The dynamics of real interest rates, monetary policy and its limits

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For more than 30 years, interest rates have been on a downward trend because of disinflation, the changing balance of savings and investment, and slower potential growth. Although ultra-loose monetary policies prevented the crisis turning into a depression and supported activity, as well as removing the threat of deflation and a breakup of the eurozone, there is disagreement about how effective they are, and about possible undesirable effects at the current phase of the cycle. They are not the only game in town, which raises the question of other policies that could raise potential growth.

Monetary policies have become, and remain, extremely loose, including in countries where economies have been recovering for several years and are approaching full employment. The Fed has proved reluctant to normalise monetary policy. In past decades, the authorities used to raise rates well before the unemployment rate fell to a level compatible with full employment, but that is no longer the case. The UK authorities have not yet started the process. That seems partly the result of the slow pace of recovery, which is normal after a recession triggered by a financial crisis (Reinhart et al, 2014). Official interest rates are therefore at historically low levels. That is true in the UK, Japan and the eurozone, where the refi rate has been cut to zero and the deposit facility rate has been -0.4% in March 2016. It is also true in countries like Switzerland, Denmark and Sweden, which have been forerunners for negative interest-rate policies (NIRPs). Although the Fed started to normalise monetary policy in December 2015, US official rates remain close to their all-time lows.

Long-term interest rates have also fallen to extremely low levels, and are negative up to 8 years for German government bonds (Bunds) and up to 10 years for Japanese government bonds (JGBs). Half of the bond market in OECD countries is showing negative yields. Real long yields have also fallen (see charts 3-6 below) to levels that have in the past only ever been seen in very specific circumstances, i.e. in the decade following World War II, during "financial repression" (when rates were capped and other regulations were introduced to push down rates, aimed in particular at reducing interest rates on public debt) and during the "great inflation" of the 1970s.

Central banks policy rate

Long yields have been on a downward trend since the 1980s, firstly because of disinflation, then because of a downtrend in real yields, itself mainly caused by a fall in potential growth (because of demographics and productivity trends). In addition, there has been a surge in savings in emerging economies and a shortage of risk-free bonds because of deteriorating credit quality in several parts of the bond market (e.g. mortgage-backed securities in the USA and sovereign bonds in peripheral eurozone countries).
Monetary policies implemented since the financial crisis broke in the late 2000s have helped push down long yields. That happened initially following the subprime disaster and then, in the eurozone, after the sovereign debt crisis in which a vicious circle formed between sovereign and bank debt, with market fragmentation affecting the transmission mechanism of monetary policy. More recently, yields have been held down by deflation fears. Official rates have therefore been cut to the zero lower bound, and in some cases below it. Unconventional measures became more widely adopted after the markets seized up, to prevent the banking and financial crisis from turning into a credit crunch, deflation and finally a depression. They included the ECB’s long-term liquidity injections and central-bank asset purchases (quantitative easing in the USA, UK, Japan and then the eurozone).

Central banks balance sheet

With official rates at rock bottom and forward guidance suggesting they would stay there, investor expectations pushed down risk-free long yields. Liquidity injections and quantitative easing programmes have had the same effect, by pushing down the term premium. Charts 3-6 show that long yields followed short rates lower, and continued to fall once short rates had stabilised.

Although monetary policy has undeniably helped to limit the extent and consequences of recent crises by loosening financing terms, it has also helped limit the risk of deflation. There are several questions about whether it can remain effective for a long period given the difficulty of combating factors affecting the real economy (low potential growth, entrenched deflationary pressure), and about its unintended effects, particularly regarding financial stability, since bubbles are likely to burst and debt to remain excessive. These effects are prompting some to raise the problem of ultra-loose monetary policy being potentially irreversible. As Mario Draghi has reminded us, monetary policy is "not the only game in town": it buys time and makes it easier to implement the structural policies needed to ensure a long-term recovery in growth, but is not a substitute for such policies (for more details on that subject, see Thibault Mercier [2016]).

Long yields: current situation and explanations

Both nominal and real long yields have been on a downward trend since the "great inflation" came to an end, and have continued to fall since interest rates started falling well before the recent crisis (chart 7). In the 1980s, the great inflation was defeated and interest rates followed inflation lower. They then continued falling due to a decline in real interest rates. Between the end of the 1990s and the end of the 2000s, nominal and real interest rates fell in tandem, with inflation expectations remaining roughly stable. During that "great moderation", inflation expectations were usually in line with central-bank targets. That is clear if we compare the yields on traditional bonds with those on index-linked paper: in the USA, the 10-year Treasury yield fell from 6% in the late 1990s to 2% in the mid-2010s, while the TIPS yield fell from 4% to 0.5%; in the UK, the yield on traditional Gilts fell from 6% to 2% and the yield on index-linked Gilts from 3% to -1%.

Yields showed similar movements at the global level. King et al (2014) calculated a global real yield based on average yields in G7 countries. That global real yield fell from 4.27% on average between 1985 and 1989, to 2.68% between 2000 and 2004, 1.85% between 2005 and 2009, and 0.45% between 2010 and 2013. In emerging economies, real long yields also fell from 11% in 1998 to 2% in 2007, before stabilising (CEPR 2015).
**US short & long term interest rates**

![Chart 3](image)

**Japan: short & long term interest rates**

![Chart 6](image)

**Eurozone: short & long term interest rates**

![Chart 4](image)

**US T.Note 10y rate**

![Chart 7](image)

**UK: short & long term interest rates**

![Chart 5](image)

**US Tips rate**

![Chart 8](image)
The movement is especially remarkable given that emerging yields often factor in exchange-rate and solvency risks. Increasing global financial integration has led to the formation of a global interest rate. The diagrams below (figure 1) show the formation of an equilibrium rate in situations where economies are independent and integrated. Where economies are independent, the equilibrium real yield is $r_a$ in advanced economies and $r_e$ in emerging economies, and $r_a > r_e$, since emerging economies are generating surplus savings and advanced economies have borrowing requirements. Financial integration leads to a global equilibrium rate of $r^*$. Emerging economies show surplus savings ($S > I$) and capital outflows cover the investment/savings gap ($I > S$) in advanced countries.

Contributory factors

Where does this movement originate? Several theories have been advanced, including Alan Greenspan's "conundrum" (or Ben Bernanke's "savings glut"), leading to a fall in long yields that is not justified by monetary policy (see d'Arvisenet op. cit.). If real long yields result from the balance of savings and investment, why have they fallen? Is it because of savings or investment?

Supply and demand for funds:

A fall in the propensity to invest moves the equilibrium from $E$ to $E_1$, and an increase in the propensity to save leads to equilibrium $E_2$. A fall in both propensities leads to equilibrium $E'$; the equilibrium interest rate falls and keeps the savings and investment rates unchanged (figure 2). The same result is obtained with rigid savings (figure 3) or investment that shows no sensitivity to interest rates (figure 4).
Globally, savings and investment rates, which are naturally equal ex post, have been relatively stable (chart 9). The same was true in both advanced and emerging economies in the late 1990s, but a divergence appeared in the 2000s, with emerging economies showing surplus savings covering the borrowing requirements of advanced economies.

**World savings & investment balance (% of GDP)**

Savings dynamics rely on several factors, foremost among which is demographics. Young people are net borrowers, middle-aged people are savers and the elderly spend their savings. As a result, changes in the relative sizes of these population categories have a major impact on the savings rate.

Population ageing does not necessarily lead to a rise in savings if it is accompanied by longer working lives, in line with the increase in life expectancy. At the moment, demographic figures show that that is not happening. Based on average figures among OECD countries, male life expectancy at retirement age rose from 13.5 years in 1971 to 18.5 years in 2010, and is projected to be 20.3 years in 2050 (OECD 2014), with retirement age falling from 63.8 in 1971 to 62.9 in 2010 and projected to rise to 64.6 in 2050. The disparity between movements in life expectancy and retirement age naturally pushes up savings. The increase in a population's average age is also connected with low birth rates. The falling proportion of young people automatically causes savings to fall, as does the scarcity of collateral. Two variables appear crucial: the proportion of working people aged 40-64, whose savings rate is high, and the proportion of those aged 65 and over, who are spending their savings. Globally (excluding China), the proportion of people aged 40-64 was 25% in 1980 but 33% at the start of the 2010s. Over the same period, the proportion of people aged 65 and over rose from 10% to 13%. As a result, the proportion of people who are saving hard rose 8 points, and the proportion of people spending their savings by 3 points. In China, the contrast was even greater, with the proportion of people aged 40-64 rising 15 points from 20% to 35%, while the proportion of people aged 65 or over increased 3 points from 5% to 8%. So far, therefore, demographic movements have clearly been in favour of savings; for an econometric analysis of how demographic factors affect the propensity to save, see CEPR 2015. The movement described above is now reversing. In the next few decades, the proportion of people aged 40-64 will fall slightly while the proportion of people aged 65 or over is set to reach 20% in 2030.

