Normalisation of monetary policies: prospects and divergences

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Introduction

Although the world's leading central banks are currently still conducting very expansionary monetary policies, sooner or later those policies will doubtless need to be tightened. However, divergent macroeconomic situations will mean different exit timings. For instance, in the United States the purchase of securities has ended whereas the euro area recently introduced new monetary easing measures.

In that context, this article aims to look at the divergences in terms of the normalisation of monetary policies by examining more specifically the cases of the United States and the euro area. It focuses in particular on the financial turmoil that could accompany the expected normalisation in the United States, and the potential spillover effects for the euro area.

The article is in four sections. The first section presents the current monetary policy stance in the four main advanced economies, namely the United States, Japan, the United Kingdom and the euro area. The second section addresses the macroeconomic situations underlying that stance in the euro area and in the United States, while the third section considers the outlook for the monetary policy of those two economies. Finally, the fourth section deals with the normalisation of monetary policy in the United States and the potential spillover effects on the euro area.

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1. Monetary policy stance in the advanced economies

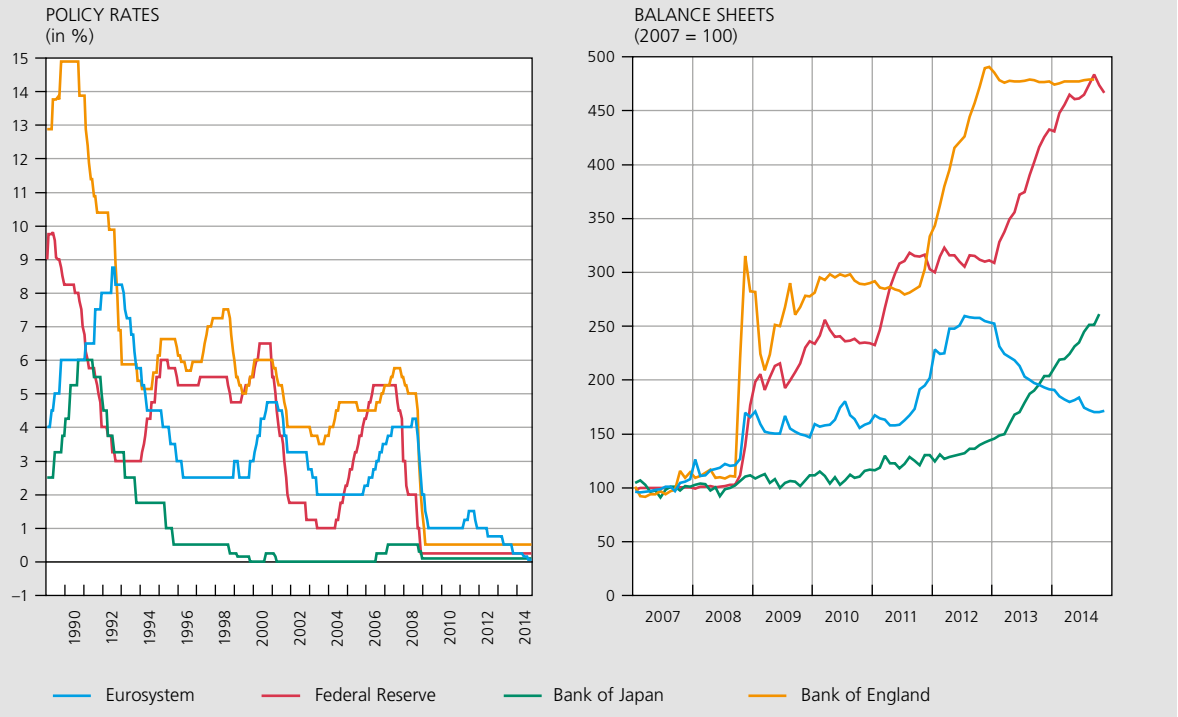
This section describes the current monetary policy stance in the four large advanced economies: the United States, Japan, the United Kingdom and the euro area. To that end, we review the main instruments used by the central banks of those regions in the wake of the recent crisis, and we discuss their effects on the interest rates relevant for decisions on consumption and investment.

A vigorous response to the crisis

In response to the economic and financial crisis that erupted in the summer of 2007, the leading central banks of the advanced economies introduced numerous measures aimed at achieving their objectives for price stability and/or employment. First, policy interest rates were slashed. In the United States, the euro area and the United Kingdom, the cuts were unprecedentedly rapid and substantial, while in Japan the rates were again reduced to their historical low. The policy rates set by the Federal Reserve, the Bank of England and the Bank of Japan are currently at their lowest level since the end of 2008 or early 2009, while the Eurosystem has recently decided to make further cuts (see section 3.1.1). Furthermore, faced with the scale of the crisis and the zero lower bound for nominal interest rates, the leading central banks have turned to "unconventional" monetary policy instruments.

On the one hand, they have adopted forward guidance for their communication on future monetary policy developments and, in particular, movement in policy rates. In so doing, the central banks aim to influence public

CHART 1 KEY POLICY RATES AND BALANCE SHEETS



Source : Thomson Reuters Datastream.

expectations concerning future short-term interest rates, exerting pressure on longer-term rates and thereby increasing the accommodative character of their monetary policy. In clarifying the central bank's assessment of the economic situation and its reaction function, forward guidance performs a special role in times of crisis, when there is usually great uncertainty. The large central banks have all issued guidance on their policy interest rates, though there are variations in the nature and number of announcements made. The Federal Reserve has been by far the most active. It first issued relatively vague guidance on its policy rates in 2008, but the statements then became more specific, defining a time horizon in 2011 and then – in 2012 – numerical thresholds for macroeconomic variables (see section 2.2). Since March 2014, however, the signals have reverted to a general, more flexible but also less transparent form. The Bank of Japan introduced forward guidance on interest rates in 2010, while the European Central Bank and the Bank of England did the same in the summer of 2013. Although the guidance has undergone slight adjustment since then, it is still currently applied.

The central banks have also made use of their balance sheets, which have expanded dramatically. Between 2007 and 2014, the balance sheets of the Federal Reserve and the Bank of England thus increased almost fivefold, while that of the Bank of Japan expanded by around two and a half times. The Eurosystem's balance sheet more than doubled between 2007 and mid-2012, before contracting significantly. While the balance sheet growth seen during the crisis is exceptional, strong expansion has also occurred in the past, during the two world wars and the Great Depression of the 1930s (Fergusson *et al.*, 2014).

The balance sheet growth really began after the collapse of the Lehman Brothers bank on 15 September 2008. At first, it generally reflected the measures taken to facilitate access to liquidity and to support credit conditions on certain specific markets. Later, once the key interest rates were close to their floor, the balance sheet expansion gradually began to reflect the adoption of asset purchase programmes aimed at influencing long-term interest rates and thus easing monetary policy further. The Federal Reserve, the Bank of England and the Bank of Japan all three approved massive asset purchase programmes financed by the creation of reserves, and the growth of their balance sheets is very largely attributable to that "quantitative easing" policy.

From November 2008, the Federal Reserve introduced a total of four purchase programmes which resulted in the acquisition of long-term assets amounting to over $ 3 800 billion. The last programme, adopted at the end of 2012 and initially providing for monthly purchases of mortgage-backed securities (MBSs) amounting to $ 40 billion and US Treasury bonds totalling $ 45 billion, was gradually scaled down from January 2014 before ending in November. The Federal Reserve thus reduced its monetary support for the economy and initiated a very gradual normalisation of its monetary policy. The Bank of England adopted an asset purchase programme in March 2009 whereby it acquired assets totalling £ 375 billion between March 2009 and November 2012. Finally, the Bank of Japan launched a modest asset purchase programme in October 2010 before switching to a more ambitious programme in April 2013. The latter, known as quantitative and qualitative easing, is intended to ensure that the new 2 % inflation target defined in January 2013 is achieved as quickly as possible. With this programme, the Bank of Japan aims in particular to double its monetary base and the amount of Japanese government bonds that it holds within the space of two years. The Eurosystem bought covered bonds between 2009 and 2012 and, under the Securities Markets Programme, government debt securities between May 2010 and February 2012. Nevertheless, the Eurosystem's purchases of assets remained modest in comparison with its balance sheet total. Moreover, they were only meant to preserve the efficient transmission of its monetary policy and thus support lending to households and businesses.

In contrast to the situation of the other central banks, the expansion of the Eurosystem's balance sheet mainly reflects its increased intermediation role and the growth of its lending to the banks, which play a crucial role in financing the euro area's private sector. While the other central banks themselves orchestrated the growth of their balance sheets as part of their quantitative easing policies, the Eurosystem essentially left the expansion of its balance sheet to the discretion of the commercial banks and their need for refinancing. The contraction of the Eurosystem's balance sheet that began in the summer of 2012 thus reflects the banks' declining need for liquidity following the reduction in financial fragmentation in the euro area (de Sola Perea and Van Nieuwenhuyze, 2014). The Eurosystem's recent decisions, namely the implementation of targeted longer-term refinancing operations (TLTROs) in June and the launch of programmes for the purchase of asset-backed securities (ABSs) and covered bonds in September, should reverse the trend and lead to a further substantial increase in the Eurosystem's balance sheet (see also section 3.1.1).

A very accommodative stance

To assess the accommodative character of the policies pursued, it is relevant to focus on the movement in real medium- and long-term interest rates, as they hold a central position in the transmission of monetary policy to the real economy. Not only do they influence decisions on consumption, saving and investment but they also affect the valuation of other assets such as equities and real estate. We shall confine ourselves to risk-free interest rates[1] because they are rates over which the central bank has more direct influence, and they are particularly important since they form the basis for determining the other interest rates in the economy (Boeckx *et al.*, 2013).

According to the interest rate term structure theory, longer-term nominal rates depend partly on expectations regarding future short-term interest rates and partly on term premiums which compensate for the uncertainty surrounding future nominal interest rates (Boeckx *et al.*, 2013). By using their policy instruments, central banks can influence each of these components. In setting their key interest rates, they aim to influence short-term rates. Since adjustments to the key interest rates are infrequent and normally indicate a trend, they affect expectations of future short-term interest rates. Moreover, central banks use their forward guidance to steer those expectations of future policy rates. As the guidance offered reduces uncertainty and encourages investors to take a longer-term view, it can also depress term premiums.

