



EUROPEAN CENTRAL BANK

EUROSYSTEM

**Thomas Warmedinger**  
Division Business Cycle Analyses  
DG Economic Developments

**Gerrit Koester**  
Division Prices & Costs  
DG Economic Developments

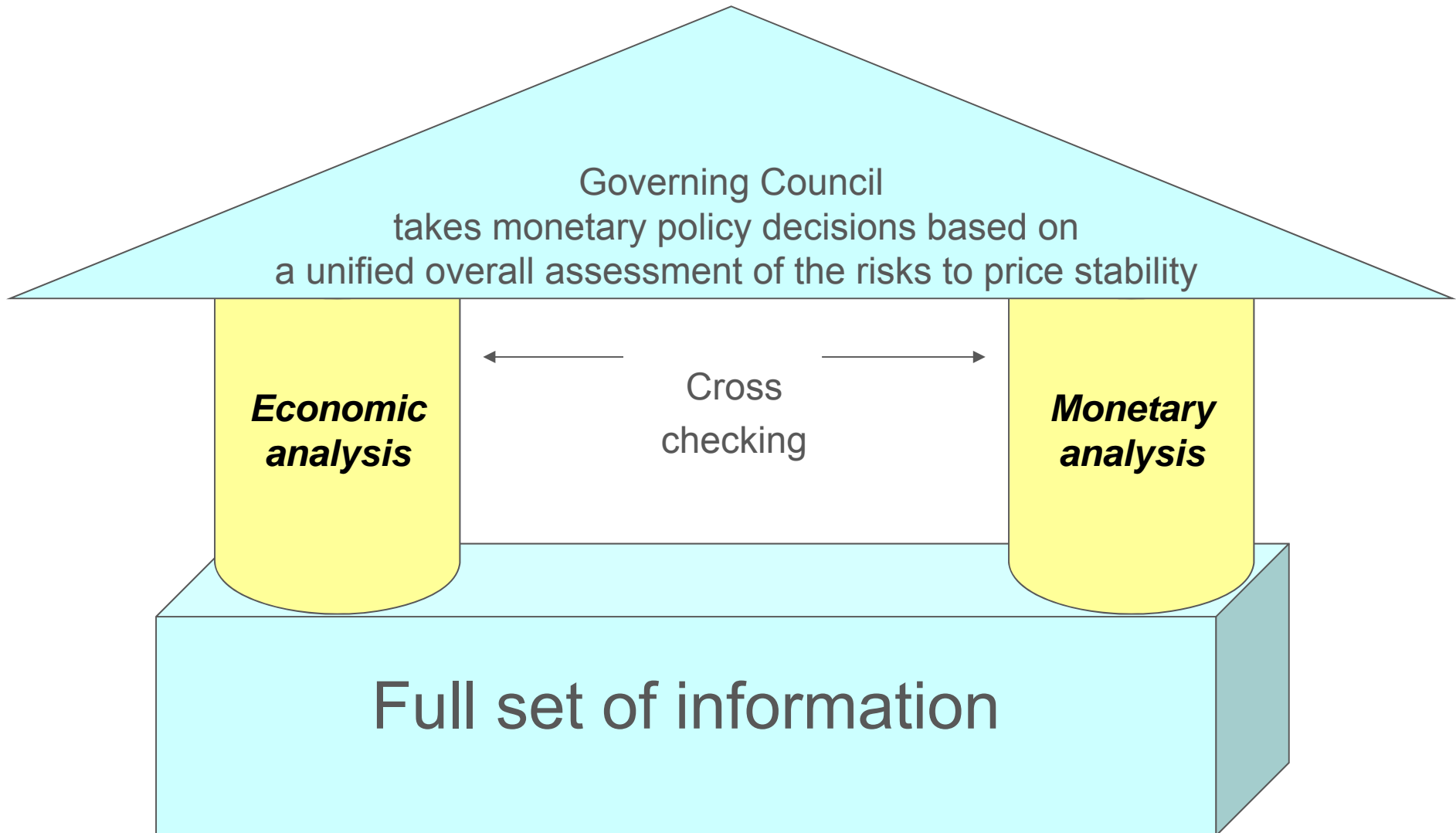
# **The euro area economy: Economic conditions, inflation and prospects**

Central Banking Seminar

Frankfurt am Main, 10 July 2018

**1** Economic analysis and conjunctural assessment**1.1** Economic analysis at the ECB**1.2** Main features of the euro area economy**1.3** Recent conjunctural developments**1.4** Business cycle synchronisation**2** Inflation developments in the euro area**2.1** Recent developments in euro area inflation**2.1** Euro area inflation through the lens of the Phillips Curve**2.2** Structural drivers of inflation**2.3** Inflation outlook

Economic analysis as part of the information set to inform monetary policy decisions



- Assessment of **short to medium-term determinants of price developments**
- Forward-looking assessment of relevant information from a variety of indicators (e. g. business cycle, wages, exchange rate, asset prices, financial yields, fiscal policy, etc.)
- Quarterly macroeconomic projections for inflation and growth in the euro area, prepared by staff of the Eurosystem/ ECB

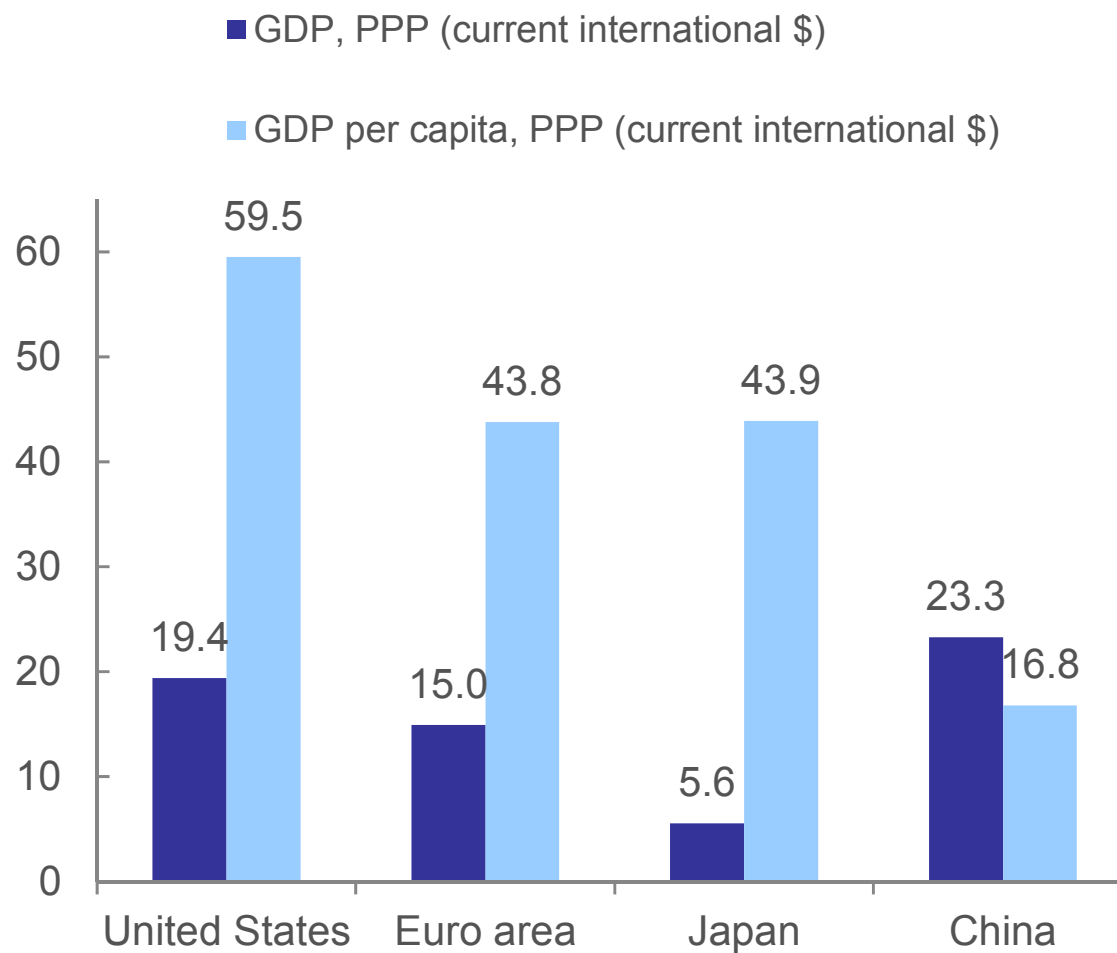
Monitoring

Analysing

Forecasting

**1** Economic analysis and conjunctural assessment**1.1** Economic analysis at the ECB**1.2** Main features of the euro area economy**1.3** Recent conjunctural developments**1.4** Business cycle synchronisation**2** Inflation developments in the euro area**2.1** Recent developments in euro area inflation**2.1** Euro area inflation through the lens of the Phillips Curve**2.2** Structural drivers of inflation**2.3** Inflation outlook

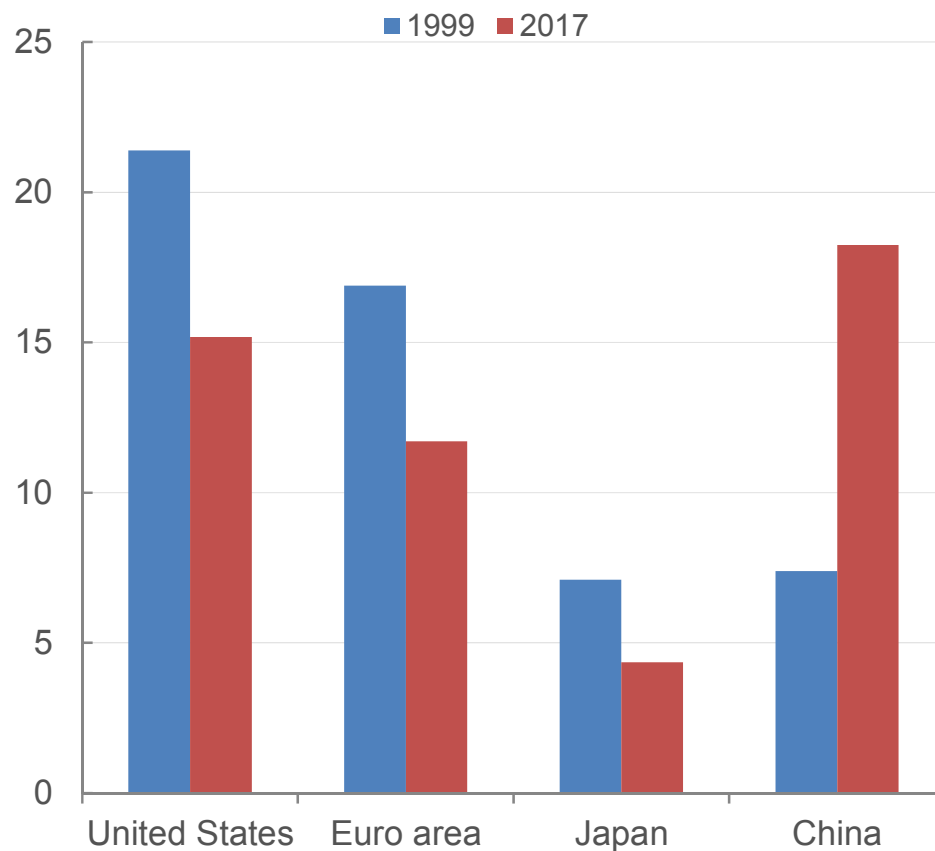
## Size and per capita income – international comparison



Source: Worldbank, International Comparison Database.  
 Note: Data are for 2017.