As well as demographics, several other factors are putting downward pressure on real yields:

- increasing inequality, which pushes up the savings rate (see below),
- the savings glut, i.e. the increase in savings (and official reserves) built up by emerging economies since the Asian crisis broke,
- the scarcity of risk-free assets, due to the deterioration in the credit quality of mortgage-backed securities in the USA, followed by sovereign bonds in peripheral eurozone countries (CEPR, 2015)\(^3\),
- the propensity to invest: growth in the working-age population has started to slow, first in advanced economies and then in emerging economies after accelerating for several decades. It is not clear how these movements will affect demand for capital. On the one hand, on a per capita basis, the capital spending requirement is falling. On the other, the scarcity of labour may cause capital to substitute labour. Changing growth models, involving an increase in the use of qualified labour (human capital), which shows greater complementarity with capital than unqualified labour, work in the same direction. The fall in the relative price of capital, evaluated at 30% since the early 1980s (IMF 2014a), means that investment can remain constant in real terms with lower expenditure\(^4\). However, the fall in the
relative price of capital may stimulate demand for investment. According to the IMF (op. cit.), the first effect has the upper hand. In addition, there is the increase in the spread between the return on capital and the risk-free rate, with the former having fallen less (from 3.8% to 1.8% on average between 2008 and 2013) than the latter (from 3.3% to 0.5%), along with a fall of almost one third in the real interest elasticity of investment, and a decline in public spending (IMF 2014b).

Rachel et al (2015) sought to identify and quantify the factors behind changes in the desired amount of savings (S(r) curve), the desired amount of investment (I(r) curve) and the consequences for the global equilibrium real interest rate (figure 5 below). The joint movements of I(r) and S(r) left the savings and investment rates unchanged globally, as we have seen empirically (see above). However, they produced a near 3-point fall in the equilibrium real interest rate that equalises savings and investment since the 1980s (a-b arrow): 1.6 points of the movement are down to movements in the desired savings curve and 1.4 to movements in the desired investment curve.

As regards savings, demographic factors have apparently increased the savings rate by 4 points and reduced the interest rate by 0.9 points. In the last few decades, the reduction in the proportion of young people has had more of an effect than population ageing, resulting in a fall in the dependency rate from 50% to 42% (based on 23 advanced and emerging economies). The relative increase in the working-age population has naturally supported savings. In future, population ageing will have more of an effect than the fall in working young people, and will lead to an increase in the dependency rate, resulting in a reduction in savings (figure 6 below).

The savings glut has shifted S(r) by one point to the right, and has reduced r* by 0.25 points.

Widening inequality has increased desired savings by 2 points and reduced r* by 0.45 points.

On the investment side, the joint effect of the lower relative price of capital and the real interest elasticity of investment has apparently moved I(r) by one point and reduced the real equilibrium interest rate r* by 0.5 points. The reduction in public investment has shifted I(r) by one point and r* by 0.2 points. The roughly 100bp widening in the spread between the return on capital and the risk-free rate during the period has apparently shifted I(r) by 0.7 points to the left and caused r* to fall by a similar amount.

We saw above that investment and savings rates used to be stable at the global level, but that the situation hid differences between advanced and emerging economies, with the former showing a borrowing requirement (I>S) and the latter funding capacity (S>I). Real interest rates have been falling, but at different rates depending on the zone, as we can see below. Real interest rates are falling in both advanced and emerging economies, but savings and investment rates are higher in emerging economies than in advanced economies (figure 7).
The equilibrium real interest rate

Natural or Wicksellian rate

What is it?
From the monetary policy point of view, the neutral interest rate is the one that brings inflation into line with its target while minimising the output gap. The natural or Wicksellian rate $r^*$ adjusts for savings and desired investment. If the market rate ($r$) is lower (i.e. there is a real interest gap), demand for loans will exceed savings, the money supply will increase and $r$ will converge with $r^*$. Conversely, if $r > r^*$, savings will exceed desired investment and $r$ will fall into line with $r^*$, which is why $r^*$ is an equilibrium rate.

Several factors are suggested to explain why real equilibrium rates have been falling at the global level: the reduction in term premiums (the additional yield demanded by investors for holding long-term securities rather than making successive investments in short-term paper) because of lower uncertainty about future monetary policy given increased transparency since the 1990s; the increase in emerging-market reserves until recently; regulations forcing banks to hold more safe investments; the reduction in the supply of high-quality assets; and naturally the effect of quantitative easing programmes.

One of the key issues is that the equilibrium real interest rate is not directly observable and varies over time. It is possible simply to estimate it on the basis of moving averages of observed rates. It can also be calculated from models based on economic behaviour, as Laubach and Williams do (chart 10).

In economic theory, the natural interest rate $r^*$ depends on the trend rate of productivity growth ($\gamma$), the psychological discount rate or time preference rate ($\rho$), the population growth rate ($n$) and the elasticity of intertemporal substitution in consumption ($\sigma$), which measures the preference for consumption to be smoothed over time:

$$r^* = \frac{\gamma}{\sigma} + \rho + \alpha n$$

Low productivity growth reduces expected incomes, which causes households to increase savings in order to support future consumption. The increase in savings supports the build-up of capital, the capital coefficient (capital/GDP ratio) increases, and that reduces the marginal productivity of capital. If the elasticity of intertemporal substitution is high ($\sigma > 1$), i.e. if households freely agree to transfer consumer spending from one period to another and do not increase their savings in response to a change in productivity growth, the sensitivity of the real interest rate to productivity growth will be reduced. The literature, summarised by Havranek et al (2015), put that elasticity at around 0.5, which means that a 1-point fall in productivity growth results in a 2-point reduction in the real interest rate.
If the rate of population growth (n) is low and if labour and capital are complementary, the marginal productivity of capital and therefore the real interest rate will be low, and investment will be moderate. Conversely, if n is high, with young people making up a large proportion of the population, innovation may be stimulated.

Box 1: Equilibrium real interest rate and growth: some results from economic theory

Growth models show that the equilibrium real interest rate \( r^* \) falls with a fall in (potential) long-term growth, which can be analysed as the sum of per-capita productivity growth (g) and growth in the labour force (n).

In fundamental growth models (Solow, Ramsey, Diamond's overlapping generations model)\(^6\), the equilibrium real interest rate is equal to the marginal product of capital \( f'(k) \) less the capital depreciation rate \( \delta \):

\[
 r^* = f'k - \delta 
\]

Solow model (1956)

The fundamental dynamic equation in the Solow model is:

\[
 Dk = sf(k) - (\delta + n)k 
\]

where \( k = K/L \) (the capital/labour ratio), \( s \) is the savings rate (exogenous), \( f( ) \) the production function, \( \delta \) the capital depreciation rate, \( n \) the labour force growth rate and \( Dk \) the growth rate of \( k \).

That simply means that, in a stable situation, the growth rate in capital per capita is equal to the difference between savings \( sf(k) \) and the investment needed to replace obsolete capital and keep capital intensity unchanged given population growth. In an enhanced version of the model that gives much more robust empirical results\(^7\) by including technical progress according to the Harrod definition, labour is expressed in efficiency units (AL): \( k = K/AL \) where \( A \) measures the efficiency of labour. Solow’s fundamental equation then becomes:

\[
 (1) \quad Dk = sf(k) - (\delta + n + g)k 
\]

where \( g \) is the rate of technical progress (\( g = \frac{dA}{A} \)).

Based on the fundamental dynamic equation (1) and the definition of the equilibrium real interest rate:

\[
 (2) \quad r^* = f'k - \delta 
\]

We can show the link between the equilibrium real interest rate \( r^* \) and the growth components \( n \) and \( g \), which amounts to finding \( dr^*/dn \) and \( dr^*/dg \).

This can be written:

\[
 (3) \quad dr^*/dn = dr^*/dg = \left( \frac{dr^*/dk}{dk/dn} \right) = f''k \left( -\frac{k}{(\delta + n + g + sf'k)} \right) > 0 
\]

- effectively, from (2), we get \( dr^*/dk = d f'k/dk = f''k < 0 \) (diminishing returns)

- and differentiating (1) using the implied form\(^9\), we get:

\[
 dk/dn = -k/(\delta + g + n - sf'k) 
\]

Expression (3) shows that the equilibrium real interest rate varies in the same direction as \( g \) or \( n \). The long-term decline in growth is associated with a fall in the equilibrium real interest rate. Diamond's overlapping generations model produces the same result.