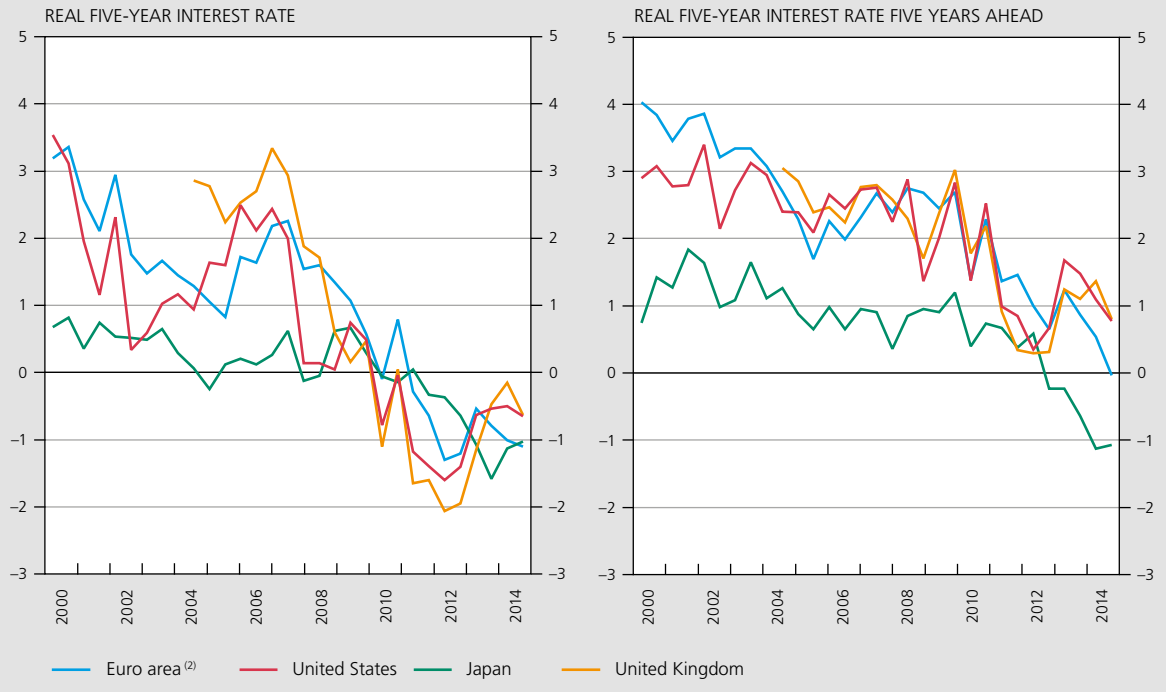
Those premiums come under more direct pressure in the case of long-term asset purchase programmes which specifically aim to reduce them. However, by signalling the central bank's views on the current and future economic situation, the announcement of purchase programmes may also influence expectations of future short-term interest rates (Bauer and Rudebusch, 2013). Finally, if inflation expectations remain firmly anchored, the movements in nominal interest rates are reflected in real interest rates, which are relevant for decisions on consumption and investment. The central bank may also influence real interest rates by modifying inflation expectations. That is what the Bank of Japan did via its programme of quantitative and qualitative easing. The introduction of that ambitious securities purchase programme led to higher inflation expectations in Japan after years of moderate deflation.

(1) Yields on Treasuries in the United States and the average yield in the five main euro area countries with an AAA rating on 30 June 2013 (Germany, Austria, Finland, France and the Netherlands). That choice enables us not only to exclude the credit risk affecting the yield on some government bonds in the euro area but also to limit the influence of negative liquidity premiums in the case of government bonds of countries such as Germany.

Real five-year interest rates, taken here as medium-term rates, declined overall at the start of the crisis in parallel with the fall in the policy rates. After some volatility and a slight rise, they dropped to a historic low between the beginning of 2012 and the beginning of 2013. In the recent period, they have displayed wide divergences between economic blocs. In the context of the statements by the Federal Reserve Chairman concerning a possible reduction in asset purchases (see section 4.1), they rose sharply in the United States and the United Kingdom between the spring and autumn of 2013; after that they remained stable or increased more slowly. In the euro area, the rise in 2013 gave way to a further decline in 2014, though it was tempered by a fall in inflation expectations. Finally, in Japan, where the rates were already very low when the crisis erupted, there was no real decline until the beginning of 2013, after the Bank of Japan adopted its programme of quantitative and qualitative easing. Against the backdrop of rising inflation expectations, they have dipped to a historically low level in recent months.

The real five-year interest rate five years ahead, our long-term rate, can be regarded as the real short-term interest rate expected in the five-year period commencing in five years' time, to which a term premium is added. The real short-term interest rate expected in that future period can be taken as the expected real GDP growth rate, in that it can be assumed that monetary policy will be neutral overall in the long-term. The decline in the real five-year interest rate five years ahead is therefore due both to the lower growth expected in the long-term and the reduction in term premiums resulting in particular from the central banks' asset purchases. Taking that into account, the real five-year interest rates five years ahead naturally remained steadier in the initial stages of the crisis. Nevertheless, they began to fall towards the end of 2010, reaching a low point between the spring of 2012 and the spring of 2013. Unsurprisingly, that was particularly apparent in countries which were quick to adopt asset purchase programmes, namely the United States and the United Kingdom. After a strong surge between the spring and autumn of 2013 following statements by the then Federal Reserve Chairman Ben Bernanke, they rapidly subsided again, primarily in the euro area. In the recent period, long-term inflation expectations have declined somewhat in the euro area, but recent monetary policy measures have probably depressed term premiums. In Japan, the real long-term interest rate is currently at an all-time low, owing to the marked rise in

CHART 2 REAL FIVE-YEAR INTEREST RATES[1] AND FIVE-YEAR INTEREST RATES FIVE YEARS AHEAD



Sources: Thomson Reuters Datastream, Consensus Economics.
(1) Nominal interest rates deflated by average inflation expectations over the period.
(2) Average yield in the five main euro area countries with an AAA rating on 30 June 2013 (Germany, Austria, Finland, France and the Netherlands)..

inflation expectations and the Bank of Japan's programme of quantitative and qualitative easing.

Generally speaking, real interest rates are no longer necessarily on the floor, but they remain very low in historical terms. At present, real five-year interest rates are still decidedly negative, and real five-year interest rates five years ahead are well below their long-term average. While the monetary policies conducted by the large central banks of the advanced economies are undeniably still very accommodating, it is nonetheless obvious that those policies have diverged recently. While renewed easing took place in Japan and the euro area, a partial tightening occurred in the United States and the United Kingdom. The macroeconomic fundamentals underlying the differences apparent between the United States and the euro area and the resulting implications are discussed in the rest of this article.

2. Macroeconomic context

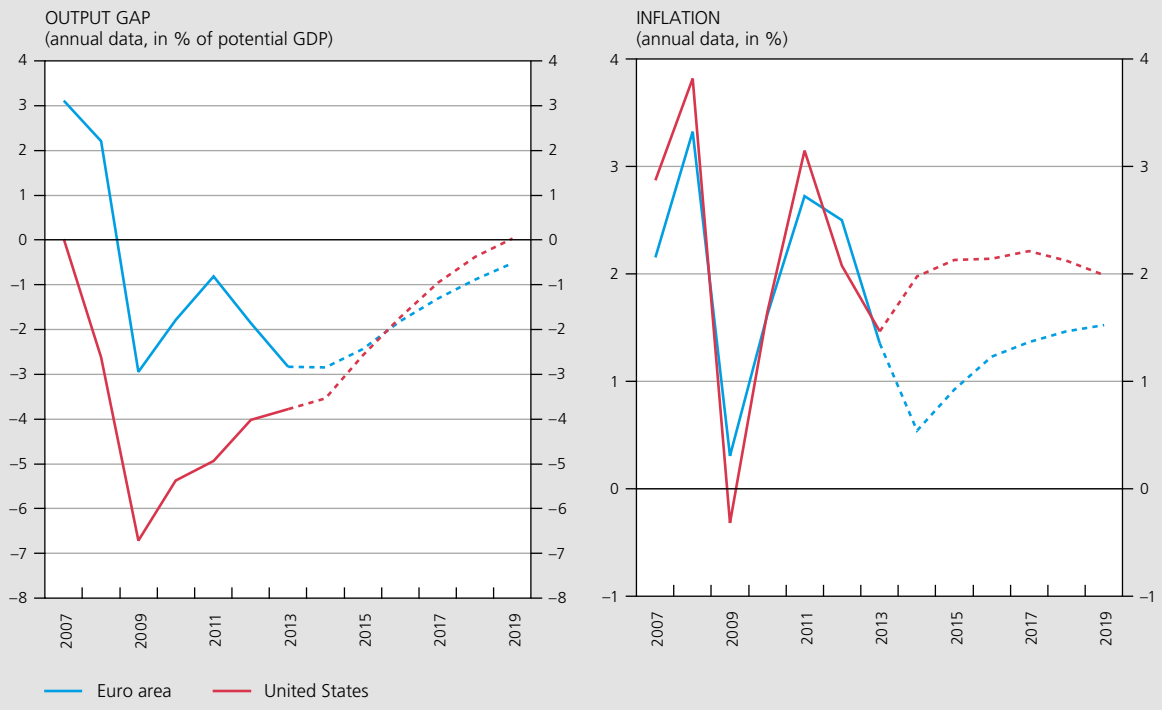
This section examines the macroeconomic situation that underlies monetary policy in the United States and in the euro area, and foreshadows the likely divergences in normalisation. Special attention will focus on labour market developments in the United States and inflation expectations in the euro area, given their major role in the current monetary policy of the Federal Reserve and the Eurosystem respectively.

2.1 General overview

The recovery of economic activity following the 2008-2009 economic and financial crisis was particularly slow from a historical perspective. However, it was clearly more vigorous in the United States than in the euro area, where the sovereign debt crisis which erupted in the spring of 2010 triggered a further contraction between late 2011 and early 2013. Moreover, in the most recent period, the growth figures have remained good in the United States, whereas growth in the euro area has been hesitant and patchy.

At the end of 2014, output was still well below its potential level in both economies, indicating substantial unused capacity. In recent years, the (negative) output gap has tended to widen in the euro area, whereas it has narrowed

CHART 3 OUTPUT GAP AND CONSUMER PRICE INFLATION (1)



Source: IMF, World Economic Outlook (October 2014).
(1) The dotted lines correspond to projections.

in the United States. Looking ahead, according to the IMF projections, the output gap will be closed faster in the United States than in the euro area.

In both economies, inflation is considerably below the target levels, though to greatly differing degrees. In the United States, that has been the case since the end of 2012. In September 2014, inflation measured by the private consumption expenditure deflator (PCE index) – for which the target is 2 % – stood at 1.48 %, and has averaged 1.4 % since the beginning of 2013. In the euro area, inflation according to the harmonised index of consumer prices has undergone a correction since the end of 2011. From an initial figure of 3 %, it dropped below 2 % at the beginning of 2013, and was down to 0.4 % in October 2014.

In the years ahead, given the inflation projections published by the IMF in October 2014, inflation measured on the basis of the consumer price index – normally slightly higher than the figure according to the private consumption expenditure index – is expected to remain at just above 2 % in the United States. In the euro area, although inflation could rise, it will nevertheless be unlikely to exceed 1 % before 2016, and could remain well below 2 % for the next five years.

Though these two leading macroeconomic indicators are not exhaustive, they do shed light on the slow and uneven recovery of activity following the great recession. While the United States still has substantial unused production capacity, it does appear to be a relatively robust economy with an inflation profile tending towards its target. Conversely, the recovery is lagging well behind in the euro area, and the downward trend in inflation suggests an increased, albeit limited, risk of deflation (see also section 2.3). Against that background, the monetary policies currently being pursued by the Federal Reserve and the Eurosystem will probably remain accommodating for some time yet. However, the normalisation of monetary policy which has begun in the United States will gradually progress, while an additional easing is not ruled out in the euro area, as is evident from the recent announcements by the ECB Governing Council. The next two sections take a more detailed look at two topics of significance for the future conduct of monetary policy in the United States and the euro area respectively, namely the labour market and inflation expectations.

2.2 Labour market in the United States

In the United States, labour market developments play a key role in determining the timing and pace of the exit from the very accommodative monetary policy currently being pursued. The assessment by the Federal Open Market Committee (FOMC) of the under-utilisation of labour and the impact of that on wages and prices is decisive in that respect.