## Advanced economies share in world GDP is shrinking

Share in world GDP (GDP based on PPP, in %, annual data)

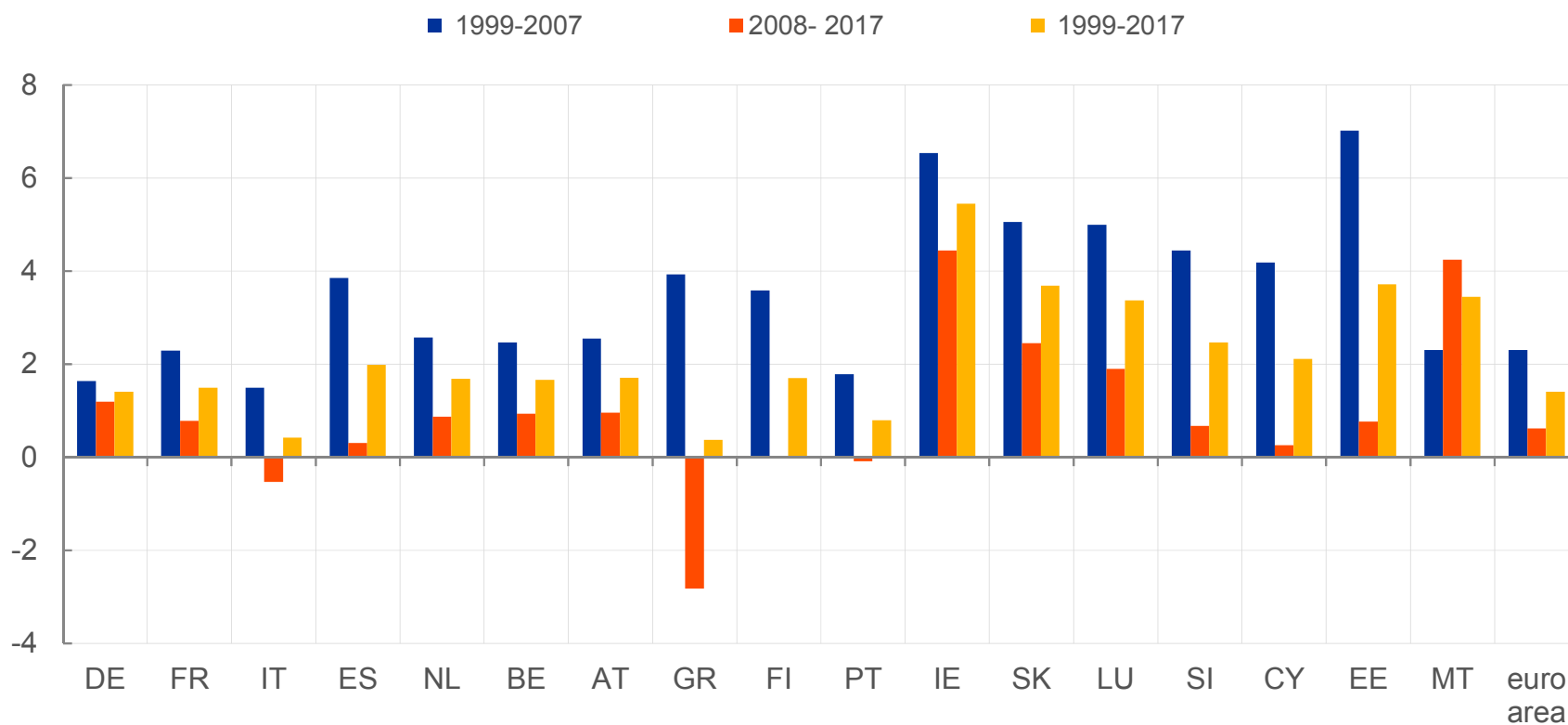


Source: Worldbank International Comparison Database, ECB staff calculations .

Note: Data are for 2017. The share in world GDP is calculated by dividing the country's annual GDP based on PPP by the aggregated annual world GDP in a given year.

## GDP growth heterogeneous across countries

GDP growth across euro area countries (averages of annual percentage changes)

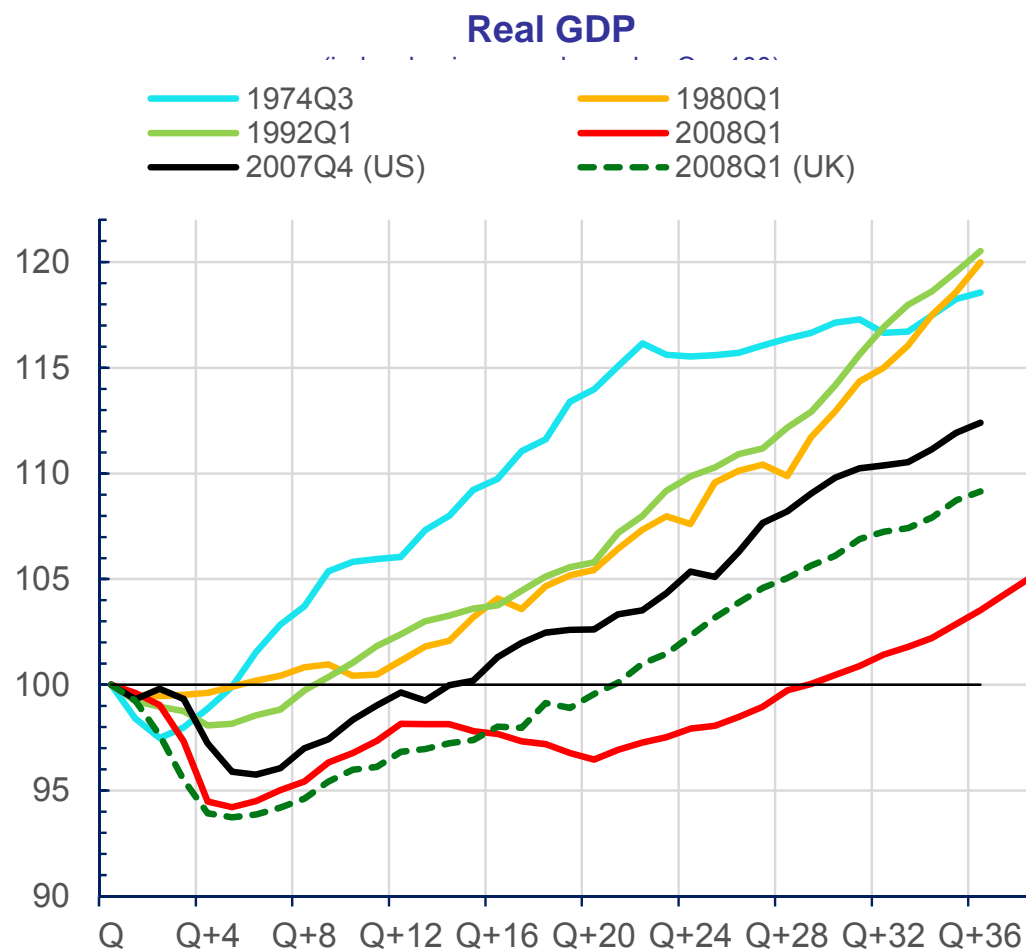


Sources: Eurostat and ECB calculations.



**1** Economic analysis and conjunctural assessment**1.1** Economic analysis at the ECB**1.2** Main features of the euro area economy**1.3** Recent conjunctural developments**1.4** Business cycle synchronisation**2** Inflation developments in the euro area**2.1** Recent developments in euro area inflation**2.1** Euro area inflation through the lens of the Phillips Curve**2.2** Structural drivers of inflation**2.3** Inflation outlook

The euro area has emerged from an unusually deep and protracted recession

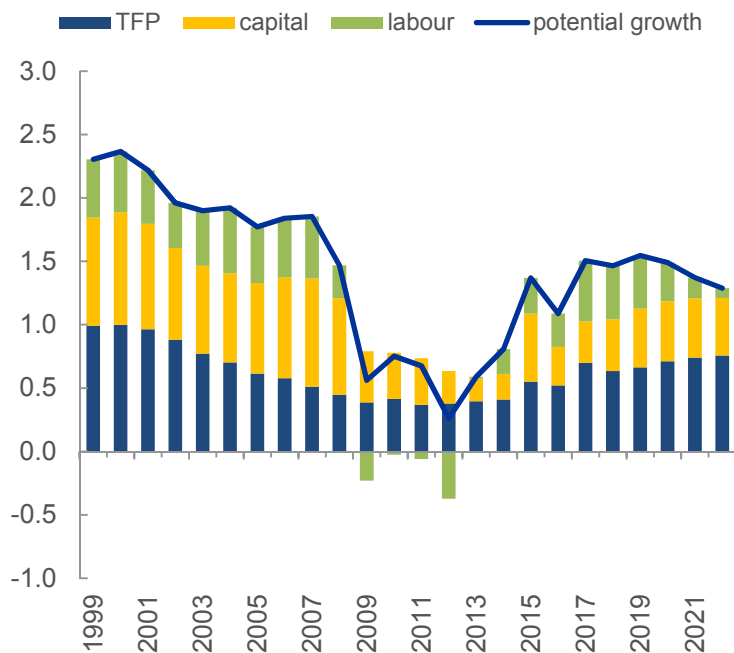


Sources: Eurostat and ECB calculations.  
 Note: the peaks are defined by the CEPR Euro Area Business Cycle Dating Committee.  
 Latest observations: 2018Q1 for the euro area.

**Potential growth recovered somewhat since the crisis;  
strong real GDP growth seen in 2013-2017 led to the gradual closing of the output gap**

## Euro area potential output and its components

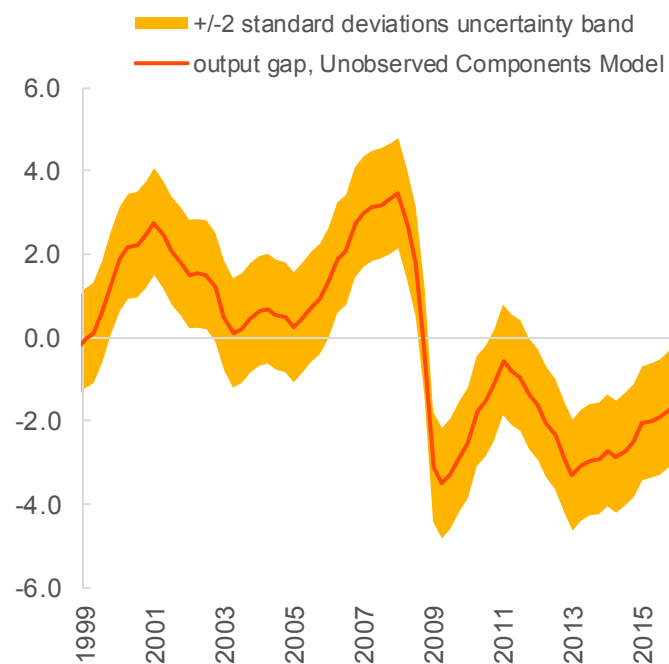
(Potential growth in %, components in pp.)



Source: European Commission.

## Output gap estimate of an Unobserved Components Model

(in % of potential output)

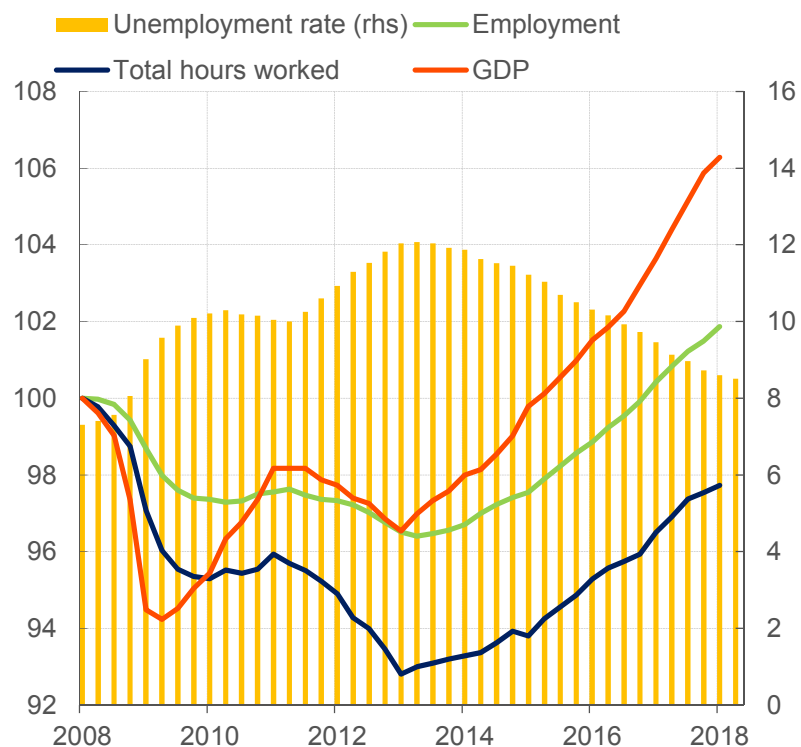


Sources: ECB staff calculations. ECB Economic Bulletin 2018/3

## Favourable labour market developments support economic expansion

### Employment, total hours worked, unemployment rate and the GDP

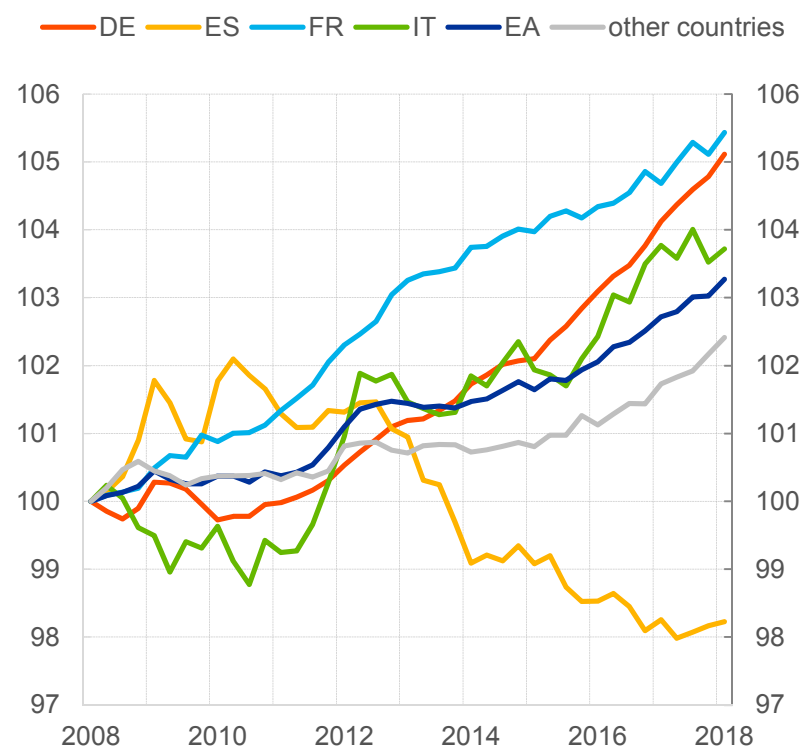
(index, 2008Q1 = 100; percentage of the labour force)



Sources: Eurostat and ECB calculations.  
Latest data: 2018 April for the unemployment rate, 2018Q1 for the rest.