In the Ramsey model (1928), savings are endogenous; they depend on households' intertemporal optimisation behaviour:

\[
 r^* = f'k - \delta = \rho + \Theta g 
\]

where \( \rho \) is the time preference rate (or household impatience rate): based on two periods, an amount of consumption \( C/ (1 + \rho) \) may be sacrificed in the present if consumption reaches \( C \) in the following period, so utility is unchanged and \( \Theta \) is the elasticity of the marginal utility of consumption, which reflects the desire to smooth consumption over time. In a modified version taking into account population change \( n \), we can write:

\[
 r^* = f'k - \delta = \rho + n + \Theta g 
\]

Again, \( r^* \) falls with \( n \) and \( g \).

Equilibrium rate and golden rule:

Consumption per capita is written \( c = f(k) - (n + g )k \).

It is maximised for a level \( k^* \). With a first-order condition \( c'(k) = 0 \), we get \( r = f'(k) = (n+d)k \).

Household savings cover the accumulation of capital and the investment that allows \( k \) to remain unchanged:

\[
 sf(k) = dk/dt + (n+g)k 
\]

If \( k < k^* \), savings exceed investment, which allows \( k \) to remain constant; \( k \) will increase and tend towards \( k^* \) and vice versa if \( k > k^* \).
Potential growth has slowed and is continuing to slow

Potential growth, demographics and productivity

At the global level, potential growth fell from around 4.5% per year in the 1990s to 4% in the early 2010s and 3% by the middle of the current decade. We can analyse potential growth as the sum of changes in the working-age population (typically people aged 20-60) and per-capita productivity growth.

The working-age population grew by 1.8% per year from the mid-1990s to the mid-2000s, but only by 1% per year in the mid-2010s, and the rate is expected to fall to 0.6% by 2030. Almost all geographical zones are seeing a slowdown (except sub-Saharan Africa). Since the start of the 2000s, growth in the working-age population has fallen from 1% to 0.4% in the USA and from 0.5% to -0.5% in the eurozone.

In the last 20 years or so, the average annual per-capita productivity growth rate has been 2.5%, but that masks a slowdown: it was 3.1% between 1996 and 2007, but has been half that level since 2013 (1.5%).

There are several factors at play. On the one hand, manufacturing, which generally generates above-average productivity growth, is making up less of the economy. Since 1998, global manufacturing production has risen 2.8% per year as opposed to GDP growth of 4%, and in the OECD the figures are 0.7% and 1.6% respectively. Manufacturing’s share of value added has fallen in the last 25 years, from 16% to 14.8% in the eurozone and from 12% to 11.7% in the USA. On the other hand, productivity growth has slowed, both in manufacturing and the rest of the economy.

In the USA, for example, productivity growth in the last 25 years has been 3.8% in manufacturing and 1.1% in the rest of the economy. In the eurozone, the figures are 2.3% and 0.6% respectively. Since 2011, productivity has been almost flat in both sectors in the USA, and has risen 1% and 0.4% respectively in the eurozone.

The fall in potential growth is likely to limit GDP growth, since the unemployment rate is falling and negative output gaps are narrowing. Observed and potential growth appeared to be aligned in 2015.

Looking beyond potential growth: hangover effects and “misallocation” of resources

-Hangover effects

As a great deal of research has shown in recent years, particularly that of Reinhart and Rogoff (2014), a demand-side shock resulting from the bursting of a debt bubble causes a longer and deeper recession and a slower recovery than those that follow normal recessions. After the crisis, not only does GDP not move back to its previous trend level, but grows more slowly because of balance-sheet consolidation. Combined with uncertainty, that consolidation holds back investment, R&D spending etc., while caution among lenders (i.e.
increased collateral requirements) hampers the creation of new businesses. Longer periods of unemployment lead to human capital becoming obsolete and may cause an increase in structural unemployment. Weaker demand has a negative impact on productivity growth and potential growth, which becomes endogenous. Reifschneider et al (2013) estimate potential US output based on a production function. For each input, they distinguish between a cyclical component and a trend component. They show that the change in potential output appears partly related to movement in cyclical components. They conclude that monetary policy aimed at moderating a fall in demand will limit the impact of a cyclical deterioration on the supply side; for an analysis of the factors examined (pro-cyclical role of uncertainty, destruction of potential, endogenous nature of supply, creditless recoveries and balance-sheet consolidation) see d’Arvisenet, April 2015.

In the labour market, the hangover effect results in a persistent increase in unemployment, which does not fall back to its initial level during the recovery; this has been a typical story in the eurozone in recent decades. In the USA, unemployment is stationary, oscillating around a central level. In the eurozone, unemployment is drifting higher, as shown by figures 8 and 9.

- *A competing approach: misallocation of resources*

Hangover effects call into question the neutrality of money: monetary policy acts on demand, which influences supply. Borio (2015) and Borio et al (2015) put forward a different approach involving the "non-neutrality" of money. They focus on the financial cycle, which is longer than the business cycle and which monetary policy seeks to smooth; between 1971 and 2008 there were three financial cycles and eight business cycles. A downturn in the financial cycle damages the real economy through a loss of GDP and lower productivity growth. During a credit boom, the allocation of resources deteriorates, due to incentives to prioritise financing sectors that have collateral but low productivity (typically construction) at the expense of businesses with limited tangible capital and/or large R&D expenditure. When looking at a sector’s productivity growth, Borio distinguishes between a component common to the whole economy and a component related to the allocation of resources to the sector. In 21 OECD countries between 1970 and 2009, annual productivity growth was apparently cut by 0.3 points during booms, two thirds of which is attributable to the misallocation of resources. If a banking or financial crisis happens after the boom, the fall in productivity growth reaches 0.7 points per year in the five years following the peak, 90% of which is due to misallocation. Over ten years – five pre-crisis and five post-crisis – the loss is considerable. Pre-crisis misallocation worsens the fall in productivity growth during the crisis: the deterioration in the banking sector arising from the downturn in the financial cycle does not help to correct past misallocation of resources. This causes Borio to recommend monetary policies that focus more on financial stability. Bech et al (2012), observing 24 countries since 1960, compare how activity responds to official interest rates during a normal
cycle (without a financial crisis) and a cycle during which a crisis takes place, based on 79 cycles of which 24 included a financial crisis. For normal cycles, the coefficient that links growth with real short-term interest rates is \(-0.275\) \((t=-3.05)\) across the whole cycle, and \(-0.574\) \((t=-2.72)\) during the downturn. In cycles including a crisis, the coefficients are \(-0.128\) \((t=-3.97)\) and \(0.216\) \((t=1.36)\) respectively: financial crises therefore make interest-rate policy less effective.

Borio et al (2013) calculate an output gap taking into account variables that are characteristic of the financial cycle (movements in credit and real-estate prices). They explain a significant proportion of changes in the output gap in the USA and UK. The authors produce estimates of the output gap that are closer to those measured ex-post than those obtained using traditional methods (production function or Hodrick-Prescott filter). That leads them to recommend policies that differ from those based on a classical Taylor rule, which would be too loose in the upward phase of the cycle. Based on their analysis that takes into account how the financial cycle affects the output gap, the Fed funds rate should have been 1 point higher during the upward phase before the US subprime crisis and 0.7 points higher in the UK. That would have probably led to a smaller crisis, or possibly would have avoided a crisis altogether. This brings to mind the idea of "leaning against the wind", as opposed to the Greenspan and Bernanke approach of only intervening after a crisis has broken out: it is not possible to identify exactly whether a rise in asset prices is a bubble or not, and there is a risk of wrongly adopting an excessively tight policy that damages activity. The approach was challenged by work done by the BIS, which shows the predictive value of financial variables in gauging the probability of a crisis and takes into account the cost of a crisis on economic activity.

**Monetary policy**

Monetary policy played a key role in avoiding a depression and combating the threat of a eurozone break-up. In the eurozone and Japan, the challenge for monetary policy now is to bring inflation back into line with its target. Several years after the recovery started, monetary policy remains extremely loose in OECD countries. Although expansionary policies have undeniably had positive effects, some questions remain. Will they remain effective long-term? Do they have undesirable effects on financial stability and, eventually, on the ability to unwind policies that have been loose for a long time?

After quickly reviewing these questions, it seems obvious that, as Mario Draghi has said several times, monetary policy is not the only game in town. The eurozone needs a level of fiscal co-ordination that goes beyond eurozone rules: for example, a common budget system – and there are many proposals in this area – could help support demand and eradicate excessively low inflation. The eurozone also needs long-term policies capable of increasing potential growth. That would make it easier to bolster the public finances and to raise interest rates without jeopardising the solvency of borrowers.

