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**Implications for the Euro Area of
Divergent Monetary Policy
Stances by the Fed and the ECB**

**Monetary Dialogue
February 2016**

COMPILATION OF NOTES



DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Implications for the euro area of divergent monetary policy stances by the Fed and the ECB

Monetary Dialogue 15 February 2016

COMPI LATION OF NOTES

Abstract

Confronted with a different macroeconomic and financial environment, the ECB and the Fed monetary stances seem to be more and more on diverging paths. While the Fed has stopped its quantitative easing (QE) operations and has recently decided to raise the target range for the federal funds rate, the ECB is committed to extend the scope of its QE programme launched in March 2015 and does not intend to reverse its zero interest rate policy before 2017. This compilation of notes requested by the Committee on Economic and Monetary Affairs (ECON) for the February 2016 Monetary Dialogue provides an assessment of the main repercussions and risks for the euro area of potentially divergent monetary policies by the Fed and the ECB.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

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INTRODUCTION

The euro area economy is currently experiencing a decent economic recovery, mainly driven by temporary factors, such as low oil prices, a relatively weak euro – which have boosted exports - and a very accommodative monetary stance by the ECB. According to the latest Commission Forecasts, growth is expected to accelerate gradually over the next two years and become more broad based.

Compared to the US, however, euro-area growth will be lagging behind. In addition, the US economy has so far avoided deflation risks which are still looming in the euro area. Confronted with a different macroeconomic and financial environment, the ECB and the Fed monetary stances seem to be more and more on diverging paths. While the Fed has stopped its quantitative easing (QE) operations and has recently decided to raise the target range for the federal funds rate by 0.25 bp. (and is considering raising its key policy rates further in the course of 2016), the ECB is committed to extend the scope of its QE programme launched in March 2015 and does not intend to reverse its zero interest rate policy before 2017.

Against the above background, the notes included in this compilation provide an assessment of the main repercussions for the euro area of potentially divergent monetary policies by the Fed and the ECB, discuss whether the expected tightening of US Fed monetary policy represents a substantial risk for the ongoing recovery of the euro area and analyse potential implications/policy risks of Fed's interest rate "normalisation" for ECB conventional and unconventional monetary policy. The main conclusions and policy options are summarised below.

The notes prepared by monetary experts (members of the Monetary Expert Panel) have been requested by the Committee on Economic and Monetary Affairs as an input for the February 2016 session of the Monetary Dialogue.

Roman Horvath (CASE). The monetary policy stances between the Fed and the ECB already differ and are likely to differ much more in the future. The Fed currently expects to increase the fed funds rate to approximately 3-3.5% in 2018 and beyond. By contrast, the ECB expects to continue its asset purchases programme (at least until March 2017 and to keep policy interest rates near zero.

However, to properly account for the differences in the monetary policy stance of the Fed and the ECB, one should also consider the fact that the ECB continues to apply non-standard policy measures. It is useful to compare the so-called shadow rates between the Fed and the ECB. The shadow rate largely coincides with the official monetary policy rate, if the rates are above zero and no non-standard measures are applied. Once we consider the empirical estimates of the shadow rates of the Fed and the ECB, we observe that monetary policy divergence is even larger as compared to the official monetary policy rates. Therefore, the monetary policy divergence between Fed and the ECB is likely to be sizeable even from a historical perspective.

The available empirical research suggests that the international spillovers of the Fed's monetary policy have a substantial effect on macroeconomic and financial conditions both in the euro area and in emerging markets. The normalization of the Fed's monetary policy is likely to temporarily support the euro area economy by strengthening economic activity and reducing deflationary risks. The Fed's tightening is likely to weaken the euro, making euro area exports more competitive. A weaker euro can contribute to higher import prices and, therefore, higher inflation.

The economic and financial difficulties in emerging markets may significantly weaken the positive effects of US monetary policy normalization for the euro area economy. The Fed

may slow down monetary policy normalization and simultaneously, the demand for euro area exports to emerging markets may weaken. In addition, a strong dollar may be one of the causes of low oil prices. If this is true, then a weak euro will not contribute to reduced deflationary risks because oil prices will fall at the same time.

More generally, sizeable international spillovers of domestic central bank actions and non-negligible monetary policy divergence among major central banks suggest that monetary policy coordination might be beneficial during volatile times.

Kerstin Bernoth, Philipp J. König (DIW Berlin). US monetary policy plays a key role in the global financial system. As the euro area is well-integrated in international financial markets, the current tightening in the Fed's monetary stance is likely to create non-negligible spillovers for the euro area.

The tightening of the US monetary stance may influence the monetary stance in the euro area through at least three channels: First, available (bank) funding in the euro area may decline due to the reversal of the global financial cycle following tighter US monetary policy. Second, interest rate increases in the US may exert upward pressure on euro area interest rates. Third, a continued tightening in the US may lead to a further depreciation of the euro vis-à-vis the dollar over the medium term.

These developments may hamper the current efforts of the ECB to keep the monetary stance accommodative and provide ample funding conditions in euro area economies through extraordinary liquidity provision and rock bottom interest rates. This raises the question whether the ECB should loosen its monetary stance even further to counteract spillovers from the US.

To loosen its monetary stance, the ECB can engage in more aggressive asset purchases. Additionally, the ECB could also move the deposit facility rate further into negative territory. It is, however, unclear whether such measures will create the pressure on interest rates and credit developments that is needed to fully offset financial spillovers from tighter US monetary conditions. First, despite the massive injection of central bank money, credit creation in the euro area is still sluggish. Second, the purchases' effects on medium- to long-term interest rates were only moderate since the programme was introduced in an environment of already declining and very low longer term rates. Third, despite the ECB's strong interventions, HICP inflation remains well below ECB target for price stability.

At the same time, it may have been the very existence of a global financial cycle that has weakened the interest rate channel of monetary policy. Yet, the exchange rate channel may have become relatively more important. But even if the exchange rate is an important piece in the monetary transmission channel, it should not (and probably would not) be targeted directly by the ECB. However, in the presence of ultra-loose monetary policy and weak aggregate demand, it is a thin red line between competitive devaluations and devaluations engineered for the sake of acquiring a greater share of world demand (Rajan, 2015).

In view of the increasingly interconnected world economy, spillover effects and externalities of foreign monetary policy have become more significant over the past decades and going forward they are likely to gain even more importance. It is therefore desirable to embark on greater international coordination of monetary policies, in particular during tense periods of economic and financial recovery.

It is unlikely that additional monetary measures by the ECB could contain undesired spillovers and unintended side effects from the present US tightening. However, the ECB should, probably in close cooperation with emerging market central banks, work towards improvements in international policy coordination. This is also in the interest of the Fed. It

can be argued that taking spillovers of its monetary policy explicitly into account could even be in line with the domestic mandate of the Fed since spillovers will eventually create repercussions on the US economy and thereby also affect the Fed's target variables.

Andrew H. Hallett (University of St Andrews). Policymakers take the view that the best way to provide for superior economic performance is to ensure low inflation, a disciplined monetary policy, stable exchange rates, and financial stability. In the crisis period there has been little inflation: so monetary policies were naturally constrained to be similar (set at, or close to their "lower bound"), and financial stability could be achieved with stabilised exchange rates and full capital mobility for easy financing and liquidity provision.

In the "great moderation" era, back to the early 1990s, there was likewise low and stable inflation, disciplined monetary policies led by Germany and the US, stabilised exchange rates and free capital movements. Before that time, there was more variation in monetary policies and exchange rates; and less stability in monetary, financial or real economic conditions. So, to answer the question posed for this session of the Monetary Dialogue we need to go back to the concerns of that time ("the impossible trinity") to analyse the implications and consequences, for the real economy and the financial markets, of returning to a world with divergent monetary policies between the US and ECB, more variable exchange rates, but free capital mobility and open trade.

Policymakers cannot achieve their three top priorities, an independent monetary policy/control of inflation, a fixed or stabilised exchange rate and free unrestricted capital flows, all at the same time ("impossible trinity" proposition). At best, they can reach two out of the three; or limited versions of two or more. From there, we conclude that:

- i) The main consequence of a policy divergence with the US is that it loosens the usual policy trilemma by restoring the possibility of effective inflation or deflation control;
- ii) The Euro exchange rate vs. the US dollar now becomes flexible, rather than de facto fixed because monetary policy is fixed at its zero lower bound;
- iii) At this point the numerical impact of these changes is likely to be small as the policy divergence is still small and the common world cycle is stronger than it used to be;
- iv) At the same time the Euro-zone trade imbalances will become exaggerated in the direction of greater surpluses. That is likely to cause further divergence within the Euro bloc, with the Southern periphery economies being most at risk;
- v) However these effects are significantly modified by the increasing use of network (supply chain) trade in the Euro area. That reduces the tendency to pull apart, but it weakens the capacity of exchange rate realignments to generate a recovery;
- vi) Internally the policy divergence tends to weaken policy impact (transmission and the pass-through), which also dilutes the effect of the original policy difference;
- vii) The lifespan of the policy difference may be limited because of adverse effects on the wider macroeconomic imbalances which imply a potential political backlash;
- viii) A useful addition to this analysis, to strengthen financial stability, is to use financial regulation as an explicit (cyclical or structural) policy instrument to control the credit and asset markets (a control on asset bubbles). This takes care of our dependence on global cycles and the natural tendency to excess leverage when financial stability seems assured. That would allow us to devote more policy power to other problems specific to the Euro economy and weaken the impact of any policy divergence with the US or financial instabilities emanating from China.



DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Divergent monetary policies of the US Federal Reserve and the ECB: Implications for the euro area

Roman HORVATH

IN-DEPTH ANALYSIS

Abstract

The monetary policies of the US Federal Reserve and the European Central Bank are likely to diverge substantially over the next several years. The Fed expects to normalize its policy and increase the monetary policy rate to approximately 3% over the next 2-3 years. Meanwhile, the ECB is likely to keep the rate close to zero and implement non-standard policy measures. The resulting interest rate differential is likely to weaken the euro and make euro area exports more competitive, thereby supporting economic activity and reducing deflationary risks. However, this positive effect may be limited if the Fed's monetary policy normalization increases financial instability in emerging market economies and if this normalization proceeds at a slower than expected pace.

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EXECUTIVE SUMMARY

- The US monetary policy is expected to normalize. According to the Fed, monetary policy interest rates will increase by approximately 1 p.p. in 2016 and will continue to gradually increase to approximately 3-3.5% in 2018 and beyond. Meanwhile, the ECB plans to continue asset purchases at least until March 2017 and is likely to keep policy interest rates near zero. As a result, the monetary policy of these two major central banks will diverge over the next few years. When we consider the so-called shadow rates, the divergence in monetary policy stances is likely to be sizeable even from a historical perspective.
- The international spillovers of US monetary policy are known to be sizeable, strongly affecting the euro area as well as emerging markets.
- The normalization of US monetary policy is likely to help the euro area strengthen its economic activity and decrease deflationary risks. The interest rate differential between the US and the euro area monetary policy rate is likely to make European exports more competitive via a weaker euro. A weaker euro would also contribute to higher import prices and would therefore reduce deflationary risks. All these effects depend on whether or not they are already fully priced in by the markets.
- On the other hand, the competitiveness gain for the euro area may be limited if the normalization of the Fed's monetary policy has a negative impact on financial stability in emerging markets. Dollar-denominated debt in emerging markets is often sizeable and, coupled with sudden capital outflows, makes these markets vulnerable. This vulnerability may have a negative effect on the global economy, including the euro area. The Fed hikes have been associated with financial turbulence in emerging markets in the 1980s and 1990s. In addition, a strong dollar may be one of the causes of the current low oil prices. Oil is priced in USD. In such a case, a weak euro may not help reduce deflationary risks because oil prices tend to fall at the same time.
- The recent economic-financial developments in China pose the risk that the normalization of the US Fed monetary policy will be slower than expected during the last monetary policy meeting of the Fed in December 2015. Normalization can also be slower if commodity prices are lower than expected. Slower than expected normalization of US monetary policy can even temporarily appreciate the value of the euro vis-à-vis the US dollar.

1. INTRODUCTION

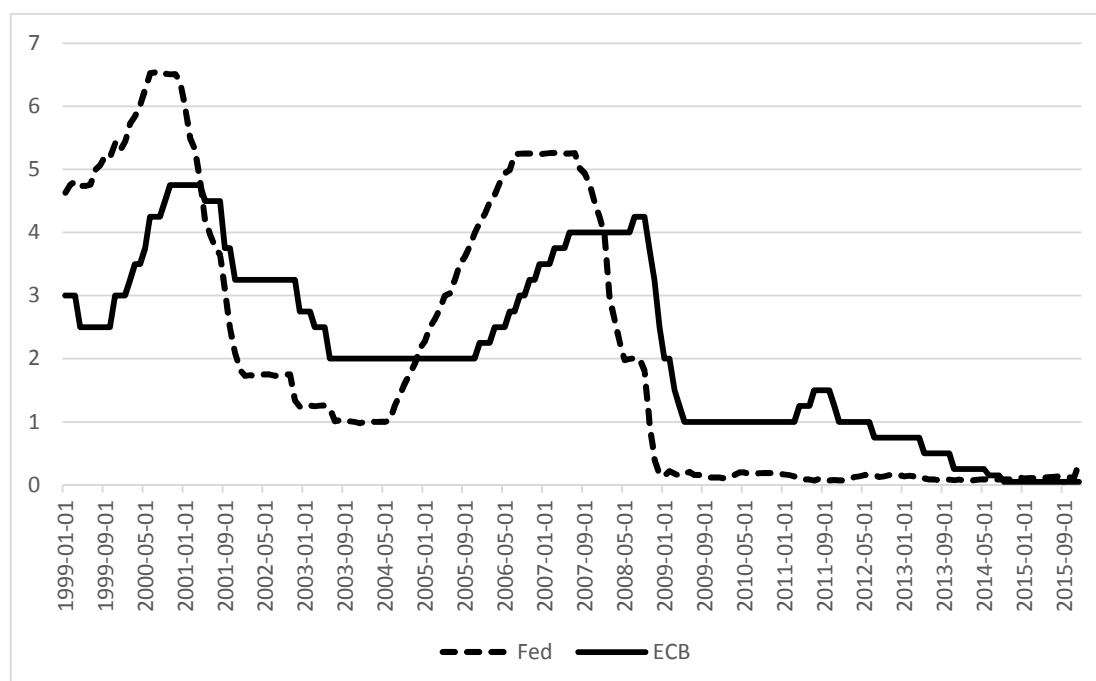
Following the outburst of the global financial crisis, central banks in developed countries decreased their monetary policy rates to zero or even to slightly negative territory. With rates close to a lower bound, central banks adopted various non-standard policy measures to help restore macroeconomic and financial stability.

