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Is Globalization Reducing the Ability of Central Banks to Control Inflation?

Monetary Dialogue November 2015

COMPILATION OF NOTES

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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

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Abstract

The notes in this compilation prepared by key monetary experts explore the different ways in which globalisation could have an impact on inflation and monetary policy transmission channels. The growing integration of production processes, commodity price shifts and the reduced ability of wage negotiators to set wages due to globally more integrated labour markets are examples of powerful factors shaping domestic inflation developments.

The notes have been requested by the Committee on Economic and Monetary Affairs (ECON) of the European Parliament as an input for the November 2015 session of the Monetary Dialogue between the Members of the ECON Committee and the President of the ECB.

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INTRODUCTION

Since the beginning of the crisis, inflation rates have shown a clear downward trend in many advanced countries and have fallen well below the targets of their respective monetary authorities. Despite strong monetary action, inflation expectations are slow to pick up. In some countries, the recovery is quite strong and unemployment rates have decreased, yet price pressures and wage development continue to remain subdued. Central banks seem to have (partially) lost their ability to control inflation rates.

The notes in this compilation prepared by key monetary experts explores the different ways in which globalisation could have an impact on inflation and monetary policy transmission channels, including the role played by the growing integration of production processes, global commodity price shifts, the reduced ability of wage negotiators to set wages due to globally more integrated labour markets. The main conclusions and policy recommendations are summarised below.

The notes have been requested by the Committee on Economic and Monetary Affairs (ECON) of the European Parliament as an input for the November 2015 session of the Monetary Dialogue between the Members of the ECON Committee and the President of the ECB.

Christophe Blot *et al.,* (OFCE). The report of yields four conclusions:

(i) ECB (conventional and unconventional) monetary policy is not able to fully control headline inflation as the global determinants of euro area inflation are large, and explain around 50% of inflation dynamics;

(ii) As the ECB can control the domestic part of inflation, it should target a domestic price index rather than a Consumer Price Index (CPI), even one that would correct for the evolution of some regulated and some volatile prices (the core index);

(ii) In the current situation of domestic deflation, a more expansionary monetary policy is required. It should be accompanied by increases in wages. Indeed, financial conditions, wages and costs account for about 10 percent each of the variance in euro area CPI: boosting them would help to reverse the deflationary trend;

(iv) In view of the large impact of external variables on domestic inflation, the ECB should enhance (policy) cooperation with other central banks in order to match its CPI inflation target at 2%. Absent appropriate cooperation, the ECB shall communicate clearly to the markets that its monetary policy decisions are dependent on the external developments.

Grégory Claeys and **Guntram Wolff** (Bruegel). Globalisation can change inflation dynamics. More integration in goods markets means that imported goods with fluctuating prices have more influence over the price level. Deeper integration of labour markets can affect the local workers' wage-bargaining power, while deeper financial integration has an influence on long-term interest rates. All three effects could not only influence inflation rates but also affect in one way or another the transmission mechanism of monetary policy.

However, powerful counter-forces are also at play. Deeper financial integration not only affects long-term interest rates but also increases the role of the exchange rate, and can thereby increase the effectiveness of monetary policy. Labour market integration is unlikely to be a strong and important element in today’s world of managed borders. Trade integration only affects a limited part of the basket of goods and services that are consumed. Disinflationary tendencies in respect of those tradeable goods can be offset by higher inflation rates for purely domestic goods.

A more serious problem for monetary policy than globalisation is the constraint resulting from the zero lower bound. Once the short-term nominal interest rate has fallen to zero, financial conditions can be negatively affected by a temporary drop in inflation over which the central bank has no control. And while the authors argue in favour of unconventional monetary policy such as asset purchases, the ability of the ECB to reach its inflation goal would be facilitated by better macroeconomic policies in the euro area.

Christian Dreger *et al.,* (DIW). The fall in inflation over the past decades is partially attributed to the success of monetary policy. The focus on inflation control and high awareness to act pre-emptively contributed to a more credible policy. Even the decline since the financial crisis may be interpreted in terms of domestic factors, while the decrease in oil prices accelerated the evolution. In particular, the modest economic upswing in the euro area plays a crucial role for the low inflation environment. Inflation will pick up again if the business cycle swings up again. As the basic determinants of inflation did not change much, central banks should be still able to control inflation. However, the task for the monetary authorities has become more challenging in the short run under the conditions of interconnected and globalised markets. Globalization has likely contributed to a flattening of the output-inflation trade-off. While the empirical evidence is mixed so far, several channels might be important. To the extent that the synchronization of business cycles has increased across countries, the central banks can less affect the domestic output gap. In addition, lower import prices in more competitive markets may exert some downward pressure on inflation.

Salomon Fiedler *et al.,* (Kiel Institute for the World Economy). Globalization in international trade and financial globalization in practice may have reduced the ability of monetary policy to control inflation in the short to medium term but have not eliminated it. As a consequence, central banks would be well advised to tolerate small deviations from their inflation targets for longer periods of time than they would otherwise consider in a world without globalization as long as inflation expectations are well-anchored. The impact of globalization on the ability of monetary policy to control inflation is strongest for small, open economies.

The impact on the euro area as a relatively large economy, with a lower degree of openness than many small economies, is most likely more moderate but still noticeable. With regard to the period of disinflation in the euro area since 2012, several factors are at play but not globalization *per se*. If globalization had abolished the ability of the ECB to control inflation and thereby contributed to the period of disinflation, this would have required an abrupt change in globalization after the global financial crisis. But this is not the case; if anything, the pace of intensifying globalization has declined since the crisis. Nevertheless, global factors have contributed to this period of disinflation. Most importantly, the slump in oil prices has significantly lowered inflation in the euro area. However, this is not a major concern for monetary policy because these effects will fade out relatively soon. Global slack may have contributed to subdued inflation in the euro area, too, but this effect is difficult to quantify.

Overall, there are several other reasonable explanations for the long period of subdued inflation in the euro area. Just to name a few, there is overwhelmingly strong evidence that financial crises have long-lasting dampening effects on output and that the ensuing recoveries are weak. This might subdue inflation for quite some time. Moreover, there is growing evidence that the effectiveness of monetary policy to control inflation is significantly lower in the aftermath of financial crises. Finally, the disinflation in the euro area after 2012 - sometimes labelled “surprisingly excessive” - is not as surprising as it might seem because the euro area (in contrast to other advanced economies) fell back into a recession due to the sovereign debt crises in this period. Overall, the evidence

suggests that the relatively long period of disinflation in the euro area is rather a normal outcome of the general circumstances than a failure of monetary policy. From this perspective, monetary policy may be well advised to tolerate inflation being below its inflation target for an extended period.

Eddie Gerba and **Corrado Macchiarelli** (LSE). Globalisation has *not* led to a decline in the sensitivity of inflation to domestic output gap nor to domestic monetary policy. Domestic monetary policy can still control domestic interest rates and so stabilise inflation (and output). The only way in which globalisation might matter is by challenging central banks in keeping inflation expectations fully anchored nationally, and by increasing coordination of financial measures globally. The latter is particularly relevant given the presence of banks operating worldwide, hence increasing the likelihood of cross-border propagation of domestic liquidity shocks.

This does, however, not mean that the degree of openness of an economy is no significance for the conduct of monetary policy directly. Monetary policies should indeed be increasing mutual sensitivity of the monetary transmission channel to changes in the exchange rate. Moreover, openness forces central banks to confront a variety of practical issues that would not be present in the case of a closed economy, such as whether to stabilize an index of domestic prices only, or an index of the prices of all goods consumed in the domestic economy. Also, the need of correct quantitative specification of the structural models used in a central bank more has become more urgent. Overall, however, globalisation, even if expected to be rapid, does not justify the degree of alarm that some commentators have urged upon central banks. It should remain possible for a disciplined central bank to achieve its inflation target without any exceptional needs for coordination of monetary policy with other central banks. the need for coordinated and detailed action lies instead in the financial (policy) sphere.

Christopher Hartwell (CASE). Economic evidence shows that there has been a decline in the sensitivity of inflation to domestic output gaps, while foreign output gaps are playing a more prominent role in domestic inflation. Despite this reality, domestic monetary policy does still control domestic interest rates and has a more prominent effect on controlling inflation.

Globalization has contributed somewhat to wage moderation via competition, but fragmented labour markets mean that national developments and wage negotiations still predominate over international factors. One policy implication is that globalization should be encouraged, even if future effects on inflation are likely to be muted. A further implication is that good monetary policies remain crucial in the battle against inflation, including a narrow focus on inflation targeting rather than adding other targets to a central bank's mandate. Given the power wielded by advanced economy central banks on global commodity prices, this should be taken into account when setting policies so as to not export inflation to commodity-dependent emerging markets.

Andrew H. Hallett (University of St Andrews). It is true that the ability to control inflation may be lost in conventional models of monetary policy, but it is not necessarily the result of globalization as such. The traditional view is the result of the perception that monetary policy is the only instrument for controlling inflation. But there are many other ways of controlling inflation, or reinstating that control. Extending conventional monetary policy to include the use of reserves, or vary the composition of assets used to carry it out, or adopt exchange rate target bands, is one approach. Coordination of those policies with fiscal policy is another. And to use financial regulation as an explicit policy instrument to control credit and leverage directly is a third. But they all require reforms to the policy instruments or policy institutions.

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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

The ability of the ECB to control inflation in a global environment

Christophe BLOT, Jérôme CREEL, Paul HUBERT,
Fabien LABONDANCE, Xavier RAGOT

IN-DEPTH ANALYSIS

Abstract

In this paper, we study the global determinants of euro area inflation and show that they are large - they explain around 50% of inflation dynamics – and make it impossible for the ECB to fully control headline inflation. Nevertheless, we show that the ECB retains some control on the domestic part of euro area inflation. We therefore argue in favour of a change in the inflation target pursued by the ECB. Unless a change occurs, the ECB should promote cooperation with other central banks in order to match its CPI inflation target at 2% as 40 to 50% of CPI determinants is related to foreign yields and foreign output growths.

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EXECUTIVE SUMMARY

- The ECB is not able to impact the headline inflation with its conventional and unconventional policies. According to our assessment, the global determinants of euro area inflation are large, and explain around 50% of inflation dynamics, and sufficiently large to make it impossible for the ECB to fully control headline inflation.
- Nevertheless, the ECB is able to control the domestic part of inflation. This conclusion urges a change in the inflation target pursued by the ECB. The ECB mandate of "price stability" would remain adequate if the ECB were targeting a domestic index rather than a CPI index, even one that would correct for the evolution of some regulated and some volatile prices (the core index).
- In the current situation of domestic deflation, a more expansionary monetary policy is required. It should be accompanied by increases in wages, for instance in surplus countries. Indeed, financial conditions and wages and costs account for 10 percent each of the variance in euro area CPI: boosting them would help reverse the deflationary trend.
- The ECB should endeavour to foster cooperation with other central banks in order to match its CPI inflation target at 2%: 40 to 50% of CPI determinants is related to foreign yields and foreign output growths. If cooperation is not possible, the ECB may well make clear that its decisions on policy rates are dependent on the foreign economic, monetary and financial environment which weighs on euro area inflation. In the end, communication will be central to demonstrate that the ECB has still some ability to control part of inflation.

1. INTRODUCTION

The global financial crisis has had strong negative consequences on the real economy but has had only a minor impact on inflation, apparently. The surge in unemployment rates and GDP declines in Western countries have not been associated with a sharp decrease in inflation while the on-going recovery has not been accompanied, to date, by an increase in inflation.

There have been at least four explanations for this long-standing low and stable inflation era despite large swings in real activity and unemployment. The first one relates to the reliance by central banks on inflation targets (or on inflation targeting) and to the impact of inflation targets on inflation expectations: inflation targets have anchored the households and firms' expectations. If wages are indexed on expected inflation and central banks are credible, inflation should remain low. The second explanation relates to a change in the slope of the so-called Phillips curve: the sensitivity of inflation to the unemployment gap (the difference between the actual and natural unemployment rate) has decreased, for reasons that still remain unclear (see Constancio, Hartmann and Tristani, 2015). Among these reasons, one may argue that wages are no longer indexed on inflation expectations. The third explanation relates to the diffusion of information technology (IT) and its incidence on firms' costs. For instance, logistics would have been substantially improved (and its costs lessened) by the better instantaneous knowledge of the level, disposal and location of inventories that IT has permitted. The fourth explanation relates to globalisation: inflation rates are determined by global factors. The list of possible global factors is long: real activity of trade partners, oil shocks, import prices, international competition, etc. The fourth explanation may be that the low impact of the global financial crisis on inflation would reflect a situation in which some global factors, like the initial resilience of growth in emerging countries, would have mitigated the impact of some other factors, like the initial slump in Western countries.

In the following, we focus on the specific role of global factors. First, we study whether inflation in the euro area is determined, and to what extent, by global (or external) factors. Our own estimation is that half of the inflation dynamics (measured by the CPI which is the target of the ECB) is explained by global factors. This may seem a lot, but it also implies that half of the inflation dynamics is determined by past inflation and domestic factors which can be affected by monetary policy. Second, we study whether policies implemented by the ECB have an impact not only on inflation but also on its different components – domestic or external. Stated differently, we wonder whether the ECB can still control inflation and to what extent. We conclude with some policy recommendations.

2. GLOBAL INFLATION

Before presenting our own assessment of the role of global factors on inflation dynamics, we present a literature review of previous studies. A fair assessment is that the results are mixed, and no clear consensus emerges.

2.1 Global inflation in the literature

The "Great Moderation" has spurred an abundant literature on its determinants and many papers in this field of research studied the impact of globalisation on inflation. On the one hand, and according to Ball (2006), globalisation has not reduced the long-run level of inflation, has not changed the determinants of inflation, and has not contributed substantially and negatively to the inflation process. On the other hand, Ciccarelli and Mojon (2010) show that inflation in industrialized countries is largely a global phenomenon. First, inflations of 22 OECD countries have a common factor that accounts for nearly 70% of their variance. Second, a robust error-correction mechanism brings domestic inflation rates back to global inflation.

A few papers have used measures of global output gaps to proxy the external factors of inflation. They usually reach a similar conclusion as Ball (2006). Ihrig et al. (2010) do not support the hypothesis that globalisation has increased the role of international factors and decreased the role of domestic factors in the inflation process of 11 industrial economies. They point to insignificant estimated effect of foreign output gaps on domestic consumer price inflation. Calza (2008) finds little evidence that global capacity constraints have either explanatory or predictive power for domestic consumer price inflation in euro area countries between 1979 and 2003. Gnan and Valderrama (2006) show that the domestic output gap seems to have lost its influence on inflation in the euro area; however, the global output gap does not significantly impinge on euro area inflation. In contrast, Borio and Filardo (2006) show that the impact of global factors has been growing since the 1990s and that these factors have sometimes contributed more to inflation than domestic measures of economic activity. They use different proxies of global output gaps (trade-weighted global output gap, exchange rate weighted global output gap, exchange rate adjusted trade-weighted global output gap and GDP-weighted global output gap) which add substantial explanatory power to inflation rate equations.

Several other papers have focused on international trade to proxy the external factors of inflation. Sbordone (2007) analyses the potential effect of global market competition on US inflation dynamics. He argues that the actual increase in US trade has not been substantial enough to foster the rise in US market competition that is necessary to explain the observed decline in the slope of the inflation-marginal cost relation. Kohn (2006) argues that import prices have a direct impact on US consumer prices and shows that this impact has increased over time with the increase in the share of imported consumer goods in households' spending. Badinger (2008) uses a cross-section of 91 countries covering the period 1985-2004 to assess the relationship between inflation and globalisation, measured in terms of trade and financial openness. He shows that increasing trade or financial openness by 1 percentage point reduces average inflation by -0.2 to -0.4 percent. He also concludes that this result is not robust to a subsample of 25 OECD countries.

The lack of consensus on the global nature of inflation raises two issues. The first one relates to the definition of global factors. The above-mentioned papers use either some aggregate measures of foreign output gaps or some measures of trade. They neither take both nor extend proxies to other factors. The second issue is one of assessment. The multiplicity of empirical results so far calls for own assessment.

2.2 Global inflation in the euro area

We assess to what extent the consumer price index and core euro area inflation are driven by domestic or global factors. In contrast with the above mentioned literature, we use a large array of determinants to extract the global determinants of inflation in the euro area, including some related to finance. Our results, discussed below, show that the variable which the ECB is targeting – the consumer price index – is substantially explained by global factors: around 50% of the variability of inflation is explained by these factors whereas only a quarter is driven by domestic factors. The remaining quarter is explained by past CPI. Results explaining the variability of core inflation (excluding energy and food, the prices of which are assumed to be determined on global markets) also point to a larger influence of external factors than domestic ones. The conclusion is that inflation in the euro area is largely influenced by global factors. Consequently, a substantial part of inflation is out of control of the ECB.

The methodology to obtain this result is explained in Appendix 1. We use two econometric models to extract the role of global factors on euro area inflation. In the first one, we directly introduce measures of potential international determinants of inflation: we consider oil prices, US corporate bond yields, a weighted measure of the GDP of OECD countries plus the 6 major non-member economies (Brazil, China, India, Indonesia, Russia and South Africa) and unit labour costs of OECD countries. Oil prices give information on energy intensity of production; US interest rates proxy the global financial environment while weighted GDP measures the global output. Unit labour costs are competitiveness indicators which give an assessment of the incidence of global labour competition and global trade on inflation.

In the second one, we are more agnostic about the nature of global factors and we use a factor model. The idea of these models is to directly extract from the data some unknown (but measurable!) determinants (or factors) which affect the euro area inflation rates.

The two methods conclude that roughly 50% of inflation (CPI or core inflation) is explained by global factors.

3. DOES THE ECB CONTROL INFLATION?

The global nature of euro area inflation raises two related issues: first, is the ECB able to impact, then control, inflation, in accordance with its main mandate? As we have just seen that 50% of CPI inflation is global, the ECB cannot be expected to have a direct influence of the "global part" of inflation. This being said, the key and second issue is to assess the ability of the ECB to control the remaining part of inflation, the "domestic" inflation. To do this we first construct a measure of inflation once we remove the role of global factors. We use our two econometric models presented in Appendix 1 to extract the role of global factors from observed inflation. We apply these methods to both CPI inflation to obtain a "domestic CPI inflation" and to core inflation (when we exclude foods and energy), to obtain a domestic "core inflation". The difference between headline CPI inflation and our measure of domestic CPI inflation is big. The difference between core inflation and our measure of domestic core inflation is much smaller, as one can expect. Food and energy are indeed some key determinants of the role of global factors in CPI inflation.

To ease the discussion, the first graph of Figure 1 plots CPI inflation (black line) together with our two measures of "domestic CPI inflation". The difference between domestic CPI and headline CPI raises two remarks:

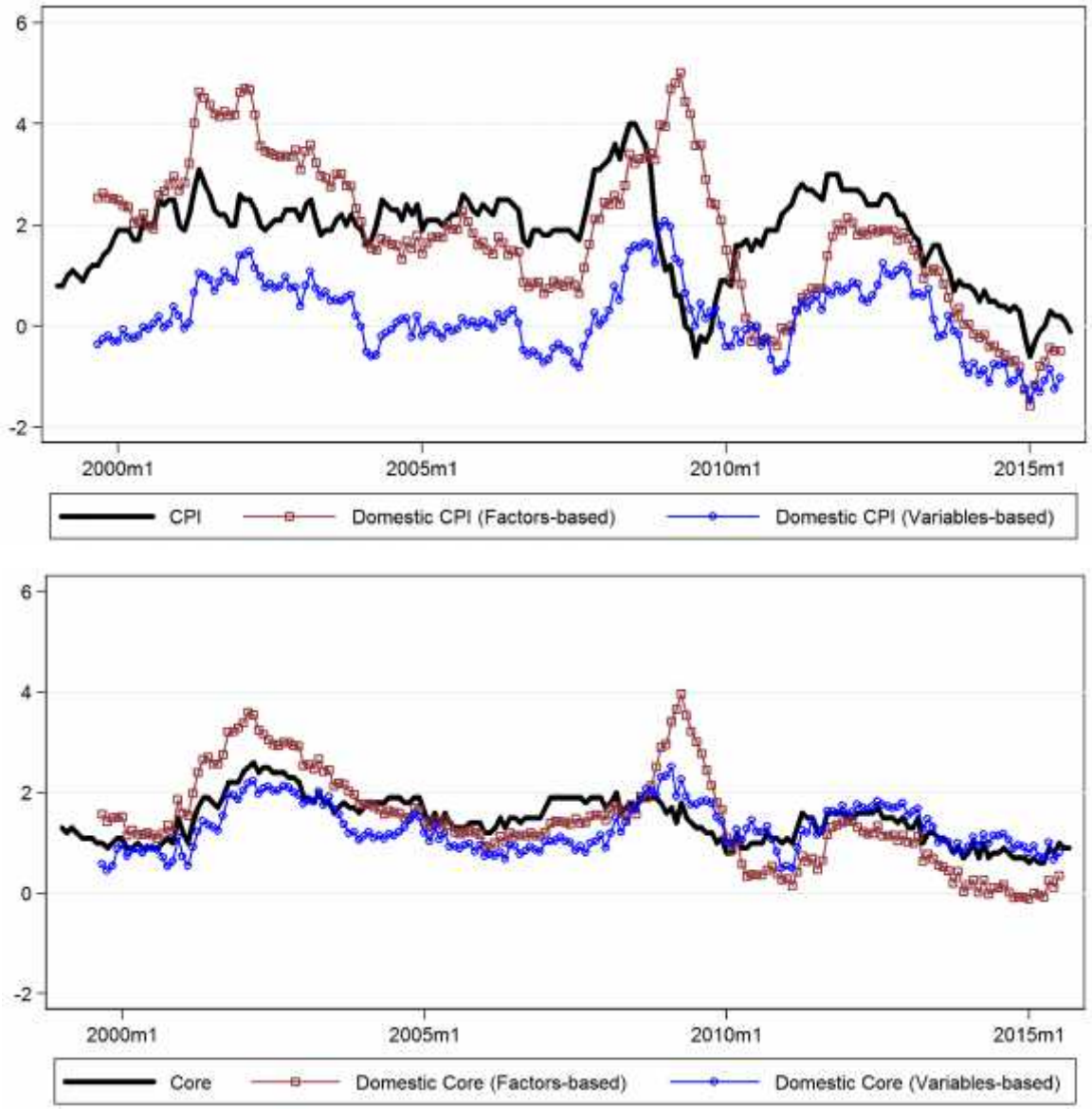
- First, until 2012, the contribution of global factors to headline CPI has been large, as shown by the difference between the headline CPI and the domestic CPI. The global nature of euro area inflation is not a new issue.
- Second, the euro area has entered into a domestic deflation since 2013; a more aggressive monetary policy would have been welcome since then[1].

The second graph of Figure 1 plots core inflation (black line) together with our measure of "domestic core inflation". The difference between domestic core inflation and headline core inflation shows that:

- This core inflation is relatively well immune from global factors. In contrast with headline CPI, the differences between the overall core index and the domestic core index are relatively minor.
- The most important difference is certainly in terms of variability: the domestic core index is more volatile than the overall core index.

[1] The domestic inflation peak of 2009 does not weaken our computed measure. Indeed, some may argue that this peak is the lagged peak of headline inflation in 2008 after the oil peak; hence the domestic measure would turn out to be a global one. This is not true, for two reasons. The first is that the domestic CPI measure does not exhibit a repeating lag vis-à-vis the headline CPI; the second is simply that, in 2009, most global factors were downward-trending: the 2009 domestic measure of the CPI is computed after subtracting these negative global factors from the headline CPI.

Figure 1 – Times series of domestic inflation measures



Source: Eurostat and OFCE calculations

As we have now consistent measures of domestic inflation, we can assess the ability of the ECB to control domestic inflation. We can contrast this result with the ability of the ECB to control headline inflation. We do this exercise with both CPI inflation and core inflation.

The methodology is presented in Appendix 2. The analysis yields the following results.

- Is the ECB able to impact, then control, inflation, in accordance with its main mandate?

The answer is no. A monetary shock has a minor and weak impact whatever the horizon (short or long) on headline inflation, CPI or core. As a consequence, headline inflation (which thus includes the effects of global factors) seems to be out of control for the ECB, for the period we consider.

- Is the ECB powerless?

No. Our analysis shows that a monetary shock impinges on domestic inflation rates: a restrictive monetary policy generates a reduction in domestic inflation rates, CPI and core.

The general outcome is thus mixed: monetary policy has some power but cannot control the overall dynamics of the headline inflation. This has some collateral implication for the mandate of the ECB: it is not consistent to ask the ECB to fulfil a target (headline inflation) that it does not fully control.

4. CONCLUSIONS AND POLICY RECOMMENDATIONS

The previous analysis yields four conclusions:

1. The ECB is not able to impact the headline inflation with its conventional and unconventional policies, a conclusion which corresponds to what observers of the current evolution of euro area inflation can witness. This conclusion is consistent with the view that in a globalised world, a central bank cannot control the inflation rate. This conclusion is not straightforward, though: it might well be that the extent to which the globalised world impinges on the inflation rate is not large enough to discharge the central bank from the control of inflation. Empirical assessment is thus required. According to our assessment, the global determinants of euro area inflation are large, and explain around 50% of inflation dynamics, and sufficiently large to make it impossible for the ECB to fully control headline inflation.

2. The ECB is able to control the domestic part of inflation. This conclusion urges a change in the inflation target pursued by the ECB. The ECB mandate of “price stability” would remain adequate if the ECB were targeting a domestic index rather than a CPI index, even one that would correct for the evolution of some regulated and some volatile prices (the core index).

3. In the current situation of domestic deflation, a more expansionary monetary policy is required. It should be accompanied by increases in wages. Indeed, financial conditions and wages and costs account for 10 percent each of the variance in euro area CPI: boosting them would help reverse the deflationary trend.

4. The ECB should endeavour to foster cooperation with other central banks in order to match its CPI inflation target at 2%: 40 to 50% of CPI determinants is related to foreign yields and foreign output growths. If cooperation is not possible, the ECB may well make clear that its decisions on policy rates are dependent on the foreign economic, monetary and financial environment which weighs on euro area inflation. In the end, communication will be central to demonstrate that the ECB has still some ability to control part of inflation.

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APPENDIX 1

Determinants of inflation

We assess the determinants of inflation with a vector auto-regressive (VAR) model including 6 lags, under two different settings. In the first one, we simply include a limited list of macro variables in the model. It includes four possible domestic determinants of inflation: bank credit to the private sector, unemployment rate, 10-year bond yields, and wage growth. Bank credit and 10-year bond yields are proxies of the financial and economic environment: the higher bank credit and the lower interest rates, the higher investment and economic activity. Unemployment rate intervenes as in the Phillips curve while the wage growth tackles the issue of wage indexation. The VAR model includes four potential global determinants: oil prices, US corporate bond yields, a weighted measure of the GDP of OECD countries plus the 6 major non-member economies (Brazil, China, India, Indonesia, Russia and South Africa) and unit labour costs of OECD countries. Oil prices give information on energy intensity of production; US interest rates proxy the global financial environment while weighted GDP measures the global output. Unit labour costs are competitiveness indicators which give an assessment of the incidence of global labour competition and global trade on inflation.

In the second setting, we proceed in two steps. Rather than using the "usual suspects" of inflation determinants (the above mentioned 8 macro variables), we extract from several macro variables (26) a few principal components (that we call factors) which capture the largest possible variance in the data. In the second step, we include these factors in a VAR model to assess their contribution to inflation. Drawing on a Principal Component Analysis, we estimate 3 domestic factors, from 11 euro area variables: credit to the private sector, unemployment, 10-year bond yields, wage growth, industrial production, CISS –Composite Indicator of Systemic Stress–, the euro/dollar exchange rate, the number of hours worked, the monetary aggregate M3, and the shadow rate representing the level of both conventional and unconventional monetary policy tools in the interest rate space. We estimate 3 global factors from 15 global variables: oil prices, the VIX index capturing financial stress and liquidity, US corporate bond yields, Chinese corporate bond yields, unit labour costs of OECD countries, the GDP of OECD countries plus the 6 major non-member economies, gold price, the US economic policy uncertainty index and the Chinese economic policy uncertainty index of Baker, Bloom and Davis, world trade, the ECB commodity price index for food, the ECB commodity price index for non-food, the OECD composite leading indicator, the OECD business confidence survey and the OECD consumer confidence survey.