The labour market has always played a leading role in the monetary policy debates and decisions of the FOMC, compared to other central banks in the advanced economies. That situation results largely from what is known as the Dual Mandate, whereby the Federal Reserve is responsible for ensuring full employment as well as price stability. However, quantification of the full employment concept is a serious challenge for a central bank, and the FOMC has therefore always stressed that this target was largely determined by non-monetary structural factors which may change over time and are difficult to measure, whereas the price stability target is defined as a rise in the PCE deflator of 2 % in the long term.

The attention that the FOMC pays to the labour market is also reflected in the wording of the threshold-based forward guidance introduced in December 2012, whereby the period for maintaining the exceptionally low interval for the target federal funds rate was linked to the level of unemployment. At that time, the FOMC had considered it inappropriate to raise policy rates so long as unemployment remained above 6.5 %. At the same time, the one-year inflation forecasts should not exceed 2.5 % and long-term inflation expectations should remain firmly anchored. As unemployment continued to fall during 2013, the FOMC amended its forward guidance, and the significance of the threshold was reduced somewhat. It was announced that the exceptionally low interval for the target rate was also to be maintained if unemployment fell below 6.5 %, so long as the said conditions concerning inflation forecasts and inflation expectations were met.

In March 2014, the threshold-based forward guidance and the explicit reference to the level of unemployment were replaced by a broader qualitative wording that took account of a wider range of labour market indicators. The FOMC judged it necessary to consider other indicators besides the unemployment rate in order to obtain an accurate assessment of the degree to which the US economy was still not meeting its full employment target. In addition, this rewording is a logical step when a central bank moves on from a highly accommodative monetary policy stance, in which threshold-based forward guidance is an instrument for implementing that policy, and initiates a monetary exit in which the FOMC does not wish to rely on a single, purely quantitative indicator to determine the timing of the first interest rate rise, and the pace of subsequent rate increases.

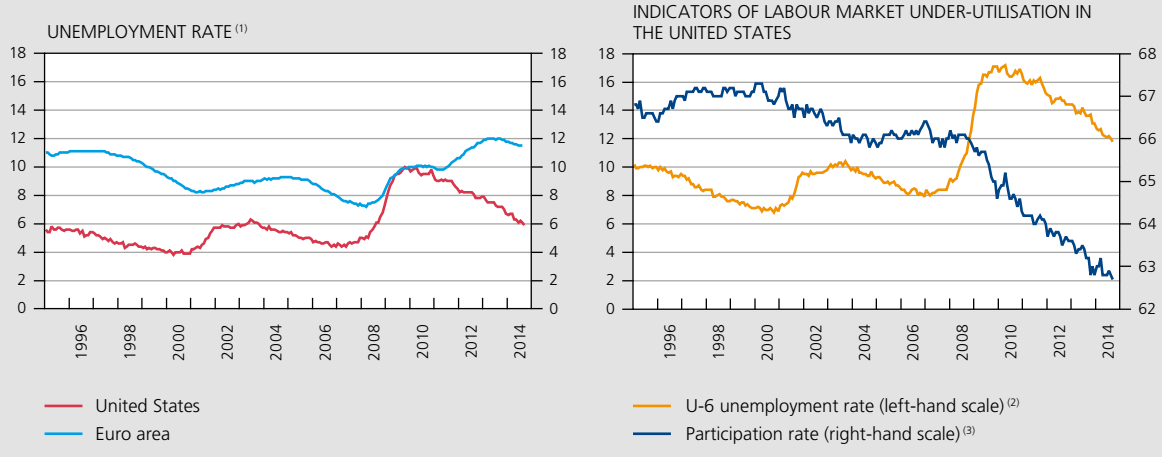
The recovery of the labour market in the United States is reflected in strengthening growth of employment accompanied by a marked fall in the unemployment rate, down from around 10 % at the end of 2009 to below 6 % at the end of 2014. At the same time, in the euro area unemployment continued to rise after 2010, peaking at 12 % in 2013, and has only declined slowly since then against the backdrop of persistently fragile economic activity. To ensure that the central bank is correct in its assessment of this apparently strong labour market recovery, Yellen (2014a, 2014b) presents six indicators which, in addition to unemployment, help to provide an accurate estimate of the use of labour and the pursuit of full employment. We shall consider two of these indicators, namely labour market participation and the number of people working part-time for economic reasons.

Part of the fall in unemployment is due to the decline in labour market participation among the population of working age. In fact, during the crisis, the activity rate dropped from around 66 % to below 63 %. This decline is due partly to structural factors, such as population ageing and incapacity to work on account of sickness, disability or school enrolment, and partly to cyclical factors relating to the deteriorating employment outlook and workers becoming discouraged from seeking jobs (Council of Economic Advisers, 2014). The analysis also shows that certain structural factors, such as inability to work on account of sickness, disability or school enrolment, also comprise a cyclical component. This tricky distinction is important if the central bank is to assess the inflation risks.

The traditional unemployment rate reflects the unemployed population of working age who have actively looked for work in the past four weeks. A broader criterion for measuring the under-utilisation of the labour market, namely the U-6 unemployment rate, also takes account of all those who are no longer seeking work because of the economic situation (the discouraged), all those who have actively looked for work in the past twelve months, but not necessarily in the past four weeks (the marginally attached), and all those who would like to work full-time but only have a part-time job for economic reasons. The discrepancy between this U-6 measure and the traditional unemployment rate is narrowing but remains considerable, and is even greater than it was in earlier recessions. This indicates that under-utilisation of the labour force remains significant.

The above statistics contribute towards a more accurate, nuanced estimate of the labour market recovery in the United States and of any upward pressure on wages and prices. That also clearly shows that the switch from a single measure – the unemployment rate – to a broad range of indicators in order to assess the under-utilisation of the labour market and determine the monetary policy stance was entirely justified. It is evident that the under-utilisation is greater than it would appear on the basis of the unemployment rate alone. That explains why, even though an

CHART 4 LABOUR MARKET INDICATORS



Sources: Thomson Reuters Datastream, Bureau of Labor Statistics, Eurostat.

(1) Persons actively seeking work in the last four weeks, in % of the labour force.

(2) Unemployment rate, including unemployed persons no longer seeking work in view of the economic situation (discouraged), unemployed persons who want to work but have not looked for a job recently, and persons working part-time for economic reasons.

(3) Ratio of persons in work and job-seekers in the labour force aged 16 years and over.

interest rate rise is looming on the horizon, it will not come for a while yet, and subsequent increases will only come gradually (see section 3).

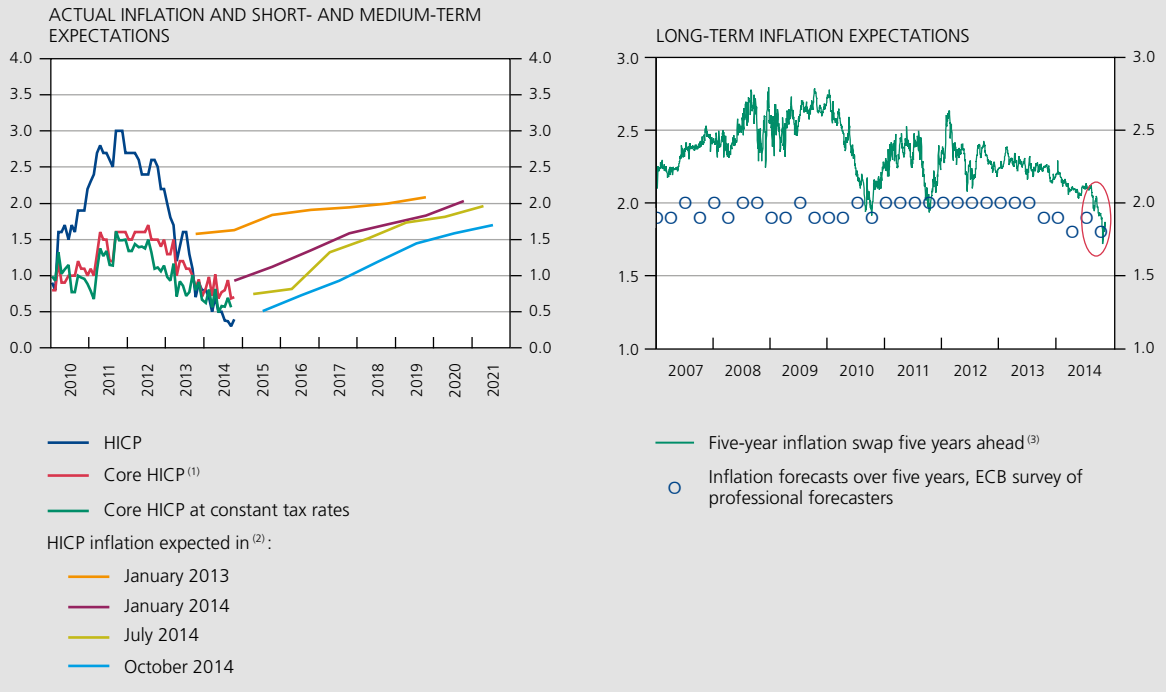
2.3 Inflation expectations in the euro area

The firm anchoring of inflation expectations in the medium term, and especially in the long term – namely the tendency of expectations to remain within a fairly narrow range around the inflation target defined by the central bank – is vital to guarantee the central bank's credibility, to ensure the effectiveness of monetary policy and, therefore, to safeguard price stability in practice.

In the euro area, price stability – the primary objective of the Eurosystem – was defined by the Governing Council as an annual rise in the HICP of less than but close to 2 % in the medium term. This medium-term concept is important in that it allows inflation to deviate temporarily from its target in response to temporary shocks affecting the economy and the prices of certain goods or services, such as food and energy. In that context, it is unsurprising that short-term inflation expectations are subject to some volatility and may sometimes deviate considerably from the inflation target. Conversely, long-term inflation expectations have to remain firmly anchored.

Year-on-year inflation in the euro area has been falling steadily since the end of 2011. Since the beginning of 2013, it has been less than 2 %, and dropped below 1 % more than a year ago. Having fallen continuously in recent months, it was down to 0.3 % in September 2014. Although core inflation was somewhat steadier, it also declined and stood at around 0.8 % in the summer of 2014. In parallel with this disinflationary trend, short-term inflation expectations – over a two-year horizon – were revised downwards. Measured on the basis of the implicit interest rate on a one-year inflation swap, they were thus significantly below 1 % at the end of 2014. More surprisingly, medium-term inflation expectations – over a two- to five-year horizon – also dropped significantly and have since remained at levels well below the ECB's quantitative definition of price stability. In both the short and the medium term, it actually appears that inflation expectations have fallen to an all-time low in the recent period. Finally, and more worryingly, long-term

CHART 5 INFLATION AND INFLATION EXPECTATIONS IN THE EURO AREA



Sources: Bloomberg, Thomson Reuters Datastream, ECB.

(1) HICP excluding energy and food.

(2) Measured on the basis of the implicit forward rate for an inflation swap. Since consumer price indices are published after some delay, inflation swaps reflect the inflation expected in the month three months before the swap's due date. For instance, one-year contracts dated October 2014 reflect the inflation rates expected in July 2015.

