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# SO FAR APART AND YET SO CLOSE: SHOULD THE ECB CARE ABOUT INFLATION DIFFERENTIALS?

ZSOLT DARVAS AND GUNTRAM B. WOLFF

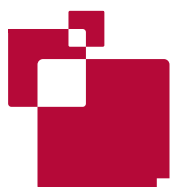
## Highlights

- Inflation rates can differ across regions of monetary unions. We show that in the euro area, the US, Canada, Japan and Australia, inflation rates have been substantially and persistently different in different regions. Differences were particularly substantial in the euro area. Inflation differences can reflect normal adjustment processes such as price convergence or the Balassa-Samuelson effect, or can reflect the different cyclical position of regions. But they can also be the result of economic distortions resulting from segmented markets or unsustainable demand and credit developments fuelled by low real interest rates.
- In normal times, the European Central Bank cannot influence such developments with its single interest rate instrument. However, unconventional policy measures can have different effects on different countries depending on the chosen instrument, and should be used to reduce fragmentation and ensure the proper transmission of monetary policy. The new macroprudential policy tools are unlikely to be practical in addressing inflation divergences.
- It is crucial to keep the average inflation rate close to two percent so that inflation differentials are possible without deflation in some parts of the euro area, which in turn might endanger area-wide financial stability and price stability.

Zsolt Darvas ([zsolt.darvas@bruegel.org](mailto:zsolt.darvas@bruegel.org)) is a Senior Research Fellow at Bruegel. Guntram Wolff ([guntram.wolff@bruegel.org](mailto:guntram.wolff@bruegel.org)) is Director of Bruegel. This Policy Contribution was prepared for the European Parliament Committee on Economic and Monetary Affairs ahead of the European Parliament's Monetary Dialogue with European Central Bank President Mario Draghi on 22 September 2014. Olga Tschekassin provided excellent research assistance. Copyright remains with the European Parliament at all times.

Telephone  
+32 2 227 4210  
[info@bruegel.org](mailto:info@bruegel.org)

[www.bruegel.org](http://www.bruegel.org)



# SO FAR APART AND YET SO CLOSE: SHOULD THE ECB CARE ABOUT INFLATION DIFFERENTIALS?

ZSOLT DARVAS AND GUNTRAM B. WOLFF, SEPTEMBER 2014

## EXECUTIVE SUMMARY

Inflation rates can differ across regions of monetary unions. We show that in the euro area, the US, Canada, Japan and Australia, inflation rates have been substantially different in different regions. For example, the price level in San Diego increased by 9.1 percent between 1998-2013 relative to the average while in Atlanta it decreased by 6.1 percent. In the euro area between 1998 and 2011, the German price level fell by 5.5 percent relative to the average while the Greek price level increased by 16.6 percent. The differences have therefore been persistent, and particularly substantial in the euro area.

Inflation differences can reflect normal adjustment processes such as price convergence or the Balassa-Samuelson effect. They can also reflect the different cyclical position of the region, because e.g. in regions undergoing economic slump and high unemployment, prices tend to increase less. Different composition of consumption can also explain different overall inflation rates in regions. But inflation differences can also be the result of economic distortions resulting from segmented markets and insufficient competition. In the euro area, before the global crisis, unsustainable demand and credit developments were fuelled by higher inflation, which reduced the real interest rates and thereby made borrowing cheaper.

In normal times, the European Central Bank (ECB) does not influence country-specific developments with its single interest rate instrument. In fact, pre-crisis literature showed that the monetary transmission to different euro-area countries was comparable. In crisis times, liquidity operations such as MRO (Main Refinancing Operations)

or LTRO (Long Term Refinancing Operations) will be used differently by different banks depending on the strength of their balance sheets and the strength of the sovereign in which they have their main activity. Yet, such measures only mitigate failures in the financial system and help to improve the proper transmission of monetary policy. Asset purchases by the ECB could also have different effects in different euro-area countries, because assets are not uniformly distributed across countries. For example, French companies have issued about half of all outstanding corporate bonds in the euro area, and almost half of residential mortgage-based asset backed securities (ABS) have been issued in the Netherlands. In some other euro-area countries there was close to zero issuance of such securities. Unconventional policy measures can therefore have different effects on different countries depending on the chosen instrument. They are used to reduce fragmentation and improve proper transmission of monetary policy but they can also influence the area-wide inflation rate.

