
	Overnight deposits (EONIA)	1-month deposits (EURIBOR)	3-month deposits (EURIBOR)	6-month deposits (EURIBOR)	12-month deposits (EURIBOR)	3-month deposits (LIBOR)	3-month deposits (LIBOR)
	1	2	3	4	5	6	7
2016	-0.32	-0.34	-0.26	-0.17	-0.03	0.74	-0.02
2017	-0.35	-0.37	-0.33	-0.26	-0.15	1.26	-0.02
2018	-0.36	-0.37	-0.32	-0.27	-0.17	2.31	-0.05
2018 Dec.	-0.36	-0.37	-0.31	-0.24	-0.13	2.79	-0.10
2019 Jan.	-0.37	-0.37	-0.31	-0.24	-0.12	2.77	-0.08
Feb.	-0.37	-0.37	-0.31	-0.23	-0.11	2.68	-0.08
Mar.	-0.37	-0.37	-0.31	-0.23	-0.11	2.61	-0.07
Apr.	-0.37	-0.37	-0.31	-0.23	-0.11	2.59	-0.06
May	-0.37	-0.37	-0.31	-0.24	-0.13	2.53	-0.07
June	-0.36	-0.38	-0.33	-0.28	-0.19	2.40	-0.07

Source: ECB.

1) Data refer to the changing composition of the euro area, see the General Notes.

2.2 Yield curves

(End of period; rates in percentages per annum; spreads in percentage points)

	Spot rates					Spreads			Instantaneous forward rates			
	Euro area [1, 2]					Euro area [1, 2]	United States	United Kingdom	Euro area [1, 2]			
	3 months	1 year	2 years	5 years	10 years	10 years - 1 year	10 years - 1 year	10 years - 1 year	1 year	2 years	5 years	10 years
	1	2	3	4	5	6	7	8	9	10	11	12
2016	-0.93	-0.82	-0.80	-0.47	0.26	1.08	1.63	1.17	-0.78	-0.75	0.35	1.35
2017	-0.78	-0.74	-0.64	-0.17	0.52	1.26	0.67	0.83	-0.66	-0.39	0.66	1.56
2018	-0.80	-0.75	-0.66	-0.26	0.32	1.07	0.08	0.51	-0.67	-0.45	0.44	1.17
2018 Dec.	-0.80	-0.75	-0.66	-0.26	0.32	1.07	0.08	0.51	-0.67	-0.45	0.44	1.17
2019 Jan.	-0.58	-0.60	-0.58	-0.32	0.19	0.79	0.08	0.45	-0.61	-0.50	0.24	1.00
Feb.	-0.57	-0.57	-0.54	-0.28	0.23	0.80	0.17	0.49	-0.56	-0.44	0.27	1.06
Mar.	-0.57	-0.61	-0.62	-0.45	-0.01	0.60	0.00	0.35	-0.64	-0.59	-0.02	0.75
Apr.	-0.56	-0.60	-0.59	-0.39	0.08	0.67	0.12	0.43	-0.62	-0.54	0.08	0.88
May	-0.57	-0.64	-0.69	-0.56	-0.13	0.51	-0.08	0.24	-0.72	-0.72	-0.17	0.64
June	-0.60	-0.69	-0.75	-0.64	-0.26	0.43	0.07	0.14	-0.78	-0.79	-0.29	0.44

Source: ECB.

1) Data refer to the changing composition of the euro area, see the General Notes.

2) ECB calculations based on underlying data provided by EuroMTS and ratings provided by Fitch Ratings.

2.3 Stock market indices

(index levels in points; period averages)

	Dow Jones EURO STOXX indices												United States	Japan
	Benchmark		Main industry indices											
	Broad index	50	Basic materials	Consumer services	Consumer goods	Oil and gas	Financials	Industrials	Technology	Utilities	Telecoms	Health care	Standard & Poor's 500	Nikkei 225
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2016	321.6	3,003.7	620.7	250.9	600.1	278.9	148.7	496.0	375.8	248.6	326.9	770.9	2,094.7	16,920.5
2017	376.9	3,491.0	757.3	268.6	690.4	307.9	182.3	605.5	468.4	272.7	339.2	876.3	2,449.1	20,209.0
2018	375.5	3,386.6	766.3	264.9	697.3	336.0	173.1	629.5	502.5	278.8	292.9	800.5	2,746.2	22,310.7
2018 Dec.	335.2	3,057.8	646.7	247.8	624.8	311.8	146.9	556.0	441.5	283.5	296.3	719.4	2,567.3	21,032.4
2019 Jan.	340.5	3,088.7	662.2	252.1	630.4	315.4	150.2	570.3	448.1	293.2	288.0	718.3	2,607.4	20,460.5
Feb.	355.0	3,223.1	699.4	266.4	667.5	329.9	152.9	598.9	480.6	301.7	285.8	743.0	2,754.9	21,123.6
Mar.	365.7	3,332.9	718.3	272.1	692.2	339.9	157.6	621.0	493.4	307.8	297.0	755.1	2,804.0	21,414.9
Apr.	379.0	3,458.8	750.9	277.8	731.0	341.6	163.8	652.7	522.5	311.9	296.9	749.6	2,903.8	21,964.9
May	369.4	3,385.4	710.2	267.4	721.6	324.7	157.0	643.9	519.6	312.0	290.9	732.7	2,854.7	21,218.4
June	369.7	3,406.0	722.6	264.9	728.5	323.2	152.0	652.3	517.5	323.9	296.6	734.0	2,890.2	21,060.2

Source: ECB.

2 Financial developments

2.4 MFI interest rates on loans to and deposits from households (new business) [1), 2)]

(Percentages per annum; period average, unless otherwise indicated)

	Deposits				Revolving loans and overdrafts	Extended credit card credit	Loans for consumption			Loans to sole proprietors and unincorporated partnerships	Loans for house purchase					
	Overnight	Redeemable at notice of up to 3 months	With an agreed maturity of:				By initial period of rate fixation		APRC [3)]		By initial period of rate fixation				APRC [3)]	Composite cost-of-borrowing indicator
			Up to 2 years	Over 2 years			Floating rate and up to 1 year	Over 1 year			Floating rate and up to 1 year	Over 1 and up to 5 years	Over 5 and up to 10 years	Over 10 years		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2018 June	0.03	0.46	0.34	0.63	6.04	16.84	4.51	5.64	6.11	2.27	1.60	1.81	1.97	1.88	2.12	1.82
July	0.03	0.46	0.33	0.64	6.00	16.80	4.85	5.75	6.22	2.40	1.63	1.83	1.93	1.85	2.12	1.81
Aug.	0.03	0.45	0.30	0.64	6.01	16.78	5.44	5.88	6.41	2.38	1.63	1.82	1.92	1.85	2.11	1.81
Sep.	0.03	0.45	0.30	0.69	6.04	16.71	5.30	5.74	6.27	2.33	1.60	1.81	1.91	1.85	2.08	1.79
Oct.	0.03	0.45	0.29	0.73	5.97	16.73	5.06	5.71	6.23	2.45	1.60	1.80	1.91	1.86	2.09	1.80
Nov.	0.04	0.44	0.29	0.73	5.93	16.67	4.94	5.68	6.18	2.37	1.61	1.85	1.94	1.88	2.11	1.81
Dec.	0.03	0.43	0.30	0.78	5.87	16.68	4.92	5.47	5.98	2.27	1.61	1.80	1.91	1.84	2.10	1.80
2019 Jan.	0.03	0.42	0.33	0.75	5.92	16.63	5.32	5.83	6.34	2.36	1.61	1.81	1.89	1.86	2.09	1.82
Feb.	0.03	0.42	0.32	0.71	5.97	16.61	5.28	5.71	6.28	2.41	1.59	1.84	1.87	1.84	2.09	1.80
Mar.	0.03	0.40	0.30	0.78	5.90	16.65	5.41	5.61	6.18	2.36	1.60	1.80	1.83	1.81	2.06	1.78
Apr.	0.03	0.40	0.32	0.77	5.88	16.66	5.56	5.63	6.19	2.36	1.60	1.77	1.77	1.77	2.02	1.75
May [(p)]	0.03	0.43	0.31	0.80	5.82	16.67	5.59	5.76	6.34	2.34	1.58	1.79	1.73	1.74	1.99	1.73

Source: ECB.

1) Data refer to the changing composition of the euro area.

2) Including non-profit institutions serving households.

3) Annual percentage rate of charge (APRC).

2.5 MFI interest rates on loans to and deposits from non-financial corporations (new business) [1), 2)]

(Percentages per annum; period average, unless otherwise indicated)

	Deposits			Revolving loans and overdrafts	Other loans by size and initial period of rate fixation									Composite cost-of-borrowing indicator
	Overnight	With an agreed maturity of:			up to EUR 0.25 million			over EUR 0.25 and up to 1 million			over EUR 1 million			
		Up to 2 years	Over 2 years		Floating rate and up to 3 months	Over 3 months and up to 1 year	Over 1 year	Floating rate and up to 3 months	Over 3 months and up to 1 year	Over 1 year	Floating rate and up to 3 months	Over 3 months and up to 1 year	Over 1 year	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2018 June	0.04	0.07	0.74	2.29	2.26	2.45	2.30	1.64	1.56	1.69	1.21	1.33	1.70	1.68
July	0.03	0.08	0.39	2.27	2.15	2.42	2.25	1.68	1.59	1.66	1.14	1.30	1.65	1.63
Aug.	0.03	0.08	0.61	2.25	2.19	2.43	2.32	1.67	1.63	1.73	1.10	1.27	1.69	1.63
Sep.	0.03	0.08	0.44	2.22	2.21	2.35	2.31	1.65	1.54	1.67	1.13	1.40	1.69	1.65
Oct.	0.03	0.06	0.52	2.22	2.13	2.43	2.33	1.66	1.60	1.69	1.23	1.10	1.66	1.64
Nov.	0.03	0.06	0.63	2.19	2.19	2.40	2.34	1.67	1.60	1.67	1.20	1.35	1.69	1.66
Dec.	0.03	0.07	0.53	2.18	2.20	2.29	2.25	1.60	1.59	1.67	1.21	1.39	1.59	1.63
2019 Jan.	0.03	0.08	0.54	2.22	2.15	2.40	2.32	1.67	1.62	1.72	1.13	1.30	1.61	1.63
Feb.	0.03	0.07	0.52	2.21	2.15	2.41	2.33	1.65	1.63	1.70	1.13	1.38	1.56	1.64
Mar.	0.03	0.12	0.62	2.17	2.17	2.38	2.30	1.66	1.58	1.68	1.19	1.36	1.57	1.65
Apr.	0.03	0.09	0.54	2.19	2.19	2.36	2.26	1.67	1.60	1.64	1.16	1.33	1.43	1.62
May [(p)]	0.03	0.10	0.46	2.15	2.18	2.38	2.29	1.66	1.58	1.64	1.10	1.17	1.50	1.57

Source: ECB.

1) Data refer to the changing composition of the euro area.

2) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector.

2 Financial developments

2.6 Debt securities issued by euro area residents, by sector of the issuer and initial maturity

(EUR billions; transactions during the month and end-of-period outstanding amounts; nominal values)

	Outstanding amounts							Gross issues [1]						
	Total	MFIs (including Euro-system)	Non-MFI corporations			General government		Total	MFIs (including Euro-system)	Non-MFI corporations			General government	
			Financial corporations other than MFIs	FVCs	Non-financial corporations	Central govern-ment	Other general govern-ment			Financial corporations other than MFIs	FVCs	Non-financial corporations	Central govern-ment	Other general govern-ment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short-term														
2016	1,241	518	135	.	59	466	62	349	161	45	.	31	79	33
2017	1,240	519	155	.	70	438	57	367	167	54	.	37	79	31
2018	1,222	505	174	.	72	424	47	388	171	65	.	41	76	35
2018 Dec.	1,222	505	174	.	72	424	47	285	107	73	.	36	44	26
2019 Jan.	1,292	541	170	.	88	435	58	482	221	74	.	50	98	38
Feb.	1,276	539	169	.	94	419	55	392	189	73	.	42	63	24
Mar.	1,331	564	178	.	98	435	55	431	186	81	.	45	79	40
Apr.	1,318	562	167	.	109	418	61	421	195	68	.	53	58	47
May	1,337	574	168	.	115	422	59	433	195	61	.	56	83	37
Long-term														
2016	15,379	3,695	3,174	.	1,184	6,684	641	220	62	53	.	19	78	8
2017	15,359	3,560	3,048	.	1,243	6,865	642	247	66	73	.	18	83	7
2018	15,748	3,687	3,149	.	1,266	7,020	626	228	64	68	.	16	75	6
2018 Dec.	15,748	3,687	3,149	.	1,266	7,020	626	192	60	94	.	15	20	3
2019 Jan.	15,816	3,711	3,150	.	1,263	7,067	625	288	106	48	.	16	109	9
Feb.	15,941	3,749	3,165	.	1,274	7,121	632	299	104	55	.	14	115	11
Mar.	16,007	3,754	3,190	.	1,298	7,124	641	267	76	61	.	25	88	17
Apr.	15,981	3,746	3,179	.	1,303	7,111	641	240	55	78	.	18	81	8
May	16,045	3,763	3,205	.	1,300	7,142	635	245	62	77	.	13	86	7

Source: ECB.

1) For the purpose of comparison, annual data refer to the average monthly figure over the year.