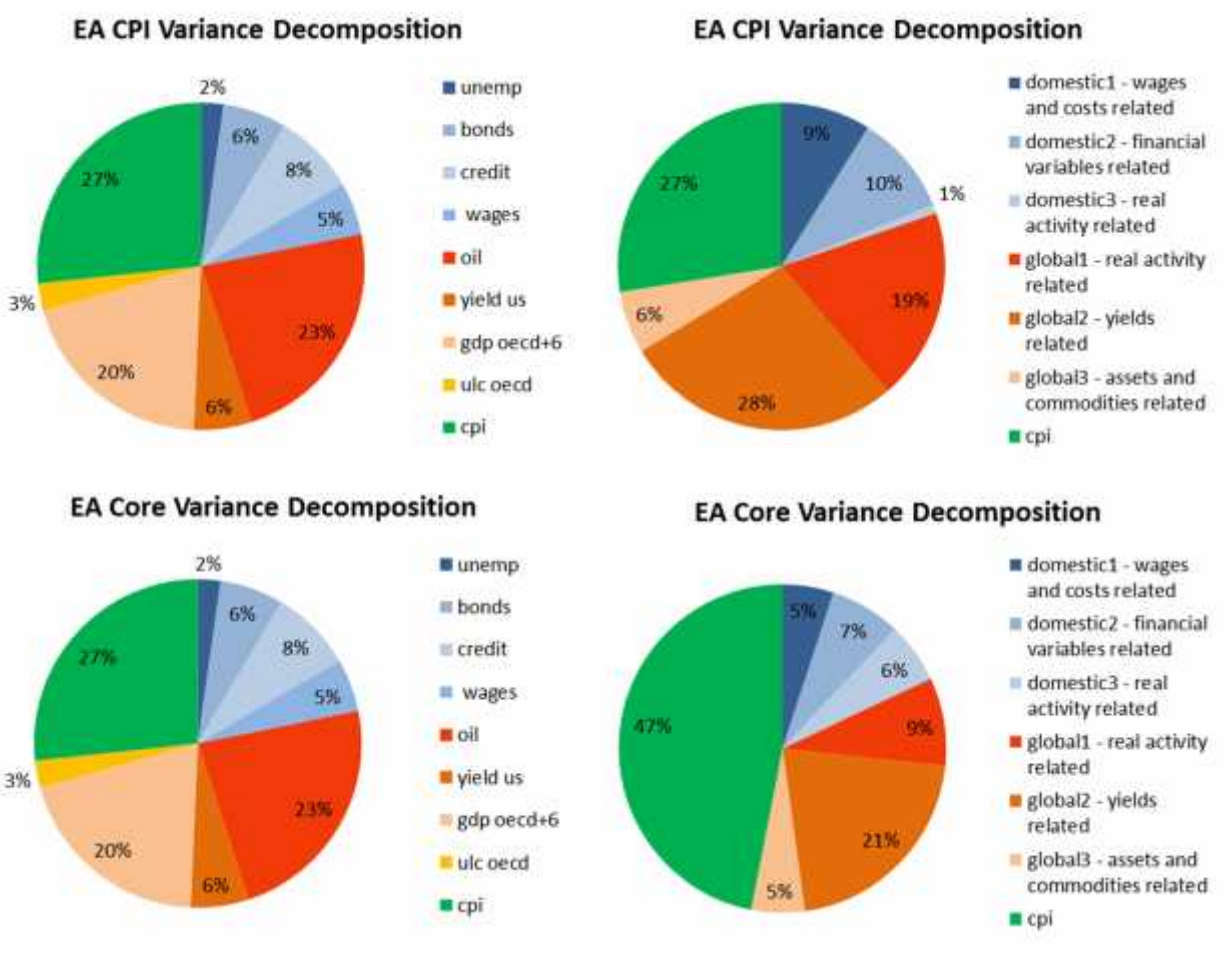
We compute the variance decomposition of the two VAR models which we use to assess the contribution of domestic and global determinants of inflation. The sources of data are ECB, FRED Saint Louis, and OECD. The sample has a monthly frequency and covers the period from January 1999 to May 2015.

Figure 2 presents the variance decomposition of CPI (first row) and Core inflation (second row), based on the first model with macro variables (first column) and on the second model with factors (second column). From the first model, it appears that domestic determinants of inflation capture a relatively small portion of

inflation, i.e. about 20%; among these 20%, those related to the labour market (wages and unemployment) are relatively minor. Global determinants are prominent in explaining inflation, with global output and the price of oil capturing significant portions of inflation with contribution above 20% for each. The conjunctions of hikes in the price of oil and trough in world output in 2008-2009 or of trough in the price of oil and output recovery in 2014-2015, which mitigate each other, help explain the low and stable inflation rate in these periods. It is important to stress that core inflation is computed on all items excluding energy and food, but that these components are not necessarily external factors. Moreover, the consumption of energy which is excluded from the core index may not entirely account for the incidence of oil as an intermediate consumption in the output process and then on the price of output. Finally, the core index may include the price of commodities: correcting the core index for the price of oil can be viewed as a proxy for a commodities-corrected price index.

The second model does not attribute inflation variations to deliberately-chosen variables but to the variables which actually contribute to the variance of inflation. They do not show a very different picture and therefore confirm the global nature of euro area inflation. The contribution of global factors to inflation is more than twice that of domestic factors, whatever the inflation index. The second model also highlights the substantial contribution of factors related to foreign yields; they explain between 20 and 30% of the variance of CPI or core inflation. The global monetary and finance environment has an impact on euro area inflation

Figure 2 – Variance decomposition



APPENDIX 2

Effects of monetary policy on inflation

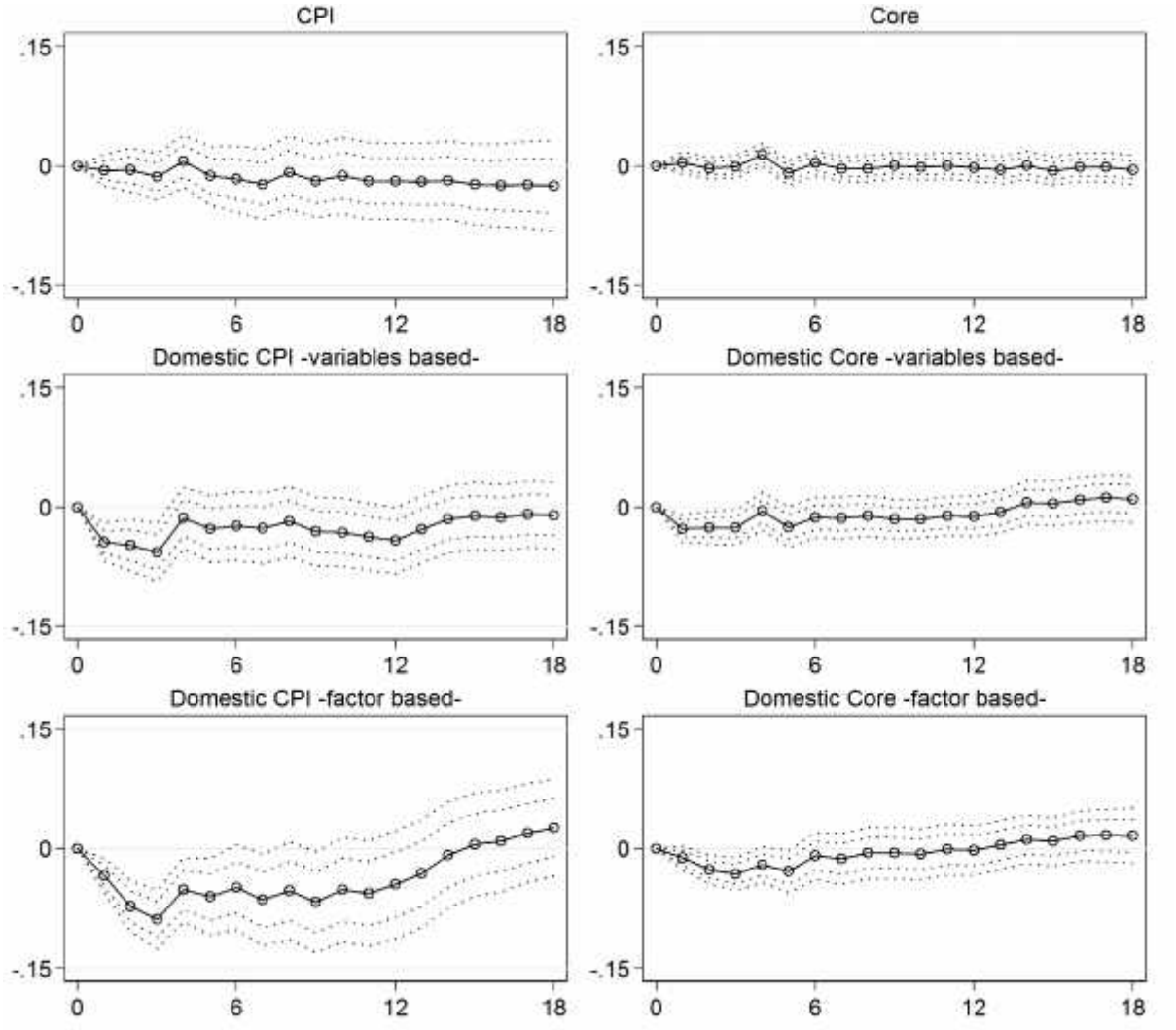
Drawing on these six measures of euro area inflation (headline CPI, core inflation, and domestic indices respectively for both, with corrections stemming from two models), we can disentangle the ability of ECB policies to impact the headline measures from its ability to impact domestic measures. We assess by how much ECB policies affect the headline CPI and core inflation, and compare with the assessment of how much the same ECB policies affect the domestic inflation indices that we computed.

We estimate the effect of a restrictive (positive) monetary shock on the different measures of inflation in a VAR model with 6 lags comprising unemployment, industrial production, credit growth, the relevant inflation measure, 10-year bond yields, euro/dollar exchange rate, CISS, oil prices, inflation expectations 5-year 5-year-forward, and the shadow rate which gives a proxy of conventional and unconventional monetary measures. Figure 3 plots the impulse response of inflation measures to the positive monetary shock.

The first row of figure 3 shows that a monetary shock has a minor and weak impact whatever the horizon (short or long) on headline inflation, CPI or core.

The second and third rows of figure 3 show that a monetary shock impinges on domestic inflation rates: a restrictive monetary policy generates a reduction in inflation rates, CPI and core, whatever the model used to correct for global factors. If the ECB were targeting a domestic inflation rate, it would be able to impact, then to control, this inflation rate.

Figure 3 – Effect of monetary policy shocks on inflation



Note: Responses of inflation measures to a positive (restrictive) monetary shock. Dotted lines represent 68% and 90% confidence intervals.

European Parliament

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is globalisation reducing the ability of central banks to control inflation?

Grégory CLAEYS, Guntram WOLFF

IN-DEPTH ANALYSIS

Abstract

After soaring in the 1970s, inflation in OECD countries stabilised, coming down from 9% on average in the early 1980s to about 2% in the years before the crisis, and to a lower level in recent years. This trend coincided with the acceleration of globalisation, triggering a debate about whether global integration (of goods, labour and financial markets) could be one of the main drivers of the disinflation process and whether central banks' ability to control inflation could be weaker as a result. In this policy brief, we explore the different ways in which globalisation could have an impact on inflation and monetary policy transmission channels. We conclude that inflation dynamics can be affected by globalisation and that central banks should take external factors into account in their decision-making processes and in their economic models. Ultimately, central banks retain their ability to control inflation, even if the transmission mechanisms are affected by globalisation and in particular by financial integration, especially if they accept flexible exchange rates.

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EXECUTIVE SUMMARY

- After soaring in the 1970s and early 1980s, inflation has declined significantly in all advanced countries and is now at very low levels. This movement coincided with the acceleration of globalisation, triggering a recent debate on whether globalisation could be one of the main drivers of the disinflation process, and whether the ability of central banks to control inflation could be undermined as a result.
- The acceleration in globalisation has mainly taken three forms that could affect inflation dynamics and monetary policy: trade integration, labour market integration and financial integration.
- Openness in terms of trade and finance has led to a greater sensitivity of domestic price levels to external price shocks. Trade with low-cost countries has increased massively in the last two decades, which has logically resulted in a reduction in the price of imported goods. Global competition between firms might have also reduced the pricing power of domestic companies, while the integration of billions of workers into the global labour market has likely reduced the bargaining power of domestic workers. The empirical literature shows that the contribution of globalisation to the global disinflation movement since the 1990s has been positive, but rather limited for the moment.
- A more important question is whether these integration trends affect the transmission mechanisms of monetary policy and reduce the ability of central banks to fulfil their mandate.
- The transmission channels of monetary policy could potentially be affected at various levels. First, central banks could lose their ability to control inflation if inflation becomes a function of global slack instead of being a function of domestic slack. Second, central banks could lose control of short-term rates if rates become a function of global liquidity instead of the liquidity provided by the domestic central bank. And third, central banks could lose their hold over domestic inflation and economic activity if long-term interest rates depend only on the balance between savings and investment at the global level, and not at the domestic level.
- It is true that the negative relationship between domestic slack and domestic inflation has changed and that that the slope of the so-called Phillips curve has flattened since the mid 1980s. However, recent empirical studies have failed to demonstrate that globalisation had been one of the main drivers behind this trend. A more plausible explanation seems to lie in the monetary policy changes that have taken place since the mid 1980s, with the adoption of credible inflation-targeting regimes in many advanced countries.
- Concerning the control of central banks over the domestic yield curve, it is clear that as long as central banks retain some kind of domestic monopoly over the issuance of base money, they will be able to control the shorter end of the domestic yield curve. For long-term rates, this is less clear, however. The conundrum episode of 2004-06 in the US suggests that long-term rates can

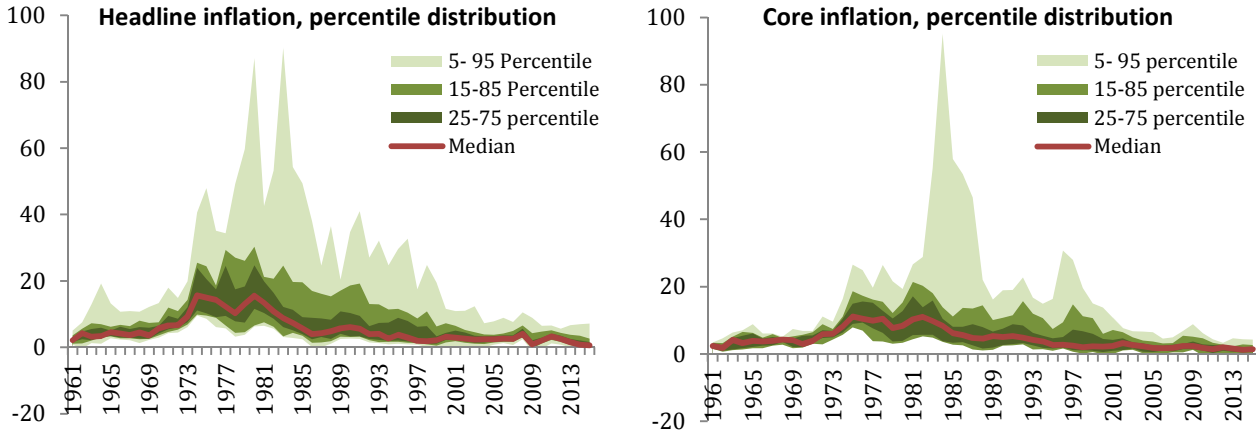
become less sensitive to short-term rates and that external factors can affect them significantly. Since the beginning of the crisis, central banks also showed that they were willing to use less conventional monetary tools in order to influence the whole yield curve, in particular when they are constrained at the short end of the curve by the zero lower bound.

- In any case, even if financial integration could result in a reduction of the role of the long-term interest rate channel, for countries accepting flexible rates globalisation should at the same time increase the role of the exchange rate as a transmission mechanism, because of the increased sensitivity to differences in interest rates of the demand for domestic and foreign assets.
- Given the potentially greater effects of external shocks on more open economies and the potential alteration of monetary policy transmission channels in more integrated financial markets, globalisation forces central banks to take external developments into account in their monetary policy decisions. In particular, central banks will need to have a medium-term policy goal orientation instead of trying to manage yearly inflation rates that are driven by global shocks. Overall, we think that central banks will retain their ability to stabilise inflation at the targeted level in the medium term, even though globalisation does not facilitate the central banks' task, which is already quite difficult because of the zero lower bound.

1. INTRODUCTION

Inflation has come down significantly in the last 30 years all over the world. Figure 1 shows the median inflation rate and the distribution of inflation rates of 50 major economies. Not only are inflation rates lower across the globe, but also differences in inflation rates now very minor compared to the past. In the 1970s, the average 25-75 percentile range for headline inflation was 7.8-23.7%, compared to 1.2-4% since 2010 (while the core inflation range was 6.5-17.7% in the 1970s compared to 0.9-3.2% since 2010). This lowering and narrowing of inflation has triggered a debate about whether globalisation is the driver of this disinflation and whether central banks' ability to control inflation rates has weakened.

Figure 1: Headline and core inflation across the world



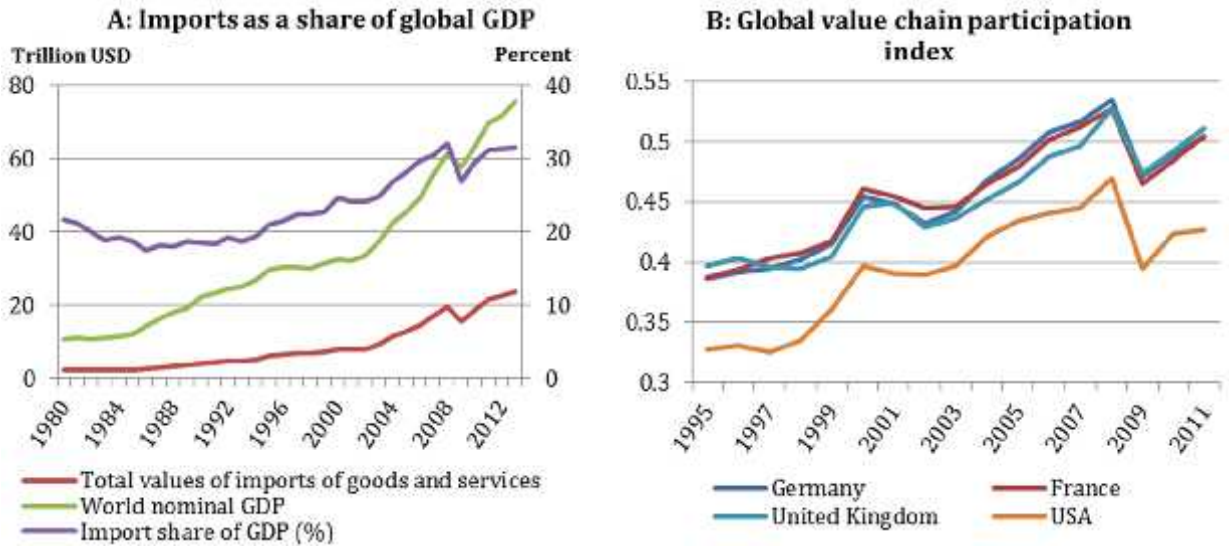
Source: OECD Economic Outlook and Bruegel calculations.
Notes: Median year-on-year inflation across an unbalanced panel of 50 countries for headline inflation and 38 countries for core inflation.

There are different definitions of globalisation, but for the purposes of this paper, three different forms of globalisation appear to be particularly relevant because they could have an impact on inflation dynamics and the conduct of monetary policy, as suggested for instance by Yellen (2006).

The first is globalisation in the markets for goods and services. As more and more goods and services are produced in many different parts of the world, the prices for these goods seem to be set in international markets. This might reduce the ability of central banks to control inflation1. Figure 2a shows that global trade as a percentage of global GDP has increased substantially in the last three decades. Figure 2b documents the increasing integration of production processes in global value chains (GVCs).

[1] See for instance Roach (2015), who argues that central banks have lost their ability to control inflation because of globalisation, but that they shouldn't worry about it and should instead focus on financial stability risks.

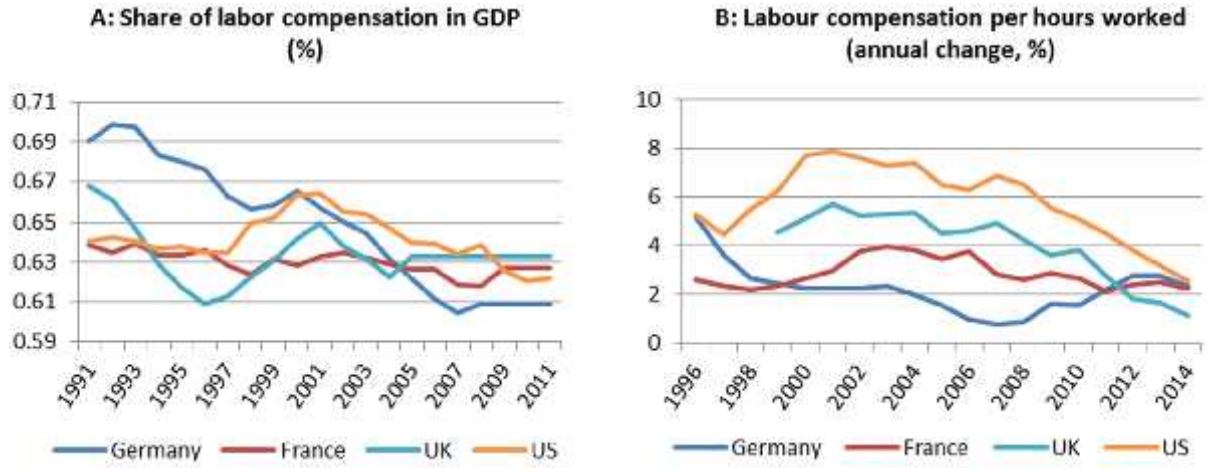
Figure 2: Global trade integration



Source: OECD, IMF IFS, Bruegel calculations, World Input and Output database (WIOD) and ECB calculations following Koopman et al (2010).
Note: The global value chain participation index is a synthetic measure of how much an economy is involved in internationally fragmented production (GVC).

The second relevant form of globalisation is the global integration of labour markets. Migrating workers, and most importantly the increase in the global labour force available to produce exportable goods and services from 1.5 to 3 billion workers in two decades (Freeman, 2006), is probably reducing the bargaining power of unions and workers in advanced countries in setting wages and therefore influencing domestic inflation rates. Combined with increased trade integration and other factors, this might have contributed to the structural shift of power from workers to firms (as Figure 3 illustrates) with profound effects on inflation.

Figure 3: Global labour market integration



Source: FRED (Saint Louis Fed); OECD
Note: A: Share of labour compensation in GDP at current national prices; B: Series have been smoothed by 5-year moving average

Finally, increased financial integration is often seen as a factor undermining the ability of central banks to control interest rates, especially over longer time horizons, and might thereby influence output and inflation. Deeper financial integration has triggered a convergence of global interest rates (as Figure 4 shows).

Figure 4: Convergence of global interest rates

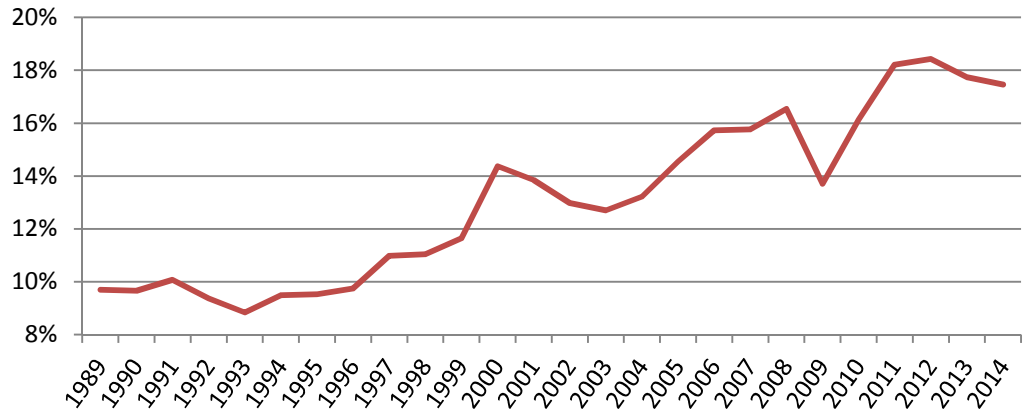
Source: Datastream

This paper first reviews the impact of these three integration trends on inflation dynamics. We then discuss whether and how this affects the ability of central banks to influence inflation. Our approach is similar to Mishkin (2008), who argued that globalisation could influence policymakers in stabilising prices and output in two different ways: by directly influencing inflation and output, and by influencing the way monetary policy can influence inflation and output.

2. GLOBALISATION AND INFLATION

Imports from outside the EMU have significantly increased as a share of GDP since the beginning of the 1990s (Figure 5)2. The prices of imports should therefore matter for domestic inflation rates but are also determined by the exchange rate. Moreover, in addition to increased imports, one can observe increased exports, which also affect the domestic economy's price setting mechanism.

Figure 5: EMU imports of goods from extra EMU countries (% of GDP)



Source: Eurostat.

A number of different channels can be identified through which import prices impact domestic inflation. First, there is a direct effect from lower prices for imported goods, either because they enter the consumer basket directly or because they reduce the cost of domestic production via imported intermediate goods. Moreover, there is an indirect effect or second-round effect in that the increased purchasing power of wages induced by lower import prices might dampen demand for wage increases. Finally, there is also a wealth effect in that lower import prices free purchasing power for domestic goods which in turn can boost demand and inflation in that sector3. The overall inflation effect is therefore theoretically not fully determined.

Empirically, of course, fluctuations in global prices can have major temporary effects on domestic prices. Figure 6 shows that energy and (in a lesser extent) food price inflation are major determinants of euro-area headline inflation. These fluctuations pose a significant challenge to central banks. Some central banks have reacted by emphasising that their inflation goal is centred on core inflation measures4. Others, such as the ECB, carefully document that core inflation measures suffer from a number of drawbacks5. Instead, the ECB emphasises the medium-term nature of its inflation goal. The aim is not to reach an inflation rate of close to 2% every year but rather to have such an inflation rate in the medium term. As a result, if inflation of the price of important imported goods is on a long-

[2] Although the increase in imports from outside the EMU is significant, the EMU, just like other continental "monetary zones" such as the US or China, is still relatively closed in comparison to more open economies like the UK for which good imports as a share of GDP are around 25% in 2014.

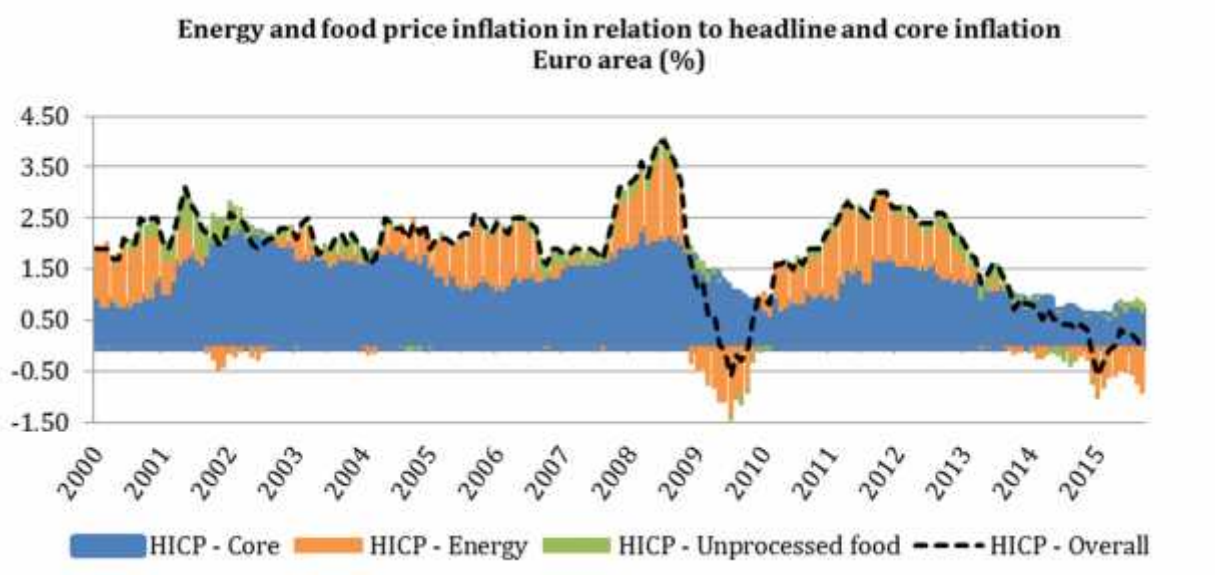
[3] As Ball (2006) explains, denouncing what he calls the "accounting theory of inflation fallacy", lower prices of some goods are above all changes in relative price changes that do not necessarily translate into a decrease of the aggregate price level. For instance, imported Chinese shirts makes shirts cheaper compared to other goods and services, and therefore purchasers can spend a smaller share of their wages on shirts and more on other goods and services, the prices of which will tend to go up or increase more rapidly. It is therefore possible that the average level of prices will not be affected.