**Monetary policy during the crisis**

Monetary policies adopted after the subprime crisis broke, and then after the Lehman bankruptcy, prevented a real-estate and financial crisis from turning into a depression like that seen between the two world wars. It also stopped the eurozone splitting up by breaking the vicious circle between sovereign bond yields and interest rates on bank debt, and stopping the divergence between the financing terms of eurozone members, which was hampering the transmission mechanism of monetary policy. Policies included 3-year LTROs (long term refinancing operations), the SMP (securities market program), the announcement that the ECB would do "whatever it takes" and OMTs (outright monetary transactions) - see d'Arvisenet, 2014.

When the money markets seized up, that could have led to a credit crunch and deflation. The risks caused central banks to cut official interest rates to unprecedented levels and inject liquidity into markets that had ceased to be liquid, since the collapse of confidence in interbank markets had made it impossible to set prices. Central banks played their role of lenders of last resort, and the Fed's credit easing removed risk
by buying assets such as mortgage-backed securities. When policy rates hit the zero lower bound, the risk of deflation arising from nominal interest rates becoming rigid and inflation falling (pushing up real interest rates and therefore tightening monetary conditions, particularly in a high-debt situation) was removed:

- partly through communication (forward guidance) intended to guide expectations and convince markets that low interest rates were here to stay. That pushed down long yields by causing investors to expect future short rates to be low, which in turn caused the yield curve to flatten, since long-term interest rates are the average of expected future short-term interest rates.

- partly by buying assets. Central banks helped push down long yields by reducing the term premium – which is the premium for holding long-term bonds, with an impact that is in addition to expectations regarding short rates – and by encouraging investors to rebalance portfolios and therefore take on more risk. A vast amount has been written on measuring the effects of QE on interest rates (see d’Arvisenet, 2014). With inflation falling below target, the ECB took new measures: adopting fixed-rate TLTROS instead of operations linked to money-market rates, and purchasing covered bonds and ABSs in order to improve the financing terms of financial intermediaries, as announced in January 2015 and implemented in March. QE, which caused the euro to fall as soon as the markets saw it as a possibility, was adopted following a statement by Mario Draghi at Jackson Hole in August 2014. Since then, QE has been strengthened and supplemented, with an extension of the timeframe, an increase in the amount of purchases from EUR 60 bn to EUR 80 bn per month, and the introduction then extension of a negative bank deposit facility rate (for more details on recent measures, see for example the ECB’s Economic Bulletin of February 2016).

Those policies have paid off: interest rates have fallen and financing terms have become looser, as shown by the relaxation of lending criteria. In the eurozone, the 10-year bond yield was 2.24% in 2013 to 0.65% in 2014, 0.77% in December 2015 and 0.22% in February 2016. Bank lending rates have fallen sharply since 2012, with the rate on business loans of more than one year being 2.09% in February 2016 as opposed to 2.36% a year previously for amounts over EUR 1 m, and 3.22% versus 3.60% a year previously for loans of less than EUR 250,000. Business loans outstanding fell by 2.9% in 2014 and 1.4% in 2015 but have now stabilised. Outstanding loans to households have stopped contracting, rising 1.9% in 2015 after falls of 0.1% in 2013 and 0.3% in 2014.

### Eurozone: bank lending

![Graph showing bank lending trends](chart13.png)

**Deflation risk**

The challenge is to combat an extremely low inflation rate (charts 14-16) and to remove the risk of deflation that may arise in the event of a shock. At the global level, monetary policies are very loose. In its 2015 annual report, the BIS calculated an average policy rate of 2.5% between 2010 and 2014 as opposed to a Taylor rate of 4.5% (6% and 9% respectively for emerging economies). The BIS believes that this situation – which, as in the years preceding the crisis, shows an asymmetry in monetary policy, with an accommodative bias during the recovery phase – poses risks for financial stability.

The desire for inflation to rise back to its target level explains why monetary policy, as well as seeking to smooth out the cycle, has remained loose and has become even more so, several years after the recovery began. The USA is a good example of this: chart 17 shows that in past decades, the authorities used to raise rates well before the unemployment rate fell to a level compatible with full employment. Today, the normalisation of interest rates is hesitant in the USA and shows no signs of starting in the UK, even though the unemployment rate is in line with its long-term level.
Effectiveness and undesired effects

Low inflation is hard to eradicate because it is partly due to exogenous factors (commodity prices, surplus capacity at the global level etc.) but also because labour markets are behaving in a new way. However, the desire to push up inflation is a reasonable one, as is the choice of a 2% target. A low but positive inflation rate makes it easier to adjust relative prices at a time when prices and wages are showing downward rigidity ("greasing the wheels" argument). It makes it possible to raise interest rates and so have some room for manoeuvre in the event of a shock, which is not the case when rates are near-zero. It also allows the debt burden to be eased gradually. So far, monetary policy loosening has reduced market rates as inflation has fallen, avoiding an increase in real interest rates. By reducing long-term interest rates to below the nominal GDP growth rate, it has reduced the risk of highly indebted economic agents becoming insolvent and has avoided deflationary pressure.
Box 2: What does "deflation risk" mean?

In general, whether explicitly or otherwise, the term refers to the Great Depression, when both prices and activity fell. Borio et al (2015), based on a study of 38 countries between 1870 and 2013, show that 663 episodes of generally falling prices and 66 cases of persistent deflation (over five years) were not accompanied by a fall in growth, with the exception of the Great Depression. Across the whole of the period under review, the average growth rate was 1.5% during times of deflation and 2.7% at other times, and 0.8% during periods of persistent deflation as opposed to 2.1% in the five years that preceded them. In Japan, after the real-estate and stockmarket bubble burst and after bank balance sheets deteriorated sharply in the 1990s, growth collapsed (the first lost decade), but deflation did not appear until 2000-2012. During that period, GDP per capita rose 10% (12% in the USA) and GDP per economically active person by 20% (12% in the USA).

A distinction should be made between good and bad deflation. Deflation arising from a drop in demand results in a combination of falling prices and activity, while that resulting from increased supply results in lower prices but not a fall in activity. Falling asset prices appear to be much more damaging than falling prices of goods and services. In the period as a whole, episodes of falling real-estate prices (of at least 20% over a 5-year period following a peak) involved two years of economic contraction and average growth of 0.5% over the 5-year period, versus an average of 2.2% in the previous five years. Falling share prices (averaging 30% over a 2-year period, following by a stabilisation in the following three years) are associated with average growth of 0.9% versus 2.9% in the previous five years. Deflation increases the burden of debt. Except in the inter-war period, bouts of deflation do not involve debt deflation, but high debt levels increase the loss of GDP arising from a fall in real-estate prices. In the USA, lost wealth due to falling real-estate and share prices during the recent crisis amounted to USD 9.1 tn and USD 11.3 tn respectively. By comparison, a 1-point fall in inflation over three years would have increased public- and private-sector debt by USD 1.1 tn in real terms. That prompts Borio to question the effectiveness of monetary policy which, by combating deflation risk, may carry a risk of inflating bubbles that will burst sooner or later. As well as macroprudential arrangements, he suggests a preventative policy (leaning against the wind) taking into account the financial cycle, which is much longer than the business cycle, or at least adopting a symmetrical policy that tightens as much in the upward phase of the cycle as it loosens during the downward phase. The Greenspan and Bernanke theory is that officials do not know any better than the markets whether or not a bubble is in place, because they do not have any more information about the fundamentals, so they should let bubbles inflate and intervene if they burst, thereby removing the risk of tightening at the wrong time. The theory was put into practice in the 2000s, leading to a policy rate much lower than that suggested by a Taylor rule. However, we know that financial excesses are not impossible to detect, particularly by looking at indicators such as the credit/GDP ratio and asset price movements relative to their trend.

Flattening of the Phillips curve

In the last few years, wages have been slow to accelerate, even in countries like the USA and UK that have moved back to full employment.

That situation may be the result of measurement problems, since the structural unemployment rate below which wages accelerate may have fallen, or the result of a flattening in the Phillips curve that connects wage growth or price inflation with the unemployment rate. There is plenty of evidence for the phenomenon in the last 20 years: a given decline in the unemployment rate is associated with a much smaller rise in wages than before, or to put it another way, a larger output gap is required for a given increase in inflation.

US: wages growth vs unemployment rate

![Chart 18](https://example.com/chart18.png)

Source: BLS
Borio et al (2007) show that in the USA, inflation has become more sensitive to the global output gap as a result of globalisation. Estimated US figures show a reduction in the coefficient linking inflation and the gap between observed and long-term unemployment rates. Finally, there is an asymmetry in the way inflation responds to changes in the output gap, depending on the extent and direction of those changes. If we distinguish between a large (over 1 point of GDP), medium (between +1 and -1 point of GDP) and small (less than -1 point) output gap, and based on US figures, we get an inflation/output gap coefficient of 0.8 for a large output gap and 0.27 for a small output gap. That shows that the cyclical improvement may, in a depressed situation, prove slow to drive up inflation (d’Arvisenet, 2014).