The new macroprudential policy tools are unlikely to be practical to address inflation divergences.

Overall, the primary responsibility for addressing unsustainable regional differences in inflation resides with national policy makers and the EU institutions responsible for surveillance. The ECB should keep the average inflation rate close to two percent so that inflation differences are possible without deflation in some parts of the euro area. It can use unconventional policy measures to steer the area-wide inflation rate or address financial fragmentation that hinders proper monetary policy transmission, but it should refrain from using unconventional policy measures to influence country-specific inflation rates.

## INTRODUCTION

Regional inflation differences are a common phenomenon in larger currency areas. Sometimes, these inflation differentials are persistent. The mandate of central banks, however, refers to the area-wide inflation rate, which is simply the weighted average of the regional inflation rates. The euro area is also structured that way: the Governing Council of the European Central Bank (ECB) has clarified that it aims to maintain inflation below, but close to, 2 percent over the medium term for the area as a whole<sup>1</sup>.

The definition of one central policy goal is not surprising: Nobel Prize laureate Jan Tinbergen formulated the famous Tinbergen rule according to which one needs at least one policy instrument for each policy objective. Accordingly, a central bank in a currency area could use its interest rate policy to influence the area-wide inflation rate, but it would need additional policy instruments if it should take into account inflation differences in the currency area. The question of the implications of inflation differentials for monetary policy is therefore also a question of what policy instruments should be available to the ECB. In current circumstances, the ECB like many other central banks, uses more policy instruments to fulfil its mandate. In addition, the ECB has been given macroprudential policy powers, which could in principle be used to address inflation differentials if they are judged to be harmful.

Inflation differentials were noted and discussed in the ECB and by academics prior to the crisis (de Haan, 2010, provides a survey). Angeloni and Ehrmann (2007) note that inflation differentials are substantial with a standard deviation of around 1 percent. Fendel and Frenkel (2009) examine whether inflation differentials have influenced the behaviour of the ECB since the launch of the euro. They hypothesise that the ECB has been less restrictive than euro area-wide developments would dictate, thereby preventing deflation in the low-inflation countries such as Germany pre-

crisis. Beck, Hubrich and Marcellino (2009) show that factor market distortions and other structural characteristics were key reasons for inflationary differences. ECB (2012) takes a similar view and suggests that the mispricing of risk, overly optimistic expectations and inappropriate national policies play a role. However, ECB (2012) also acknowledges that non-standard monetary policy measures, not just national structural policy measures, are needed to prevent disorderly adjustments and to ensure proper monetary policy transmission. An important theme discussed in the literature is the need to have a certain level of minimum inflation for the area as a whole to allow for differences in inflation rates without having some countries in deflation. Sibert (2003), for example, argues that unexpected shocks that tip a country into deflation might be more costly than redistribution resulting from an unexpected inflationary shock. Therefore, a certain minimum level of inflation for the area-wide aggregate is warranted.

And indeed, while the clarification of the area-wide inflation target does not refer to inflation differences within the euro area, inflation differences are one of the three reasons given by the ECB Governing Council to explain the aim of close to 2 percent area-wide inflation. This rate would allow the ECB to “provide a sufficient margin to address the implications of inflation differentials in the euro area. It avoids that individual countries in the euro area have to structurally live with too low inflation rates or even deflation”<sup>2</sup>.

Inflation rates can differ for a variety of reasons within a monetary union. Inflation can, for example, be lower when the region in question is regaining price competitiveness if the price level relative to productivity is higher than in other regions. Higher productivity growth can also lead to higher inflation rates via the Balassa-Samuelson effect. A weak business cycle in a particular region could also reduce inflation relative to the area-wide average. Such developments are a normal part of adjustment in a monetary union.

*‘A central bank in a currency area could use its interest rate policy to influence the area-wide inflation rate, but it would need additional policy instruments if it should take into account inflation differences in the currency area.’*

1. Article 127(1) of the Treaty on the Functioning of the European Union (TFEU) defines the primary objective of the European System of Central Banks to maintain price stability, but does not present an operational definition. Such a definition was set by the ECB’s Governing Council: “Price stability is defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2 percent”. The aim of close to, but below 2 percent inflation in the medium term is a clarification issued by the Governing Council.