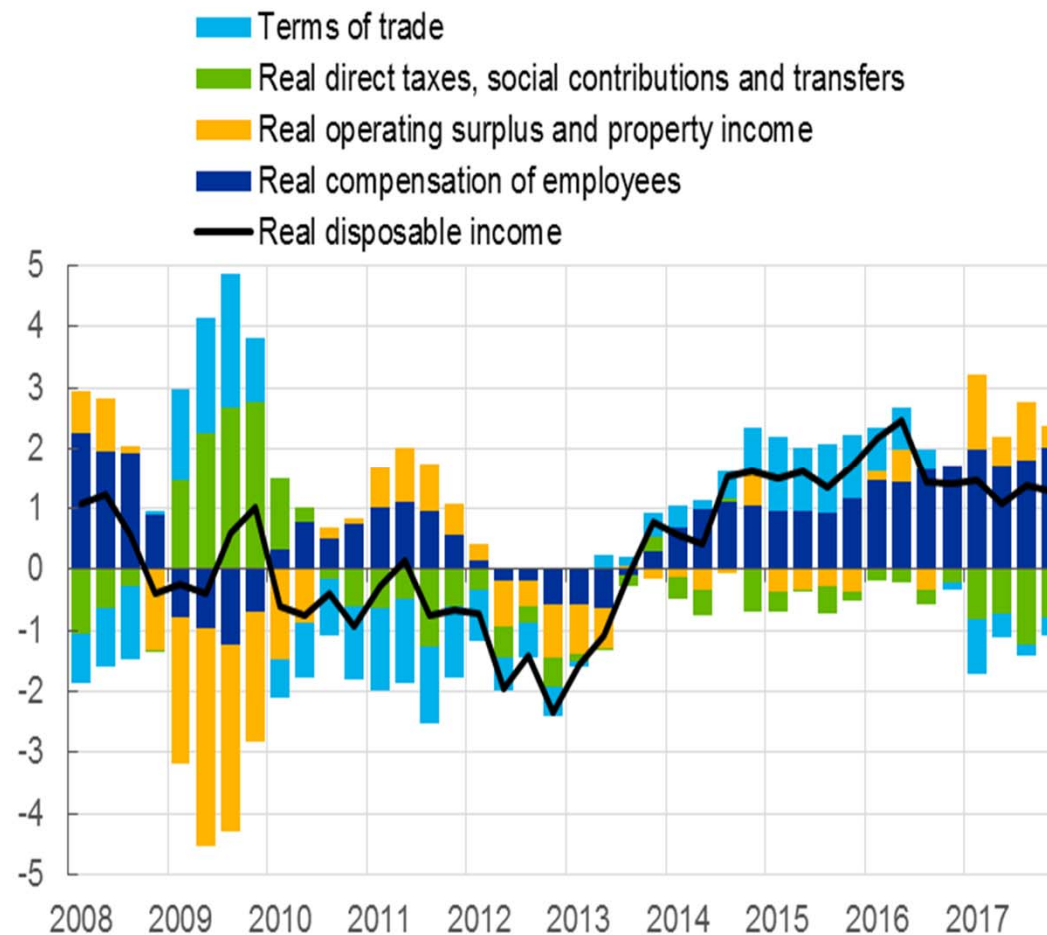
### Labour supply in the euro area and the largest countries

(index, 2008Q1 = 100)



Sources: Eurostat and ECB calculations.  
Latest data: 2018Q1.

## Real disposable income growth mainly supported by real compensation



Sources: Eurostat and ECB calculation.

Note: All income components are deflated with the GDP deflator. The contribution from the terms-of-trade is proxied by the differential in the GDP and consumption deflator.

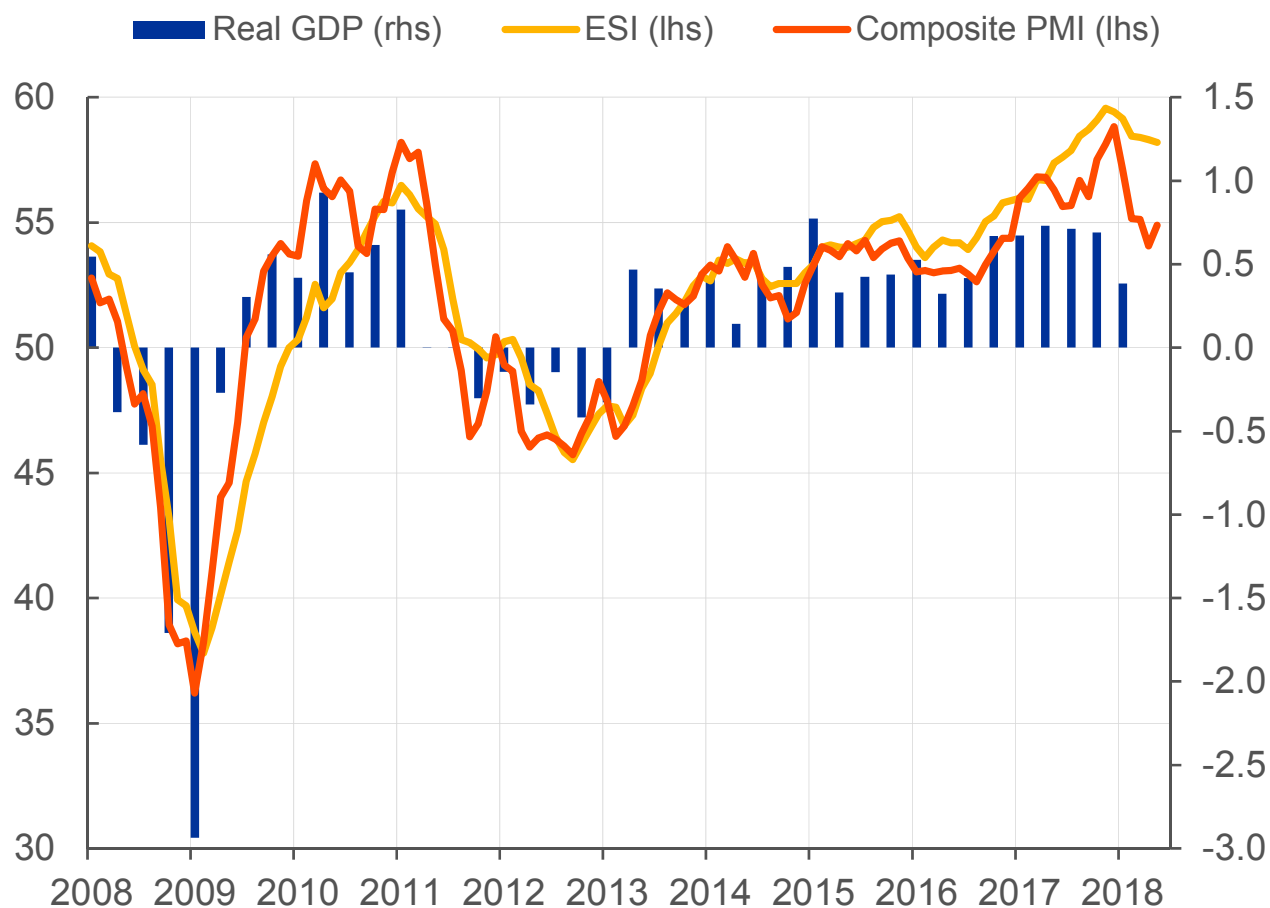
Total disposable income is deflated with the consumption deflator.

Last observation: 2017Q4.

## Some softening in growth since the beginning of 2018

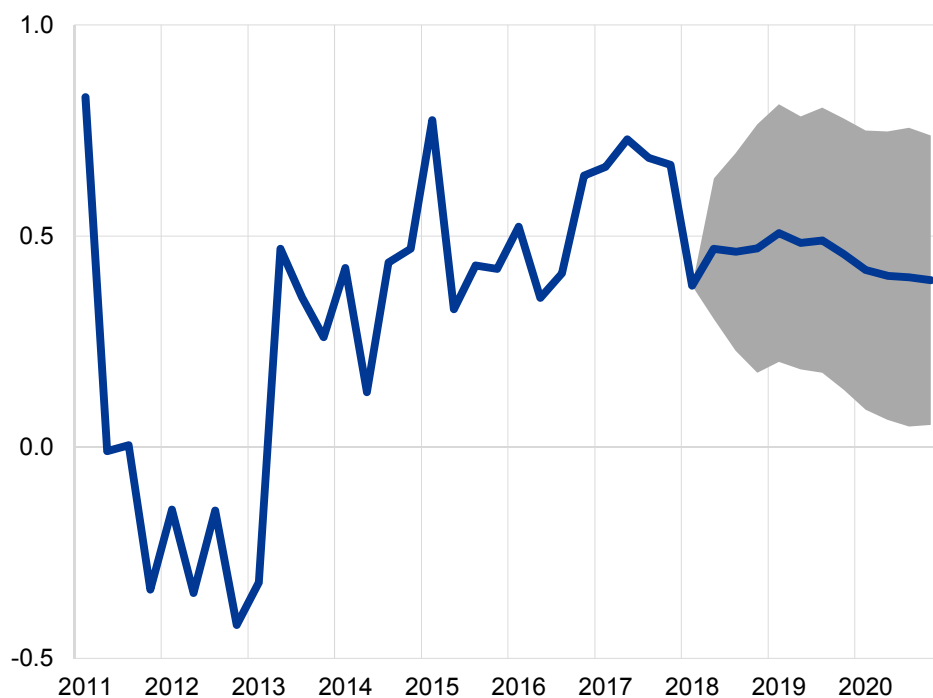
## Euro area real GDP, composite PMI and ESI

(q-o-q % change, diffusion index and percentage balance)



## Medium-term growth outlook

**Euro area: real GDP growth**  
(in percent change quarter ago)



- Growth moderated at beginning of 2018
- Annual GDP growth projected to decline from 2.1% in 2018 to 1.7% in 2020
- Continued expansion over medium term supported by
  - ECB's accommodative monetary policy stance
  - Lower deleveraging needs
  - Rising profits
  - Growth in foreign demand
- Gradual slowdown in growth due to
  - Declining impact from past monetary policy measures
  - Labour supply shortages

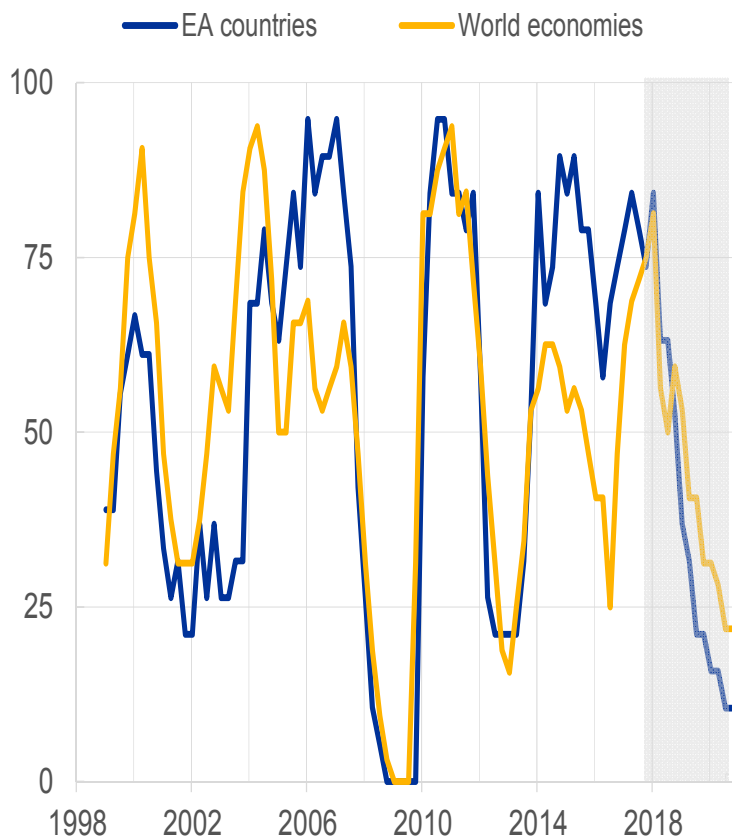
Source: ECB, June 2018  
Note: See ECB website, 14 June 2018.