[4] This was the case of the Central Bank of Korea which targeted CPI inflation excluding petroleum and agricultural products from 2000 to 2006.

[5] See for instance Cristadoro et al (2005)

term downward trajectory, this dampens inflation even in the medium term and monetary policy would then have to aim to increase the inflation rate of domestically produced goods in order to reach its 2% target.

Figure 6: headline and core inflation in the euro area



Source: Eurostat.

Another channel through which increased integration of goods markets affects inflation dynamics is its effects on competition. Increased global competition reduces mark-ups for domestic firms in advanced countries. In addition, increased competition might have spurred innovation (in the 1990s in the US for instance) and increased productivity, which could have exerted downward pressure on production costs and therefore on prices.

Labour market integration could also have a significant impact on domestic inflation rates. Workers in some euro-area countries might accept wage restraint in the face of possibly larger numbers of migrants or posted workers that could come to perform their work. Such wage restraint could in turn lead to lower inflation numbers. Empirically, it is hard to know whether this effect is relevant. Certainly, many euro-area countries currently receive large numbers of migrants, but the recent empirical literature suggests that such immigration has only moderate effects on wages6. More importantly, the integration since the beginning of the 1990s of China, India and countries from the former Soviet bloc into the global labour market has increased competition between workers across countries and reduced the bargaining power of workers in advanced countries7 (especially of the less skilled) because of the enhanced opportunity for firms to substitute imports for domestic production and the fear of offshoring.

Finally, capital market integration could also affect inflation rates. Cheaper capital would reduce the cost of production and thereby affect inflation. Again, the empirical relevance of this effect might be quite limited.

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6 For instance, Dustmann et al (2014) find an overall slightly positive effect of migration on wages in the UK. It is true that migration leads to a reduction in wages in the parts of the distribution where the relative density of migrants is higher than the relative density of natives, but it also leads to an increase in native wages in the parts of the distribution where the opposite is the case.

7 As a proxy for this loss in bargaining power of workers in advanced countries, Cecchetti et al (2007) report evidence that the number of days lost to strikes has been reduced significantly since the mid 1990s and is now at an historically low level.

A different question is whether deeper financial integration, deeper trade integration and deeper labour market integration affects the transmission mechanisms of monetary policy, a topic we turn to in the next section.

3. GLOBALISATION AND THE TRANSMISSION MECHANISMS OF MONETARY POLICY

What are the main transmission channels of monetary policy and how could they be affected by globalisation? Central banks mainly influence domestic economic activity and inflation through changes (and expected changes) to financial conditions. In normal times, the main way for central banks to do that is though their ability to control the short-term interest rate at which banks lend to each other overnight (i.e. the Fed fund rate in the US, the EONIA in the euro area) through the provision of short-term liquidity (via open market operations in the US, via direct lending to banks in the euro area)8. In turn, overnight interbank rates influence financial conditions through other types of short-term rates and the rest of the yield curve, as well as equity prices and exchange rates, which are all relevant for aggregate demand, economic activity and ultimately for inflation.

As noted, for instance, by Woodford (2009), three aspects of the transmission mechanism of monetary policy could potentially be affected by globalisation:

- Central banks could lose their ability to control inflation even if they retain some power over domestic output if inflation becomes a function of global slack instead of being a function of domestic slack;
- Central banks could lose control of short-term interest rates if the liquidity premium becomes a function of global liquidity instead of domestic liquidity provided by the domestic central bank;
- Central banks could lose its grip on inflation and the domestic economy if long-term interest rates depend only on the balance between saving and investment at the global level and not at the domestic level.

Let's take a look at these three assertions in turn and see if there is some truth to them.

Concerning the first point, we assume for the moment (we discuss that assumption later) that despite globalisation, central banks can perfectly control financial conditions and therefore influence the level of economic activity domestically (at least in the short term). Traditionally, in a closed economy, the existence of slack reduces the ability of producers to increase prices and of workers to ask for higher wages. In broad terms, the transmission mechanism of monetary policy relies on this inverse relationship (known to economists as the Phillips curve) between the degree of slack and the price level to achieve the desired level of inflation.

Could the loss of workers' bargaining power in wage negotiations and the reduction of the market power of firms discussed in the previous section lead to a flattening of the Phillips curve (i.e. weaken the positive link between domestic activity and domestic inflation)? In that case, even with a low domestic unemployment rate, wage developments and domestic inflation could be subdued as long as some global slack exists9. It is true that Phillips curves have started to flatten in many advanced countries since the mid 1980s, or in other words, that the rate of unemployment triggering wage increases and inflation is lower today than in the past. However, while recent research tends to show that consumer price indexes are slightly affected by import prices10, the literature on Phillips curves in the US

[8] Since the beginning of the crisis, major central banks worldwide have expanded their traditional toolbox with new instruments to try to influence directly the longer end of the curve (for instance with the introduction of LTRO, TLTRO, forward guidance and quantitative easing in the euro area)

[9] Another possibility could be that, even if the relationship between employment and wages remains strong, global competition between firms could reduce their pricing power and force them to not pass on the wage increases into the prices of the final products, and instead cut their mark-ups.

[10] Pain, Koske and Sollie (2006) suggest that the direct effect of globalisation on average annual consumer price inflation is limited and within the range of 0.0 to –0.3 percentage points over the period 2000 to 2005.

and Europe11 also suggests that foreign output gaps are not important determinants of domestic inflation12.

As pointed out by Mishkin (2008), better monetary policy in advanced countries is a more plausible explanation for the observed flattening of the Phillips curves and is more consistent with the timing of their flattening. After the surge of inflation of the 1970s, monetary authorities implemented credible policies that have anchored inflation expectations at a low but positive level. These policies, combined with the move away from indexation of wages, have made external price shocks much less persistent than in the 1970s thanks to the absence of the second-round effects. Figure 6 suggests a low pass-through of recent external shocks from the headline inflation rate (e.g. from oil prices) to the core measure.

Second, on the control of central banks over their main short-term rate instrument, it is clear that in a closed economy the monopoly given to central banks to issue base money allows them to perfectly control the shorter end of the yield curve (the previous discussion took for granted that the central bank was able to change financial conditions to influence domestic economic activity). However, given the massive provision of liquidity by all major central banks since the beginning of the crisis, there have recently been a lot of discussions about the role of "global liquidity" and an increased perception that it may now matter more than domestic liquidity induced by domestic monetary policy in determining domestic financial conditions, especially for small open economies.

The increase in the correlation of the short-term rates of advanced countries in the last decade has led some observers to fear that global financial integration has eroded the monopoly power of central banks by giving agents the possibility to use different currencies. In theory, the perfect control of the central bank over short-term rates derives from the assumption that only the currency and reserves issued by the central bank are useful for facilitating transactions. So what happen if this assumption is relaxed?

It is important to note that in advanced countries, we are very far from a situation in which multiple currencies could be substitutes for executing payments. However, even if that was the case and multiple currencies would be accepted as means of payment, as explained by Woodford (2007), the central bank could still have some control over inflation as long as some goods are priced in the domestic currency. In extremis, however, the possibility to use multiple currencies as means of payment would mean that inflation is measured in different currencies – close to a system of dollarisation/euroisation in which the inflation rate is set outside of the dollarised/eurorised country. However, dollarisation/eurorisation are not an outcome of globalisation. Dollarisation usually happens only in countries in which the central bank's objective is not to stabilise the price index in its own currency. Virtual currencies such as Bitcoins are also still quantitatively small. So overall, central banks retain control of short-term interest rates, over which they have the monopoly power. By controlling short-term rates, they can influence financial conditions and demand.

Finally, long-term rates are conventionally decomposed as the expected future path of short-term nominal rates plus some duration and risk premium. So, if we believe that short-term rates are still under the control of central banks, it should logically follow that long-term rates should also be under central-bank control. However, developments in the last few decades have shown that long-term rates are more influenced than before by

[11] One of the first papers trying to tackle that issue, by Borio and Filardo (2006), asserted that the flattening of Phillips curve could come from the fact that foreign output gaps matter more than domestic ones, but its conclusions were quickly refuted by Ihrig et al (2007), Ball (2006) and Pain, Koske and Sollie (2006).

[12] From a theoretical perspective, Woodford (2007) convincingly shows that even in the extreme case in which the labour market was fully integrated at the global level (a situation very far from the current situation, as suggested by the empirical literature) and therefore in which foreign output gaps would matter and influence the slope of the Phillips curve, monetary policy would still be able to stabilise domestic inflation.

external factors, as capital markets become more integrated worldwide. It is not only interest rates in advanced countries that are more correlated than before13, but it also seems that on various occasions, long-term rates have become less responsive to short-term rates. In the recent past, the "conundrum" period (2004-06), during which long-term rates were well below short-term rates, is a good example of a disconnect between the movement of short and long-term rates. It seems that the global savings glut phenomenon identified by Bernanke (2005), with high demand coming from emerging markets for safe assets in the form of sovereign bonds from advanced countries and from the US in particular, could have been responsible for a major reduction in risk premiums at the time. However, after the start of the crisis, major central banks have expanded their traditional toolbox with new instruments (asset purchases, forward guidance, long-term refinancing operations, etc.) in order to influence more directly the longer end of the curve, in particular since they have reached the zero lower bound.

In the extreme case in which long-term interest rates would be determined by the balance between investments and savings at the global level because of full capital market integration (again a situation still quite far from today's), it is conceivable that domestic monetary policy could lose some of its influence over long-term interest rates (especially if central banks do not want to use unconventional monetary tools in normal times). However, it would not mean that domestic central bank would lose their ability to control inflation. As highlighted by Yellen (2006) and Mishkin (2008), even if financial globalisation could reduce the role of the long-term interest rate channel, it increases at the same time the role of the exchange rate as a transmission mechanism. The disappearance of capital controls and the reduction in the portfolio home bias in many advanced countries already mean that financial markets are much more integrated than a few decades ago and that the demand for domestic and foreign assets is more sensitive to differences in interest rates, thus enhancing the influence of monetary policy on the exchange rate. Furthermore, in the medium term, deflation or even lower inflation abroad than at home should also lead mechanically to an appreciation of foreign currency relative to domestic currency, which should also limit the direct effect of globalisation through lower import prices. In theory, a flexible exchange rate regime should therefore shield a country's monetary policy from the main effects of financial and trade integration.

[13] As pointed out by Bernanke (2007), correlations between long-term rates in the US and those in other industrial countries are high and have risen significantly in the last decade. For instance, from 1990 to 2006, the daily correlation between changes in ten-year swap rates in the United States and Germany averaged 0.42, and during the last three years of that period, rose to 0.65.

4. CONCLUSIONS

There are some good reasons to believe that globalisation can change inflation dynamics. More integration in goods markets means that imported goods with fluctuating prices have more influence over the price level, as is most evident with oil and food, as well as with tradeables produced domestically. Deeper integration of labour markets can affect the local workers' wage-bargaining power, while deeper financial integration has an influence on long-term interest rates. All three effects could not only influence inflation rates but also affect in one way or another the transmission mechanism of monetary policy.

All three effects render the work of central banks in achieving their inflation target more difficult. However, powerful counter-forces are also at play. Deeper financial integration not only affects long-term interest rates but also increases the role of the exchange rate, and can thereby increase the effectiveness of monetary policy. Labour market integration is unlikely to be a strong and important element in today's world of managed borders. Trade integration only affects a limited part of the basket of goods and services that are consumed. Disinflationary tendencies in respect of those tradeable goods can be offset by higher inflation rates for purely domestic goods.

In an increasingly integrated world, central banks need to take into account global economic developments and their spillovers. But through having almost complete control over short-term nominal interest rates and through their ability to affect long-term interest rates directly through asset purchases, central banks have powerful instruments to steer financial conditions that affect demand and inflation. Finally, as has been forcefully argued by Trichet (2008), a medium-term orientation of monetary policy reduces the need for the central bank to react to short-term variations in inflation rates that arise from external price shocks.

A more serious problem for monetary policy than globalisation is the constraint resulting from the zero lower bound. Once the short-term nominal interest rate has fallen to zero, financial conditions can be negatively affected by a temporary drop in inflation over which the central bank has no control. And while we argue in favour of unconventional monetary policy such as asset purchases, the ability of the ECB to reach its inflation goal would be facilitated by better macroeconomic policies in the euro area.

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NOTES

European Parliament

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is globalization reducing the ability of central banks to control inflation?

Christian DREGER, Malte RIETH, David POTHIER

IN-DEPTH ANALYSIS

Abstract

In the period following the financial crisis, euro area inflation fell to historically low levels. In this report, we investigate the ability of central banks to control inflation. The rising globalization of markets may have changed the determinants of the inflation process, as drivers from the global economy might have gained importance. This could imply that the task to control domestic inflation is becoming more challenging for central banks. In this report, the impact of globalization on inflation is considered in more detail. Specific topics include the potential role of commodity prices and changes in wage-setting behaviour.

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EXECUTIVE SUMMARY

- Starting from the 1980s, inflation has declined in many countries. Lower inflation might be partially caused by the greater success of monetary policy in controlling the inflation rate. The stronger focus on inflation control, underpinned by more central bank autonomy caused by flexible exchange rates and a greater awareness to act in a pre-emptive manner, resulted in better and more credible policy.
- Euro area inflation fell further following the recent crisis. Still, the evolution might be explained in terms of standard determinants, such as inflation expectations, output gaps and commodity prices. Inflation expectations decreased, in line with actual inflation. Domestic demand is still rather weak and hampered by fiscal consolidation. The fall of commodity prices accelerated the evolution.
- In addition, globalization may have gradually changed the conditions under which economies operate, with potential effects on inflation and inflation control by central banks even long before the financial crisis. Channels include higher competition in integrated markets and cost reductions, commodity price shifts and changes in wage-setting behavior.
- Up to now, the evidence for the presence of global variables in the Phillips curve framework is rather weak. With a few notable exceptions, global output gaps are found to be insignificant. More supportive effects for the impact of globalization on domestic CPI inflation are are detected for the import price channel.
- Depending on their nature, the effects of oil price shocks on domestic inflation may differ. Demand shocks tend to be more important than shocks in the oil supply. The empirical evidence on whether oil price effects have increased in recent times is inconclusive. On the one hand, wage-price spirals are less relevant in recent periods. On the other hand, oil price fluctuations might have a higher impact on domestic inflation in a very low inflation environment.
- The trade-off between inflation and unemployment has weakened. This can be attributed to central banks' success in anchoring long-term inflation expectations before the crisis. In addition, structural changes such as globalization have put downward pressure on wages, making prices and wages less responsive to changes in domestic demand. Hence, cyclical changes in unemployment are less likely to have significant inflationary or disinflationary effects.
- To the extent that domestic inflation is driven by global factors, the task to control inflation becomes more challenging for central banks. While central banks can always control inflation under a floating exchange rate regime, globalization presents more of a problem for the short-run stabilization of output and inflation. Up to now, the empirical results on the globalization effect are rather fragile.

1. INTRODUCTION

There is widespread agreement among economists that in the long run, when prices can completely adjust, inflation is inherently a monetary phenomenon (Benati, 2009). Since money defines the unit of account, monetary developments are integral for the determination of prices and inflation. Excessive liquidity can provide early signals for the occurrence of speculative bubbles in asset prices with potential risks to inflation and the real economy (Bussiere and Fratzscher, 2006, Adalid and Detken, 2007). Thus, monetary developments play a key role in the two pillar strategy of the ECB. While one pillar is based on the economic analysis of price risks in the short run, the other is built on the monetary analysis of price risks over the medium and long term. The explicit reliance on monetary aggregates is a distinguishing feature of the ECB compared to other central banks (Hall, Swamy and Tavlas, 2012). Over long periods, average inflation can be traced back to the rate of monetary expansion. According to the quantity theory of money:

(1) $$p_t^* = m_t - y_t^* .$$

Thus, long run equilibrium inflation p^* should be equal to the difference between money growth m and potential output growth y^*. Other things being equal, an increase in the rate of monetary expansion will ultimately lead to higher inflation pressure in the long run. Following De Grauwe and Plan (2005), tighter linkages between money and prices can be observed, particularly in high-inflation economies. Despite the fact that the impact of money on prices is a long lasting phenomenon, Dreger and Wolters (2014) conclude that monetary aggregates have some potential to improve short term inflation forecasts for the euro area, even in the most recent period. The accuracy rises with the forecasting horizon. In addition, the development of monetary aggregates does not yet indicate inflation pressure in the euro area; see Dreger and Wolters (2015).

Because of the existence of price rigidities, monetary policy can affect real output, but the impact is limited to a transition period when prices do not fully adjust. Monetary policy influences the financial conditions under which economic actors operate. During normal times, the central bank adjusts the policy rate, which typically is set by some kind of rule. In fact, the so-called Taylor rule is often used to describe the monetary policy stance in the period before the crisis. Here, the policy rate reacts to the (expected) gaps in inflation and output; i.e. the deviations of actual inflation from the inflation target and actual output growth from potential output growth. According to the Taylor (1993) principle, the coefficient of the inflation gap should exceed unity to ensure that real interest rates respond to higher inflationary pressure. After the turn of the century, however, rising deviations can be observed, as actual interest rates fell increasingly below the benchmark defined by the rule. However the empirical fit could be improved if the original rule is extended with foreign variables (Belke and Gros, 2005). This accounts for higher dependencies of central bank decisions around the world. Actions by the US Federal Reserve, for example, led to similar moves of other central banks, including the ECB.

In normal times, policy rate changes are passed to the entire term structure, i.e. short and long term interest rates that influence the borrowing costs for firms and households. Long term interest rates are affected, as they include current and expected future short term rates. Nominal interest rates are targeted, but due to price rigidities, central banks implicitly influence real interest rates. If actual output is above its long run level, inflation pressure is expected to increase. By raising the policy rate, the central bank lowers excess demand, and subsequently inflation declines. Policy measures can also influence expectations about how the economy will develop in the future, including expectations for wages and prices.

For instance, higher inflation expectations may lead households to increase consumption spending. Since expectations can inherently influence current inflation, the appropriate communication of monetary policy and the anchoring of expectations are crucial for achieving policy goals. In the financial crisis, short-term interest rates became fixed at the zero lower bound. Since they are unable to fall much further, central banks introduced unconventional measures to provide additional stimulus to the real economy. The ultimate aim is to reduce long-term interest rates to improve financial conditions (Beckers, Bernoth, König and Grazzini, 2015).

Starting from the 1980s, inflation declined in many countries, including the US and the euro area. A review of the experience is provided by Galati and Melick (2006). Lower inflation might be partially explained by the higher effectivity of monetary policy during the Great Moderation (Bernanke, 2004). The stronger focus on inflation control, underpinned by more central bank autonomy caused by flexible exchange rates and a greater awareness to act in a pre-emptive manner resulted in a better and more credible policy.

According to the standard Phillips curve model

(2) $$p_t = p_t^e + \quad (y_t - y_t^*) + \text{a} oil_t + £_t$$

the determinants of actual inflation p include inflation expectations (indexed with a superscript e), pressure from the demand side captured by the output gap, where y (y^*) is actual (potential) output growth, and international supply shocks, proxied by commodity (oil) prices (Woodford, 2003). The error term ε should satisfy the white noise properties, and β and λ are parameters to be estimated. Monetary policy affects all variables on the right hand side, apart from commodity prices, as they are determined by global markets. It should be noted that the determinants on the right hand side still explain the recent inflation experience, at least in part. Due to the inflation decline in the post-crisis period, long run inflation expectations decreased. Euro area demand is also weak and hampered by fiscal consolidation. The fall of commodity prices accelerated the evolution.

In recent years, however, globalization has changed the conditions under which economies operate, with potential effects on inflation. Due to higher openness, the coefficient of the output gap might have declined. Thus, the Phillips curve is somewhat flatter than in the past. This finding is often based on real marginal costs rather than output gaps, as the former appear to be more successful from the empirical point of view (Sbordone 2007). The empirical evidence for a weaker relationship between the output gap and inflation is discussed later in this report. In addition, competition has intensified since markets have become more integrated, thereby reducing markups in wages and prices. The inclusion of firms from emerging markets in international production chains lowered input costs and may have contributed to lower global inflation (Guerrieri, Gust and Lopez-Salido, 2010). In this policy brief, we look at the impact of globalization, the role of commodity price shifts and changes in wage-setting behaviour on inflation.

2. GLOBALIZATION AND INFLATION

Due to the integration of product and financial markets, macroeconomic outcomes, such as domestic GDP growth and inflation increasingly depend on international factors. Intensified trade with low cost countries can lead to a decline of inflation through lower import prices for intermediate and final goods. Driven by advances in information and communication technologies, production can be organized in highly fragmented stages, thereby exploiting relative cost advantages of different locations. Hence, the basic Phillips curve specification (2) could be augmented with globalization measures. Low demand in one country may be compensated by high demand in other areas, and supply shortages in one region by more ample supply in another. To the extent that the integration of markets has stimulated global long run output growth, foreign output gaps may have declined. However, these measures are beyond the influence of national authorities. Thus, monetary policy could lose its ability to control inflation, especially in the short run.

2.1. The role of global output gaps

The empirical evidence on the impact of globalization on domestic inflation is ambiguous. Tootell (1998) explore a Phillips curve and added trade-weighted measures of capacity utilization for the US major trading partners. The standard model (2) still provides a reasonable fit to the data, as the foreign variables are not significant. In contrast, Gamber and Hung (2001) specify a Phillips curve by including a broader set of countries. Import prices exert a larger impact in industries with larger import penetration. High foreign capacity utilization accounts for much of the decline in US inflation.

Similarly, Pain, Kospke and Sollie (2006) find that consumer prices in the industrialised countries are driven by import prices and that the multiplier has increased over time. While the sensitivity of inflation to the domestic output gap declined, its sensitivity to foreign conditions increased. However, while the transmission comes through import prices, a separate role for foreign output gaps cannot be confirmed. Based on panel regressions for the industrial countries, Ball (2006) finds that the role of the foreign output gap for inflation is smaller than that of the domestic output gap and significant only at the margin. It adds little, if any, explanatory power to the standard model. Globalization changed neither the course of long run inflation nor the structure of the Phillips curve benchmark. Calza (2009) replicate the Tootell analysis for the euro area, finding weak evidence that global capacity constraints have explanatory power for domestic inflation. López-Villavicencio and Saglio (2014) did not find support for the relevance of globalization in making inflation less responsive to output expansions in the main industrial countries.

In contrast, the findings of Borio and Filardo (2007) are heavily in favour of the impact of globalization. While the sensitivity of inflation to domestic output gaps decreased over time, proxies for the global economic slack add explanatory power in a large panel of countries. The presence of the global slack variable reduces the significance of the domestic output gap. However, if the degree of business cycle synchronization between the country under consideration and the global economy is rather high, the individual effects of the domestic and foreign output gap are hard to identify. In any case, the findings appear to be robust even after variables for external shocks on domestic inflation, such as oil and import prices are taken into account. The measure of global slack is constructed through the aggregation of country-individual output gaps. Weights are chosen in line with trade (exports and imports), exchange rates and production. But, as noted by Ihrig, Kamin, Lindner and Marquez (2010), the results likely lack robustness, as they depend highly on the construction of the foreign gap. Plausible variations in the weighting scheme, for instance due to a broader range of trading partners, led to a deterioration of the evidence. In addition, the treatment

of inflation expectations plays a crucial role. The latter authors find little support for an increasing role of globalization. The effect of foreign output gaps on domestic inflation appears to be largely insignificant and often displays the wrong sign. Moreover, the decline in the responsiveness of inflation to the domestic output gap observed in many countries cannot be traced to the globalization phenomenon. The countries where the impact of the output gap declined the most were not those where openness to trade increased. Similarly, Mody and Ohnsorge (2007) conclude that higher shares of trade did not reduce the sensitivity of inflation to domestic output gaps.

The globalization effect is difficult to explore in single regression models. Dynamic effects and interdependencies might not be captured properly by univariate approaches. Indeed impulse responses based on structural time varying VAR models reveal that global output gaps can affect the inflation dynamics in many countries. The conclusion appears to be robust across countries, periods and the choice of the identification scheme. However, in contrast to expectations, the impact of the foreign output gap did not increase over time (Bianchi and Civelli, 2015). The impacts of the global slack on inflation are positively related to the degree of economic integration, the latter proxied by the degree of business cycle synchronization. In addition, the inflation response to foreign output gap shocks is positively related to the degree of openness.

2.2. Decreasing production costs

Globalization has boosted competition and can therefore contribute to a decrease in inflation. Chen, Imbs and Scott (2009) look at disaggregated EU data, finding evidence that trade openness lowers prices by reducing firm markups and stimulating productivity. Following Guerrieri, Gust and Lopez-Salido (2010), foreign competition plays a major role in accounting for inflation in the traded goods sector. Since this sector is subject to international competition, the results point to declining markups due to the stronger integration of markets. Due to wage dependencies across the different sectors of the economy, price developments in traded goods will ultimately lead to spillovers to non-traded goods. By applying an IV estimation strategy, Auer and Fisher (2010) and Auer, Degen and Fisher (2012) conclude that import competition from low-wage countries has a more pronounced downward effect on prices and long run inflation in the US and the euro area than previously thought, especially in the labour intensive industries. For instance, if exporters from low wage countries capture 1 percent of the European market share, producer prices in manufacturing will decrease by 3 percent. This result is driven by higher import competition from low-wage countries in Asia, particularly China. However, effects from low wage countries in Central and Eastern Europe are not detected.

By employing the global VAR framework as well as large scale macroeconometric models, Dreger and Zhang (2014) provide evidence that the Chinese integration into the global economy reduced inflation in the main industrial countries following the financial crisis, not just in Japan, due to strong trade relationships, but also in the US and the euro area. However, the effect does not appear to be very strong. Similarly, the panel regressions presented by Côté (2008) point to modest effects. According to Kamin, Marazzi and Schindler (2006) the impact of Chinese exports on global import prices is not negligible, but even lower than in the aforementioned studies. Imports from China had little effects on producer prices in the US.

3. COMMODITY PRICE SHIFTS AND INFLATION

The consequences of global commodity price shifts on domestic economic conditions depend on whether the country is a commodity importer or exporter. In the report we focus on net importers of commodities such as the euro area. The commodity can be a final good, for example agricultural products, or an input factor to production, such as oil or metals. As oil is the most important commodity import in advanced economies in terms of import volume relative to other commodities, the discussion centres on the effects of global oil prices on domestic inflation.

3.1. Should central banks target core or headline inflation?

The academic literature has reached no consensus on whether central banks should target core inflation, which excludes price inflation of energy and food items, or headline inflation, which includes them (De Gregorio, 2012). The majority of inflation targeting central banks uses headline inflation as their target (Hammond, 2012). Reasons are mainly of practical nature: Inflation targets in terms of headline inflation are easier to communicate to the public and are consistent with other price measures used; for example, in the planning and communication of public balances. In case of persistent shocks in energy and food prices, core inflation will signal actual inflation only with delay, depending on the length of pass-through of shocks to other prices. Here, we focus on the effects of commodity price shocks on headline consumer price index inflation.