Both the ECB and the Fed kept their monetary policy rates at very low levels during the financial crisis, as Figure 1 illustrates. As a result, their monetary policy rates moved closely in sync with each other. However, already in mid-2013, the Fed announced it would be “tapering” its unconventional policies (quantitative easing) and it made tapering conditional primarily on the performance of labour markets. The tapering ended in October 2014 and after a year of interest rate stability, it was followed by the federal funds rate hike in mid-December 2015.

On the other hand, on December 3rd, 2015, the ECB announced an extension of the ECB’s asset purchases until at least March 2017 at the current rate of EUR 60bn a month as well as a 10bp cut to its deposit rate.

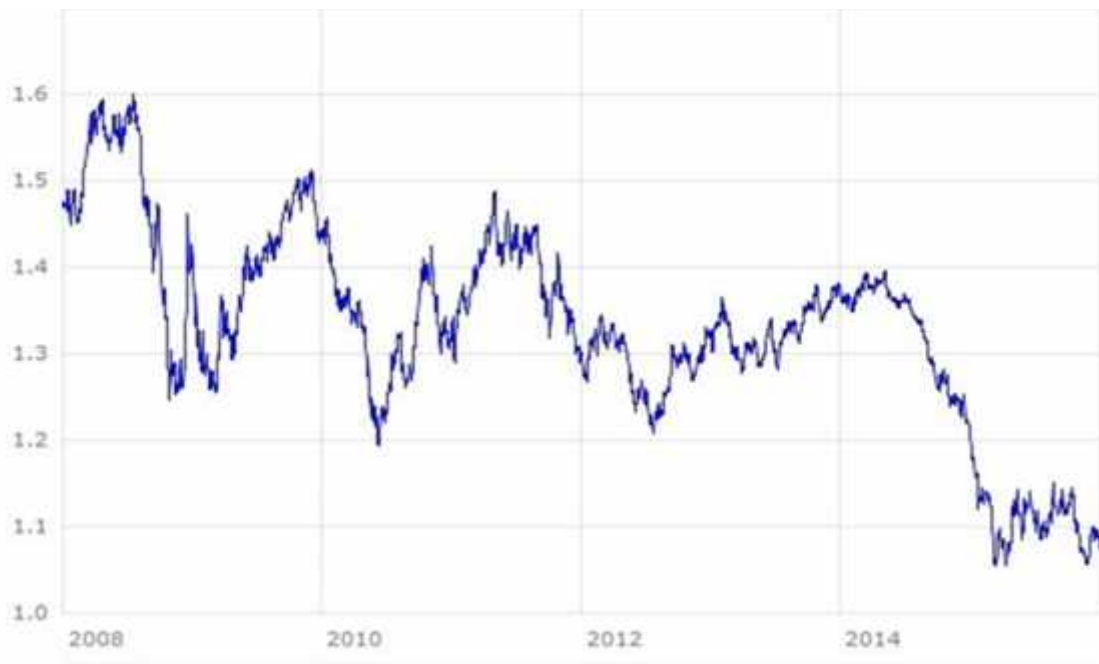
As a result, we observe a divergence in monetary policies between these two major central banks. Although this divergence is not distinguishable from Figure 1 yet, it is important to note that 1) Figure 1 does not include the forecast of monetary policy rates and 2) the official monetary policy rate in the zero lower bound environment does not capture the monetary policy stance appropriately (the official rate should be “adjusted” for non-standard policy measures). Once we consider these two aforementioned issues, the divergence between monetary policy stances is likely to become sizeable even from a historical perspective.

Figure 1: Monetary policy rates in the US and Euro Area



Source: US Fed and ECB. Effective fed funds rate for the US. ECB main refinancing operations rate for the euro area.

Figure 2: EUR vs. USD exchange rate, January 2008-December 2015



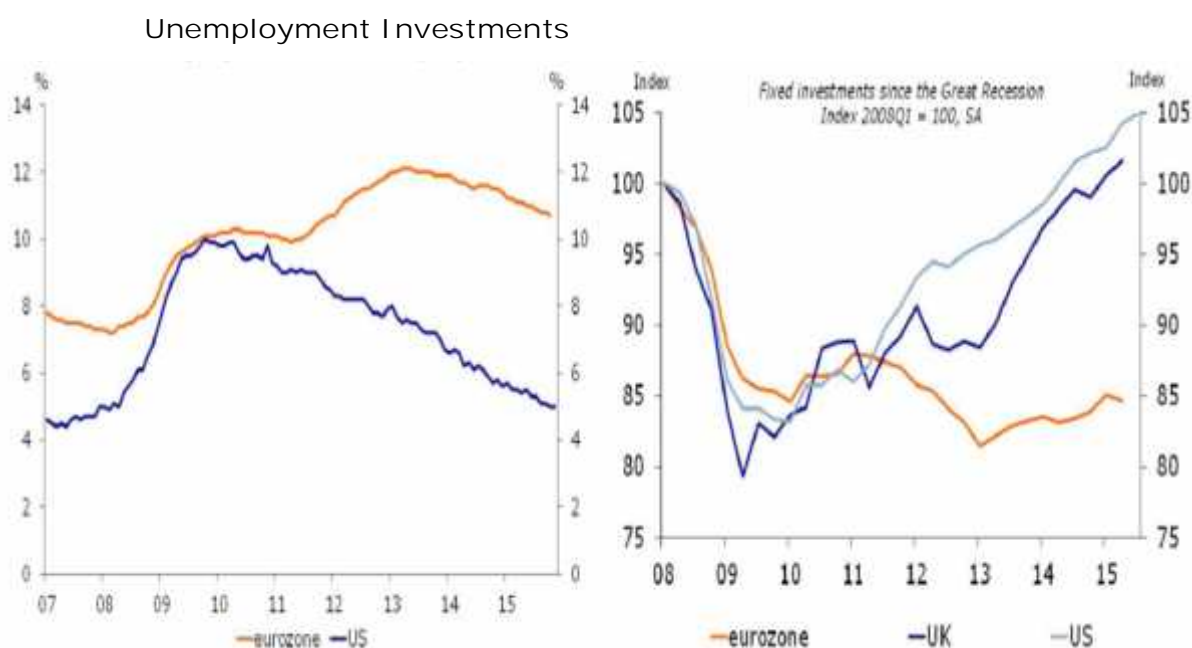
Source: ECB (daily observations).

The exchange rate movements may also shed some light on monetary policy divergence. Figure 2 presents the USD/EUR exchange rate since the beginning of the global financial crisis. We observe a strong appreciation of the US dollar since March 2014, which has been primarily driven by pricing in the expectations about the US monetary policy normalization.

Why do we observe a monetary policy divergence between the Fed and the ECB? As Figure 3 illustrates, the divergence seems to largely reflect the differences in macroeconomic fundamentals. We choose two important indicators – unemployment and investments. The unemployment rate in the US has been falling since 2011 and is currently close to its pre-crisis level in 2007. On the other hand, the unemployment rate in the euro area has shown only weak improvement and remains higher than 10%. US investments also improved significantly, while the euro area investment activity has largely stagnated.

In addition, inflation rates in the US and the euro area have also diverged. While deflationary risks in the euro are not non-negligible with the HICP inflation rate close to zero, the PCE inflation rate in the US is positive and according to the Fed, it is expected to increase in 2016 well above 1%.

Figure 3: Diverging trends in the US and Euro Area fundamentals



Source: Eurostat. US BEA. Rabobank.

This report argues that the normalization of the Fed's monetary policy is likely to help the euro area strengthen economic activity and decrease deflationary risks. The interest rate differential between the US and the euro area monetary policy rate is likely to make European exports more competitive because of a weaker euro. A weaker euro contributes to higher import prices in the short-run and therefore, reduces deflationary risks (obviously, improved economic activity in the euro area over the medium-term may generate inflation as well). All these effects depend on whether or not they are already fully priced in by the markets.

On the other hand, the competitiveness gain for the euro area can be limited in case the normalization of the Fed's monetary policy has a negative impact on financial stability in emerging markets. Dollar-denominated debt in emerging markets is sizeable and makes these markets vulnerable, which may have a negative effect on the euro area economy.

The recent economic-financial developments in China increase the risk that the normalization of the Fed's monetary policy will be slower than expected in December 2015, i.e. at the time of the last monetary policy meeting of the Fed. Normalization may also be slower if commodity prices are lower than expected. Slower than expected normalization of US monetary policy can even temporarily appreciate the value of the euro. In addition, some argue that a strong dollar causes low oil prices. In such a case, deflationary risks in the euro area will not be reduced by a strong dollar.

The rest of this report is organized as follows. Section 2 is a survey of relevant literature examining the international spillovers of the US and the EC's monetary policies. The US monetary policy outlook is discussed in Section 3 and the implications of US monetary policy normalization for the euro area are examined in Section 4. Section 5 concludes.

2. WHAT DO WE KNOW ABOUT INTERNATIONAL SPILLOVERS OF MONETARY POLICY?

This section offers a brief overview of the existing empirical evidence on the international spillovers of monetary policy, with a focus on the international spillovers of US monetary policy but several studies examining the international spillovers of ECB monetary policy are also mentioned. All relevant studies are not covered; rather, some representative studies are used to illustrate the likely nature of international spillovers of monetary policy.

2.1. International spillovers of the US Fed monetary policy

There is extensive empirical evidence suggesting that the international spillovers of the Fed's monetary policy are sizeable (see, for example, Georgiadis, 2015, for a recent contribution). Earlier empirical evidence has focused on examining the effects of conventional US Fed monetary policy (the term conventional means the policy conducted through changing the fed funds rate and not through the non-standard policy measures such as quantitative easing) as described in Kim (2001), Mackowiak (2006) or Neri and Nobili (2010). As the US Fed introduced unconventional monetary policy, such as the aforementioned quantitative easing, during the global financial crisis, new empirical literature emerged examining the international spillovers of both conventional and unconventional monetary policy [(Fratzscher et al. (2013), Bauer and Neely (2014), Chen et al. (2015), Neely (2015)] . Since the primary focus of this report is examining the effect of the normalization of US monetary policy on the euro area, it looks at the international spillovers of conventional US monetary policy and refers to the above references on the international spillovers of unconventional US monetary policy.

This stream of empirical research typically employs some kind of vector autoregression (VAR) model. The VAR models are useful because they can jointly analyse the interdependence among economic series and examine the nature of how one economic series reacts to a surprise (shock or unexpected change) in the other series. Therefore, one can obtain estimates of how strongly and how long it takes for one series to affect the other series. There are several types of VAR models such as block-restriction VAR or global VAR, which are typically applied to examine the economic interactions among countries.

Kim (2001) examines the international effects of US monetary policy shocks and finds that US monetary expansion typically has a positive spillover effect on real GDP and industrial production in developed countries with a lag of approximately 1-2 years.

Neri and Nobili (2010) investigated the effects of US monetary policy on the euro area economy using the two-country structural VAR model with data from 1982-2007. Their results suggest that an unexpected increase in the fed funds rates depreciates the value of the euro relatively quickly. Economic activity in the euro area is strengthened after the Fed implements monetary tightening, with the maximum reaction taking place approximately one year after the shock.

Obviously, empirical research does not focus solely on the international spillovers of the Fed's monetary policy on macroeconomic fluctuations. There is also research examining the international effects of US monetary policy on asset prices. Ehrmann and Fratzscher (2009) offered an important contribution. They assessed to what extent the Fed tightening affects stock markets around the globe. Not surprisingly, their results suggest that the reaction of stock markets is quite heterogeneous across countries. Overall, the results indicate that a tightening of monetary policy by the Fed by 1 p.p. is associated with a 2.7% fall in stock markets outside of the US.

2.2. International spillovers of the ECB monetary policy

In the literature, there is (somewhat limited) evidence on the international spillovers of ECB conventional and unconventional monetary policy.

Horvath and Rusnak (2009) examined the effect of ECB monetary policy on Slovakia in 1999-2007. They used the data from the period prior to Slovakia entering the euro area and estimated the block-restriction VAR model. They documented very strong spillovers of ECB monetary policy on Slovak economic activity and prices. The maximum reaction of Slovak prices to changes in ECB monetary policy rates occurs with a lag of approximately 6 months. The reaction of Slovak output to ECB monetary policy is somewhat slower and occurs with a lag of approximately 1 year. The reaction of Slovak prices is economically stronger than the reaction of output. The results suggest that ECB monetary policy caused about 20% of the variation in prices in Slovakia (before Slovakia adopted the euro) and approximately 5% of the variation in output. The authors hypothesize that the weaker effect on output was caused by the reforms undertaken in Slovakia during that period, i.e. high Slovak growth was largely driven by domestic factors.

Once the ECB introduced non-standard policy measures during the crisis, a large volume of research appeared examining the effect of ECB measures on the euro area economy or European financial markets. However, there is somewhat limited research on the international spillovers of ECB unconventional monetary policy.

To our knowledge, the first study examining the international spillovers of ECB unconventional monetary policy was by Kucharcukova et al. (2014). The authors investigated the effects of ECB policy on the Central European countries (the Czech Republic, Hungary and Poland), which did not adopt the euro as their official currency, and three euro “opt-out” countries (Denmark, Sweden and the UK). Kucharcukova et al. (2014) developed a monetary conditions index for the ECB, which they dinto a conventional monetary policy component and an unconventional monetary policy component. They estimated VAR models for each country individually. Their results suggest that conventional ECB monetary policy has a systematic effect on economic activity and prices in the Central European and “euro opt-out” countries. Regarding the international effects of unconventional ECB monetary policy, the results are somewhat mixed. There is a clear effect on the exchange rate following the ECB unconventional monetary policy shock. Output reacts in some countries but prices remain largely unaffected.