See:

<https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html>

2. See the webpage cited in footnote 1.

However, there are cases of persistent inflation differentials, which can be a cause of concern. In particular, the first nine years of the euro was characterised by rapid increases in prices and unit labour costs in a number of euro-area countries, which can be assessed as excessive. The persistently high inflation and wage increases reduced the real interest rate relative to other regions of the monetary union, fuelling bubbles in some of the countries. Such long-lasting divergence in unit labour costs is often associated with significant changes in production structures and current account divergences. The corresponding build-up of debt caused significant problems later.

Persistently falling inflation or even deflation in some parts of a currency area can also lead to adverse developments, in particular when private and/or public sector indebtedness is high, because it will become more difficult to service high debt. When downward nominal rigidities are prevalent in a region, low inflation or deflation seriously hinders the allocation of production factors, and unemployment can increase substantially.

Low inflation in a region increases the real interest rate that borrowers in the region have to pay because nominal rates in a monetary union are in principle identical for assets with similar risk. The problem is compounded when financial fragmentation prevents the equalisation of nominal interest rates for similar businesses in different regions and thereby even the nominal interest rate can be higher in a region facing low inflation. The combination of low inflation and somewhat higher nominal interest rates leads to substantially higher real interest rates. The economic literature documents how such high real interest rates undermine production and investment and are a severe obstacle to growth and recovery<sup>3</sup>.

Differences in inflation rates in regions of a currency area can make the monetary policy sub-optimal for many or even all regions ('one-size does not fit all'), even if monetary policy is optimal for the aggregate of the currency area. Moreover, when there are sizeable differences in inflation across the monetary union, it is especially crucial to reach the area-wide objective of 2 percent to prevent some countries or regions facing too-low inflation or deflation and the associated problems.

For all these reasons, the magnitude, causes and consequences of inflation differentials in a currency area have to be carefully analysed when assessing monetary policy. In this briefing paper we first compare the persistence of inflation differentials between euro-area countries in comparison with inflation differentials within the United States, Canada, Japan and Australia. The final section assesses the consequences of such differentials and their implications for monetary policy.

### THE MAGNITUDE AND PERSISTENCE OF INFLATION DIFFERENTIALS WITHIN CURRENCY AREAS

Figure 1 on the next page reports the cumulative consumer price inflationary differences relative the average of the euro area for the initial 12 countries that joined the euro. Relative to the headline inflation rate [all items] before the crisis, inflation was persistently above average in Ireland, Greece, Luxembourg, Spain and Portugal, and below average in Germany, Finland, Austria and France. During the crisis, the differential increased initially in Greece (partly due to increases in consumption taxes), but declined later. There was a major relative decline in Ireland and a smaller decline in Portugal, while in Luxembourg and Spain the cumulative inflationary difference remained or even increased further. Among the pre-crisis low-inflation countries, there was an increase in Austria and Finland, but not in Germany and France.

The two major components of the consumer basket, goods and services, show even wider variations in different countries and over time than the headline index. Even the sub-index of durable industrial goods, which includes items that are the most exposed to foreign trade and competition, shows very diverse developments in different euro-area countries.

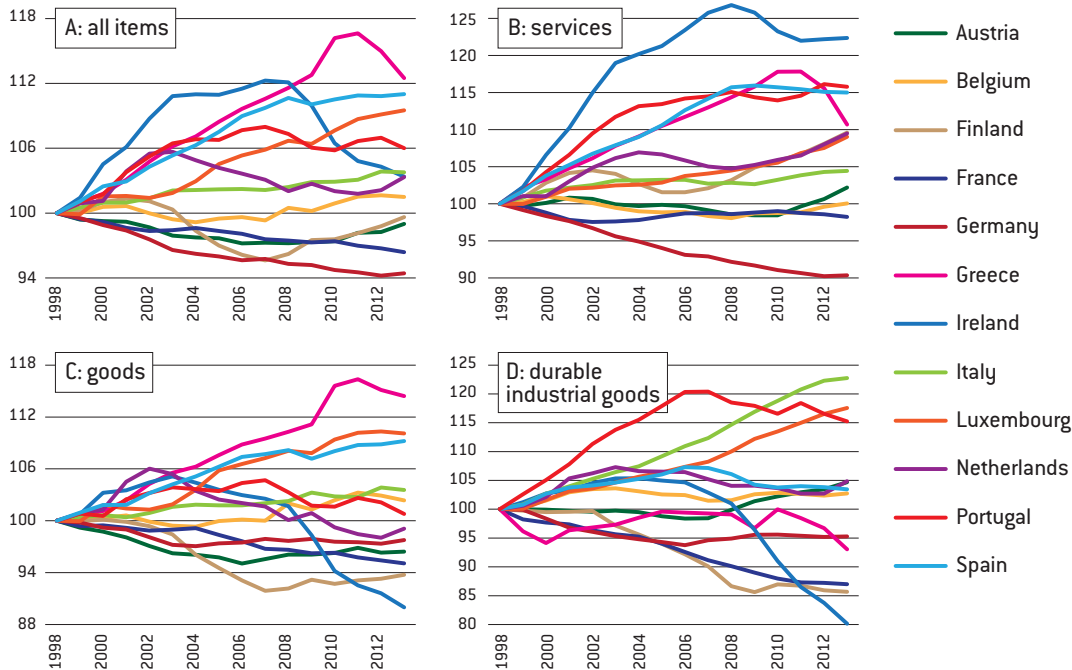
Within-country differences, including their persistence, are somewhat smaller in the US and Canada than in the euro area, and significantly smaller in Japan and Australia (Figure 2). Taking the US example, Figure 2 shows that the price level in San Diego increased by 9.1 percent relative to the average between 1998-2013 while in Atlanta it decreased by 6.1 percent. In Canada, the increase relative to the national average in Alberta

