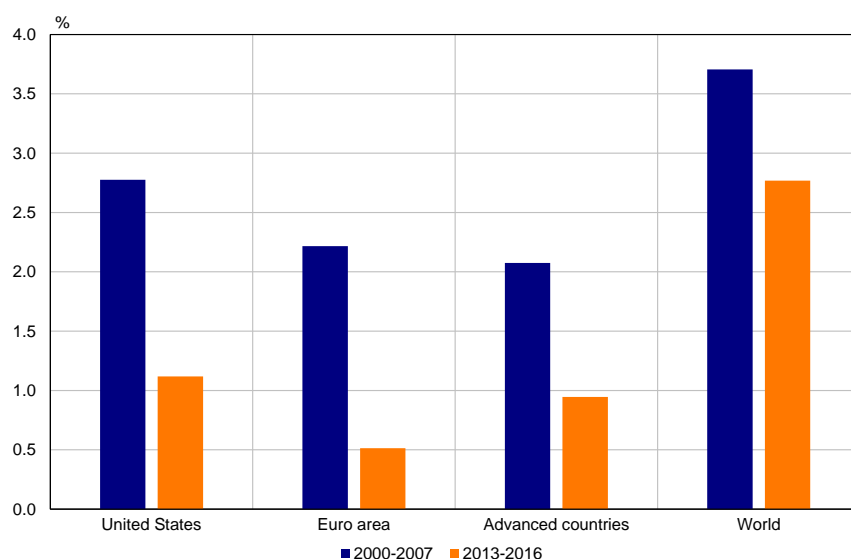


Why is global inflation still so low?

- Global inflation has declined sharply since 2012 to levels generally below central banks' inflation targets. The uptick over the past year is mainly attributable to a recovery in oil prices, and could be curtailed if higher prices do not feed through significantly to wages. So far, core inflation (excluding food and energy) has remained virtually flat.
- A long period of low inflation has numerous related costs. A reduction in inflation increases the real cost of past debt and compels economic agents to use a larger portion of their income to pay down debt. This, in turn, involves weaker investment and consumption. Furthermore, in a context of nominal rigidity, low inflation makes it difficult to adjust real wages downwards during an economic shock, thus amplifying the adverse impact on employment. Finally, a lasting period of low inflation leaves central banks little room of manoeuvre when key interest rates are already at low levels – as is the case today.
- Low global inflation is caused by several factors: (i) a continued imbalance between supply and demand, due to weak economic momentum in the aftermath of the crisis, overinvestment in some sectors in China, and the ageing of the world population; (ii) weak wage momentum, especially in advanced countries (reflecting a reduction in workers' bargaining power, globalisation, wage moderation policies in some countries, or untapped labour reserves not fully reflected in unemployment statistics); (iii) lower inflation expectations following a period of low inflation; and (iv) the decline in oil prices since 2014. At the same time, the banking sector's difficulties and the need for the private sector and government to deleverage in some countries have dampened demand and made monetary policy less effective.
- In the medium term, core inflation is set to recover only very gradually, driven to a certain degree by an upturn in demand (private sector credit growth, lower unemployment rate, recovery in wages, etc.), even though inflation has become less responsive to the economic cycle than previously. However, the aforementioned structural factors are expected to continue to have a dampening effect.
- The current context of low core inflation calls for: (i) continued monetary support, especially in the euro area and Japan, where core inflation remains very low; (ii) the roll-out of pro-wage growth policies in countries with sizeable current account surpluses, notably in the euro area; and lastly (iii) a change to the industrial policies driving global sector overcapacity, notably in China.

Global inflation (average)

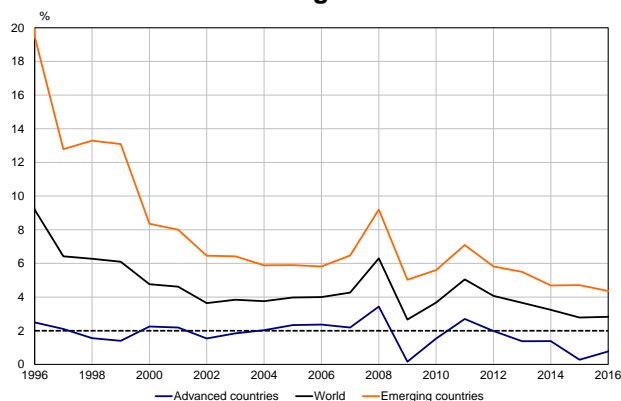


Source: IMF ; DG Trésor calculations.