2.7 Growth rates and outstanding amounts of debt securities and listed shares

(EUR billions; percentage changes)

	Debt securities							Listed shares			
	Total	MFIs (including Eurosystem)	Non-MFI corporations			General government		Total	MFIs	Financial corporations other than MFIs	Non-financial corporations
			Financial corporations other than MFIs	FVCs	Non-financial corporations	Central government	Other general government				
	1	2	3	4	5	6	7	8	9	10	11
Oustanding amount											
2016	16,620.1	4,213.2	3,309.7	.	1,243.7	7,149.9	703.7	7,089.5	537.6	1,080.2	5,471.6
2017	16,599.5	4,079.3	3,203.9	.	1,312.8	7,303.6	699.9	7,954.7	612.5	1,249.6	6,092.6
2018	16,970.1	4,191.4	3,323.5	.	1,338.0	7,444.5	672.7	7,027.1	465.1	1,099.4	5,462.6
2018 Dec.	16,970.1	4,191.4	3,323.5	.	1,338.0	7,444.5	672.7	7,027.1	465.1	1,099.4	5,462.6
2019 Jan.	17,108.3	4,252.1	3,320.2	.	1,350.9	7,502.1	683.1	7,483.0	487.0	1,185.1	5,810.9
Feb.	17,217.4	4,287.2	3,334.5	.	1,368.3	7,540.9	686.5	7,715.8	518.7	1,225.2	5,971.9
Mar.	17,337.2	4,318.1	3,367.4	.	1,396.6	7,559.4	695.7	7,764.2	495.8	1,230.9	6,037.5
Apr.	17,298.1	4,308.1	3,346.5	.	1,411.8	7,529.4	702.3	8,090.7	537.0	1,281.8	6,271.9
May	17,382.0	4,337.1	3,372.9	.	1,414.6	7,563.6	693.8	7,587.5	470.9	1,208.1	5,908.5
Growth rate											
2016	0.3	-3.0	-1.2	.	6.2	2.2	-0.1	0.5	1.2	0.9	0.4
2017	1.3	-0.5	0.1	.	5.9	2.2	0.5	1.0	6.1	2.8	0.2
2018	1.9	1.7	3.1	.	3.3	1.9	-4.3	0.8	-0.1	2.8	0.4
2018 Dec.	1.9	1.7	3.1	.	3.3	1.9	-4.3	0.8	-0.1	2.8	0.4
2019 Jan.	2.1	2.1	2.1	.	3.5	2.3	-2.7	0.7	-0.1	2.8	0.4
Feb.	2.6	3.0	2.3	.	4.6	2.5	-1.6	0.6	-0.1	2.6	0.3
Mar.	2.5	3.0	2.7	.	3.6	2.1	0.0	0.4	-0.2	1.7	0.2
Apr.	2.3	2.9	1.8	.	3.9	2.1	0.7	0.0	-0.2	-0.1	0.1
May	2.7	3.9	2.5	.	3.5	2.0	0.6	0.0	-0.2	-0.2	0.0

Source: ECB.

2 Financial developments

2.8 Effective exchange rates [1)]

(period averages; index: 1999 Q1=100)

	EER-19						EER-38	
	Nominal	Real CPI	Real PPI	Real GDP deflator	Real ULCM [2)]	Real ULCT	Nominal	Real CPI
	1	2	3	4	5	6	7	8
2016	94.4	89.5	90.8	85.1	79.0	89.3	109.7	88.9
2017	96.6	91.4	91.9	86.0	78.3	89.8	112.0	90.0
2018	98.9	93.4	93.4	87.5	79.3	90.9	117.9	93.8
2018 Q3	99.2	93.7	93.4	87.7	79.3	91.3	119.2	94.8
Q4	98.5	93.0	92.9	87.1	79.1	90.4	118.4	93.8
2019 Q1	97.4	91.6	92.1	85.9	78.6	89.1	116.7	92.1
Q2	97.3	91.4	91.8	.	.	.	116.8	91.8
2019 Jan.	97.8	92.1	92.7	-	-	-	117.3	92.7
Feb.	97.4	91.7	92.3	-	-	-	116.6	92.0
Mar.	96.9	91.0	91.5	-	-	-	116.2	91.5
Apr.	96.7	91.0	91.3	-	-	-	116.1	91.4
May	97.4	91.4	91.9	-	-	-	117.0	91.9
June	97.9	91.8	92.4	-	-	-	117.4	92.2
Percentage change versus previous month								
2019 June	0.5	0.5	0.5	-	-	-	0.4	0.2
Percentage change versus previous year								
2019 June	0.0	-0.8	0.1	-	-	-	0.6	-1.0

Source: ECB.

1) For a definition of the trading partner groups and other information see the General Notes to the Statistics Bulletin.

2) ULCM-deflated series are available only for the EER-18 trading partner group.

2.9 Bilateral exchange rates

(period averages; units of national currency per euro)

	Chinese renminbi	Croatian kuna	Czech koruna	Danish krone	Hungarian forint	Japanese yen	Polish zloty	Pound sterling	Romanian leu	Swedish krona	Swiss franc	US Dollar
	1	2	3	4	5	6	7	8	9	10	11	12
2016	7.352	7.533	27.034	7.445	311.438	120.197	4.363	0.819	4.4904	9.469	1.090	1.107
2017	7.629	7.464	26.326	7.439	309.193	126.711	4.257	0.877	4.5688	9.635	1.112	1.130
2018	7.808	7.418	25.647	7.453	318.890	130.396	4.261	0.885	4.6540	10.258	1.155	1.181
2018 Q3	7.915	7.417	25.718	7.455	324.107	129.606	4.303	0.892	4.6471	10.405	1.144	1.163
Q4	7.895	7.420	25.864	7.462	322.995	128.816	4.299	0.887	4.6605	10.320	1.137	1.141
2019 Q1	7.663	7.422	25.683	7.464	317.907	125.083	4.302	0.873	4.7358	10.419	1.132	1.136
Q2	7.672	7.418	25.686	7.467	322.973	123.471	4.282	0.875	4.7480	10.619	1.126	1.124
2019 Jan.	7.750	7.429	25.650	7.466	319.800	124.341	4.292	0.886	4.7062	10.269	1.130	1.142
Feb.	7.649	7.415	25.726	7.463	317.908	125.280	4.318	0.873	4.7486	10.499	1.137	1.135
Mar.	7.587	7.421	25.676	7.462	315.924	125.674	4.297	0.858	4.7546	10.500	1.131	1.130
Apr.	7.549	7.428	25.677	7.465	321.181	125.436	4.286	0.862	4.7584	10.482	1.132	1.124
May	7.674	7.419	25.768	7.468	324.978	122.948	4.296	0.872	4.7594	10.737	1.130	1.118
June	7.794	7.408	25.605	7.467	322.559	122.081	4.264	0.891	4.7250	10.626	1.117	1.129
Percentage change versus previous month												
2019 June	1.6	-0.1	-0.6	0.0	-0.7	-0.7	-0.8	2.2	-0.7	-1.0	-1.2	1.0
Percentage change versus previous year												
2019 June	3.2	0.3	-0.7	0.2	0.0	-5.0	-0.9	1.4	1.3	3.4	-3.4	-3.3

Source: ECB.

2 Financial developments

2.10 Euro area balance of payments, financial account

(EUR billions, unless otherwise indicated; outstanding amounts at end of period; transactions during period)

	Total [1]			Direct investment		Portfolio investment		Net financial derivatives	Other investment		Reserve assets	Memo: Gross external debt
	Assets	Liabilities	Net	Assets	Liabilities	Assets	Liabilities		Assets	Liabilities		
	1	2	3	4	5	6	7	8	9	10	11	12
Outstanding amounts (international investment position)												
2018 Q2	25,683.4	26,256.5	-573.2	10,999.6	9,039.5	8,752.4	10,907.1	-96.6	5,337.9	6,309.9	690.0	14,294.7
Q3	25,848.2	26,265.3	-417.1	10,967.4	8,923.6	8,891.9	10,984.8	-80.1	5,395.1	6,356.9	673.9	14,343.2
Q4	25,145.7	25,478.1	-332.4	10,679.9	8,813.7	8,481.9	10,369.2	-94.5	5,359.4	6,295.2	719.1	14,054.3
2019 Q1	26,292.8	26,450.1	-157.3	10,900.8	8,851.1	9,091.7	11,127.4	-100.1	5,659.2	6,471.6	741.1	14,431.9
Outstanding amounts as a percentage of GDP												
2019 Q1	225.5	226.8	-1.3	93.5	75.9	78.0	95.4	-0.9	48.5	55.5	6.4	123.8
Transactions												
2018 Q2	205.0	163.2	41.8	47.9	32.2	3.7	-49.8	37.6	109.1	180.8	6.6	-
Q3	26.5	-58.8	85.3	-110.6	-93.6	39.0	-9.5	34.9	62.0	44.3	1.3	-
Q4	-379.3	-447.2	67.8	-269.6	-182.3	-35.4	-143.7	29.9	-110.0	-121.2	5.8	-
2019 Q1	337.3	279.8	57.5	79.7	27.7	52.9	142.3	6.6	195.4	109.7	2.7	-
2018 Dec.	-407.7	-464.5	56.8	-205.8	-161.4	-7.5	-109.5	2.0	-199.6	-193.6	3.1	-
2019 Jan.	293.8	291.1	2.6	53.7	38.9	38.3	59.9	1.0	203.5	192.4	-2.7	-
Feb.	-2.6	-5.4	2.8	20.6	7.8	-0.8	23.0	-1.1	-21.6	-36.2	0.2	-
Mar.	46.2	-5.9	52.1	5.4	-18.9	15.3	59.5	6.8	13.5	-46.4	5.2	-
Apr.	167.4	190.3	-22.9	29.9	73.2	9.5	-7.9	3.1	121.8	125.0	3.2	-
May	91.4	38.4	53.0	12.9	-7.8	-0.2	52.3	5.3	71.6	-6.2	1.7	-
12-month cumulated transactions												
2019 May	200.5	-54.2	254.7	-230.1	-143.0	61.4	50.1	88.2	258.4	38.7	22.6	-
12-month cumulated transactions as a percentage of GDP												
2019 May	1.7	-0.5	2.2	-2.0	-1.2	0.5	0.4	0.8	2.2	0.3	0.2	-

Source: ECB.

1) Net financial derivatives are included in total assets.

3 Economic activity

3.1 GDP and expenditure components

(quarterly data seasonally adjusted; annual data unadjusted)

	GDP											
	Total	Domestic demand								External balance [1]		
		Total	Private consumption	Government consumption	Gross fixed capital formation				Changes in inventories [2]	Total	Exports [1]	Imports [1]
						Total construction	Total machinery	Intellectual property products				
	1	2	3	4	5	6	7	8	9	10	11	12
	Current prices (EUR billions)											
2016	10,831.6	10,349.1	5,878.6	2,223.9	2,209.4	1,052.2	679.1	472.1	37.3	482.5	4,946.4	4,463.9
2017	11,216.1	10,717.5	6,060.5	2,286.9	2,325.0	1,119.9	714.3	485.0	45.2	498.6	5,306.9	4,808.3
2018	11,585.8	11,071.3	6,229.6	2,352.8	2,421.8	1,191.2	750.6	474.4	67.1	514.5	5,565.2	5,050.7
2018 Q2	2,891.6	2,756.8	1,552.7	587.3	601.7	296.2	187.2	116.9	15.1	134.7	1,386.0	1,251.2
Q3	2,907.4	2,786.7	1,561.5	589.1	611.2	300.8	190.0	119.0	24.9	120.7	1,401.4	1,280.8
Q4	2,923.9	2,800.6	1,571.8	595.3	622.1	305.8	191.6	123.3	11.4	123.2	1,417.8	1,294.6
2019 Q1	2,949.0	2,811.9	1,582.5	598.2	625.1	312.2	190.5	121.0	6.1	137.1	1,428.7	1,291.6
	as a percentage of GDP											
2018	100.0	95.6	53.8	20.3	20.9	10.3	6.5	4.1	0.6	4.4	-	-
	Chain-linked volumes (prices for the previous year)											
	quarter-on-quarter percentage changes											
2018 Q2	0.4	0.4	0.1	0.4	1.6	1.5	2.1	1.3	-	-	1.1	1.4
Q3	0.2	0.5	0.1	0.0	0.4	0.1	0.5	0.9	-	-	0.3	1.0
Q4	0.2	0.1	0.3	0.6	1.5	1.2	0.8	3.5	-	-	1.1	1.0
2019 Q1	0.4	0.3	0.5	0.1	0.1	1.4	-0.4	-2.4	-	-	0.7	0.3
	annual percentage changes											
2016	1.9	2.3	1.9	1.8	3.9	2.6	5.8	4.3	-	-	3.0	4.1
2017	2.4	2.0	1.8	1.2	3.6	3.8	4.8	1.7	-	-	5.3	4.7
2018	1.9	1.5	1.3	1.0	2.1	3.1	4.3	-3.5	-	-	3.4	2.7
2018 Q2	2.2	0.5	1.4	1.1	-2.3	3.9	5.6	-22.7	-	-	4.2	0.5
Q3	1.7	1.8	1.0	0.7	3.1	2.1	4.2	3.9	-	-	3.3	3.7
Q4	1.2	1.7	1.1	1.1	3.9	3.0	2.6	8.3	-	-	2.1	3.3
2019 Q1	1.2	1.3	1.1	1.2	3.7	4.3	3.0	3.2	-	-	3.2	3.7
	contributions to quarter-on-quarter percentage changes in GDP; percentage points											
2018 Q2	0.4	0.4	0.1	0.1	0.3	0.2	0.1	0.1	-0.1	0.0	-	-
Q3	0.2	0.5	0.1	0.0	0.1	0.0	0.0	0.0	0.3	-0.3	-	-
Q4	0.2	0.1	0.2	0.1	0.3	0.1	0.1	0.1	-0.5	0.1	-	-
2019 Q1	0.4	0.3	0.3	0.0	0.0	0.1	0.0	-0.1	0.0	0.2	-	-
	contributions to annual percentage changes in GDP; percentage points											
2016	1.9	2.2	1.0	0.4	0.8	0.3	0.4	0.2	0.0	-0.3	-	-
2017	2.4	2.0	1.0	0.3	0.7	0.4	0.3	0.1	0.0	0.5	-	-
2018	1.9	1.4	0.7	0.2	0.4	0.3	0.3	-0.2	0.1	0.5	-	-
2018 Q2	2.2	0.5	0.8	0.2	-0.5	0.4	0.4	-1.2	-0.1	1.8	-	-
Q3	1.7	1.7	0.5	0.1	0.6	0.2	0.3	0.2	0.4	0.0	-	-
Q4	1.2	1.6	0.6	0.2	0.8	0.3	0.2	0.3	0.0	-0.4	-	-
2019 Q1	1.2	1.3	0.6	0.2	0.8	0.4	0.2	0.1	-0.3	0.0	-	-

Sources: Eurostat and ECB calculations.

1) Exports and imports cover goods and services and include cross-border intra-euro area trade.

2) Including acquisitions less disposals of valuables.

