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 -

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 trade[2] 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.

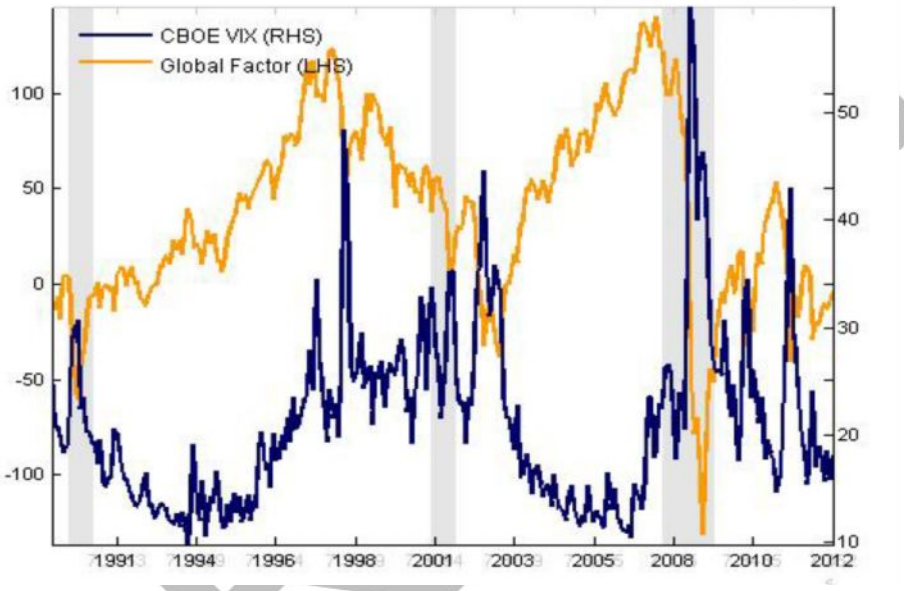
[3] See also the discussion in IMF (Box 4.1, 2007).

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 system[8] 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.

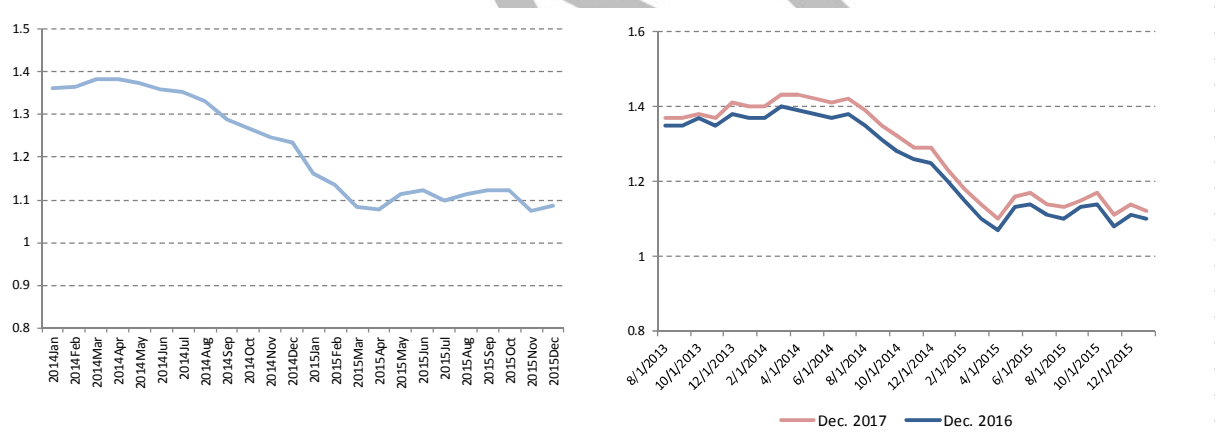
appreciate further for up to two years following the initial monetary policy shock.[10] For example, Eichenbaum and Evans (1995) point to a "delayed overshooting puzzle" where the peak of the exchange rate adjustment occurs with a delay of several quarters. The role of the international banking sector 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