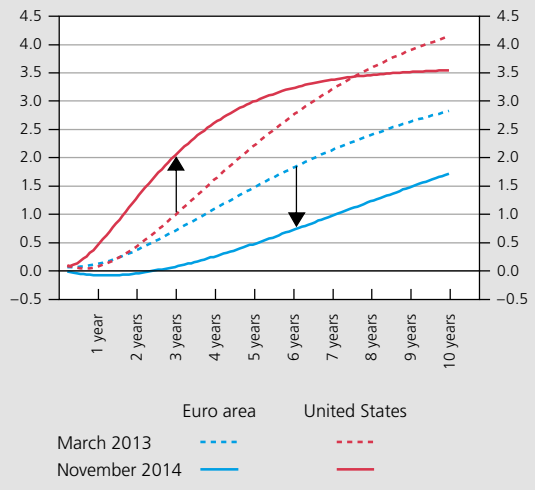
(3) Implicit inflation rate derived from swaps covering the inflation risk in the euro area for a five-year period beginning five years after the conclusion of the contract.

inflation expectations – e.g. over the five-year period beginning in five years' time – have also declined. That is particularly the case since the summer of 2014, although the decline has been small. This finding based on financial data tends to be confirmed by the ECB's surveys of professional forecasters – an indication of expectations unaffected by the uncertainty or liquidity premiums included in the prices of financial assets. These developments are troubling since that horizon is the most relevant for assessing the central bank's credibility, and long-term inflation expectations are not deemed to be influenced by fluctuations in observed inflation.

In a very low inflation environment, it is evident that the anchoring of inflation expectations in the euro area has recently been weakened to some extent. The decline in inflation expectations is worrying in that it exerts upward pressure on real interest rates, even though nominal rates are on the floor. The recent monetary policy measures adopted by the Eurosystem have to be viewed in the light of these developments and the associated risks.

CHART 6 OVERNIGHT MARKET INTEREST RATE EXPECTATIONS ON THE FINANCIAL MARKETS

(in %, based on overnight index swap rates)



Sources: Bloomberg, own calculations.

3. Outlook for monetary policy in the United States and in the euro area

3.1 When will the exit take place?

In recent years, with policy interest rates close to zero, changes to the size or composition of the central bank balance sheet together with forward guidance have become the main policy instruments of central banks in the advanced economies (see section 1). The FOMC, with its principles and plans for the normalisation of monetary policy, has recently resurrected the interest rate instrument as an indicator of the monetary policy stance during the exit phase (FOMC, 2014).

In view of the divergences in the macroeconomic situation and outlook between the United States and the euro area, the timing of the normalisation of monetary policy could well vary (see section 2). This asynchronous exit is also clearly reflected in the interest rate expectations of the financial markets. In that regard, our preferred indicator is the forward interest rate curve of the overnight index swaps (OIS), which shows the expected movement in interest rates on the overnight market. In the euro area, the overnight market rate is the Euro Overnight Index Average (Eonia), while in the United States it is the effective federal funds rate.

These interest rate curves for October 2014 show that the financial markets expect an initial interest rate rise in the United States during 2015, whereas overnight market rates in the euro area are expected to remain low or even negative for some time. Apart from the difference in the timing of the initial rate increase, it is also striking that once the first rate increase has been introduced the markets are only predicting a very gradual rise in interest rates. That is particularly the case in the euro area. Last year, the difference in the monetary policy stance – both actual and expected – between the United States and the euro area became larger. Whereas in March 2013 the expectations regarding the overnight market rate were fairly similar in the short term, macroeconomic developments have since led to a considerable divergence in the expected monetary policy stance. Finally, it should also be noted that long-term expectations relating to the overnight market rate have been revised downwards in the United States and in the euro area.

The next section presents an analysis of the decisions underlying the divergences in expectations regarding the monetary policy stance.

3.1.1 Recent Eurosystem decisions

At its June and September 2014 meetings, the ECB Governing Council adopted a series of new monetary policy measures in response to the sluggish business activity and the disinflationary trend in the euro area.

First, it slashed its key interest rates, reducing them to their lower limit. The interest rate on the main refinancing operations was thus cut from 25 to 15 basis points in June, then to 5 basis points in September. The deposit facility rate moved into negative territory, down from 0 to –10 basis points in June, then –20 basis points in September. Finally, the marginal lending facility rate was reduced from 75 to 40 basis points in June, ending up at 30 basis points in September. These decisions reinforced the accommodative character of the Eurosystem's monetary policy stance. While the reduction in the main policy rate lowered the cost of obtaining refinancing from the Eurosystem, the cut in the deposit facility rate, taking it into negative territory, is an integral part of the desired additional monetary easing. In a surplus liquidity environment, the floor policy rate plays a key role in determining the Eonia overnight interest rate. This parallel movement in interest rates also conforms to the aim of maintaining a constant corridor between the interest rate on the main refinancing operations and the deposit facility rate. That preserves the Eurosystem's intermediation margin and avoids discouraging transactions on the interbank market (Kasongo Kashama, 2014).

The Governing Council also implemented new unconventional measures. The first of these consists of targeted LTROs, which offer banks long-term financing – up to four years – in return for new lending to businesses and households, excluding mortgage loans. The interest rate on these operations is the main refinancing operation rate applicable at the time of the operation plus 10 basis points. Counterparties that satisfy the set conditions can thus obtain funding at low cost until the end of 2018, regardless of the movement in the main policy rate. Unlike the long-term operations previously introduced by the Eurosystem, these operations comprise an incentive mechanism to encourage the banks to expand their lending to the real economy.

The second measure comprises two large-scale securities purchase programmes, the first concerning ABSs and the second relating to covered bonds. These purchases should revitalise these two markets and that should in turn support issuance of securities and stimulate the underlying lending. Via these new programmes, the ECB Governing Council also intends to exercise more direct control over the growth of the Eurosystem's balance sheet. These programmes thus mark a break with a situation in which the growth of the euro area's monetary base depends essentially on the behaviour of the banks, which govern recourse to Eurosystem liquidity in the context of a full allotment liquidity-providing procedure. Apart from their direct effects on the interest rates on the securities purchased, the programmes should also influence the yields on many other assets by encouraging portfolio reallocations, and should therefore lead to a more general reduction in financing costs in the economy.

These measures indicate a new approach on the part of the ECB. With interest rates on the floor, they should enable the ECB to make its monetary policy more accommodative. The Governing Council has constantly reiterated that it is ready to take additional measures if need be.

3.1.2 Normalisation of monetary policy in the United States

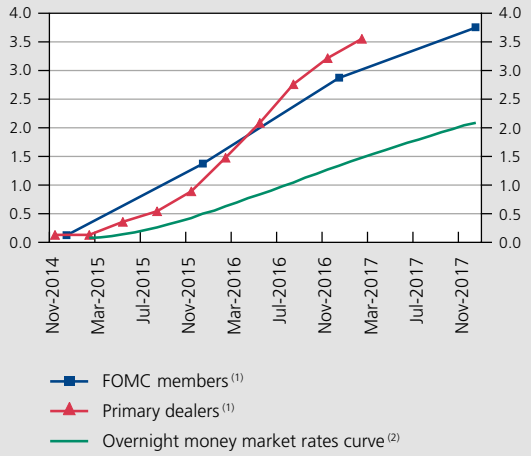
In contrast to the euro area, the United States has already taken the first steps towards normalising monetary policy. However, the exact timing and the announcement of the initial tightening of monetary policy still present major challenges for the US central bank. In the past, particularly in 1994 but also more recently, in the spring of 2013 and in January 2014, the element of surprise in the timing of the normalisation in the United States had always triggered some volatility on the global financial markets. Nevertheless, good communication by the central bank can help to reduce undesirable financial market volatility. Like many of the world's central banks, the Federal Reserve has significantly expanded its communication in the past decade, notably by announcing the economic projections of the FOMC members, by circulating the minutes of FOMC meetings more promptly, by extending the monetary policy statement issued at the end of each FOMC meeting, by organising a press conference after certain FOMC meetings and via talks by FOMC members. Two elements of the Federal Reserve's communication strategy are particularly relevant in regard to monetary policy normalisation : the publication of the interest rate path expected by individual FOMC members and the publication of the normalisation principles.

The individual forecasts of FOMC members concerning the path of the target federal funds rate have been made public four times a year since the first quarter of 2012, together with the projections for certain macroeconomic variables, namely inflation, real GDP growth and unemployment. This communication gives the financial markets access to important information about when the FOMC members expect the first interest rate increase to be made and the pace of subsequent increases. It is evident from these interest rate expectations that during 2012 and 2013 the FOMC members systematically postponed both the first interest rate rise and the subsequent ones. These interest rate expectations changed in the first quarter of 2014. Since then, against the backdrop of an improving outlook for economic growth and rising inflation expectations, the FOMC members have expected an initial interest rate rise during 2015.

In September 2014, the expected median interest rate stood at 1.37 % for the end of 2015 and 2.86 % for the end of 2016. The FOMC thus clearly indicated that it expected several interest rate increases during 2015 and further rises in 2016. As regards the pace of the rate increases, the FOMC once again stressed in its October 2014 monetary policy statement that the level of interest rates could long remain below the levels considered normal in the long term, i.e. after employment and inflation have reached levels close to those compatible with its mandate. In so doing, the FOMC signals that normalisation will be very gradual. It should also be noted that the statistic used – the median of all interest rate expectations of all the FOMC members – does not distinguish between voting and non-voting members of the FOMC. That median may therefore differ from the interest rate path expected by the FOMC that is relevant in practice.

While the primary dealers' interest rate expectations according to a survey conducted in September 2014 are fairly similar to those of the FOMC members, they differ considerably from the interest rate expectations of financial market participants based on overnight index swap rates. The primary dealers predict a federal funds rate in the region of 1.5 % in February 2016 and 3.5 % a year later. According to the OIS rate curve, the pace of the interest rate increases would thus be much slower. Part of the discrepancy between the FOMC's interest rate expectations and the overnight money market rates curve may be due to the expected persistence of abundant surplus liquidity (see section 3.2.2). But it may equally be due to a different estimate of the pace of subsequent interest rate increases. Divergences in expectations concerning the monetary policy stance are undesirable if the aim is to curb volatility and prevent sudden adjustments to market expectations (see section 4.1).

CHART 7 FEDERAL FUNDS RATE EXPECTATIONS
(in %)



Sources: Bloomberg, FOMC, Federal Reserve Bank of New York, own calculations.
(1) Median federal funds rate expected in September 2014.
(2) Based on the overnight index swap rate in November 2014.

The principles for the normalisation of monetary policy, published for the first time in June 2011, were updated in September 2014 (FOMC, 2014). Those principles specify that a more restrictive monetary policy will be implemented by using the interest rate instrument rather than by actively modifying the size or composition of the central bank's balance sheet. Section 3.2 examines in more detail the conduct of a restrictive interest rate policy in the presence of surplus liquidity.