1. Global inflation has declined sharply since 2012 and now stands at a low level – particularly in advanced economies

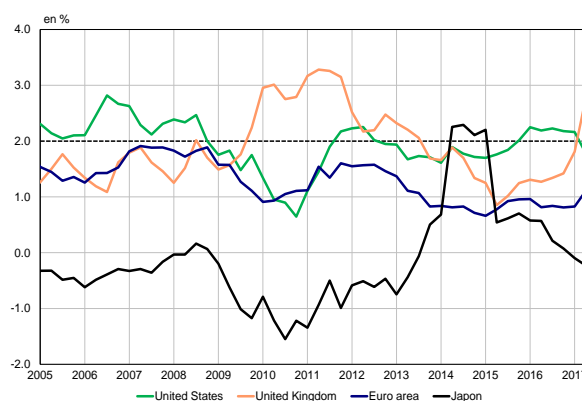
From 5.0% in 2011, global inflation had declined to just 2.8% by 2016 (see Chart 1). In advanced economies, especially Japan and the euro area, inflation is much lower (0.8% in 2016) than in emerging economies (4.4%). This weak inflation is partly attributable to plummeting oil prices. Yet in Japan and the euro area, core inflation – excluding the most volatile components such as oil – is also low compared to central banks' targets of around 2%¹ (see Chart 2).

Chart 1: Total global inflation



Source: IMF.

Chart 2: Core inflation



Source: BLS, ONS, Eurostat, MIC.

2. A long period of low inflation has numerous related costs

Just as excessive inflation has an economic cost, a long period of low inflation is also damaging.

- **Weak inflation hampers deleveraging.** The more inflation declines, the more the real cost of past debt contracted at fixed interest rates rises. Lower-than-expected inflation leads indebted economic agents to use a larger share of their income to service their debt. During a period in which deleveraging needs remain significant, this can weigh on aggregate consumption and investment.
- **In a context of low inflation and wage stickiness, a negative demand shock results in a more marked increase in unemployment.** In such cases, companies resort more to cutting jobs to reduce their production costs, rather than adjusting real wages, which are hemmed in by wage stickiness and low inflation.
- **A lasting decline in inflation leaves central banks little room for manoeuvre of policy rates.** For a given nominal interest rate, low inflation increases the real interest rate. While central banks can push their key interest rates below zero to contend with an abrupt shock, their room for manoeuvre is limited in this respect.² Moreover, some research suggests that by affecting economic agents' inflation expectations, a lasting decline in inflation could significantly reduce the short-term impact of non-conventional measures.³

¹ The inflation targets of the main central banks are quite similar: The ECB targets a year-on-year increase in the euro area price index (HICP) “below, but close to, 2%”; the Fed, an annual increase in the price index for PCE of 2%; the Bank of England, an annual increase in the CPI of 2%; and the Bank of Japan – since September 2016 – even aims to overshoot its target of CPI inflation of 2%. The Fed's mandate is unique in that it includes a second objective, namely to achieve “maximum sustainable employment”.

² See, for example, Coeuré B. (2016), “Assessing the implications of negative interest rates”, speech to Yale School of Management, 28 July.

³ See, for example, Tenreiro S. and Thwaites G., “Pushing on a String: US Monetary Policy Is Less Powerful in Recessions”, *American Economic Journal: Macroeconomics*, October 2016, vol. 8, no. 4, pp. 43–74.

- **A long period of low inflation can also trigger a change in agents' expectations, further complicating the return to targeted inflation levels.** Empirically speaking, the best predictor of future inflation is past inflation, hence the risk for a change in the inflation regime after a negative shock.⁴ In this context, only an equivalent positive inflation shock could cause a reset to the pre-crisis inflation regime.
- **Furthermore, a long period of low inflation increases the risk of a dip into deflation following a negative macroeconomic shock.** Deflation presents the same drawbacks as a situation of low inflation, but to a greater extent, compounded by the risk of purchasing and investment decisions being postponed – which would, in turn, dampen demand and drive inflation even lower.

3. Several factors contribute to low global inflation

3.1 Oil prices have plummeted since 2014

The sharp drop in oil prices (with the barrel of Brent declining from \$110 in mid-2014 to less than \$30 in early 2016 to trade at around \$55 today) weighed on global inflation, which decreased from 3.2% in 2013 to 2.5% in 2016. Core inflation remained virtually flat at 2.6% p.a. on average over this period. However, the drop in oil prices had indirect and “second-round” effects (i.e. the reduction in the cost of inputs being passed on to retail prices, triggering a price/wage spiral weighing on wages) that went beyond its immediate effect on energy prices. Falling prices recorded for other commodities, particularly agricultural commodities, also reduced inflation.

Abundant academic literature has focused on the effect of oil prices on inflation.⁵ A 10% decline in oil prices is estimated to reduce overall prices by up to 0.4% within one year in the G20 economies. Thus, the circa 70% decline in the price of a barrel of oil between mid-2014 and early 2016 had an estimated negative impact on overall prices of up to 2.8%. These results are backed up by simulations carried out using the NiGEM global macro model.⁶ In NiGEM, a \$10 decline in the price of oil would decrease the global inflation rate by 0.3 percentage points in the two years following the decline (with the inflation rate gradually returning to equilibrium thereafter). According to this model, the circa \$80 decline in the price of oil between mid-2014 and early 2016 reduced global inflation by around two percentage points in 2015 and 2016, with the price level being 4% lower in 2016 compared to a scenario of the barrel of oil remaining unchanged at its mid-2014 level. The rebound in the price of oil over 2016 is likely to partially reverse this effect.