**1** Economic analysis and conjunctural assessment**1.1** Economic analysis at the ECB**1.2** Main features of the euro area economy**1.3** Recent conjunctural developments**1.4** Business cycle synchronisation**2** Inflation developments in the euro area**2.1** Recent developments in euro area inflation**2.1** Euro area inflation through the lens of the Phillips Curve**2.2** Structural drivers of inflation**2.3** Inflation outlook



## Shares of countries with current GDP growth exceeding the past 3-year average

(quarterly data)

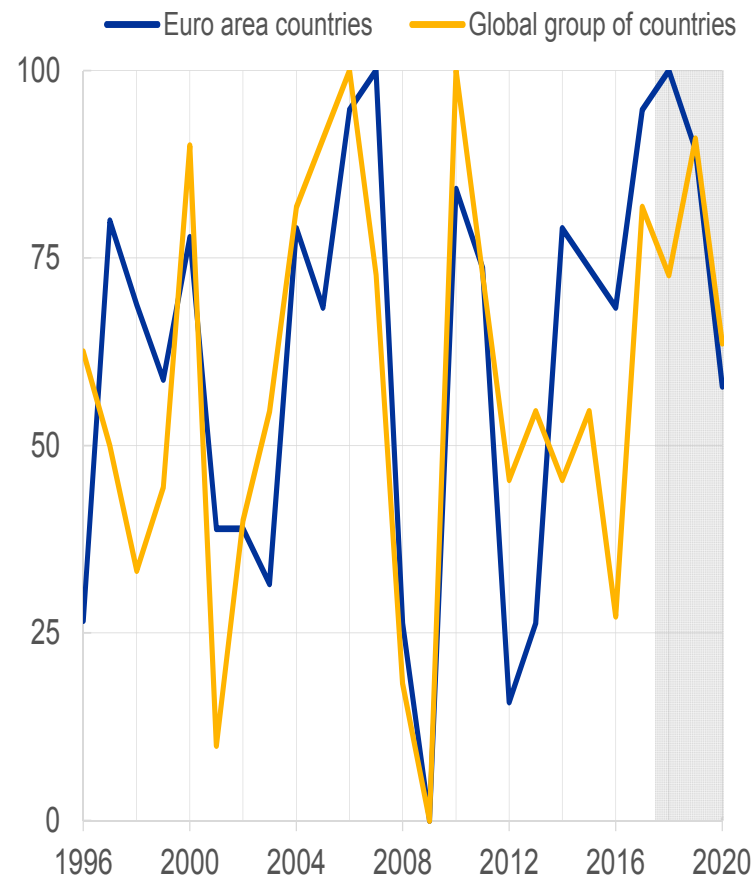


Source: OECD, Eurostat, ECB projections database.

Notes: World economy is based on real GDP growth rates (YoY) calculated for 31 countries + EA aggregate, accounting for 92% of global GDP in PPP. The euro area economy consists of the current 19 EA member countries. Shaded area refers to the projection horizon

## Shares of countries with a positive GDP-potential output growth differential

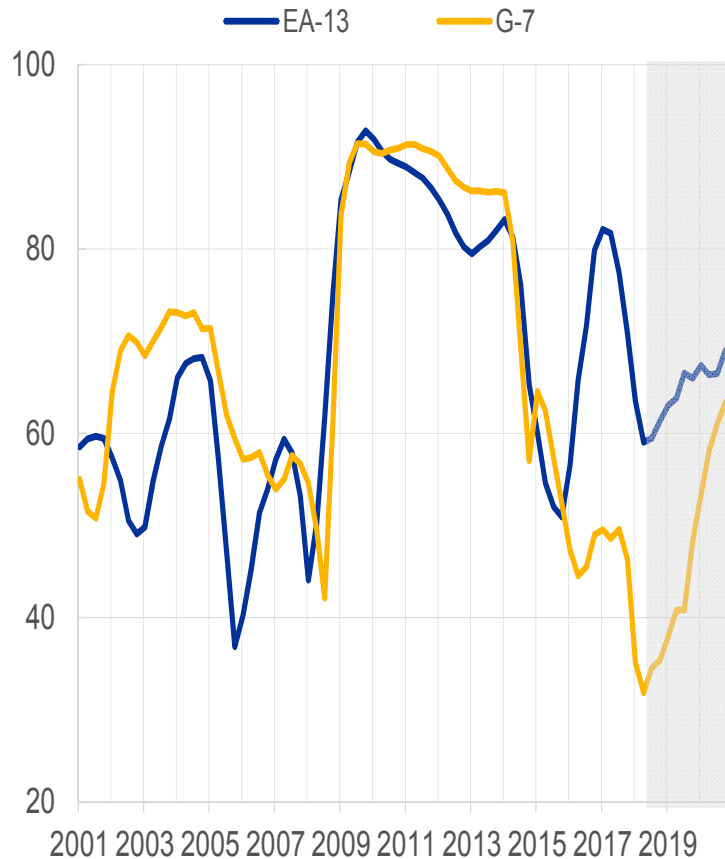
(annual data)



Source: OECD, Eurostat, ECB projections database.

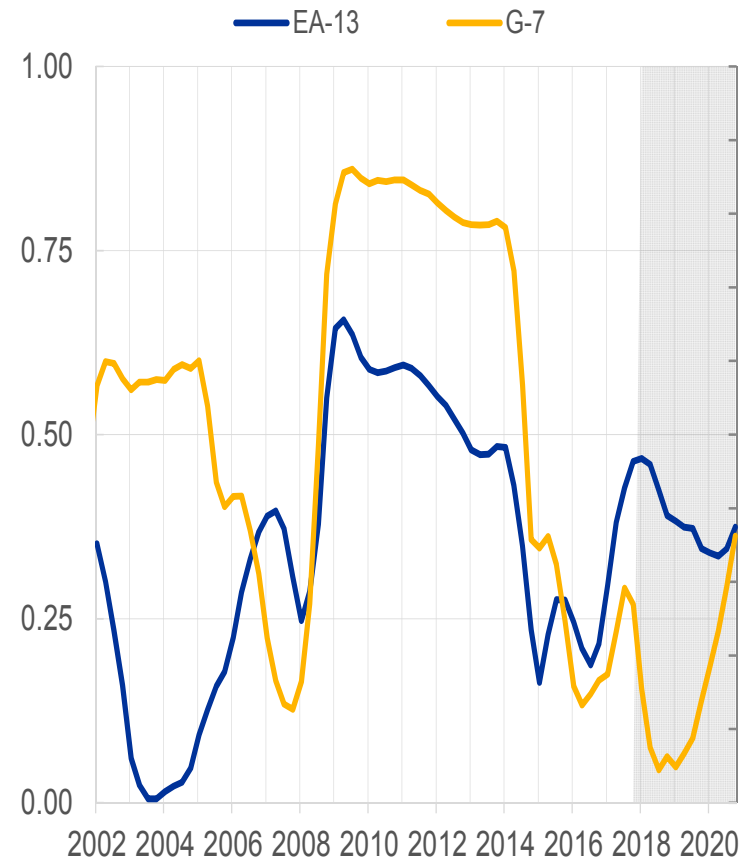
Notes: the global group consists of the Euro Area, US, Japan, UK, China, India, S. Korea, Russia, Brazil, Mexico and Turkey (i.e. the countries with available potential output growth estimates). Shaded area refers to the projection horizon.

**Share of output growth variance explained by the first principal component over a 5-year rolling window**  
(quarterly data)



Source: OECD, Eurostat, ECB projections database.  
Notes: Based on the 5-year rolling window estimates of the first principle component of quarterly year-on-year GDP growth rates over the period 1970Q1-2020Q4.. Grey shaded area refers to the projection horizon

**Cross-country (spatial) correlations over a 5-year rolling window**  
(quarterly data)



Source: OECD, Eurostat, ECB projections database.  
Note: Moran's index is a weighted average single measure summarising the panel of pair-wise cross-country correlations. Grey shaded area refers to the projection horizon.

## 1 Economic analysis and conjunctural assessment

1.1 Economic analysis at the ECB

1.2 Main features of the euro area economy

1.3 Recent conjunctural developments

1.4 Business cycle synchronisation

## 2 Inflation developments in the euro area

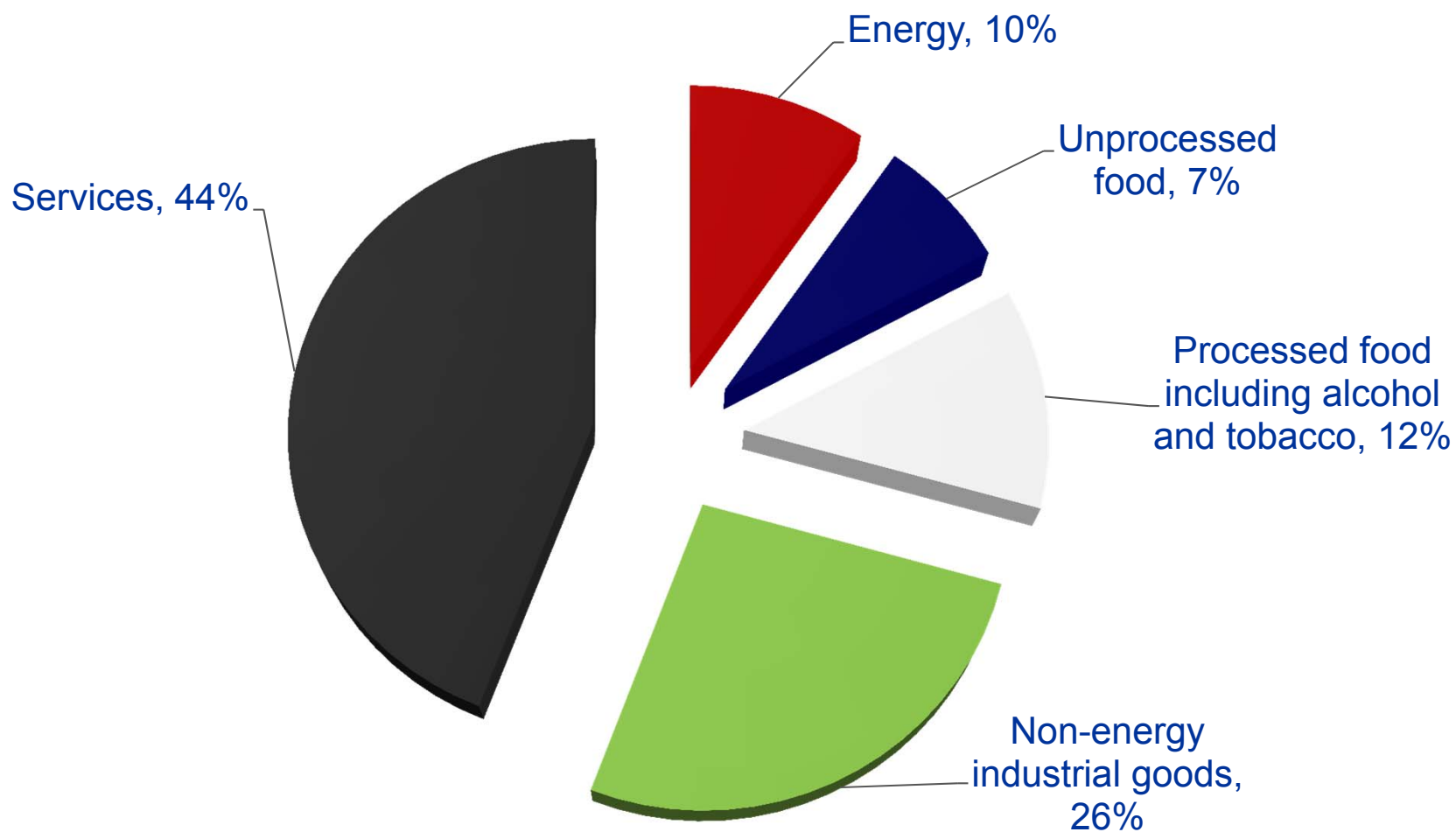
2.1 Recent developments in euro area inflation