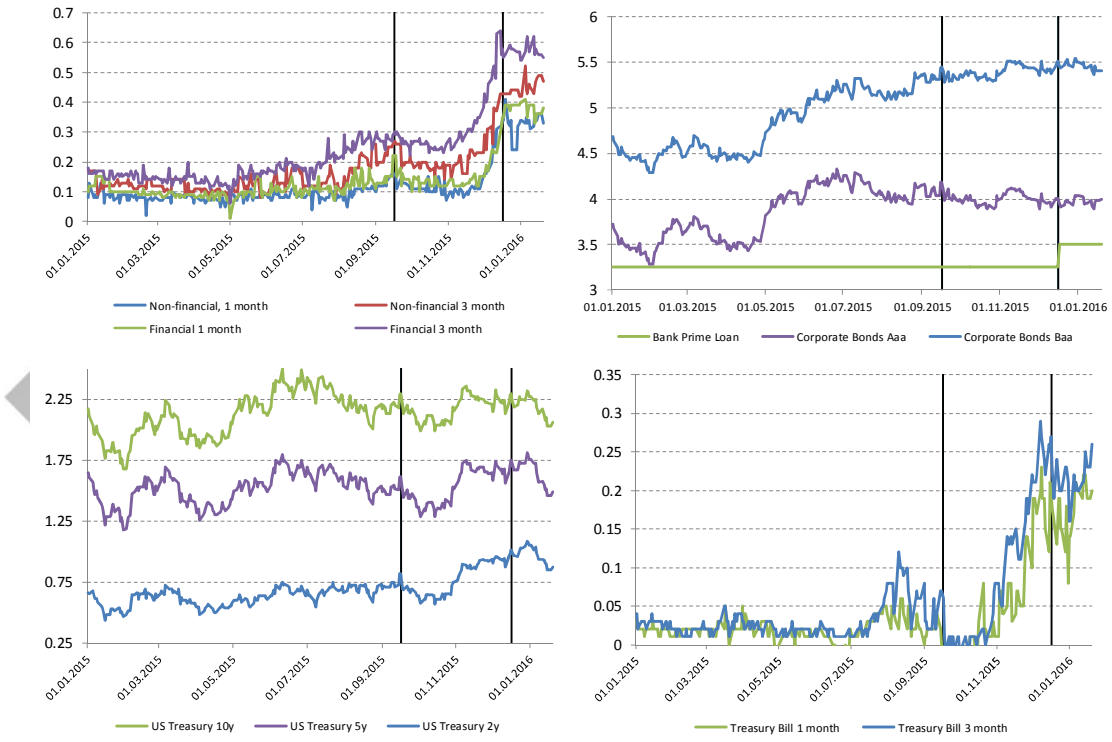
The Fed's rate increase induced an increase in interest rates on financial and non-financial assets in the United States (Figure 3). These increases are small in magnitude, therefore not substantially altering the overall low-interest environment in the United States. However, going forward, the US Fed 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-cause[11] 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 hoovers 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.

REFERENCES

- Bekaert, G., Hoerova, M., Lo Duca, M., 2013. Risk, Uncertainty and Monetary Policy. Journal of Monetary Economics 60 (7), 771–788. http://www.sciencedirect.com/science/article/pii/S0304393213000871
- Bernoth, K., de Vries, C. and von Hagen, J. (2010): "The forward premium puzzle and latent factors day by day", CEPR Discussion Paper No. 7772. http://www.dnb.nl/en/binaries/Working%20paper%20246-2010_tcm47-232349.pdf
- Bernoth, Kerstin, Philipp König, Carolin Raab and Marcel Fratzscher (2015). "Unchartered Territory: Large-Scale Asset Purchases by the European Central Bank" DIW Economic Bulletin, 13/2015, pages 189-198. Available at http://www.diw.de/documents/publikationen/73/diw_01.c.499370.de/diw_econ_bull_2015-13-1.pdf
- Bernoth, K., König, P. and Raab, C. (2015b). "Large-Scale Asset Purchases by Central Banks II: Empirical Evidence" DIW Round-Up, April 8. Available at http://www.diw.de/de/diw_01.c.500200.de/presse/diw_roundup/large_scale_asset_purchases_by_central_banks_ii_empirical_evidence.htmlfor%20overview
- Borio, C. and H. Zhu (2012): "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?", Journal of Financial Stability, 8(4), December 2012, 236-251. http://www.sciencedirect.com/science/article/pii/S1572308911000611
- Bruno, V. and H. S. Shin (2013). "Capital Flows and the Risk-Taking Channel of Monetary Policy". Journal of Monetary Economics, Volume 71, April, 119-132. http://www.sciencedirect.com/science/article/pii/S0304393214001688
- Buitron, C. and E. Vesperoni (2015): "Spillover Implications of Differences in Monetary Conditions in the United States and the Euro Area", International Monetary Fund, Washington D.C., https://www.imf.org/external/pubs/ft/pdp/2015/pdp1501.pdf
- Campa, J. M. and J. M. Gonzalez Minguez (2006). "Differences in Exchange Rate Pass-Through in the Euro Area", European Economic Review, 50(1), 121-145. http://www.sciencedirect.com/science/article/pii/S0014292105000085
- Chen, Q., A. Filardo, D. He and F. Zhu (2015). "Financial Crisis, US Unconventional Monetary Policy and International Spillovers", Bank for International Settlemens, Working Paper, 494, http://www.bis.org/publ/work494.pdf +
- Chinn, M. and J. Frankel (2005): "The euro area and world interest rates", Santa Cruz Center for International Economics, Working Paper no 1016. http://www.ssc.wisc.edu/~mchinn/intratepap7.pdf
- Committee on International Economic Policy and Reform (2012): „Banks and Cross-Border Capital Flows: Policy Challenges and Regulatory Responses", Brookings Institution,September2012: http://www.brookings.edu/~/media/research/files/reports/2012/9/ciepr/09%20ciepr%20banking%20capital%20flows
- De Bandt, O. and T. Razafindrabe (2014). "Exchange rate pass-through to import prices in the Euro-area: A multi-currency investigation," International Economics, 138, 63–77. http://www.sciencedirect.com/science/article/pii/S2110701714000092
- Dees, F., M. DiMauro, H. Pesaran, L. Smith (2006): "Exploring the international linkages of the euro area: a global VAR analysis", Journal of Applied Econometrics, 22, 1-38. http://onlinelibrary.wiley.com/doi/10.1002/jae.932/pdf