However, since inflation expectations are more tightly anchored to central banks' targets and economies are less dependent on oil, the oil price pass-through to inflation is weaker than in the past.⁷ Moreover, some academic research has suggested that the pass-through effect is asymmetric, with a decline in oil prices having a lower impact on inflation than an increase.⁸

⁴ See, for example, Cecchetti S.G. *et al.* “Deflating Inflation Expectations: The Implications of Inflation's Simple Dynamics”, *C.E.P.R Discussion Papers* No. 11925, 2017.

⁵ Peersman and Van Robays (2012), “Cross-country differences in the effects of oil shocks”, *Energy Economics*, Kilian (2009); “Not All Oil Price Shocks Are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market”, *American Economic Review*; and World Bank (2015), “The Great Plunge in Oil Prices: Causes, Consequences, and Policy Responses”.

⁶ NiGEM (National Institute Global Econometric Model) is a multinational model using a “New-Keynesian” framework, developed the UK's NIESR (National Institute for Economics and Social Research).

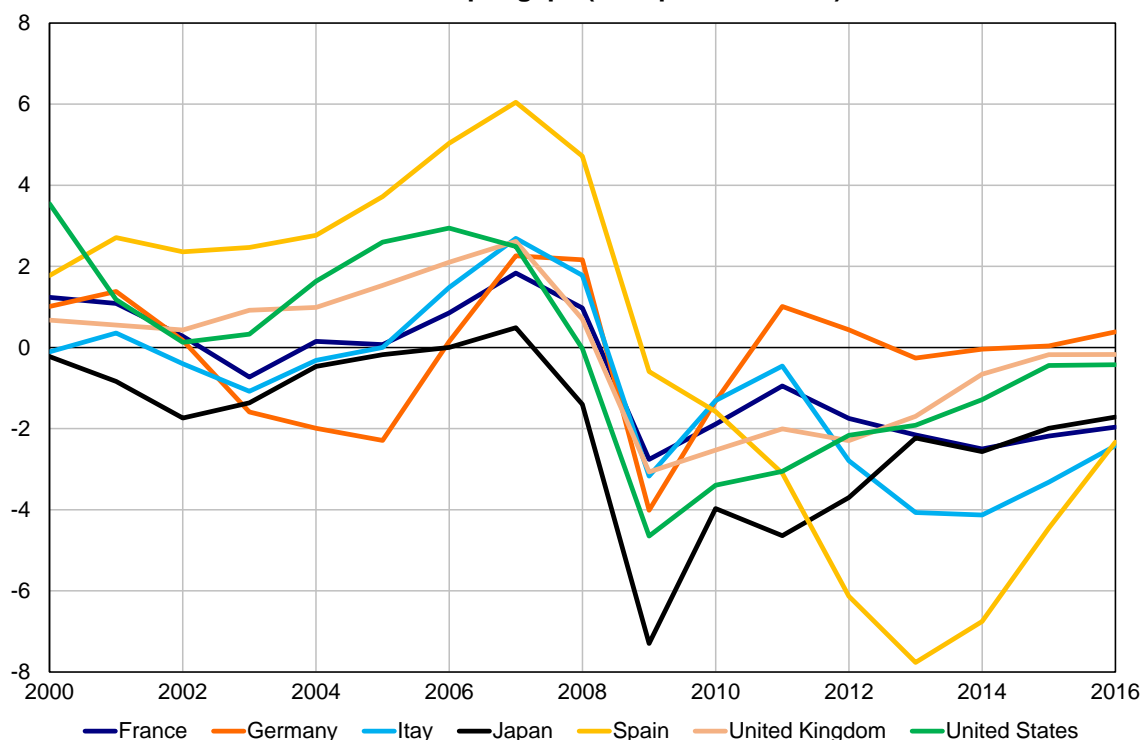
⁷ See Hooker (2002), “Are Oil Shocks Inflationary? Asymmetric and Nonlinear Specifications versus Changes in Regime”, *Journal of Money, Credit and Banking*, or Blanchard and Gali (2008), “The Macroeconomic Effects of Oil Price Shocks: Why are the 2000s so Different from the 1970s?” *NBER Working Paper*.

⁸ Hamilton (2003), “What is an Oil Shock?” *Journal of Econometrics*.

3.2 Global supply and demand have remained in imbalance since the 2008 crisis

Low global inflation is also thought to be attributable to the persistent supply/demand imbalance, reflected by widening output gaps⁹ since the 2008 financial and economic crisis (see Chart 3). On the demand side, the deleveraging under way in certain advanced countries contributes to this imbalance. Highly-indebted borrowers – whose propensity to consume may be higher – are deleveraging at the expense of consumption and investment (after peaking at 182% of GDP in the course of 2009, the debt of the non-financial private sector in advanced economies had ebbed to around 165% of GDP at end 2016). Fiscal consolidation has also affected demand in advanced countries. For advanced countries as a whole and in the euro area, the structural adjustment (as measured by the IMF) came to nearly 4 percentage points of potential GDP, cumulatively, over the period 2011-2015.