3. See for example, Garcia and Wolff (2014).

was about 8-9 percent, while in British Columbia there was a fall of more than 6 percent during the same period. Persistent differences in inflation rates are therefore not uncommon for monetary

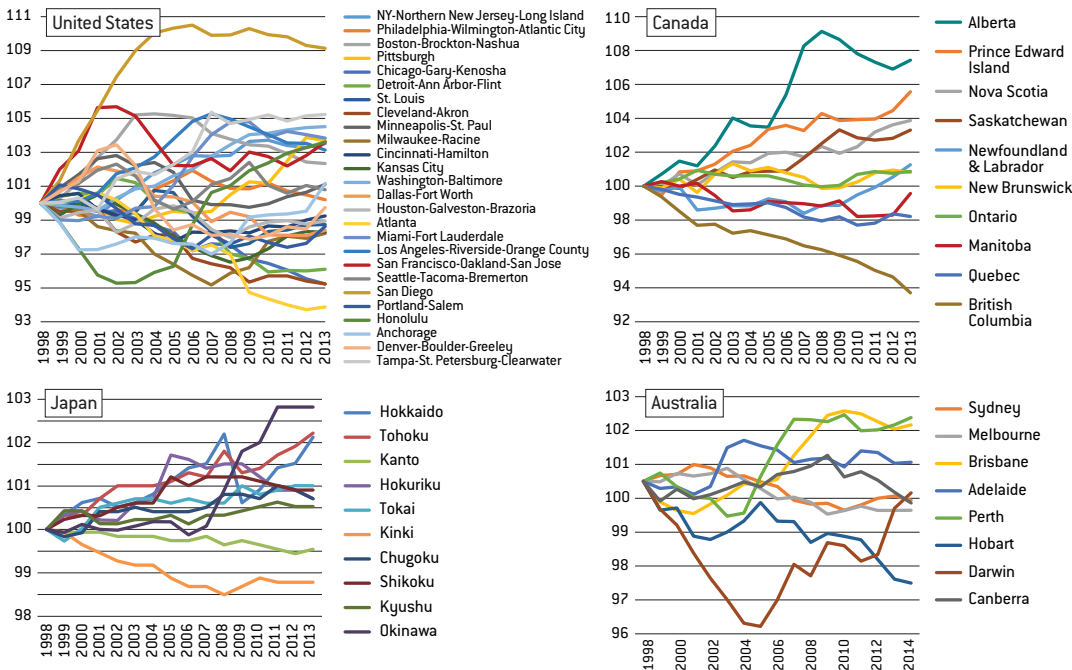
unions. However, in Japan and Australia the regional differences are much smaller. In Japan the difference between the districts with the highest and the lowest inflation relative to the national

Figure 1: Inflation developments in euro-area countries relative to the euro-area average (1998=100)



Source: Bruegel based on Eurostat's Harmonised Index of Consumer Prices (HICP) database.