2.1 Euro area inflation through the lens of the Phillips Curve

2.2 Structural drivers of inflation

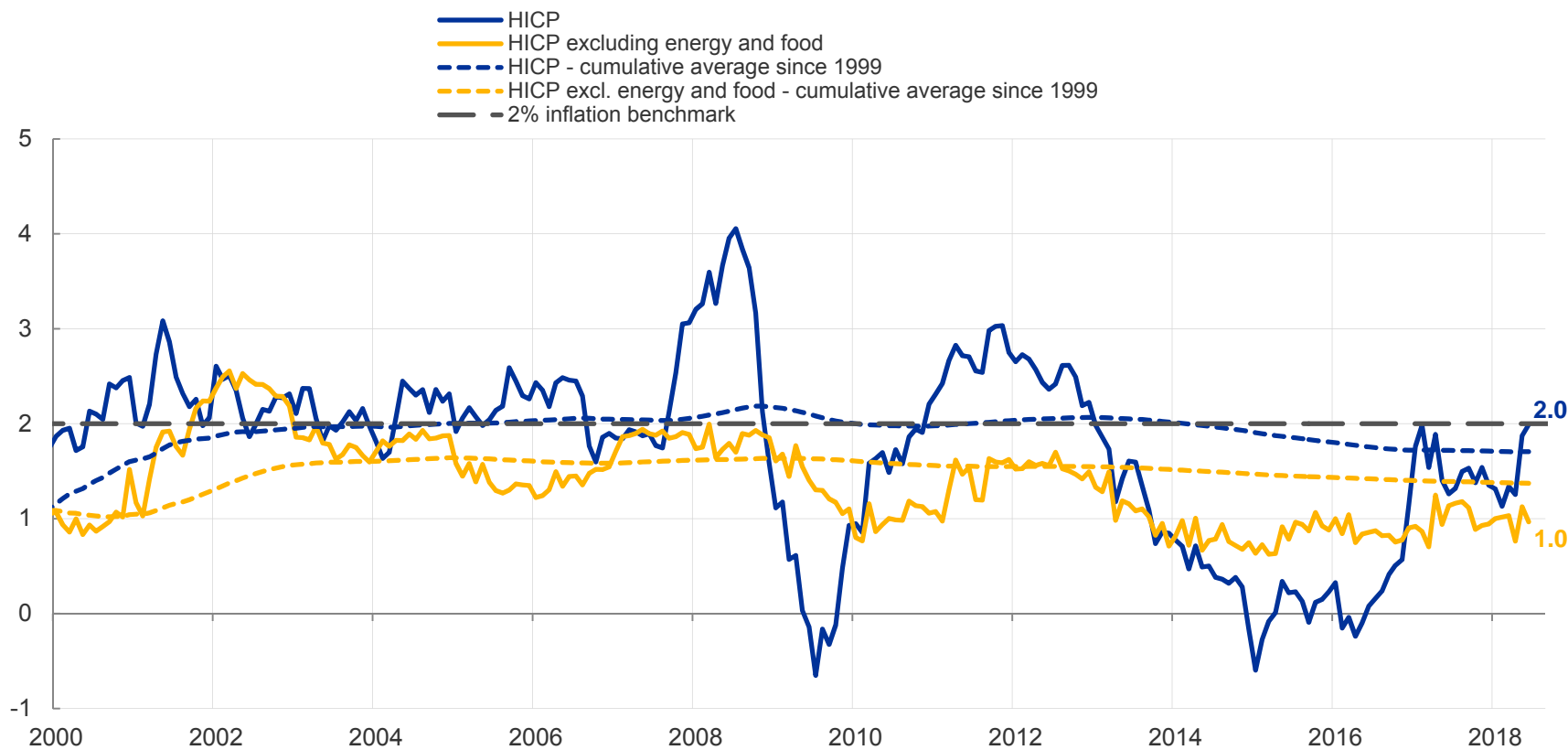
2.3 Inflation outlook

### Weights of HICP components (in %)



Source: Eurostat.

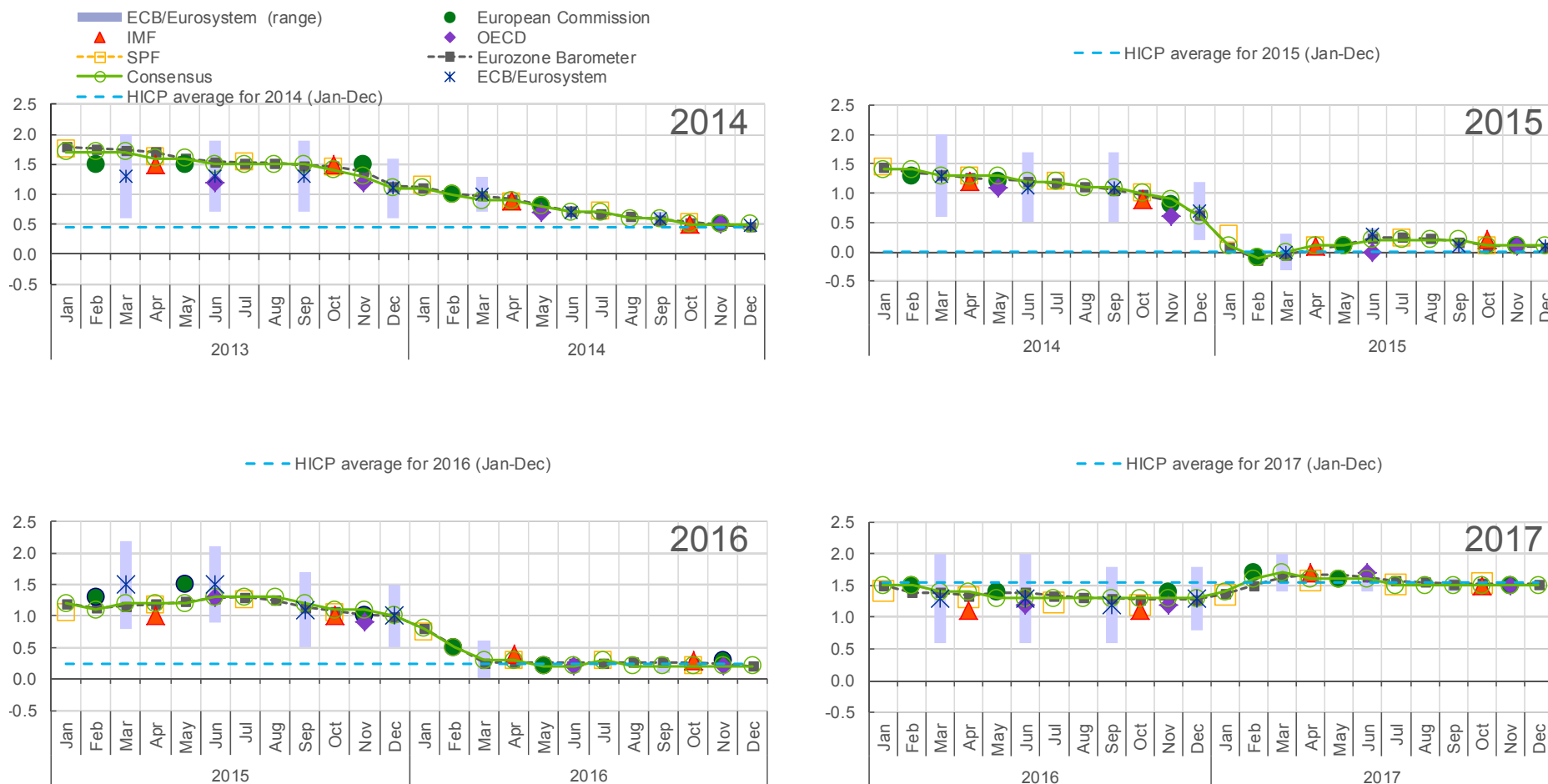
## HICP and HICP excluding energy and food (annual percentage changes)



Sources: Eurostat and ECB calculations.

Note: Latest observations are for June 2018 (flash estimates). The cumulative averages are the averages of the annual inflation rates from January 1999 to each month.

## Evolution of projections for average headline inflation in 2014, 2015, 2016 and 2017



Source: Ciccarelli and Osbat (2017), "Low inflation in the euro area: Causes and consequences", ECB OP no. 181.

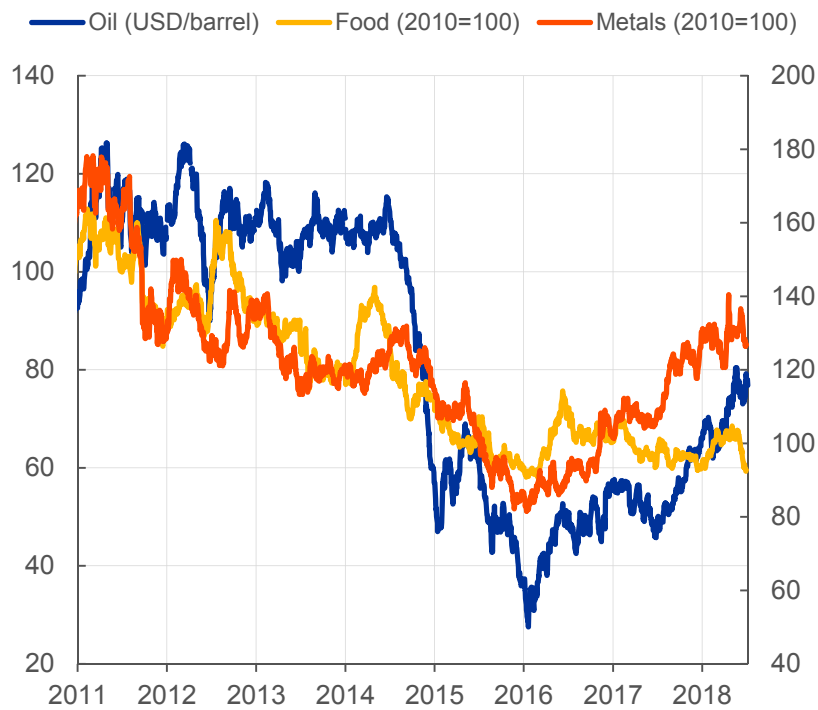
Data sources: ECB, IMF, European Commission, OECD, Consensus Economics, Eurozone Barometer.

Note: The horizontal axis shows the publication date of the forecast.

# Headline inflation was suppressed by (unexpected) falls in commodity prices ECB-PUBLIC

## Brent crude oil, food and metals prices

(lhs: USD per barrel for oil; rhs: index food/metal)

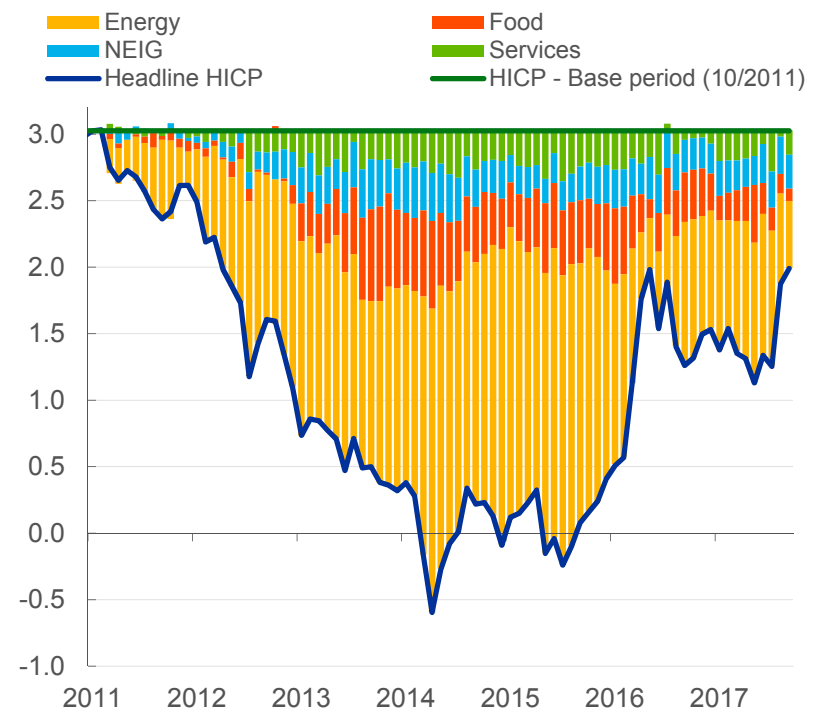


Source: ECB.

Notes: The index for metals is composed of Aluminium, Lead, Copper, Nickel, Zinc and Tin. Latest observations refer to July 6 2018 for oil, and to June 29 2018 for food and metals.