3.2. Sources of oil price fluctuations

To assess the effect of oil price shocks on domestic inflation, it is important to distinguish between the underlying forces that trigger oil price changes. Kilian (2009) decompose oil price movements into three exogenous contributors: shocks to the physical supply of oil (oil supply shocks), changes in global demand for oil driven by global business cycles (aggregate demand shocks), and shifts in the precautionary demand for oil due to changing expectations about future oil supply or demand conditions (oil-market specific shocks). Depending on the (unobservable) nature of the movements in (observable) oil prices, the effects on domestic inflation can differ considerably.

The author shows that aggregate demand shocks and oil-specific shocks are quantitatively more important than oil supply shocks. Aggregate demand shocks are responsible for long-lasting swings in oil prices, while oil-specific shifts tend to be behind shorter and more pronounced oil price increases and decreases. Kilian (2008) estimates that the median response of CPI inflation in G7 countries to unexpected changes in oil supply, resulting, for example, from political events in the Middle-East, peaks after three to four quarters. He estimates that an exogenous reduction in global oil production of one percent leads to an increase in consumer price inflation in the US of approximately one half percentage point after three quarters. The effects are quantitatively relatively similar in Italy, France, and Germany. In the UK, Canada and Japan the peak increase in inflation is earlier; concentrated in the first two quarters after the oil supply disruption. Overall, however, Kilian (2008) concludes that the evolution of CPI inflation in the G7 countries would have evolved very similar to the actual path observed since the 1970s even in the absence of oil price fluctuations due to unexpected changes in the global supply of oil.

Oil price changes driven by global aggregate demand have strong and long-lasting effects on the evolution of both domestic GDP and inflation (Kilian, 2009). Two offsetting forces are at play. The direct effect of an increase in global demand stimulates the domestic economy, i.e. GDP will increase. At the same time, however, the oil price will increase, thus reducing the initial GDP expansion. Regarding domestic inflation, both the direct and indirect effects work in the same direction. The two effects led to a sustained increase in the CPI level for more than three years.

Lipinska and Millard (2012) provide a theoretical model to investigate the transmission of higher oil prices on output and inflation in advanced economies. The authors determine two main influences on domestic inflation: a headwind effect, in which higher demand for commodities induce prices increases at the global level that feed into domestic inflation, and a tailwind effect, according to which inflation in advanced economies is reduced through productivity spillovers from emerging markets. Similarly, De Gregorio (2012) argues that there are two main effects of commodity price shocks on the domestic economy. First, there is a direct effect on inflation, as can be seen from the Philips curve in equation (2). Second, depending on the oil intensity of the economy, the increase in oil prices leads to a decline in productivity and hence a drop in potential output.

3.3. Did the effect of oil price shocks change over time?

Unlike Kilian (2009), Blanchard and Galí (2007) do not distinguish between different types of sources of oil price shifts but estimate their average effect on macroeconomic aggregates. GDP growth declines and inflation increases in response to positive changes in oil prices. This is consistent with the arguments of Kilian (2009) that oil price fluctuations are mostly driven by shifts in global demand and oil-market specific developments and less by oil supply shocks. Blanchard and Galí then investigate whether the effect of oil price shocks changed over time. In particular, they analyse whether there are differences in the effect of oil prices on GDP and inflation before and after 1984. Both periods are characterised by high oil price volatility. While high oil prices were associated with weak GDP growth and high inflation in the 1970s and early 1980s, GDP growth and inflation in most advanced economies subsequently stabilised; in particular during the 2000s.

The authors estimate that before 1984 an unexpected oil price increase of ten percent led to an increase of US CPI inflation by about 0.5 percentage points after one year. Post-1984, effect vanished quickly, lasting only for about two quarters. In France and the UK, the difference between the pre- and post-1984 period is even more pronounced. While inflation increases in the first period, it hardly reacts to increases in oil prices in the latter period. This is somewhat different in Germany, where the effect on inflation is very small in both periods. The authors attribute the small effects to the hawkish stance of the German Bundesbank.

To explain the reasons for the changing inflation response before and after 1984, Blanchard and Galí highlight three factors. First, the oil intensity of industrial economies has changed over time. As a reaction to early oil price crises, the share of oil in production and consumption goods decreased, which made the economies more resilient to oil price fluctuations. Second, the credibility of monetary policy seems to have increased over time. For example, many countries have adopted implicit or explicit inflation targeting regimes, increased the transparency of central bank decision making, and central banks improved their communication strategies. These arrangements contributed to an anchoring of inflation expectations. In turn, this reduced second-round effects and thereby limited the impact of oil price shocks on actual inflation. Third, unionization and wage indexation seems to have decreased, making labour markets and real wages more flexible. A quicker adjustment of real wages in turn helped to reduce price pressures from oil price increases in the 2000s.

Focusing on oil supply shocks, Baumeister and Peersman (2013) study a time-varying impact on the US during the period 1974 to 2011. They find that the largest impact on CPI inflation occurs after three to four quarters. Their estimates suggest that the effect of a 10 percent increase in oil prices due to supply disruptions has increased over time. Further, they estimate that oil supply shifts are responsible for about one-third of the variability in domestic CPI inflation in recent years, whereas they accounted only for about one-fifth in the period before 2000. This observation, however, can partly be explained by the lower

volatility of inflation itself in more recent years. Overall, the authors conclude that oil supply shocks are still relevant for macroeconomic outcomes in the US but that they do not dominate domestic inflation developments.

Overall, the empirical evidence indicates that the effect of a given change in global oil prices on domestic inflation has become less important. The presumably conflicting empirical findings of Blanchard and Galí (2007) and Baumeister and Peersman (2013) can be reconciled in light of the results of Kilian (2009). As discussed above, the latter authors emphasize that it is important to discriminate between the causes of oil price fluctuations and discusses three thereof. Baumeister and Peersman concentrate only on one of these causes, namely, unexpected changes in oil supply, and find that their effect on domestic inflation has increased over time. Blanchard and Galí instead estimate the average effect of all three causes of oil price shifts on domestic inflation. Given that Kilian (2009) shows that the other two causes, real-activity related global demand for oil and precautionary oil-market specific demand, which are neglected in the analysis of Baumeister and Peersman, are quantitatively much more important for global oil price determination, the results of Blanchard and Galí imply that the effect of a given change in oil prices due to the other two causes on domestic inflation has weakened. Finally, it is worth mentioning that, similar to Baumeister and Peersman, Blanchard and Galí also detect that the share of oil price movements in domestic inflation variability has increased over time. This, however, is rather a symptom of monetary policy success, not failure. As better monetary policy lowered the volatility of inflation rates, while the volatility of oil prices has approximately remained stable over the last decades, the importance of oil price in inflation fluctuations has simply increased.

3.4. How should monetary policy respond to oil prices?

Regarding monetary policy, the empirical findings imply that the question of whether and how central banks should respond to oil price fluctuations is not well posed. Instead, monetary policy needs to distinguish between the sources of oil price fluctuations and tailor its response to the specific underlying causes of oil price shifts. Bodenstein, Guerrieri, and Kilian (2012) analyse this question in a large-scale macroeconomic model of the global economy and the oil market. Here, oil prices move endogenously in response to deeper underlying causes, such as demand or supply shocks in specific countries or sectors. These shocks in turn also imply changes in asset prices, exchange rates, and capital accounts, which come in addition to changes in oil prices and need to be taken into account when setting monetary policy. Their main conclusion is that no two causes underlying oil price changes call for the same response of an inflation-targeting monetary authority. For example, it is not even sufficient to know that demand for oil in China increased, rather the central bank needs to understand why Chinese oil demand changed (could be due to higher GDP growth or a higher oil intensity in production). These conclusions have important implications for the question of whether in a globalised world, monetary policy can still control domestic inflation effectively. The answer is yes, once the central bank successfully differentiates between the underlying factors of oil price fluctuations.

In a related contribution, Bodenstein, Guerrieri, and Gust (2013) show that in the current period, when the main policy rates are at the zero-lower bound in many advanced countries, the objective of central banks to stabilise inflation in response to causes that imply oil price changes has become even easier. In other words, the zero-lower bound weakens the trade-off that central banks face between stabilising inflation and output. To illustrate this argument, the authors consider the effect of an increase in global demand for oil that triggers an increase in the price of oil. Higher oil prices do increase domestic inflation and lower domestic output. When monetary policy is constrained by the zero-lower bound, the increase in inflation, however, is actually welcome from a welfare point of view as it lowers real interest rates. The latter, in turn, stimulate investment in the home economy and counteract the contractionary effect of higher oil prices.

4. WAGE SETTING AND MONETARY POLICY

Has globalization affected the ability of central banks to stabilize employment and inflation? A common view is that the integration of low-wage workers from China and the former Soviet bloc into the global economy has depressed wages and prices, thereby limiting the ability of central banks to target a specific inflation rate. While this view figures prominently in the media, Rogoff (2006) points out that it fails to recognize that globalization constitutes a shock to relative prices: if the price of imports falls, the relative price of domestically-produced goods and services must necessarily rise. This, in itself, should not be a concern for central banks, since they are responsible for stabilising the overall price level, which is determined by aggregate supply and demand conditions and not the relative price of a particular good or service.

A central bank operating under a floating exchange rate regime will thus always be able to set the domestic inflation rate in the long run. Nonetheless, Bernanke (2007) emphasises that globalisation should not be ignored by central bankers as it may alter the trade-off between inflation and unemployment, thereby affecting the efficacy of monetary policy as a stabilization tool. This short-run trade-off between inflation and unemployment is captured by the (expectations-augmented) Phillips curve. In the absence of commodity price shocks, the Phillips curve model (2) can be rewritten as follows:

(3) $p_t = p_t^e + \quad (y_t - y_t^*) + £_t$

To understand the implications for unemployment, Okun's law postulates a (negative) link between the output gap and the unemployment gap. The unemployment gap measures the deviations of actual unemployment u from the NAIRU (Non Accelerating Inflation Rate of Unemployment). The NAIRU u* can be traced back to labour market frictions and mismatch problems:

(4) $y_t - y_t^* = -\sim \left(u_t - u_t^*\right)$

Substituting Okun's law (4) into equation (3), one obtains a re-formulated version of the standard Phillips curve, expressed in terms of deviations from the NAIRU:

(5) $p_t = p_t^e - ¥\left(u_t - u_t^*\right) + £_t \quad , \quad ¥ = \sim$

It is important to note that the negative relationship between inflation and unemployment implied by the Phillips curve depends on the presence of nominal price and wage rigidities. For example, if prices and wages were perfectly flexible, the Phillips curve would be vertical, meaning that the unemployment rate would be uniquely determined by supply-side factors and unaffected by monetary conditions. It follows that structural changes (like globalisation) that modify the degree of price and wage flexibility can have important implications for the conduct of monetary policy.

4.1 Globalisation and the "Flattening" of the Phillips Curve

There is significant disagreement among economists about how the opening of international trade and labour markets has affected price and wage rigidities. Rogoff (2006) argues that higher competition from emerging markets should translate into increased price and wage flexibility, as it weakens the bargaining power of domestic monopolies and labour unions. This suggests that globalization should lead to a steepening of the Phillips curve (i.e. a worsening of the inflation-unemployment trade-off), thereby dampening the output effects of monetary stimuli. An interesting implication of Rogoff's (2006) argument is that, faced with a less favourable inflation-unemployment trade-off, monetary policymakers will find it easier to commit to a regime of low and stable inflation. This is because changes in the inflation rate would have only marginal effects on the unemployment rate. Thus, monetary

stimuli would result in increased price volatility without yielding substantial benefits in terms of lower output volatility.

In contrast, Borio and Filardo (2007) argue that by facilitating the outsourcing of labour, globalisation has put downward pressure on wage growth and has generally made prices and wages less responsive to changes in domestic demand. Several factors can potentially be responsible for this. Bean (2006a), for example, stresses that increased competition from low-wage/labour-abundant countries implies that firms have less scope to raise prices when demand increases. He also emphasizes that workers will struggle to negotiate higher wages due to the threat of offshoring. Bean (2006b) also points out that by increasing the availability of cheap imports, the opening of international markets can be viewed as a positive supply shock, leading workers to enjoy higher real wages without affecting firms' labour costs. Overall, these views suggest that by reducing the sensitivity of inflation to changes in domestic demand conditions, globalisation has led to a flattening of the Phillips curve (i.e. an improvement in the inflation-unemployment trade-off). This means that monetary stimuli targeted toward stabilizing output and employment fluctuations would have only minor inflationary or disinflationary effects.

The link between globalisation and price setting was recently formalised by Guilloux-Nefussi (2015). In line with the two views described above, she identifies two counteracting effects. On the one hand, increased competition tends to reduce domestic firms' market power, thereby reducing real rigidities and making prices more responsive to marginal cost shocks. On the other hand, increased openness tends to favour the selection of larger, higher-productivity firms that are more able to compete in international markets. These firms are less likely to transmit marginal cost shocks into higher prices in order to protect their market share. At the aggregate level, Guilloux-Nefussi (2015) finds that the second (selection) effect dominates the first (competitive) effect, thereby leading to a lower pass-through of marginal costs to overall inflation. In other words, her framework suggests that on average one should expect globalization to lead to an improvement in the inflation-unemployment trade-off faced by central banks.

The view that the Phillips curve has become flatter over the past few decades also squares well with the experience of many, but not all, advanced economies. For example, Iakova (2007) documents a secular decline in the responsiveness of inflation to changes in unemployment since the 1980s for the UK. The results are confirmed by other studies, such as Kuttner and Robinson (2010) for the US and Australia. A notable exception seems to be the euro area. According to Papademos (2007), the ECB has failed to detect any significant structural break in the euro area Phillips curve.

Inter alia, the flattening of the Phillips curve suggests that changes in the unemployment rate may not signal significant inflationary pressure. The recent US experience is a good example in this regard. While unemployment spiked during the 2008/2009 recession, it has since then returned to a level some consider close to the NAIRU. This steady reduction in unemployment has not, however, been accompanied by a significant increase in inflation, notwithstanding nominal interest rates being set at their effective zero lower bound.

The debate remains opens about why inflation has been so unresponsive to recent monetary stimuli, especially in low unemployment countries. Since wages are the largest source of household income and the largest component of firm operating costs, the lack of significant nominal wage growth may be a primary reason explaining the persistence of low inflation. A prominent view advanced by Daly and Hobijn (2014) is so-called pent-up wage deflation. They argue that since firms struggle to lower wages during recessions due to downward nominal wage rigidities, they face less pressure to raise them even when the economy recovers and slack in the labour market is reduced. As emphasised by Yellen (2014), it is also likely that such short-run cyclical factors interact with longer-run structural factors, including globalisation and the secular decline in the labour income

share. According to Kohn (2006), however, the existing evidence suggests that globalisation only has a modest effect on nominal wage growth. Specifically, he argues that models of aggregate labour compensation usually fail to detect a robust relationship between globalisation and aggregate wage dynamics in the US.

Ultimately, the extent to which globalisation is responsible for the flattening of the Phillips curve remains an empirical question. Unfortunately, it is difficult to find a firm consensus among existing studies. Iakova (2007) and Borio and Filardo (2007) find that globalisation has reduced the sensitivity of inflation to the domestic output gap. However, as mentioned above, serious doubts have been raised concerning the robustness of the Borio and Filardo (2007) results. Using quarterly data for euro area countries between 1979 and 2003, Calza (2009) fails to find any effect of global capacity constraints on domestic inflation. Similarly, using a micro-dataset consisting of 2000 Italian firms, Gaiotti (2010) finds no evidence that the sensitivity of prices to capacity utilisation is affected by firms' exposure to competition from emerging markets.

Others authors seek to explain the flattening of the Phillips curve as the outcome of changes in the way monetary policy has been conducted since the 1980s. According to Williams (2006), the weakened relationship between inflation and unemployment (or output gaps, more generally) is nothing more than the result of central banks' success in anchoring long-term inflation expectations. In particular, by lowering trend inflation, central banks have reduced the frequency of nominal price and wage adjustments, which in turn has fed back into a flattening of the Phillips curve. Using long-term interest rate data from 17 industrialised countries, Laxton and N'Diaye (2002) find that the trade-off between unemployment and inflation tends to be less in countries that successfully commit to a low-inflation regime.

4.2 Implications for monetary policy

A somewhat paradoxical implication of an improved inflation-unemployment trade-off (or flatter Phillips curve) is that it may weaken monetary discipline and thereby lessen central banks' ability to control inflation (Woodford, 2007). More specifically, if central banks expect significant monetary stimuli to have only marginal effects on the inflation rate, this may lead them to adopt an overly dovish monetary stance. This is especially likely if monetary policymakers view the Phillips curve as a fixed structural relationship, rather than one this is partially determined by monetary policy itself. Abstracting from these commitment problems, Razin and Binyamini (2007) characterise optimal monetary policy in an environment with liberalised trade, labour and capital flows. They find that increased factor mobility flattens the output-inflation trade-off. Compared to an environment with reduced factor mobility, they argue that the optimal policy response consists of central banks reacting more aggressively to fluctuations in inflation and less aggressively to fluctuations in the output-gap, as globalisation weakens the link between domestic output fluctuations and inflation.

Given its implications for policy, the debate about which economic forces are responsible for the flattening of the Phillips curve is not purely academic. Indeed, a flatter Phillips curve suggests that central banks with an explicit employment mandate (like the Federal Reserve) should be able to target a lower unemployment without fearing destabilising inflation dynamics. For central banks without such a mandate (like the ECB), it suggests that changes in unemployment are less likely to translate into changes in inflation.

According to Bean (2006a), globalisation thus serves as a double-edged sword for monetary policymakers. On the one hand, a flatter Phillips curve means that monetary policy errors will not necessarily translate into large deviations of inflation away from its targeted level. On the other hand, central banks will struggle to push inflation up, or bring it down, if it significantly deviates from target.

5. CONCLUSIONS

The fall in inflation over the past decades is partially attributed to the success of monetary policy. The focus on inflation control and high awareness to act pre-emptively contributed to a more credible policy. Even the decline since the financial crisis may be interpreted in terms of domestic factors, while the decrease in oil prices accelerated the evolution. In particular, the modest economic upswing in the euro area plays a crucial role for the low inflation environment. Inflation will pick up again if the business cycle swings up again. As the basic determinants of inflation did not change much, central banks should be still able to control inflation. However, the task for the monetary authorities has become more challenging in the short run under the conditions of interconnected and globalised markets. Globalization has likely contributed to a flattening of the output-inflation trade-off. While the empirical evidence is mixed so far, several channels might be important. To the extent that the synchronization of business cycles has increased across countries, the central banks can less affect the domestic output gap. In addition, lower import prices in more competitive markets may exert some downward pressure on inflation.

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NOTES

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DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is globalization reducing the ability of central banks to control inflation?

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IN-DEPTH ANALYSIS

Abstract

Globalization influences inflation and the transmission channels of monetary policy in various ways. The effects of globalization on the ability of monetary policy to control inflation have been discussed intensively. However, in the light of recent experiences with extended periods of disinflation in many advanced economies, the question whether the ability of monetary policy to control inflation has suffered significantly from increasing globalization has become new relevance. This paper discusses whether globalization is reducing the ability of central banks to control inflation and draws conclusion for the current situation in the euro area.

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EXECUTIVE SUMMARY

- Globalization influences prices and price setting mechanisms in various ways and could potentially affect the ability of central banks to control inflation in a meaningful way. However, fundamental concerns about the efficacy of monetary policy to influence inflation have not been borne out.
- When assessing the impact of globalization on inflation, it is helpful to differentiate between globalization in international trade and financial globalization, between globalization (increase in international trade) and global factors (oil prices, global slack), as well as between temporary effects (decline in import prices) and structural changes (change in price mechanism due to higher competition).
- Globalization has dampened the relative prices of traded goods, e.g. by increasing the available pool of labour and competition. In principle, these factors dampen inflation temporarily but can be relevant for extended periods of time if globalization continuously intensifies. However, these factors do not reduce the ability of monetary policy to control inflation, and central banks can take account of them.
- With regard to structural changes, theoretical arguments and empirical evidence are ambiguous. On the one hand, increased international competition tends to reduce the ability of firms to change prices over the business cycle and thereby may also lower the systematic impact of monetary policy on inflation. Moreover, as the relevance of trade for business cycle fluctuations rises, the role of global slack for domestic inflation may become increasingly important, making it more difficult for central banks to control inflation.
- On the other hand, the increasing relevance of trade for business cycle fluctuations also increases the importance of exchange rates as far as inflation is concerned. As a consequence, to the extent that monetary policy can control exchange rates, the ability of central banks to control inflation could increase.
- Financial globalization exposes domestic financial systems to global financial cycles, inducing central banks to place greater emphasis on maintaining financial stability to the detriment of their attention towards their inflation targets. Moreover, financial globalization contributes to the co-movement of international business cycles and thereby may reduce somewhat the ability of monetary policy to control exchange rates and inflation.
- Overall, globalization may have reduced the ability of central banks to control inflation to some extent, but it has not eliminated it. In practice, increasing globalization may make it more appropriate for central banks to sometimes allow for deviations from their inflation targets for longer periods than they would do otherwise. In a large, relatively closed economy, such as the euro area, globalization is of less relevance to monetary policy than in small, open economies.
- Regarding the current period of low inflation in the euro area since 2012, the contribution from temporary global factors, such as the fall in oil prices, is more important than structural changes caused by globalization. A great deal of other factors, such as slow recoveries and long-lasting adjustment processes following severe economic crises as well as lower effectiveness of monetary policy following such crises, may have a huge impact as well.

1. INTRODUCTION[1]

Globalization affects inflation in various ways as inflation dynamics are more and more driven by international linkages through commodities, trade and finance. Moreover, globalization potentially affects the ability of monetary policy to control inflation in a meaningful way. Therefore, it is crucial for central banks to take these effects into account when they conduct monetary policy. It is reasonable to classify the aspects of globalization that are relevant for central banks into different categories. Some of the aspects are directly linked to globalization (such as the decline in relative prices of internationally traded goods) while other aspects (such as fluctuations in commodity prices and global slack) are better labelled as global factors, even though the strength with which these global factors affect inflation and monetary policy may be linked to the degree of globalization. Ultimately, the importance of the different aspects of globalization for central banks will be determined by the extent to which they impact the control of monetary policy on inflation and whether they have temporary or longer-lasting effects.

Globalization is not a new phenomenon but has been going on for centuries. The effects of globalization on inflation and monetary policy have been discussed intensively. However, in the light of recent experiences with an extended period of disinflation, in particular of the euro, the question arises whether the ability of monetary policy to control inflation has suffered significantly from increasing globalization. Overall, this seems unlikely as no pronounced shift in the degree of global integration occurred at the time in question; if anything, the pace of increasing globalization has slowed down since the global financial crisis. However, globalization may have hampered the ability of monetary policy to influence inflation, making it more difficult for central banks to reach their inflation targets in times of severe economic crises.

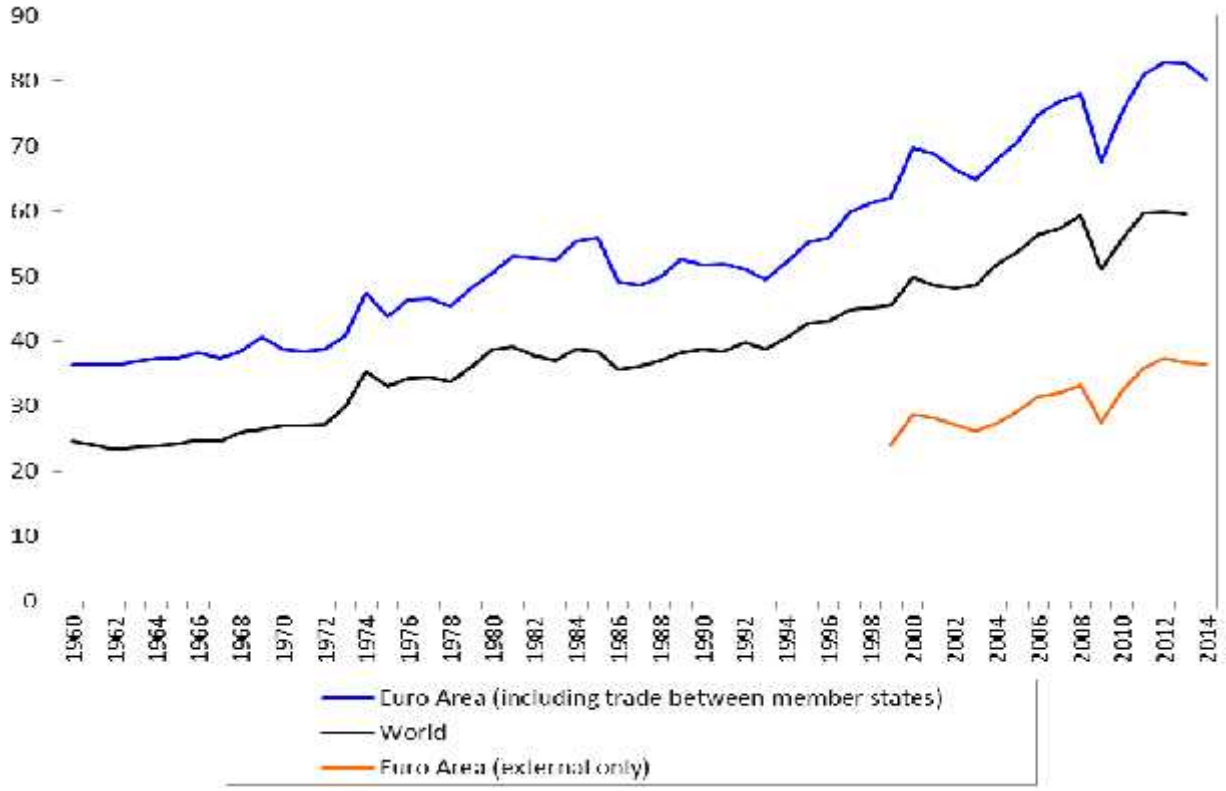
Against this backdrop, this paper takes a fresh look at how globalization affects inflation and monetary policy. In Section 2, we discuss various ways in which globalization affects inflation and the transmission channels of monetary policy. In Section 3, we discuss whether exchange rates may act as a buffer for the effects of globalization on inflation and monetary policy transmission mechanism channels. In Section 4, we discuss the effects of financial globalization (which has become increasingly important in recent decades) on monetary policy. In Section 5, we conclude and discuss the implications of globalization for the current situation in the euro area.

[1] The authors thank Mewael F. Tesfaselassie for highly appreciated comments and discussions.

2. INTERNATIONAL TRADE, INFLATION, AND MONETARY POLICY

Globalization of trade affects inflation and the transmission channels of monetary policy in various ways. With increasing globalization, it has become more and more complicated for central banks to assess the relevance of all the different aspects affecting inflation and monetary transmission. When assessing the relevance to monetary policy, it is important to consider whether a specific aspect of globalization has transitory or permanent effects on inflation and whether specific aspects structurally change the way monetary policy can influence inflation. Since most central banks in advanced economies, including the ECB, target inflation rates with a medium-term horizon, unexpected non-repeating shocks, such as a change in oil prices, are not a major concern of monetary policy. Even if there are aspects of globalization that can persistently dampen inflation, central banks should, in principle, be able to take these into account and to continue to ensure price stability. More relevant for central banks would be structural changes that impair the transmission channels of monetary policy. But even such changes can be mitigated by central banks that anticipate them and change their policies accordingly. In this context, one should note that the deepening of international trade is not a new phenomenon but has been proceeding, some setbacks notwithstanding, for centuries. The most recent phase of trade globalization has been ongoing since the 1990s manifesting itself in rising trade to GDP ratios for the world as well as for the euro area (Figure 1).[2]

Figure 1: International Trade as Share of GDP
(Exports plus imports of goods and services in percent of GDP)



Sources: World Bank, Eurostat

[2] While the euro area is relatively open with regard to cross-country trade (including trade between member states), it is relatively closed when the euro area is considered as one economic unit and only external trade is taken into account.

Before discussing the relevant temporary and permanent effects that globalization in international trade may have on inflation (Section 2.2) and the relevant structural effects it may have on monetary policy (Section 2.3), we start with some theoretical considerations based on the Phillips Curve to organize thoughts (Section 2.1).