**Supporting solvency**

When it reduces long-term interest rates to below the nominal growth rate, monetary policy helps to reduce debt ratios and push up asset prices and investment. In the USA, the non-financial private-sector debt ratio (households and companies) rose from 110% of GDP in the late 1990s to over 140% at the end of the 2000s, before falling to 122% five years later. In the eurozone, the decline was much more modest, with the debt ratio rising from 120% at the end of the 1990s to 170% in 2009, before falling only 10 points since then (charts 22 and 23).

In the USA, long-term interest rates were lower than nominal growth between 2003 and 2006, which helped inflate the real-estate bubble, and again since 2010. In the eurozone, by contrast, long-term interest rates did not fall below nominal growth until 2014. Between 2010 and 2015, nominal growth averaged 3.7% and long-term interest rates averaged 2.4% in the USA. In the eurozone, between 2010 and 2013, long-term interest rates averaged 3.6%, comfortably exceeding nominal growth of 1.7%. In 2015, long-term interest rates fell to 1% while nominal growth was 2.6% (charts 24, 25, 26, 27).
US debt outstanding by sector (% of GDP)

[Graph showing debt outstanding by sector (% of GDP) with labels: Nonfinancial corporates, Total Households]

Source: Federal Reserve (Flow of Funds)

Eurozone: nominal GDP growth vs 10y interest rate

[Graph showing GDP growth vs 10y interest rate with labels: Nominal GDP, y/y, Bund 10y rate]

Source: Eurostat, Thomson Reuters

Total indebtedness

[Graph showing total indebtedness (% of GDP) with labels: Japan, USA, UK, Eurozone]

Source: IMF

UK: nominal GDP growth vs 10y interest rate

[Graph showing GDP growth vs 10y interest rate with labels: Nominal GDP, y/y, Gilt 10y rate]

Sources: ONS, Thomson Reuters

US: nominal GDP growth vs 10y interest rate

[Graph showing GDP growth vs 10y interest rate with labels: Nominal GDP, y/y, T.Note 10y rate]

Sources: BEA, Thomson Reuters

Japan: nominal GDP growth vs 10y interest rate

[Graph showing GDP growth vs 10y interest rate with labels: Nominal GDP, y/y, 10y interest rate]

Sources: Cabinet Office, Thomson Reuters
Given the eurozone's low potential growth, reducing interest rates to below the nominal growth rate requires a much larger reduction in rates than in the USA, which is naturally helpful for the financial positions of debtors, but has some negative effects (e.g. bubbles, mispricing of assets and volatility: see below).

The credit channel

Financing terms have become looser and lending criteria have been eased: given that liquidity is already abundant, should more be added? Companies and households have wanted to reduce their debt levels, and that has pushed down the demand for credit despite favourable borrowing terms. Companies are financing investments themselves (chart 28), buying back shares and building up cash piles (chart 30). In the eurozone, demand for credit has recently recovered according to the ECB’s quarterly Bank Lending Survey (see chart 12 above), but recent movements in loans outstanding remain modest.

Self-financing rate of non-financial corporates

![Chart 28](source: Eurostat)

The risk channel

By reducing risk-free interest rates, the idea is that investors will seek higher yields and therefore take on more risk. That should push up share prices and cause spreads on private-sector and emerging-market bonds to tighten. In some areas of the financial markets, risk may be under-remunerated (i.e. underestimated). That may be the case for both private-sector and sovereign bonds. In the eurozone, for example, 10-year government bond yields have fallen sharply, to 0.17% in Germany, 0.5% in France, 1.4% in Italy and 1.5% in Spain, compared with expected 2016 debt/GDP ratios of between 68% and 132% in those countries.

As regards the eurozone, the ECB’s purchases have mainly entailed sales of bonds by foreign central banks, whose official reserves have fallen 13% since peaking at around USD 11.5 tn in mid-2014. Resident investors have only bought moderate amounts of risky securities, as shown by movements in spreads, which rose from 330bp in early 2015 to 550bp in early 2016 for high-yield bonds, and from 100bp to 200bp for BBB-rated bonds. When an event or a change in perception – such as fears regarding a major slowdown in China or uncertainty about US monetary policy – causes risk aversion to rise, as in mid-2015 and late 2015/early 2016, risks are reassessed, asset prices (stockmarkets) fall, yields on risky assets rise and uncertainty pushes up volatility in securities and foreign-exchange markets. In the end, whereas financing conditions are meant to improve, they may deteriorate and hold back investment and demand, leading to a further fall in risk-free rates and reducing demand for risky assets, and causing additional pressure on spreads.

Those developments are accompanied by an increase in volatility, exacerbated by the decline in liquidity in certain markets and connected to a reduction in market-making activity. This is shown by daily variations in share prices, credit spreads and exchange rates. Over a two-month period, the average variation went from 2.5bp in early 2014 to 6bp in early 2016 for high-yield spreads, from 0.4% to 0.7% for share prices and from 0.15% to 0.3% for exchange rates (see Artus, 2016). More fundamentally, by making risk-free debt scarcer in the market, QE pushes up spreads on risky paper, encouraging investors to hold them.

The wealth channel

Economic theory – e.g. Modigliani’s life-cycle theory and Friedman’s permanent income hypothesis – shows a proportional relationship between consumption and wealth. The factor of proportionality, the marginal propensity to consume wealth, depends on the interest...
rate, the time preference rate (impatience rate) and the preference for smoothing consumption over time.

An expansionary monetary policy, by reducing risk-free rates, encourages the purchase of risky assets and an increase in asset prices. A wealth effect may then help to support household and/or business demand; the increase in the market value of companies (market capitalisation) by comparison with the value of their productive capital (Tobin's Q ratio) stimulates investment.

The sensitivity of consumer spending to wealth is both psychological and institutional (ease of mobilising wealth tied up in real estate, extent of pension savings, etc.). In the USA, the increase in households' wealth as a proportion of their disposable income or debt, together with a climate of optimism, caused the savings rate to fall from 5% in 2002 to 2.9% in 2007. The propensity to consume housing wealth is estimated at 6 cents in the dollar over the long-term, and the propensity to consume financial wealth at 3 cents in the dollar (chart 29).

Potential wealth effects vary between countries. Movements in asset prices differ from one region to another: at the end of 2015, the S&P 500 had risen 200% from its 2009 low, whereas the EuroStoxx index had risen only half as much over the same period. Housing investment started to recover in 2011 in the USA. It has been accompanied by rising house prices since 2013, whereas investment has continued to fall in the eurozone. Ownership of risky assets, particularly equities, is much lower in the eurozone than in the USA. The possibility of using an increase in housing wealth to increase mortgage borrowing and spend the proceeds (home equity loans), which was very common in the USA before the crisis, does not exist in the eurozone. Contrary to what has happened in the USA, the eurozone household savings rate has not fallen since the crisis ended (12.5% in 2012 and 13% in 2015 according to Eurostat figures).

Distribution of value added and inequality

In the USA, GDP per capita has risen 50% in real terms in the last 20 years, while real wages (deflated
by GDP deflator) have risen only 18%. The situation is similar in Japan, with increases of 16% and 3% respectively. The difference between output and wage growth is smaller in the UK and eurozone. Since the end of the 1990s, wages have risen by 20% while GDP per capita is up 22% in the UK, and the corresponding figures for the eurozone are 9% and 15% respectively. The resulting distribution of value added reflects an increase in company profits. In net terms, profits have risen from 11% of GDP in 2002 to 12.5% in the USA, and have been above their pre-crisis level for the last five years. Similarly, they have risen from 12% of GDP to 14% in Japan, as opposed to 6% in the early 2000s. This upturn in profits, arising from the unequal distribution of value added and sometimes combined with weak investment as in the UK and eurozone, has increased self-financing by companies. In the four aforementioned countries/zones, companies are able to invest without external financing. In the USA, money raised from renewed borrowing and bond issues is mainly being used to buy back shares (chart 30).

USA: real incomes by quintile, 1990-2014

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Growth 1990-2014 (%)</th>
<th>Ratio / Q1 1990</th>
<th>Ratio / Q1 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>-7.3</td>
<td>2.51</td>
<td>2.66</td>
</tr>
<tr>
<td>Q2</td>
<td>-1.9</td>
<td>4.15</td>
<td>4.62</td>
</tr>
<tr>
<td>Q3</td>
<td>3.3</td>
<td>6.26</td>
<td>7.52</td>
</tr>
<tr>
<td>Q4</td>
<td>11.3</td>
<td>12.15</td>
<td>16.62</td>
</tr>
<tr>
<td>Q5</td>
<td>26.7</td>
<td>19.37</td>
<td>28.46</td>
</tr>
<tr>
<td>Top 5%</td>
<td>36.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1

Source: US Census Bureau

The distributive effects of monetary policy

Ultra-loose monetary policy reduces the interest rate on public-sector debt. As investors hunt for yield, yields on private-sector debt fall, which benefits new borrowers (households and companies) at the expense of lenders (financial institutions, households and companies). It results in rising asset prices (bonds, equities, real estate) and leads to rising private-sector wealth, particularly among the richest (see table 2).