Chart 3: Output gaps (% of potential GDP)



Source: IMF.

However, the magnitude of the disinflationary effect of the supply/demand imbalance is mitigated by the lower sensitivity of wages and prices to economic cycles (see Box 1)

⁹ The output gap represents the difference between an economy's potential and actual output. A wider (or negative) output gap indicates that output is running below its potential.

Box 1: A flatter Phillips curve in advanced economies: inflation has become more inert and less sensitive to economic conditions

In 1958, A.W. Phillips highlighted an inverse correlation between the unemployment rate and nominal wage growth rate, using British statistics for the period 1861-1957. Today, the Phillips curve also refers to the inverse correlation between the unemployment rate and inflation.¹⁰

It has been observed that inflation has become less sensitive to fluctuations in output and unemployment, as reflected by a flattening of the Phillips curve in advanced economies (see Chart 4). **This phenomenon coincided with an increase in central banks' credibility and better anchoring of inflation expectations**,¹¹ which have grown more stable since the mid-1970s.¹²

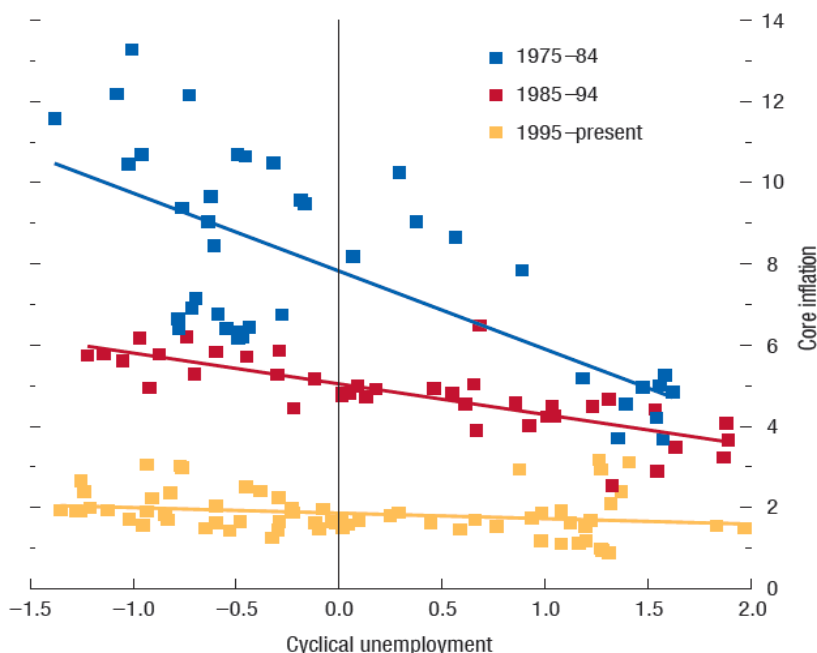
Several factors have been put forward as explanations for the flattening of the Phillips curve. These include:

- Lower bargaining power for workers: the reduction in bargaining power is considered to have been driven by labour market reforms, notably the elimination of automatic wage indexation mechanisms in many countries, and more broadly, by a decline in union membership in OECD countries (see below).
- Globalisation: inflation is regarded as more sensitive to global demand trends and less to national trends,¹³ with weak demand in one country potentially offset by stronger international demand.

Moreover, inflation is considered to be more inert in a low-inflation context,¹⁴ notably on account of:

- Wage stickiness on the downside: producers are less inclined to cut prices if demand declines because they cannot adjust their wage costs downward.¹⁵
- Price adjustment costs for firms: when inflation is low, firms have less incentive to change their pricing due to the fixed costs of price adjustments.¹⁶

Chart 4: Flattening of the Phillips curve in advanced economies



How to read this chart: each square represents the average of core inflation and cyclical unemployment in the advanced economies for one quarter.

Sources: OECD, IMF calculations (WEO april 2013).

¹⁰ Assuming that firms set their prices by adding a margin to unit labour costs, inflation is equal to the wage growth rate minus the labour productivity growth rate.

¹¹ Roberts J.M. (2006), "Monetary Policy and Inflation Dynamics", *International Journal of Central Banking*, Federal Reserve Board.

¹² Blanchard O., Cerutti E. and Summers L. (2015), Inflation and Activity: Two Explorations and their Monetary Policy Implications, *IMF Working Paper*.

¹³ Borio C. and Filardo A. (2007), "Globalisation and inflation: New cross-country evidence on the global determinants of domestic inflation", *BIS Working Papers*.

