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

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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AUTHORS

Andrew HUGHES HALLETT, School of Economics and Finance, University of St Andrews, Scotland

RESPONSIBLE ADMINISTRATOR

Dario PATERNOSTER

EDITORIAL ASSISTANT

Irene Vernacotola

LINGUISTIC VERSIONS

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ABOUT THE EDITOR

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To contact Policy Department A or to subscribe to its newsletter please write to:
Policy Department A: Economic and Scientific Policy

European Parliament
B-1047 Brussels
E-mail: Poldep-Economy-Science@ep.europa.eu

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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 eminating 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 each[1]. 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 employment[2].

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 eminating 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.

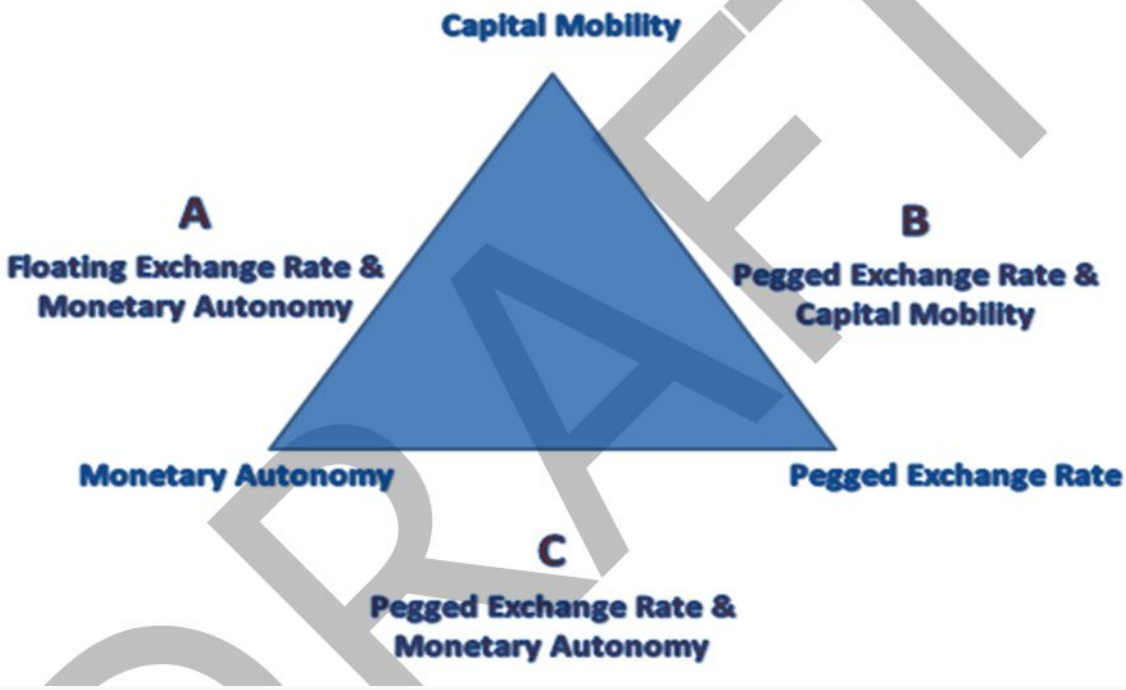

Figure 1: The open economy policy trilemma
Source: Klein and Shambaugh (2013)

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 in 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 term[4].

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 Serven (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 euro-zone is in substantial surplus overall, this divergence will lead to an accumulation of

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

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 sharply[5].

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.

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

[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.

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-though 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 trade[7] 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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