- Eichenbaum and Evans, 1995; "Some empirical evidence on the effects of shocks to monetary policy on exchange rate", Quarterly Journal of Economics, 110 (1995), pp. 975–1009. http://qje.oxfordjournals.org/content/110/4/975.abstract
- Ehrmann, M. and Fratzscher, M. (2009): "Global financial transmission of monetary policy shocks", Oxford Bulletin of Economics and Statistics 71(6), 739-60. http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0084.2009.00561.x/abstract
- Ehrmann, M., M. Fratzscher and R. Rigibon (2011): „Stocks, bonds, money markets and exchange rates: measuring international financial transmission", Journal of Applied Econometrics, 26(6), 948-974. http://onlinelibrary.wiley.com/doi/10.1002/jae.1173/abstract
- Eijffinger, S. (2008): "How much inevitable US-Euro area interdependence is there in monetary policy?", Intereconomics, Nov / Dec 2008. http://link.springer.com/article/10.1007%2Fs10272-008-0267-6#/page-1
- European Central Bank (2015). "The International Role of the Euro". https://www.ecb.europa.eu/pub/pdf/other/euro-international-role-201507.en.pdf
- Fratzscher, Marcel, Marco Lo Duca and Roland Straub (2013). "On the International Spillovers of US Quantitative Easing" Working Paper Series 1557, European Central Bank. Available at http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1557.pdf
- Gabaix, X. and M. Maggiori (2014). "International Liquidity and Exchange Rate Dynamics", NBER Working Paper, No. 19854: http://www.nber.org/papers/w19854.pdf
- Georgiadis, G. (2015). "Determinants of Global Spillovers from US Monetary Policy", European Central Bank, Working Paper, 1854, https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1854.en.pdf
- Georgiadis, G. and A. Mehl (2015). "Trilemma, not Dilemma: Financial globalisation and monetary policy effectiveness". Globalization and Monetary Policy Institute Working Paper, 222. Federal Reserve Bank of Dallas. https://ideas.repec.org/p/fip/feddgw/222.html
- Gürkaynak, R. and J. Wright (2012). "Macroeconomics and the Term Structure." Journal of Economic Literature, 50(2): 331-67. https://www.aeaweb.org/articles.php?doi=10.1257/jel.50.2.331
- Obstfeld, M. and K. Rogoff (1995): "Exchange rate dynamics redux", Journal of Political Economy, 103(3), 624-660. http://www.jstor.org/stable/2138701?seq=1#page_scan_tab_contents
- Passari, E. and H. Rey (2015): "Financial Flows and the International Monetary System", The Economic Journal, 125(584), 675-698. http://onlinelibrary.wiley.com/doi/10.1111/ecoj.12268/abstract
- Rajan, R. (2015). "Competitive Monetary Easing: Is It Yesterday Once More?", Macroeconomics and Finance in Emerging Market Economies, 8(1-2), 5-16. http://www.bis.org/review/r140414b.htm
- Rey, H. (2013). "Dilemma not Trilemma: The Global Cycle and Monetary Policy Independence". Proceedings - Economic Policy Symposium - Jackson Hole, 1–2. http://www.nber.org/papers/w21162
- Rey, H. (2015): "The International Credit Channel and Monetary Autonomy ", Mundell-Fleming Lecture, International Monetary Fund, 2014. https://www.imf.org/external/np/res/seminars/2014/arc/pdf/Mundell.pdf