As regards normalisation of the size of the central bank's balance sheet, in December 2013 the FOMC decided that, from January 2014, it would start tapering, i.e. scaling down the pace of its asset purchases. Since then, each FOMC meeting has decided to cut purchases of debt securities by $ 10 billion per month from the initial monthly figure of $ 85 billion. At the October 2014 FOMC meeting, it was agreed to end the purchases from November 2014. The monetary policy normalisation principles also stipulate that the size of the balance sheet will not diminish until interest rates have risen, as the plan is only to end or limit reinvestment of the amounts maturing once interest rates have been raised. As most of the debt securities held by the Federal Reserve are fairly long-dated and the FOMC has adopted a decision in principle not to sell or actively reduce the MBS portfolio, the balance sheet reduction will only be very gradual. Only in the longer term will the portfolio reserved for monetary policy – the SOMA portfolio, which represents around 95 % of the Federal Reserve's balance sheet total – expand again following the upward trend in banknotes in circulation, as had also been the case before the implementation of the quantitative easing programmes. As for its composition, until that time, the portfolio will continue to comprise a considerable proportion of MBSs, supplemented by US government bonds.

3.2 Normalisation of monetary policy in the presence of abundant surplus liquidity

In the years ahead, the major challenge for the monetary exit will consist in pursuing a more restrictive monetary policy by raising interest rates when the central bank reserves still contain substantial excess liquidity. That is the current position in the United States and the United Kingdom, but this analysis is equally relevant for the euro

area with the prospect of a marked expansion of the Eurosystem's balance sheet.

3.2.1 Conducting monetary policy with an interest rate corridor

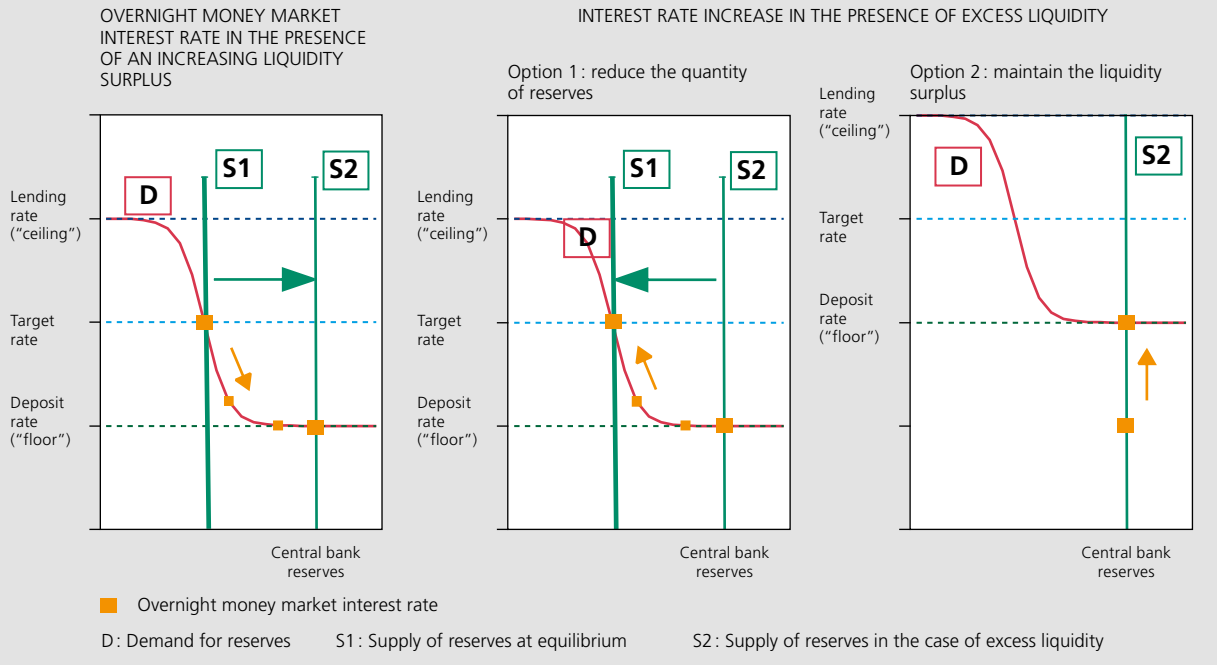
This section briefly explains how a central bank can pursue a restrictive interest rate policy in the presence of an abundant liquidity surplus by using an interest rate corridor. In theory, a corridor system may in fact curb interest rate volatility on the overnight money market and separate the interest rate policy from the size of the central bank's balance sheet (Kahn, 2010). Traditionally, a corridor system comprises three policy rates. The main one is the target rate for overnight money market rate. In the euro area, before the crisis, the target rate was in practice the rate on the weekly liquidity-providing operations, while in the United States it was the target federal funds rate. The overnight money market rate is set by the market participants and corresponds to the average rate on overnight transactions. Generally, the central bank provides a quantity of central bank reserves on the market so that, over a certain period, the overnight money market rate tends towards the target rate. At equilibrium, if the money market is operating properly, banks with a deficit (surplus) can borrow (lend) on the interbank market.

The lending rate and the deposit rate complete the corridor. The lending rate is the rate at which the central bank lends liquidity, against collateral, to counterparties facing a deficit at the end of the day which they are unable or unwilling to cover on the market. In normal circumstances, the lending rate is the interest rate ceiling on the overnight money market since the central bank's counterparties can always obtain liquidity at that rate outside the market and therefore have no reason to borrow at a higher rate. In the euro area, the lending rate is the rate on the marginal lending facility; in the United States it is the discount window rate.

The deposit rate is the remuneration of the deposits that counterparties hold on current accounts with the central bank. In principle, this is the floor rate since it is available to the central bank's counterparties at all times and they therefore have no incentive to lend at a lower rate. In the euro area, the deposit rate is the rate on the deposit facility; in the United States, it is the interest rate on excess reserves.

If the supply of central bank reserves increases so a liquidity surplus arises, the overnight money market rate will fall. That is what happened during the financial crisis when banks – particularly in the euro area – were worried about the counterparty risk and were no longer willing to lend one another funds on the interbank market, thus forcing the central bank to make up the liquidity shortfall. Excess liquidity was also created in the United States when the Federal Reserve decided to launch programmes for the

CHART 8 MONETARY POLICY IN THE PRESENCE OF EXCESS LIQUIDITY



purchase of debt instruments for the purposes of an expansionary monetary policy.

One of the challenges that central banks will have to address in the coming years will concern implementing a more restrictive monetary policy – despite abundant excess liquidity – by raising the overnight money market rate. In principle – if the monetary policy transmission mechanisms work properly – such an increase in the overnight money market rate should be transmitted to the other market interest rates. There are two ways in which the central bank can introduce a restrictive policy.

First, the central bank has the option of reducing the quantity of reserves until the central bank reserves market is restored to equilibrium. If the interbank market is operating properly, the central policy rate will regain its role as the target for the overnight money market interest rate. The central bank will then implement its restrictive policy by continuing to raise this target rate. The other two key rates – the lending rate and the deposit rate – usually move in parallel. Before the financial crisis, this operational framework was widespread in most of the advanced economies, including the euro area and the United States.

Central banks can conduct liquidity-absorbing operations by adjusting the liabilities side of their balance sheet. This does not alter the size of the central bank's balance sheet, but it changes the composition of the liabilities. Thus, until recently the Eurosystem absorbed the liquidity created by the Securities Markets Programme (SMP) by offering one-week term deposits. The Federal Reserve's instruments are term deposits and reverse repos; it has already conducted a number of operational tests. However, the central bank is dependent on the market's willingness to take part in these operations, and the markets' attitude in that regard depends on the size of the liquidity surplus. The bigger the surplus, the greater the interest among the counterparties. Other factors to be taken into account are the rate offered by the central bank and the degree of tension on the financial markets, which determines the liquidity needs at the end of the month or quarter. In the event of very substantial excess liquidity – like the $ 2 500 billion surplus in the United States in the fourth quarter of 2014 – the volume of reserves to be absorbed is so great that the rates offered on term deposits and reverse repos need to be very attractive. Such high rates could seriously disrupt money market functioning.

Another way in which central banks can reduce their liquidity surplus is to reverse the asset purchase programmes that they had introduced. This is a more structural measure in that it allows a permanent reduction in the central bank's balance sheet. In view of the current level of assets held by central banks, a massive, rapid sale would spark unprecedented volatility on the financial markets. In the case of the Federal Reserve, the impact on both domestic and global financial stability is a decisive reason for not taking that route. If assets held have to be sold at a loss, there is also the risk of repercussions on the central bank's profit and loss account, which could compromise its financial independence.

The second option consists in maintaining the liquidity surplus and hence the downward pressure on overnight market rates within the interest rate corridor, and implementing the more restrictive monetary policy by raising the floor rate. This option is frequently cited in the literature as a floor rate system.

The advantage of a floor rate system is that the interest rate policy, and hence the monetary policy stance, can be defined independently of the level of the liquidity surplus or the size of the central bank balance sheet. That advantage is particularly important if the liquidity surplus was created for reasons other than just the monetary policy stance. Thus, the Eurosystem introduced fixed-rate full allotment of liquidity against the backdrop of a malfunctioning interbank market, engendering demand-driven fluctuations in central bank balance sheets. Similarly, asset sales – e.g. in the case of the Federal Reserve – may be undesirable from the point of view of financial stability. However, if a more restrictive monetary policy becomes necessary in the meantime owing to the outlook for economic activity and inflation, a floor rate system allows interest rates to be increased without any immediate need to alter the purchase programmes or the fixed rate full allotment tendering procedure.

One important aspect of this second option is that the deposit rate is an effective floor for the overnight market rate. For the Eurosystem, that is the case, but in the United States that is not necessarily so, as mentioned in section 3.2.2. The Eurosystem's operational framework is an example of an environment in which the floor rate still operates effectively even in a crisis. During the crisis, a liquidity surplus was created owing to the increased intermediation role performed by the central bank (Boeckx and Ide, 2012). As expected in the case of an excess supply of central bank reserves, the overnight money market rate (Eonia) fell to around its floor level, namely the deposit facility rate. Within the Eurosystem, the Eonia rate has never gone below this floor. Banks with excess liquidity have always preferred to use the deposit facility rather than lend their surplus at a rate lower than that on the deposit facility. In other words, the Eurosystem's corridor system functions effectively and can therefore be used to drive up market interest rates even if there is a large liquidity surplus. Two

factors contribute to the efficiency of the transmission of the floor rate to other market interest rates. First, most banks are Eurosystem counterparties and have direct access to the deposit facility. Next, the financing of the euro area's economy takes place largely via the banking system, so that the financial conditions prevailing in the real economy are effectively influenced by the floor interest rate.

Finally, it should be noted that the existence of a corridor system with a floor rate cannot stop other market rates from being lower than that floor. The reasons are that investors do not all have access to the central bank's deposit facility, and other considerations concerning the risk incurred for the expected yield may play a role in investment decisions. Thus, in a period of increased tension, the yields on certain short-term sovereign securities have been lower than the deposit facility rate. This restricted access for financial market operators to central bank facilities remunerated at the floor rate is also a challenge for the Federal Reserve.