Figure 2: Regional inflationary developments in US, Canada, Japan and Australia relative to the national average (1998=100)



Source: Bruegel based on Bureau of Labor Statistics, Statistics Canada, Statistics Bureau Japan, Australian Bureau of Statistics, Note: Due to regional data availability constraints we use 25 metropolitan areas for US, 10 main provinces for Canada, 10 districts for Japan and 8 state capitals for Australia. For Australia, the 2014 data is the average of the first two quarters of the year.

average is 4 percentage points while it is 4.6 percentage points in Australia when looking at state capitals. In Canada the difference in inflation between the ten main provinces amounts to 13.7 percentage points, while in the US there is a differential of 15.3 percentage points for the 26 key metropolitan areas.

While in Canada and Japan these differences look rather persistent, it is the opposite for the US. Most US metropolitan areas alternate between higher and lower inflation than the national average. In Australia some state capitals have a persistent positive or negative inflation differential relative to the national average; others like Perth or Brisbane, however, switch between periods of positive and negative inflation differentials. Darwin, for instance, had the highest negative inflation differential between 1998 and 2005, but this was later compensated for by higher inflation, and in the full period of 1998-2014 the cumulative difference relative to the national average was almost zero. In the euro area, by contrast, most inflation differentials had a rather persistent nature between 1998 and 2013, with the notable exception of Ireland. The cumulated difference between the country with the highest rate (Greece) and the lowest rate (Germany) was a staggering 23 percentage points in CPI developments in 2011 compared to the base year of 1998.

#### THE CONSEQUENCES AND IMPLICATIONS OF INFLATION DIFFERENTIALS

When prices and wages increase faster than productivity in a region of a monetary union, significant imbalances can emerge because of deteriorated competitiveness. The higher inflation rate drives divergence further, by making borrowing cheaper in real terms and thereby fuelling credit inflows and sustaining further demand that again contributes to inflation. As a result, inflation divergences can become quite persistent until creditors start doubting the solvency of their debtors<sup>4</sup>. Without a stand-alone exchange rate and monetary policy, the correction of such imbalances is painful and difficult. Financial constraints can drive up nominal interest rates in the region compared to the area-wide average, increasing the real interest rate and pushing the region into a

cyclical downturn. The weak supply of tradable goods and net exports further reduces growth and increases unemployment. The cyclical downturn and high unemployment in turn rebalances the earlier inflationary divergence.

Regaining the lost competitiveness through price and wage disinflation is a slow process. If wage developments have gone unchecked for too long and the loss of competitiveness is significant, the tradable goods sector might have lost substantial market share and the industrial sector is accordingly weak. It might be difficult to regain strength in this sector in particular if certain skills are lost. Moreover, wages typically do not fall in nominal terms because of heavy resistance from workers. As a result, the adjustment speed is limited.

More worrying than inflation differentials, however, is the much more significant increase in unemployment in those euro-area countries that had higher inflation prior to the crisis (Figure 3 on the next page). In the main US metropolitan areas, unemployment developments were less diverse, less related to pre-crisis inflation and less persistent, while in Canada differences were even lower than in the US<sup>5</sup>. This suggests that persistent inflation rate differentials are a particularly big problem in Europe's monetary union. Other adjustment mechanisms such as labour mobility or financial and fiscal risk sharing, are less developed in the euro area than in the US or Canada, which makes the inflation differentials more problematic for the euro area (van Beers *et al*, 2014; Sapir and Wolff, 2013).

This situation raises significant questions for the European Central Bank and in particular for the conduct of monetary policy and macroprudential policies.

#### Monetary policy

An important question for the ECB is how to decide on and implement monetary policy when there are inflation differentials. In principle, monetary policymakers in a currency area (even when there are different regional inflation rates) should base their decisions on the average inflation rate and average economic developments. In changing a single interest rate, ie only one policy instrument, they

4. Darvas and Merler (2013) argue that regional differences and macroeconomic imbalances can hamper the proper transmission of ECB monetary policy.