Halova and Horvath (2015) also examined the international spillovers of ECB unconventional monetary policy. They used the ECB shadow policy rate from Wu and Xia (2016) and central bank assets to assess the intensity of ECB unconventional monetary policy. Unlike Kucharcukova et al. (2014), they estimated the panel VAR model (including all the countries jointly in the regression model) and they focused on a wider set of Central and Eastern European countries (Croatia, the Czech Republic, Hungary, Poland and Romania). Their results suggest that, overall, the output and prices in Central and Eastern Europe temporarily increase following the implementation of an expansionary unconventional monetary policy by the ECB. This implies that the ECB monetary policy has also been beneficial for countries outside the euro area, as it has helped improve economic activity and reduce deflationary risks. The reaction of Central and Eastern European countries to the changes in ECB unconventional monetary policy is more sizeable for output than for prices. Their results indicate that ECB unconventional monetary policy explains approximately 10% of output fluctuations in the five aforementioned Central and Eastern European countries and the maximum reaction occurs approximately one year after the ECB unconventional monetary policy shock. The reaction of prices is economically small.

Overall, empirical research examining the international effects of the US Fed or the ECB suggests that international spillovers of monetary policy are strong among countries which are integrated financially and by trade. On average, empirical research suggests that once the Fed or the ECB undertake some changes in their monetary policies (such as the unexpected increase in their monetary policy rates), the maximum impact on other countries' output and prices is approximately with a lag of one year.

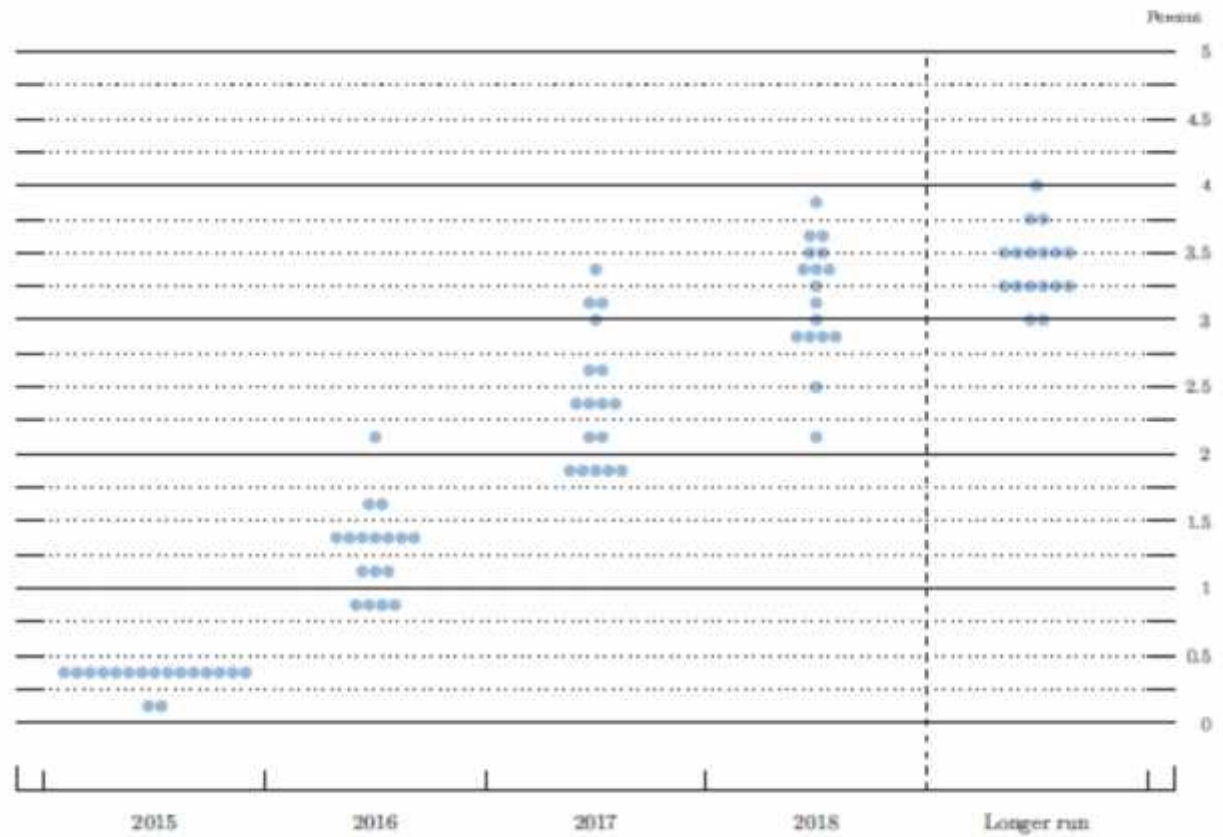
3. US MONETARY POLICY OUTLOOK

On December 16th, 2015, the Federal Open Market Committee (FOMC) decided to increase the target range for the federal funds rate by $\frac{1}{4}$ p.p., thereby raising the target range for the federal funds rate to $\frac{1}{4}$ - $\frac{1}{2}$ percent. The increase in monetary policy rates was expected, to a large extent, since the Fed had been communicating for several months that the era of “zero” policy interest rates was coming to an end. As a result, the EUR/USD rate practically did not change following the announcement of the US Fed interest rate hike.

In addition, the Fed communicated that they expected a gradual increase in the monetary policy rate in future. According to their expectations, this gradual increase is consistent with bringing the inflation rate to the 2% objective over the medium term. The main argument to gradually increase monetary policy interest rates to the “normal” level is a significant improvement in US labour market conditions (with a strong job growth in late 2015). The Fed currently expects the US unemployment rate to stay below 5% for the upcoming years, accompanied by solid economic activity (real GDP is expected to grow at 2-2.5% on average in 2016-2018). Additionally, the Fed expects US inflation (personal consumption expenditures inflation) will gradually increase from close to zero to the 2% objective. The Fed expects the US inflation rate to be 1.7% in 2016.

Figure 3 displays the expected US monetary policy rates for 2016, 2017, 2018 and beyond. The figure is based on the assessment of appropriate monetary policy by the individual Federal Open Market Committee (FOMC) members. The figure was released on December, 16th, 2015 during the last US Fed monetary policy meeting. It is worth noting that vis-à-vis the previous monetary policy meeting, which took place in September 2015, the Fed’s expectations about monetary policy normalization remained largely unchanged. Interestingly, according to Figure 3, the Fed is much more hawkish in terms of tightening their monetary policy which is what the markets expect. The implied fed funds rate (based on Fed funds futures) is much lower than what is portrayed in Figure 3. According to the markets, the implied rate is below 2%, therefore, the markets expect a slower pace of tightening than the Fed.

Figure 3: Expected federal funds rate:
Assessment of individual FOMC Members

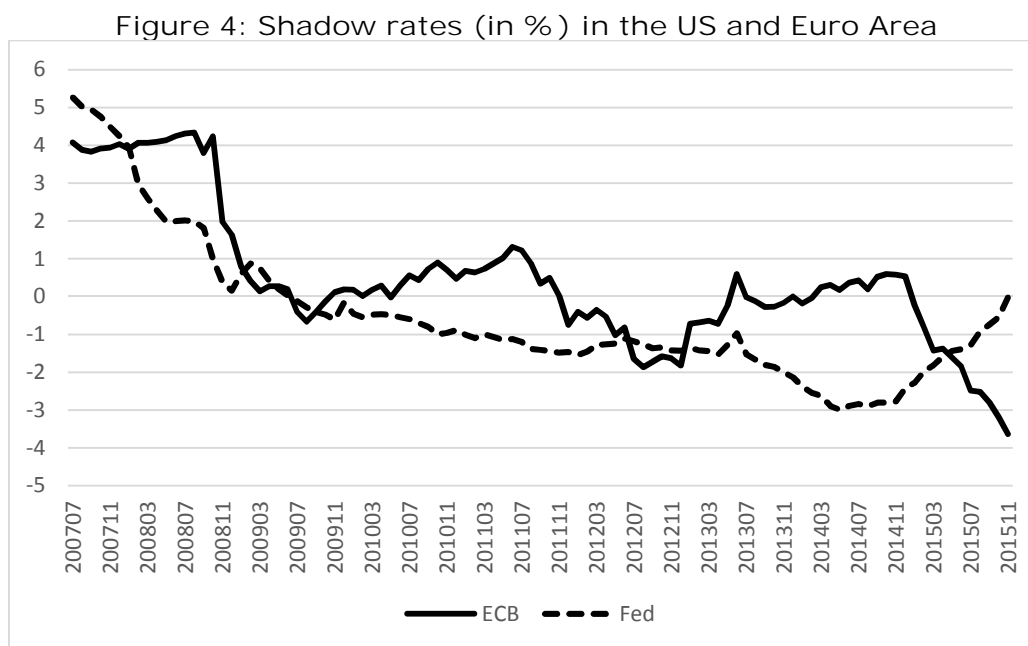


Source: US Fed. FOMC members' assessment of appropriate future monetary policy in the US. Midpoint of target range or target level for federal funds rate. Expectations as of December, 16, 2015.

4. MONETARY POLICY DIVERGENCE: IMPLICATIONS FOR THE EURO AREA

4.1. Will the monetary policy divergence be large?

It is worth discussing how large the monetary policy divergence between the Fed and the ECB is likely to be. Will the divergence be large even from a historical perspective? If we simply examine the expected difference between the Fed and ECB monetary policy rates, the difference looks sizeable (approximately 2-3p.p.) but not dramatic, considering what these central banks have experienced in the recent past.



Source: Website of professor Cynthia Wu at <http://faculty.chicagobooth.edu/jing.wu/research/data/WX.html>

However, the monetary policy divergence is stronger once we consider that the ECB still employs non-standard policy measures, while the Fed no longer uses them. As a result, the difference in the monetary policy stance of the Fed and the ECB is larger than the monetary policy rates imply. Wu and Xia (2016), among others, estimate the so-called shadow rate, which assesses the monetary policy stance in an environment of zero lower bound on interest rates. The shadow rate is based on a non-linear term structure model. The benefit of the shadow rate is that it is not bound by zero. In addition, the shadow rate largely coincides with the official monetary policy rate, if this rate is above zero. The 'shadow rate' concept has become quite popular among central banks (for example, the Federal Reserve Bank of Atlanta posted and regularly updated the shadow rate for the US).

The shadow rate may illustrate the monetary policy divergence between the Fed and the ECB more accurately. I present shadow rates for the US and the euro area in Figure 4. According to the estimates, the monetary policy divergence is likely to be even larger than the official monetary policy rates. The monetary policy divergence is likely to be large in 2016-2018 even from a historical perspective, if the normalization of the Fed's monetary policy continues at the expected pace and at the same time the ECB maintains its unconventional policies.

4.2. What are the implications for the Euro Area?

The monetary policy divergence between the Fed and the ECB is likely to have temporary positive effects for the euro area in terms of improved economic activity and reduced deflationary risks. We have already observed a strong USD appreciation, especially in 2014. A weaker euro is likely to boost the competitiveness of the euro area exporters (approximately 20% of the euro area exports go to the US). A weaker euro will also increase the price of imports, thereby reducing deflationary risks in the euro area.

The positive effects for the euro area stemming from monetary tightening in the US will be weakened in the case that US monetary policy tightening will have a significantly negative effect on US economic activity. Nevertheless, most experts seem to expect that the first effect will dominate and that a weaker euro will contribute to more exports to the US and subsequently, to more solid economic activity in the euro area and to an inflation rate closer to what the ECB considers as price stability. However, this positive effect will be temporary. Most empirical research on the domestic and international transmission of monetary policy finds that the maximum impact of monetary policy surprises (shocks) occurs approximately one year after the shock (see Neri and Nobili, 2010, among others). Although we know that these transmission lags can vary across countries and over time, the average of one year seems to be reasonable.

Nevertheless, it is important to emphasize that the expectations about the future fed funds rate increases are largely priced in by the financial markets. As a result, if the Fed increases the rate at a significantly slower than expected pace, the euro may temporarily appreciate vis-à-vis the USD and competitiveness gains from a weak euro will be reaped only partially or not at all. Similarly, financial markets also form expectations about the intensity of non-standard policy measures of the ECB. If the intensity is weaker than expected, it may also result in the appreciation of the euro.

4.3. What are the risks?

The main risk for the euro area and potentially for the global economy is that the Fed's monetary policy normalization will contribute to greater financial instability in emerging market economies. Many of these economies are moderately or strongly indebted and rely on external financing, with their debt often denominated in the US dollar.

We have already observed in the past that a strong appreciation of the USD has been associated with a number of financial turbulences in emerging markets such as the Mexican peso crisis in 1994, the Asian financial crisis in 1997, the Brazilian currency crisis in 1999 and the Argentine economic crisis in the early 2000s. Typically, financial turbulence in emerging markets is spurred by (sudden) capital outflows following monetary policy rate increases in the US or other developed countries. Even though the economic fundamentals in emerging markets are in better shape nowadays than two decades ago, the current developments in the Chinese stock market suggest that the risks are pertinent. Similarly, we have also observed non-negligible capital outflows, exchange rate depreciations and stock market declines in major emerging markets at the time the Fed announced its plans to taper in 2013 (Kawai, 2015). On the other hand, the increased financial instability in emerging markets can be compensated in the medium-term by improved export dynamics from emerging markets to the US (this is due to a stronger dollar and improved economic activity in the US). Therefore, if these risks should materialize, one can expect that the financial channel will dominate in the short-term, while the trade channel may dominate in the medium-term.

The MSCI Emerging Markets Index documents the expectations of a worsening of economic performance in emerging markets in late 2015 and early 2016 (see Figure 5). This stock market index covers 23 emerging markets (such as China, India, Brazil, Russia, Indonesia or South Africa). The greatest weight in the index – approximately $\frac{1}{4}$ - is formed by China, followed by South Korea, Taiwan, India, South Africa and Brazil. This stock market index illustrates how the worsening of economic and financial conditions in emerging markets is relatively dramatic. In addition, the uncertainty about future economic developments is also well illustrated by the stock market trading being recently halted several times in the Chinese stock market.