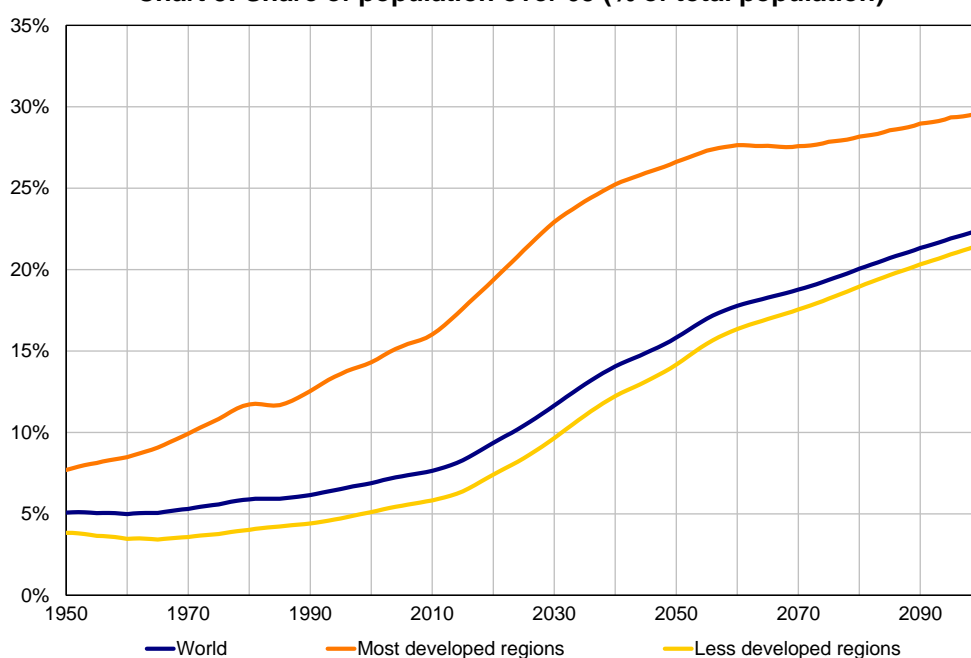
3.3 Ageing could also dampen demand

The declining birth rate and rising life expectancy in the world's main economies, notably among the advanced economies, are driving a rapid ageing of the population (see Chart 5). This ageing affects the behaviour of both households and businesses, with an overall negative effect on demand and inflation.

Thus, the large baby boom generations, currently nearing retirement age, tend to save a sizeable portion of their income in order to offset the future loss of earned income (consistent with the life-cycle hypothesis). This is even more true as they anticipate a long retirement. This weighs on aggregate consumption. At the same time, ageing weighs on investment by lowering the future economic outlook, and on the overall wage trend, as the now larger cohorts of workers retiring are replaced by younger workers who earn less on average.¹⁷ Some empirical research has indeed pointed to an overall disinflationary effect of ageing.¹⁸

In the medium term, the gradual retirement of the baby boomers could reverse this process; the life-cycle hypothesis suggests that retired households save less than working age households, or may even reduce their savings. However, this aspect of the life-cycle hypothesis is uncertain, as data available for some countries on savings by age category indicates that pensioners sometimes continue to save a significant amount of their income.

Chart 5: Share of population over 65 (% of total population)



Source: UNDP.

3.4 Some industrial policies lead to global overcapacity in certain sectors

In China, the industrial investment encouraged by the government since 2008 has led to an accumulation of production overcapacity in many industrial sectors, such as in the heavy industry, notably in steelmaking, and in the capital goods sector. One symptom of these sector overcapacities is the average utilisation rate of the Chinese economy, which fell by more than 15 percentage points between 2010 and 2016 (see Chart 6), fuelling an extended decline in producer prices over the same period (see Chart 7). The Chinese price trend, by way of world trade, plays a key role in global price setting.

¹⁴ Lopez-Villavicencio A. and Mignon V. (2013), "Nonlinearity of the inflation-output trade-off and time varying price rigidity".

¹⁵ Yellen J.L. (2012), "Perspectives on monetary policy", *BIS central bankers' speeches*.

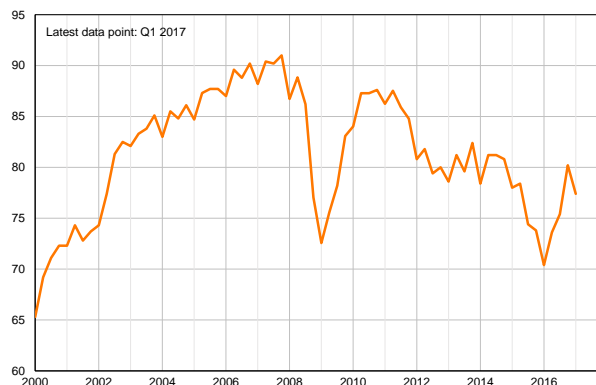
¹⁶ Klenow P.J. and Malin B.A. (2010), "Microeconomic Evidence on Price-Setting", *NBER Working Paper*.

¹⁷ The so-called "Noria effect". See, e.g. for the US, M.C. Daly, B. Hobbin (2016), *The Intensive and Extensive Margins or Real Wage Adjustment*, Federal Reserve Bank of San Francisco *Working Papers*, 2016-04.