5. Figure 3 shows that the greatest increase in US regional unemployment rate was about 5 percentage points, much below the greatest value for the euro area, which was 20 percentage points for Greece. Therefore US developments were less diverse. The coefficient of determination (R<sup>2</sup>), which measures the goodness of fit of the regression line, was 0.63 for the euro area and 0.25 for the United States, underlining that the relationship was much weaker in the US than in the euro area. Since the peak in unemployment was in 2010 for the US, in panel B of Figure 2 we show the increase in unemployment from 2008-10. If we extend the sample period for the US up to 2013, the R<sup>2</sup> falls to 0.05, suggesting practically no relationship and lower persistence than in the euro area.

can also influence only the average developments, according to the Tinbergen rule. In fact, before the crisis, monetary policy was found to have roughly similar effects throughout the euro area (Angeloni and Ehrmann 2003). A cut to the ECB main rate therefore led to a roughly similar lowering of the rate in all euro-area countries. Even though transmission channels are different, the work of the ECB showed that the overall effect on inflation in the EU countries was comparable. Currently however, it is less certain if monetary policy has roughly comparable effects on all euro-area countries. While an empirical assessment of different transmission effects is difficult to undertake in the current circumstances, there are a number of reasons to think that policy transmission has become less even.

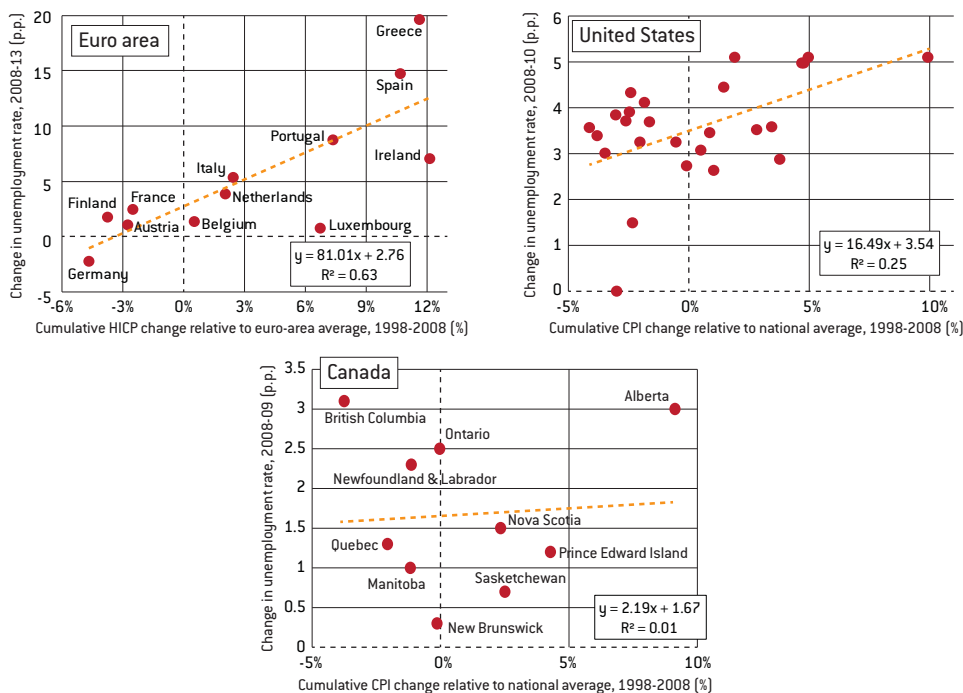
First, an important transmission channel for monetary policy is the banking system. If the quality of the banking system's balance sheets is low, a reduction or increase in interest rates might not be transmitted to firms and households. As a consequence, monetary policy would not have the desired effect on economic activity and inflation. Bank credit default swap spreads in different countries suggest that the healthiness of bank

balance sheets differed and still differs in different euro-area countries, and thereby the transmission of monetary policy likely differs too.

A second reason for different effects in different countries is that nominal interest rates have reached the zero lower bound. As a consequence, 'unconventional' monetary policy measures such as targeted longer-term refinancing operations (TLTRO) purchases of asset backed securities (ABS) and bank covered bonds have been decided.

The take-up of TLTRO will likely be different in different euro-area countries, depending on their access to private long-term financing options. So far, the main refinancing operations (MRO) and the two 3-year longer term refinancing operations (LTRO) also channelled liquidity unevenly across the euro area (see Figure 4). In particular, while before the crisis banks in Germany relied extensively on ECB liquidity, during the crisis liquidity was provided to banks suffering from particular stress, which were often banks in countries at risk of low inflation. However, it is important to note that the liquidity operations are not defined based on geographic criteria.

Figure 3: Pre-crisis inflation differentials and the increase in unemployment during the crisis



Source: Bruegel based on data from Eurostat and BLS. Note: the dots on panel B indicate 26 US metropolitan areas. The peak in unemployment was in 2013 in the euro area, in 2010 in the US and in 2009 in Canada. Therefore we show the change in unemployment from 2008-13 for the euro area, from 2008-10 for the US and from 2008-09 for Canada.