3 Economic activity

3.2 Value added by economic activity

(quarterly data seasonally adjusted; annual data unadjusted)

	Gross value added (basic prices)											Taxes less subsidies on products
	Total	Agriculture, forestry and fishing	Manufacturing energy and utilities	Const-ruction	Trade, transport, accom-modation and food services	Infor-mation and com-munica-tion	Finance and insurance	Real estate	Professional, business and support services	Public ad-ministration, education, health and social work	Arts, enter-tainment and other services	
	1	2	3	4	5	6	7	8	9	10	11	12
	Current prices (EUR billions)											
2016	9,720.0	158.4	1,963.1	486.5	1,839.6	452.1	468.6	1,100.3	1,066.1	1,849.2	336.1	1,111.7
2017	10,056.6	172.4	2,028.2	516.6	1,920.9	473.3	461.9	1,128.9	1,113.2	1,897.7	343.5	1,159.5
2018	10,381.9	172.7	2,080.8	554.4	1,981.6	495.7	462.5	1,163.0	1,163.1	1,958.0	350.0	1,203.9
2018 Q2	2,590.8	42.7	521.5	137.5	495.3	123.3	114.9	289.8	290.3	488.2	87.3	300.8
Q3	2,605.1	43.3	523.1	140.0	496.1	125.0	115.9	291.5	291.6	490.9	87.6	302.2
Q4	2,620.3	43.8	520.5	142.7	500.0	126.0	116.1	293.6	294.6	495.0	87.9	303.6
2019 Q1	2,641.7	44.5	522.9	146.0	503.9	127.0	116.5	296.2	297.5	498.7	88.7	307.3
	as a percentage of value added											
2018	100.0	1.7	20.0	5.3	19.1	4.8	4.5	11.2	11.2	18.9	3.4	-
	Chain-linked volumes (prices for the previous year)											
	quarter-on-quarter percentage changes											
2018 Q2	0.4	0.0	0.2	1.1	0.4	1.2	0.3	0.1	0.7	0.1	-0.1	0.6
Q3	0.2	-1.0	-0.2	0.7	0.1	1.3	0.7	0.4	0.0	0.3	0.4	0.0
Q4	0.3	0.7	-0.5	1.1	0.4	0.5	0.1	0.3	0.7	0.3	0.2	0.1
2019 Q1	0.5	1.0	0.1	1.2	0.8	1.3	-0.2	0.3	0.3	0.4	0.5	0.3
	annual percentage changes											
2016	1.8	-1.4	3.2	1.5	1.9	4.1	0.2	0.5	2.3	1.2	0.5	2.8
2017	2.4	1.7	3.1	3.3	3.1	4.9	0.4	1.1	3.8	1.1	1.0	2.5
2018	1.9	0.9	1.7	3.4	2.3	4.4	0.9	1.3	3.2	1.1	0.7	1.6
2018 Q2	2.2	1.7	2.8	3.2	2.5	4.6	0.7	1.2	3.5	1.1	0.5	1.9
Q3	1.7	0.0	1.1	3.3	2.0	4.6	1.4	1.3	2.6	0.9	0.5	1.7
Q4	1.2	-0.1	-0.9	3.4	1.8	3.7	0.7	1.3	2.8	1.1	0.5	1.1
2019 Q1	1.3	0.7	-0.4	4.1	1.7	4.4	0.8	1.1	1.6	1.1	1.0	0.9
	contributions to quarter-on-quarter percentage changes in value added; percentage points											
2018 Q2	0.4	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	-
Q3	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	-
Q4	0.3	0.0	-0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	-
2019 Q1	0.5	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	-
	contributions to annual percentage changes in value added; percentage points											
2016	1.8	0.0	0.7	0.1	0.4	0.2	0.0	0.1	0.3	0.2	0.0	-
2017	2.4	0.0	0.6	0.2	0.6	0.2	0.0	0.1	0.4	0.2	0.0	-
2018	1.9	0.0	0.3	0.2	0.4	0.2	0.0	0.1	0.4	0.2	0.0	-
2018 Q2	2.2	0.0	0.6	0.2	0.5	0.2	0.0	0.1	0.4	0.2	0.0	-
Q3	1.7	0.0	0.2	0.2	0.4	0.2	0.1	0.1	0.3	0.2	0.0	-
Q4	1.2	0.0	-0.2	0.2	0.3	0.2	0.0	0.1	0.3	0.2	0.0	-
2019 Q1	1.3	0.0	-0.1	0.2	0.3	0.2	0.0	0.1	0.2	0.2	0.0	-

Sources: Eurostat and ECB calculations.

3 Economic activity

3.3 Employment [1)]

(quarterly data seasonally adjusted; annual data unadjusted)

	Total	By employment status		By economic activity										
		Employees	Self-employed	Agriculture, forestry and fishing	Manufacturing, energy and utilities	Construction	Trade, transport, accommodation and food services	Information and communication	Finance and insurance	Real estate	Professional, business and support services	Public administration, education, health and social work	Arts, entertainment and other services
	1	2	3	4	5	6	7	8	9	10	11	12	13
Persons employed													
as a percentage of total persons employed													
2016	100.0	85.4	14.6	3.2	14.8	5.9	24.9	2.8	2.6	1.0	13.5	24.2	7.0
2017	100.0	85.7	14.3	3.2	14.8	6.0	24.9	2.8	2.5	1.0	13.7	24.2	7.0
2018	100.0	86.0	14.0	3.1	14.8	6.0	24.9	2.9	2.4	1.0	13.8	24.1	6.9
annual percentage changes													
2016	1.4	1.7	-0.1	-0.4	0.9	0.3	1.6	3.1	-0.3	2.1	2.9	1.4	0.8
2017	1.6	2.0	-0.5	-0.5	1.2	1.9	1.7	3.3	-1.2	2.0	3.1	1.3	1.2
2018	1.5	1.8	-0.4	-0.3	1.4	2.7	1.5	3.2	-0.9	1.9	2.5	1.2	0.5
2018 Q2	1.6	1.9	-0.3	-0.3	1.6	2.6	1.4	2.8	-0.9	2.0	2.9	1.3	1.3
Q3	1.4	1.7	-0.3	0.1	1.3	2.7	1.5	3.6	-1.1	1.7	2.3	1.2	0.0
Q4	1.4	1.6	-0.3	-0.2	1.3	3.1	1.5	3.5	-0.6	1.4	1.9	1.2	-0.4
2019 Q1	1.3	1.6	-0.1	0.3	1.3	2.5	1.2	3.8	-0.2	2.0	1.7	1.2	0.1
Hours worked													
as a percentage of total hours worked													
2016	100.0	80.6	19.4	4.3	15.4	6.7	25.8	3.0	2.6	1.0	13.2	21.9	6.2
2017	100.0	81.0	19.0	4.2	15.3	6.7	25.8	3.0	2.6	1.0	13.4	21.8	6.2
2018	100.0	81.4	18.6	4.2	15.3	6.8	25.7	3.1	2.5	1.0	13.6	21.7	6.1
annual percentage changes													
2016	1.4	1.8	-0.3	-0.2	0.9	0.5	1.6	3.0	0.1	2.7	3.0	1.3	0.8
2017	1.2	1.7	-0.9	-1.0	1.1	1.9	1.2	3.0	-1.7	2.1	2.8	0.8	0.5
2018	1.5	2.0	-0.6	0.3	1.4	3.0	1.2	3.2	-0.9	2.1	2.8	1.3	0.5
2018 Q2	1.8	2.3	-0.5	0.7	1.6	2.8	1.1	3.2	-0.5	2.3	3.5	1.5	1.9
Q3	1.7	2.1	-0.1	0.8	1.3	3.6	1.5	3.9	-0.9	2.3	3.1	1.3	0.7
Q4	1.6	2.0	-0.2	0.2	1.3	3.5	1.4	3.8	-0.2	1.2	2.4	1.4	0.6
2019 Q1	1.6	1.9	0.5	1.4	1.4	3.7	1.5	3.9	0.2	1.8	2.2	1.2	0.4
Hours worked per person employed													
annual percentage changes													
2016	0.0	0.2	-0.2	0.2	0.1	0.2	0.0	0.0	0.4	0.5	0.1	-0.1	0.0
2017	-0.4	-0.2	-0.3	-0.5	-0.1	0.0	-0.5	-0.3	-0.5	0.1	-0.4	-0.5	-0.7
2018	0.0	0.2	-0.2	0.5	-0.1	0.3	-0.3	0.0	0.0	0.2	0.3	0.1	0.0
2018 Q2	0.2	0.4	-0.2	1.0	0.0	0.2	-0.2	0.4	0.4	0.2	0.6	0.2	0.6
Q3	0.3	0.4	0.3	0.7	0.0	0.9	0.0	0.2	0.2	0.6	0.8	0.1	0.7
Q4	0.2	0.4	0.1	0.3	0.1	0.3	0.0	0.3	0.5	-0.2	0.5	0.2	0.9
2019 Q1	0.3	0.3	0.6	1.1	0.1	1.1	0.3	0.1	0.4	-0.2	0.4	0.0	0.4

Sources: Eurostat and ECB calculations.

1) Data for employment are based on the ESA 2010.

3 Economic activity

3.4 Labour force, unemployment and job vacancies

(seasonally adjusted, unless otherwise indicated)

	Labour force, millions [1]	Under-employ-ment, % of labour force [1]	Unemployment												Job vacancy rate [2]
			Total		Long-term unemploy-ment, % of labour force [1]	By age				By gender					
						Adult		Youth		Male		Female			
			Millions	% of labour force		Millions	% of labour force	Millions	% of labour force	Millions	% of labour force	Millions	% of labour force		
	1	2	3	4	5	6	7	8	9	10	11	12	13		14
% of total in 2016			100.0			81.7		18.3		52.2		47.8			
2016	162.028	4.3	16.257	10.0	5.0	13.292	9.0	2.965	20.9	8.484	9.7	7.774	10.4		1.7
2017	162.659	4.1	14.761	9.1	4.4	12.094	8.1	2.666	18.8	7.636	8.7	7.124	9.5		1.9
2018	163.301	3.8	13.393	8.2	3.8	10.964	7.4	2.429	17.0	6.900	7.9	6.492	8.6		2.1
2018 Q2	163.180	3.9	13.521	8.3	3.9	11.084	7.4	2.437	17.1	6.967	7.9	6.555	8.7		2.1
Q3	163.730	3.6	13.153	8.1	3.6	10.754	7.2	2.398	16.7	6.796	7.7	6.356	8.4		2.1
Q4	163.702	3.7	12.983	7.9	3.6	10.606	7.1	2.377	16.5	6.647	7.6	6.335	8.4		2.3
2019 Q1	163.278	3.6	12.680	7.7	3.5	10.352	6.9	2.327	16.1	6.465	7.4	6.215	8.2		2.3
2018 Dec.	-	-	12.864	7.9	-	10.509	7.0	2.355	16.3	6.564	7.5	6.300	8.3		-
2019 Jan.	-	-	12.805	7.8	-	10.462	7.0	2.343	16.3	6.530	7.4	6.275	8.3		-
Feb.	-	-	12.712	7.8	-	10.382	6.9	2.330	16.1	6.488	7.4	6.224	8.2		-
Mar.	-	-	12.523	7.6	-	10.213	6.8	2.309	15.9	6.378	7.3	6.145	8.1		-
Apr.	-	-	12.451	7.6	-	10.145	6.8	2.306	15.9	6.331	7.2	6.121	8.0		-
May	-	-	12.348	7.5	-	10.053	6.7	2.295	15.7	6.279	7.1	6.069	8.0		-

Sources: Eurostat and ECB calculations.

1) Not seasonally adjusted.

2) The job vacancy rate is equal to the number of job vacancies divided by the sum of the number of occupied posts and the number of job vacancies, expressed as a percentage.

3.5 Short-term business statistics

	Industrial production						Con-struction produc-tion	ECB indicator on industrial new orders	Retail sales				New passenger car regis-trations
	Total (excluding construction)	Main Industrial Groupings							Total	Food, beverages, tobacco	Non-food	Fuel	
		Manu-facturing	Inter-mediate goods	Capital goods	Consumer goods	Energy							
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of total in 2015	100.0	88.7	32.1	34.5	21.8	11.6	100.0	100.0	100.0	40.4	52.5	7.1	100.0
annual percentage changes													
2016	1.6	1.8	1.8	2.0	1.8	0.5	3.0	0.6	1.6	1.0	2.2	1.4	7.2
2017	2.9	3.2	3.4	3.8	1.4	1.2	3.1	7.9	2.5	1.6	3.4	1.0	5.7
2018	0.9	1.2	0.6	1.8	1.3	-1.5	2.1	2.7	1.6	1.3	2.0	0.6	0.8
2018 Q3	0.5	0.7	-0.3	1.5	1.0	-1.2	2.4	1.6	1.2	1.0	1.5	0.0	3.4
Q4	-1.9	-1.7	-2.1	-2.0	-0.4	-3.6	1.9	-1.0	1.7	1.4	1.9	1.6	-9.4
2019 Q1	-0.3	0.0	-0.8	0.2	1.3	-2.7	5.1	-3.2	2.4	0.9	3.5	2.7	-3.6
Q2	.	.	.	.	.	.	.	.	.	.	.	.	-1.7
2019 Jan.	-0.4	-1.2	-1.4	-2.4	1.1	5.6	1.3	-2.8	2.2	1.6	2.4	3.9	-2.5
Feb.	0.0	0.9	-0.7	1.1	3.3	-6.0	7.3	-3.8	2.9	0.9	4.6	2.6	-2.3
Mar.	-0.5	0.3	-0.4	1.8	-0.3	-7.6	6.6	-3.0	2.0	0.4	3.7	1.6	-5.5
Apr.	-0.4	-0.5	-1.3	-1.3	1.8	0.0	3.1	-1.8	1.8	2.1	1.5	1.5	-0.2
May	-0.5	-0.6	-2.6	-0.7	2.9	0.8	2.0	-5.2	1.3	0.0	2.2	-0.3	1.1
June	.	.	.	.	.	.	.	.	.	.	.	.	-5.6
month-on-month percentage changes (s.a.)													
2019 Jan.	2.0	1.7	0.5	1.9	2.7	2.7	-1.4	-0.5	0.8	0.0	1.6	1.4	5.0
Feb.	0.0	0.4	0.0	0.0	0.6	-3.3	3.2	-1.5	0.7	0.2	1.2	-0.5	-0.1
Mar.	-0.3	-0.3	0.0	0.7	-0.8	-0.6	-0.4	0.1	0.1	0.5	-0.3	-0.6	-3.6
Apr.	-0.4	-0.7	-0.9	-1.4	0.2	1.6	-1.7	0.9	-0.1	-0.2	0.0	-0.2	4.8
May	0.9	0.9	-0.2	1.3	2.6	0.7	-0.3	-2.1	-0.3	-0.5	-0.1	-1.3	2.8
June	.	.	.	.	.	.	.	.	.	.	.	.	-6.7

Sources: Eurostat, ECB calculations, ECB experimental statistics (col. 8) and European Automobile Manufacturers Association (col. 13).