¹⁸ Bobeica E., Lis E., Nickel C. and Sun Y. (2017), "Demographics and inflation", *ECB Working Paper Series*; D. Anderson, D.P. Botman and Hunt B. (2014), *Is Japan's Population Aging Deflationary?* *IMF Working Paper*; and T. Lindh and Malmberg B. (2000), "Can Age Structure Forecast Inflation Trends?" *Journal of Economics and Business*.

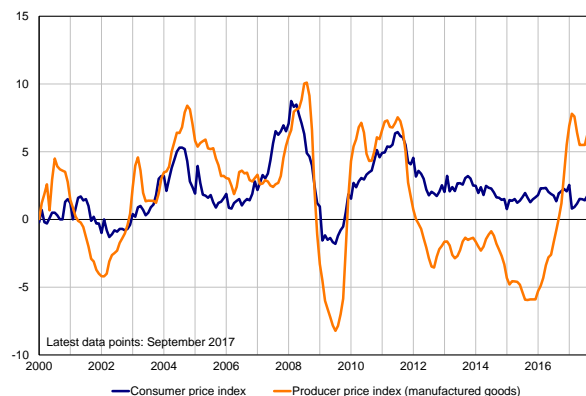
Since 2013, the Chinese government has implemented reforms aimed at cutting back overcapacity (e.g. by strengthening environmental standards so as to encourage obsolete capacity to be brought off line). These efforts have possibly contributed to the stronger producer price inflation trend since the start of 2016. Nevertheless, overcapacity remains high and continues to fuel the supply/demand imbalance.

Chart 6: Capacity utilisation rates in China (%)



Source: People's Bank of China.

Chart 7 Price indices in China (% change year on year)

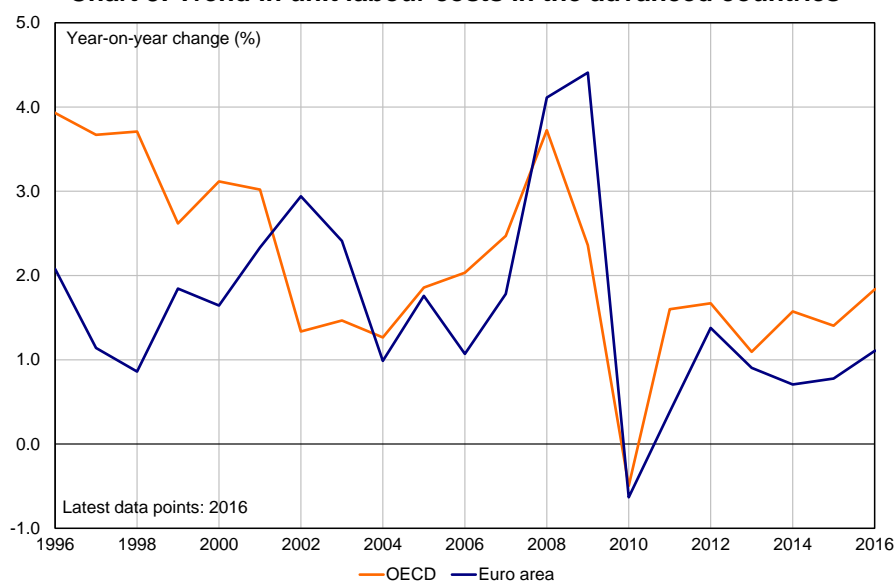


Source: National Bureau of Statistics of China.

3.5 Wages are rising slowly, especially in advanced countries

Unit labour costs¹⁹ lack strong momentum in most advanced countries (see Chart 8). This curbs the growth of production costs and prices. The weak momentum of unit labour costs is notably attributable to weak wage growth.

Chart 8: Trend in unit labour costs in the advanced countries



Source: OECD.

In addition to lower inflation expectations, several factors contribute to the weak wage growth:

- **Excess capacity on the labour market.** The weak recovery in wages, compared to the sharp growth in employment, suggests considerable labour market slack, which is higher than suggested by traditional unemployment metrics. This excess capacity can be attributed to unemployed workers who gave up looking for work, thus dropping out of the active labour force, and to specific forms of work (or insecure work). In the euro area, the recovery in employment since the crisis actually hides the fact that the proportion of workers on full-time, permanent contracts has declined in favour of temporary

¹⁹ The labour cost indicator showing the cost per unit of value-added produced. It represents the ratio of nominal wages to labour productivity.

contracts or part-time work. The labour market's excess capacity stood at around 15% at end 2016.²⁰ A broader metric to measure cyclical unemployment, notably taking into account these different kinds of employment, would allow for a better understanding of why inflation is low.²¹