An additional risk may be related to the EUR/USD exchange rate and oil prices interactions. Oil is traded in US dollars. A strong dollar causes higher oil prices for the euro area, which may reduce demand for oil in the euro area and subsequently lower oil prices. In this scenario, a strong dollar will not help reduce the deflationary risks in the euro area (as described in the previous paragraph), as a strong dollar will be associated with low oil prices. Nevertheless, some argue that the dramatic fall in oil prices has been primarily caused by supply factors such as an unwillingness by the Organization of the Petroleum Exporting Countries to reduce the supply of oil rather than the demand factors described in this paragraph. Davig et al. (2015) provide an interesting overview of recent oil price developments and the likely causes of oil price volatility.

In addition, there is also a risk that medium and long-term rates in the euro area will increase along with the US rates such that the domestic (euro area) rate would be disproportionately sensitive to global or US conditions. Nevertheless, this “financial contagion” hypothesis is less relevant in comparison to the risk that US monetary policy normalization would result in higher financial instability in emerging markets.

Figure 5: MSCI Emerging Markets Stock Index



Source: Financial Times.

More generally, the risks associated with US monetary policy normalization can be somewhat mitigated with transparent and clear central bank communication so that markets are not surprised by the timing or pace of US monetary policy normalization and therefore can gradually adjust to the new steady state without excessive volatility.

CONCLUSIONS

In this report, I analysed the monetary policy divergence between the Fed and the ECB and examined the implications of this divergence for the euro area economy.

The monetary policy stances between the Fed and the ECB already differ and are likely to differ much more in the future. The Fed is expected to normalize its monetary policy, i.e. it will not keep the fed funds rate near zero but will increase to a more “normal” long-term equilibrium level. The Fed currently expects to increase the fed funds rate by approximately 1 p.p. in 2016 and to gradually increase it to approximately 3-3.5% in 2018 and beyond. On the other hand, the ECB expects to continue asset purchases at least until March 2017 and is very likely keep policy interest rates near zero. As a result, the monetary policy rates are likely to differ sizeably.

However, to properly account for the differences in the monetary policy stance of the Fed and the ECB, one should also consider the fact that the ECB continues to apply non-standard policy measures. It is useful to compare the so-called shadow rates between the Fed and the ECB. The shadow rate largely coincides with the official monetary policy rate, if the rates are above zero and no non-standard measures are applied. The shadow rate provides a reasonable assessment of the monetary policy stance in the zero lower bound environment, as it is not bound by zero. Once we consider the empirical estimates of the shadow rates of the Fed and the ECB, we observe that monetary policy divergence is even larger as compared to the official monetary policy rates. Therefore, the monetary policy divergence between Fed and the ECB is likely to be sizeable even from a historical perspective.

As the monetary policy divergence between the Fed and the ECB is likely to be large, the question is how strongly will Fed hikes affect the euro area economy. The available empirical research suggests that the international spillovers of the Fed’s monetary policy have a substantial effect on macroeconomic and financial conditions both in the euro area and in emerging markets.

The normalization of the Fed’s monetary policy is likely to temporarily support the euro area economy by strengthening economic activity and reducing deflationary risks. The Fed’s tightening is likely to weaken the euro, making euro area exports more competitive. A weaker euro can contribute to higher import prices and may therefore increase the probability that euro area inflation will be closer to what the ECB considers ‘price stability’ (i.e. the inflation rate is below but close to 2%). Obviously, the functioning of an exchange rate channel to generate positive effects for the euro area economy depends on whether they are already fully priced in by the markets. For example, an unexpected slowdown of US monetary policy normalization may well even temporarily cause the euro to appreciate.

The economic and financial difficulties in emerging markets, especially those recently observed in China, may significantly weaken the positive effects of US monetary policy normalization for the euro area economy. The Fed may slow down monetary policy normalization and simultaneously, the demand for euro area exports to emerging markets may weaken. In addition, a strong dollar may be one of the causes of low oil prices. If this is true, then a weak euro will not contribute to reduced deflationary risks because oil prices will fall at the same time.

More generally, sizeable international spillovers of domestic central bank actions and non-negligible monetary policy divergence among major central banks suggest that monetary policy coordination might be beneficial during volatile times.

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NOTES



DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Implications for the euro area of divergent monetary policy stances by the Fed and the ECB – The role of financial spillovers –

Kerstin BERNOTH, Philipp J. KÖNIG

IN-DEPTH ANALYSIS

Abstract

The recent interest rate increase of the US Federal reserve can be marked as the beginning of the exit of overly expansionary monetary policy in the United States. A tightening of US monetary policy may spill over to the euro area via financial markets and financial linkages. In particular it may cause a decline in (bank) funding and an increase of European interest rates and depreciation of the euro vis-à-vis the dollar over the medium term. These developments may hamper the current efforts of the ECB to keep the monetary stance in the euro area accommodative. It is unlikely that additional (expansionary) monetary measures by the ECB could help much in containing these spillovers. However, the ECB should work towards improving international policy coordination. This could also be in the interest of the Federal Reserve Bank.

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EXECUTIVE SUMMARY

- After seven years of very low interest rates, the US Federal reserve has raised its policy rate from the 0-25 bps range to a new range of 25-50 bps.
- As the European Central Bank (ECB) still seeks to keep interest rates at rock bottom levels in the euro area, the monetary stances of the Fed and the ECB are beginning to diverge.
- US monetary policy may create non-negligible spillovers to the euro area. In particular, a tighter US monetary policy may spill over via financial markets and financial linkages between the US and the euro area.
- What's more, US monetary policy may be a key determinant of the global financial cycle (the co-movement of asset prices, credit creation and cross-border capital flows). As US banks hold a sizeable portion of cross-border claims against the euro area, a tighter US monetary policy may induce a retrenchment in cross-border funding. This may counteract the ECB's efforts to sustain ample funding conditions in euro area economies.
- Capital flow reversals may go along with further appreciations of the dollar vis-à-vis the euro. This may be passed through to euro area prices and thereby help the ECB to achieve its inflation target
- But higher US interest rates also create pressure on euro area rates, thus making it more costly for households and non-financial firms to finance investment and expenditures. This may act as a drag on the economic recovery in the euro area.
- While the euro area may become subject to US-induced spillovers, it is not obvious how the ECB should react. It is unclear whether additional unconventional measures could contain the effect of spillovers, given that the recent measures have not been very effective so far.
- It would be desirable to achieve greater international policy coordination between central banks, meaning that the Fed takes into account the impact of its policy on the euro area, but also on emerging market economies without giving up its domestic mandate. It would therefore be in the interest of the ECB to push for further international policy coordination.

1. INTRODUCTION

On December 16, 2015, the US Federal Reserve Bank (Fed) raised the target for its policy rate (federal funds rate) from the previous range of 0 – 25 basis points (bps) to a new range of 25 – 50 bps. Thereby, the Fed put an end to the almost seven years of ultra-low interest rates in the United States (US). This decision was taken in response to continuously improving macroeconomic conditions, including falling unemployment and a closing output gap. Moreover, the Fed expected inflation to move toward its two percent objective over the medium term. Therefore it considered economic conditions to be sufficiently robust to risk increasing the interest rate.

At the same time, the European Central Bank (ECB) announced it would keep its main policy rate at the current low level of five bps and to continue with its large-scale asset purchases programme through at least 2017. Hence, while there is good reason to expect that the Fed will continue to gradually raise interest rates further in the next quarters, albeit at a very slow pace, the ECB, given the weaker economic conditions in the euro area is strongly intervening to keep rates at rock bottom levels. From this perspective, the Fed and ECB monetary policy stances are diverging.

This raises questions about the consequences of a steady tightening of US monetary policy for the economic conditions in the euro area and, in turn, for the appropriate policy response for the ECB. Will a policy tightening in the US act as an additional drag on the economic recovery in the euro area? Must the ECB, consequently, engage in even larger asset purchases to keep monetary conditions in the euro area accommodative? Or will policy tightening in the US constitute an additional stimulus for the euro area economy through its immediate effect on the exchange rate, i.e. through the weakening of the euro compared to the US-dollar?

While it is certainly too early to provide clear-cut answers to these questions, the following report seeks to address the main underlying issues, providing some guidance of the consequences of the Fed's interest rate increase for the euro area. In particular, this study focusses on financial spillovers, since the United States and the euro area are primarily linked via financial markets (Eijffinger, 2008).

2. SPILLOVERS OF US MONETARY POLICY

In a globalized and increasingly integrated world economy, countries are interconnected through trade and capital flows.¹ Whenever trade and capital flows respond to changes in domestic monetary policy, they transmit these policy changes to other countries, which are connected to the domestic economy via trade and financial linkages.

In a nutshell, the conventional monetary transmission channel starts from variations at the short end of the yield curve, which affect domestic financing conditions in money and credit markets, further leading to changes in asset prices. Eventually the demand for goods and services responds, thereby inducing changes in goods prices and wages. In an open economy the effects of policy rate variations may spill over to the rest of the world: changes in domestic financing conditions may affect demand, supply and interest rates in international capital markets; changes in asset prices may include changes in the price of foreign currencies, i.e. exchange rates; changes in the demand for goods and services may include changes in the demand for imported goods etc.

While many economies, including but not limited to the majority of developing and emerging markets, have only a negligible impact in international markets, the opposite is true for the United States. Indeed, Georgiadis (2015) estimates substantial spillover effects of conventional US monetary policy. For many economies these are of an order of magnitude that exceeds the domestic effects in the United States. Georgiadis points out that the magnitude of spillovers depends crucially on country characteristics. In particular, spillovers are especially large for financially well-integrated economies with weaker trade links. But even countries with less-developed or less-open financial markets may experience strong spillovers originating in the US if they suffer from other distortions and vulnerabilities, such as rigid labour markets, inflexible exchange rate regimes or higher public debt ratios.

Also Ehrmann and Fratzscher (2009) study the macroeconomic determinants of the strength of spillovers from US monetary policy. Similar to Georgiadis, they note that spillovers are especially strong for countries with relatively liquid and open financial markets, implying that the transmission of US monetary policy shocks depends on the degree of financial integration. However, Ehrmann and Fratzscher also find that the impact of the US monetary policy shock increases with the degree of openness-to-trade (being two to three times larger for open than for countries that are less open to trade). They emphasize that the degree of integration with the entire rest of the world matters for the transmission of US monetary policy shocks, not just the bilateral integration with the US.

As the euro area is relatively open to trade² and well-integrated into international financial markets, these empirical findings suggest that spillovers from US monetary policy will be strongly felt. Moreover, Eijffinger (2008) points out that the euro area and the United States are mainly linked via financial markets, in particular via capital flows, exchange rates and interest rates. This implies that the euro area will be hit hard by a financial downturn and will benefit much less from an economic upswing in the United States.³

¹ Clearly, economies are also connected via labor flows but they are of lesser interest for the present report.

² For example, in 2014 the euro area's current account balance was at 2.4% of GDP, its share of world exports (excluding euro area trade) was at roughly 16%, while its exports and imports (in percent of GDP) stood at 26% and 23%, respectively. According to all of these measures, the euro area economy was even more open to trade compared with similarly large and important economic areas such as the US, China or Japan.

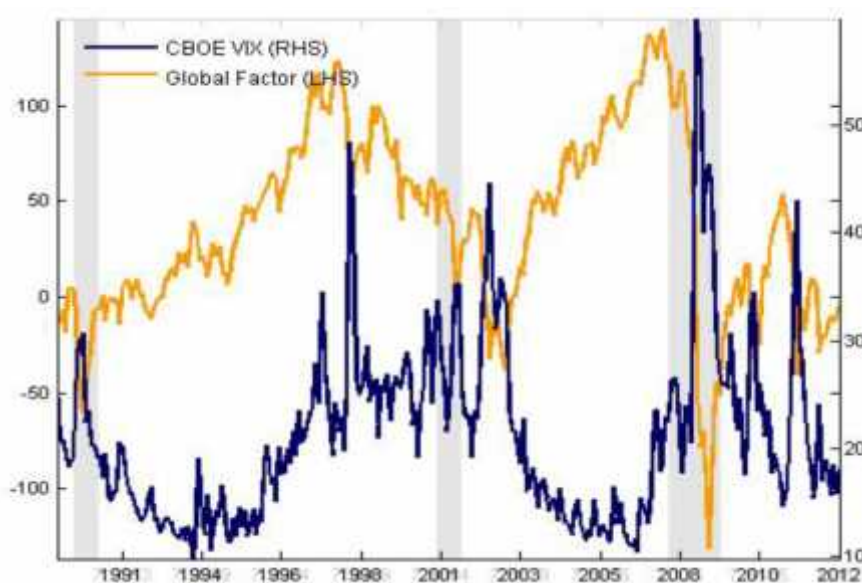
³ See also the discussion in IMF (Box 4.1, 2007).

3. SPILLOVERS CHANNELS

3.1 Capital flows and the global financial cycle

Recently, a number of studies point to the existence of a “global financial cycle” (Rey 2013, 2015; Passari and Rey, 2015). The global financial cycle describes the co-movement of gross capital flows, banking sector leverage, credit creation, and risky asset prices across countries. As shown, for example by Rey (2013), gross capital inflows are positively correlated across countries and asset classes. Common measures of market fear (e.g. VIX or VSTOXX) are negatively correlated with gross cross-border flows, credit and bank leverage. Rey further points out that risky asset prices around the world are driven by a single (global) factor, which is highly negatively correlated with market fear measures (Figure 1). Rey (2013) shows that one important determinant of this single factor is the US’s monetary policy stance.

Figure 1: Single global factor (lhs) and market fear (rhs)



Source: Rey, 2013.

The existence of the global financial cycle could potentially invalidate a key implication of international macroeconomics, the so-called “impossible trinity” or “trilemma.” The trilemma states that an economy can combine at most two out of the following three regimes: free cross-border capital flows, independent monetary policy (directed towards domestic objectives), or a fixed exchange rate. According to the trilemma, a country with a floating exchange rate regime, like the euro area, should be able to conduct an independent monetary policy despite cross-border capital flows being fully free and flexible. However, according to Rey (2013), the key driver of the global financial cycle is US monetary policy. This, in turn, could reduce the trilemma to a dilemma, where, irrespective of the exchange rate regime, monetary policy can be conducted independently if and only if the capital account is managed. Otherwise domestic monetary policy would be rendered ineffective and would largely be driven by monetary policy in the US.⁴ Thus, financial globalisation might weaken the effectiveness of domestic monetary policy through global financial cycle effects. This poses a challenge to central banks in non-US economies including the ECB.