3 Economic activity

3.6 Opinion surveys

(seasonally adjusted)

	European Commission Business and Consumer Surveys (percentage balances, unless otherwise indicated)								Purchasing Managers' Surveys (diffusion indices)			
	Economic sentiment indicator (long-term average = 100)	Manufacturing industry		Consumer confidence indicator	Construction confidence indicator	Retail trade confidence indicator	Service industries		Purchasing Managers' Index (PMI) for manufacturing	Manufacturing output	Business activity for services	Composite output
		Industrial confidence indicator	Capacity utilisation (%)				Services confidence indicator	Capacity utilisation (%)				
	1	2	3	4	5	6	7	8	9	10	11	12
1999-15	99.2	-5.3	80.7	-11.7	-15.0	-8.7	7.2	-	51.2	52.5	53.0	52.8
2016	104.1	-1.8	81.7	-8.1	-16.4	0.6	11.3	88.9	52.5	53.6	53.1	53.3
2017	110.1	5.5	83.2	-5.4	-4.2	2.3	14.6	89.8	57.4	58.5	55.6	56.4
2018	111.2	6.6	83.8	-4.9	6.1	1.3	15.2	90.3	54.9	54.7	54.5	54.6
2018 Q3	110.9	5.9	83.7	-5.1	6.6	1.9	15.3	90.3	54.3	54.0	54.4	54.3
Q4	108.8	3.6	83.6	-6.4	7.9	-0.3	13.4	90.4	51.7	51.0	52.8	52.3
2019 Q1	106.0	-0.5	83.2	-7.0	7.5	-1.0	11.6	90.7	49.1	49.0	52.4	51.5
Q2	104.1	-4.3	.	-7.0	6.1	-0.7	11.6	.	47.7	48.5	53.1	51.8
2019 Feb.	106.2	-0.4	-	-6.9	6.6	-1.3	12.1	-	49.3	49.4	52.8	51.9
Mar.	105.6	-1.6	-	-6.6	7.5	0.3	11.5	-	47.5	47.2	53.3	51.6
Apr.	103.9	-4.3	82.8	-7.3	6.5	-1.1	11.8	90.7	47.9	48.0	52.8	51.5
May	105.2	-2.9	-	-6.5	4.1	-0.9	12.1	-	47.7	48.9	52.9	51.8
June	103.3	-5.6	-	-7.2	7.7	0.1	11.0	-	47.6	48.5	53.6	52.2
July	.	.	-	-6.6	.	.	.	-	46.4	47.0	53.3	51.5

Sources: European Commission (Directorate-General for Economic and Financial Affairs) (col. 1-8) and Markit (col. 9-12).

3.7 Summary accounts for households and non-financial corporations

(current prices, unless otherwise indicated; not seasonally adjusted)

	Households							Non-financial corporations					
	Saving ratio (gross) [1]	Debt ratio	Real gross disposable income	Financial investment	Non-financial investment (gross)	Net worth [2]	Housing wealth	Profit share [3]	Saving ratio (net)	Debt ratio [4]	Financial investment	Non-financial investment (gross)	Financing
	Percentage of gross disposable income (adjusted)		Annual percentage changes					Percentage of net value added		Percentage of GDP	Annual percentage changes		
	1	2	3	4	5	6	7	8	9	10	11	12	13
2016	12.1	94.2	1.8	2.0	6.1	3.3	2.7	35.7	7.7	138.1	5.0	6.1	3.0
2017	11.7	93.7	1.4	2.1	7.2	4.3	4.2	34.5	6.9	136.7	3.9	4.5	2.4
2018	11.9	93.4	1.6	1.9	7.7	2.5	4.7	34.3	6.6	135.4	2.0	7.7	1.2
2018 Q2	11.8	93.5	2.1	1.9	8.2	4.0	4.7	34.8	7.0	136.9	3.3	1.6	1.9
Q3	11.8	93.4	1.4	1.9	8.5	3.6	4.7	34.4	6.8	136.6	2.9	8.6	1.7
Q4	11.9	93.4	1.5	1.9	8.5	2.5	4.7	34.3	6.6	135.4	2.0	21.3	1.2
2019 Q1	12.4	93.0	2.7	2.2	7.7	3.6	4.0	33.9	6.3	135.0	1.8	5.5	1.2

Sources: ECB and Eurostat.

1) Based on four-quarter cumulated sums of both saving and gross disposable income (adjusted for the change in the net equity of households in pension fund reserves).

2) Financial assets (net of financial liabilities) and non-financial assets. Non-financial assets consist mainly of housing wealth (residential structures and land). They also include non-financial assets of unincorporated enterprises classified within the household sector.

3) The profit share uses net entrepreneurial income, which is broadly equivalent to current profits in business accounting.

4) Based on the outstanding amount of loans, debt securities, trade credits and pension scheme liabilities.

3 Economic activity

3.8 Euro area balance of payments, current and capital accounts

(EUR billions; seasonally adjusted unless otherwise indicated; transactions)

	Current account											Capital account [1]	
	Total			Goods		Services		Primary income		Secondary income			
	Credit	Debit	Net	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
	1	2	3	4	5	6	7	8	9	10	11	12	13
2018 Q2	1,034.2	948.0	86.2	579.0	510.6	226.8	198.3	200.3	174.6	28.2	64.4	8.3	8.8
Q3	1,038.1	963.7	74.4	588.2	525.3	230.1	204.4	191.1	165.4	28.7	68.7	8.8	5.7
Q4	1,058.8	978.0	80.8	600.4	530.8	233.3	205.8	195.1	167.4	29.9	74.1	22.0	64.3
2019 Q1	1,061.1	969.7	91.3	606.2	524.6	233.7	205.7	192.0	171.5	29.2	67.9	10.5	14.8
2018 Dec.	348.2	323.0	25.2	199.5	174.8	77.5	69.4	61.4	53.5	9.9	25.3	14.5	23.6
2019 Jan.	361.0	322.8	38.3	201.7	173.6	77.3	68.8	71.5	56.6	10.5	23.8	3.9	4.6
Feb.	348.9	318.6	30.4	200.8	173.2	77.1	68.1	62.3	55.3	8.7	21.9	3.6	4.1
Mar.	351.1	328.4	22.7	203.6	177.9	79.3	68.7	58.2	59.5	10.0	22.3	3.0	6.1
Apr.	346.3	324.0	22.4	197.6	174.5	77.3	70.8	62.7	58.3	8.7	20.4	2.4	1.9
May	349.8	320.1	29.7	200.3	173.5	76.6	71.2	63.7	55.9	9.2	19.5	2.9	2.0
12-month cumulated transactions													
2019 May	4,202.8	3,880.0	322.8	2,387.8	2,100.9	926.8	824.5	773.2	681.2	115.0	273.3	49.9	93.2
12-month cumulated transactions as a percentage of GDP													
2019 May	36.0	33.2	2.8	20.5	18.0	7.9	7.1	6.6	5.8	1.0	2.3	0.4	0.8

1) The capital account is not seasonally adjusted.

3.9 Euro area external trade in goods [1] , values and volumes by product group [2]

(seasonally adjusted, unless otherwise indicated)

	Total (n.s.a.)		Exports (f.o.b.)					Imports (c.i.f.)					
			Total				Memo item:	Total				Memo items:	
	Exports	Imports		Intermediate goods	Capital goods	Consumption goods	Manufacturing		Intermediate goods	Capital goods	Consumption goods	Manufacturing	Oil
	1	2	3	4	5	6	7	8	9	10	11	12	13
Values (EUR billions; annual percentage changes for columns 1 and 2)													
2018 Q2	4.4	6.2	566.7	272.1	118.3	166.7	475.7	516.0	301.3	80.4	127.0	365.2	65.5
Q3	4.7	10.3	573.0	278.5	117.6	166.8	479.1	531.3	310.1	86.7	126.9	374.4	68.4
Q4	3.8	7.8	579.8	278.3	123.2	168.3	485.0	535.7	309.4	88.6	129.9	379.8	66.0
2019 Q1	4.1	5.0	588.2	284.1	120.4	172.7	492.9	531.8	306.4	84.9	132.5	380.7	64.2
2018 Dec.	-2.0	2.7	193.0	91.8	42.2	56.2	161.6	177.3	101.5	29.8	42.7	126.1	20.9
2019 Jan.	2.6	3.5	195.0	94.9	40.5	56.9	164.3	177.9	102.6	29.0	43.6	126.8	20.9
Feb.	6.3	5.5	195.2	94.2	40.0	57.1	164.0	174.9	100.7	27.5	43.9	126.1	21.0
Mar.	3.6	6.2	197.9	95.1	39.9	58.7	164.7	179.1	103.1	28.5	45.0	127.8	22.3
Apr.	5.3	6.6	192.9	92.4	39.2	58.1	159.8	177.2	101.6	27.9	44.7	126.5	21.6
May	7.1	4.3	195.6	.	.	.	162.3	175.3	.	.	.	123.2	.
Volume indices (2000 = 100; annual percentage changes for columns 1 and 2)													
2018 Q2	3.1	2.9	125.8	124.7	127.3	129.4	126.7	115.5	115.7	112.9	118.4	119.8	101.4
Q3	1.1	2.1	125.4	125.8	125.2	127.6	126.2	115.4	115.0	118.6	115.6	120.3	99.3
Q4	0.2	1.8	126.0	124.9	129.9	127.7	126.5	116.0	115.2	118.7	117.1	120.5	100.5
2019 Q1	0.1	1.3	126.9	127.0	126.0	129.4	126.9	116.4	116.6	113.8	118.8	120.3	107.9
2018 Nov.	-1.4	-0.3	125.5	124.9	128.3	126.9	126.9	114.9	113.6	117.1	117.0	120.1	94.6
Dec.	-5.0	0.4	125.5	123.7	132.1	127.6	125.5	116.5	116.0	118.8	115.5	119.5	108.8
2019 Jan.	-1.0	1.9	126.3	127.1	127.7	128.4	126.8	117.4	118.1	117.3	116.8	120.1	111.3
Feb.	2.0	1.3	126.4	126.3	125.5	128.4	126.7	115.1	115.0	110.9	118.8	120.0	105.9
Mar.	-0.5	0.8	127.9	127.5	124.8	131.3	127.2	116.8	116.7	113.2	120.8	120.6	106.7
Apr.	0.9	2.2	123.9	123.1	121.7	129.4	122.9	115.6	114.7	111.9	120.4	120.1	98.2

Sources: ECB and Eurostat.

1) Differences between ECB's b.o.p. goods (Table 3.8) and Eurostat's trade in goods (Table 3.9) are mainly due to different definitions.

2) Product groups as classified in the Broad Economic Categories.

4 Prices and costs

4.1 Harmonised Index of Consumer Prices [1)]

(annual percentage changes, unless otherwise indicated)

	Total					Total (s.a.; percentage change vis-à-vis previous period) [2)]						Administered prices	
	Index: 2015 = 100	Total		Goods	Services	Total	Processed food	Unprocessed food	Non-energy industrial goods	Energy (n.s.a.)	Services	Total HICP excluding administered prices	Administered prices
			Total excluding food and energy										
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of total in 2019	100.0	100.0	70.9	55.5	44.5	100.0	14.5	4.5	26.4	10.1	44.5	83.6	16.4
2016	100.2	0.2	0.8	-0.4	1.1	-	-	-	-	-	-	0.2	0.3
2017	101.8	1.5	1.0	1.6	1.4	-	-	-	-	-	-	1.6	1.0
2018	103.6	1.8	1.0	2.0	1.5	-	-	-	-	-	-	1.7	2.2
2018 Q3	104.1	2.1	1.0	2.6	1.5	0.5	0.4	0.5	0.1	2.7	0.3	2.1	2.4
Q4	104.3	1.9	1.0	2.3	1.5	0.3	0.3	0.3	0.1	1.6	0.2	1.8	2.8
2019 Q1	103.5	1.4	1.0	1.5	1.4	0.0	0.6	0.2	0.1	-2.4	0.3	1.3	2.4
Q2	105.3	1.4	1.1	1.3	1.5	0.6	0.6	-0.3	0.0	1.6	0.6	1.3	2.1
2019 Jan.	103.0	1.4	1.1	1.2	1.6	0.0	0.3	0.0	0.1	-0.9	0.1	1.2	2.5
Feb.	103.3	1.5	1.0	1.6	1.4	0.2	0.2	0.9	0.0	0.6	0.1	1.4	2.4
Mar.	104.4	1.4	0.8	1.6	1.1	0.1	0.4	-1.3	-0.1	0.8	0.2	1.3	2.2
Apr.	105.1	1.7	1.3	1.5	1.9	0.4	0.1	0.0	0.0	0.7	0.5	1.7	2.1
May	105.2	1.2	0.8	1.4	1.0	0.0	0.2	0.4	0.1	0.9	-0.2	1.1	2.1
June	105.4	1.3	1.1	1.0	1.6	0.1	0.2	0.3	0.0	-1.2	0.5	1.1	2.2

	Goods						Services					
	Food (including alcoholic beverages and tobacco)			Industrial goods			Housing		Transport	Communication	Recreation and personal care	Miscellaneous
	Total	Processed food	Unprocessed food	Total	Non-energy industrial goods	Energy		Rents				
	14	15	16	17	18	19	20	21	22	23	24	25
% of total in 2019	19.0	14.5	4.5	36.5	26.4	10.1	11.0	6.5	7.2	2.6	15.3	8.4
2016	0.9	0.6	1.4	-1.1	0.4	-5.1	1.1	1.1	0.8	0.0	1.3	1.2
2017	1.8	1.5	2.4	1.5	0.3	4.9	1.3	1.2	2.1	-1.1	2.1	0.8
2018	2.2	2.1	2.3	1.9	0.3	6.4	1.2	1.2	1.5	-0.1	2.0	1.4
2018 Q3	2.5	2.1	3.8	2.7	0.2	9.5	1.1	1.1	1.4	0.2	2.2	1.3
Q4	2.0	1.9	2.0	2.4	0.2	8.4	1.2	1.1	1.5	-0.3	1.9	1.7
2019 Q1	2.0	1.9	1.9	1.3	0.3	3.9	1.2	1.2	1.3	-0.6	1.7	1.5
Q2	1.5	1.8	0.6	1.2	0.3	3.6	1.3	1.3	2.1	-1.2	2.0	1.5
2019 Jan.	1.8	1.8	1.8	1.0	0.3	2.7	1.2	1.1	1.6	-0.4	2.2	1.5
Feb.	2.3	2.1	2.9	1.3	0.4	3.6	1.2	1.2	1.3	-0.8	1.8	1.5
Mar.	1.8	2.0	1.1	1.5	0.1	5.3	1.2	1.2	1.1	-0.7	1.2	1.5
Apr.	1.5	1.7	0.8	1.6	0.2	5.3	1.3	1.2	2.5	-1.2	2.8	1.6
May	1.5	1.9	0.4	1.3	0.3	3.8	1.3	1.2	1.5	-1.5	1.0	1.4
June	1.6	1.9	0.7	0.6	0.3	1.7	1.5	1.4	2.2	-0.9	2.1	1.4

Sources: Eurostat and ECB calculations.