In terms of asset purchases, the eligibility criteria cannot and should not include geographic location. However, the size, liquidity and characteristics of such markets are different in different countries. For example, almost half of euro-area residential mortgage-based ABS has been issued in the Netherlands (the outstanding stock was €250 billion in 2013Q4), while in France the outstanding stock was very small (€10 billion)<sup>6</sup>. As a result, the purchases will have different impacts on different countries.

A third reason lies in the still remaining financial fragmentation. While financial fragmentation was much greater two years ago than now, there are still differences in interest rates for assets of comparable quality. This fragmentation means that policy signals do not get transmitted equally to capital markets.

Monetary policy in current circumstances therefore can take into account the heterogeneity of the monetary union, including inflation differentials, because it employs more than one policy instrument that can have a different impact in different countries. However, the ECB's primary objective is to maintain price stability in the euro-area as a whole and the ECB should consider regional differences only to the extent that they have an impact on its mandate. For example, when financial fragmentation hinders the proper transmission of monetary policy in some regions,

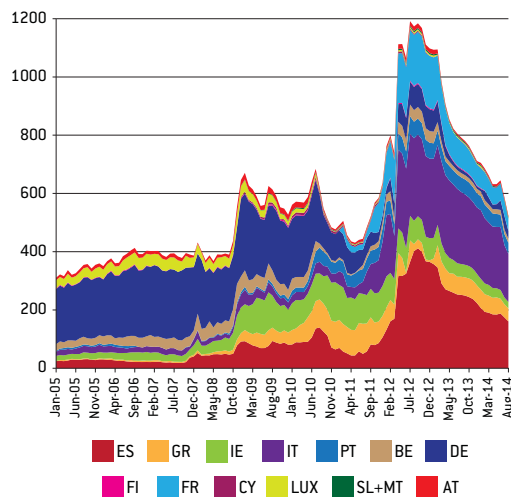
measures to improve the transmission mechanisms are justified. For example, some central bank policy measures are specifically targeted at addressing fragmentation in specific markets. The ECB's Outright Monetary Transactions (OMT) programme announcement was the most important policy measure to address fragmentation. Such measures are justified if they ensure the proper functioning of monetary policy and contribute to fulfilling the mandate of the ECB<sup>7</sup>. Also, when too-low inflation or deflation in certain regions can threaten the achievement of area-wide financial stability, the ECB should be especially vigilant and act, within its mandate, to minimise threats to financial stability. For example, lasting deflation in Italy would undermine public debt sustainability, which in turn could have negative repercussions for financial stability and inflation in the euro area as a whole. To avoid deflation in Italy at time when average euro-area inflation is well below the 2 percent threshold, the ECB should step-up efforts to push average euro-area inflation back to the 2 percent threshold in order to allow intra-euro inflationary divergence without any country falling into deflation. But the ECB should not try to balance inflationary differences, which are the results of economic distortions resulting from segmented markets and insufficient competition.

Overall, while monetary policy measures in normal times only take into account the average developments in the monetary union, in times of crisis or financial fragmentation the impact of non-conventional measures on different jurisdictions must be considered. In aiming to fulfil its mandate, the ECB has to ensure that monetary policy transmission operates properly and that it contributes to financial stability throughout the union. In current circumstances, it is particularly important that the ECB achieves its goal of an inflation rate close to 2 percent in order to allow the process of adjustment to go on without countries that need to regain competitiveness having to fall into deflation.

### Macroprudential policies

The key question for macroprudential policy is if the ECB should use some of its new macroprudential powers when inflation in a country becomes significantly higher than the average

Figure 4: Use of Eurosystem liquidity (in EUR billions, 01/2005 – 08/2014)



Source: Bruegel, updated from Pisani-Ferry and Wolff (2012) using data from the ECB and national central banks.