⁴ The global financial cycle hypothesis obviously squares with the findings of Georgiadis (2015) and Ehrmann and Fratzscher (2009) about the determinants of spillovers and their magnitude discussed above.

Moreover, as pointed out by Bruno and Shin (2014), the international banking sector plays an important role for the transmission of global liquidity conditions. International banks' behaviour is often pro-cyclical as it is strongly influenced by the interaction between capital positions (leverage) and risk perception. An increase in the US policy rate induces a reduction in leverage and an increase in the VIX (a measure for the general risk aversion).⁵ In response, banks curtail lending and cross-border credit flows decline, a process that is called the "risk-taking channel" (Borio and Zhu, 2012).⁶

In the second quarter of 2015, US banks accounted for about 11% of total cross-border claims against counterparties in the euro area, roughly one third of which had a maturity of no more than one year.⁷ Given that the bulk of all cross-border claims against euro area counterparties are held within the area, US banks constitute the most important lender from outside the monetary union. This suggests that the recent tightening by the Fed (as well as the currently expected continuation of this policy stance throughout 2016) may lead to a retrenchment in bank-intermediated capital flows from the US to the euro area. In addition, it is likely that large and internationally active euro area banks will display a similar behaviour as US banks, lowering their leverage in response to an increase in perceived risks.

Thus, with regard to the euro area, a further monetary tightening in the US would automatically lead to an increase in general risk aversion (measured, for example, by the VIX or the VISTOXX). The overall outcome may be a decline in available funding within euro area due to a reversal of the global financial cycle and the "risk-taking channel" of international banks. This could potentially counteract the current efforts by the ECB to sustain ample funding conditions in euro area economies.

3.2 Exchange rate effects

As hinted at in the previous sections, capital flows and, as a corollary, the international banking system⁸ are important for transmitting US monetary policy shocks to the rest of the world. This suggests that one needs to go beyond the standard macroeconomic framework of open economies - such as the classic Mundell-Fleming-Dornbusch model or its modern vintage by Obstfeld and Rogoff (1995). These models leave only a limited role for financial frictions. For example, the uncovered interest rate parity (UIP)⁹ is usually assumed to hold, or liquidity demand is closely linked to consumption expenditures (Gabaix and Maggiori, 2014).

In particular, models where UIP holds would imply that a contractionary US monetary shock leads to an immediate appreciation of the US-dollar. This is followed by a depreciation of the dollar as investors view the initial appreciation as a cue to liquidate their positions. While empirical studies generally confirm the initial appreciation, there is ample empirical evidence that UIP does generally not hold and that currencies tend to persistently

⁵ Their story runs as follows: Higher US policy rates raise banks' refinancing cost and, given that the VIX has increased, value-at-risk constraints start to bind, implying that leverage is curtailed.

⁶ Bruno and Shin (2014) emphasize that the role of the US dollar as the world's most important currency for the global banking system is important for the bank leverage effect to be active at all. The monetary policy decisions of other countries are not associated with similar strong leverage, nor, consequently, spillover effects.

⁷ See BIS, consolidated banking statistics (immediate counterparty basis).

⁸ See e.g. the detailed report of the Committee on International Policy Challenges and Regulatory Responses (2012) on the role of the international banking system in intermediating a large part of global cross-border capital flows.

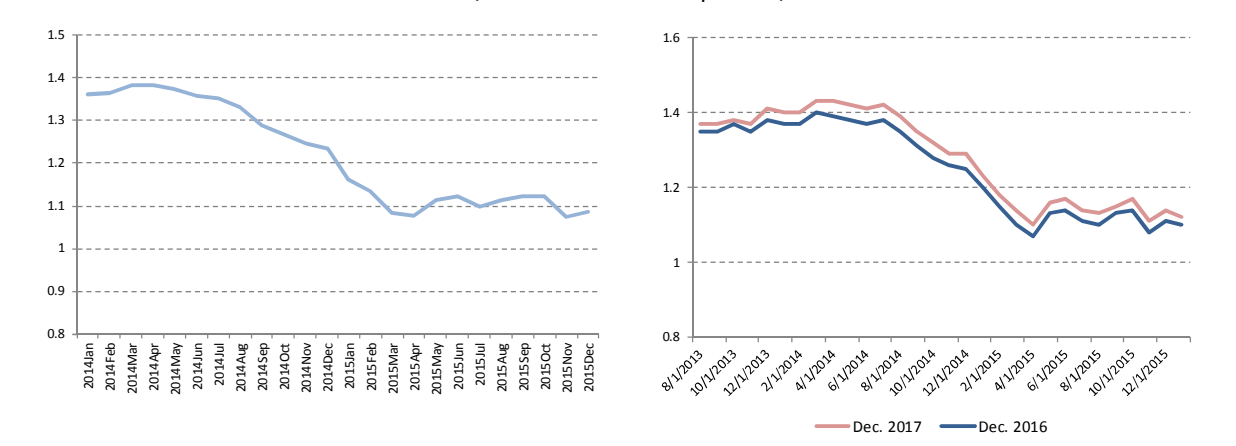
⁹ The uncovered interest parity condition is a no-arbitrage (rather, no-speculation) condition holding that the expected return from holding, say, a dollar deposit should be equal to the expected return from holding a euro deposit. If UIP holds, the interest rate differential between the euro area and the US should equal the expected rate of depreciation of the euro-dollar exchange rate.

appreciate further for up to two years following the initial monetary policy shock.¹⁰ For example, Eichenbaum and Evans (1995) point to a “delayed overshooting puzzle” where the peak of the exchange rate adjustment occurs with a delay of several quarters. The role of the international banking sector described above may constitute a missing link explaining empirical patterns that violate predictions based on UIP. Bruno and Shin (2013) find that the decrease in cross-border banking capital flows and the decline in the leverage of international banks in response to a US monetary policy contraction is associated with a further appreciation of the US dollar.

Thus, although the euro had weakened considerably prior to the Fed’s decision, and is currently expected to remain relatively unchanged (Figure 2), further reductions of bank-intermediated capital flows in response to the recent tightening by the Fed may induce further appreciations of the US dollar in the coming quarters. This appreciation process will be amplified and prolonged in case of a continued tightening of US monetary policy during 2016.

While the interest rate channel of monetary policy may weaken with financial globalisation through global financial cycle effects, the exchange rate channel may strengthen through larger net foreign currency exposures, as pointed out recently by Georgiadis and Mehl (2015). If the net foreign currency exposure of a country is large, US monetary tightening would induce a depreciation of the domestic currency. Valuation effects would then lead to a rise in the net foreign asset position, thereby loosening domestic economic conditions.

Figure 2: Dollar-euro exchange rate and expectations
(based on future prices)



Note: Left panel: Spot dollar-euro exchange rate, end-of-month observation; Right panel: Dollar-euro futures exchange rate with maturity in December 2016 and 2017, end-of-month observations. Futures exchange rates can be interpreted as the markets’ expectation of the exchange rate at maturity.

Source: Thomson Reuters, European Central Bank.

¹⁰ Various explanations of the forward premium puzzle (FPP) - or the related violation of the uncovered interest parity (UIP) - are offered. One branch of the literature argues that the forward premium contains a time-varying risk premium that is negatively correlated with the expected change in the exchange rate. Another branch argues that the forward premium contains a systematic forecast error due to learning about regime shifts or irrational information processing. Others argue that the estimate of the slope coefficient is biased due to the response of monetary policy to output and inflation, which are correlated with the exchange rate in turn. See Bernoth, de Vries and von Hagen (2010) for an overview.

For the euro area, Georgiadis and Mehl (2015) estimate that a 10-percent depreciation of the euro implies an increase in the average net foreign asset position of about 2.8 percentage points. Hence, while the existence of a global financial cycle may pose a challenge to monetary authorities in non-US economies, the valuation effects via changes in net foreign currency exposures may counteract these effects and help sustain monetary policy effectiveness. Georgiadis and Mehl show that, despite the presence of global financial cycle effects, their quantitative (net) effect in the average euro area economy is rather small due to the existence of competing net foreign currency exposure effects.

3.3 Pass-through to prices

A depreciation of the euro may push up prices and inflation in the euro area in at least three ways. First, prices of imported consumption goods immediately become more expensive. Second, prices of imported inputs increase, thereby leading to a rise in domestic production costs and to higher prices of domestic final goods. Third, expenditure switching implies an increase in demand for domestic goods, thereby putting further upward pressure on prices of domestic goods (ECB, 2015b). Such price effects usually occur with a lag of several quarters (Campa and Minguez, 2006; DeBandt and Razafindrabe, 2014). For example, ECB (2015b) provides statistical evidence that the pass-through of the 20 percent devaluation of the euro between the second quarter of 2014 and the second quarter of 2015 had its peak impact on prices at the end of 2015, when it added roughly 0.8 percentage points to euro area inflation. The impact of this devaluation is expected to last through the end of 2017. Moreover, given that the depreciation vis-à-vis the dollar continued throughout the last two quarters of 2015, partly driven by expectations about the future tightening of US monetary policy, inflationary pressures due to the devaluation are likely to persist after 2017, thereby counteracting recent disinflationary trends in the euro area and contributing to bringing inflation back to the ECB's medium-term target.

3.4 Interest rate spillovers

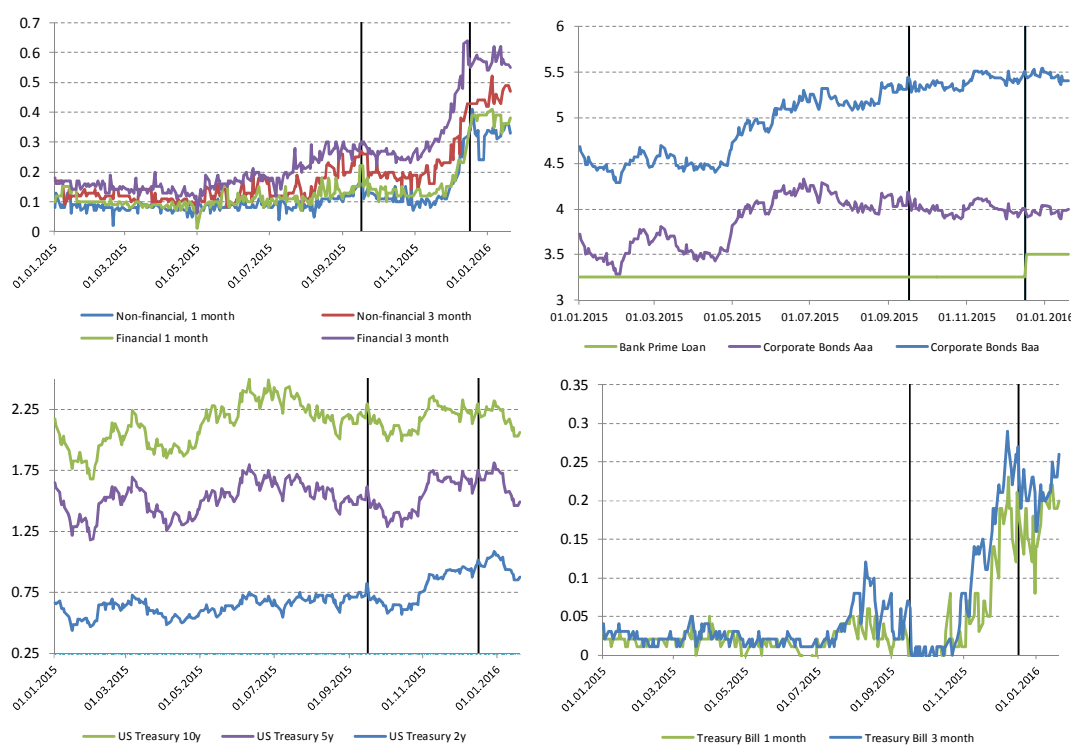
The Fed's rate increase induced an increase in interest rates on financial and non-financial assets in the United States (Figure 3). These increases are small in magnitude, therefore not substantially altering the overall low-interest environment in the United States. However, going forward, the US Fed is likely to further raise rates during 2016. Rising interest rates in the United States are likely to spill over, leading to higher interest rates in the rest of the world for the following reasons: First, higher expected returns in the United States may entail portfolio shifts toward US assets as international investors may draw capital from other countries, thereby creating upward pressure on yields there. Second, Gürkanyak and Wright (2011) argue that market participants may expect the central bank to have some private information about the state of the global business cycle. Thus, the policy actions of the Fed may signal this information to international market participants. This causes them to update their beliefs about the state of the global economy as well as about the potential policy actions of their domestic central banks. Third, the pass-through of an appreciated US dollar to non-US prices may lead to inflationary pressure and output growth via expenditure-switching in other countries, thereby prompting increases in non-US interest rates.

Eichenbaum and Evans (1995) show that long-term yields across countries rise in response to a contractionary US monetary policy shock. However, the increase in US yields exceeds the corresponding increase in foreign yields, such that the yield spreads between the US and foreign countries rise. For the euro area, Chinn and Frankel (2005) show that prior to the creation of the monetary union, European rates were strongly affected by interest rate changes in the United States, whereas the effects became more ambiguous in the early stages of the euro when US rates were somewhat influenced by euro area rates.

However, they conclude that it is predominantly the United States' interest rates that affect the euro area rates and not the other way around. Similarly, Ehrmann, Fratzscher and Rigobon (2005) provide evidence for the existence of bilateral influences (from euro area to US and vice versa). However, variations in financial conditions in the United States have a much larger effect on euro area markets than the other way around. For example, variations in US short-term interest rates explain roughly 10 percent of the variation in bond yields in the euro area. Moreover, variations in US financial markets explain more than 25 percent of the variation in euro area financial markets, while the latter only account for roughly 8 percent of the former's variation.