## Contributions to the decline in HICP inflation

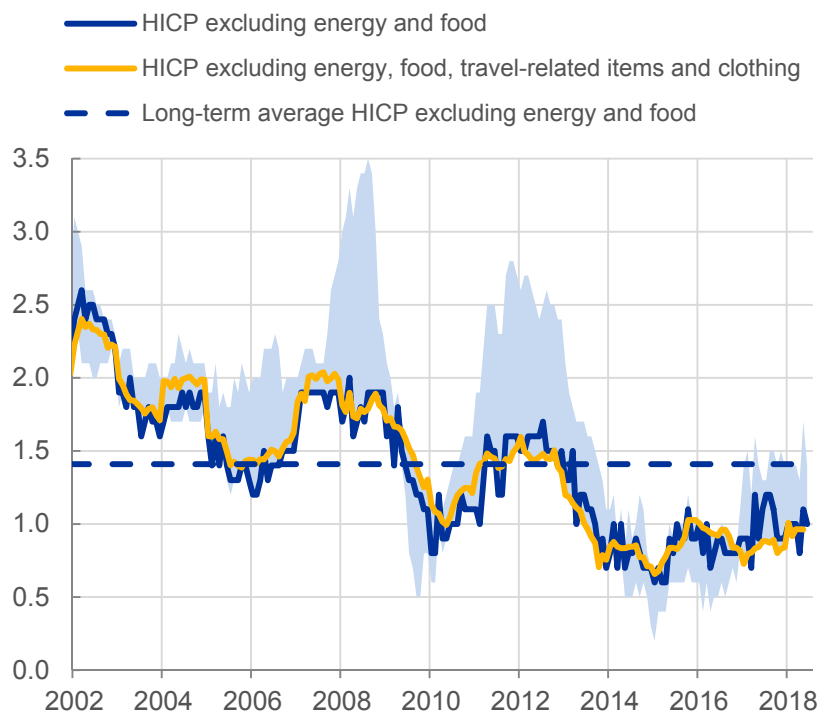
(overall index: annual growth rates; and contributions in p.p.)



Sources: Eurostat and ECB staff calculations.

Note: Latest observation: June 2018 (flash estimates). The base period refers to the latest peak.

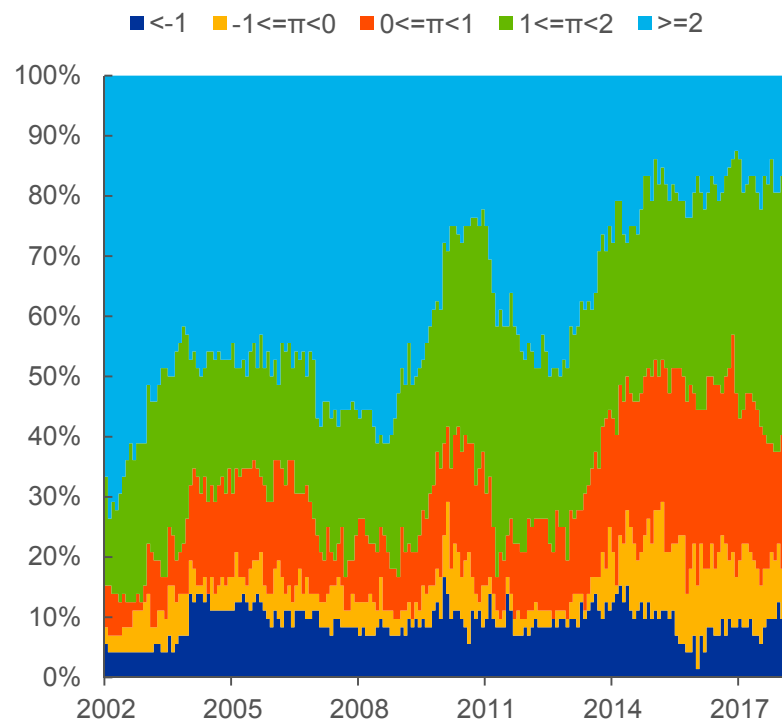
## Measures of underlying inflation (annual percentage changes, percent)



Sources: Eurostat and ECB calculations.

Notes: The range includes exclusion-based measures, trimmed means and a weighted median. Latest observation: June 2018 (flash estimate) for HICP excluding energy and food; May 2018 for the rest.

## Share of items with high/low inflation in HICP excluding food and energy (unweighted share)



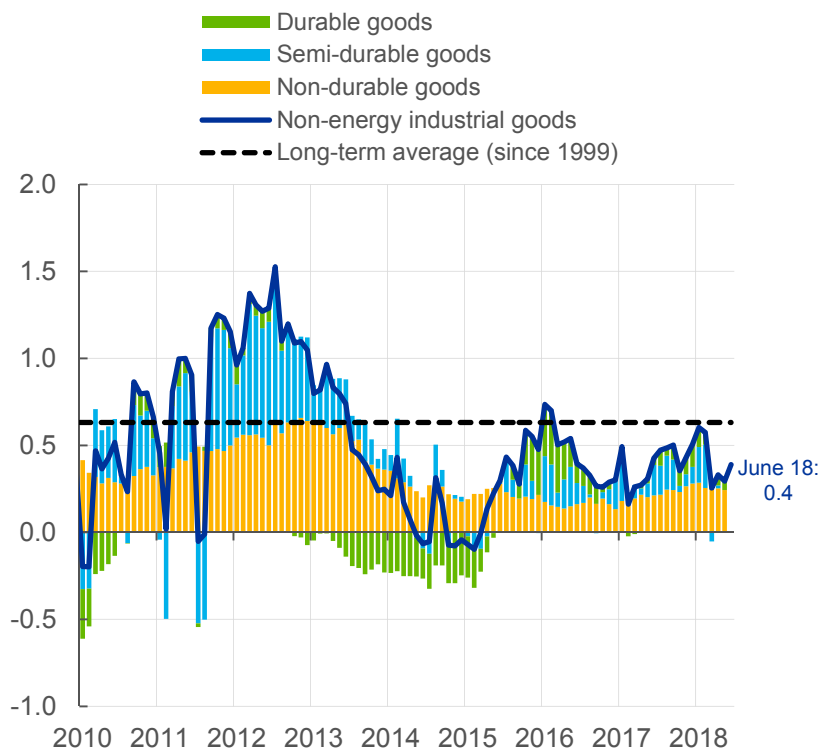
Sources: Eurostat and national statistical offices

Notes: The coloured areas reflect the unweighted share of items in HICP excluding food and energy within the respective range. Latest observation: May 2018.



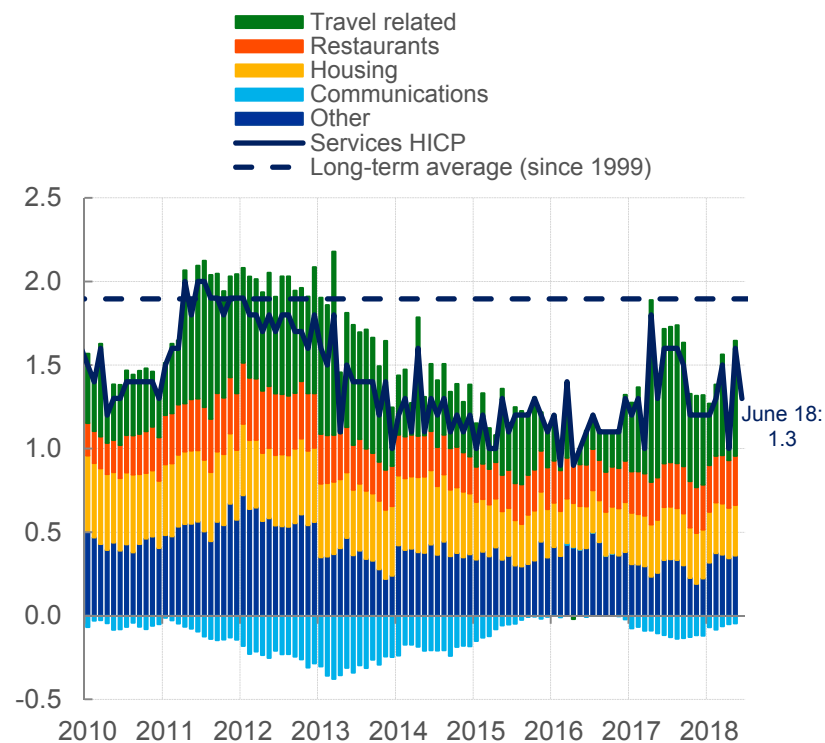
### HICP non-energy industrial goods (NEIG)

(annual percentage change, percentage point contributions)



### HICP services

(annual percentage change, percentage point contributions)

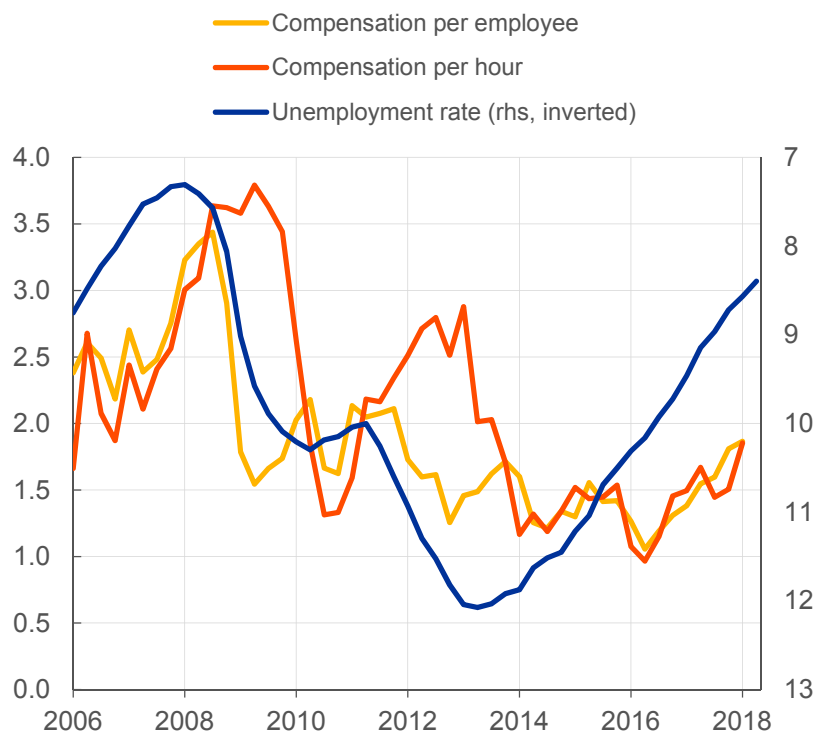


Sources: Eurostat and ECB calculations.  
 Latest observations: June 2018 (flash estimate) for HICP non-energy industrial goods, and May 2018 for the rest.

Sources: Eurostat and ECB calculations.  
 Latest observations: June 2018 (flash estimate) for services HICP, and May 2018 for the rest.

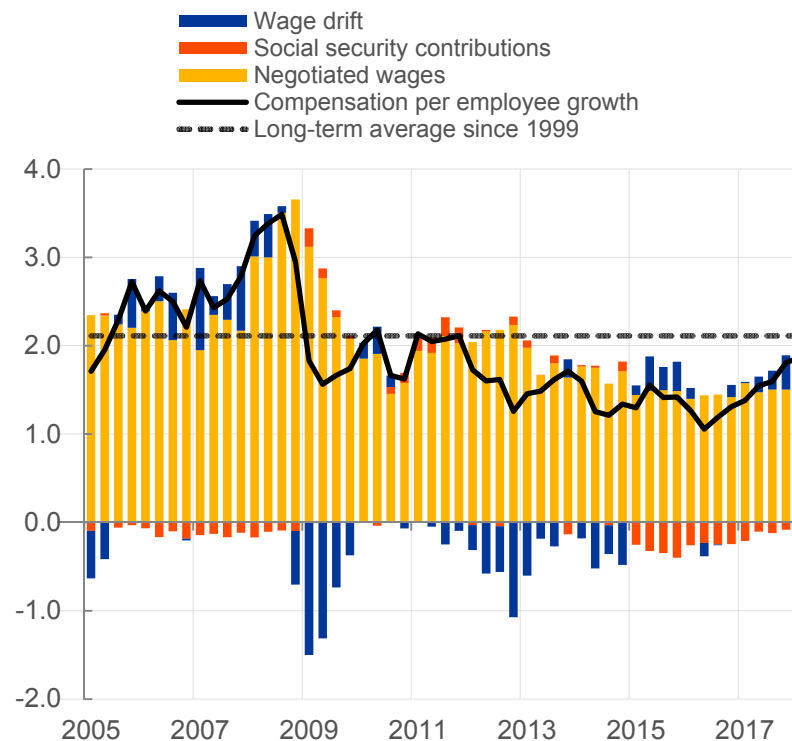
## Labour costs and unemployment developments

(lhs: annual percentage changes; rhs: percentage)



## Decomposition of wage developments

(annual percentage changes, percentage point contributions, quarterly data)



Sources: Eurostat, ECB calculations.  
 Latest observation: 2018Q2 for the unemployment rate (based on April and May 2018) and 2018Q1 for the rest.

Sources: Eurostat and ECB calculations.  
 Note: The latest observation refers to 2018Q1. Dashed line reflects long-term average of compensation per employee since 1999Q1.