2.1. Theoretical Considerations Based on the Phillips Curve

In its essence, a Phillips curve conceptualizes the connection between the rate of inflation and economic slack. In the original Phillips Curve, economic slack was measured via unemployment, but the output gap fulfills a similar role. The functional form of the Phillips Curve is important for central banks to learn about the trade-off between inflation and economic slack: it shows the required change in economic slack that is needed to achieve a given change in inflation (this trade-off is closely related to the so-called sacrifice ratio). A flattening of the Phillips Curve (implying that a larger change in economic slack or output is necessary to change inflation by the same amount) would imply that a central bank has lost some of its ability to control inflation. Obviously, there are a lot of other factors besides economic slack that may influence inflation, most prominently inflation expectations. However, the Phillips Curve relationship between inflation and economic slack is a very simple though convincing way of thinking about the ability of central banks to control inflation.

Empirical investigations of the Phillips Curve are complicated by the fact that different specifications of the Phillips Curves are plausible and that different measures for economic slack (which is unobservable) can be used. Moreover, there is strong evidence that the Phillips Curve relationship between output and economic slack varies over time and is non-linear in its nature (Snower 2015). This could be due to intrinsic problems such as adjusting inflation expectations that make the continued exploitation of the relationship impossible (Lucas' critique) or due to changing additional factors that exert their influence on inflation and economic slack over time (so that the data gathered no longer lends itself to "ceteris paribus"-comparisons).

Research seems to be favourable to the view that the Phillips Curve has flattened in the past decades (IMF 2006, Roberts 2006). However, the results depend to some extent on which specification of the Phillips Curve and which measure for economic slack are used (Gordon 2007, Gordon 2013). For the euro area, empirical results suggest that the Phillips Curve may have flattened somewhat in the past decades but steepened again since the Global Financial Crisis (Constâncio 2015). Several reasons have been discussed as to why the Phillips Curve may have flattened. One of the most prominent, globalization, we discuss in more detail below. Other reasons include a stronger anchoring of inflation expectations and downward rigidities of wages and prices that become more relevant when trend inflation is lower as it was the case throughout since the so-called Great Moderation.[3]

[3] While a flattening of the Phillips Curve may make it more difficult for monetary policy to reach its inflation target, this is obviously not the case when the flattening is caused by a stronger anchoring of inflation expectations at the inflation target.

2.2 Transitory and Permanent Effects: Trade and Commodities

Globalization lowers the relative prices of internationally traded goods and thereby is associated with lower import prices. There are basically three effects that changes in import prices have on inflation:

1. The direct effect on CPI inflation via changes in import prices. The consumer price index includes goods produced domestically as well as imported goods. Relatively cheaper imported goods and services have a direct impact on the import component of CPI inflation and will lead to a decrease in CPI inflation (see e.g. Mishkin, 2007)

2. The expenditure switching effect on domestic inflation. In addition to these direct effects on CPI inflation via import prices, there is also an indirect effect via demand substitution on domestic inflation. With imported goods and services becoming cheaper relative to domestic goods, consumers will demand relatively fewer domestic goods and relatively more imported goods. This is called the expenditure switching effect. Its strength depends on the substitutability of imported and domestic goods. The decrease in demand for domestic goods will lead - once prices adjust - to a decrease in domestic inflation. CPI inflation is also affected via the share of domestic goods in the consumer price index.

3. The effect of strategic price complementarities between domestic and foreign firms. Domestic firms will anticipate the expenditure switching effect. To the extent that they compete with foreign firms, they will also lower their prices in order to prevent a large loss in demand because of the lower prices of imported goods produced by foreign competitors. Hence, expenditure switching also leads via strategic price complementarities to direct effects on domestic inflation in addition to the indirect effects caused by changes in demand (see Cwik, Müller and Wolters, 2011).

In general, all of these effects have a transitory impact on inflation following a one-time change in import prices. However, when import prices continuously change due to globalization, e.g. caused by continuously increasing globalization in international trade, these effects can dampen inflation for extended periods unless monetary policy is adjusted accordingly.

Commodities

Fluctuations in commodity prices are an important determinant of the international co-movement in inflation (Carney 2015). In principle, changes in commodity prices have only transitory effects on inflation and are not a major concern of monetary policy as long as inflation expectations are well-anchored. Therefore, central banks could allow the variance of inflation to be relatively high – world commodity prices are quite volatile (see Anderton et al. 2009) – but keep the average rate of inflation unchanged and close to their target.

The impact of commodity prices on inflation is not the result of increasing globalization in recent decades, but is rather a global factor that is relevant to inflation. With regard to globalization, commodity prices are, however, also cited as a countervailing factor against deflationary pressures from emerging markets: growth in those countries would increase global demand for commodities and raise their prices (Pain et al. 2008), and thereby reduce the net effect of dampened goods prices. Following this line of thought, the overall impact of the integration of China into the world economy on global inflation could be quite

low. However, recent experiences with the slump in oil prices show that the supply of commodities in response to price changes may also adjust after some time.

International Trade in Goods

Globalization has put downward pressure on the relative prices of internationally traded goods by increasing the available pool of labor and deepening the integration of international supply chains. A decline of important prices due to increasing globalization can have, as discussed above, three effects on domestic inflation, including increasing competition, which forces firms to accept lower mark-ups. All of these effects are transitory (because a one-time change in import prices will only temporarily affect inflation) and are therefore not of major importance for monetary policy.[4] When globalization increases continuously, as observed in recent decades, such effects are recurring and may dampen inflation for extended periods. However, central banks can learn about such trends and adjust their policy accordingly; this would simply imply that domestic prices would rise more rapidly during such periods to offset the downward pressure on inflation from imported goods. Only if increasing globalization were to come continuously as a surprise to central banks these effects could lead to permanently subdued inflation. Sometimes it is argued that relatively cheaper imports, which allow for higher domestic inflation (taking some overall inflation target as given), may even help central banks to control inflation because domestic downward rigidities (e.g., downward rigidities of wages) would be alleviated (Rogoff 2006).

2.3 Structural Effects of Globalization on Monetary Policy

Globalization may also have structural effects on price setting mechanisms and the monetary policy transmission mechanism. Such effects are of more concern for central banks than temporary effects on inflation; they are, however, also more difficult to gauge.

Price Setting Behaviour

While higher international competition tends to reduce the mark-up of firms and thereby temporarily inflation, it could also have a more structural impact on price mechanisms by impairing firms' ability to change prices over the business cycle. This would imply a flattening of the Phillips Curve and smaller effects of changes in the stance of monetary policy on inflation. However, with lower mark-ups, firms also may have to immediately adjust their prices to changes in their cost structure, implying a steepening of the Phillips Curve (see Carney 2015). In addition to firms, also unions may lose market power with increasing globalization (and an increasing pool of available labour) leading tendencially to more flexibility in wages and in turn in prices. However, the increasing supply chain integration and specialization across countries might act as a confounder: insofar as the demand for special skills rises in some country, the market power of the respective workers may also increase (Rogoff 2006). Moreover, lower wages for low-skilled workers can have other reasons apart from globalization, such as failures of the education system, increased low-skill immigration, or technology changes (Leamer 1996). Which effect dominates is an empirical question that is very difficult to answer. However, there is some evidence that higher competition due to globalization in tendency may lead to a flattening of the Phillips Curve (IMF 2006).

[4] An alternative way to interpret the effects of globalization in trade on inflation is to argue that the integration in international trade raises the productivity of a country. The increase in productivity in turn increases potential output leading to a temporary downward pressure on inflation.

Increasing Share of Internationally Traded Goods in GDP

Increasing globalization has been accompanied by an increasing share of internationally traded goods in GDP. Therefore, fluctuations in the global business cycle have become increasingly important, vis-à-vis domestic factors within the reach of domestic central banks, for fluctuations in the domestic business cycle and in inflation. For the Phillips Curve this would imply a flattening because changes in domestic slack may have a lower impact on overall inflation when, at the same time, global slack may have a larger impact. While this argument is theoretically appealing, the empirical evidence is mixed. Some empirical studies find that the importance of global slack has increased (Garcia and Wynne 2010), some are sceptical whether global slack has a significant impact on domestic inflation at all (Mishkin 2008). For the euro area, empirical evidence is scarce but the existing evidence suggests that global slack is not a major driver of inflation (Calza 2009). Empirical investigations are complicated by the fact that several different specifications of the Phillips Curve and several measures for slack are plausible. Moreover, it is hard to identify which role the increasing share of internationally traded goods has on domestic inflation because globalization affects inflation and monetary policy in various ways and it is difficult to distinguish empirically between all of them. When using a broader approach, there is some evidence that there are global factors that have a significant impact on domestic inflation in addition to fluctuations in commodity price (Ciccarelli and Mojon 2010).

Structural Effects of Globalization May Have Lowered the Ability of Monetary Policy to Control Inflation

Overall, the literature seems to slightly favour the view that the effects discussed in this section may have reduced the ability of monetary policy to control inflation somewhat. Central banks have to take more and more global developments into account, and changes in the stance of monetary policy may have lost some of their impact on inflation. This would by no means imply that central banks would not be able to ensure price stability any more. However, with increasing globalization it has become more difficult to gauge how global developments work through complex international supply chains and finally affect domestic inflation. Moreover, with increasing globalization, central banks may have to make use of their instruments more aggressively to reach their inflation targets (in a given period of time). However, central banks usually prefer to adjust the stance of their monetary policy only gradually, and larger changes may be inappropriate in times when uncertainty about the state of the business cycle and the optimal stance of monetary policy is high. Therefore, with increasing globalization central banks may, in practice, have to tolerate deviations from their inflation target for extended periods of time.

3. GLOBALIZATION AND THE EXCHANGE RATE CHANNEL OF MONETARY POLICY TRANSMISSION

Increased trade integration can have a potentially large effect on the exchange rate channel of monetary policy transmission. With respect to this issue, it is useful to distinguish between inflation measured by the consumer price index (CPI), which includes import prices, and domestic inflation. Let us consider for simplicity a contraction of monetary policy, though the arguments outlined below will also apply conversely to an expansion of monetary policy. A contraction of monetary policy leads to higher domestic interest rates that will make it more attractive to invest in domestic currency compared to foreign currency. The domestic currency will appreciate. The exchange rate channel works via the relative price of imported goods. Depending on the degree of pass-through from exchange rate changes to import prices, a currency appreciation makes domestic goods and services more expensive relative to imported goods. This change in the relative price of imports can affect inflation in three different ways that haven been described in more detail above:

1. The direct effect on CPI inflation via changes in import prices.
2. The expenditure switching effect on domestic inflation.
3. The effect of strategic price complementarities between domestic and foreign firms.

All three transmission channels increase the effects of a given change in the interest rate on inflation. Channel 1 increases the effects on CPI inflation, but has no effect on domestic inflation. Channels 2 and 3 increase the effects on domestic inflation as well as, via the share of domestic goods in the consumer price index, on CPI inflation. Hence, the exchange rate channel makes monetary policy more effective in principle. Monetary policy's control over inflation increases since the output decline necessary to bring about a given reduction of inflation is smaller in open economies than in closed economies.

The strength of the exchange rate channel depends on three factors: the import share, the exchange rate pass-through and the degree of strategic price complementarities. The exchange rate channel works fully via the price of imported goods and services relative to domestic goods and services. Hence, the larger the import share is, the larger become the effects of the exchange rate channel. Therefore, the exchange rate channel is of particular importance in small open economies rather than in very large economies with a relatively small import share like the U.S. economy. Over the last decades, trade integration has increased, and some observers have identified this secular trend as an important manifestation of globalization. Hence, globalization can increase the importance of the exchange rate channel for monetary policy transmission and potentially increase monetary policy's control over inflation.

However, the effectiveness of the exchange rate channel also crucially depends on the pass-through of changes in the exchange rate into import prices. If the law of one price holds, then the exchange rate pass-through is complete. Any change in exchange rates will lead to a one-to-one change in import prices and, therefore, to large effects on CPI inflation and domestic inflation via the three transmission channels described above. If, however, producers are able to discriminate and set different prices across markets, then the effects of the exchange rate channel are smaller. In the extreme case of local currency pricing, there would be no immediate effect of changes in exchange rates on import prices and thus no effect of the exchange rate channel at all. In reality, some firms will price their goods and services in the currency of the producing country (producer currency pricing) and some

firms will price their goods in the currency of the country where the goods and services are sold (local currency pricing). Thus, exchange rate pass-through will not be complete and limit the effectiveness of the exchange rate channel.

While the evidence for increased trade integration and thus increased import shares in many economies is clear, the evidence regarding exchange rate pass-through is much more uncertain. Several recent studies focusing on US import prices suggest that exchange rate pass-through has been declining over the last one or two decades (see e.g., Marazzi et al., 2005). However, the degree of exchange rate pass-through is not independent of the currency. Gopinath, Itskhoki, and Rigobon (2010) show that the degree of exchange rate pass-through is much lower for the average good priced in US dollars (25 per cent) than in other currencies (95 per cent). Campa and Goldberg (2005) find that the unweighted average of exchange rate pass-through to import prices for 25 OECD economies amounts to 60% in the short run. They estimate exchange rate pass-through to be lowest for the US economy (25%). For the euro area, Campa and Gonzalez Minguez (2006) find an exchange rate pass-through of about 60% in the short run for an unweighted average of 12 euro area economies. They also test whether the introduction of the euro has caused structural change in exchange rate pass-through but find no strong statistical evidence for this hypothesis. Some studies report a decline in exchange rate pass-through to import prices over recent years (see e.g. di Mauro, Ruffer and Burda, 2008, for the euro area). Such a decline might be connected to the increase in trade integration. Gust, Leduc and Vigfusson (2006) show in a theoretical model that increases in trade integration lead to more foreign competitors in the domestic market. This, in turn, leads to a higher volatility of mark-ups over costs and a decline in exchange rate pass-through to import prices. Gopinath (2015) shows that a good proxy for a country's inflation sensitivity to exchange rate fluctuations is the fraction of its imports invoiced in a foreign currency. Hence, U.S. inflation is very much insulated from exchange rate shocks, while for other countries the exchange rate channel might be much more important.

While for the direct effect on inflation and the expenditure switching effect (channels 1 and 2 above) the joint occurrence of a large import share and a large degree of exchange rate pass-through are sufficient, for the direct effects on domestic inflation (channel 3 above) in addition strategic price complementarities are necessary. Chen, Imbs and Scott (2009) provide evidence suggesting that increased exposure to foreign trade has a competitive effect that is reflected in firms' price-setting decisions. Hence, ongoing globalization might strengthen the effect of the exchange rate channel via strategic price complementarities.

Overall, our analysis shows that increasing globalization of trade can strengthen monetary policy's ability to control inflation via the exchange rate channel. The strength of this effect depends on the import share and on the pass-through of exchanges rate movements on import prices. An increase in the effectiveness of monetary policy in controlling inflation concerns in particular small open economies with flexible exchange rates. The euro area is a relatively large economy with an import share that has increased in past decades but that is lower than in many other smaller economies. The pass-through of exchange rates to import prices is, according to several studies cited above, higher than in the US. However, the strength of the exchange rate channel depends also on the ability of the central bank to influence the exchange rate. In recent years, we have witnessed a co-movement of business cycles and in turn a co-movement of policy rates limiting this ability. However, with the expected decoupling of interest rate cycles this situation might change and the European Central Bank's control over inflation might increase to some extent via the exchange rate channel.

4. IS INTERNATIONAL CAPITAL MARKET GLOBALIZATION REDUCING CENTRAL BANKS' ABILITY TO CONTROL INFLATION?

A substantial part of the phenomenon we now term 'globalization' is related to the ongoing integration of international capital markets. Economies across the globe have intensified their efforts to remove capital market barriers, aiming at gathering efficiency gains from improved capital allocation. As a result, gross capital flows have grown considerably since the early 1990s. Within the environment of a globalized capital market, the ability of a central bank to control inflation also depends on the extent to which the domestic economy can be shielded from global financial shocks. The standard textbook answer to this question is given by the so-called "open economy trilemma". It states that in the absence of capital controls, only flexible exchange rates allow central banks to conduct independent monetary policies (Obstfeld and Taylor, 2004). It is interesting to note that flexible exchange rates as a necessary precondition for monetary policy autonomy also have been taken as a sufficient measure. In particular, Woodford (2010) argues that it is hard to imagine a setup where globalization significantly impacts a central bank's ability to control inflation. However, the author's analysis explicitly excludes financial market imperfections and monetary policy objectives other than inflation targeting. In Section 4.1., we discuss to what extent real-world financial markets undermine the ability of flexible exchange rates to shield the economy from exogenous (financial) shocks and how this interferes with the central banks' ability to focus of their inflation target. In Section 4.2., we discuss to what extent an additional policy objective, i.e. financial sector stability, interferes with the central banks' ability to focus on their inflation target.

4.1. The Global Financial Cycle – Dilemma, not Trilemma?

Questioning Woodford's (2010) assumptions, the isolating effect of flexible exchange rates has been challenged. In particular, Rey (2013) suggest that the monetary policy pursued in the world's financial centres may predetermine monetary conditions in peripheral economies irrespective of the exchange rate regime. The starting point of this 'global financial cycle' is the observation that capital and credit flows turn out to be strongly pro-cyclical and contain centre economies' liquidity provision and global risk appetite as strong common components.

The recent developments on international capital markets provide anecdotal evidence in favour of this new view. After the financial crisis, safe haven flows to advanced economies in mid-2011 were followed by excessive liquidity provision in the United States and Europe. Within the respective quantitative easing programmes, ample liquidity migrated to emerging market economies in search of yield. This was followed by a strong real appreciation of emerging market currencies, leading to a loss of price competitiveness and inflation pressures. In May 2013, the Federal Reserve's announcement of a monetary policy "tapering" abruptly reversed capital flow directions in favour of the United States and other financial hubs. The resulting adjustments in emerging stock and foreign exchange markets pose a challenge to domestic policy makers, often described as a currency crisis or emerging markets crisis.

More rigorous empirical evidence is provided by Forbes and Warnock (2012), reporting that domestic factors are dominated by global factors in driving capital flows. Focusing on emerging market economies, Chung et al. (2014) document the importance of centre economy liquidity provision, which affects most prominently less liquid financial markets via global credit cycles. For a number of economies, these factors can lead to excessive credit

growth leading to a domestic economic boom as well as abrupt contractions in crisis times. Gourinchas and Obstfeld (2012) and Schularick and Taylor (2012) indeed show that excessive credit growth is one of the best predictors of crisis phenomena. The empirical results reported in Jochem and Reitz (2014) support the hypothesis that in the recent past, global factors were dominating local asset prices and that emerging markets find it increasingly difficult to insulate the domestic economy. In particular, liquidity provision of the Federal Reserve turned out to be one of the major driving factors of emerging market asset prices. The empirical literature thus confirms the new view of a world with global financial cycles characterised by dominant capital flows leading to strong co-movements in international asset prices and business cycles.

Georgiadis and Mehl (2015) replicate the results for the euro area as well as for a broader set of economies, showing that domestic asset prices contain strong global components. The important contribution of the authors is to stress that increasing integration of an economy into world financial markets may also exert a counteracting influence on monetary policy effectiveness. The authors argue that countries maintaining large foreign asset positions show a strong wealth effect of a monetary shock. For example, if a contractionary policy shock causes the domestic currency to appreciate, residents suffer losses from their foreign investments and may reduce consumption spending. Since this wealth effect clearly depends on the exchange rate's flexibility to react, the authors claim that the exchange rate regime is still an important prerequisite of monetary policy. However, the wealth effect works in the opposite direction if the country maintains a large foreign liability position, thereby constituting an adverse effect of monetary policy. Thus, on a global level, wealth effects should be substantially dampened.

The conclusion to be drawn from this experience is that it is largely impossible for economies outside the financial centres to completely shield themselves from global financial trends. Strong interrelations with the monetary conditions of the centre economy, capital flows, and the leverage of dominant financial institutions imply that the classical open economy trilemma is being replaced by a 'dilemma' (Rey, 2013): Irrespective of the exchange-rate regime, fully independent monetary policy can only be achieved if barriers to capital flows are introduced. To what extent the global financial cycle binds domestic monetary policy clearly depends on the size of the country's financial markets. For small, open economies, such as emerging market economies, with less developed financial markets, a stronger co-movement with global factors can be expected. The euro area with deep and liquid financial markets is less vulnerable to global shocks.

4.2. The Monetary Policy Trade-Off in Globalized Capital Markets

The open economy trilemma originally emerges from the famous Tinbergen principle, stating that a policy authority needs one instrument for each policy goal to exactly meet the target value. In modern economies, however, central banks are in a less comfortable position and have learned to deal with two targets, namely price level stability and full employment, with the monetary policy stance as the only instrument at hand. The way a central bank manages this trade-off is described by the Taylor rule and reflects a society's preferences for the respective monetary policy goals. Thus, in contrast to the Tinbergen case a gradual deviation from target values will be regularly observed (Obstfeld, 2014). Managing the policy trade-off is more complicated, and deviations from target values will be larger if a third goal, namely financial stability, is added to the list. For example, during the global financial crisis and particularly during the European sovereign debt crisis, the lack efficient macro-prudential instruments forced the European central bank to use its core monetary tools (liquidity provision) in order to restore the stability of the financial system. These liquidity measures are still in place, although in some countries of the euro area a

return to more traditional monetary regimes would be desirable, pointing to a worsened policy trade-off.

In general, the following phenomena may divert monetary policy away from the traditional macroeconomic goal of price level stability if the economy becomes integrated into the global capital market.

- Global macro-prudential policy tools are typically less effective than their domestic counterparts. Obstfeld (2014), p. 38 argues that 'it may do little good to place restrictions on lenders within one's jurisdiction if foreign lenders can enter the market and operate without restriction. Moreover, direct limitation of residents' domestic foreign-currency borrowing is less effective if the same entities can issue foreign-currency debt in offshore markets.' Empirical evidence is reported in findings of Ostry et al. (2012) that domestic policy measures typically strengthen the financial stability in a panel of 51 emerging market economies between 1995 and 2008, but the efficiency of these tools suffer when agents can migrate to less regulated markets. As a result, the likelihood of domestic monetary policy to be engaged in financial stability programmes and driven away from traditional inflation targeting is higher in integrated capital markets.

- Short-term capital flows were blamed for further challenging monetary policy because of their myopic search for return. For example, in commodity-exporting economies like Australia, Canada, but also Brazil, overheating was observed due to strong global growth in the run-up to the financial crisis. The interest rate reaction of these central banks attracted funds from low-yielding currencies, thereby further boosting the economy. As a result, the effectiveness of monetary policy to control inflation is severely hampered in times of substantial swings in global liquidity.

CONCLUSIONS AND IMPLICATIONS FOR THE EURO AREA

Conclusions

Globalization affects inflation and the transmission channels of monetary policy in various ways. Some aspects of globalization and global factors exert only temporary influence on inflation. Changes in commodity prices are an important determinant of the international co-movement of inflation rates, and the recent slump in oil prices has significantly contributed to subdued inflation in many advanced economies in this period. By increasing the pool of available labour and international competition, globalization has led to price declines in internationally traded goods, thereby putting downward pressure on inflation. While this downward pressure is also temporary in nature, it could be relevant for long periods if globalization continuously intensifies. However, central banks can take these developments into account when conducting their monetary policy so that their ability to control inflation is not called into question.

Other ways in which globalization affects inflation are more structural in nature and thus of greater relevance to the ability of monetary policy to control inflation. Higher competition may reduce the ability of firms and workers to change their prices and wages over the business cycle, thus tending to reduce the effects of changes in the monetary policy stance on inflation. Moreover, with increasing relevance of traded goods to domestic business cycle fluctuations, fluctuations in the global business cycle, which are out of reach for national monetary policy, have become more relevant. The effects of global business cycle fluctuations on domestic prices are not only becoming more important; they are also increasingly difficult to gauge because they work through increasingly complex international supply chains. Overall, this development also tends to lower the effectiveness of monetary policy to control inflation and makes it more relevant for central banks to take international developments into account.

Deepening global trade integration may hurt central banks' ability to control inflation insofar as increasingly important global factors and developments elude their influence and are harder to keep track of, but higher trade shares also increase the importance of exchange rate movements for inflation. This strengthens the effects of monetary policy on inflation to the extent that it is able to influence exchange rates. However, when the international co-movement of business cycles is relatively high, the ability of monetary policy to impact exchange rates may vanish if all central banks take similar measures at the same time. Moreover, with increasingly intensifying financial globalization, central banks have to take more and more international capital flows and financial stability issues into account at the cost of distracting their attention somewhat from reaching their inflation target.

Overall, globalization in international trade and financial globalization in practice may have reduced the ability of monetary policy to control inflation in the short to medium term but have not eliminated it. As a consequence, central banks would be well advised to tolerate small deviations from their inflation targets for longer periods of time than they would otherwise consider in a world without globalization as long as inflation expectations are well-anchored. The impact of globalization on the ability of monetary policy to control inflation is strongest for small, open economies. The impact on the euro area as a relatively large economy, with a lower degree of openness than many small economies, is most likely more moderate but still noticeable.

Implications for the Euro Area

With regard to the period of disinflation in the euro area since 2012, several factors are at play but not globalization per se. If globalization had abolished the ability of the ECB to control inflation and thereby contributed to the period of disinflation, this would have required an abrupt change in globalization after the global financial crisis. But this is not the case; if anything, the pace of intensifying globalization has declined since the crisis. Nevertheless, global factors have contributed to this period of disinflation. Most importantly, the slump in oil prices has significantly lowered inflation in the euro area. However, this is not a major concern for monetary policy because these effects will fade out relatively soon. Global slack may have contributed to subdued inflation in the euro area, too, but this effect is difficult to quantify.

Overall, there are several other reasonable explanations for the long period of subdued inflation in the euro area. Just to name a few, there is overwhelmingly strong evidence that financial crises have long-lasting dampening effects on output (Reinhart and Rogoff 2009) and that the ensuing recoveries are weak (Boysen-Hogrefe et al, forthcoming). This might subdue inflation for quite some time. Moreover, there is growing evidence that the effectiveness of monetary policy to control inflation is significantly lower in the aftermath of financial crises (Jannsen et al. 2015). Finally, the disinflation in the euro area after 2012 - sometimes labelled “surprisingly excessive” - is not as surprising as it might seem because the euro area (in contrast to other advanced economies) fell back into a recession due to the sovereign debt crises in this period. However, the beginning and the end of recessions are notoriously hard to predict (Dovern and Jannsen 2015). Consequently, the disinflationary period was not predicted ex ante but can be explained relatively well ex post facto (Constâncio 2015). Overall, the evidence suggests that the relatively long period of disinflation in the euro area is rather a normal outcome of the general circumstances than a failure of monetary policy. From this perspective, monetary policy may be well advised to tolerate inflation being below its inflation target for an extended period.

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NOTES

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is globalization reducing the ability of central banks to control inflation?

Eddie GERBA, Corrado MACCHIARELLI

IN-DEPTH ANALYSIS

Abstract

Since the beginning of the crisis, inflation rates have shown a clear downward trend in many advanced countries and have fallen well below the targets of their respective monetary authorities. Despite strong monetary action, inflation expectations are slow to pick up. In some countries, the recovery is quite strong and unemployment rates have decreased, yet price pressures and wage development continue to remain subdued. Do central banks seem to have (partially) lost their ability to control inflation rates? Against the backdrop of fluctuations in global commodity prices and growth, together with the ongoing structural changes related to globalization wielding pressure on prices and wages, this paper focuses on the implications of globalization for domestic inflation and its expectations and the possible consequences for national monetary policies.

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EXECUTIVE SUMMARY

Since the beginning of the crisis, inflation rates have shown a clear downward trend and have fallen well below the targets of their respective monetary authorities. Despite strong monetary action, inflation expectations are slow to pick up. In some countries, the recovery is quite strong and unemployment rates have decreased, yet price pressures and wage development continue to remain subdued.

Much of the debate about globalization has revolved around the flattening of the short-term Phillips curve over time. However, a number of studies have challenged the idea that the evidence of a flattening of the curve reflect a mounting influence of foreign and global measures of economic and financial slack in domestic price changes, highlighting instead how the observed inflation "torpor" could rather be the result of different or simultaneous factors, such as better expectations' management, "good luck" (fewer adverse shocks before 2007), or structural reforms in several countries.