1) Data refer to the changing composition of the euro area.

2) In May 2016 the ECB started publishing enhanced seasonally adjusted HICP series for the euro area, following a review of the seasonal adjustment approach as described in Box 1, *Economic Bulletin*, Issue 3, ECB, 2016 (https://www.ecb.europa.eu/pub/pdf/ecbu/eb201603.en.pdf).

4 Prices and costs

4.2 Industry, construction and property prices

(annual percentage changes, unless otherwise indicated)

	Industrial producer prices excluding construction [1]										Con-struction [2]	Residential property prices [3]	Experimental indicator of commercial property prices [3]
	Total (index: 2015 = 100)	Total		Industry excluding construction and energy						Energy			
			Manu-facturing	Total	Intermediate goods	Capital goods	Consumer goods						
							Total	Food, beverages and tobacco	Non-food				
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of total in 2015	100.0	100.0	77.3	72.1	28.9	20.7	22.5	16.5	5.9	27.9			
2016	97.9	-2.1	-1.4	-0.5	-1.6	0.5	0.0	0.0	0.0	-6.9	0.7	4.0	5.0
2017	100.8	3.0	3.0	2.1	3.2	0.9	1.9	2.8	0.2	5.6	2.0	4.3	4.8
2018	104.0	3.2	2.4	1.5	2.6	1.0	0.4	0.2	0.6	8.1	2.4	4.8	4.2
2018 Q2	103.1	2.8	2.6	1.3	2.5	1.0	0.3	0.1	0.6	6.7	2.3	4.8	5.0
Q3	104.9	4.3	3.2	1.5	3.1	1.1	0.1	-0.3	0.7	12.5	3.0	4.9	3.2
Q4	105.7	4.0	2.3	1.4	2.5	1.1	0.3	-0.2	0.8	11.1	2.3	4.7	3.0
2019 Q1	105.4	3.0	1.3	1.1	1.3	1.5	0.4	-0.1	1.0	7.7	2.5	4.0	.
2018 Dec.	105.1	3.0	1.5	1.3	2.2	1.1	0.4	0.0	0.8	7.8	-	-	-
2019 Jan.	105.4	2.9	0.9	1.1	1.6	1.4	0.4	0.0	0.9	7.4	-	-	-
Feb.	105.5	3.0	1.5	1.2	1.3	1.6	0.5	0.0	1.0	8.0	-	-	-
Mar.	105.4	2.9	1.7	1.1	1.2	1.6	0.2	-0.3	1.0	7.7	-	-	-
Apr.	105.1	2.6	1.6	1.2	1.2	1.5	0.8	0.6	0.9	6.4	-	-	-
May	105.0	1.6	1.2	1.0	0.8	1.6	1.0	0.9	0.8	3.1	-	-	-

Sources: Eurostat, ECB calculations, and ECB calculations based on MSCI data and national sources (col. 13).
1) Domestic sales only.
2) Input prices for residential buildings.
3) Experimental data based on non-harmonised sources (see https://www.ecb.europa.eu/stats/ecb_statistics/governance_and_quality_framework/html/experimental-data.en.html for further details).

4.3 Commodity prices and GDP deflators

(annual percentage changes, unless otherwise indicated)

	GDP deflators								Oil prices (EUR per barrel)	Non-energy commodity prices (EUR)					
	Total (s.a.; index: 2010 = 100)	Total	Domestic demand				Exports [1]	Imports [1]		Import-weighted [2]			Use-weighted [2]		
			Total	Private consump-tion	Govern-ment consump-tion	Gross fixed capital formation				Total	Food	Non-food	Total	Food	Non-food
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
% of total										100.0	45.4	54.6	100.0	50.4	49.6
2016	107.0	0.9	0.5	0.4	0.6	0.7	-1.3	-2.4	39.9	-2.0	-1.4	-2.8	-3.1	-3.7	-2.3
2017	108.2	1.1	1.5	1.3	1.6	1.5	1.9	2.9	48.1	5.8	-3.5	16.6	6.7	-1.6	17.8
2018	109.6	1.4	1.8	1.4	1.9	2.0	1.4	2.3	60.4	-0.9	-6.3	4.3	-0.2	-5.5	5.7
2018 Q3	109.8	1.4	2.1	1.7	2.0	2.3	2.3	3.8	64.8	2.0	-3.4	7.1	3.1	-2.2	8.8
Q4	110.2	1.5	2.0	1.6	1.9	2.2	1.7	2.9	59.5	1.9	0.1	3.6	2.3	0.2	4.4
2019 Q1	110.7	1.6	1.6	1.3	1.7	2.3	1.3	1.5	55.6	3.2	3.7	2.8	3.9	5.2	2.7
Q2	.	.	.	.	.	.	.	.	61.0	-1.6	-0.3	-2.8	0.0	4.9	-4.9
2019 Jan.	-	-	-	-	-	-	-	-	51.9	1.2	3.9	-1.1	1.5	3.8	-0.7
Feb.	-	-	-	-	-	-	-	-	56.5	4.1	4.9	3.5	4.4	5.6	3.3
Mar.	-	-	-	-	-	-	-	-	58.8	4.3	2.4	6.0	5.9	6.3	5.5
Apr.	-	-	-	-	-	-	-	-	63.4	2.0	1.2	2.8	4.3	7.5	1.0
May	-	-	-	-	-	-	-	-	63.1	-4.0	-2.9	-5.0	-2.2	2.8	-7.1
June	-	-	-	-	-	-	-	-	56.0	-2.7	1.0	-5.8	-1.9	4.7	-8.4

Sources: Eurostat, ECB calculations and Bloomberg (col. 9).
1) Deflators for exports and imports refer to goods and services and include cross-border trade within the euro area.
2) Import-weighted: weighted according to 2009-11 average import structure; use-weighted: weighted according to 2009-11 average domestic demand structure.

4 Prices and costs

4.4 Price-related opinion surveys
(seasonally adjusted)

	European Commission Business and Consumer Surveys (percentage balances)					Purchasing Managers' Surveys (diffusion indices)			
	Selling price expectations (for next three months)				Consumer price trends over past 12 months	Input prices		Prices charged	
	Manu-facturing	Retail trade	Services	Construction		Manu-facturing	Services	Manu-facturing	Services
	1	2	3	4	5	6	7	8	9
1999-15	4.2	-	-	-3.6	32.0	56.7	56.3	-	49.7
2016	-0.4	2.3	4.4	-7.1	0.6	49.8	53.9	49.3	49.6
2017	9.2	5.1	6.9	2.5	12.7	64.6	56.3	55.1	51.6
2018	11.5	7.4	9.4	12.1	20.3	65.4	57.9	56.1	52.7
2018 Q3	11.1	7.5	9.0	12.4	21.2	65.2	58.4	55.5	52.8
Q4	11.9	8.5	10.0	13.0	23.9	62.6	58.4	54.5	52.7
2019 Q1	8.9	8.2	10.4	11.4	20.4	53.9	57.7	53.0	53.1
Q2	4.6	7.1	9.1	6.1	19.7	50.6	57.1	51.2	52.3
2019 Feb.	9.0	8.1	9.2	12.4	20.4	53.9	58.1	52.7	52.7
Mar.	6.9	7.8	10.4	8.9	21.5	52.3	56.8	52.3	53.3
Apr.	5.2	8.3	10.1	7.8	15.6	52.7	57.7	51.4	53.1
May	5.3	7.7	8.2	6.7	22.6	51.2	57.5	51.6	51.6
June	3.3	5.4	9.0	3.9	21.0	48.0	56.2	50.6	52.3
July	.	.	.	.	.	46.1	56.9	48.7	52.1

Sources: European Commission (Directorate-General for Economic and Financial Affairs) and Markit.

4.5 Labour cost indices
(annual percentage changes, unless otherwise indicated)

	Total (index: 2016 = 100)	Total	By component		For selected economic activities		Memo item: Indicator of negotiated wages [1]
			Wages and salaries	Employers' social contributions	Business economy	Mainly non-business economy	
	1	2	3	4	5	6	7
% of total in 2018	100.0	100.0	75.3	24.7	69.0	31.0	
2016	100.0	1.3	1.4	1.0	1.1	1.6	1.4
2017	101.8	1.8	1.8	1.8	1.9	1.6	1.5
2018	104.1	2.2	2.1	2.7	2.4	1.8	2.0
2018 Q2	107.7	2.2	2.0	2.8	2.5	1.4	2.1
Q3	100.8	2.4	2.3	2.9	2.6	2.1	2.1
Q4	110.6	2.3	2.3	2.4	2.3	2.4	2.1
2019 Q1	99.6	2.5	2.5	2.2	2.4	2.4	2.3

Sources: Eurostat and ECB calculations.
1) Experimental data based on non-harmonised sources (see https://www.ecb.europa.eu/stats/ecb_statistics/governance_and_quality_framework/html/experimental-data.en.html for further details).

4 Prices and costs

4.6 Unit labour costs, compensation per labour input and labour productivity

(annual percentage changes, unless otherwise indicated; quarterly data seasonally adjusted; annual data unadjusted)

	Total (index: 2010 =100)	Total	By economic activity									
			Agriculture, forestry and fishing	Manu-facturing, energy and utilities	Con-struction	Trade, transport, accom-modation and food services	Information and commu-nication	Finance and insurance	Real estate	Professional, business and support services	Public ad-ministration, education, health and social work	Arts, enter-tainment and other services
	1	2	3	4	5	6	7	8	9	10	11	12
						Unit labour costs						
2016	105.5	0.8	0.8	-1.1	0.4	1.2	-0.6	1.7	5.8	1.2	1.5	2.1
2017	106.3	0.8	-0.8	-0.2	-0.1	0.0	0.6	-0.9	3.0	1.7	1.8	1.9
2018	108.1	1.8	0.9	1.7	1.1	1.5	1.5	-0.2	4.3	2.1	2.2	2.2
2018 Q2	107.7	1.5	0.3	1.0	0.8	1.1	1.3	-0.1	3.8	2.0	2.2	2.4
Q3	108.5	2.2	2.3	2.4	1.7	2.0	1.6	-0.5	4.9	2.8	2.5	2.6
Q4	109.1	2.4	1.3	3.6	1.8	2.0	2.0	0.0	4.8	2.2	2.3	2.6
2019 Q1	109.5	2.3	1.1	3.9	1.3	2.4	0.8	-0.4	4.8	2.1	2.1	2.0
						Compensation per employee						
2016	109.4	1.3	-0.2	1.3	1.7	1.5	0.4	2.2	4.1	0.6	1.3	1.8
2017	111.2	1.6	1.4	1.7	1.3	1.4	2.3	0.7	2.0	2.4	1.6	1.7
2018	113.6	2.2	2.1	1.9	1.8	2.3	2.7	1.6	3.7	2.8	2.1	2.5
2018 Q2	113.3	2.1	2.3	2.2	1.4	2.3	3.1	1.6	3.0	2.7	2.0	1.6
Q3	114.2	2.5	2.2	2.3	2.3	2.6	2.6	2.1	4.4	3.2	2.2	3.1
Q4	114.6	2.2	1.4	1.4	2.1	2.3	2.2	1.3	4.8	3.1	2.1	3.5
2019 Q1	115.2	2.3	1.5	2.2	2.8	3.0	1.4	0.6	4.0	2.0	2.0	2.9
						Labour productivity per person employed						
2016	103.8	0.5	-1.0	2.4	1.3	0.3	1.0	0.5	-1.6	-0.6	-0.2	-0.3
2017	104.6	0.8	2.2	1.8	1.4	1.4	1.6	1.7	-0.9	0.7	-0.2	-0.2
2018	105.1	0.4	1.2	0.2	0.7	0.8	1.2	1.8	-0.6	0.7	-0.1	0.2
2018 Q2	105.3	0.6	2.0	1.2	0.6	1.2	1.8	1.6	-0.8	0.6	-0.2	-0.7
Q3	105.2	0.3	-0.1	-0.1	0.6	0.6	0.9	2.6	-0.5	0.3	-0.3	0.5
Q4	105.1	-0.2	0.1	-2.1	0.2	0.3	0.2	1.4	-0.1	0.9	-0.1	0.9
2019 Q1	105.2	-0.1	0.4	-1.7	1.5	0.5	0.6	1.0	-0.8	-0.1	-0.1	0.9
						Compensation per hour worked						
2016	110.9	1.1	-0.8	1.1	1.7	1.0	0.4	1.9	3.7	0.2	1.4	1.7
2017	113.0	1.8	1.5	1.7	1.2	1.7	2.4	1.2	1.9	2.5	2.0	2.3
2018	115.2	2.0	1.7	1.9	1.2	2.3	2.5	1.6	3.1	2.4	1.9	1.9
2018 Q2	114.4	1.7	0.8	2.1	0.7	2.2	2.3	1.2	2.3	2.0	1.7	0.4
Q3	115.1	2.0	2.1	2.1	1.5	2.3	2.2	1.9	3.3	2.3	2.0	1.8
Q4	115.6	1.8	1.0	1.3	1.5	2.2	1.7	0.9	4.5	2.5	1.8	2.2
2019 Q1	116.2	1.9	0.0	2.1	1.9	2.5	1.2	0.2	3.8	1.6	1.9	2.5
						Hourly labour productivity						
2016	105.6	0.5	-1.2	2.3	1.0	0.2	1.0	0.1	-2.2	-0.7	-0.1	-0.3
2017	106.9	1.2	2.7	2.0	1.4	1.9	1.9	2.2	-1.1	1.0	0.2	0.5
2018	107.4	0.4	0.7	0.3	0.4	1.1	1.2	1.8	-0.8	0.4	-0.2	0.2
2018 Q2	107.0	0.4	1.0	1.2	0.4	1.4	1.4	1.3	-1.0	0.0	-0.4	-1.3
Q3	106.8	0.0	-0.8	-0.1	-0.3	0.5	0.7	2.3	-1.1	-0.4	-0.4	-0.2
Q4	106.8	-0.4	-0.3	-2.2	-0.1	0.3	-0.1	0.9	0.1	0.4	-0.4	-0.1
2019 Q1	107.0	-0.4	-0.7	-1.8	0.4	0.2	0.5	0.6	-0.6	-0.5	-0.1	0.5

Sources: Eurostat and ECB calculations.