When abundant liquidity leads to capital outflows and therefore a decline in the domestic currency, export companies benefit because their foreign sales increase or their profits on foreign sales increase once converted into the local currency. On the other hand, currency depreciation is bad for those buying imports, although the effect has recently been offset by falling oil prices.
Assets held by households (thousands of dollars, 2013 median)

<table>
<thead>
<tr>
<th>Income band</th>
<th>Assets</th>
<th>of which financial</th>
<th>of which real estate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>14.6</td>
<td>1.0</td>
<td>22.7</td>
</tr>
<tr>
<td>20-40</td>
<td>63.5</td>
<td>4.1</td>
<td>61.3</td>
</tr>
<tr>
<td>40-60</td>
<td>140.4</td>
<td>16.2</td>
<td>109.7</td>
</tr>
<tr>
<td>60-80</td>
<td>273.1</td>
<td>50.8</td>
<td>196.6</td>
</tr>
<tr>
<td>80-90</td>
<td>494.1</td>
<td>132.0</td>
<td>304.3</td>
</tr>
<tr>
<td>90-100</td>
<td>1,400.4</td>
<td>566.9</td>
<td>704.8</td>
</tr>
</tbody>
</table>

Table 2

Finally, there are effects on public-sector debt. The central bank pays dividends and taxes to the government. Since QE consists of buying government bonds with newly printed money, it leads to a transfer of debt from the portfolios of private-sector agents to the central-bank’s balance sheet. Taking the central bank and government together, the government’s payments to the private sector, institutional investors and households are reduced (because they hold fewer government bonds).

The exchange-rate channel

In the 1980s and 1990s, currency depreciation allowed a country to boost export volumes, as shown by the foreign trade figures of countries like Italy and Spain, which devalued when the ESM broke up. However, that is harder to achieve today. Countries that export high-value-added goods show very low price elasticity of exports (0.24 for the eurozone, much more for France and Spain and much less for Germany, which makes higher-end products) and their companies use a pricing-to-market strategy that enables them to increase their margins abroad. The price elasticity of imports, which have risen from 10% of GDP to 25% in the last 25 years, is even lower in the eurozone (0.13), partly due to the segmentation of value chains, which makes import volumes less sensitive to price. Higher import prices affect prices of non-tradable goods, whose inputs become more expensive, and real incomes, although the effect has recently been masked by falling oil prices. At a time when many countries are seeing under-utilisation of capacity, there is a large temptation to stimulate exports through currency depreciation, in order to find abroad the demand that is lacking at home. That leads to recurring devaluations, sometimes described as a currency war in which devaluations by each participant cancel each other out (charts 31, 32, 33, 34).
Devaluations also have negative effects for countries whose foreign-currency debt exceeds their external assets. Finally, the increase in the consumer price index resulting from a currency devaluation does not directly reduce debt ratios, which are calculated using GDP deflators. As regards the eurozone, it is reasonable to ask why a zone with a current-account surplus would want to increase its competitiveness.

Effects on public finances

The public-sector debt burden falls when interest rates are low, despite the further increase in debt levels that they may encourage (charts 36-38). Similarly, there is less urgency when it comes to carrying out structural reforms to boost potential growth and therefore help reduce debt ratios.
Surplus savings

The eurozone is suffering from a surplus of savings. That is shown by a current-account surplus of over 3% of GDP, resulting from rising current-account surpluses in Germany and the Netherlands and disappearing deficits in peripheral countries. With capital inflows from Northern European countries having come to a halt (due to fragmentation), peripheral countries have adopted fiscal adjustment policies that have dragged down domestic demand, and therefore imports, and have taken steps to increase their competitiveness.

New measures: negative interest-rate policies (NIRPs) and their limits

The central banks of Sweden, Switzerland, Denmark, the eurozone and Japan have adopted negative interest rates on excess bank reserves, either in order to stop their currencies rising in the forex market, or to combat deflationary pressure (for more details, see Bech et al 2016). Negative rates automatically feed through to the interbank market, since banks focus on maturities or counterparties that still offer positive rates. What about loan rates? If it is impossible to cut deposit interest rates below zero, the temptation for banks to defend margins by tightening credit conditions could lead to consequences that are the opposite of those expected. If loan rates fall more than the rates on banks’ source funds, banks’ interest margins are adversely affected, which is one of the reasons why the ECB has carried out further TLTROs (see ECB economic bulletin no.2/2016).16

Very low or negative interest rates cause a redistribution of wealth from savers to borrowers. The latter benefit from low rates – in the eurozone for example, interest payments have fallen from 4% of GDP at the end of the 2000s to 1.5% last year, and for households they have fallen from 2.5% to 0.7% – and demand for credit increases. Currency depreciation, even if it has not resulted in a sharp acceleration in export volumes (see above), has helped eurozone profits recover, with profits/GDP ratio rising 2 points since end-2012 to 12.8%.

On the other hand, low rates are naturally bad news for savers. If they want to maintain their income, they must save more (income effect), offsetting the positive effect of low rates on consumer spending. This can be seen in Germany, where the savings rate has risen by almost 1 point since 2014 to 17%. In the eurozone, where interest rates on loans have fallen from 3.5% to 2% for households and from 4.3% to 2.2% for companies since 2012, negative interest rates are dragging down the profits of credit institutions, since they cannot apply lower rates to deposits without running the risk that households will choose to hold notes and coins instead. The threshold beyond which households will do that remains unknown. It is likely to be below zero because of the costs of holding cash (transportation, storage and insurance). It also probably depends on the period over which rates are expected to remain negative. Extremely low or negative interest rates naturally affect institutional investors, which are required by regulations to hold risk-free assets. Lower interest rates generate capital gains, since they increase the price of risk-free assets, but the interest flows from those assets decline as higher-yielding bonds mature and are replaced by bonds with lower coupons. Given their obligations to pay returns that are higher than can be derived from recently issued securities, margins are contracting. That means that life insurers are offering lower rates on new policies, and companies are realising capital gains to meet their obligations. By doing so, they are reducing the proportion of high-yielding securities in their portfolios. These developments, which are particularly sensitive in Germany, have provoked strong criticism of the ECB’s monetary policy from politicians. All of this shows that negative interest-rate policies have limitations.
Factors preventing monetary policy being fully effective in causing a rapid rise in inflation, at least in the eurozone and Japan, have led to a debate on whether further unconventional measures would be appropriate:

- Helicopter money: given that unconventional monetary policy is proving slow to raise inflation to its target level, some have recommended a "helicopter money" policy. Unlike QE, this does not involve printing money to buy assets in the hope that the money transferred will end up being spent, but giving money directly to households without the central bank’s balance sheet receiving anything in return. It may take the form of financing government transfers to households by printing money. Given the risk that households will not spend the extra real income, some go so far as to recommend getting rid of cash altogether. That would make it possible to apply negative interest rates to deposits, since households would not be able to withdraw their cash and would have an incentive to spend. The resulting increase in demand could push inflation up to its target level. Obviously, such recommendations are wishful thinking.

- Others have recommended the adoption of an inflation target much lower than 2% over the medium term, despite the aforementioned advantages of keeping inflation at a moderate level, or adopting a nominal growth target, which could allow monetary policy to be tightened without an increase in inflation if real growth were sufficiently strong. With a nominal growth target, the USA for example could have started normalising monetary policy much earlier. In the last two years, inflation has fallen by a similar amount in the eurozone and USA, but the USA’s nominal growth rate has averaged 3.7% in the last five years and was 4.1% in 2014. In the eurozone, the nominal growth rate has been 1.7%. In the USA, the output gap has narrowed 3.4 points since the economy bottomed out in 2009, as opposed to only 1.3 points in the eurozone. The accent would therefore no longer be on real interest rates, but on the gap between nominal growth and interest rates, in order to support or increase the solvency of debtors or to calm the exuberance that may jeopardise financial stability.

The fear of liftoff and the question of irreversibility

Unwinding a prolonged period of very loose monetary policy raises a number of questions. Reducing central-bank balance sheets is difficult because it is unclear how markets will react: they may draw incorrect conclusions about the future direction of monetary policy. In particular, they could anticipate a tightening that is larger than that planned by the monetary authorities and overreact, as happened when Ben Bernanke announced in mid-2013 that the Fed was considering "tapering", i.e. reducing its asset purchases (Turner 2014). At the moment, the Fed and the Bank of England are reinvesting the proceeds from maturing bonds, and have announced that they will start normalising policy by raising interest rates, not by shrinking their balance sheets.