Regarding commodity prices, the observed surge in the real price of oil before the crisis was driven almost entirely by a sequence of unanticipated increases in the international demand for commodities, in particular from emerging Asia. Particularly, the resulting (net) oil price increases over the period 2003 – 08 reflected indeed a persistent shift in the oil's shortage. This shift left little scope for monetary policy authorities to mitigate the impact of the shock. Certainly, commodity prices have come off their peak recently, and this decline is projected to persist, given recent growth dynamics in China and the expected further slowdown in emerging economies. However, previous evidence suggests that this may not affect core inflation directly. Some preliminary evidence from the US says nevertheless that these dynamics in commodity prices may feed through expected inflation under the assumption that inflation expectations have not been fully anchored. Even there, central banks should not worry too much about commodity shocks in global demand, beyond making sure that inflation expectations remain anchored.

Regarding labour markets, there is sufficient evidence for wage moderation and decreased union bargaining power over the past two decades. But rather than a result of integration of labour markets themselves, it seems to be a consequence from capital and product market integrations, and international competitiveness pressures (or shocks) such as import penetration rates, mark-ups or capital flows.

On the finance side, we note that while the crisis highlighted how, in a globalized world, monetary policy interventions had to go beyond the domestic facility wielded in the past, this did not represented a change in the monetary policy stance. This crisis rather highlighted the need for a global coordinated in terms of regulation, supervision and control.

Our conclusion is that domestic monetary policy can still control domestic interest rates and so stabilise inflation (and output). No matter the pace of globalisation and how great its eventual extent may be, it should remain possible for a disciplined central bank towards a clear inflation target to achieve that goal without the impediment of having to coordinate excessively with other central banks. The only way in which globalization might matter for monetary policy is by increasing mutual sensitivity of the monetary transmission channel to changes in the exchange rate. This, however, does not mean that the degree of openness of an economy lacks significance for the conduct of monetary policy. Other important issues should be considered, such as the correct structural specification of models on which policy is built, the practical issues of defining domestic inflation, or the mutual financial interconnectedness and, certainly, the need for continued coordinated financial policy measures.

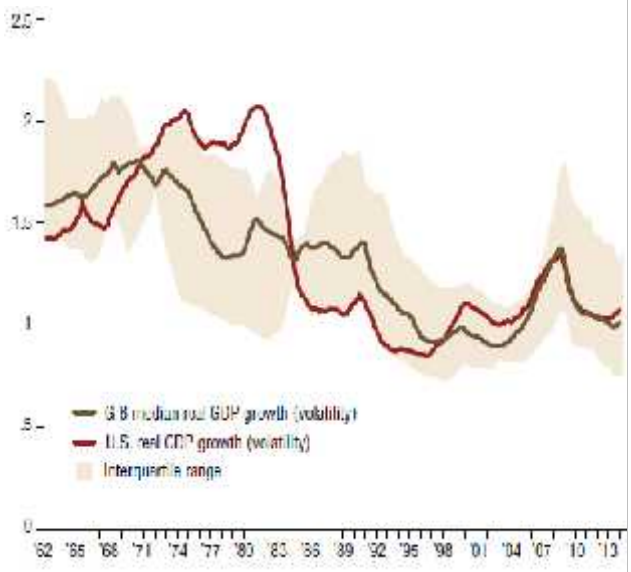
1. INTRODUCTION

Since the beginning of the crisis, inflation rates have shown a clear downward trend in many advanced countries and have fallen well below the targets of their respective monetary authorities. Despite strong monetary action, inflation expectations are slow to pick up. In some countries, the recovery is quite strong and unemployment rates have decreased, yet price pressures and wage development continue to remain subdued. Do central banks seem to have (partially) lost their ability to control inflation rates? The challenges to monetary policy in an increasingly interconnected world are a topic having long high-ranked on policy makers' agenda. Yet, the evidence that globalization may alter monetary policy transmission is not always conclusive. To the same degree, separating the effect of globalization on domestic inflation, though imported goods, from that of other factors – anchoring of expectations, economic slack, etc. – may prove difficult. Against the backdrop of fluctuations in world commodity prices and growth, together with the ongoing structural changes related to globalization wielding pressure on prices and wages, this paper review focuses on the implications of globalization for domestic inflation and its expectations and the possible consequences for national monetary policies.

2. THE "REAL-SIDE" IMPACT OF GLOBALIZATION

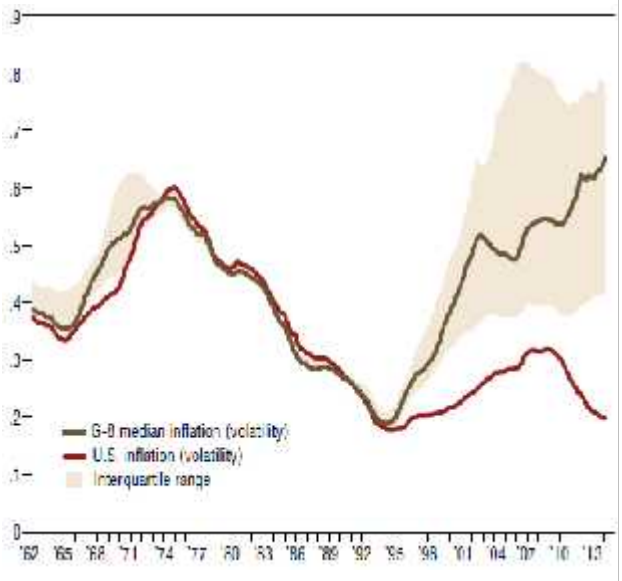
Theoretically economists have long recognized the importance of macroeconomic interdependence. The Mundell-Fleming models of open economies developed in the 1960s and the 1970s, as well as the modern two-country New Keynesian models that came later, amply described the effects that shocks to one economy may have on a representative foreign economy.[1] It had generally been understood, however, that the role of globalization is rather an empirical issue (for a review see Chudik, 2014).

Figure 1 – Real GDP Growth Volatility



Source: Martinez-García (2014).

Figure 2 – Inflation Volatility



[1] Two country models are suitable to better describe the behaviour of a small open economy, rather than a larger and more closed economy such as the euro area, Japan or the US In addition, two country models have been recognized to be insufficient to study how real and financial shocks transmit across nations in a globalized world. Hence, multicounty-DGSE models have been developed, even if at the cost of lower transparency (see Chudik, 2014).

Globalization is typically analysed through the lenses of interconnectedness. The latter has substantially increased starting from the 1970s, as evidenced by a decline in the overall macroeconomic volatility around the mid-1980s; a period known as the “Great Moderation” in the US. Looking at the conditional standard deviation for the US and the G-8 (US, UK, Canada, France, Germany, Japan, Spain and Italy) one could see that real GDP growth volatility has been mostly decreasing up until the end of the 90s, to later hit a peak in 2009 with the global financial crisis (Figure 1). Interestingly, the data also show a prevalent decline in inflation volatility between the mid-70s and the mid-90s, tailed by a similar rise afterwards. European countries in the catching up years – i.e. prior to the euro adoption – have been mostly affected by such a rise in inflation volatility. The latter remained fairly low in the US over the same period (Figure 2).

The mismatch between output and inflation volatility starting from the mid-1990s is a phenomenon known as flattening of the short term Phillips curve. Indeed much of the debate about globalization has revolved around the flattening of this short-term relationship over time. Findings of the Organization for Economic Cooperation and Development, among others, support the idea of a decline in the sensitivity of inflation to the domestic output gap (i.e. output in deviation from its potential) over time in many industrialized countries, including the US and the euro area (on the latter see also Anderton et al., 2009). As noted by Martinez-García (2014), Ball (2006), Ighir et al. (2007), a number of studies have nevertheless challenged the idea that the evidence of a flattening of the Phillips curve over time reflect a mounting influence of foreign and global measures of economic and financial slack in domestic price changes (e.g. Borio and Filardo, 2007), highlighting instead how the observed inflation “torpor” could rather be the result of different or simultaneous factors, such as better expectations’ management (Bernanke, 2010), “good luck” (fewer adverse shocks before 2007), or structural reforms in several countries (Anderton et al. 2009).

Rather than looking at a steepening of the Phillips curve itself, one could also note that, theoretically, there are in fact a number of explanations for which structural changes in the slope of the Phillips curve through globalization, as well as the direct contribution of import prices to measures of domestic inflation, may not necessarily be linear. These include the degree and extent of openness with respect to other countries (see also Martínez-García and Wynne (2010); lower mark-ups and marginal costs, owing to competition driving inflation down and prices to be more flexible through imported goods’ prices; measures of domestic economic slack (see e.g., Ball, 2006; Rogoff, 2006).

3. THE "FINANCE-SIDE" IMPACT OF GLOBALIZATION

While it goes beyond the scope of this analysis, one should recognize that there is also a finance-side of the globalization.

Deregulation of the financial services industry, starting from the 1980's, and the internationalization of financial market activity from 1990's have completely re-shaped the industry both in its shape and form. Banks, traditionally the core financial intermediaries of a country have grown into multinational universal banks, many of them operating in more than 100 countries. In addition, the traditional retail banking divisions have fused with more modern investment and derivative-trading activities. The result is a more integrated risk-management approach and a higher ability to perform regulatory arbitrage by banks.

The emergence of market-based financing institutions, MBFI (or shadow banks, as they are often called) has completely changed the fund-raising model of banks. Rather than relying on traditional deposits, banks have increasingly turned to the MBFIs for liquidity. Moreover, these institutions have also become core funders of derivative and other non-traditional investment products, often via special-purpose vehicles or conduits. The total effect of this 'revolution' is that market-based financial institutions have not only become the centralised liquidity supplier for banks in one country, but for much of the international financial market over the 2000's.

The equity markets have undergone a similar internationalization, both on the supply and the demand end. For investors, improved technology, the IT-revolution in the investment industry, and the removal of entrance barriers in stock markets has given unprecedented access to international investments, both in terms of reach and speed. For firms requiring financing, the internationalisation of the supply-chain and the business models coupled with the removal of barriers to quote on other stock markets has meant that the share of financing coming from countries other than that of the headquarters has drastically increased. The impact has been an increased geographical portfolio diversification as well as a higher diversity in capital structure of firms.

There has also been a sharp re-balance in the FX-market and the currency reserves. First, the dollar reserves (or dollar-denominated claims) in China and Japan are now as high (or even higher) than the Federal Reserve's. The implication is that Fed's control over its currency's value is attenuated. Second, the rising importance of the Euro as an international currency, both in terms of its trade on the FX-market and as a reserve currency in other central banks, has increased its exposure to international shocks. Lastly, the volume of the FX market has markedly increased since the turn of the millennium. The market is de-centralised and over-the-counter (OTC) which has allowed it to globalize more than any other segment of the financial market.

For national central banks, the implications are several. On one hand, the financial supervisors have a tougher task to oversee bank activities outside their borders. Financial regulators have a more complex task to impose binding rules on the institutions. And for monetary policy, the trade-off between inflation and output is flattened and the ability to control (national) inflation is weakened.[2]

[2] We just wish to outline some of the developments and processes in the financial industry since the 1990's. The topic is complex and large, requiring a separate analysis on the effects of financial industry internationalization on monetary policy. However, this is outside the scope of the current paper.

4. GLOBALIZATION AND MONETARY POLICY

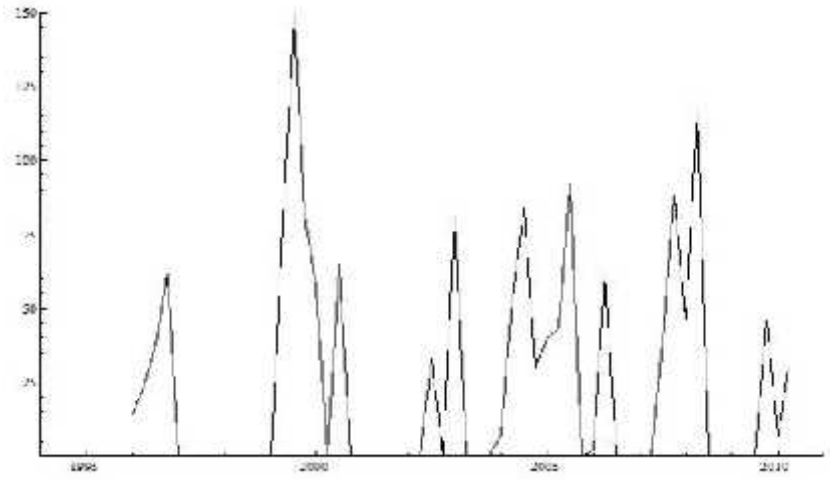
There are a numbers of ways in which globalization constrain or simply interact with the ability of monetary authorities to achieve price stability. First, as countries become more integrated into the globalized world, their economic and financial conditions are likely to become more affected by external shocks. Secondly, globalization may alter the transmission channels of monetary policy itself. Working though the real side, and with trade becoming more important, monetary policy may have incentives to act through exchange rates and net exports and less through domestic aggregate demand (Kamin 2010). On the finance side, with long-term bond yields being increasingly priced in international markets, their responsiveness to short-term policy rates in control of monetary authorities may decline. This can be particularly the case in an environment of abundance of liquidity, and long term-interest rate convergence, as it was the case just before 2007 (OECD, 2013).

4.1. Real side: Oil price, global demand and expectations

OECD Staff estimates suggest that the integration of non-OECD economies over the period 1996-2005 into world trade has reduced annual domestic inflation overall. In particular, prior to the crisis, the advent of China and other Asian economies has reduced annual domestic inflation by 0.2 on average in the US and the euro area up until 2005 (Pain et al., 2006).

Over the last couple of years, globalization has also worked though world demand, mainly consumption. The increase in global consumption of food and other commodities, especially from China and other Asian economies, has resulted into higher food and energy prices globally, including oil prices. This effect has partially offset the lower prices globalization induced through imported goods and services (Stark, 2008). There is not much a central bank can do about changes in the relative prices of food and energy (the so called “core” inflation component) but to accommodate such first round effects on headline inflation. There is a consensus, however, that a central bank aiming at maintaining price stability should carefully monitor price and wage development to avoid second round effects, as well as ensure that inflation expectations remain well anchored (Stark, 2008).

Figure 3 – Net Oil Price Increase Index



Note: The net oil price increase is computed as in Hamilton (1996), i.e. considering the price of oil price in the current quarter, relative to the maximum value for the level achieved during the previous four quarters. Last observation 2010Q2.

Source: Authors’ calculations.

Talking about globalization and monetary policy, Woodford (2010), among others, argued that theoretically globalization does not necessarily imply a weakening of monetary policy in affecting the real side of the economy, i.e. output and inflation. Instead, the effect of globalization is to be expected on the trade-offs of monetary policy over time and the economic (and financial) environment in which monetary policy has to operate (Bernanke, 2007). In a changing environment, the relevant trade-offs must be recognized, particularly from a policy making point of view, when designing monetary policy effectively (see also Martinez-García, 2014). The question is however to which extent the observed changes are due to globalization?

One of the aforementioned trade-offs consists in the identification of inflation's long run trend dynamics, as opposed to the short run dynamics. As Stark (2008) puts it, central banks have to cope with the idea that the impact of surges in oil and commodity prices on output and inflation depends crucially on the reaction of economic agents (i.e. expectations), particularly participants in the product and labour market.

Importantly, expectations will have to do not only with the reaction of agents in response to the original shock (first-hand effect), but also with the economic agents' response to the monetary policy stance after the shock (second-hand effect). Second round effects will be stronger the larger the shock affecting headline inflation (hence, prompting a more decisive monetary policy reaction). The nonappearance of second-round effects following food and commodity shocks will depend indeed on inflation expectations remaining firmly anchored.

Worldwide, the observed oil prices fell in the 1990s (Figure 3) partly due to increases in non-OPEC oil production (Anderton et al. 2009). The observed surge in the real price of oil more recently – just before the crisis – was instead driven almost entirely by a sequence of unanticipated increases in the international demand for commodities. In particular, the latest oil price boom of 2008 was driven by unexpected growth in emerging Asia, as evidenced by the data on professional real GDP forecast errors shown in Table 1. What happened was not that OECD demand for oil and other commodities increased by much, but rather that additional unanticipated demand arose from Asia, given continued high demand from OECD countries (Kilian, 2009). Such global aggregate demand forces more than offset the increases in the production of crude oil over the same period, mainly stemming from supply in newly opened areas (like the Caspian Sea).[3] The resulting (net) oil price increases in Figure 3 over the period 2003 – 08 reflect indeed a persistent shift in the oil's shortage. Once again this was mainly driven by unanticipated positive global aggregate demand shocks after 2003, as Figure 4 further illustrates.

Table 1 – Average Forecast Surprises
(Percentage points)

	December 2000–May 2003	June 2003–June 2008	July 2008–December 2008
Germany	–0.12	0.00	–0.33
Japan	–0.10	0.08	–0.27
United States	0.05	0.02	0.08
Brazil	–0.10	0.03	0.07
China	–0.04	0.12	–0.17
India	–0.06	0.03	–0.17
Russia	0.06	0.12	–0.42

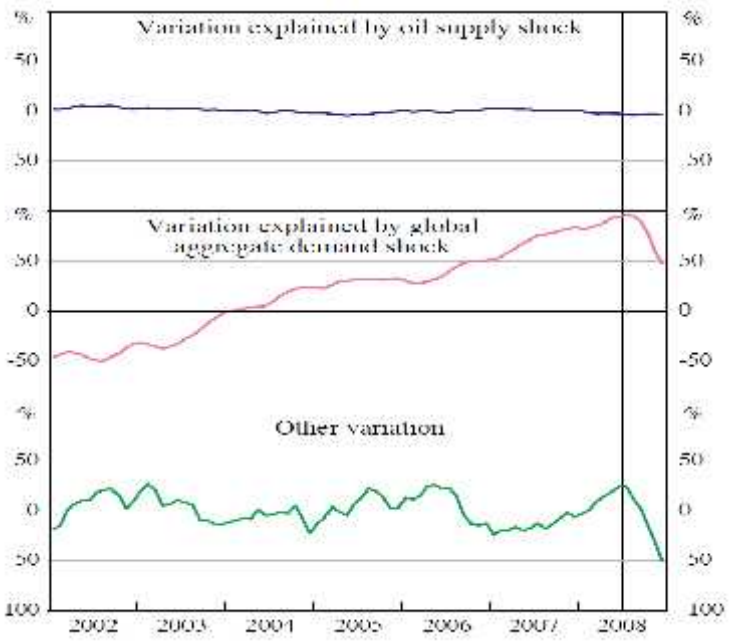
Note: Average forecast surprises computed based on successive annual forecasts of real GDP growth reported by the Economist Intelligence Unit

Source: Killian and Hicks (2009).

[3] This new production only partially offset declining rates of production in other geologically mature non-OPEC oil regions, such as the North Sea or the US.

This shift in the real scarcity of resources left little scope for monetary policy authorities to mitigate the impact of the shock. There is, moreover, no evidence that speculation or supply side shocks in oil markets significantly affected monetary policy indeed over the same period (for the US, see Kilian, 2009).

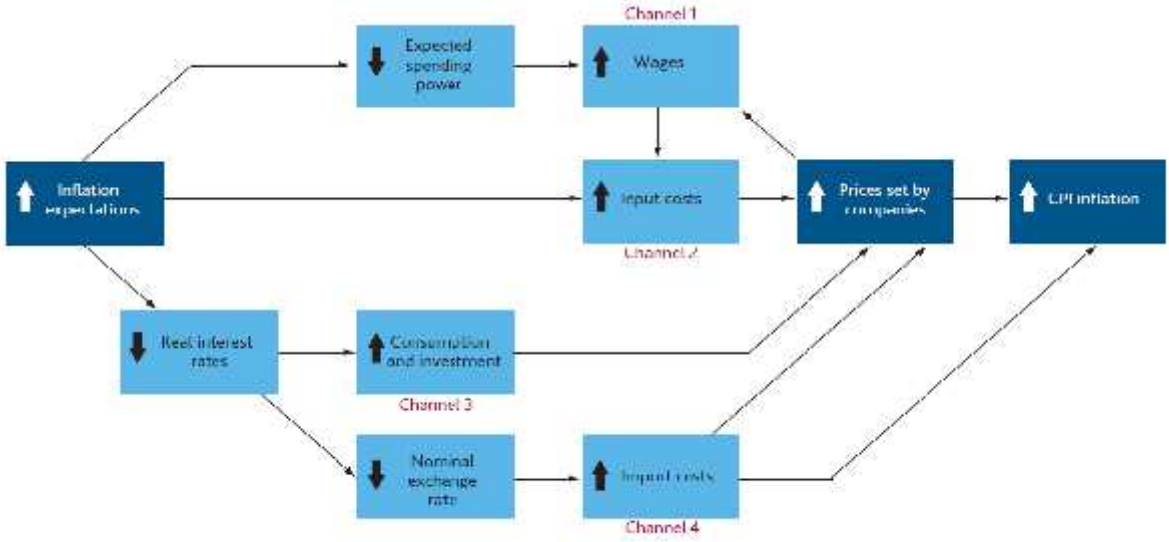
Figure 4 - Explanatory Power of Oil Supply and Oil Demand Shocks for the Real Oil Price



Source: Killian (2009a).

Note: The vertical line marks mid 2008 when global real economic activity peaked.

Figure 5 – Inflation expectations and inflation persistence



Source: Maule and Pugh (2013).

Simulation results proposed in Anderton et al. (2009) for the euro and US show that, prior to the crisis, oil price impacts on inflation seemed to be weaker than in the past and it did not tend to feed into core inflation. This seemed to be indeed partly the result of anti-inflationary monetary policy, which has kept inflation expectations well anchored (the so-called "anchored expectations" hypothesis of Bernanke, 2010). In the same vein, Blanchard and Galí (2007) found that oil price shocks have progressively had smaller effects compared to the past on prices and wages also owing to an increase in the credibility of monetary policy, as well as a decrease in the share of oil in consumption and production. Cecchetti and Moessner (2008) also found that in recent years core inflation has not tended to follow headline inflation in response to food and commodity price shocks, implying that commodity prices do not now generally lead to second-round effects on inflation. Furlong and Ingenito (1996) showed as well how commodity prices generally fail to predict core inflation. Commodity prices have come off their peak, and this decline is projected to persist, given recent growth dynamics in China and the expected further slowdown in emerging economies. In the light of the evidence mentioned above, it seems highly unlikely based on the aforementioned results that the deflationary trend observed more recently is the result of first-hand effects (commodity prices to core inflation) from the recent sharp fall in oil prices.

Having excluded this hypothesis leave us with the other hypothesis that behind the deflation pattern observed in many countries is the loss of anchoring of expectations (i.e. central bank credibility); a scenario certainly difficult to assert at this stage. Consistent with this hypothesis, is the evidence from the US provided by Coibion and Gorodnichenko (2015). The latter shed light on the possibility that changes in household inflation expectations between 2009 and 2011 could be explained by changes in oil prices in the US. In other words, the latter authors highlight how commodity prices seem to have fed through inflation expectations, given that the latter were not fully anchored. In particular, given that inflation expectations clearly play an important role in determining the persistence of inflation itself (Figure 4), the latter findings – under the assumption that household expectations have not been fully anchored – could make us reconsider the relationship between commodity (oil) price and inflation. The general consensus is that there is nothing a central bank could or should do in response to shocks in commodities and global demand, beyond making sure that inflation expectations remained anchored. If the anchoring of inflation expectations has been lost (Kilian, 2009; Stark, 2008), and commodity prices fed through the expectation channel, hence marking a shift with respect to the previous decade, it is difficult to say now. A preliminary look at the US evidence supports this idea, even if its assessment would certainly require a more thorough quantitative analysis. Should this be the case, central banks should avoid mixing signals, and facilitate instead communication with markets' participants, to reduce second-round effects.

4.2. Real side: Wages and the globalization of markets

Most empirical studies have shown that there has been a significant wage moderation going on since 1990's. While most of them show that one of the key underlying causes is the increased integration of product, capital (and to some extent) labour markets, or globalisation, there is little agreement on the exact mechanism at work. In a study of five EU countries (Germany, France, Italy, Belgium and the UK), Dumot et al (2006) find a negative effect of internationalization on union bargaining power, even in highly powerful labour union countries such as Germany and France. Their results are most significant for the latter half of the 1990's and 2000's.

Coinciding with the period of largest wage moderation found in OECD countries during the same period (OECD, 2003), they conclude that this moderation has been caused by a decreased power of labour unions, rather than sticky wages or a decrease in labour demand, as proposed in Bhagawati and Deheija (1994).[4]

A firm-level study of Belgian enterprises in Abraham et al (2009) depicts a more detailed landscape. They find that in sectors with high mark-ups, the globalisation (defined as a simultaneous integration of product and labour markets) has resulted in an increase of the unions bargaining power. In sectors where competition from low-wage countries increased, on the other hand, the integration of markets has resulted in a significant decrease of the bargaining power. Stated slightly differently, in sectors with high import penetration rates, the mark-ups are lower, and so are the union bargaining power, resulting in an overall wage moderation (and positive employment effects).

In a theoretical (neoclassical trade model) study, Eckel (2003), on the other hand, finds that the key factor of whether wages moderate and unemployment rises as a result of globalisation is the direction of capital flows. In capital importing countries, the skills premium (and therefore wages) increase as a result of globalisation, meanwhile unemployment increases in capital exporting countries.

Most differentiated from the previous results is, however, the theoretical study by Felbermayr et al (2011), who argue that trade liberalisation only leads to a decrease in unemployment and an increase in real wages. The result holds as long as globalisation implies an increase in productivity defined as a decrease in variable trade costs or entrance of new countries into the trade-block permitting higher competition. Yet, as the authors admit, the proposition is limited only to multilateral trade liberalization amongst symmetric countries. Much of the progress in trade and market integration has been amongst asymmetric countries in bilateral deals. To conclude, there is sufficient evidence for wage moderation and decreased union bargaining power over the past two decades. But rather than a result of integration of labour markets themselves, it seems a consequence from capital and product market integrations, and international competitiveness pressures (or shocks) such as import penetration rates, mark-ups or capital flows.

4.3. Finance side: Banking globalization

An important channel of monetary policy effectiveness passes through bank lending. This has clear consequences for influencing the real side of the economy as well (i.e. output and inflation) as well as expectations. In a previous paper (Gerba and Macchiarelli, 2015) we noted that how banks concentration (a feature highly present in Europe, as noted by Panetta, 2014) makes banks' lending decisions less dependent on the monetary policy stance (see, e.g., Kashyap and Stein, 2000). Banks with high liquidity and diversified portfolios will be able indeed to adjust their credit flow more gradually, based on the internal finance, so to changes in the monetary policy stance (see, e.g., Brunnermeier and Pedersen, 2009; Adrian and Shin, 2010). A high level of concentration, with credit markets dominated by a limited number of large and liquid actors, would make it harder for monetary policy to affect the banking sector.

This is the case for global banks as well. In a seminal paper, Keyshap and Stein (2000), for instance, looked at the top 5% of banks in the asset distribution, to investigate the relationship between banks' size and their global network. They conclude that large global

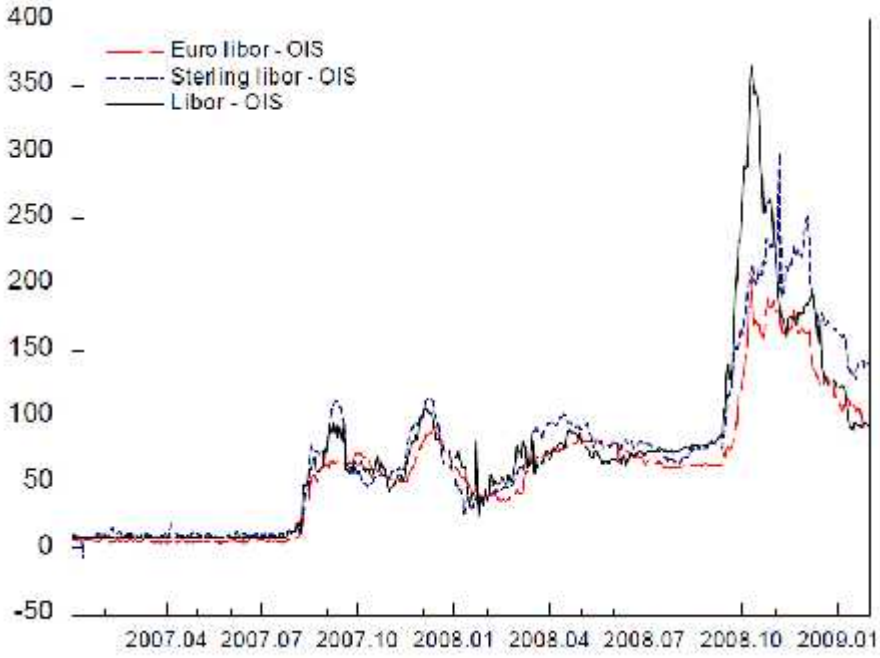
[4] Abowd and Lemieux (1993) and Borjas and Ramey (1995) found similar evidence of falling rents in the US and Canada as a result of globalization. However, their studies do not include the distribution of rents between workers and employers, and therefore the bargaining power of unions cannot be determined (Harrison, 2002).

banks are indeed insulated from monetary policy shocks, as opposed to groups of large banks with domestic-only operations. Banks with significant operations in foreign countries will be able to smooth monetary impulses via an internal reallocation of funds between their head office and their foreign offices. This has certainly implication for monetary policy spillovers across countries.