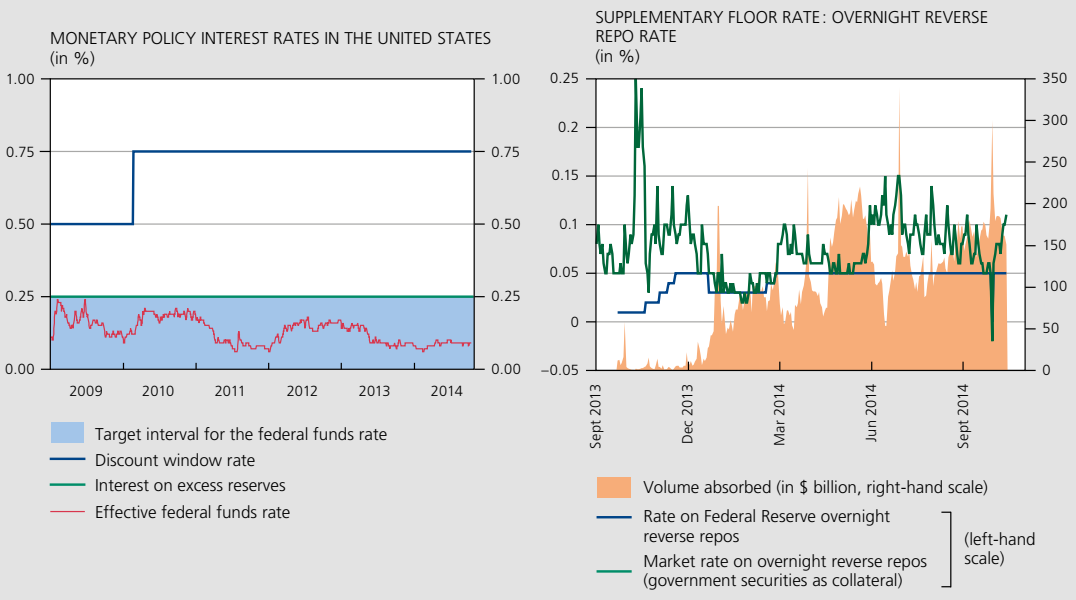
3.2.2 Federal Reserve : leaks in the floor ?

Like the Eurosystem, before the crisis, the Federal Reserve aimed to achieve equilibrium on the central bank reserves market by conducting open market operations, primarily repos, with its counterparties, but on a daily basis – rather than weekly, as in the case of the Eurosystem. Since the eruption of the financial crisis, the Federal Reserve's operational framework has also shifted towards a corridor system. In principle, the discount window rate is the ceiling overnight market rate – the effective federal funds rate – and the level of interest on excess reserves (IOER), introduced in October 2008, is the remuneration that the Federal Reserve pays to the banks, i.e. the depository institutions, on the excess reserves held. In December 2008, the FOMC established a range of between 0 and 0.25 % for the target federal funds rate, the discount window rate currently standing at 0.75 % and the rate on excess reserves at 0.25 %.

In its September 2014 exit principles, the FOMC stresses that it will implement a more restrictive policy by increasing the interval for the target federal funds rates. The overnight market rate will therefore be adjusted via the increase in the rate on the excess reserves, i.e. by the maintenance of a floor rate system. It is noteworthy that the overnight market rate is lower than the floor rate. In other words, some financial institutions lend and borrow central bank reserves at a rate below the deposit rate available to the banks on their current accounts with the Federal Reserve.

There are two main reasons for this situation. First, the government-sponsored enterprises (GSEs), such as Fanny Mae, Freddy Mac and the Federal Home Loan Banks,

CHART 9 THE MONEY MARKET IN THE UNITED STATES



Sources : Thomson Reuters Datastream, Federal Reserve Bank of New York.

operate on the federal funds market but do not receive interest on the excess reserves on the accounts that they hold with the Federal Reserve. This large volume of excess reserves exerts downward pressure on the overnight market rate. The second reason is that depository institutions which have access to the IOER facility can, in principle, engage in arbitrage by borrowing federal funds from the GSEs and depositing them with the central bank in return for remuneration. However, that does not happen, or only to a very small extent. The explanation is that, since 2011, the banks have had to pay a fee to the FDIC (Federal Deposit Insurance Corporation), the fee being related to the size of their balance sheet. Engaging in arbitrage on the federal funds market causes the balance sheet to expand, and the fee to be paid to the regulator averages between 10 and 15 basis points, though it varies from one institution to another. However, foreign banks holding an account with the Federal Reserve are exempt from these fees and are therefore fairly active on the federal funds market. Nevertheless, it is not easy to determine the extent to which these foreign banks ensure the efficient transmission of the floor rate to the other US financial market segments.

The negative spread between the IOER – which should, in principle, act as the floor rate – and the overnight market rate is a major challenge for the Federal Reserve in connection with the normalisation of its monetary policy, owing to the uncertainty over the smooth transmission of an increasing floor rate to the short-term market rates (Gagnon and Sack, 2014). That is why the FOMC, in its policy normalisation principles, mentions a supplementary floor rate, namely the rate on overnight reverse repos. However, that facility will only be used if the Federal Reserve cannot keep the overnight market rate within the desired range by using the interest rate on excess reserves alone.

The overnight reverse repo is an open market operation aimed at absorbing liquidity, whereby the counterparty receives interest from the Federal Reserve for the duration of the operation, i.e. overnight, plus collateral in the form of government securities. This operation does not affect the size of the central bank's balance sheet but it does alter the composition of the liabilities, i.e. the liquidity surplus recorded under the central bank reserves becomes smaller. A significant feature of this instrument is that, apart from the traditional counterparties such as the depository institutions and GSEs, money market funds are also eligible. The expansion of the range of counterparties to include parties active in other financial market segments is important for the efficiency of the floor rate during transmission to other market rates (see the large number of Eurosystem counterparties in the euro area, where bank financing dominates). If the reverse repo facility is implemented with fixed-rate full allotment, the overnight reverse repo rate should act as a (supplementary) floor rate. By analogy with the interest rate on the excess reserves, money market funds or GSEs would not, in principle, conclude any overnight repo contracts with government securities as collateral at a rate lower than that offered by the Federal Reserve, as overnight (reverse) repos guaranteed by government securities are particularly safe assets, especially when the counterparty is the Federal Reserve.

However, it should be noted that the first direct effect of this facility described above, namely the absorption of reserves, can also be exploited at a later stage in the normalisation process, as increased recourse to the overnight reverse repo facility would lead to the absorption of a large quantity of reserves, thus driving up their price, and that could help to reinforce the signal of a tighter monetary policy. However, excessive use of the overnight reverse repo facilities implies the risk that the available central bank reserves may diminish to the point where the overnight market rate exceeds the target rate, and that could cause an undesirable tightening of monetary policy.

In 2013 and 2014, the Federal Reserve has already conducted tests to check the efficient functioning of the overnight reverse repo facility. These tests took the form of a specific amount allotted at a fixed rate per counterparty. The amount increased gradually from $ 0.5 billion per counterparty to the current figure of $ 10 billion, and the interest rate is currently 5 basis points, as opposed to 1 basis point at the start. Money market funds are the main participants in these operations (Potter, 2014). The Federal Reserve also finds that the amounts subscribed are generally greater when the spread between the market rate and the rate offered by the Federal Reserve is relatively small. In addition, the amounts subscribed are large towards the end of a month or quarter, when money market funds have less access to safe overnight investments. According to the Federal Reserve, the provisional results are satisfactory and the overnight reverse repo rate appears to perform its function as a floor rate.

4. Normalisation in the United States and spillover effects in the euro area

Asynchronous normalisation of monetary policies in the large advanced economies implies risks associated, in particular, with unwelcome spillover effects. In an economically and financially integrated world, the effects of monetary measures adopted by one economic bloc may easily be transmitted to other regions, without

their macroeconomic situation justifying such spillovers. In that context, and in order to illustrate the potential future disruption, we analyse here the consequences of the first signals of monetary policy normalisation in the United States and the resulting spillover effects for the euro area.

4.1 The 2013 tapering episode

On 22 May 2013, Ben Bernanke, then Chairman of the Federal Reserve, suggested in Congress that, if the health of the economy continued to improve, the Fed might decide to scale down ("taper") its purchases of US Treasury bonds and MBSs. He confirmed his remarks on 19 June at a press conference. These announcements, which came after a long period of monetary easing, were a big surprise to market participants and generated increased uncertainty over the Fed's future intentions, in regard to both asset purchases and key interest rates. Although the Fed keeps its interest rate decisions separate, in principle, from its decisions to purchase assets, the ending of its securities purchases is actually regarded as heralding an interest rate rise, in order to avoid transmitting contradictory monetary policy signals. In the ensuing months, the financial markets were subject to substantial selling of securities and high volatility (BIS, 2014).

Although there was no suggestion of any increase in the key interest rates, the mere mention of a reduction in asset purchases by the Federal Reserve generated a strong reaction on the bond markets. In the space of just a few months, the yield on ten-year Treasury bonds went up by around 1 percentage point, from just under 2 % at the end of May to almost 3 % in mid-September 2013. The five-year interest rate five years ahead, which represents its long-term component, increased by over 100 basis points during the same period. That is not so surprising given that asset purchases primarily influence the term premium, which increases with the maturity of the rates. However, the five-year rate, the short-term component of the ten-year yield, also increased considerably, demonstrating that the statements about purchases of securities also affected expectations concerning future short-term interest rates and hence the policy rates.

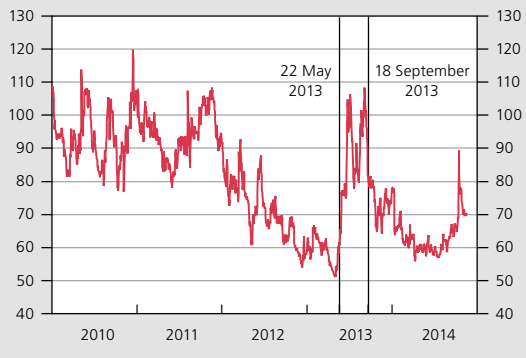
In response to the rise in short-term rates, Ben Bernanke stressed in a speech to Congress in July 2013 that the policy rates would remain at a low level for an exceptionally long period after the end of the asset purchase programme, and that the phasing out of that programme would depend on the country's economic and financial situation. There was only a very partial easing of the turbulence, and it was not until the Fed's announcement on 18 September 2013, stating that it would postpone the tapering of its securities purchases, that interest rates subsided to more moderate levels. The announcement of a reduction in purchases from January 2014, which came on 18 December 2013, was widely expected and therefore did not trigger any strong market reaction. The decision was in fact accompanied by a statement saying that the very accommodative monetary policy would be maintained for a considerable time after the end of the programme and the strengthening of the recovery.

When the Federal Reserve actually scaled down its asset purchases from January 2014, that did not create any upward pressure on rates either. From the start of the year, the five-year rate remained fairly stable overall, while the five-year rate five years ahead displayed a clear downward trend. This surprising development actually looks like a new "conundrum", the term that Alan Greenspan used in 2005 to describe the fall in long-term interest rates which accompanied the increase in the policy rates over the preceding months (Greenspan, 2005).

This conundrum is due partly to a reduction in the term premium (IMF, 2014b), which could be attributable in particular to the low level of sovereign yields in the other advanced economies and the uncertainty surrounding global economic growth, two factors that cause investors to turn to US Treasury bonds. However, it may also reflect a fall in expectations concerning the future level of long-term federal funds rates (see section 3.1) and,

CHART 10 IMPLICIT VOLATILITY OF US GOVERNMENT BONDS

(basis points)[1]

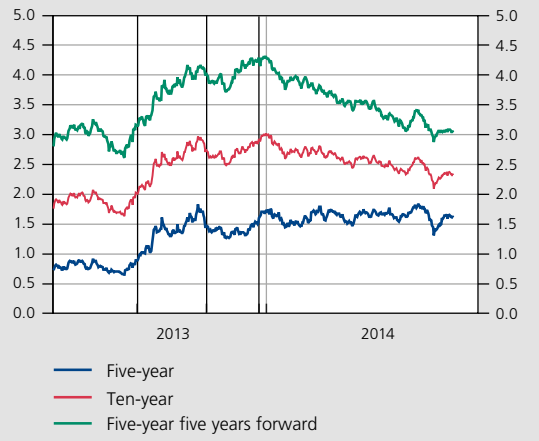


Source : Thomson Reuters Datastream.