**1** Economic analysis and conjunctural assessment**1.1** Economic analysis at the ECB**1.2** Main features of the euro area economy**1.3** Recent conjunctural developments**1.4** Business cycle synchronisation**2** Inflation developments in the euro area**2.1** Recent developments in euro area inflation**2.1** Euro area inflation through the lens of the Phillips Curve**2.2** Structural drivers of inflation**2.3** Inflation outlook

Set of hybrid New Keynesian Phillips Curves

$$\pi_t = \mu + \rho\pi_{t-1} + \theta\pi_t^e + \beta x_{t-1} + \gamma\pi_{t-2}^{imp} + \varepsilon_t$$

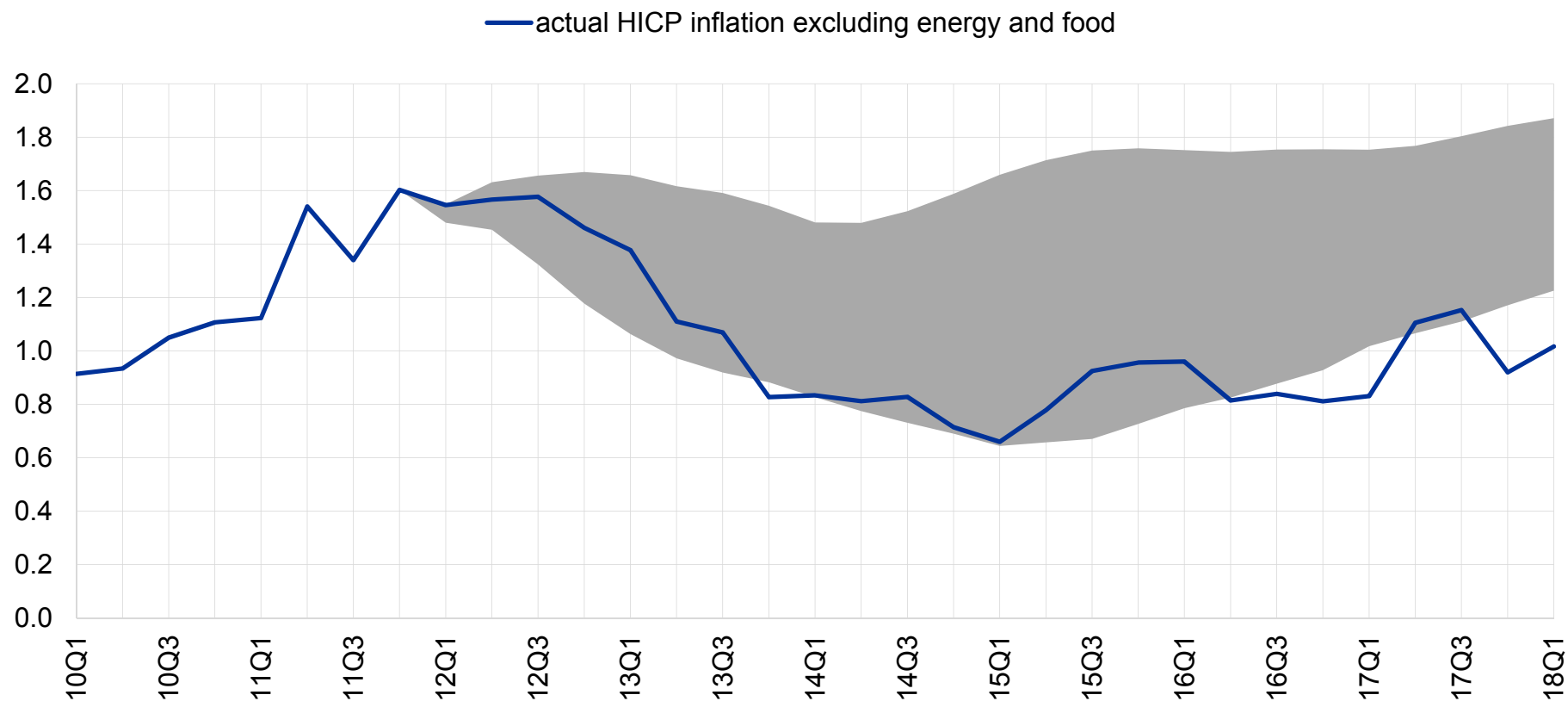
Where:

$\pi_t$	annualized q-o-q growth rate of SA HICP excluding energy and food
$\pi_t^e$	survey-based inflation expectations (SPF and EC at many horizons)
$\pi_t^{imp}$	annual growth rate of extra-EA import prices
$x_t$	slack measure

- (1) output gap – ECB estimates;
- (2) GDP growth;
- (3) unemployment rate;
- (4) unemployment gap – ECB estimates
- (5) output gap – EC estimates

## Conditional Phillips curve forecast for the post-crisis period

(HICP inflation excluding energy and food; annual percentage changes)



Sources: Eurostat and ECB calculations.

Notes: The starting point of the forecast is the second quarter of 2012. The last observation is 2018Q1. The grey range covers the conditional forecast of HICP inflation excluding energy and food from an equation where it is regressed on its lag, lagged import prices, a lagged measure of slack (combining output gap model-based estimates, GDP growth, the unemployment rate, the unemployment gap and the output gap – the latter based on European Commission estimates) and a measure of inflation expectations (based on quarterly Consensus Economics measures with horizons from one to seven quarters and Survey of Professional Forecasters measures one, two and five years ahead).

First published in : Ciccarelli and Osbat (2017), "Low inflation in the euro area: Causes and consequences", ECB OP no. 181.

For details see: ECB Annual Report 2017; chapter 1.1; box 2.

## 1 Economic analysis and conjunctural assessment

1.1 Economic analysis at the ECB

1.2 Main features of the euro area economy

1.3 Recent conjunctural developments

1.4 Business cycle synchronisation

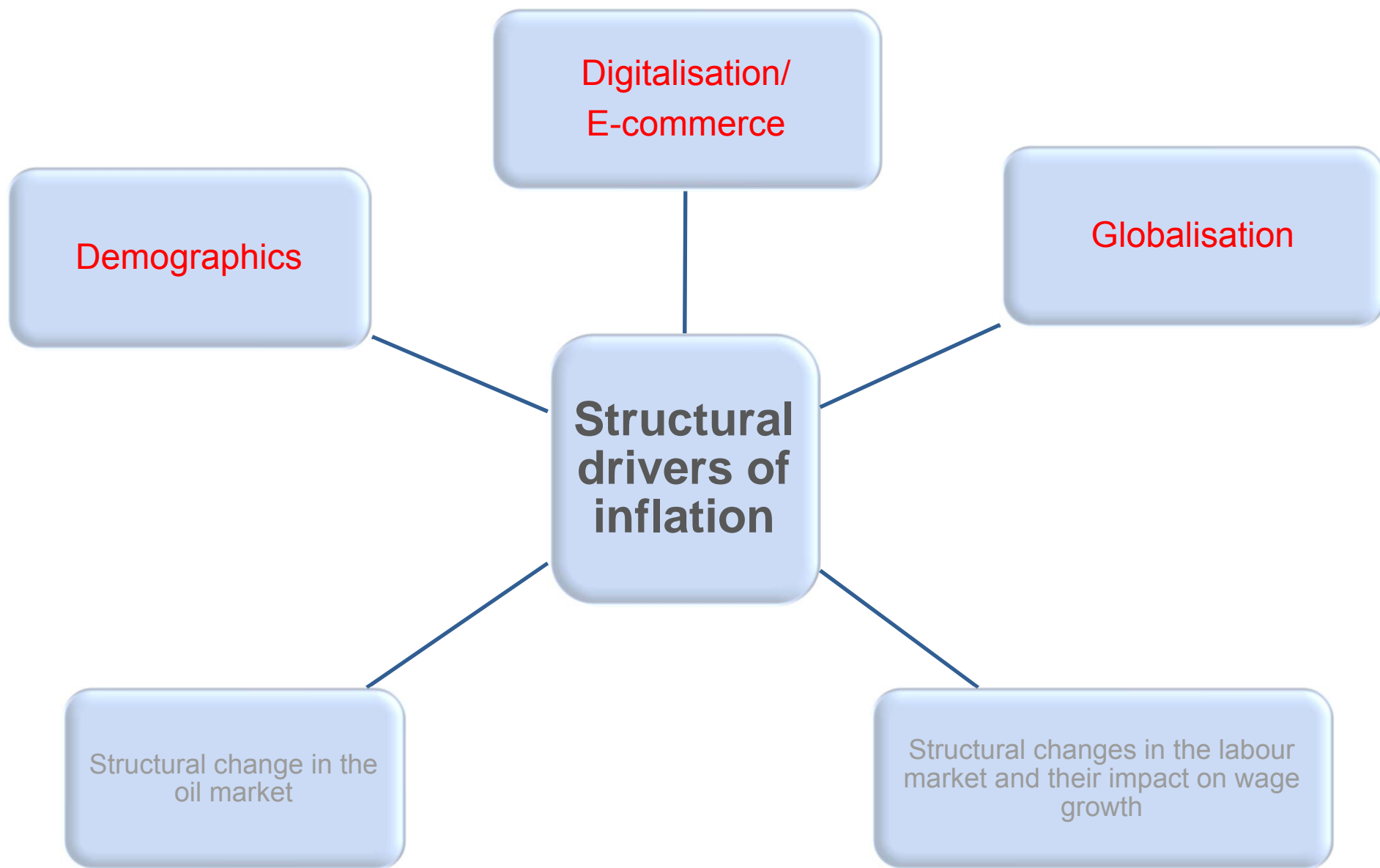
## 2 Inflation developments in the euro area

2.1 Recent developments in euro area inflation

2.1 Euro area inflation through the lens of the Phillips Curve

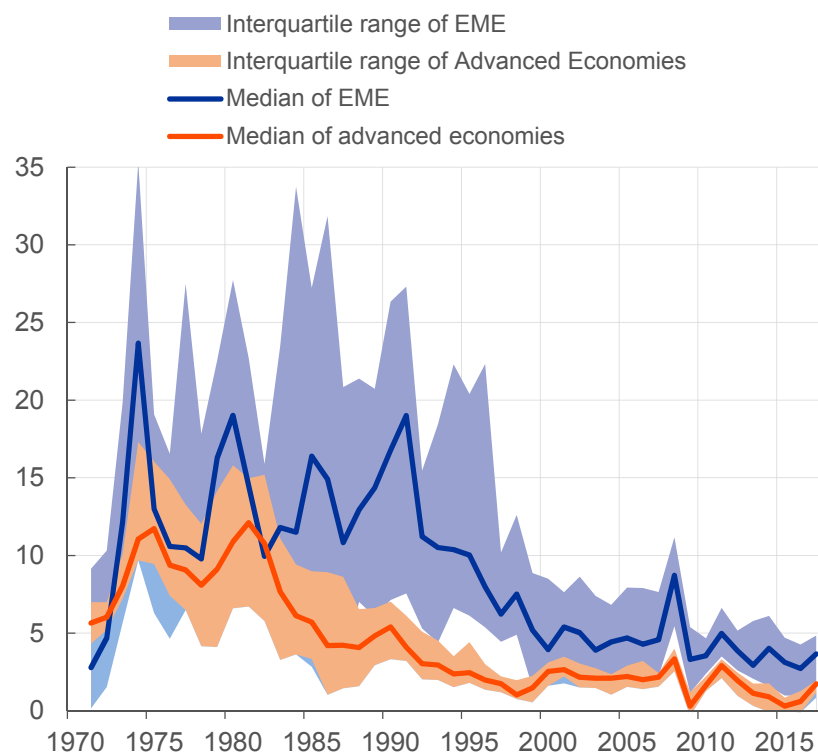
2.2 Structural drivers of inflation

2.3 Inflation outlook



## Range of headline inflation in advanced and emerging economies over time

(annual percentage changes)



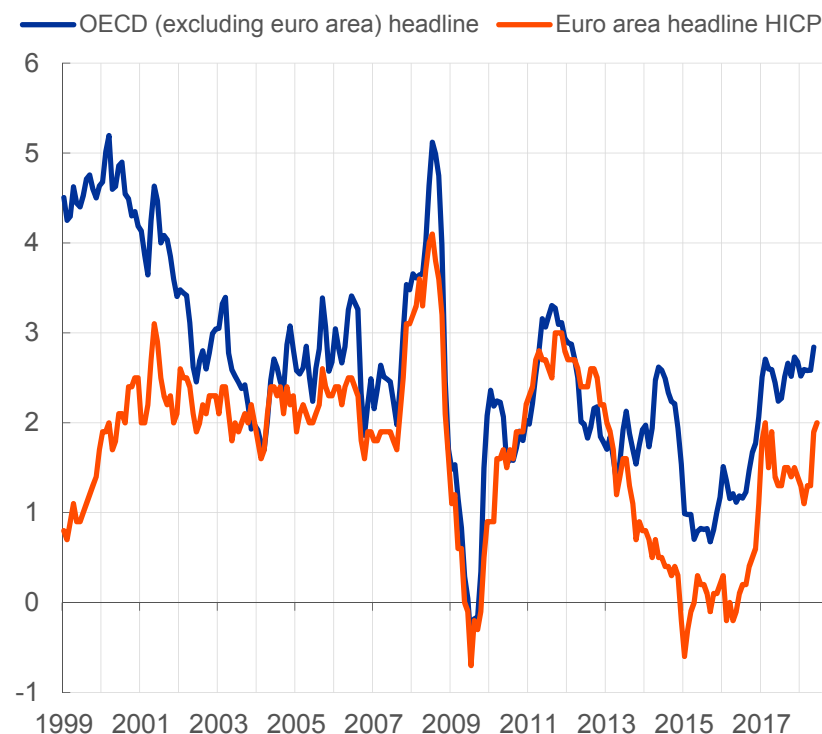
Source: Haver.