Indeed, global banks, by adjusting to monetary policy shocks via internal reallocations, will affect their foreign lending as well, hence increasing the likelihood of cross-border propagation of domestic liquidity shocks (Cetorelli and Goldberg, 2009). This may reduce the central bank's ability to control domestic inflation, even if there is no conclusive evidence on this. Looking at the recent experience during the crisis, a coordinated approach in-between central banks globally has been adopted, mainly to tackle the systemic risk associated with the cross-border externalities of banks operating globally.

Figure 6 – Spread of LIBOR over OIS (3-Month) Interest Rates

(Basis points)



Source: Kamin and Pounder (2009).

One of the most important challenges posed by the crisis was in fact the shortage of funding in foreign currencies experienced by several financial institutions operating globally. All such shortages were a direct result of the globalization of banking and asset management (Kamin, 2009) and could not be addressed through standard monetary policy tools, but required "a more internationally coordinated approach among central banks to the lender-of-last-resort function" (Bernanke, 2008). The central banks' measures adopted by the Fed, the ECB, the BoJ and the BoE, mainly exploited the flexibility of the existing monetary policy framework, with the aim of supporting banks which would have otherwise faced a massive shortage in foreign funding; hence, not a change in the nationals' monetary policy stances. The effectiveness of these measured is evidenced by sharp decline in dollar Libor-OIS spreads, with credit spreads in interbank markets around generally returning to their pre-crisis levels after 2010 (Figure 6). While the effect on expectation is difficult to measure, these measures certainly helped restore confidence in the interbank and money market, avoiding a liquidity shortage at this early stage of the crisis.

Again, while the crisis highlighted how, in a globalized world, monetary policy interventions had to go beyond the domestic facility wielded in the past, this did not represented a change in the monetary policy stance. This crisis rather highlighted the need for a global coordinated framework in terms of regulation, supervision and control.

The Financial Stability Board, bringing together the financial authorities of 23 countries, as well as the new Basel Committee on Banking Supervision, including – as of 2009 – representatives from 27 countries, are indeed examples of such a coordinated approach, beyond price stability (see also OECD, 2013).

4.4. Globalisation and monetary discipline

It has commonly been claimed in the literature that globalisation will inevitably lead to higher monetary discipline, since inflation expectations are lowered. The reason is the positive feedback loop between inflation expectations and interest rate movements. This works via multiple channels. First, economic agents understand that, as a result of globalisation, monetary authorities credibly commit to the primary objective of price-stability, resulting in a downward pressure on future inflation. Second, the lower actual inflation may have bolstered central banks' credibility, and so amplifying the inflation dampening effect of the original positive supply shock. Third, understanding globalisation as downward pressure on prices and wages, economic agents will take these movements into account and lower their expectations even further. This results in a flattening of the Phillips curve, and an increased incentive for the central bank to keep the monetary discipline and anchor the expectations of the economic agents even further (Gnan and Valderrama, 2006).

A recent theoretical study by Cavelars (2009) shows that these inter-temporal assumptions are flawed. First, the argument that increased openness enhances monetary discipline put forward by Romer (1993) is not fully robust since a lowering of import tariffs can make it more attractive to conduct expansionary monetary policy (to boost expenditure). Second, an increase in competition in the goods market may have an adverse effect on monetary policy. Cavelars shows that a decline in monopoly power of firms enhances the expenditure-switching effect of monetary policy; the latter result standing in contrast with Rogoff (2003, 2006). In other words, when competition is fierce, a change in the international relative price of goods gives rise to larger shifts in demand, prompting central banks to respond to these demand shifts (even if they don't have price effects). Hence, globalisation is not assurance for monetary discipline, or lower inflation expectations.

CONCLUSIONS

The challenges posed to monetary policy by an increasingly interconnected world have been highly ranked on policy makers' agenda for some time. Yet, the evidence that globalization may alter monetary policy transmission is not always conclusive. Recent experiences have allured some to conclude that external factors such as commodity price movements, capital flows and international growth prospects are increasingly influencing domestic inflation. The discussion proposed in this paper is whether this has resulted in a weaker influence of national central banks on domestic inflation (i.e. a credibility issue), and whether the monetary discipline has directly increased as a result of the globalisation.

The answer is negative. As Mishkin (2009) points out, the exaggerated claim that greater openness of economies invalidates traditional economic models of inflation, and thus monetary policy's ability to stabilise it is not true. Globalisation does have the potential to be stabilising for individual economies and has been a key factor in promoting growth. However, globalisation has not led to a decline in the sensitivity of inflation to domestic output gap nor to domestic monetary policy. Domestic monetary policy can still control domestic interest rates and so stabilise inflation (and output). The only way in which globalisation might matter is by challenging central banks in keeping inflation expectations fully anchored nationally, and by increasing coordination of financial measures globally. The latter is particularly relevant given the presence of banks operating worldwide, hence increasing the likelihood of cross-border propagation of domestic liquidity shocks.

This does, however, not mean that the degree of openness of an economy is no significance for the conduct of monetary policy directly (Woodford, 2010). Monetary policies should indeed be increasing mutual sensitivity of the monetary transmission channel to changes in the exchange rate. Moreover, openness forces central banks to confront a variety of practical issues that would not be present in the case of a closed economy, such as whether to stabilize an index of domestic prices only, or an index of the prices of all goods consumed in the domestic economy (hence, calling upon a proper measurement of domestic inflation vs. import prices). Also, the need of correct quantitative specification of the structural models used in a central bank more has become more urgent. Overall, however, globalisation, even if expected to be rapid, does not justify the degree of alarm that some commentators have urged upon central banks. No matter the pace of globalisation and how great its eventual extent may be, it should remain possible for a disciplined central bank towards a clear inflation target to achieve that goal without any exceptional needs for coordination of monetary policy with other central banks, as the initial stage of the crisis has shown. The need for coordinated and detailed action lies instead in the financial (policy) sphere.

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DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is globalization reducing the ability of central banks to control inflation? Impacts on prices and wages

Christopher HARTWELL

IN-DEPTH ANALYSIS

Abstract

Inflation rates, as measured by either consumer or producer price indices, have been on the decline in all advanced economies over the past 20 years. Economic globalization, which has also been on a sustained upward path, offers clues for inflationary performance globally. Our central finding from this paper is that globalization has made it more difficult for central banks to influence domestic prices, as production process continue to counteract banks' demand for inflation; however, the scale of the effect of globalization remains small and banks still have several powerful tools at their disposal. Central banks also may underestimate their power in influencing commodity prices, especially if they are in advanced economies. Finally, the fragmentation of global labour markets means that wage-setting still remains a nationally-determined outcome.

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EXECUTIVE SUMMARY

- Inflation rates, as measured by either consumer or producer price indices, have been on the decline in all advanced economies over the past 20 years. But finding the actual drivers of inflationary outcomes in developed countries post-crisis requires looking beyond national boundaries. In particular, economic globalization, which has also been on a sustained upward path, offers clues for inflationary performance globally.
- Globalization is anticipated to dampen inflationary outcomes via several channels, including increasing competitive pressures to hold down price mark-ups and by creating a disciplining mechanism for central banks.
- Evidence from the economics literature shows that globalization has indeed had a moderating influence on inflation, although it is quite small and the impact differs across countries.
- Most research on the relationship between globalization and inflation has been in advanced countries, with relatively little on emerging markets.
- Economic evidence shows that there has been a decline in the sensitivity of inflation to domestic output gaps, while foreign output gaps are playing a more prominent role in domestic inflation. Despite this reality, domestic monetary policy does still control domestic interest rates and has a more prominent effect on controlling inflation.
- Globalization may also have an impact on commodity prices, which can then in turn affect domestic price levels. The influence is exactly the opposite of the globalization/inflation nexus, however, as monetary policy in advanced economies appears to determine commodity prices rather than the other way around.
- For emerging markets, commodity price developments can dominate national price ones, and have a large impact on inflation. These effects are differentiated by the dependence of the particular economy on particular commodities.
- Globalization has contributed somewhat to wage moderation via competition, but fragmented labour markets mean that national developments and wage negotiations still predominate over international factors.
- The policy implications of this research are straightforward, as policies that expand globalization should be encouraged, even if future effects on inflation are likely to be muted.
- A further implication is that good monetary policies remain crucial in the battle against inflation, including a narrow focus on inflation targeting rather than adding other targets to a central bank's mandate.
- Given the power wielded by advanced economy central banks on global commodity prices, this should be taken into account when setting policies so as to not export inflation to commodity-dependent emerging markets.
- Finally, labour market flexibility appears to be impervious to globalization. If a country wishes to reap more benefits from globalization via more flexible labour markets, such reforms will need to be endogenously generated.

1. INTRODUCTION

Inflation rates, as measured by either consumer or producer price indices, have been on the decline in all advanced economies, with the OECD seeing an average annual growth rate of inflation in early 2015 of approximately 0.5% (Figure 1). Even in the "great moderation" of the 1990s, inflation in the OECD averaged approximately 5%, a figure not seen since the spike in inflation accompanying the start of the global financial crisis in 2008. Along with this decrease in inflationary levels, the volatility of inflation has also declined substantially (excepting late-2008), while consumers also expect inflationary episodes to be far shorter today than they did in the 1970s (White 2008).

Figure 1: Consumer Price Inflation in the OECD

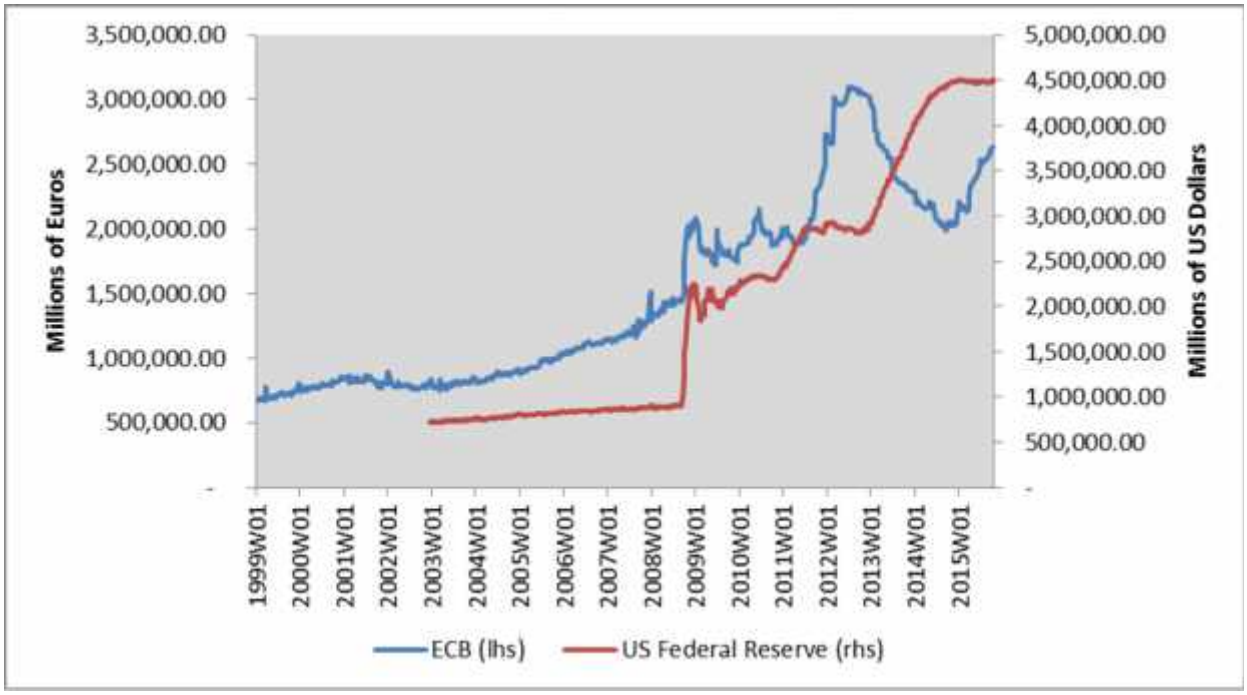
Source: OECD Database (https://data.oecd.org/price/inflation-cpi.htm).

The paradox of this performance, especially since 2008, is that these inflationary outcomes have occurred precisely in an era where inflation is the overriding goal of major central banks. Seven years after the Lehman Brothers bankruptcy and the unofficial start of the global financial crisis, the great unconventional monetary experiment in the world's developed economies continues. From "quantitative easing" from the US Federal Reserve to "monetary accommodation" from the European Central Bank (ECB), unprecedented amounts of liquidity have been pumped into the global financial system, albeit at different scales (with the Fed far surpassing the ECB in terms of its accommodation – see Figure 2). But while the coordinated and continuing response to the global financial crisis by the world's central banks may have "saved the system," it has also exposed the limits of monetary policy in influencing the macroeconomy, especially in areas where structural policy is required.

Finding the actual drivers of inflationary outcomes in developed countries post-crisis requires looking beyond national boundaries. Indeed, the issues of inflation and the diminishing ability of central banks to control inflation have dovetailed with another economic phenomenon, that of globalization. While economic globalization in most advanced countries, even four years after the global financial crisis (2012), was at levels not seen since the mid-1990s, trade volumes have continued to increase, with the OECD

countries seeing an increase in trade to GDP of 12 percentage points from 2003 to 2013.[1] Accompanying this boom in trade has been an integration of production processes across boundaries, a trend that, in the pre-crisis period, had the effect of putting downward pressure on domestic prices via competition (Pain et al. 2006). This integration of production processes has also opened the door for commodity prices to set the pace for national price developments, with shifts in energy and food prices presenting additional challenges for central banks targeting inflation (De Gregorio 2012). As Jean-Claude Trichet noted in 2008, "despite limited convergence in price levels, inflation developments have seemingly reflected the influence of global factors."[2]

Figure 2: Total Assets of Central Banks, by Week, 1999-2015



Source: European Central Bank data warehouse (http://sdw.ecb.europa.eu/), Federal Reserve Bank of St. Louis (https://research.stlouisfed.org/fred2/).

This purpose of this brief is to examine the effects of these two trends, increased globalization and moderate inflation, and ascertain if globalization is reducing the ability of policymakers to control policies in their own country. Our central finding from this analysis is that, in one sense, globalization has made it more difficult for central banks to influence domestic prices, as production processes continue to counteract banks' demand for inflation; however, the scale of the effect of globalization remains small and banks still have several powerful tools at their disposal. In regards to commodity prices, central banks also may underestimate their power, especially if they are in advanced economies. Finally, the fragmentation of global labour markets means that wage-setting still remains a nationally-determined outcome.

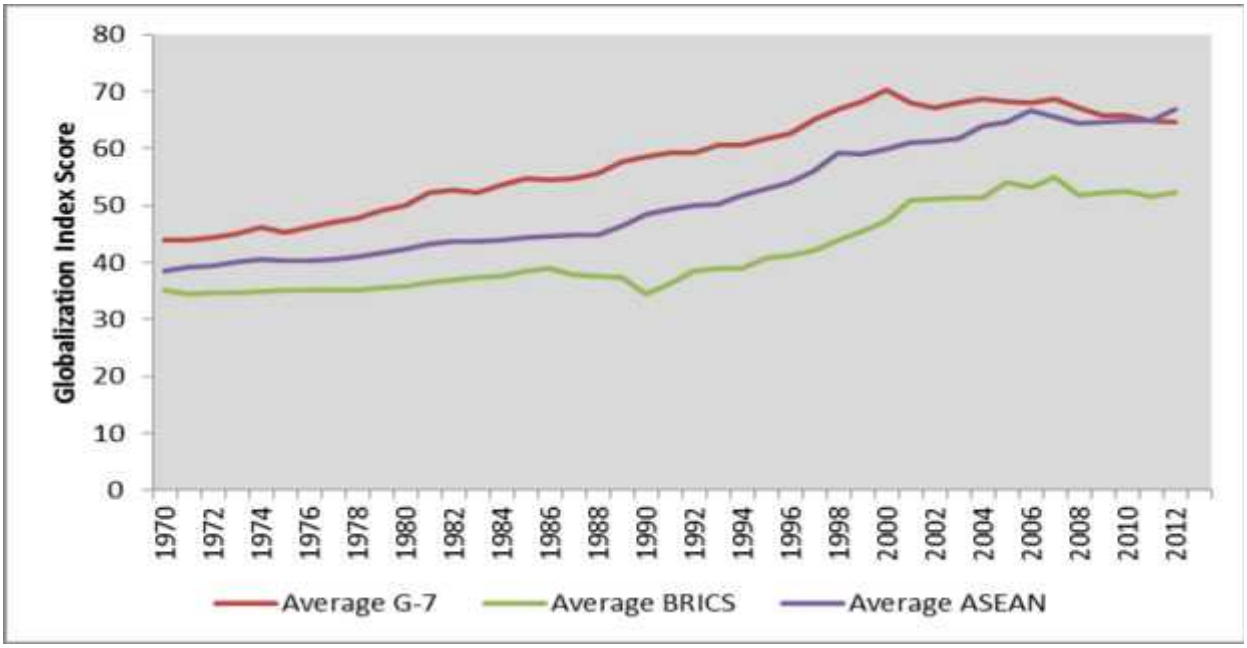
[1] Globalization data is based on the Index of Globalization, created by researchers at the KOF Swiss Economic Institute (Dreher 2006). OECD trade numbers are based on World Bank World Development Indicators (WDI) data.

[2] Speech held at the Barcelona Graduate School of Economics on February 14, 2008. Available at http://84.88.73.1/tmp/pdf/BE%20Lecture%20Transcript.pdf.

2. GLOBALIZATION AND INFLATION: A REVIEW

The reality of globalization over the past 20 years has been a tale of increased economic integration across many fronts, including trade, manufacturing and production processes, labour markets, capital markets, information flows, and culture. Measured by the Index of Globalization from the KOF Swiss Economic Institute, Figure 3 shows that economic globalization has been on a steady rise across all representative country groupings since 1970, with a large spike after 1989 and a plateau after the global financial crisis.

Figure 3: Index of Globalization, 1970-2012



Source: Author's calculations based on data from the KOF Swiss Economic Institute (http://globalization.kof.ethz.ch/).

The effect of this globalization on monetary policy emerged as a popular topic in the economics literature approximately ten years ago, as the seeming continuing moderation of inflation in the 1990s was attributed to both prudent central bank policy and increased globalization. The extant literature theorized that globalization would operate through several different channels in moderating inflation:

- Globalization removes incentives for imprudent macroeconomic policy, such as discretionary bursts of inflation, as international goods and capital markets react adversely. This has the effect of moderating policymakers and encouraging low inflation (Tytell and Wei 2004);
- Trade puts downward pressure on the price of goods, as comparative advantages are adhered to and lowest-cost suppliers at a given quality level survive (Rogoff 2003);
- Similarly, relocation of production due to lower barriers can help lower prices through cost-savings, which are then passed on to the consumer (IMF 2006);
- Increased competition from lower-cost foreign suppliers reduces the mark-up that domestic producers could charge on goods in the home market, undercutting monopoly power and thus reducing overall prices (Pain et al. 2006); and
- Globalization can spur productivity growth for both domestic and foreign manufacturers, as increased pressure to innovate also contributes to better utilization of materials and lower costs for inputs (IMF 2006).

Moreover, disinflation attributable to globalization over the past two decades has created a virtuous cycle: much as the 1960s and 1970s created an expectation of ever-higher inflation, the disinflation in the 1980s and 1990s has kept inflationary expectations fairly stable at a very low level (White 2008). With firms anticipating low inflation in the future, and thus lower costs of capital, they are more likely to invest in long-term projects which in turn also contribute to innovation and lower prices.

However, a few caveats apply to these hypothesized channels of influence. In the first instance, they refer to forces which would lower the price level in a particular country, not those that would necessarily lower inflation (Mishkin 2009). That is, inflation is everywhere and at all times a monetary phenomenon, so that even pressures for price level decreases can, theoretically, be counteracted by monetary policy.

Along these lines, the definition of "inflation" utilized in these analyses often refers only to core or headline inflation, relying on broader indices of prices. While globalization may temper price pressure in product markets, it is hard to say that all facets of inflation have been moderated; one only need look at the run-up in asset markets prior to the global financial crisis and, to some extent, their re-inflation since 2009 to see that globalization may have stoked inflationary pressures rather than moderated them.

Finally, and as we will see in the next section, globalization's effect on prices via increased competition may be localized in those industries that are exposed to global forces. That is, globalization may reduce prices in import-competing industries, but there is less of a chance of having a broad-based reduction in price levels due to globalization (Rogoff, 2003). Of course, this assertion also overlooks the fact that inputs and intermediate goods may also see a price decline, which would have a larger effect on an economy, but in general globalization may only affect narrow segments of the goods market (and have little impact on services).

2.1. The Evidence on Globalization and Inflation

Despite these possible mitigating factors against globalization's impact on inflation, it is undeniable that the fall in inflation across the world over the past 25 years has correlated with a rapid increase in globalization. Research has also uniformly shown that global factors have had an increasing effect in determining domestic inflation (Hodgetts, 2006), with some papers (Borio and Filardo, 2007) finding that global factors now dominate domestic ones for inflationary outcomes. While the scale of the effect that globalization has had on inflation varies depending upon the sample and timeframe, nearly all studies show a very modest improvement in inflation due to globalization.

Specifically, Pain et al. (2006) estimate that imports from China and elsewhere in Asia reduced inflation in the US by 0.1 percent per year over 1996 to 2005, while the Eurozone saw a reduction of 0.3 percent annually over 2000 to 2005. Focusing narrowly on the United Kingdom, Nickell (2005) estimates that inflation decreased by 0.55 percent per year due to globalization, while Kamin et al. (2006) show that the rise of China lowered import prices by about 0.8 percent annually in the US, only translating to an overall price decrease of 0.1 percent per year. Finally, the IMF (2006) estimated that a 1 percent fall in import prices would lead to a 0.08 percent drop in inflation across a sample of advanced countries (the G7 plus Australia).

Overall, this research, as can be seen, has focused mainly on the overall effect of globalization on inflationary pressures in advanced economies, so there is little evidence of the effects of globalization on emerging markets. Also, as noted above, this work focuses mainly on product markets with little research into the effect of global trade in services.

Both of these omissions are due mainly to issues of data, but are promising areas of future research. Also necessary for understanding the link between globalization and inflation will be to re-examine the issue with a longer time-series; current research may suffer from a bias in timeframe, given that the vast majority of research was conducted prior to the global financial crisis. These truncated time-series will not have captured the halt in globalization (especially in international trade) that accompanied the crisis.

Finally, and perhaps importantly for our purposes, this research has shown the effects of globalization but generally without a sense of its implications. If inflation is determined exogenously to a country system, this must change the way in which policymakers think about monetary policy. As Claudio Borio (2011:12) of the Bank for International Settlements remarked, “purely country-centric approaches to understanding the workings of the economy and formulating policies are bound to be inadequate.” But is this actually the case? In a globalized world, is integration actually making it more difficult for central banks to influence domestic prices?

3. THE CHALLENGE FOR CENTRAL BANKS (I): GLOBALIZATION, COMMODITY PRICES, AND PRICE INDEPENDENCE

The challenge for central banks can be broken up into two separate-yet-related areas: the effect that global integration of production processes has had on domestic inflation and the effect that globalization has had on commodity prices. These two effects are in some ways countervailing, as increased globalization may have a downward effect on product market price levels; however, globalized markets may mean increased demand for commodities, which then could result in higher prices that then feeds through to inflation. In both instances, central banks are buffeted by external forces, and finding the right balance between internal needs and external realities presents the largest challenge for monetary policy.

3.1. Production Processes and Central Bank Influence

Rogoff (2003), perhaps influenced by his background at the IMF, was one of the few researchers to note the challenge for central banks that global (dis)inflationary pressures present, as global forces may push inflation below what monetary authorities may project or desire. However, it was Mishkin (2009:191) who comprehensively summarized the four major issues confronting central banks today:

(i) "Has globalization led to a decline in the sensitivity of inflation to domestic output gaps (the difference between actual and potential output) and thus to domestic monetary policy?

(ii) Are foreign output gaps playing a more prominent role in the domestic inflation process, so that domestic monetary policy has more difficulty stabilizing inflation?

(iii) Can domestic monetary policy still control domestic interest rates and so stabilize both inflation and output?

(iv) Are there other ways, besides possible influences on inflation and interest rates, in which globalization may have affected the transmission mechanism of monetary policy?"

In regards to each of these questions, in the first instance, it appears that there is unequivocally a decline in the sensitivity of inflation to domestic output gaps, but there is mixed evidence on whether this is attributable to inflation.

Theoretical modelling from Clarida et al. (2002) show that, in an open-economy DSGE model, Phillips curves become flatter as an economy becomes more open. This theory has been matched by extensive empirical data. The IMF (2006) study examined above found that, over 1960 to 2004, the sensitivity of inflation to the domestic output gap fell substantially in the G7 countries plus Australia, due mainly to trade openness. Similarly, Debelle and Wilkinson (2002), focusing exclusively on Australia, find sensitivity to the domestic output gap plummeting at the precise time that product and labour markets were opening up to globalization. And the gold standard of this research line, Borio and Filardo (2007), finds that globalization is the main culprit for inflation moderation across a sample of 16 OECD countries.

However, contrarian evidence exists as to whether or not globalization is the true source of this decline. Ihrig et al. (2010) find that the sensitivity of inflation to domestic output gaps is not related to the extent of globalization that a country has embraced. And, answering his own question, Mishkin (2009) argues that declining sensitivities should instead be attributed to better monetary policy. With more independent central banks and firm

commitment to breaking the back of inflation, Mishkin believes that inflationary expectations were re-set, and thus households and businesses would see inflationary shocks as transient and not push for higher wages or prices to compensate. If this is indeed the case, it would thus be imperative for central banks to play the role they did in the 1980s and 1990s and combat inflation, rather than attempting to re-inflate the economy.

Turning to Mishkin's second question, the answer is unanimously yes, foreign output gaps are playing a more prominent role in domestic inflation. As noted above, in some instances and for smaller countries, foreign output gaps have dominated the effects of domestic factors (Borio and Filardo 2007; Ciccarelli and Mojo 2010), while for other samples, the effect of foreign output gaps is much smaller (Ihrig et al. 2010) or highly dependent upon the specific country being examined (Ball 2006). Given the complexity of monetary policy even in a closed economy, the trend towards increased globalization means that Woodford's (2007) injunction for central bankers to monitor import prices is sound advice.[3]

The answer to the third question requires some clarification, in particular in regards to the time horizon being examined. In general, domestic monetary policy does still control domestic interest rates but only in the short-term; longer-term interest rates in advanced economies are more likely to be influenced by global factors, including savings behavior, capital flows, and global risk premia (Warnock and Warnock 2009). Undoubtedly, however, by utilizing interest rate and monetary channels, central banks continue to exhibit a high degree of influence in setting inflationary targets.

However, a key point for understanding the post-crisis world is also to note that central bank goals have shifted from merely stabilizing inflation towards output-related goals. Under this scenario, it is difficult to say that monetary policy can stabilize both inflation and output, since it appears there is much leverage to affect one and zero leverage to affect the other (López-Villavicencio and Saglio 2014).

Finally, thinking about the other ways that globalization may have affected the transmission mechanism, the answer is also yes, specifically through political economy channels. As noted earlier, globalization may have contributed to monetary rectitude by removing many of the incentives for inflation. Bean (2006) also notes that policy credibility is at stake, and if central bankers react to the disinflation that globalization brings with sustained inflationary tactics, it may change perceptions of their credibility or inflationary expectations writ large. Finally, Mishkin (2009) also notes that globalization may smooth domestic consumption, as changes in domestic demand are offset by changes in imports. Where demand shocks occur, output is less likely to respond as dramatically, given that the trade balance can absorb much of the shock. Thus, more open economies have an additional buffer against drops in consumption, meaning an easier target for central bankers focusing on aggregate demand.