(1) MOVE (Merrill Option Volatility Expectations) index measuring the implicit short-term volatility on US Treasury bonds of various maturities. The vertical lines respectively indicate the first statements by Ben Bernanke, on 22 May 2013, and the Federal Reserve's announcement on 18 September 2013, stating that it will not reduce its purchases for the time being.

CHART 11 US TREASURY BOND YIELDS

(percentage points)[1]



Sources: Thomson Reuters Datastream, own calculations.

(1) The vertical lines respectively indicate the first statements by Ben Bernanke, on 22 May 2013, the Federal Reserve's announcement on 18 September 2013, stating that it will not reduce its purchases for the time being, and its announcement on 18 December 2013 saying that it will reduce its purchases as from January 2014.

therefore, a downward revision of expectations regarding trend growth (IMF, 2014b). A sudden decline in interest rates occurred in mid-October, following the publication of troubling macroeconomic figures from the United States and elsewhere. Though this turbulence was short-lived, it again demonstrated the markets' potential for abrupt responses.

4.2 Factors which could contribute to greater interest rate volatility

The spring 2013 statements triggered a fit of volatility and an unexpected rise in interest rates. Conversely, the publication of macroeconomic indicators arousing fears for the health of the global economy generated a sharp fall in yields in the autumn of 2014. These developments suggest that, when it actually comes, the normalisation of American monetary policy could well create some turbulence. Various factors in particular could cause disruption on the financial markets.

First, the uncertainty surrounding future targets for the federal funds rate could be particularly severe, given the limits of forward guidance. The Federal Reserve could well decide – as announced – to maintain its interest rates at lower levels for longer than normal. However, in the long run, that could give rise to expectations that monetary policy will be tightened more quickly than in previous cycles, that being considered necessary to prevent overheating and the creation of bubbles.

Next, as indicated by the OIS yield curve, market participants seem to expect the policy to be more accommodative for a longer period than anticipated by the FOMC members themselves (see section 3.1.2). The public could therefore misinterpret the Fed's forward guidance and underestimate the degree to which short-term interest rates could change according to economic developments. Once normalisation has begun, the surprise and confusion over the Federal Reserve's intentions would be all the greater, and that could indeed cause interest rates to rise more sharply and become more volatile.

Furthermore, in an environment with substantial excess liquidity, there could be concern about the ability of central banks to maintain full control over money market rates during the normalisation process. As explained in section 3.2.2, the FOMC has a range of instruments for controlling short-term money market rates, and the tests conducted so far have proved convincing. However, if the instruments were to prove inadequate in practice, the central bank might have to sell assets in order to reduce the outstanding amount of reserves. Asset sales could also become necessary to control inflation in the event of a derailment. Whatever the reasons, the announcements and the actual sales of securities appearing on the central bank's balance sheet would probably affect the prices of the securities and hence interest rates, just as they did when the securities were bought.

Finally, the recent structural decline in bond market liquidity could exacerbate the problems identified above (IMF, 2014b). In particular, the market makers' stocks of fixed-income securities have been declining steadily since 2007, and that has probably reduced the capacity of dealers to absorb shocks during periods of tension. While some non-bank entities have emerged as substitutes for broker-dealers, there are not enough of them to compensate for the reduction in the latter's intermediation capability.

4.3 Normalisation and spillover effects

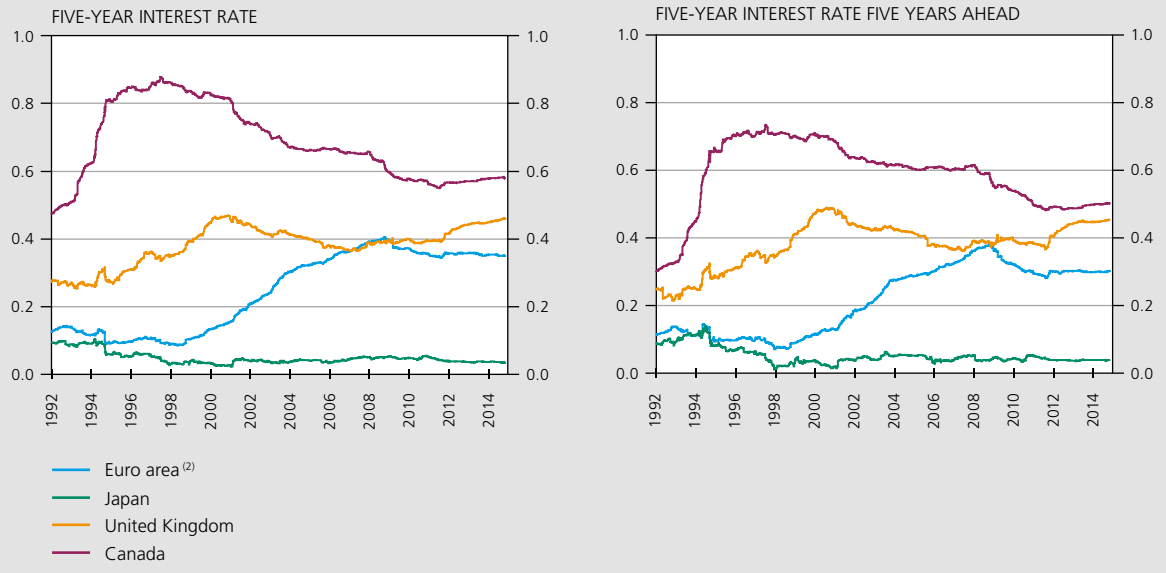
Given the weight of the United States in the global economy and the crucial role of the US dollar as a reserve currency, transatlantic financial developments may have global repercussions extending to a broad range of assets in the advanced and emerging economies. The turmoil that could result from the normalisation of American monetary policy thus raises the question of the impact on third countries.

In these circumstances, it is relevant to examine the influence of American interest rates on those in other economies. A fairly simple measure of that link is the degree to which day-to-day changes in five-year interest rates and in five-year rates five years forward are synchronised between sovereign bonds of other advanced economies and US Treasury bonds. The synchronisation of five-year interest rates tends to reflect the degree of convergence in expectations regarding key interest rates and, therefore, in the correlation of economic cycles, which depends partly on trade integration. On the other hand, the synchronisation of day-to-day changes in the five-year rates five years ahead tends to indicate parallel movements in term premiums and is thus more a sign of financial integration. In this connection, some talk about the existence of a global financial cycle, featuring common trends in asset prices, capital flows and debt levels (Rey, 2013).

In general, there has been greater synchronisation between American interest rates and those in the euro area since the late 1990s. However, since the crisis erupted, that degree of synchronisation has diminished whereas it has increased between American rates and their British counterparts. That is particularly true of five-year rates five years ahead, possibly because the Eurosystem has not adopted a quantitative easing programme, in contrast to the Federal Reserve and the Bank of England. At the extremes, it is noteworthy that the interest rate synchronisation with the United States is particularly marked for Canada, which is unsurprising given the close real and financial links between the two countries. Conversely, the synchronisation between Japanese and American rates has been extremely weak since the early 1990s, bearing witness to the significant differences in macroeconomic performance between the two nations over the past two decades.

If the synchronisation indicates the possible contagion of interest rate movements between the United States and a third economy, it is also necessary to consider the cause of the tightening of financial conditions in the United States in so far as that determines the contagion effects. According to the IMF (IMF, 2014a), it is necessary to distinguish between "real" shocks and "monetary" shocks. Positive "real" shocks concern an improvement in the growth prospects, and the accompanying interest rate rise is like a normal monetary policy response to macroeconomic developments. Conversely, positive "monetary" shocks lead to interest rate rises which are not justified by the macroeconomic situation. They can be interpreted as deviations from a monetary policy rule such as the Taylor rule, or may reflect a rise in the term premium following financial turbulence. Real shocks do not necessarily have a negative effect on the countries concerned, in that the accompanying increased yields

CHART 12 SYNCHRONISATION OF INTEREST RATES WITH THE UNITED STATES (1)



Sources : Thomson Reuters Datastream, own calculations.

(1) Coefficients of a regression on a 60-month rolling window of day-to-day changes in sovereign yields as a function of day-to-day changes in the yields on US Treasury bonds of the same duration.

(2) The rates used for the euro area correspond to the average of the rates for the main euro area countries with a AAA rating on 30 June 2013 (Germany, Austria, Finland, France and the Netherlands).

are offset by the stimulation of exports resulting from the expansion of economic activity in the United States. In contrast, monetary shocks generate negative spillover effects in third countries because the rise in yields is not offset, and it weakens the economy.

The respective influence of the two types of shock fluctuates widely over time. According to the IMF (IMF, 2014a), the initial rise in ten-year Treasury rates following the spring 2013 statements by Ben Bernanke was more monetary in character, whereas the eventual increase between May 2013 and mid-July 2014 was attributable entirely to real shocks. In the future, a gradual process of normalisation justified by strengthening economic activity should prevent risks of financial instability and should not have significant adverse repercussions.

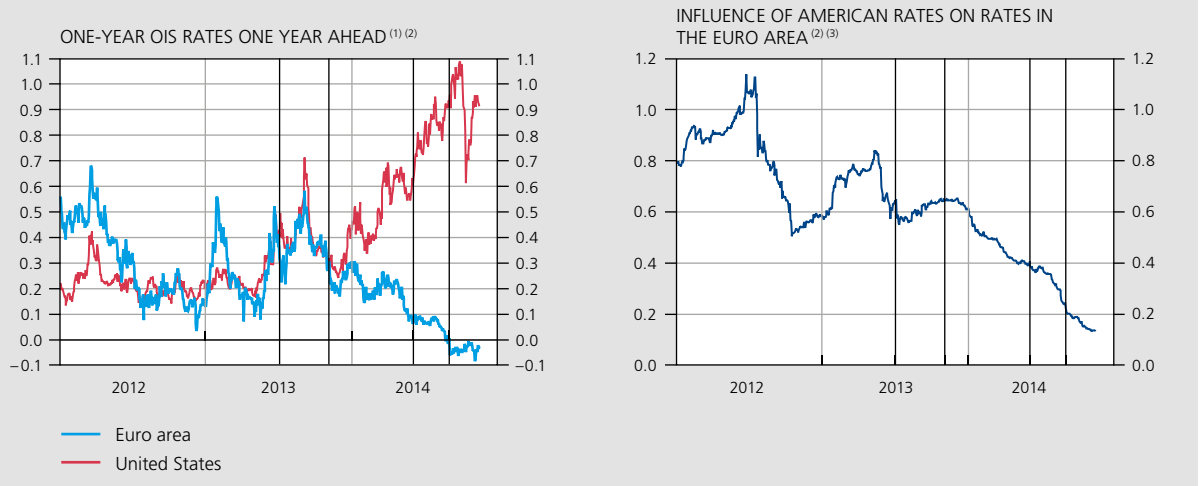
The historical synchronisation between American rates and those in the euro area shows that the latter could well feel the effects of potential disruption due to the normalisation of US monetary policy. Those repercussions will depend on the scale and nature of the underlying shocks. Regardless of the type of shock, it is nevertheless possible that the Eurosystem's monetary policy stance may be disrupted and may therefore cease to reflect the weakness of the euro area's economic fundamentals. In the next section, we look at the fall-out from the tapering episode and the way in which the Eurosystem has managed to preserve the independence of its monetary policy during the recent period.