- **Reduced bargaining power of the workers.** This is partly due to the ongoing decline in the unionisation rate in advanced countries, a trend that has continued since 2000: the proportion of workers in OECD countries that belong to a trade union declined from 35% in 1960 to 17% in 2014. It is also related to the sharp rise in unemployment following the crisis, with unemployment above 12% of the active labour force in the euro area in 2013, as well as pro-employment reforms undertaken in the euro area, notably Germany's Hartz reforms of the 2000s and Spain's reforms between 2010 and 2012.²²
- **Low labour cost countries opening up to trade and entering the global market.** The contribution of emerging or developing countries to global activity grew sharply as of 2001, rising from 21% to around 39% in 2016. These countries' integration into the international trade system exerts downward pressure on global wages, through two channels:
 - On one hand, it weighs on the wages of low-skilled workers in advanced countries. With the opening up of trade, advanced countries have come to specialise in the higher value-added sectors in which they hold a comparative advantage. This reduces the relative demand for low-skilled workers. The downward pressure on the wages of low-skilled workers is nevertheless cushioned by rising wages for skilled workers – leading to an uncertain overall wage effect.
 - On the other, the opening of trade leads to higher wages in emerging countries, but this trend is partially offset by the sizeable labour reserves in these countries, notably China.
- The weak wage momentum may also be caused by an underlying slowdown in productivity gains, but the eventual effect on inflation is ambiguous and uncertain because important productivity gains can also allow for price reductions.
- **In the euro area, some Member States' efforts to boost their cost competitiveness.** The decline in inflation in the euro area is partly attributable to the wage adjustment implemented since 2012 in many of the peripheral euro area countries in an attempt to strengthen their current accounts, reduce their foreign debt levels, and catch up their lag behind Germany in terms of cost competitiveness, notably following the wage moderation in Germany (between 1995 and 2007). In 2016, although the peripheral countries' current account deficits had been reduced, wage growth remained limited and inflation low. So far, Germany has made little contribution to closing the unit labour cost gaps that arose between 1995 and 2007 – even though German wages have clearly gathered momentum since the end of the 2000's.²³

3.6 Monetary policies struggle to rekindle inflation

The sheer magnitude of the crisis prompted central banks to implement entirely new policies in order to ensure price stability. Faced with disinflation, central banks began by cutting their key rates to floor levels. Then they adopted unconventional monetary policies. The effects of this monetary support depended notably on the speed at which it was implemented – for example, quantitative easing was implemented later in the euro area and Japan than in the US.

However, several factors limited the capacity of monetary policy to rekindle inflation. Despite an easing of credit supply conditions, private-sector deleveraging dampened credit demand and reduced the transmission capacity of monetary policy. The banking sector's difficulties and a phenomenon of financial fragmentation – particularly in certain euro area Member States – further curbed this capacity. Moreover, a

²⁰ “Assessing labour market slack”, *ECB Economic Bulletin*, Issue 3 / 2017, May 2017.

²¹ See Coeuré B. (2017), “Scars or scratches? Hysteresis in the euro area”, speech given to the International Centre for Monetary and Banking Studies, Geneva, 19 May 2017.

²² See Anne-Braun J., Bogue M., Gouardo C. and Mathieu R. (2016), “Spain's labour market reform: an initial assessment”, *Trésor-Economics* no. 174.

²³ See de Waziers D. (2017), “Rationale for the new wage momentum in Germany”, *Trésor-Economics* no. 202.

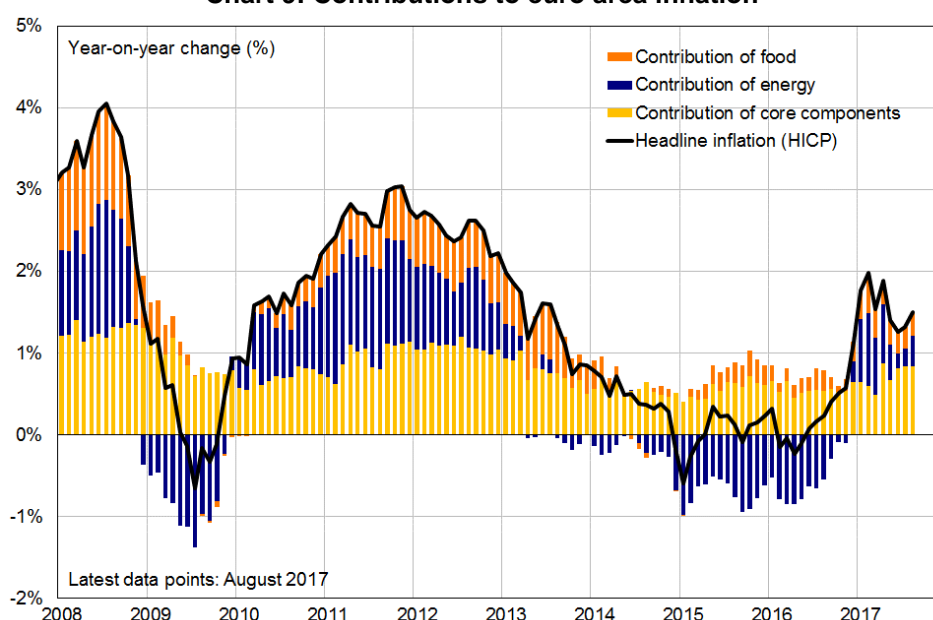
number of factors, including the ageing population and slowdown in productivity, may have reduced the “natural” interest rate (i.e. the equilibrium rate that the central bank should target when the output gap is nil).²⁴ This decline in the natural rate, combined with the floor rate constraint, may have reduced the capacity of monetary policies to be as accommodative as intended over the period.