In contrast, Dees et al. (2006) find that changes in US short-term interest rates have only negligible effects on euro area variables such as short-term rates, output and inflation. Shocks to US long-term rates have, however, at least in the initial periods, statistically and economically significant effects on euro area long-term rates. Eijffinger (2008), using a longer sample and a different statistical method, however, obtains a more nuanced picture. While short-term rates in the US and the euro area mutually Granger-cause¹¹ each other, long-term interest rates in the US tend to Granger-cause long-term rates in the euro area. In further estimations he finds evidence that it is generally the US interest rate (at both the short and long horizons) that adjusts to close interest differentials between the US and the euro area, whereas the euro area rates hardly move. From these estimations, Eijffinger concludes that there exist statistically significant interdependencies between the euro area and the US, but that the direction runs usually from the US to the euro area and not so much the other way around.

Figure 3: Interest rates in the US



Notes: Vertical lines indicate meetings of the Fed's open market committee on September 16 (where a lift-off was already expected) and December 16, 2015 (where the lift-off eventually took place).

Source: Federal Reserve Bank

¹¹ A variable X is said to Granger-cause a variable Y if the forecast of Y improves when lagged values of X are included in the forecasting model for Y. Although Granger causality is an often invoked notion in statistical analyses of time-series, it does not necessarily imply causation in the strict sense of the word.

It follows that the interest rate increases in the United States (across different maturities) are likely to induce interest rate increases in the euro area. This, however, could counteract the efforts of the ECB to push interest rates down. Hence, the diverging monetary policy stances may lead to a situation where the ECB's monetary policy stance will become less accommodative due to US influences.

4. CONCLUSIONS AND POLICY IMPLICATIONS

US monetary policy plays a key role in the global financial system. As the euro area is well-integrated in international financial markets, the current tightening in the Fed's monetary stance is likely to create non-negligible spillovers for the euro area.

The tightening of the US monetary stance may influence the monetary stance in the euro area through at least three channels: First, available (bank) funding in the euro area may decline due to the reversal of the global financial cycle following tighter US monetary policy. Second, interest rate increases in the US may exert upward pressure on euro area interest rates. Third, a continued tightening in the US may lead to a further depreciation of the euro vis-à-vis the dollar over the medium term.

These developments may hamper the current efforts of the ECB to keep the monetary stance accommodative and provide ample funding conditions in euro area economies through extraordinary liquidity provision and rock bottom interest rates. This raises the question whether the ECB should loosen its monetary stance even further to counteract spillovers from the US.

To loosen its monetary stance, the ECB can engage in more aggressive asset purchases (either by stepping up the volume of its monthly purchases or by extending the length of its purchase programme). Additionally, the ECB could also move the deposit facility rate further into negative territory, making the holding of excess reserves more costly for banks, thereby increasing the 'velocity of liquidity'. It is, however, unclear whether such measures will create the pressure on interest rates and credit developments that is needed to fully offset financial spillovers from tighter US monetary conditions. First, although the ECB has injected up to 600 bn euro of central bank money since the inception of its asset purchase programme, credit creation in the euro area is still sluggish and improves only at a slow pace. Second, the purchases' effects on medium- to long-term interest rates were only moderate since the programme was introduced in an environment of already declining and very low longer term rates. Third, most importantly, despite the ECB's strong interventions, HICP inflation in the euro area still hovers at 0 to 0.2 percent and does not show signs of converging back to the ECB's two-percent target soon.¹²

At the same time, as pointed out above, it may have been the very existence of a global financial cycle that has weakened the interest rate channel of monetary policy. Yet, the exchange rate channel may have become relatively more important. But even if the exchange rate is an important piece in the monetary transmission channel, it should not (and probably would not) be targeted directly by the ECB. However, in the presence of ultra-loose monetary policy and weak aggregate demand, it is a thin red line between competitive devaluations and devaluations engineered for the sake of acquiring a greater share of world demand (Rajan, 2015).

In view of the increasingly interconnected world economy, spillover effects and externalities of foreign monetary policy have become more significant over the past decades and going forward they are likely to gain even more importance. It is therefore desirable to embark on greater international coordination of monetary policies, in particular during tense periods of economic and financial recovery.

¹² Clearly, the low inflation rate is partly caused by energy and oil prices at rock bottom levels and other extraordinary factors. But even if one takes these developments into account, the marginal effect of asset purchases on euro area inflation was moderate at best, see Bernoth et al. (2015).

It is unlikely that additional monetary measures by the ECB could contain undesired spillovers and unintended side effects from the present US tightening. However, the ECB should, probably in close cooperation with emerging market central banks, work towards improvements in international policy coordination.¹³ This is also in the interest of the Fed. It can be argued that taking spillovers of its monetary policy explicitly into account could even be in line with the domestic mandate of the Fed since spillovers will eventually create repercussions on the US economy and thereby also affect the Fed's target variables.

¹³ See Rajan (2015) for a forceful argument for international monetary policy cooperation from the point of view of emerging market central banks.

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NOTES



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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Implications for the euro area of divergent monetary policy stances by the Fed and the ECB

Andrew HUGHES HALLETT

IN-DEPTH ANALYSIS

Abstract

In December 2015, the Federal Reserve raised US interest rates for the first time in nine years and implied that they expected to do so four more times in 2016. The ECB meanwhile continued with loose monetary policy at the zero lower bound and expanded its quantitative easing programme to reduce longer dated market rates.

The immediate implication of these divergent policies is that we go back to a pre-crisis world in which the implication of independent monetary policies with free capital mobility (financial integration) is a more flexible dollar-euro exchange rate and larger trade imbalances, all of which heightens the conflict between the goals of internal and external financial stability. But the numerical impact of these effects is likely to be limited because of the increased use of supply chain trade, because a stronger world cycle due to integration implies less need for different policies, and because the policy divergence itself is as yet small.

Internally policy divergence tends to weaken policy impact through smaller transmission and pass-through effects in the financial markets. The duration of the policy difference may also be limited because there are adverse effects on the wider macroeconomic imbalances. An innovation here would be to use financial regulation as an explicit policy instrument to control the credit and asset markets (asset price bubbles). This helps take care of our dependence on global cycles and the natural tendency to excess leverage when financial stability is assured.

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EXECUTIVE SUMMARY

The striking feature of any modern economy is the degree of financial and trade integration, which constrains the actions of the policymakers. Policymakers take the view that the best way to provide for superior economic performance is to ensure low inflation, a disciplined monetary policy, stable exchange rates, and financial stability. In the crisis period there has been little inflation: so monetary policies were naturally constrained to be similar (set at, or close to their “lower bound”), and financial stability could be achieved with stabilised exchange rates and full capital mobility for easy financing and liquidity provision.

In the “great moderation” era, back to the early 1990s, there was likewise low and stable inflation, disciplined monetary policies led by Germany and the US, stabilised exchange rates and free capital movements. Before that time, there was more variation in monetary policies and exchange rates; and less stability in monetary, financial or real economic conditions. So, to answer the question posed in the title to this paper we need to go back to the concerns of that time (“the impossible trinity”) to analyse the implications and consequences, for the real economy and the financial markets, of returning to a world with divergent monetary policies between the US and ECB, more variable exchange rates, but free capital mobility and open trade.

We start from the “impossible trinity” proposition: policymakers cannot achieve their three top priorities, an independent monetary policy/control of inflation, a fixed or stabilised exchange rate and free unrestricted capital flows, all at the same time. At best, they can reach two out of the three; or limited versions of two or more. From there, we conclude the implications of the Fed’s monetary tightening, and the ECB’s unconventional loosening, are:

- The main consequence of a policy divergence with the US is that it loosens the usual policy trilemma by restoring the possibility of effective inflation or deflation control.
- The Euro exchange rate vs. the US dollar now becomes flexible, rather than de facto fixed because monetary policy is fixed at its zero lower bound.
- At this point the numerical impact of these changes is likely to be small as the policy divergence is still small and the common world cycle is stronger than it used to be.
- At the same time the Euro-zone trade imbalances will become exaggerated in the direction of greater surpluses. That is likely to cause further divergence within the Euro bloc, with the Southern periphery economies being most at risk.
- However these effects are significantly modified by the increasing use of network (supply chain) trade in the Euro area. That reduces the tendency to pull apart, but it weakens the capacity of exchange rate realignments to generate a recovery.
- Internally the policy divergence tends to weaken policy impact (transmission and the pass-through), which also dilutes the effect of the original policy difference.
- The lifespan of the policy difference may be limited because of adverse effects on the wider macroeconomic imbalances which imply a potential political backlash.
- A useful addition to this analysis, to strengthen financial stability, is to use financial regulation as an explicit (cyclical or structural) policy instrument to control the credit and asset markets (a control on asset bubbles). This takes care of our dependence on global cycles and the natural tendency to excess leverage when financial stability seems assured. That would allow us to devote more policy power to other problems specific to the Euro economy and weaken the impact of any policy divergence with the US or financial instabilities emanating from China.

1. INTRODUCTION

The outstanding feature of any modern economy is the degree of financial and trade integration. This constrains the actions of the policymakers. Policymakers have always taken the view that the best way to provide for superior economic performance is to ensure low inflation, a disciplined monetary policy, stable exchange rates, and financial stability. In the recent past, there has been little inflation: so monetary policies were naturally similar (set at their “lower bound”), and financial stability could be achieved with stabilised exchange rates and full capital mobility for easy financing and liquidity provision.

In December 2015, however, the Federal Reserve raised US interest rates for the first time in nine years and suggested that they expected to do so four more times in 2016. The ECB, on the other hand, continued with its loose monetary policy at the zero lower bound and expanded its quantitative easing programme to reduce market rates. This signals a return to independent monetary policies. The problem then is that the “impossible trinity” implies that policymakers cannot achieve their three top priorities – an independent monetary policy for inflation control, a stable exchange rate, and unrestricted capital flows – simultaneously. At best, they can choose two out of the three; or varying degrees of success in each¹. And, by extension, attempts to maintain financial stability across the world’s financial markets will typically mean surrendering some of the goals of domestic policy – such as low inflation with stable growth or rising employment².

Thus, on standard analysis, the main consequence of a policy divergence with the US is that it loosens the usual policy “trilemma” by restoring the possibility of effective inflation or deflation control in the Euro area by allowing an independent monetary policy to operate. But at the cost of the Euro-dollar exchange rate becoming more flexible instead of de facto fixed (while interest rates are kept at their zero lower bound). This is bound to create the possibility of increased instability in the financial markets, especially if some countries or firms have borrowed in foreign currencies, and hence some instability in the financing of debt or deficits in the domestic economies as well.

That said, the numerical impact of these effects may be smaller than would have been the case in the past because financial integration has made the common world cycle stronger than it was. Nevertheless Euro-zone trade imbalances will be exaggerated in the direction of greater surpluses, which will cause further divergence within the Euro bloc with the Southern periphery economies being most at risk. On the other hand, these changes are modified by the increasing use of network/supply chain trade in the Euro area. That will reduce the tendency to pull apart, but it weakens the capacity of exchange rate realignments to generate a recovery. Finally, the duration of this policy difference may be limited because of adverse effects on the wider macroeconomic imbalances which will demand a response.

One implication of this analysis is that financial regulation can, and perhaps should be used as an explicit cyclical or structural policy instrument to control the credit and asset markets (and hence as a control on asset bubbles). This would take care of a dependence on global cycles and the natural tendency to excess leverage when financial stability seems assured. It would also allow us to devote more time to other problems specific to the Euro economy, and to weaken the impact of any policy divergence with the US or financial instabilities emanating from China.

¹ Obstfeld et al. (2005), Klein and Shambaugh (2013), Aizenman (2013)

² Triffin (1960)

2. THE FIRST IMPLICATION: INFLATION CONTROL REGAINED?

2.1 The impossible trinity issue reconsidered

The impossible trinity of monetary policy states that policymakers cannot reach their three main goals – an independent monetary policy (hence a proper degree of inflation control), fixed or stabilised exchange rates, and unrestricted capital flows – all at the same time. Policymakers must choose which two out of those three goals they wish to achieve at any point. This is illustrated in Figure 1.

In that figure, each point of the triangle represents one of the characteristics desired in the policies finally chosen; and each side, being a line that goes through two of the three required properties, represents a combination of two characteristics that one might choose. But one cannot be on all three sides simultaneously.

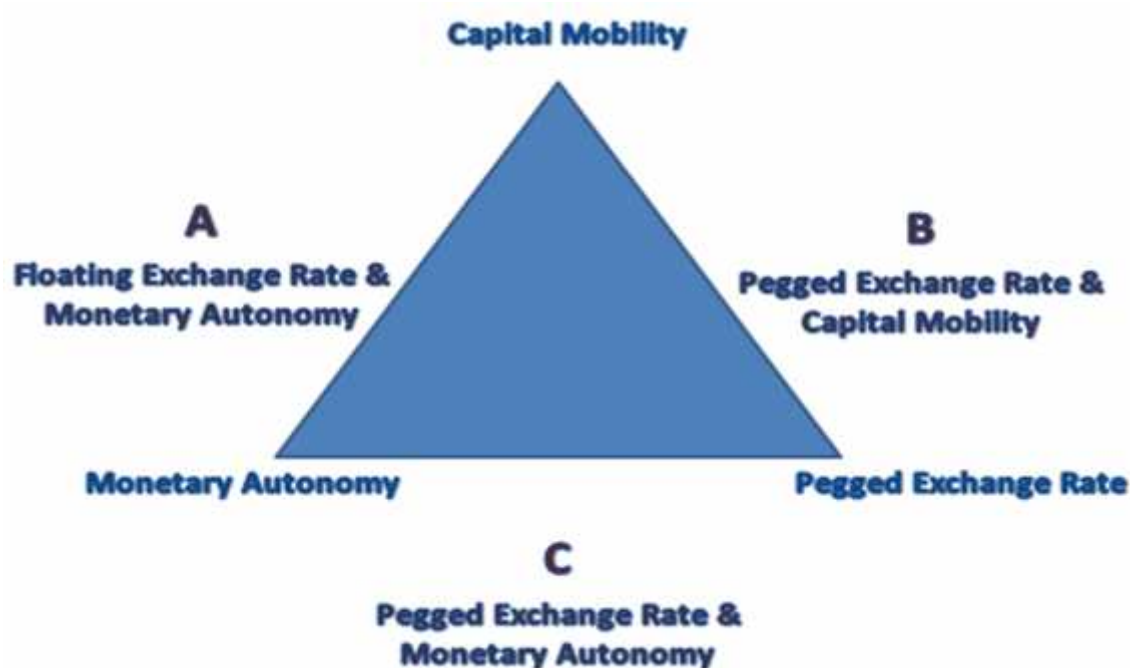


Figure 1: The open economy policy trilemma

Source: Klein and Shambaugh (2013)

The left side of the triangle, marked A, depicts an economy with an independent monetary policy (and hence an ability to control inflation), plus full capital mobility, but with a flexible and potentially volatile exchange rate. On the right, B represents an economy with a fixed exchange rate and full capital mobility, but no independent monetary policy and hence no ability to control inflation independently of its financially linked partners. And C shows an economy with fixed exchange rates, an independent monetary policy and the capacity to control inflation, but no capital mobility (restricted capital markets, with limited financial integration and little currency convertibility). But nowhere in the figure can we get all three properties at once. On the other hand, any of the positions along lines A or C will allow a full, normal ability to control inflation according to domestic needs.