6. See a detailed examination of the outstanding stocks of various assets that the ECB could purchase in Claey's *et al* (2014).
7. See Darvas (2012) and Wolff (2013, 2014).
8. Macroprudential policy can at best address credit booms and high inflation, but its scope is certainly very limited in fostering credit growth and reversing low inflation during an economic downturn.



inflation rate<sup>9</sup>. There is no easy answer to this. Macroprudential policies can certainly play a role in dampening excessive credit developments in some regions and could thereby be used to reduce inflation divergences from the average. However, the ECB needs to be cautious and act only when there is an objective risk or an imbalance emerging. As we have argued, many inflation developments and deviations from the average are normal developments in a large currency area and reflect underlying structural changes or adjustments. The ECB is therefore confronted with a significant information problem. It needs to assess in real time whether a certain regional inflation development is an equilibrium development reflecting sustainable underlying fundamentals or whether there is a need to act pro-actively, which is a difficult task. When using country-specific macroprudential tools, the ECB would face significant political-economy problems as it would need to act against substantial national

interests. Overall, while macroprudential tools would allow the ECB to address country specific inflation rates, their practical value may be less than is often suggested.

In conclusion, we have argued that monetary policy should above all ensure that area-wide inflation does not fall below the 2 percent objective. This would allow the adjustment process in terms of different inflation rates to continue between euro-area countries, without any country entering deflation. Persistent deflation in some countries would endanger public debt sustainability and thereby undermine financial stability and inflation in the euro area as a whole. The ECB should use unconventional policy measures to achieve the 2 percent area-wide objective and also to reduce financial fragmentation and improve monetary transmission in countries that undergo deep structural adjustments in the wake of too-high inflation in the past.

## REFERENCES

- Angeloni, Ignazio and Michael Ehrmann (2003) 'Monetary transmission in the euro area: early evidence', *Economic Policy* vol 18(37): 469-501
- Angeloni, Ignazio and Michael Ehrmann (2007) 'Euro area inflation differentials', *B.E. Journal of Macroeconomics*, Topics, 7(1), article 24
- Beck, Guenter W., Kirstin Hubrich and Massimiliano Marcellino (2009) 'Regional inflation dynamics within and across euro area countries and a comparison with the United States', *Economic Policy* ol 24(57): 141-184
- Claeys, Grégory, Zsolt Darvas, Silvia Merler and Guntram B. Wolff (2014) 'Addressing weak inflation: The European Central Bank's shopping list', *Policy Contribution* 2014/05, Bruegel
- Darvas, Zsolt (2012) 'The ECB's magic wand', *Intereconomics: Review of European Economic Policy*, Springer, vol. 47(5): 266-267
- Darvas, Zsolt and Silvia Merler (2013) 'The European Central Bank in the age of banking union', *Policy Contribution* 2013/13, Bruegel
- De Haan, Jakob (2010) 'Inflation Differentials in the Euro Area: A survey', in J. de Haan and H. Berger (eds) *The European Central Bank at Ten*, Springer
- ECB (2012) 'Inflation differentials in the euro area during the last decade', *ECB Monthly Bulletin*, November, pp71-85
- Fendel, Ralf and Michael Frenkel (2009) 'Inflation differentials in the euro area: did the ECB care?' *Applied Economics* 41: 1293-1302
- Garcia, Noah and Guntram B. Wolff (2014) 'Chart of the week: real interest divergence weighs on growth', Bruegel blog, 15 July, <http://www.bruegel.org/nc/blog/detail/article/1387-chart-of-the-week-real-interest-divergence-weighs-on-growth/>
- Jean Pisani-Ferry and Guntram B. Wolff (2012) 'Propping up Europe?' *Policy Contribution* 2012/07, Bruegel
- Sapir, André and Guntram B. Wolff (2013) 'The neglected side of banking union: reshaping Europe's financial system', Bruegel policy contribution to informal ECOFIN, September

- Sibert, Anne (2003) 'The new monetary policy strategy of the ECB', Briefing paper for the Committee on Economic and Monetary Affairs of the European Parliament, May
- Van Beers, Nancy, Michiel Bijlsma and Gijsbert T.J. Zwart (2014) 'Cross-country insurance mechanisms in currency unions', *Working Paper* 2014/04, Bruegel
- Wolff, Guntram B. (2013) 'The ECB's OMT programme and German constitutional concerns', in *Think Tank 20: The G20 and Central Banks in the new world of unconventional monetary policy*, Brookings.
- Wolff, Guntram B. (2014) 'The OMT programme was justified but the fiscal union question remains', Bruegel blog, 15 July, <http://www.bruegel.org/nc/blog/detail/article/1391-the-omt-programme-was-justified-but-the-fiscal-union-question-remains/>