5 Money and credit

5.1 Monetary aggregates [1)]

(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	M3											
	M2							M3-M2				
	M1			M2-M1								
	Currency in circulation	Overnight deposits		Deposits with an agreed maturity of up to 2 years	Deposits redeemable at notice of up to 3 months			Repos	Money market fund shares	Debt securities with a maturity of up to 2 years		
	1	2	3	4	5	6	7	8	9	10	11	12
Outstanding amounts												
2016	1,075.3	6,082.8	7,158.1	1,330.6	2,221.0	3,551.5	10,709.7	69.6	523.1	86.6	679.2	11,388.9
2017	1,111.6	6,637.3	7,748.9	1,197.0	2,260.9	3,457.9	11,206.8	74.7	512.0	71.6	658.4	11,865.1
2018	1,162.7	7,114.8	8,277.4	1,128.2	2,298.0	3,426.1	11,703.6	74.6	523.3	73.1	670.9	12,374.5
2018 Q3	1,150.6	7,009.8	8,160.3	1,126.6	2,284.6	3,411.2	11,571.5	71.4	495.4	60.4	627.3	12,198.8
Q4	1,162.7	7,114.8	8,277.4	1,128.2	2,298.0	3,426.1	11,703.6	74.6	523.3	73.1	670.9	12,374.5
2019 Q1	1,180.7	7,285.2	8,465.9	1,113.1	2,318.4	3,431.5	11,897.4	74.4	509.6	31.5	615.5	12,512.9
Q2 [p]	1,188.4	7,417.6	8,606.1	1,110.8	2,338.5	3,449.3	12,055.4	74.9	512.3	37.0	624.2	12,679.6
2019 Jan.	1,167.7	7,122.2	8,289.9	1,123.7	2,302.7	3,426.4	11,716.3	74.9	508.5	63.5	646.9	12,363.2
Feb.	1,172.8	7,190.1	8,362.8	1,125.1	2,308.9	3,434.0	11,796.8	70.7	505.1	57.6	633.4	12,430.2
Mar.	1,180.7	7,285.2	8,465.9	1,113.1	2,318.4	3,431.5	11,897.4	74.4	509.6	31.5	615.5	12,512.9
Apr.	1,182.2	7,307.4	8,489.6	1,126.4	2,327.0	3,453.4	11,943.0	73.9	511.1	39.4	624.4	12,567.4
May	1,185.4	7,366.0	8,551.4	1,124.7	2,334.8	3,459.5	12,010.9	70.7	511.5	46.0	628.2	12,639.1
June [p]	1,188.4	7,417.6	8,606.1	1,110.8	2,338.5	3,449.3	12,055.4	74.9	512.3	37.0	624.2	12,679.6
Transactions												
2016	38.1	541.7	579.8	-106.1	16.1	-90.0	489.8	-4.3	34.3	18.3	48.3	538.0
2017	36.4	591.8	628.1	-110.5	34.3	-76.2	551.9	6.6	-10.9	-18.4	-22.7	529.2
2018	50.0	461.9	511.9	-71.5	45.0	-26.5	485.4	-3.5	11.3	-2.3	5.5	490.8
2018 Q3	16.0	116.1	132.1	-51.8	14.1	-37.7	94.4	-2.4	-12.6	-4.8	-19.7	74.7
Q4	12.1	105.3	117.4	0.3	13.4	13.7	131.1	2.9	27.7	9.3	39.8	170.9
2019 Q1	18.1	167.8	185.9	-17.4	20.9	3.5	189.4	-0.5	-16.8	-38.3	-55.5	133.9
Q2 [p]	7.7	135.9	143.6	-3.1	19.8	16.7	160.3	0.8	4.5	5.9	11.2	171.5
2019 Jan.	5.0	10.8	15.8	-4.7	5.3	0.6	16.4	0.3	-15.7	-9.3	-24.7	-8.3
Feb.	5.1	66.2	71.3	0.7	6.2	6.8	78.2	-4.3	-3.5	-5.0	-12.8	65.3
Mar.	8.0	90.8	98.7	-13.4	9.5	-3.9	94.8	3.5	2.5	-24.0	-18.0	76.8
Apr.	1.5	22.5	24.0	13.2	8.4	21.6	45.6	-0.5	3.3	7.6	10.4	56.0
May	3.2	58.8	62.0	-3.2	7.8	4.5	66.5	-3.2	0.4	5.3	2.4	68.9
June [p]	3.0	54.7	57.7	-13.1	3.7	-9.4	48.3	4.5	0.8	-6.9	-1.7	46.6
Growth rates												
2016	3.7	9.7	8.8	-7.4	0.7	-2.5	4.8	-5.8	7.0	26.1	7.6	5.0
2017	3.4	9.8	8.8	-8.4	1.5	-2.1	5.2	9.5	-2.1	-21.4	-3.3	4.7
2018	4.5	6.9	6.6	-6.0	2.0	-0.8	4.3	-4.6	2.2	-3.4	0.8	4.1
2018 Q3	4.1	7.3	6.9	-7.4	1.8	-1.4	4.3	2.0	-6.7	-26.1	-8.1	3.6
Q4	4.5	6.9	6.6	-6.0	2.0	-0.8	4.3	-4.6	2.2	-3.4	0.8	4.1
2019 Q1	5.6	7.8	7.5	-5.5	2.6	-0.2	5.2	-1.1	-1.0	-48.7	-5.7	4.6
Q2 [p]	4.7	7.6	7.2	-6.1	3.0	-0.1	5.0	1.1	0.6	-41.3	-3.7	4.5
2019 Jan.	4.7	6.4	6.2	-6.3	2.1	-0.8	4.0	-4.0	-1.7	3.7	-1.5	3.7
Feb.	5.0	6.9	6.6	-4.9	2.2	-0.2	4.5	-7.1	-1.0	-4.7	-2.1	4.2
Mar.	5.6	7.8	7.5	-5.5	2.6	-0.2	5.2	-1.1	-1.0	-48.7	-5.7	4.6
Apr.	5.2	7.7	7.4	-3.7	2.8	0.6	5.3	-4.6	-0.4	-43.0	-5.5	4.7
May	4.9	7.6	7.2	-3.9	3.0	0.7	5.2	-2.4	0.7	-28.4	-2.7	4.8
June [p]	4.7	7.6	7.2	-6.1	3.0	-0.1	5.0	1.1	0.6	-41.3	-3.7	4.5

Source: ECB.

1) Data refer to the changing composition of the euro area.

5 Money and credit

5.2 Deposits in M3 [1]

(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	Non-financial corporations [2]					Households [3]					Financial corporations other than MFIs and ICPFs [2]	Insurance corporations and pension funds	Other general government [4]
	Total	Overnight	With an agreed maturity of up to 2 years	Redeemable at notice of up to 3 months	Repos	Total	Overnight	With an agreed maturity of up to 2 years	Redeemable at notice of up to 3 months	Repos			
	1	2	3	4	5	6	7	8	9	10	11	12	13
Outstanding amounts													
2016	2,093.2	1,630.3	295.1	159.6	8.2	6,055.5	3,402.3	644.9	2,006.3	2.1	972.0	199.5	383.8
2017	2,237.7	1,794.2	285.7	148.8	9.1	6,316.5	3,702.0	562.0	2,051.9	0.7	998.6	204.4	412.6
2018	2,336.5	1,900.3	280.8	147.5	7.8	6,643.0	4,034.7	517.3	2,089.8	1.2	1,004.6	200.2	431.2
2018 Q3	2,309.7	1,886.3	267.9	148.7	6.8	6,545.8	3,946.3	524.6	2,073.8	1.1	986.4	212.2	438.3
Q4	2,336.5	1,900.3	280.8	147.5	7.8	6,643.0	4,034.7	517.3	2,089.8	1.2	1,004.6	200.2	431.2
2019 Q1	2,384.6	1,960.5	269.6	147.9	6.6	6,753.9	4,126.3	515.1	2,111.2	1.3	977.0	213.2	462.3
Q2 [p]	2,408.3	1,986.9	264.4	149.6	7.4	6,844.3	4,203.9	510.3	2,128.2	1.8	1,012.8	217.4	459.0
2019 Jan.	2,325.3	1,898.9	271.4	147.3	7.7	6,678.2	4,064.1	517.3	2,095.1	1.7	977.9	204.0	438.1
Feb.	2,348.4	1,918.9	275.8	147.0	6.7	6,723.5	4,103.1	516.9	2,102.0	1.5	964.6	206.0	452.1
Mar.	2,384.6	1,960.5	269.6	147.9	6.6	6,753.9	4,126.3	515.1	2,111.2	1.3	977.0	213.2	462.3
Apr.	2,390.9	1,963.2	271.9	148.6	7.2	6,789.7	4,156.2	513.5	2,118.3	1.7	983.3	211.8	459.0
May	2,401.7	1,977.1	268.8	148.8	7.0	6,828.6	4,188.3	512.7	2,126.1	1.6	990.2	216.9	458.7
June [p]	2,408.3	1,986.9	264.4	149.6	7.4	6,844.3	4,203.9	510.3	2,128.2	1.8	1,012.8	217.4	459.0
Transactions													
2016	131.8	156.6	-25.2	0.3	0.1	300.7	334.2	-46.5	13.9	-0.9	24.2	-28.4	19.1
2017	178.5	181.4	-3.1	-0.8	1.0	255.5	304.9	-81.6	33.5	-1.3	55.1	6.3	26.9
2018	95.0	104.3	-6.9	-1.1	-1.4	325.7	324.5	-45.1	45.9	0.5	-1.9	-4.8	17.8
2018 Q3	25.9	35.4	-9.9	0.6	-0.2	76.0	75.5	-10.7	11.3	0.0	-29.2	-8.0	11.4
Q4	27.3	14.2	13.0	-0.7	0.9	96.6	88.3	-7.5	15.7	0.1	17.2	-12.4	-6.8
2019 Q1	50.1	61.9	-11.4	0.8	-1.2	109.7	90.9	-2.6	21.4	0.1	-31.9	12.4	30.5
Q2 [p]	26.0	28.3	-4.8	1.7	0.8	90.5	77.9	-4.8	16.8	0.6	35.9	4.5	-3.6
2019 Jan.	-6.6	2.2	-9.1	0.4	-0.1	35.3	29.4	0.0	5.4	0.5	-27.1	3.4	6.8
Feb.	22.5	19.6	4.4	-0.3	-1.1	44.9	38.8	-0.5	6.7	-0.1	-14.4	2.1	13.7
Mar.	34.2	40.1	-6.6	0.8	-0.1	29.6	22.8	-2.1	9.2	-0.3	9.6	7.0	10.0
Apr.	6.3	2.7	2.2	0.8	0.6	35.1	29.8	-2.0	6.9	0.4	6.9	-1.5	-3.3
May	11.7	15.0	-3.2	0.1	-0.2	38.8	32.0	-0.9	7.7	-0.1	4.8	5.1	-0.3
June [p]	7.9	10.6	-3.9	0.8	0.4	16.6	16.0	-2.0	2.2	0.3	24.3	0.9	0.1
Growth rates													
2016	6.8	10.4	-7.9	0.3	1.4	5.2	10.9	-6.7	0.7	-29.3	2.5	-12.5	5.2
2017	8.5	11.2	-1.1	-0.5	12.5	4.2	9.0	-12.7	1.7	-65.5	5.7	3.2	7.0
2018	4.2	5.8	-2.5	-0.7	-16.0	5.2	8.7	-8.0	2.2	65.1	-0.2	-2.3	4.3
2018 Q3	4.8	7.0	-6.8	0.3	27.4	4.5	8.4	-10.0	1.9	-45.8	1.0	5.2	4.8
Q4	4.2	5.8	-2.5	-0.7	-16.0	5.2	8.7	-8.0	2.2	65.1	-0.2	-2.3	4.3
2019 Q1	5.9	7.7	-2.7	0.2	-15.7	5.7	8.9	-5.5	2.9	-18.1	-2.4	0.4	10.8
Q2 [p]	5.7	7.6	-4.8	1.7	3.0	5.8	8.6	-4.8	3.2	72.0	-0.8	-1.6	7.4
2019 Jan.	2.6	4.5	-7.0	-0.1	-23.1	5.3	8.8	-7.1	2.3	-6.4	-1.7	-1.4	5.3
Feb.	4.4	6.0	-2.8	-0.1	-25.7	5.6	8.9	-6.0	2.5	-13.6	-3.7	-1.3	8.4
Mar.	5.9	7.7	-2.7	0.2	-15.7	5.7	8.9	-5.5	2.9	-18.1	-2.4	0.4	10.8
Apr.	5.8	7.1	-0.6	1.5	-8.3	5.8	8.9	-5.2	2.9	1.3	0.1	-0.5	9.2
May	5.4	6.8	-1.2	1.1	-0.2	5.9	8.9	-4.6	3.2	19.7	-0.7	0.4	8.8
June [p]	5.7	7.6	-4.8	1.7	3.0	5.8	8.6	-4.8	3.2	72.0	-0.8	-1.6	7.4

Source: ECB.

1) Data refer to the changing composition of the euro area.

2) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector. These entities are included in MFI balance sheet statistics with financial corporations other than MFIs and insurance corporations and pension funds (ICPFs).

3) Including non-profit institutions serving households.

4) Refers to the general government sector excluding central government.