4. Headline inflation has recently risen, but core inflation remains weak

4.1 Recent uptick in inflation

Headline inflation has recently risen in the main advanced economies, dispelling the risk of deflation. Inflation is running at nearly 2% in the US, above 2% in the UK and around 1 1/2% in the euro area, and has become positive again in Japan since October 2016. **This uptick is mainly attributable to the rise in energy inflation** (see Chart 9 for the euro area). At the same time, core inflation is steady at a low level in the euro area (around 1%), well below the ECB's target rate, and turned negative again in Japan in early 2017. Core inflation declined in the US in early 2017, and is below 2.0%. It has gathered pace in the UK following the depreciation of the pound in the wake of the Brexit referendum.

Chart 9: Contributions to euro area inflation



Source: Eurostat.

4.2 What is the medium-term outlook for inflation?

Without a shift in economic policies, core inflation could increase slightly in the medium term if the economic recovery continues. It would be supported by a closing of negative output gaps thanks to a recovery in demand as a result of a lower unemployment rate and wage growth, particularly in the euro area.

This demand recovery is visible in the growth of lending to the private sector. In the euro area, against a backdrop of improving monetary conditions, lending to businesses has been increasing since May 2015 and is currently growing at a sound pace, as is lending to households.

However, core inflation is likely to remain subdued owing to the aforementioned structural factors, and its evolution will depend on the reforms implemented to tackle these factors.

With regard to energy prices, **oil prices may fluctuate around their current level in the short term.** Despite the decision in late May by OPEC and 11 non-OPEC countries to extend the production cut

²⁴ See Jaubertie A. and Shimi L. (2016), “The debate on secular stagnation: a status report”, *Trésor-Economics* no. 182.

agreement in effect since 1 January 2017 until March 2018, the supply of oil is set to remain abundant, with the recovery in US production offsetting OPEC's efforts.

5. What are the economic policy options for tackling low inflation?

5.1 The main central banks are likely to fine-tune their policies, while maintaining an overall accommodative stance in the medium term

The ECB is set to maintain an accommodative policy in the coming months. Despite the recent improvement in euro area economic growth, inflationary pressures remain weak, and the ECB has committed to maintaining “very strong” monetary support until such pressures become sustainably stronger. Its stance is therefore likely to remain very accommodative in the medium term, even though it will probably adjust its purchasing programmes in the months ahead thanks to stronger growth. **Likewise, given the weak inflation in Japan, the Bank of Japan (BoJ) is set to maintain its asset purchasing policy** and its “yield curve control” policy, with a target of ten-year yields on Japanese government bonds of close to 0%. Moreover, the **Bank of England (BoE)** could raise its key rates given the sharp increase in inflation following the depreciation of the pound, even though **a majority of its Monetary Policy Committee members are currently in favour of the status quo** in a context of uncertainty following the Brexit referendum. In the US, with inflation rising back to its target level and the economy close to full employment, **the Federal Reserve is likely to continue to tighten its monetary policy.**

5.2 Fiscal stimulus to support demand

Inflation should be supported by expansionary fiscal policy in several countries: **in the US, in connection with the expansionary measures announced by the Trump administration at a time when the US economy is at a cyclical peak; in Japan, where a stimulus package was announced in summer 2016, and in China, thanks to stimulus measures implemented by the government.** In the euro area, the overall fiscal stance is neutral and appropriate, but the rebalancing of current accounts within the area is still insufficient. This suggests that members that have some room for manoeuvre should make greater use of it.

5.3 Structural policies to drive wage and price momentum

The countries with low inflation and no competitiveness issues (notably in the euro area) could take measures to boost wage momentum. Wage hikes in countries with sizeable current account surpluses would reduce the current account imbalances within the euro area: they would boost inflation via surplus countries' domestic demand, while also increasing demand for partner countries' exports. In Germany, while policymakers have already implemented such measures (e.g. by passing a federal minimum wage), the gap between unit labour costs in Germany and the rest of the euro area still remains considerable.

Furthermore, in some countries, ongoing efforts to clean up bank balance sheets continue to weigh on the recovery in lending and thus on the transmission capacity of monetary policy. Against this backdrop, **measures aimed at resolving non-performing loans** (stronger banking supervision, sector restructuring, streamlining bankruptcy arrangements, boosting the secondary market for non-performing loans, etc.) **should be explored** and implemented, specifically within the euro area, in order to foster financial integration and the financial system's resilience to future crises.

Lastly, an active reduction in production overcapacity in China would eliminate global supply surpluses in the sectors in question. China appears to be moving in this direction, but this policy change could take a long time due to the related social and financial costs.

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