That said, there is nothing to stop us choosing an interior point in the triangle. In that case, we will get restricted exchange rate flexibility, regulated/partial capital mobility, or limited monetary independence (and limited ability to control inflation separately). By varying this position, we can get more of one or two of the desired properties at the cost of less of one of the other two. India is a case in point; now veering towards liberalising capital flows and

exercising independent monetary control as inflation becomes more problematic, while attracting FDI remains the overall priority.

Thus, we might view the US and the Fed as being on line A in figure 1, with an independent monetary and inflation policy, unhindered capital flows and a flexible exchange rate. China, meanwhile, is effectively on line C; at least its “onshore” economy is. The question assumes the Euro-zone has been on line B, de facto not by intent, and asks what would happen if it were now to move onto line A in order to regain an independent monetary policy (different from its main partners in the OECD area) for the purposes of recovery and inflation control?

The short answer is, it would allow the Euro-zone to regain a more effective monetary and inflation policy – both as an expansionary policy to avoid deflation or start a recovery, and as an effective inflation control when the recovery is underway and the effects of current unconventional policies need to be wound back. The implication would be a more variable exchange rate (against the US dollar and associated currencies) if free capital movements are considered essential for the economy and/or membership of the WTO.

In practice the outcomes may be more complicated than that, depending on the impact of the policy changes on the effectiveness of policy transmission, on constraints from outside, or the structure and responses in other sectors or other economies.

2.2 The experience of others

In reality, the outcomes are typically more varied than section 2.1 implies. Many advanced economies have chosen to be on or near line A: the US, Japan, Australia, the UK, Canada, Norway, Sweden. Others (Switzerland) would normally be in this group, but have chosen to limit capital inflows in order to restrict destabilising movements in their exchange rates.

By contrast, some economies have chosen to limit capital inflows so as to be on or near line C. These are often emerging market or developing economies whose financial markets and level of development are not deep or resilient enough to deal with the rapid in- or outflows of short term capital. Examples are Brazil, Malaysia, Thailand, and, of course, China who maintains an array of capital controls, a currency which is not freely convertible, and an exchange rate pegged (if occasionally adjusted) to the US dollar. This arrangement has left China able to control inflation – even if this has not always been done by conventional means. China, moreover, has plans to allow her currency more flexibility and become more widely traded (convertible) on world markets. This would appear to signal a move from line C towards A, although how much liberalising of the capital markets would be involved is unclear since the plan also includes maintaining separate onshore and offshore capital markets to preserve financial stability internally. It may therefore turn out to be a move along line C, in the direction of A.

The cases that lie along B, having no independent monetary policy, describe the economies within the Euro-zone; those who have adopted the currency of another country (Ecuador, Montenegro, Zimbabwe); and those who run their currency using a currency board (Hong Kong, Argentina in the 1990s, the Baltics before the Euro, some smaller Caribbean islands). But the Eurozone as a whole, having a flexible exchange rate and having exploited that fact by allowing the Euro to depreciate by 25% in the past three years in a largely unsuccessful bid to boost output and trade, lies on line A.

2.3 How financial integration reduces the ability to control inflation

Consider a small economy under monetary policies defined by line B. If there is perfect capital mobility, and domestic and foreign bonds are perfect substitutes (not always the case in practice, but generally assumed for small economies), then arbitrage will ensure domestic interest rates equal to foreign rates on matching bonds. If one Central Bank then decides to raise its interest rates – to curb inflation say – by contracting the money supply, this will trigger new purchases of domestic bonds to secure higher yields. In the absence of exchange controls (full convertibility applies), the additional funds to make these purchases must come from abroad. That puts upward pressure on the exchange rate as capital flows in. If the Central Bank does not react, the commitment to a fixed exchange rate will break and the economy in question will shift to line C with a flexible, partly flexible or adjustable exchange rate.

However, if the Central Bank wants to retain a stable exchange rate – the commitment was credible – the Central Bank must sell foreign currency and buy back its own, and do so until the original exchange rate value is regained. That reverses the initial monetary contraction and returns domestic interest rates to their initial values. The upshot is that the ability to control inflation through higher interest rates (equivalently through changes in the banks' reserve requirements, since any liquidity absorbed into higher reserves can be replaced from capital inflows) has been lost instead.

It appears capital mobility and financial integration are indeed the culprits here. Notice too that these arguments are reversible. It is not possible, for the same reasons, to reverse low inflation or deflation with a monetary expansion under fixed exchange rates.

Thus if we wish to run separate monetary policies for the Euro-zone, for example a more expansionary policy to support recovery and avoid deflation, we have three options:

- a) To relax the rigidity with which the policy priorities are imposed, to end up in a position inside the triangle with constrained but adjustable exchange rates, partial capital controls, and limited autonomy in monetary policy setting;
- b) To choose a new regime somewhere on line A. This would of course involve giving up a stabilised exchange rate to retain the ability to control inflation through an independent monetary policy;
- c) To adopt structural changes within the domestic economy, so that it or its bond markets work in a way that allows inflation control to be implemented through other mechanisms (regulatory measures?), not through monetary policy alone.

2.4 Separate monetary policies boost our ability to control inflation

The definitive empirical study of the loss of monetary autonomy, and hence the ability to control inflation, was carried out by Obstfeld, Shambaugh and Taylor (2005) on data for the developed (advanced, or OECD) countries in three distinct regime periods with different monetary arrangements: the Gold Standard (1870-1914; 15 countries; fixed (stable) exchange rates; free capital movements); the Bretton Woods era (1959-70; 21 countries; fixed exchange rates; extensive capital and currency controls); and the post-Bretton Woods era: [1973-2000; 103 countries; a mix of fixed (pegged) and flexible (unpegged) exchange rates; varying hegemon currencies; varying degrees of capital controls]. This yields a full range of regimes in the sense of Figure 1.

After a careful econometric analysis, and a careful data analysis to identify, define and measure the degrees of exchange rate flexibility and degree of capital controls in each country, Obstfeld et al. conclude that a loss of ability to control inflation was observed in those countries and those periods where fixed exchange rates but free capital movements

were operating (regime B) – just as section 2.3 predicts. Nevertheless the ability to control inflation remained in those countries operating in regimes A and C, with flexible exchange rates or with capital controls, since those regimes eliminate the need to reverse any independent monetary contractions or expansions of the type discussed in section 2.3.³

2.5 The Triffin dilemma implication

The Triffin dilemma highlights a conflict that exists in any economy between domestic goals (low inflation) and global goals (financial stability). To achieve the latter, given financial integration, a country needs to ensure that sufficient currency is made available to its trading partners for them to make their payments. Financial stability system-wide therefore requires one or more of the larger economies to run trade deficits or provide investment inflows to ensure that others have sufficient financial resources to satisfy their demand for reserves and payments. The increase in money supply needed to achieve this will generate inflation, a current account deficit and weaker exchange rates. That is to say, the inability to control inflation may stem from a clash between the needs of domestic goals and the desire for systemic financial stability. The new implication here is that divergent monetary policies open up the possibility of achieving both goals simultaneously – at least within the domestic economy.

³ These results were further confirmed in later studies (Aizenman, Chinn and Ito 2010, Aizenman 2013) that extend the data to 2010 and to a new range of emerging market economies - including the EU's central and eastern European economies.

3. TRADE BALANCE AND AGGREGATE DEMAND IMPLICATIONS

3.1 Can the euro area exploit a period of diverging monetary policies to create a recovery, boost growth or avoid deflation?

The answer to this question is essentially “yes; but not for long”. Helpfully, however, it appears that the undervaluation of the Euro implied by the Fed’s latest monetary tightening and the ECB’s ongoing loosening via quantitative easing, is likely to benefit the low-income Euro economies most and allow those benefits to spread into the medium term⁴.

The key mechanism here is the standard one that tighter monetary policy in the US (higher nominal interest rates), and looser policy in the euro-zone (lower interest rates) will trigger capital outflows from the EU to the US, pushing the dollar up and the euro down. This nominal depreciation of the euro will be and remain a real depreciation if strict inflation controls are maintained (or if the euro economy remains depressed). Under those conditions we can expect exports to expand having become more competitive, and the demand for imports to switch to cheaper domestic alternatives. This would certainly boost growth and the chances of recovery. And if the export and import price elasticities are large enough, the trade surplus will also improve – although that is of less interest since the euro zone is already in surplus and to increase that surplus further could hold growth and the recovery back (see below). And there are distributional implications: the gains will typically go to the most competitive economies, extending their surpluses, rather than to the weaker euro-zone economies. This increases the need for structural reform in those weaker economies.

Most of the empirical results in the literature show that faster growth and expanded exports are significantly associated with real exchange rate depreciations or an undervaluation of the exchange rate (Hausmann et al (2005), Easterly (2005), Rodrick (2009), Levy-Yeyati and Sturzenegger (2007), Korinek and Servén (2010)). This kind of evidence comes from both developed and emerging market economies, though the effect is more marked in low-income rather than middle- or high-income economies. And the mechanisms by which this extra growth is generated can be more varied than the simple switch of aggregate demand to the undervalued economy as described in the paragraph above. In emerging markets, distortions and market failures often damage the market for tradables. An undervalued exchange rate, by increasing profitability, compensates for those distortions and hence promotes investment and growth. Similarly it boosts growth through an expansion of savings, capital investment and productivity growth (both labour productivity and TFP).

Nevertheless, there are a number of reasons why faster growth and expanded exports will not be the outcome – at least in the medium to long term. The main counter-argument is that a large misalignment of the real exchange rate from its equilibrium value is likely to appear over time, as much when the undervaluation is created by an appreciation of a partner currency as it is by a depreciation of the home currency. But, over time, a real appreciation can lead to current account deficits and currency crises; and an undervaluation to inflation and economic overheating. So, either way, growth in the undervalued economy will be damaged and perhaps reversed.

In summary, divergent monetary policies in which the Euro is left with a more expansionary stance may have significant benefits in the short term in terms of growth and trade. But maintaining that position for too long may well turn out to be counterproductive and lead to a loss of that growth. First the trade and growth gains may go to the surplus countries, rather than the poorer or indebted economies that need the help. Second, given that the

⁴ See, for example, Haddad and Pancaro (2010)

euro-zone is in substantial surplus overall, this divergence will lead to an accumulation of low yielding foreign currency reserves which is inefficient, or if reinvested abroad to a capital outflow and further depreciation. Third, prolonged undervaluation will bring inflation through increased import prices which appear in the price index, if not from the monetary expansion itself (the liquidity expansion underlying the quantitative easing programme heightens this risk).

To these points, we should add that maintaining an undervalued exchange rate as a matter of policy can constrain monetary policy in a way that damages domestic targets – by, for example, lowering real interest rates and overlending, overinvestment, and asset bubbles. It also implies an implicit subsidy to exporters, paid for by artificially high import prices or by consumers who face reduced purchasing power. Finally, vested interests that benefit from this type of policy will resist any subsequent changes. It is likely to remain in place too long after the benefits are overcome by negative effects.

In addition, depreciations in the nominal or real exchange rate raise the cost of servicing and (more seriously) repaying/refinancing any foreign currency denominated debt, whether private or public. This may not be a numerically large problem for most in the Euro-zone as the proportion of non-Euro debt is small. But it may be of some significance for certain private sector financial institutions.

The implication of all of this is that divergent monetary policies are likely to bring some growth and trade gains in the short term. But it is not desirable to allow those differences to persist. And it would be helpful to announce a clear exit strategy in advance, for when a change in policies becomes necessary, in order to facilitate the change.

3.2 Network (Supply Chain) Trade

It is clear from the analysis of section 3.1 that the key component for the growth and trade implications of a divergence in monetary policy is the elasticity of exports, and thus growth, to a depreciation of the value of the euro exchange rate, relative to the US dollar and its associated currencies. That is the price elasticity of the export and growth effects.

At first sight, the price elasticity of imports seems to be of less interest since the euro-zone and most member economies are in surplus – although the Marshall-Lerner conditions that determine whether a euro-depreciation would increase that surplus are of some interest for the damage that larger surpluses would do to other economies in or out of the euro-zone.

However, both sets of elasticities assume greater significance when we take into account the increases in network trade. One of the important developments in the pattern of trade in recent years is the increasing use of imported components, simple or specialised, and of specialised services in the production of export goods and services. As noted in studies by the OECD and World Bank, the foreign content of Swiss exports rose from 17.5% in 1995 to 21.7% in 2011. The foreign content in South Korea doubled from 22.3% to 41.6% in the same period. The impact of a unit depreciation rate on exports fell by 30% as a result, and the impact of Japan's 2013 stimulus on growth was effectively zero for probably the same reason, although the Yen had fallen sharply⁵.

The European economies have seen the same phenomenon as shown in Table 1. The implication is that the impact of an undervalued exchange rate as a result of divergent monetary policies, on exports and growth, will be substantially reduced (nearly halved for the most of the EU economies in Table 1) compared to the case analysed in section 3.1. The reason is

⁵ Hannon (2015). The IMF reports very similar figures for the reduced impact of currency devaluations.