5 Money and credit

5.3 Credit to euro area residents [1)]

(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	Credit to general government			Credit to other euro area residents								
	Total	Loans	Debt securities	Total	Loans						Debt securities	Equity and non-money market fund investment fund shares
					Total		To non-financial corporations [3)]	To households [4)]	To financial corporations other than MFIs and ICPFs [3)]	To insurance corporations and pension funds		
						Adjusted loans [2)]						
	1	2	3	4	5	6	7	8	9	10	11	12
Outstanding amounts												
2016	4,389.3	1,084.0	3,292.1	12,881.4	10,711.1	10,982.1	4,311.4	5,449.3	836.7	113.5	1,387.4	782.9
2017	4,625.9	1,033.3	3,578.7	13,116.4	10,874.1	11,167.4	4,325.4	5,600.0	839.1	109.6	1,442.4	799.8
2018	4,687.0	1,007.4	3,668.2	13,418.1	11,127.0	11,484.9	4,408.8	5,741.5	848.8	127.9	1,520.0	771.0
2018 Q3	4,627.4	1,003.5	3,609.9	13,363.1	11,064.5	11,394.1	4,396.2	5,702.0	841.9	124.4	1,513.8	784.8
Q4	4,687.0	1,007.4	3,668.2	13,418.1	11,127.0	11,484.9	4,408.8	5,741.5	848.8	127.9	1,520.0	771.0
2019 Q1	4,662.8	1,001.3	3,650.1	13,526.9	11,196.2	11,548.0	4,422.4	5,788.2	854.2	131.4	1,527.4	803.3
Q2 [p)]	4,633.6	1,000.5	3,621.5	13,638.4	11,289.5	11,664.3	4,461.5	5,822.1	874.6	131.3	1,546.2	802.7
2019 Jan.	4,685.8	1,006.7	3,667.7	13,452.1	11,156.4	11,499.6	4,409.0	5,758.7	861.0	127.7	1,523.0	772.7
Feb.	4,684.7	1,000.8	3,672.0	13,502.1	11,179.3	11,527.0	4,425.1	5,770.4	857.4	126.3	1,533.1	789.8
Mar.	4,662.8	1,001.3	3,650.1	13,526.9	11,196.2	11,548.0	4,422.4	5,788.2	854.2	131.4	1,527.4	803.3
Apr.	4,639.8	998.3	3,630.1	13,570.5	11,234.0	11,591.1	4,444.0	5,800.3	864.0	125.7	1,523.5	813.1
May	4,632.5	1,004.4	3,616.4	13,593.1	11,257.4	11,623.7	4,464.3	5,807.1	862.8	123.2	1,534.1	801.6
June [p)]	4,633.6	1,000.5	3,621.5	13,638.4	11,289.5	11,664.3	4,461.5	5,822.1	874.6	131.3	1,546.2	802.7
Transactions												
2016	485.9	-34.5	520.3	319.7	235.8	259.9	82.5	121.1	43.2	-11.0	80.3	3.6
2017	289.7	-43.2	332.3	361.8	273.9	314.7	82.7	173.7	21.1	-3.5	64.3	23.6
2018	92.5	-28.3	120.8	372.6	304.7	378.4	124.0	166.2	-3.6	18.1	89.4	-21.4
2018 Q3	48.0	-16.2	64.5	105.3	91.0	88.0	48.7	49.9	-12.1	4.5	18.6	-4.2
Q4	40.8	4.0	36.8	65.9	60.1	92.6	16.5	42.0	-1.8	3.4	13.6	-7.7
2019 Q1	-40.4	-6.8	-33.6	107.6	83.0	78.7	25.1	50.1	6.0	1.8	-1.5	26.0
Q2 [p)]	-56.3	-1.2	-55.3	122.9	110.3	131.9	53.5	36.2	23.6	-3.0	16.8	-4.2
2019 Jan.	-12.5	-2.3	-10.2	34.8	35.0	18.7	4.3	18.4	12.4	-0.2	0.1	-0.3
Feb.	10.9	-4.8	15.3	46.3	24.9	32.2	17.5	12.9	-4.1	-1.4	7.1	14.3
Mar.	-38.8	0.4	-38.7	26.5	23.2	27.9	3.3	18.8	-2.4	3.5	-8.7	12.0
Apr.	-22.1	-3.2	-19.0	40.7	41.7	46.6	26.3	12.4	8.7	-5.7	-6.2	5.2
May	-8.4	6.0	-14.6	34.1	25.6	33.8	22.1	7.5	-1.5	-2.5	13.9	-5.5
June [p)]	-25.8	-4.0	-21.7	48.2	43.0	51.5	5.2	16.3	16.4	5.2	9.1	-3.9
Growth rates												
2016	12.4	-3.1	18.7	2.5	2.3	2.4	1.9	2.3	5.5	-8.9	6.1	0.5
2017	6.6	-4.0	10.2	2.8	2.6	2.9	1.9	3.2	2.5	-3.1	4.6	3.0
2018	2.0	-2.7	3.4	2.8	2.8	3.4	2.9	3.0	-0.4	16.5	6.2	-2.7
2018 Q3	3.1	-4.4	5.3	3.0	3.0	3.4	3.2	3.1	-0.4	11.7	5.9	-1.1
Q4	2.0	-2.7	3.4	2.8	2.8	3.4	2.9	3.0	-0.4	16.5	6.2	-2.7
2019 Q1	1.8	-2.4	3.1	2.8	2.6	3.2	2.5	3.1	-1.3	14.8	4.1	1.9
Q2 [p)]	-0.2	-2.0	0.4	3.0	3.1	3.5	3.3	3.2	1.8	5.7	3.2	1.3
2019 Jan.	2.4	-2.9	3.9	2.5	2.5	3.0	2.3	3.2	-1.8	13.0	5.3	-2.6
Feb.	2.5	-2.6	4.0	2.8	2.7	3.3	2.6	3.2	-1.4	10.6	5.3	-0.3
Mar.	1.8	-2.4	3.1	2.8	2.6	3.2	2.5	3.1	-1.3	14.8	4.1	1.9
Apr.	1.4	-2.6	2.5	2.7	2.8	3.4	2.8	3.2	0.6	5.4	2.6	1.2
May	0.7	-2.2	1.5	2.6	2.7	3.3	2.7	3.1	-0.3	1.6	3.1	0.5
June [p)]	-0.2	-2.0	0.4	3.0	3.1	3.5	3.3	3.2	1.8	5.7	3.2	1.3

Source: ECB.

1) Data refer to the changing composition of the euro area.

2) Adjusted for loan sales and securitisation (resulting in derecognition from the MFI statistical balance sheet) as well as for positions arising from notional cash pooling services provided by MFIs.

3) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector. These entities are included in MFI balance sheet statistics with financial corporations other than MFIs and insurance corporations and pension funds (ICPFs).

4) Including non-profit institutions serving households.

5 Money and credit

5.4 MFI loans to euro area non-financial corporations and households [1)]

(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	Non-financial corporations [2)]					Households [3)]				
	Total		Up to 1 year	Over 1 and up to 5 years	Over 5 years	Total		Loans for consumption	Loans for house purchase	Other loans
		Adjusted loans [4)]					Adjusted loans [4)]			
	1	2	3	4	5	6	7	8	9	10
Outstanding amounts										
2016	4,311.4	4,309.1	1,013.3	795.7	2,502.4	5,449.3	5,728.7	615.9	4,084.1	749.3
2017	4,325.4	4,360.1	987.3	820.2	2,517.9	5,600.0	5,866.6	654.4	4,217.0	728.6
2018	4,408.8	4,494.3	995.7	844.3	2,568.7	5,741.5	6,023.3	683.5	4,353.9	704.1
2018 Q3	4,396.2	4,459.8	999.7	836.2	2,560.4	5,702.0	5,979.1	678.6	4,311.7	711.7
Q4	4,408.8	4,494.3	995.7	844.3	2,568.7	5,741.5	6,023.3	683.5	4,353.9	704.1
2019 Q1	4,422.4	4,509.0	980.0	852.1	2,590.3	5,788.2	6,065.6	694.2	4,391.9	702.0
Q2 [p]	4,461.5	4,555.6	980.1	867.8	2,613.6	5,822.1	6,108.8	704.9	4,421.4	695.8
2019 Jan.	4,409.0	4,490.0	980.0	846.5	2,582.6	5,758.7	6,037.2	687.5	4,367.2	703.9
Feb.	4,425.1	4,505.9	980.5	851.2	2,593.4	5,770.4	6,051.7	690.7	4,375.6	704.1
Mar.	4,422.4	4,509.0	980.0	852.1	2,590.3	5,788.2	6,065.6	694.2	4,391.9	702.0
Apr.	4,444.0	4,528.3	985.2	859.1	2,599.7	5,800.3	6,083.0	695.6	4,405.2	699.4
May	4,464.3	4,547.0	982.9	866.1	2,615.3	5,807.1	6,098.3	700.9	4,409.3	696.8
June [p]	4,461.5	4,555.6	980.1	867.8	2,613.6	5,822.1	6,108.8	704.9	4,421.4	695.8
Transactions										
2016	82.5	100.4	-14.7	43.2	54.0	121.1	113.8	24.1	105.4	-8.4
2017	82.7	131.7	-0.3	38.0	45.0	173.7	165.5	45.1	134.3	-5.8
2018	124.0	176.1	19.6	33.5	70.8	166.2	188.6	39.6	136.4	-9.8
2018 Q3	48.7	47.8	16.4	9.7	22.6	49.9	48.6	10.3	40.5	-0.9
Q4	16.5	40.9	-2.3	7.4	11.3	42.0	50.8	7.7	39.2	-4.9
2019 Q1	25.1	23.7	-14.3	10.3	29.2	50.1	49.0	11.5	38.9	-0.3
Q2 [p]	53.5	56.7	4.5	19.0	30.0	36.2	48.4	12.6	26.2	-2.7
2019 Jan.	4.3	-2.1	-13.8	2.5	15.6	18.4	15.3	4.4	13.8	0.2
Feb.	17.5	17.3	0.7	5.4	11.5	12.9	17.5	3.3	9.1	0.5
Mar.	3.3	8.5	-1.2	2.4	2.1	18.8	16.1	3.8	16.0	-1.0
Apr.	26.3	23.8	6.5	7.4	12.3	12.4	17.2	2.9	9.8	-0.3
May	22.1	19.0	-2.2	7.2	17.1	7.5	16.7	5.6	4.1	-2.2
June [p]	5.2	13.9	0.2	4.4	0.5	16.3	14.5	4.1	12.3	-0.2
Growth rates										
2016	1.9	2.4	-1.4	5.7	2.2	2.3	2.0	4.1	2.7	-1.1
2017	1.9	3.1	0.0	4.8	1.8	3.2	2.9	7.3	3.3	-0.8
2018	2.9	4.1	2.0	4.1	2.8	3.0	3.2	6.1	3.2	-1.4
2018 Q3	3.2	4.3	3.3	4.6	2.8	3.1	3.1	6.9	3.2	-0.9
Q4	2.9	4.1	2.0	4.1	2.8	3.0	3.2	6.1	3.2	-1.4
2019 Q1	2.5	3.7	-1.2	4.6	3.3	3.1	3.3	6.0	3.5	-1.5
Q2 [p]	3.3	3.8	0.4	5.6	3.7	3.2	3.3	6.3	3.4	-1.2
2019 Jan.	2.3	3.4	-0.4	3.6	2.9	3.2	3.2	6.1	3.5	-1.2
Feb.	2.6	3.8	0.1	4.5	3.0	3.2	3.3	6.0	3.5	-1.2
Mar.	2.5	3.7	-1.2	4.6	3.3	3.1	3.3	6.0	3.5	-1.5
Apr.	2.8	3.9	-0.9	5.3	3.4	3.2	3.3	5.8	3.5	-1.3
May	2.7	3.8	-1.6	5.5	3.5	3.1	3.3	6.1	3.4	-1.6
June [p]	3.3	3.8	0.4	5.6	3.7	3.2	3.3	6.3	3.4	-1.2

Source: ECB.

1) Data refer to the changing composition of the euro area.

2) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector. These entities are included in MFI balance sheet statistics with financial corporations other than MFIs and insurance corporations and pension funds (ICPFs).

3) Including non-profit institutions serving households.

4) Adjusted for loan sales and securitisation (resulting in derecognition from the MFI statistical balance sheet) as well as for positions arising from notional cash pooling services provided by MFIs.

5 Money and credit

5.5 Counterparts to M3 other than credit to euro area residents [1)]

(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	MFI liabilities						MFI assets			
	Central government holdings [2)]	Longer-term financial liabilities vis-à-vis other euro area residents					Net external assets	Other		
		Total	Deposits with an agreed maturity of over 2 years	Deposits redeemable at notice of over 3 months	Debt securities with a maturity of over 2 years	Capital and reserves		Total	Repos with central counter-parties [3)]	Reverse repos to central counter-parties [3)]
	1	2	3	4	5	6	7	8	9	10
Outstanding amounts										
2016	307.7	6,955.9	2,089.5	70.9	2,145.9	2,649.6	1,124.8	257.0	205.9	121.6
2017	343.9	6,768.4	1,968.3	59.7	2,014.1	2,726.2	935.5	299.8	143.5	92.5
2018	378.9	6,808.8	1,941.4	56.0	2,090.6	2,720.8	1,028.6	428.5	187.0	194.9
2018 Q3	403.7	6,693.6	1,934.8	56.9	2,048.5	2,653.5	881.1	424.5	177.3	183.0
Q4	378.9	6,808.8	1,941.4	56.0	2,090.6	2,720.8	1,028.6	428.5	187.0	194.9
2019 Q1	367.7	6,903.8	1,937.8	55.6	2,145.7	2,764.6	1,175.8	418.8	199.0	212.3
Q2 [p]	359.9	6,983.6	1,953.7	57.7	2,132.6	2,839.7	1,317.8	433.3	191.5	207.8
2019 Jan.	377.3	6,855.5	1,939.7	55.6	2,111.2	2,749.0	1,066.0	392.1	199.0	208.4
Feb.	408.9	6,874.0	1,936.6	55.6	2,141.4	2,740.4	1,110.2	416.1	198.1	210.5
Mar.	367.7	6,903.8	1,937.8	55.6	2,145.7	2,764.6	1,175.8	418.8	199.0	212.3
Apr.	362.2	6,891.1	1,934.2	56.0	2,129.4	2,771.5	1,192.9	417.5	216.8	232.2
May	361.8	6,905.7	1,932.0	56.6	2,130.2	2,786.9	1,270.8	410.2	212.8	229.2
June [p]	359.9	6,983.6	1,953.7	57.7	2,132.6	2,839.7	1,317.8	433.3	191.5	207.8
Transactions										
2016	22.0	-122.9	-71.3	-8.6	-118.7	75.7	-278.3	-90.2	12.8	-12.0
2017	39.1	-74.9	-83.7	-6.6	-72.0	87.4	-92.5	-65.6	-60.9	-27.6
2018	39.0	45.0	-37.8	-4.9	17.0	70.7	64.6	45.1	21.8	24.2
2018 Q3	76.4	29.8	-16.2	-1.5	19.2	28.4	38.9	-11.3	3.2	-0.8
Q4	-24.1	16.3	-0.5	-0.9	3.4	14.2	34.7	21.7	9.7	11.9
2019 Q1	-11.1	50.8	-10.6	-0.3	45.2	16.6	111.9	-5.5	2.7	5.5
Q2 [p]	-7.8	53.5	18.2	2.1	-2.0	35.3	111.4	39.2	-7.1	-4.5
2019 Jan.	-1.6	19.6	-6.0	-0.4	20.5	5.4	20.6	-33.0	12.0	13.5
Feb.	31.5	20.9	-3.2	0.0	26.3	-2.2	42.0	18.7	-0.9	2.1
Mar.	-41.1	10.3	-1.4	0.0	-1.7	13.3	49.4	8.9	-8.4	-10.2
Apr.	-5.5	-6.9	-3.3	0.4	-15.2	11.2	23.2	1.9	17.8	19.8
May	-0.4	9.2	-1.5	0.6	-0.5	10.6	62.2	-10.2	-4.1	-2.9
June [p]	-1.9	51.3	23.0	1.1	13.8	13.4	26.1	47.5	-20.8	-21.4
Growth rates										
2016	7.8	-1.7	-3.4	-10.9	-5.3	2.9	-	-	6.3	-9.0
2017	12.6	-1.1	-4.0	-9.7	-3.4	3.3	-	-	-29.7	-22.7
2018	11.3	0.7	-1.9	-8.1	0.8	2.7	-	-	11.0	2.2
2018 Q3	14.3	0.0	-2.8	-9.3	0.0	2.3	-	-	7.7	4.9
Q4	11.3	0.7	-1.9	-8.1	0.8	2.7	-	-	11.0	2.2
2019 Q1	8.9	1.3	-1.6	-6.4	2.5	2.6	-	-	18.9	12.7
Q2 [p]	10.0	2.2	-0.5	-1.2	3.2	3.5	-	-	5.1	6.7
2019 Jan.	18.9	0.8	-1.9	-7.7	1.0	2.8	-	-	28.0	22.7
Feb.	19.6	1.3	-1.8	-7.1	2.9	2.7	-	-	35.9	27.9
Mar.	8.9	1.3	-1.6	-6.4	2.5	2.6	-	-	18.9	12.7
Apr.	4.6	1.1	-1.9	-5.4	2.1	2.6	-	-	40.6	44.3
May	8.7	1.4	-1.7	-3.7	2.4	2.9	-	-	14.4	15.9
June [p]	10.0	2.2	-0.5	-1.2	3.2	3.5	-	-	5.1	6.7

Source: ECB.