The desire to avoid disturbing the markets and to allow the real economy to absorb a rate hike means that normalisation is unlikely to happen until activity appears solid. The Fed’s rate hike in December 2015, its first for eight years, was carried out at a time when signs of slower growth were appearing and when the markets were far from agreed about future policy: the 100bp increase being considered by the Fed at the time did not appear credible to the markets. The Fed's decision caused a large amount of stress in the markets, and the effect on the dollar's exchange rate was estimated as the equivalent of a 50bp rate hike. The Fed has refrained from raising rates further in subsequent FOMC meetings. In the UK, the Bank of England has kept its base rate at 0.5% despite the return of full employment, because of concern that a rate hike would damage the real-estate market, which shows a close correlation with consumer spending.
More fundamentally, rate hikes are being prevented by two factors:
- firstly, the amount of debt and the risk of insolvency that a rate hike could bring if interest rates were to exceed the income growth rate; the amount of dollar-denominated debt outside the USA is also cause for concern (BIS 2015);
- secondly, the interest-rate risk exposure of economic agents – banks and institutional investors – with large bond portfolios18, bearing in mind that after a long period of low rates, old, higher-coupon paper has been replaced by new bonds with low coupons and longer maturities (since issuers have tried to take advantage of low rates and investors have sought yield by buying longer-dated bonds). This has led to an increase in portfolio duration, i.e. in the sensitivity of bond prices to movements in interest rates. This raises the question of the irreversibility of monetary policy (Artus 2014).

At a time when abundant liquidity is weakening the link between asset prices and fundamentals, and increasing capital movements between assets or between currencies and therefore volatility, exit strategies are made more difficult because of the risk of disappointing the markets, as shown by the recent examples of the Fed and ECB. The ECB's policy was loosened less than the markets expected in late 2015/early 2016, after which the ECB adjusted its communication and delivered more than the markets were expecting in March. The markets are expecting further loosening, because inflation is proving slow to reach the ECB's stated target, and the risk of destabilising the markets is an incentive for the ECB to make its policy even more accommodative19.

Bonds portfolio held by institutional investors & banks (% of GDP)

![Bonds portfolio held by institutional investors & banks (% of GDP)](image)

Monetary policy is not the only game in town

The eurozone has a current-account surplus because of excess savings. The financing capacity generated by the private sector – due to ongoing high household savings rates and companies funding investments from their own resources – is more than covering government borrowing requirements. As a result, there is no risk of the private sector being crowded out by public financing needs. The current-account surplus is the result of rising surpluses in certain countries – primarily Germany – and shrinking deficits in Southern European countries.

Public-sector demand is still providing little support in certain countries, where the public finances still need to be improved. Others have room for manoeuvre: Germany has a budget surplus and its debt ratio is falling. However, Germany has full employment, which means that there is no need to support demand, while the build-up of assets is justified by population ageing.

The remaining question relates to the fact that the current-account surplus is financing investment outside the eurozone, which suggests that steps should be taken to redirect it within the eurozone. The introduction of a single financial market is a step in the right direction, and a common budget system to supplement the Juncker plan looks desirable. That would make the eurozone more viable, by making it more like an optimal monetary zone. The current-account surplus, which arises from structural factors, cannot be eliminated by monetary policy, especially when monetary policy is causing the euro to weaken in a way that inflates external surpluses.

Structural reforms capable of supporting potential growth give monetary policy greater room for manoeuvre, since a gap between nominal growth and interest rates can then exist without interest rates being kept extremely low. As well as training efforts and labour market activation programmes – such as reducing the mismatch between supply and demand for jobs – the literature on reforms mainly mentions the following areas:

- job protection: reforms lead to a temporary fall in employment at existing companies by making it cheaper to fire staff, followed by an increase in job creation
because of greater incentives to hire; the extent of these effects naturally depends on the phase of the cycle in which the reforms are introduced. Reducing the cost of firing staff may reduce bankruptcies, thereby reducing their negative impact on employment. Finally, although centralised collective bargaining internalises the effects of a pay rise in a given sector, decentralised bargaining, by allowing wages to adjust to an adverse shock in a sector or company, may reduce negative effects on employment.

- more efficient operation of the labour market (greater incentives to find work, improved system for matching supply and demand for jobs, training etc.).
- tougher competition in the product market, with reduced entry barriers, leads to a fall in employment in existing companies, followed by a gradual increase as new companies arrive: the effect is greater in sectors showing low levels of consolidation. If reforms affect upstream sectors, the reduction in input prices for downstream sectors makes them more profitable and increases their activity. Finally, productivity gains, stimulated by greater competition, lead to higher pay.

The issues faced by reforms are well known. Fatas (2015) shows that, in OECD countries, there is a negative correlation between GDP per capita (or labour productivity or the employment rate) and the amount of regulations governing the product and labour markets. He also shows the positive effect that major reforms between 1998 and 2003 had on productivity growth between 2000 and 2013.

Reforms are difficult to implement, and are mainly undertaken in times of crisis, or in other words at the worst possible time. That is because of political economy reasons: the beneficial effects of reforms appear only gradually, they are uncertain and they are spread over the whole population, whereas their costs are immediate and concentrated in specific groups, which have an interest in opposing them. For reforms to be implemented, a sense of urgency is required, along with good communication, a clear mandate, patience and perseverance, because the positive effects do not appear immediately. It is better to introduce reforms simultaneously, not just because they reinforce each other, but because an extended series of reforms can bring opposition through reform fatigue.

Some fear that implementing structural reforms at a time of deflation risk may be counterproductive, resulting in an increase in supply that drags down inflation and so increases real interest rates. That results in a positive slope on the demand curve, the opposite of the normal configuration, and a general increase in prices then tends to support demand; those are the concerns raised by Summers\(^{20}\). However, not all reforms are alike. Some have no negative short-term effects, such as those that extend people's working lives, as opposed to those that negatively affect wages. Packages of reforms are preferable to isolated ones. For example, a reform of the goods market that increases competition and lowers prices will support real incomes, reducing employment at existing companies but later boosting employment gradually as new entrants arrive and thus offsetting the negative short-term effects of job protection reforms. Recent empirical research shows that such negative effects need to be put into context. Varga et al (2014) look at the effect of a package of reforms, comparing the situation in each OECD country with the average of the three “best-performing” countries in terms of regulation indicators, and assessing the impact of reducing the gap between the regulation indicators of each country and those of the three “best-performing” countries. They conclude that such a reduction in regulations would raise GDP by 3% after five years and, despite negative short-term effects from some reforms, they did not find any significant deflationary effect, even when policy rates are close to the zero lower bound, a conclusion shared by Cacciatore et al (2015)\(^{21}\).

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NOTES

1. In the absence of uncertainty about inflation and future monetary policy, long-term interest rates (with a term of T) are expressed as an average of the current short-term rate (i) and expected future short rates (i_{1,t+1}), which is the 1-year rate in j years' time:

\[(1+ i)^T = (1 + i) \prod_{j=0}^{T-1} (1 + i_{1,t+1})\]

2. The term premium (Θ) is the remuneration that investors require for holding a long-term security rather than making successive investments in short-term securities, and is naturally linked to uncertainty about future short rates:

\[i_t = \Theta + (1/T) \mathbb{E} \left( \sum_{j=0}^{T-1} i_{t+1} \right)\]

3. Caballero et al (2014) show that this can cause a safety trap to appear.

4. The economy's sensitivity to interest rates has decreased in the last few decades. Willis et al (2015) estimate that, before 1985, an unexpected fall in the Fed funds rate pushed up employment by 0.25% over 18 months in the sectors most sensitive to interest rates (construction, durable goods) and 0.10% in the non-durable goods and services sectors. Since then, the effect has decreased considerably and even gone into reverse, pushing down employment by 0.21% in durable goods, 0% in construction, 0.22% in non-durable goods and 0.03% in services. A 0.25% reduction in long-term interest rates was estimated to push up employment by 0.18% over 18 months before 1985, as opposed to 0.14% over 27 months after 1985. The shift is partly attributed to a change in the way long-term interest rates react to short rates. Before 1985, an unexpected cut in the Fed funds rate was followed by a gradual fall in long-term interest rates over 15 months. After 1985, long-term interest rates started by rising, and only started falling after 15 months. That extended response time fits with the "conundrum" mentioned by Alan Greenspan in 2004, with long rates not initially moving in the same direction as short rates. The weaker response shown by employment to lower interest rates is also because the most sensitive sectors now account for a smaller share of total employment. The durable goods sector's share of employment fell from 17% in 1960 to 6% in 2007, while that of the private-sector service sector rose form 49% to 68%. In a model that links the employment gap (difference between actual and potential employment) with its delayed value and with the real Fed funds rate, the estimated regression coefficient for the Fed funds rate went from 0.046 in 1960-1984 to 0.004 in 1985-2007.