Latest observations: The latest observation is for 2017 (annual data).

Note: The interquartile range covers 50% of the samples of emerging and advanced economies. The sample includes 17 advanced economies (Australia, Austria, Belgium, Canada, France, Germany, Greece, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United States) and 25 emerging economies (Bolivia, Chile, Colombia, Côte d'Ivoire, Ecuador, Egypt, El Salvador, Guatemala, Honduras, Indonesia, Israel, Jamaica, South Korea, Malaysia, Mauritius, Mexico, Nigeria, Paraguay, the Philippines, Singapore, South Africa, Taiwan, Thailand, Tunisia, Turkey). Only countries for which data going back to 1970 are available have been included.

## Headline inflation developments in OECD and EA countries

(annual percentage changes)



Sources: OECD, Eurostat, and ECB calculations

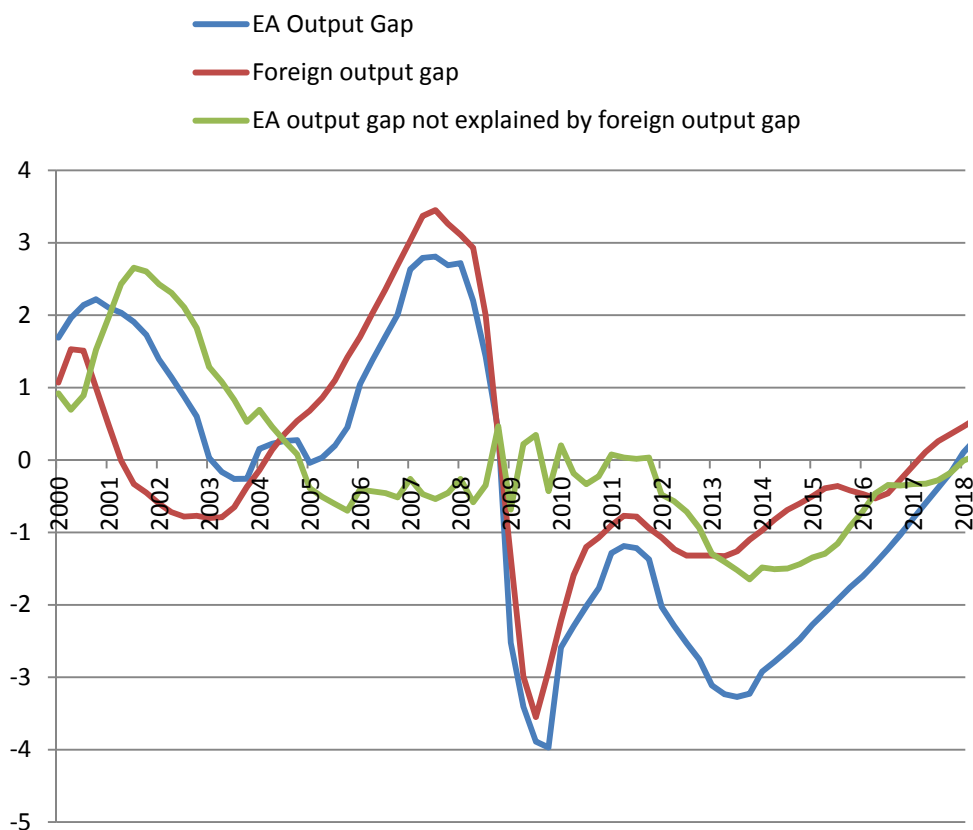
Latest observations: June 2018 (flash estimate) for the Euro Area, and May 2018 for the non-euro area OECD countries. Monthly data.

See for details: ECB Economic Bulletin 04/2017: Domestic and global drivers of inflation in the euro area



## Foreign and euro area output gap

(percentage points)



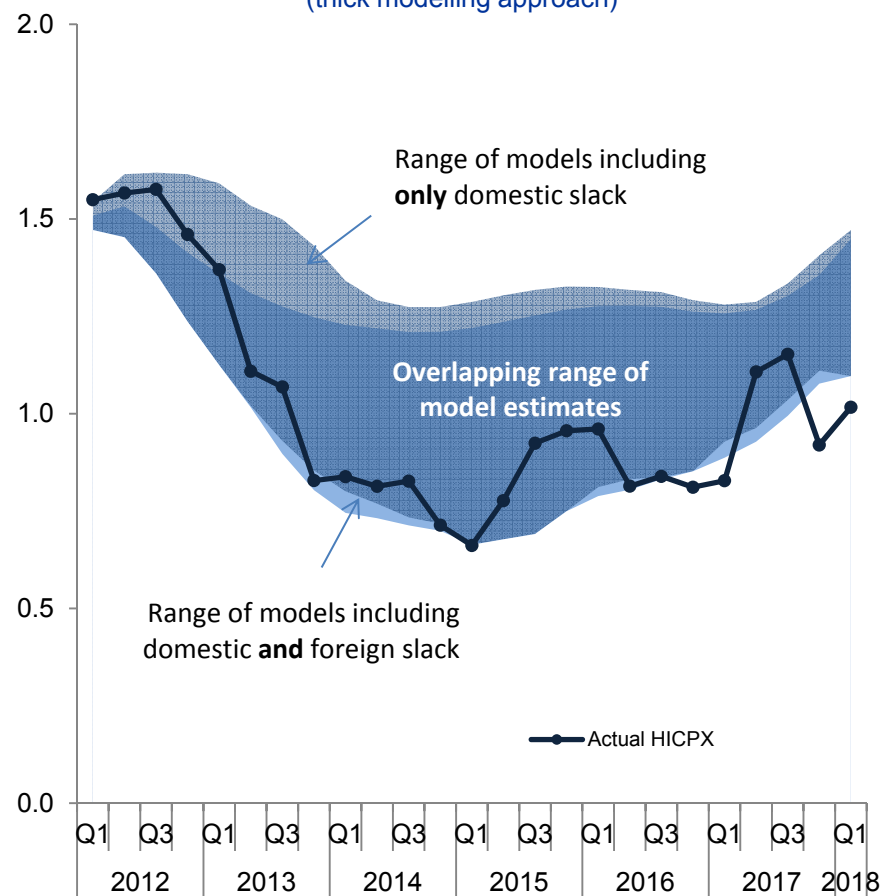
Source: ECB calculations.

Notes: The EA output gap comes from the European Commission. Foreign output gap (data/projection) is trade-weighted and based on the latest IMF WEO data. The “EA output gap not explained by foreign output gap” is derived by an auxiliary regression (regressing the domestic on the global output gap). Includes data up to 2018Q1.

Source: See “: “Domestic and global drivers of inflation in the euro area”, ECB Economic Bulletin 4/2017, and C. Nickel, 2017, <http://voxeu.org/article/role-foreign-slack-domestic-inflation-eurozone>

## Conditional forecasting HICPX: actual and conditional out-of-sample projection

(thick modelling approach)



Sources: ECB calculations based on Eurostat, IMF, Consensus Economics and SPF data. Notes: Results based on a thick-modelling approach including a broad range of fixed-coefficient specifications of the Phillips curve including either only domestic or domestic and foreign slack. The parameters are estimated over the sample 1995Q1 to 2018Q1. The conditional out-of-sample forecast is done for 2012Q1 to 2018Q1. The ranges depict forecasts for HICP excl. energy and food coming from differently specified Phillips curves. The specifications include permutations across the expectation formation (backward- or forward-looking) and the variables representing economic activity/slack.

## 1 Economic analysis and conjunctural assessment

1.1 Economic analysis at the ECB

1.2 Main features of the euro area economy

1.3 Recent conjunctural developments

1.4 Business cycle synchronisation

## 2 Inflation developments in the euro area

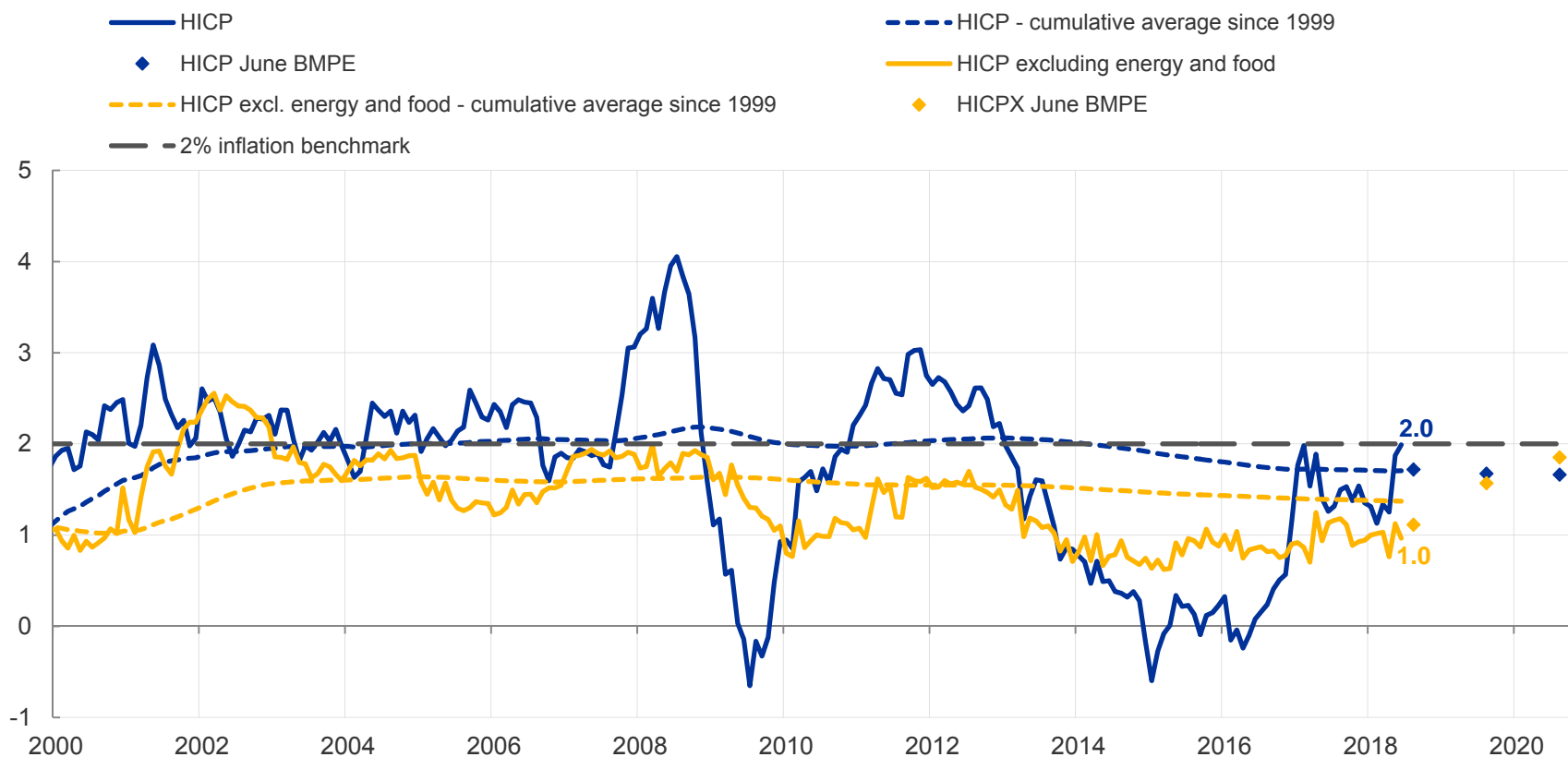
2.1 Recent developments in euro area inflation

2.1 Euro area inflation through the lens of the Phillips Curve

2.2 Structural drivers of inflation

2.3 Inflation outlook

## HICP and HICP excluding energy and food (annual percentage changes)



Sources: Eurostat and ECB calculations.

Note: Latest observations are for June 2018 (flash estimates). The cumulative averages are the averages of the annual inflation rates from January 1999 to each month.

Economic analysis as part of the information set to inform monetary policy decisions