1) Data refer to the changing composition of the euro area.

2) Comprises central government holdings of deposits with the MFI sector and of securities issued by the MFI sector.

3) Not adjusted for seasonal effects.

6 Fiscal developments

6.1 Deficit/surplus

(as a percentage of GDP; flows during one-year period)

	Deficit (-)/surplus (+)					Memo item: Primary deficit (-)/ surplus (+)
	Total	Central government	State government	Local government	Social security funds	
	1	2	3	4	5	6
2015	-2.0	-1.9	-0.2	0.1	-0.1	0.3
2016	-1.6	-1.7	-0.1	0.2	0.1	0.6
2017	-1.0	-1.3	0.0	0.2	0.1	1.0
2018	-0.5	-1.1	0.1	0.2	0.3	1.3
2018 Q2	-0.5	.	.	.	.	1.4
Q3	-0.4	.	.	.	.	1.4
Q4	-0.5	.	.	.	.	1.3
2019 Q1	-0.7	.	.	.	.	1.1

Sources: ECB for annual data; Eurostat for quarterly data.

6.2 Revenue and expenditure

(as a percentage of GDP; flows during one-year period)

	Revenue						Expenditure						
	Total	Current revenue				Capital revenue	Total	Current expenditure					Capital expenditure
			Direct taxes	Indirect taxes	Net social contributions				Compen-sation of employees	Intermediate consumption	Interest	Social benefits	
	1	2	3	4	5	6	7	8	9	10	11	12	13
2015	46.2	45.7	12.5	13.0	15.2	0.5	48.3	44.4	10.0	5.2	2.3	22.7	3.9
2016	46.0	45.5	12.5	12.9	15.2	0.5	47.5	44.0	9.9	5.2	2.1	22.7	3.6
2017	46.1	45.7	12.8	12.9	15.2	0.4	47.0	43.3	9.8	5.2	2.0	22.4	3.8
2018	46.3	45.9	13.0	13.0	15.2	0.4	46.8	43.1	9.8	5.2	1.8	22.3	3.7
2018 Q2	46.2	45.8	12.9	12.9	15.2	0.4	46.7	43.0	9.8	5.2	1.9	22.3	3.7
Q3	46.2	45.8	12.9	13.0	15.2	0.4	46.7	43.0	9.8	5.2	1.9	22.3	3.6
Q4	46.3	45.9	13.0	13.0	15.2	0.4	46.8	43.1	9.8	5.2	1.8	22.3	3.7
2019 Q1	46.2	45.7	12.9	13.0	15.1	0.4	46.8	43.1	9.8	5.2	1.8	22.3	3.7

Sources: ECB for annual data; Eurostat for quarterly data.

6.3 Government debt-to-GDP ratio

(as a percentage of GDP; outstanding amounts at end of period)

	Total	Financial instrument			Holder			Original maturity		Residual maturity			Currency	
		Currency and deposits	Loans	Debt securities	Resident creditors	MFIs	Non-resident creditors	Up to 1 year	Over 1 year	Up to 1 year	Over 1 and up to 5 years	Over 5 years	Euro or participating currencies	Other curren-cies
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2015	90.1	2.8	16.4	70.9	44.3	27.5	45.7	9.1	81.0	17.5	31.3	41.3	88.0	2.1
2016	89.2	2.7	15.6	70.9	46.8	30.7	42.5	8.8	80.5	17.2	29.8	42.2	87.2	2.1
2017	87.1	2.6	14.5	70.0	47.6	32.1	39.5	8.0	79.0	15.8	28.9	42.3	85.2	1.8
2018	85.1	2.6	13.7	68.9	47.3	32.3	37.8	7.5	77.7	15.6	28.2	41.3	83.7	1.5
2018 Q2	86.6	2.6	14.0	70.0	.	.	.	.	.	.	.	.	.	.
Q3	86.4	2.6	13.8	70.0	.	.	.	.	.	.	.	.	.	.
Q4	85.1	2.6	13.7	68.9	.	.	.	.	.	.	.	.	.	.
2019 Q1	85.9	2.6	13.6	69.7	.	.	.	.	.	.	.	.	.	.

Sources: ECB for annual data; Eurostat for quarterly data.

6 Fiscal developments

6.4 Annual change in the government debt-to-GDP ratio and underlying factors [1)]

(as a percentage of GDP; flows during one-year period)

	Change in debt-to-GDP ratio [2)]	Primary deficit (+)/ surplus (-)	Deficit-debt adjustment								Interest-growth differential	Memo item: Borrowing requirement
			Total	Transactions in main financial assets					Revaluation effects and other changes in volume	Other		
				Total	Currency and deposits	Loans	Debt securities	Equity and investment fund shares				
	1	2	3	4	5	6	7	8	9	10	11	12
2015	-1.9	-0.3	-0.8	-0.5	0.2	-0.3	-0.3	-0.1	0.0	-0.4	-0.8	1.2
2016	-0.8	-0.6	0.1	0.2	0.3	-0.1	0.0	0.1	0.0	-0.1	-0.4	1.6
2017	-2.2	-1.0	-0.1	0.3	0.5	0.0	-0.2	0.1	-0.1	-0.4	-1.1	0.9
2018	-1.9	-1.3	0.3	0.3	0.4	-0.1	0.0	0.1	0.0	0.0	-0.9	0.8
2018 Q2	-2.8	-1.4	-0.2	0.3	0.2	-0.1	0.0	0.2	-0.1	-0.4	-1.3	0.5
Q3	-2.0	-1.4	0.5	0.7	0.6	0.0	0.0	0.2	-0.1	-0.1	-1.1	1.0
Q4	-1.9	-1.3	0.3	0.5	0.4	-0.1	0.0	0.1	0.0	-0.2	-0.9	0.8
2019 Q1	-1.2	-1.1	0.7	0.7	0.6	-0.1	0.0	0.2	0.1	-0.1	-0.8	1.2

Sources: ECB for annual data; Eurostat for quarterly data.
1) Intergovernmental lending in the context of the financial crisis is consolidated except in quarterly data on the deficit-debt adjustment.
2) Calculated as the difference between the government debt-to-GDP ratios at the end of the reference period and a year earlier.

6.5 Government debt securities [1)]

(debt service as a percentage of GDP; flows during debt service period; average nominal yields in percentages per annum)

	Debt service due within 1 year [2)]					Average residual maturity in years [3)]	Average nominal yields [4)]						
	Total	Principal		Interest			Outstanding amounts					Transactions	
			Maturities of up to 3 months		Maturities of up to 3 months		Total	Floating rate	Zero coupon	Fixed rate	Maturities of up to 1 year	Issuance	Redemption
	1	2	3	4	5	6	7	8	9	10	11	12	13
2016	14.1	12.4	4.6	1.7	0.4	6.9	2.6	1.2	-0.1	3.0	2.9	0.2	1.2
2017	12.9	11.2	4.2	1.7	0.4	7.1	2.4	1.1	-0.2	2.8	2.3	0.3	1.1
2018	12.6	11.1	3.7	1.5	0.4	7.3	2.3	1.1	-0.1	2.7	2.5	0.4	0.9
2018 Q1	12.6	11.0	4.1	1.6	0.4	7.2	2.4	1.1	-0.2	2.8	2.5	0.4	1.1
Q2	12.5	10.9	3.4	1.6	0.4	7.3	2.4	1.1	-0.2	2.8	2.5	0.4	0.9
Q3	12.7	11.1	3.7	1.6	0.4	7.3	2.3	1.1	-0.1	2.7	2.6	0.4	0.9
Q4	12.6	11.1	3.7	1.5	0.4	7.3	2.3	1.1	-0.1	2.7	2.5	0.4	0.9
2019 Jan.	12.9	11.3	3.9	1.5	0.4	7.3	2.3	1.1	-0.1	2.7	2.5	0.4	0.9
Feb.	12.7	11.2	4.0	1.5	0.4	7.3	2.3	1.1	0.0	2.7	2.4	0.4	0.9
Mar.	12.7	11.2	3.8	1.5	0.4	7.4	2.3	1.1	0.0	2.6	2.5	0.5	1.0
Apr.	13.1	11.6	3.9	1.5	0.4	7.4	2.3	1.2	0.0	2.6	2.5	0.5	1.1
May	12.8	11.4	3.4	1.5	0.4	7.4	2.3	1.2	0.0	2.6	2.5	0.5	1.0
June	12.8	11.3	3.7	1.5	0.4	7.4	2.3	1.2	0.0	2.6	2.5	0.5	0.9

Source: ECB.
1) At face value and not consolidated within the general government sector.
2) Excludes future payments on debt securities not yet outstanding and early redemptions.
3) Residual maturity at the end of the period.
4) Outstanding amounts at the end of the period; transactions as 12-month average.

6 Fiscal developments

6.6 Fiscal developments in euro area countries

(as a percentage of GDP; flows during one-year period and outstanding amounts at end of period)

	Belgium	Germany	Estonia	Ireland	Greece	Spain	France	Italy	Cyprus
	1	2	3	4	5	6	7	8	9
	Government deficit (-)/surplus (+)								
2015	-2.4	0.8	0.1	-1.9	-5.6	-5.3	-3.6	-2.6	-1.3
2016	-2.4	0.9	-0.3	-0.7	0.5	-4.5	-3.5	-2.5	0.3
2017	-0.8	1.0	-0.4	-0.3	0.7	-3.1	-2.8	-2.4	1.8
2018	-0.7	1.7	-0.6	0.0	1.1	-2.5	-2.5	-2.1	-4.8
2018 Q2	-0.4	1.9	0.1	-0.6	0.8	-2.7	-2.7	-2.0	3.5
Q3	-0.3	2.0	0.1	-0.5	0.8	-2.6	-2.5	-2.1	-4.9
Q4	-0.7	1.7	-0.6	0.0	1.1	-2.5	-2.5	-2.1	-4.8
2019 Q1	-1.0	1.7	-0.7	0.0	0.4	-2.4	-3.2	-2.1	-4.2
	Government debt								
2015	106.4	71.6	9.9	76.8	175.9	99.3	95.6	131.6	108.0
2016	106.1	68.5	9.2	73.5	178.5	99.0	98.0	131.4	105.5
2017	103.4	64.5	9.2	68.5	176.2	98.1	98.4	131.4	95.8
2018	102.0	60.9	8.4	64.8	181.1	97.1	98.4	132.2	102.5
2018 Q2	105.9	62.2	8.7	68.4	177.5	98.2	99.0	133.5	102.9
Q3	105.4	61.8	8.5	67.4	182.3	98.3	99.4	133.5	110.1
Q4	102.0	60.9	8.4	63.6	181.1	97.1	98.4	132.2	102.5
2019 Q1	105.1	61.0	8.1	65.6	181.9	98.7	99.7	134.0	105.0

	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Austria	Portugal	Slovenia	Slovakia	Finland
	10	11	12	13	14	15	16	17	18	19
	Government deficit (-)/surplus (+)									
2015	-1.4	-0.3	1.4	-1.0	-2.0	-1.0	-4.4	-2.8	-2.6	-2.8
2016	0.1	0.2	1.9	0.9	0.0	-1.6	-2.0	-1.9	-2.2	-1.7
2017	-0.6	0.5	1.4	3.4	1.2	-0.8	-3.0	0.0	-0.8	-0.8
2018	-1.0	0.7	2.4	2.0	1.5	0.1	-0.5	0.7	-0.7	-0.7
2018 Q2	-0.2	0.7	1.7	3.8	1.8	0.1	-1.1	0.5	-0.6	-1.0
Q3	-0.5	0.6	2.1	3.4	2.0	0.2	-0.2	0.5	-0.5	-0.7
Q4	-1.0	0.7	2.4	2.0	1.5	0.1	-0.5	0.7	-0.7	-0.8
2019 Q1	-0.9	0.2	2.8	1.9	1.8	-0.2	-0.1	0.6	-0.7	-0.8
	Government debt									
2015	36.8	42.6	22.2	57.9	64.6	84.7	128.8	82.6	52.2	63.4
2016	40.3	40.0	20.7	55.5	61.9	83.0	129.2	78.7	51.8	63.0
2017	40.0	39.4	23.0	50.2	57.0	78.2	124.8	74.1	50.9	61.3
2018	35.9	34.2	21.4	46.0	52.4	73.8	121.5	70.1	48.9	58.9
2018 Q2	36.9	35.0	22.1	49.0	53.9	76.3	124.9	72.6	51.9	60.0
Q3	37.0	35.0	21.7	46.0	52.9	75.4	124.8	71.1	51.5	59.4
Q4	35.9	34.2	21.4	46.0	52.4	73.8	121.5	70.1	48.9	59.5
2019 Q1	37.2	34.1	21.3	46.6	50.9	72.7	123.0	67.9	48.9	59.3

Source: Eurostat.

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This Bulletin was produced under the responsibility of the Executive Board of the ECB. Translations are prepared and published by the national central banks.

The cut-off date for the statistics included in this issue was 24 July 2019.

For specific terminology please refer to the ECB glossary (available in English only).

PDF ISSN 2363-3417, QB-BP-19-005-EN-N
HTML ISSN 2363-3417, doi:10.2866/429865, QB-BP-19-005-EN-Q