Table 1: Import content of exports in EU economies in 2011

Slovakia	45%	Denmark	40%
Ireland	45%	Lithuania	40%
Czech Rep.	42%	Germany	35%
Hungary	42%	France	35%
Belgium	40%	Greece	35%
Austria	40%	Latvia	35%
Slovenia	40%	Italy	25%
Portugal	40%	Spain	25%

Source: OECD (2013), rounded to the nearest percentage point.

straightforward: an undervaluation may make exports of a given price appear cheaper in foreign currency and therefore increase the demand for exports, but the import content will be more expensive in domestic currency and (depending on the pass-through rates) put domestic export prices up. The impact of undervaluation in the EU economies will therefore be cut by between 30% and 50%. The implication is that the impact on growth would be reduced by similar proportions.⁶

Of course the same argument implies that a undervaluation of the euro vs. the dollar will reduce US exports (to the EU at least), but the cost of imports to the US will have fallen too allowing the price of the exports that use the cheaper imports to fall – which restores some of the lost US exports. The overall effect on US exports, taking into account where they are used, is similar to those in Table 1 (OECD 2013). The implication again is that the divergence in monetary policies on trade and growth will still be there, but rather smaller than we might have expected. Over time these impact reductions may themselves become smaller as new contracts are written and imports substituted. So the long term impacts may be larger than the short term effects.

There is one last factor to add: income elasticities in the demand for exports and imports. If the US continues to recover faster than the euro-zone, then the income effect will add to the demand for European exports – overcoming some of the losses due to more expensive imported components (which rise in proportion). But if higher interest rates in the US do dampen demand for consumption and investment goods, this extra demand will become progressively less. Similarly, if quantitative easing in the euro-zone is successful in rescuing the euro economy and lowering the cost of capital, demand for euro exports will expand further and the imported components in proportion. The point of interest here is that the consensus in the literature is that demand from the income effects typically out-weighs the gains in export demand due to price effects. Indeed, if the advanced economies are commodity and component importers, it is likely that the income elasticities have the larger impact. This may helpful from the European perspective; but if it is, it is due to recovery and the underlying policy stance, not to the divergence in monetary policies per se.

⁶ To make the same point another way, the share of domestic value added in domestic exports has fallen markedly since 2005 in the UK, Poland, Portugal, Netherlands, Sweden, Germany (OECD 2013) - which means that any increase in exports will have a reduced effect on output.

3.3 Exchange Rate Volatility

More important than the level of the exchange rate, is its volatility (World Bank, 2010). Exchange rate volatility is not necessarily caused by changes in monetary policy. But it may well be a consequence of divergent monetary policies as expectations adjust to, or become disturbed by, different perceptions of the future; or anticipate further policy changes as those differences resolve themselves.

A volatile exchange rate causes more volatile relative prices and hence market uncertainty, which makes it more difficult to allocate investment efficiently across sectors, inputs or production sites. That, in turn, increases risk and typically shortens investment horizons, ultimately reducing investment spending itself. Exchange rate volatility also increases adjustment costs as production is switched back and forth between tradables and non-tradables. This, as a result, reduces profitability and growth. That said, the impact of these volatility and uncertainty effects on growth will depend crucially on the level of financial development in the economy. In more developed financial markets (in the EU, in particular, where there is sufficient integration between the financial markets), agents can use sophisticated financial instruments to hedge against risk and short term volatility (Aghion et al 2009). So again there are distributional implications of the volatility and uncertainties born of divergent monetary policies, with smaller, less developed economies at greater risk.

There is in fact a long literature, leading to the work of Bachetta and van Wincoop (2000) that shows exchange rate volatility (mostly) has little effect on output or growth. This is because the exchange rate variability usually comes from something (anticipated monetary policy changes) that affects the economy positively, thereby offsetting the negative effects of that volatility on output. But these results are generated using models of economies with a single product, uniform inputs, no relative price differences, no financial markets, and no investment spending. In the real world, where these things are allowed, empirical studies show exchange rate volatility reduces growth and lowers productivity. They also show that those effects are smaller in advanced economies with higher levels of financial development (Aghion et al (2009)).

The implication is that real exchange rate volatility triggered by policy divergence does matter (and for the worse) in the euro area. But the effects may be limited, compared to elsewhere or compared to the effects of misalignments or persistent undervaluations noted in section 3.1. Nevertheless they could be serious for the smaller, more open members and where the work of financial integration is incomplete (for example, the weaker economies after the financial and debt crisis). This makes a case for completing a single financial zone.

4. REAL INTEREST RATES AND STRUCTURAL REFORM

At this point, it is worth asking if the divergence in monetary policies is significant in terms of quantitative impact. At present the short term interest rate differentials are fairly small: 0.25% in policy rates and about 0.75% for market rates up to one year. Evidently that is sufficient to generate the short term capital flows and exchange rate changes highlighted in the two previous sections. But it is hard to argue that they are large enough to have much impact on Euro-zone's real economy, unless they are regarded as semi-permanent.

However, a lot depends on how these differentials develop in the future. If the Fed raises its policy rate in four steps over the next year (as it has suggested), and the ECB maintains its current policy, then there could be significant implications for the real economy. But if (as seems more likely) the Fed holds back in the light of the current levels of uncertainty and the slowdown in the emerging economies, there likely to be rather little impact beyond the exchange rate implications discussed in sections 2 and 3 above.

Further, even if there is no monetary autonomy in an economy with a fixed exchange rate and free capital movements so interest rates are tied down, real interest rates are not fixed [Obstfeld et al 2005]. But that does not allow us to leave things there on the argument that real interest rates will imply the same divergence since, unless inflation rises faster than interest rates in the US, higher US inflation will modify the differential in real interest rates. However, inflation differentials between US and Euro area are small enough (about 0.1%) to make no practical difference. In the policy and short market rates there are small differentials in the Euro's favour; but at longer real rates, where it matters for investment demand and borrowing by households, there are still small differences in the Euro's favour, but significant differences vs. the Euro periphery: see Table 2. Three implications:

- a) The short term-long term split implies that there is little modification to be made to the conclusions reached in sections 2 and 3; that part is driven by short term speculative flows.
- b) But there are long term differentials which are important for recovery. The Euro area will be slow to recover, and lag behind the US, unless monetary policy remains expansionary and inflation is encouraged (up to target) in order to keep real interest rates low.
- c) There are also important distribution implications. Nearly all the 10-year differentials are due to differences in the 10-year nominal interest rates in different national economies, very little is from differences in inflation rates. So unless quantitative easing can be used to relieve regional risk premia, or fiscal balances are reformed, or inter-country loans or fiscal federalism are made possible, the impact of monetary divergence will mostly be felt in the performance of weaker economies (this is in addition to the effects in Section 3.1).

Table 2: Real interest rates in January 2016 (%), selected countries

	Policy Rate	1-year Rate	4-year Rate	10-yearRate
US	0	0.5	1.5	1.8
Euro	-0.1	0	0.15	0.4
Germany	-0.2	0	0.15	0.4
France	-0.1	0	0.15	0.7
Italy	-0.1	0	0.55	1.5
Spain	+0.6	0.5	1.0	2.5
Greece	+0.2	0.1	3.5	10.2

Source: National inflation rates, Economist (16 January 2016); interest rates, Financial Times (21 January 2016)

5. TRANSMISSION AND PASSTHROUGH EFFECTS

Will having divergent monetary policies in the US and Euro-zone lead to different impacts in their economies beyond the exchange rate implications in Section 3? In particular, will they affect the policy transmission and interest rate pass-through?

It is obvious that higher interest rates in the US will, in themselves, reduce investment and consumer spending because the cost of credit is rising. But both investment and consumer spending also depend positively on aggregate demand. If rising demand was the reason for interest rates to rise (monetary policy contracted), this positive effect will dominate and the Euro-zone will appear to lag the US. There are two mechanisms to reinforce that conclusion; and one to modify it. First, after a period of high debt, most consumers/investors will prefer to pay off excess debt than take on new credit. In addition low interest rates will spur refinancing. Rising earnings in the US will reverse some of that, but not in Euro-zone, which reinforces the difference between the two. Second, rising interest rates in the US are signals of the recovery to come. By contrast, low rates in the Euro area are a signal of no expectations of recovery. Investment, aggregate demand and consumer spending will suffer implying a damaged policy transmission mechanism. In the housing market however, 68% of US households hold mortgages, whereas 57% in the Eurozone do. As US interest rates rise, this difference will help reduce the divergence between US and EU spending and growth – although, being a small component, this is unlikely to make a large difference overall.

Of greater concern perhaps, are the changes in pass-through and transmission mechanisms. The impact of any policy change comes in two parts: first, the change in market rates that results from a unit change in the policy rate (the pass-through); second, the change in the economic variables we wish to influence per unit change in market rates (the transmission). It appears both have fallen since the financial crisis. Before 2007, each 1% change in the policy rate was matched by a 1% change in market rates. But since then, market rates have changed by much less than that each time. That can happen many reasons. In an era of low interest rates, investors may prefer to invest their funds in equities. That means banks have to offer higher interest rates than before to attract the funds to lend. So the market rate falls by less than the policy rate when the latter is reduced. Or, in bad times, investors or firms prefer to hoard their excess funds than deposit them in banks whose financial health they distrust (a risk aversion motive) or to avoid negative interest rates. Again, the link to market rates is broken.

The break in transmission mechanism is more easily illustrated by the difficulty of getting the banks to lend on funds deposited with them in bad times. This may be risk aversion: the banks regard their client firms as too risky, either individually or generically because the economy is contracting. Or it may be because firms and consumers are paying off their debts or downsizing in a contracting economy, or because investors prefer to hoard their cash or put it into equities for a higher return rather than deposit them in a risky bank. However it happens, the requisite loans are not made, or available credit is not taken up, and the target variables are not impacted as they should be.

The implication of all this is, to the extent that the pass-through and transmission effects remain damaged, the policy divergence between the US and Euro-zone will have a smaller effect on the EU economies than it would in normal times. But if they are restored, at least in the US, as the US economy recovers then the impact on the EU will be larger.

6. A VIEW FROM THE CREDIT AND ASSET MARKETS

A more recent set of papers provide a different perspective on the trilemma that implies that financial integration and trade globalisation reduces an economy's ability to control its inflation or reverse its deflationary pressures (Rey 2013, 2015). The argument here is that extensive financial integration means that assets of all kinds, risky and otherwise, have developed common components in prices or yields. Given free capital flows, that means that credit flows in different economies show similar pro-cyclical patterns and volatilities. This can be seen in the data (Rey 2013). As a result there are strong global financial cycles which tend to lead to excess credit growth in boom periods and credit collapse in bad times, moderated perhaps by that country's cyclical position relative to the global cycle but unaffected by the exchange rate regime in place. This tendency will be strengthened further if national cycles become more synchronised through the globalisation of trade⁷ and finance. The implication is that, when capital is mobile, the world financial cycle will constrain domestic monetary policies whatever the exchange regime. This then makes a case for throwing sand in the wheels of the domestic financial and credit markets.

There are a number of ways we can deal with this problem: targeted capital controls; policies undertaken to restrain the drivers of the world financial cycle (this would require explicit coordination between the major economies and central banks, the Fed and ECB in particular); macro-prudential policies to restrain cyclical increases of credit and leverage in recipient economies; domestic policies to weaken the transmission of systemic excess credit/leverage using financial regulation; weaken the transmission of world financial cycle effects by throwing sand in the wheels as above. If we ignore the first as inconsistent with financial integration, and the second as unrealistic, the three remaining options are all possible. Indeed, the third is already set to be introduced as part of the Basel III banking regulations. The fourth is implied by the new supervision and financial regulation systems appearing in many advanced economies: the US and UK in particular. The same could be built into the EU and Euro-zone policy frameworks. The last option was discussed in Hughes Hallett (2015). Some aspects of that approach appeared in the bail-out plans for Ireland or Spain, and are now under consideration in Sweden.

The novel feature about the policies in this approach is that they deal with inflation in financially integrated markets by attacking the root (but not the only) causes of inflation or deflation directly by regulating the credit markets, rather than indirectly by using market forces to create space for independent monetary policies.

⁷ Conditions for this further synchronisation to take place are laid out in Hughes Hallett and Piscitelli (2002)

7. MACRO IMBALANCES: WIDER IMPLICATIONS

Will this policy divergence last? That depends on the US and Euro economies; it will last so long as the Euro economy lags behind the US economy. But there are other factors which might cause the policymakers to reverse their current policies.

A standard element of any macro-economy is the (ex-post) national accounting identity:

$$S - I = (G - T) + (X - M)$$

where S=savings, I=investment, G=government spending, T=tax receipts, X=exports and M=imports. So G-T is the fiscal deficit, and X-M is the trade deficit (or properly the current account deficit). Thus, any country that increases its trade surplus (as section 3 implies will happen in the Euro area) will have either to increase its fiscal surplus ($T-G < 0$) or savings rate ($S - I > 0$) to match. But the Euro-zone already has large trade surpluses (principally Germany at 8.1% and the Netherlands at 10.6% of GDP respectively). The implication: this monetary policy divergence will oblige each member economy to step up its austerity efforts even further or to accept falls in investment or consumption, just as they try to exit a recession – a result not likely to suit either the policymakers or the public. We should therefore expect strong political pressures to reverse policies in the Euro-zone (less so in the US), and the ECB may find it hard to sustain its quantitative easing programme. The policy divergence may have a limited lifespan therefore.

8. CONCLUSIONS

The main consequence of the current policy divergence with the US is that it loosens the usual policy trilemma by restoring the possibility of inflation or deflation control: the Euro exchange rate has become flexible, rather than de facto fixed with monetary policy stuck at the zero lower bound. But at the same time the Euro-zone's trade imbalances will be exaggerated in the direction of greater surpluses. That is likely to cause some divergence within the Euro bloc, between North and South with the periphery economies being most at risk. However these effects are significantly modified by the increasing incidence of network trade in the Euro-zone. That in turn reduces this tendency to pull apart, but at the same time weakens the chances of an exchange rate realignment generating a recovery.

Internally, the policy divergence tends to weaken the policy impact, the transmission and the pass-through of any changes, which dilutes the effect of the original policy differences. On the other hand, the life span of those differences may be limited because they have adverse effects on the wider macroeconomic imbalances and may be overtaken by the global financial cycle.

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