5. As regards monetary policy, the equilibrium real interest rate is considered to be the rate that brings output into line with its potential, which would happen in a context of price and wage flexibility assuming constant mark-ups. If the actual real rate (r) is higher than the equilibrium rate (r*), output is lower than the equilibrium output, causing a negative output gap. As a result, monetary policy needs to minimise the gap between r and r* (real interest gap). On that basis, Justiniano et al (2010) show that monetary policy was too loose in the 1970s and too tight in late 2008, when the equilibrium real interest rate became negative. That widened the gap with respect to the actual real rate because of the zero lower bound, and justified the adoption of unconventional policies. Curdia et al (2014) estimate an equilibrium real interest rate based on a new Keynesian economics equilibrium model, and compare the performance of a monetary policy reaction function that substitutes the equilibrium rate (r*) for the output gap (y-y*) (specification 1), with a classical Taylor reaction function (specification 2). They show that the reaction function incorporating the Wicksellian equilibrium interest rate is a better model for actual developments than the Taylor reaction function.

6. The trend in real interest rates can be used as an indicator for the direction of equilibrium real rates, although they may differ in a given country because of several factors, some of which are persistent (e.g. deleveraging) and others temporary (confidence) or structural (demographics, productivity growth).

7. For details, see O. Blanchard and S. Fischer: Lectures on macro-economics, MIT Press, 1989, and P. Aghion and P. Howitt: The Economics of Growth, MIT Press 2009. The presence of uncertainties, and therefore risks, results in a variety of returns on assets or expected marginal productivity rates in different sectors. For example, between 1926 and 2001, the average annual return on shares in large US companies was 12.7%, with a standard deviation of 20.2%. For long-term Treasury bonds the figure was 5.7% (standard deviation of 9.4) and the return from cash was zero (standard deviation of 0) but in real terms (i.e. minus inflation) it was -3.1% (standard deviation of 4.4) (source: Stocks, bonds, bills and inflation, Yearbook 2002, Ibotson Associates).

8. See for example P. Sorensen and H Whitta-Jacobsen: Introducing Advanced Macroeconomics (pages 140 and following), Mc Graw Hill, 2005

9. Because if y = f(x), where F(x,y)= f(x) − y =0, we get dy/dx = - (dF/dx)/(dF/dy)
It is not possible to show a robust relationship between productivity growth and productive investment in volume terms. Although productivity growth was slowing, the investment rate went from 8% in the mid-1990s to 12.8% in the USA and from 8% to 10% in the eurozone.

The OECD index relating to job protection is on a scale from 0 to 6, and its figures are 0.26 for the USA, 2.87 for Germany, 2.38 for France, 2.05 for Spain and 2.51 for Italy. In certain countries where the labour market is heavily regulated, productivity may be temporarily affected by overstaffing (or disguised unemployment).

In the USA, the dynamics of unemployment ($u_t$) can be written, where $\epsilon$ is a shock, as:

$$u_t = \alpha_0 + \alpha_1 u_{t-1} + \alpha_2 u_{t-2} + \epsilon_t,$$

with $\alpha_1 + \alpha_2 < 1$, the unemployment rate is stationary and reverses to an equilibrium level of $\bar{u} = \alpha_0 / (1 - \alpha_1 - \alpha_2)$. In the eurozone, unemployment is difference-stationary, and its dynamics can be written as

$$\Delta u_t = - (1 - \alpha) \Delta u_{t-1} + \epsilon_t,$$

with $u$ converging while oscillating towards $u = u_0 + \epsilon_t / (2 - \alpha_1) > u_0$.

This behaviour is related to the rigidity of a two-tier labour market. The OECD permanent job protection indicator, which is on a scale of 1 to 6, is 0.3 in the USA and 2.5 in the eurozone. In a recession, employment of outsiders falls, and the wages of insiders are preserved. During an expansion, the wages of insiders rise but unemployment among outsiders is not fully absorbed, resulting in a ratchet effect where the unemployment rate does not fall back to its previous level. This calls into question the implicit contract theory (Azariadis etc.), according to which jobs and wages are preserved in a recession but only rise moderately during an expansion. On the contrary, profits appear to be more volatile and highly pro-cyclical because of an implicit contract between employers and employees: since the former have less risk aversion than the latter, slow wage growth in the upward phase of the cycle is a kind of insurance premium that remunerates the risks taken by employers.

Given the increasing scarcity of risk-free bonds due to central-bank buying, demand for risk-free assets should fall in favour of demand for risky assets. In a supply and demand diagram, where supply moves from O to O’ and demand is expressed in terms of the risk-free rate $r$ and the spread with respect to risky assets $\mu$, i.e. $D = f(r, \mu)$, we get a fall in $r$ and an increase in $\mu$.

$$S/Y = 21.6 - 0.28 W/Y$$

$$R^2 = 0.68$$

$$22.1 (-16.1)$$

$$S/Y = 7.89 - 0.34 W/Y + 6.27 \text{INC EXP} - 1.16 (W/Y) \text{INC EXP}$$

$$R^2 = 0.75$$

$$3.1 (-0.7) (5.8) (-5.9)$$

$S =$ savings, $Y =$ income, $\text{INC EXP} =$ income expectations, with the Student's $t$ stated in brackets.

The increase in profits from the unequal distribution of value-added is not independent of creeping consolidation, as companies seek to increase market share (buying competitors, suppliers responding to the market power of their customers etc.), increase pricing power and exploit synergies. A McKinsey study ("Measuring and managing the value of companies", McKinsey Corporate Performance Analytics, Aug 2015, as quoted in "Too much of a good thing", The Economist, 26/3/2016) on the 500 largest companies by market capitalisation, shows that their return on equity increased from 8% in 1990 to 12% in the mid-2000s and 16% at the start of the decade. The proportion of revenue generated by "fragmented" sectors in which the top four companies have less than a third of the market fell from 72% in 1997 to 58% in 2012. The proportion of revenue generated by sectors where the top four companies have between one third and two thirds of the market rose from 24% to 33%. Looking at the distribution of companies by return on equity band, the proportion generated by companies with RoE of over 20% increased. Profitable companies have become more resilient: in 2003, those with a pre-tax return on equity of 15% or more showed an 83% probability of remaining profitable 10 years later. In the previous decade, that probability was only 50%. Finally, we must take into account the ability to shape regulations, as suggested by the doubling in lobbying expenditure over the period.
Some emerging-market countries faced a monetary-policy dilemma when low rates in OECD countries stimulated capital inflows. The upward pressure on their currencies would have justified a rate cut to protect their competitiveness, but their overheating economies and inflation risk justified tightening monetary policy. In recent years, this has been typified by Brazil's situation.

In Switzerland, mortgage rates have risen even though risk-free long yields have fallen. In Japan, low rates have prompted investors to buy foreign securities rather than take more risks on domestic securities. The yen thus acquired by non-residents has been used to buy Japanese securities and, together with the yen's safe-haven status, this has pushed up the Japanese currency, which is an effect that undeniably runs counter to that intended and is causing the prospect of inflation rising to its target level to recede further.

On this point, see William de Vijlder, Conjoncture No.2, BNP Paribas, 2016

The bond portfolios of institutional investors (insurance companies and pension funds) are worth 65% of GDP in Japan, 59% in the UK, 40% in the USA and 34% in the eurozone. The bond portfolios of banks in those four countries are worth 220%, 70%, 20% and 60% of GDP respectively.

Stein et al (2016) believe that central banks should pay more attention to the way bond markets react; Orphanides (2015) calls for more rules and less discretion.

Eggertsson et al (2013) look at the effect of lower mark-ups in goods and labour markets in Southern European countries, based on a general equilibrium model. They conclude that a 1-point fall in the mark-up pushes up GDP by 2.5% in a normal period, but down by 0.3% in a crisis. Two opposite effects are at play. Expectations of a future increase in revenue related to the implementation of reforms is regarded as a wealth effect that supports consumer spending, whereas real interest rates are increased by the fall in inflation caused by the lower mark-up. That may be countered by monetary policy in a normal period (reducing nominal interest rates), but that possibility disappears in a crisis if the policy rate is close to the zero lower bound. In that situation, the wealth effect is no longer sufficient to offset the increase in real interest rates. That is why the timing of reforms is so important.

For a detailed analysis of the effects on the labour market, taking into account the cycle, see the OECD's study of 21 countries over 27 years (Employment Outlook 2016, yet to be published).
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