4.4 Decoupling of the euro area during the recent period

To illustrate the effects in the euro area of the rise in interest rates across the Atlantic in mid-2013, it is relevant to consider the movement in one-year overnight swap rates one year ahead in the United States and in the euro area. Those rates reflect the money market's interest rate expectations during the twelve-month period beginning in twelve months' time, and thus form a relevant indicator of monetary policy expectations.

On the basis of these rates, it appears that the increase in American yields in the spring of 2013 largely spread to the euro area. European rates rose even though the Eurosystem introduced forward guidance, partly for the purpose of protecting the monetary policy stance from external influences. Although the announcement of that guidance on 4 July 2013 triggered an immediate sharp fall in the one-year rate one year ahead in the euro area, the rate actually began rising rapidly again following the publication of quite favourable economic data within the

CHART 13 DECOUPLING BETWEEN THE EURO AREA AND THE UNITED STATES



Sources: Thomson Reuters Datastream, own calculations.

(1) Fixed rate paid by the counterparty of an interest rate swap receiving the overnight rates for a one-year period in one year's time (Eonia for the euro area, effective federal funds rate for the United States).

(2) The vertical lines mark 4 recent decisions by the Eurosystem: introduction of forward guidance on 4 July 2013, and the policy rate cuts on 7 November 2013, 5 June 2014 and 4 September 2014.

(3) The chart represents the regression coefficient β_1 of the equation: $\Delta(OIS_{EA}) = C + \beta_1 \Delta (OIS_{USA}) + \beta_2 \Delta (CESI_{EA})$ over a 250-day rolling window. Where ΔOIS_{EA} corresponds to the daily change in the one-year OIS rate one year ahead in the euro area, ΔOIS_{US} corresponds to the daily change in the one-year OIS rate one year ahead in the United States and $\Delta CESI_{EA}$ corresponds to the daily change in the Citigroup Economic Surprise Index for the euro area.

euro area and elsewhere. However, it should be noted that the effectiveness of the forward guidance is not confined to its immediate impact, and it has to be assessed over a longer period, according to the degree of convergence between market interest rate expectations and the central bank's intentions. From that point of view, subsequent developments suggest that the forward guidance did indeed support the Eurosystem in the conduct of its monetary policy.

The autumn of 2013 brought the start of decoupling between the European interest rate and its American counterpart, following the Eurosystem's decision on 7 November 2013 to cut its policy rates once again. Shortly after that decision, rates on either side of the Atlantic began to diverge substantially and continuously, in the face of contrasting movements in macroeconomic performance in general and the inflation outlook in particular. The Eurosystem's recent decisions to make further unprecedented cuts in its policy rates and to adopt additional unconventional measures have reinforced the divergences in the monetary policy stance and accentuated the interest rate differentials.

In order to arrive at a more detailed appraisal of the influence of American rates on European rates, it is also useful to refer to a simple econometric model which controls for the impact of new macroeconomic information in the euro area. The regression studied is this :

$$\Delta OIS_{EA} = C + \beta 1\ (\Delta OIS_{US}) + \beta 2\ (\Delta CESI_{EA}).$$

ΔOIS_{EA} corresponds to the daily change in the one-year OIS rate one year ahead in the euro area, ΔOIS_{US} is the daily change in the one-year OIS rate one year ahead in the United States and $\Delta CESI_{EA}$ is the daily change in the Citigroup Economic Surprise Index for the euro area. The regression coefficient ß1 reflects the influence of American rates on their European counterparts, taking account of macroeconomic surprises for the euro area, this last factor being, in principle, the main determinant of expectations regarding future interest rates. The construction of the macroeconomic surprise index – which represents a moving average of past and present surprises – suggests that the changes in that indicator identify the most recent surprises.

The movement in the regression coefficient based on a 250-day rolling window confirms the picture of a clear decoupling between rates on either side of the Atlantic from the autumn of 2013. That coefficient stood at 0.8 just before the statements by Ben Bernanke, and 0.65 at the beginning of December 2013, i.e. a significantly positive figure. However, it has since fallen steadily, to almost zero in the recent period.

In the end, while transatlantic financial developments caused an initial shock for the euro area, since the end of 2013, the Eurosystem has clearly been successful in confirming the independence of its own monetary policy in relation to that of the Federal Reserve, thus maintaining a policy stance in phase with the euro area's economic fundamentals. That is also evident from the movement in the euro exchange rate, which has depreciated considerably since May 2014 both against the US dollar and in effective nominal terms. That is the subject of the box below.

Box – Asynchronous normalisation of monetary policy and the exchange rate

Apart from the above-mentioned spillover effects via interest rates, we can also expect the asynchronous normalisation of monetary policy to have an impact via the exchange rate. It should be noted that bilateral exchange rate movements are difficult to explain, and the definition of their determinants is complicated. Indeed, the empirical validation of theories concerning exchange rate movements has always been challenging. The increased trade and financial integration and the complexity of the monetary, financial and banking systems are certainly contributory factors. In this box, we establish the link between the divergent monetary policy stance in the United States and the euro area and the short-term fluctuations in the bilateral exchange rate. In that regard, a more expansionary monetary policy stance in the euro area – measured by the difference in the expected short-term interest rate – should in our view lead to a depreciation of the euro. We measure the monetary policy stance as the differential in the expected three-month OIS rate nine months ahead in the euro area and in the United States.

Apart from the short-term interest rate differential, we also take account of fluctuations in the VIX – which measures volatility on the American stock markets – and the impact of the European sovereign debt crisis on the

bilateral exchange rate. These two factors reflect the recent impact of financial market risks on the exchange rate. Thus, we expect a rise in the VIX to be accompanied by a euro depreciation, on the grounds that a high level of financial uncertainty prompts a flight to safety towards US government bonds. We measure the tension on the European sovereign debt market as the spread between Italian and German ten-year government bonds. That is an approximation of investors' confidence in the euro and of capital inflows and outflows in the euro area. We expect a widening of the differential to cause a depreciation of the euro.

After having estimated the equation below, we find that both the short-term interest rate spread and the two approximations of financial market tension and uncertainty are significant for explaining the actual change in the bilateral exchange rate. All three of the respective coefficients also exhibit the expected sign: expectation of a more restrictive monetary policy in the euro area leads to a euro appreciation, while increased global financial uncertainty and a widening government bond spread cause the euro to depreciate against the US dollar.

$$\Delta \text{ EUR/USD} = c + \beta_1 \Delta[E(i^{ea}) - E(i^{US})] + \beta_2 \Delta \text{Vix} + \beta_3 \Delta \text{Spread}$$

ESTIMATED PERIOD: WEEK 1 OF 2008 – WEEK 42 OF 2014; 356 OBSERVATIONS

Variable		Standard error	*t*-statistic	*p*-value
Constant	–0.0002	0.000793	–0.25	0.8025
β1	0.0218	0.007043	3.09	0.0021
β2	–0.0253	0.006423	–3.93	0.0001
β3	–0.0100	0.004334	–2.30	0.0216

$R^2 = 0.10$

The importance of the relative monetary policy stance in explaining the exchange rate is clear from examination of the period from the second half of 2010 to the first half of 2011, when there was a slight improvement in the macroeconomic and financial environment of the euro area. The ECB effectively tightened its policy stance in the spring of 2011 by raising its interest rate target. That period therefore featured an appreciation of the euro. At the height of the sovereign debt crisis, the spreads on government bonds of the peripheral euro area countries widened and these interest rate rises were reversed. The euro then depreciated continuously until the announcement of the OMT programme in the summer of 2012.

The revival of confidence in the euro following the OMT announcement – and hence, the reduction in spreads on peripheral government bonds – then triggered a marked rise in the euro against the US dollar. That appreciation was maintained until May 2014, even though it had meanwhile become clear that the divergence in the macroeconomic outlook would lead to an asynchronous normalisation of monetary policy (see section 2). It is mainly since the beginning of 2014, when the FOMC also modified the tone and content of its statement and its published interest rate expectations, that there have been wide variations in expectations regarding the monetary policy stance. However, it was only after the May 2014 Governing Council meeting, when ECB President Mario Draghi announced supplementary measures to revive the economy and inflation, that the euro began to depreciate.

Since the crisis, the relative size of the balance sheet of Eurosystem central banks and the Federal Reserve has often been used to emphasise the difference in the monetary policy stance, and in principle it could help to explain the fluctuations in the bilateral exchange rate. That point of view is based in particular on what is known as the monetary model, whereby the relative movement in the money supply determines the exchange rate. For the period estimated, the central bank balance sheet ratio does not help to explain the short-term exchange rate

movements in the above equation, because the main effect of the size of the central bank balance sheet was to expand base money but not the more broadly defined money supply. However, it remains possible that the monetary policy measures, which cause an increase in the broad money supply as well as augmenting base money, may in fact influence exchange rates.

BILATERAL EXCHANGE RATE BETWEEN THE EURO AND THE US DOLLAR AND INTEREST RATE DIFFERENTIAL

Sources: Thomson Reuters Datastream, ECB.
(1) The expected short-term interest rate is the expected three-month OIS rate nine months ahead.

Conclusion

This article highlights the continuing highly accommodative character of monetary policy in the main advanced economies six years after the start of the great recession. The current macroeconomic context implies that this situation will persist for some time yet. However, the monetary policy normalisation which has begun in the United States is likely to continue, while an additional easing has taken place in the euro area. Expectations regarding short-term interest rates derived from the financial data also indicate that the exit from the accommodative monetary policies will probably be asynchronous.

In the spring of 2013, Ben Bernanke's statements mentioning a possible reduction in the Federal Reserve's asset purchases caused a wave of volatility and a marked rise in interest rates on the bond markets. These developments indicate the disruption that could accompany the process of normalisation in the future, and raise the question of spillover effects on third countries. Owing to the weight of the United States in the global economy and the importance of its monetary and financial systems, transatlantic financial developments pose a real risk of global repercussions.

Owing to its economic and financial links with the United States, the euro area is exposed to the spillover effects of the normalisation of US monetary policy. Those effects will depend in particular on the scale and nature of the underlying shocks. Real shocks, which concern an improvement in the growth prospects, will not necessarily cause adverse spillover effects. Conversely, monetary shocks which are unconnected with the economic fundamentals will certainly be harmful. Regardless of the type of shock, it is nevertheless possible that the Eurosystem's monetary policy stance may be disrupted and that it may cease to reflect the weakness of the euro area's economic fundamentals.

The rise in US interest rates in mid-2013 was an initial shock for the euro area and therefore demonstrates the potential contagion of financial turmoil on either side of the Atlantic. Since the end of 2013, however, the Eurosystem has been very successful in affirming the independence of its own monetary policy in relation to that of the Federal Reserve, and thus setting a policy stance geared to the macroeconomic situation in the euro area.

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