3.2. Commodity Price Shifts and National Prices

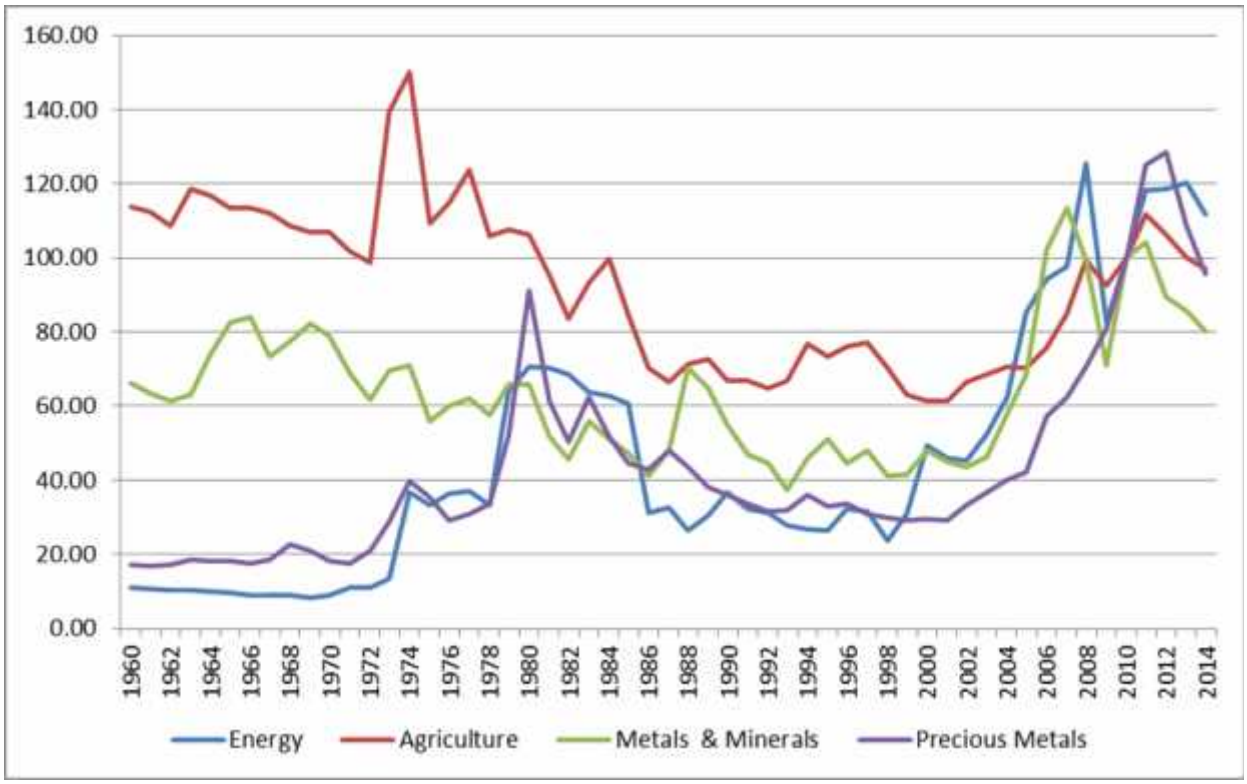
Given the reality of globalization's effects on central bank influence, a further question is if global commodity price shifts can dominate national price developments and, by extension, central bank policies. Theoretically, there are many ways in which globalization can affect commodity prices: as noted above, the expansion of global markets and the coming on-line of emerging economies can be expected to drive up demand and thus prices for commodities. This has been the case with China's emergence as a global economic power and India's booming economy, with both countries craving energy, primary foodstuffs, and

[3] However, this assumes that import prices accurately reflect global output gaps, which may not always be the case.

other commodities to fuel its manufacturing. On the other hand, globalization encourages innovation, which also encourages lower materials usage (Hartwell and Coursey 2015), or encourages exploration to increase supply (as with the shale oil/gas revolution in the United States), thus lowering price levels. Thus, it is not self-evident how commodity prices would feed through to inflation, given that the impact on commodity prices from globalization is uncertain.

Figure 4: Global Commodity Prices, 1960-2014, by Grouping

Annual Indices, 2010=100, Real 2005 Dollars



Source: World Bank Commodity Markets Outlook Historical Data (http://www.worldbank.org/en/research/commodity-markets.print)

These contradictory influences are evident in the actual path of major commodity prices over the past twenty years. As Figure 4 above shows, the prices of major commodity grouping were on a steady downward path starting in the 1970s, but all spiked upward in the period roughly corresponding to 2001 to 2007, crashed with the global financial crisis, and then resumed an upward trend between 2008 and 2013, only to fall again in 2014. A visual inspection of the data appears to confirm that the boom of China and India in the 2000s led to much higher commodity prices, but, remarkably, this was also a time of "Great Moderation" of inflation, as shown in Figure 1. The reverse is true from the 1970s, when commodity prices began their downward drift, but inflationary pressures in the OECD countries were at their highest.

The econometric evidence on the effect of commodity prices confirms that there is little relationship between commodity prices and domestic inflation. Bijapur (2012), examining the pre- and post-crisis period, finds that commodity prices had no effect on growth of inflation in 11 high-income countries across any specification. Restricted to the pre-crisis period, Pain et al. (2006) also show that the line between commodity and non-commodity price shifts is immaterial for inflationary outcomes in OECD countries, as changes in

commodity import prices have the exact same effect on price levels as changes in non-commodity import prices.

Of course, the effect of commodity price shifts on inflation can be highly country-specific, with commodity price shifts falling most heavily on countries and sectors heavily dependent on specific commodities (Gelos and Ustyugova 2012); Mallick and Sousa (2013) find that the BRICS countries, in particular, see a rise in overall price inflation as the result of a commodity price shock. However, their analysis also shows similar effects to that between globalization and inflation in general, as the price shock only feeds through to domestic inflation for a maximum of five quarters. Finally, De Gregorio (2012) finds that food commodity price shocks have the biggest effect on emerging market economies and their inflation levels, with central banks in such countries needing to shift to headline inflation targeting rather than merely core inflation.

These results point to a very important distinction on the relationship between commodity prices and domestic inflation: emerging markets appear to be price takers in regards to commodity price shifts, while advanced economies appear to be price makers. In fact, for OECD countries, the relationship between commodity prices and domestic inflation is exactly the opposite of globalization and inflation, with causality running from inflation to commodity prices rather than the other way. In particular, the commodity boom of the 2000s was in part generated by low interest rates in advanced economies (in addition to China and India), creating liquidity that chased returns in commodity markets. Research from Jeffrey Frankel (2008) through 2005 confirms this, showing a strong correlation between monetary policy in the US and commodity prices, with tighter US policy leading to lower commodity prices.

Larger countries may even influence commodity prices through inflationary expectations, as recent evidence from Hammoudeh et al. (2015), shows that contractionary monetary policy in the US leads to increases in commodity prices globally over the following six quarters, until the effects of the interest rate hike take hold. They conjecture that this effect is due to a perception of greater inflation to come (why else would the Fed have raised rates?) which then feeds into speculative buying of commodities.

Thus, the evidence regarding commodity prices and their ability to dominate national price developments confirms that commodity prices may have broader effects on domestic prices, but only for price-taker countries. For larger economies, especially in the OECD, the effects of monetary policy dominate commodity prices even in the presence of other forces (i.e. increased demand from China).

4. THE CHALLENGE FOR CENTRAL BANKS (II): LABOUR MARKET INTEGRATION AND WAGE-SETTING

An additional question regarding the effects of globalization has less to do with the conduct of monetary policy and more with the effects on labour markets: has globalization taken wage determination away from internal factors and made it dependent on exogenous conditions?

While the effect on labour markets is often a point of contention in any debate on globalization, the evidence shows that the share of wages in total factor income has labour in has been declining in advanced economies since the mid-1980s, well before the latest wave of globalization (Ellis and Smith 2010). And while globalization may impact specific sectors in differing ways, especially in relation to technological uptake (Balsvik et al. 2015), the evidence shows that it has an overall beneficial impact on labour markets. For example, work from Davidson et al. (2014) finds that globalization helps to improve the efficiency of the job-matching process in labour markets, lowering frictional unemployment. Bauer et al. (2013) also find that globalization of labour markets in Germany led to higher employment probabilities of high-skilled domestic workers and no significant changes for lower-skilled workers.

In regards to wage determination, the channels through which globalization of labour markets would work to keep down cost pressures are very similar to those seen in product markets, with competition playing the largest role. As with globalization's effect on inflation, integrated labour markets lower the ability of domestic monopolists to accrue rents; in practice and in relation to labour markets, these usually means that national unions are less likely to maintain high wages and exclude non-members from the workforce. Additionally, import penetration forces firms to cut costs, which may lead to innovation in business processes and the replacement of routine tasks with automation, thus lowering wages bill through employment reduction (Autor et al. 2003). This comports with the vast majority of trade openness/labour market literature, which finds that globalization per se has only minor effects on wages or employment, with technological change actually being the driving force.

And as with globalization writ large, there also are political economy channels that may play out in regards to the effects of labour integration. Berthold and Fehn (1998:513) conjectured that "yielding control over the money supply to the European Central Bank (ECB) should therefore create a more favourable environment for national labour-market reforms as expansionary monetary policy is once and for all ruled out as an easy solution to the country-specific unemployment problem." This is in line with the effect seen on inflationary expectations in the previous section: with expected inflation at a low level and central banks assumed to be following a course of inflation targeting, there is little incentive to push for wage increases.

In addition to labour market integration, the ability of workers themselves to move (labour mobility) may also play a large role in determining wage pressures. Europe is an excellent example of this effect, as the Schengen Agreement has created a border-free zone for labour mobility larger than any other in the world. The net effect of this mobility has been to put downward pressure on labour costs, as low-paid but reasonably-skilled workers from Europe's periphery are able to move throughout the continent. This is precisely what has happened in the UK, where (non-financial sector) wages are on a downward drift due to competition from Polish and other immigrants; evidence from Nickell (2009) supports this hypothesis while also noting that, for Spain, immigration has raised the labour supply and reduced long-term unemployment with minimal inflationary pressure due to competition.

However, as with globalization and inflation, the overall scale of such effects is quite small when compared to country-specific attributes. We have already mentioned the effects of technology, which can be endogenously generated or come from investment in R&D rather than any perceived globalization pressures. In addition, domestic labour market institutions tend to dominate the effects of globalization on wages, with each country's specific labour market framework playing much more of a role in wage-setting. This may be because, even accounting for Europe and the Schengen zone, labour markets are notoriously harder to completely integrate as opposed to product markets. Labour mobility is reduced by the human factor, as other policies or circumstances (pensions, home ownership, family ties and cultural/linguistic differences) introduce frictions that are less pronounced in production processes. Even going through with offshoring can raise company costs in the short-term, meaning it may be easier to eschew this facet of globalization in favour of domestic wage restraint (White 2008).

In regards to the evidence surrounding domestic versus global factors, Balsvik et al. (2015) show that, while Chinese competition in Norway may force some lower-skilled workers into unemployment, the wage effect is minimal; this is due mainly to centralized wage bargaining, which means wages are inflexible and thus competition must act through the (un)employment channel. In a much broader study, Felbermayr et al. (2011) show that globalization has a positive impact on employment and wages, but only where wages are bargained at the individual level, as collective bargaining yields only minor dividends. Similarly, Ebenstein et al. (2014) show that wage effects are minimal within sectors due to globalization, with the only negative effects coming when workers switch sectors (i.e. from manufacturing to services) where skills presumably are less transferable. And Potrafke (2013) shows that globalization has run up against a formidable barrier in changing domestic labour market institutions, as he shows globalization has not had a significant effect in inducing labour market deregulation. Thus, not only has globalization not had a significant short-term impact in affecting wages overall, it also has barely budged the national-level institutions that could affect wages.

In summary, globalization's effects in the labour market have generally been limited to employment effects, mainly because national institutions are far more rigid in regards to wages. These institutions appear to dominate international effects, even while globalization has a salutary effect on reducing monopoly rents and flattening wages through competition.

5. CONCLUSIONS

This paper has examined the effects of globalization on the ability of national policymakers to exercise policy sovereignty. In general, the evidence is clear that globalization exerts a strong downward influence on inflationary pressures, but the scale of this pressure is likely to be small and spread out over time. Central banks are thus able to continue to use short-term levers such as interest rates in order to influence domestic prices. The evidence also shows that central banks in the OECD countries have the power to influence global commodity price movements, with these prices overwhelming domestic price developments only in emerging market economies or countries highly dependent upon commodities. Finally, globalization has had a much smaller effect on national labour markets, mainly because integration of labour markets has proceeded at a much slower pace than the market for goods, services, or capital.

The policy implications of this research are straightforward, suggesting that the effects of globalization are simultaneously important yet overestimated. In regards to globalization's effects on inflation, integration of production processes has been an unmitigated good for price levels, inflationary outcomes, and central bank policymaking. Competition and lower import prices have helped to restrain inflationary impulses and anchored inflationary expectations at a very low level, therefore moderating wage and price increases. Given this reality, policies that expand globalization should be encouraged, even if future effects on inflation are likely to be muted.

A further implication from this analysis is that good monetary policies remain crucial in the battle against inflation, whether or not a country is globalized or not (Hartwell 2012). Central banks around the world led the fight against inflation in the 1980s and 1990s, focusing narrowly on inflation targeting and the interest rate channel in order to break the back of inflationary expectations. While many of the researchers cited above believe that central banks should expand their base of information for targeting, including import prices and especially commodity (energy) prices as a signal for future inflationary pressures, they hold to the idea that inflation should remain the core concern of central banks.

Unfortunately, many central banks in the post-crisis world have abandoned the idea of price stability in favour of output or employment targets. It is here that we see the real worries about central bank influence; while globalization has had a moderating effect on price levels and, to some extent, inflation, inflationary expectations have shifted as well. Central banks using quasi-fiscal policy and abandoning their mandate of low inflation have a real danger of both unleashing severe inflationary pressures via other means, breaking the expectations gains of the past two decades, and of course precipitating the next crisis. In reality, abandoning the idea of price stability against inflation in favour of price stability as measured by the CPI but with continuous inflation in asset markets can only lead to economic trouble.

A corollary to this idea of central bank policy is the widespread consensus that central bank independence has worked for taming inflation, and thus, it should continue as an institutional arrangement. Rogoff (2003) in particular stresses this point, but it is echoed by several other authors as being necessary in a globalized world to tame inflationary beasts. However, an additional interesting point, related to the abandonment of price stability, is that not only have production processes or labour markets become globalized, but also central bank policies. The reality of the post-crisis world is that developed economy central banks have tended to follow each other in trends, if not in levels. What may then really be driving a seeming loss of control of inflation rates near the zero-bound is a loss of differentiation of policies. To put it another way, are central banks really independent if they are all following each other towards zero interest rates? Are unconventional monetary

policies even less effective if everyone is doing them? This issue needs further examination, but could potentially be a more plausible explanation for central bank ineffectiveness in re-inflating consumer prices in the advanced economies.

Additionally, while central banks may find it difficult to focus on creating inflation, there is a real danger of advanced economies exporting inflation to emerging markets via the commodity price channel. Central banks in the G7 economies, including the ECB, have been proven to be a prime determinant of commodity prices over the past 15 years, while central banks in emerging markets are price takers. In this situation, global commodity price shifts created by advanced economies can indeed dominate national price developments, especially for countries that already have a high dependency on primary commodities, but for all economies in regards to food prices. Thus, advanced economy central banks should be prepared to consider the consequences of their monetary policy beyond national boundaries and on global developments.

Finally, the issue of wage-setting and the ability of negotiators to set their own wages domestically appears to be in no danger from the forces of globalization. This reality means that any desired moves towards labour market flexibility must come from within a country rather than being imposed from the outside. The evidence has shown that gains from globalization in the labour market are much more muted in collective bargaining schemes, perhaps arguing for more flexible labour markets for countries that wish to reap larger benefits from labour market integration. This would likely increase the ability of globalization to influence wage levels, as competitive pressures could work through both the employment and wage channels. But the fear that wage negotiators have lost the ability to set wages due to globalization is not substantiated by current research.

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NOTES

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is globalisation reducing the ability of central banks to control inflation?

Andrew HUGHES HALLETT

IN-DEPTH ANALYSIS

Abstract

That increasing globalisation, meaning greater integration in the financial markets, full capital mobility and deeper trade links at all levels, might reduce or eliminate our ability to conduct an independent (country specific) anti-inflation policy is an old concern.

There are good ad hoc and formal analytic reasons for that point of view. However it turns out that commodity prices, common productivity trends and integrated labour markets, pose little systematic threat to inflation or our ability to control it. Integrated financial markets, open credit markets and common excess leverage facilitated by world markets are quite a different matter however.

Our standard economic models show that independent monetary policies are ineffective in such conditions, if fixed or pegged exchange rates are imposed for internal stability. But they assume that monetary policy is the only instrument available for inflation control. There are other ways to control inflation, or to reinstate that control, if we relax that restriction. Extending conventional policies to include the use of reserves, or to vary the composition of assets used to carry it out, is one approach. To coordinate those policies with fiscal policy is another. To use financial regulation as an explicit policy instrument to control credit and leverage is a third. All three approaches require structural reforms to the policy instruments and/or policy institutions, and a degree of internal coordination.

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EXECUTIVE SUMMARY

The question reviewed in this paper is: to what extent is it true that globalisation (which I take to mean full financial and trade integration) reduces a Central Bank's ability to control inflation, and if so why? The answer appears to be no. It is true that under such conditions traditional forms of monetary policy are likely to be ineffective. But there are a number of other types of policy which, conducted either in combination with or as extensions of those policies, are quite capable of acting to control inflation in the same circumstances – albeit with varying degrees of efficiency. But they all require some reform or modification to the way we normally conduct anti-inflation policies.

There are other factors that may render inflation hard to control or unavoidable: rising commodity prices, integrated labour markets, or common productivity trends, for example. But they do not pose a large or systemic threat to inflation, and are unlikely to follow from globalisation per se.

The argument runs as follows:

- The loss of the ability to control inflation comes from the conflict between the desire to maintain a fixed (or near fixed) exchange rate for internal stability, and perfect capital mobility for financial stability, in a world of integrated financial markets.
- To achieve both, monetary policy has to be dedicated to serving these two targets; which rules out using an independent monetary policy to control inflation.
- Thus, the traditional set up which shows the conflict between domestic targets (inflation) and global targets (financial stability) leads to inflation that cannot be controlled.
- This approach however assumes that the only policy available is monetary policy. This is not true; there are other policies, or modifications to that policy framework, that can be used.
- The strategic alternatives are to relax the rigidity with which the goals of the under-lying framework are pursued; or to surrender one of them to allow an independent monetary policy to operate freely; or to adopt structural changes in either the economy or the policy process so that inflation control is reached by other means.
- One possibility is to use reserves or a wealth fund to change the composition, risk profiles, or relative supply (and hence cost) of the assets that could be traded. This opens up space for normal monetary policies to work.
- Another is to bring additional policies into play. Fiscal policy can also control inflation through the markets for goods and services, rather than via the financial markets. This requires careful coordination however.
- A third is to attack the drivers of inflation through the credit and asset markets to reduce the dependence on global cycles and excess leverage. This calls for financial regulation to be used as a (cyclical or structural) policy instrument.

Hence there are a number of ways to control inflation in individual economies while preserving exchange rate stability and financial integration. But they all require reforms to the policy instruments or policy institutions.

1. INTRODUCTION

The question, or fear, that globalisation may have rendered Central Banks unable to control inflation is an old one. It is perhaps best reviewed using the analytic framework of the "impossible trinity" or trilemma of monetary policy – which we can extend, in a modified form, to the Triffin dilemma in order to highlight the inherent conflicts between domestic and global policy objectives more generally.

The impossible trinity holds that policymakers cannot achieve their three top priorities – an independent monetary policy (hence an independent control of inflation), a fixed or stable exchange rate, and free unrestricted capital flows – all at the same time. At best, they will have to choose two out of the three[1]. Or, failing that, accept reaching only incomplete and variable degrees of success in each one. The Triffin dilemma, in an international/globalised context, holds that the attempt to reach highly prized global targets, such as stability and efficient functioning in the world's financial markets, will necessarily lead to an inability to achieve some of the goals of domestic policy – such as inflation – in the leading, hegemon economies at least[2].

To appreciate how this inability to control inflation can arise as a result of globalisation, one has to recognise that it can happen in a number of different ways:

a) The globalisation of markets with free capital flows will typically shrink and ultimately eliminate the Central Bank's freedom of manoeuvre for its policy instruments (interest rates usually, but also for reserve ratios, monetary aggregates or targeted exchange rates);

b) Globalisation with free capital movements can damage the transmission mechanism by which the Central Bank influences inflation, rendering the policy instruments ineffective (for example when the interest pass-through rate becomes internationally competitive[3]);

c) Also because external events over which the Central Bank has no control are actually the driving force behind inflation: for example, from commodity price movements, global wage competition, or from technical change and productivity trends.

For the purposes of answering this question, I will take it that low and stable inflation is the objective of the Central Bank's monetary policy – although in reality Central Banks usually have more extensive mandates and perform other necessary functions that have an impact on the effectiveness of monetary policy and inflation control. Similarly, I will take it that the policy instrument is the policy interest rate, linked to market rates, although Central Banks all have other instruments to hand (reserve ratios, discount rates, unconventional policies that act on market rates directly). This is for convenience since the results and conclusions drawn below are not in fact affected by a change of instrument. Third, I will assume that globalisation principally means greater financial integration, although the smaller elements to do with trade will be affected through the exchange rate. Finally the arguments used will apply as much to the control of positive inflation, as they do in reverse to control deflation.

[1] Obstfeld et al. (2005), Klein and Shambaugh (2013), Aizenman (2013)
[2] Triffin (1960)
[3]v Meaning the impact of an interest rate change as a proportion of its potential impact on inflation or investment is reduced by global competition.

2. THE BENCHMARK CASE: THE LOSS OF INFLATION CONTROL

2.1 The impossible trinity and inflation control

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

In that figure, one can choose the best position. 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 the combination of two characteristics that one might choose. But one cannot be on all three sides simultaneously.

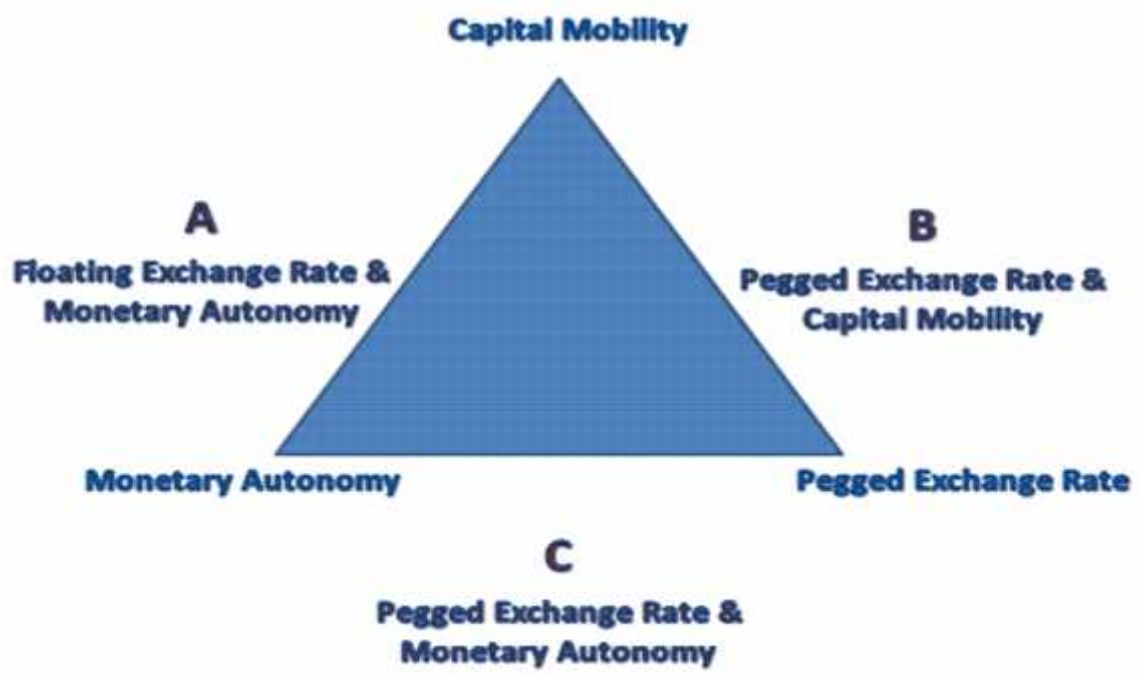

Figure 1: The open economy policy trilemma

Source: Klein and Shambaugh (2013)

The left side of the triangle, marked A, reflects an economy with an independent monetary policy and hence the ability to control inflation, and full capital mobility, but with a flexible (and potentially unstable) exchange rate. On the right, B represents an economy with a fixed exchange rate and capital mobility, but no independent monetary policy and therefore no apparent ability to control inflation. And C shows an economy with fixed exchange rates and an independent monetary policy (and ability to control inflation), but no capital mobility (closed 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.

That said, there is also nothing to stop us choosing an interior point in the triangle – with the result that we get restricted exchange rate flexibility, regulated/partial capital mobility, or limited monetary independence (and hence an incomplete ability to control inflation). 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 has been a prominent case in point; but is now veering

towards A, liberalising capital flows and adopting more independent monetary policies as inflation becomes politically more problematic while FDI is remains a priority.

2.2 Different monetary configurations with financial integration

Hence the question posed here is asking if globalisation necessarily or would normally push economies towards some point on, near or even towards the side marked B. And if so, what mechanism would that make that happen? In reality, the outcomes are rather more varied. Many large and advanced economies have chosen to be on or near line A: the US, Japan, Australia, the UK, Norway, Sweden. Others (Switzerland) would normally be in this group, but have chosen to limit their capital inflows to limit the movement 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 general level of development are not deep or resilient enough to cope with the kind of rapid in or outflows of short term capital that have been seen in recent years. Examples would be 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 most directly related to this paper lie along B, having no independent monetary policy available to the Central Bank and hence no ability of their own to control inflation. This describes the economies of the Eurozone currency union; those who have adopted the currency of another country (Ecuador, Montenegro, Zimbabwe); and those who run their currency using a strict currency board (Hong Kong, Argentina in the 1990s, the Baltics before the Euro, some smaller Caribbean islands). But the Eurozone itself has run a flexible exchange rate and formally lies on line A. However, to the extent that the ECB tries to keep the Euro's effective exchange rate constant enough to prevent inflation while maintaining competitiveness, the Eurozone as a whole may have moved in the direction of B.

2.3 How financial integration removes the ability to control inflation

Consider a small economy under the monetary arrangements 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 comparable bonds. If the home 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. If there are no exchange controls (full convertibility applies), the additional funds to do this must come from abroad. That puts upward pressure on the exchange rate as capital flows in. If the Central Bank does nothing, the commitment to a fixed exchange rate will be broken and the home economy will shift to line C with a flexible (or perhaps a partly flexible or adjustable) exchange rate.

However, if the Central Bank wants to retain its fixed exchange rate regime – the commitment was credible – the Central Bank must sell foreign currency and buy back its own, and go on doing so until the original exchange rate value is regained. That of course 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 by higher reserves can be replenished at no risk, from the capital inflows), has been lost.

It would appear capital mobility and hence globalisation is indeed the culprit here; although in reality it is possible to argue that retaining a rigid fixed exchange rate regime is equally responsible in so far as the removal of either would restore our ability to control inflation in the usual way. Notice also that these arguments are reversible. It would not be possible to reverse low inflation or deflation with a monetary expansion under fixed exchange rates.

Thus if we wish to regain the ability to control inflation under globalisation, we need to look elsewhere for the means to do it. There are three basic options:

a) To relax the rigidity with which the policy priorities are imposed, to end up in a position inside the triangle with a partial version of one or more of them: either constrained but adjustable exchange rates, or partial capital controls and regulation, or a limited degree of autonomy in monetary policy setting[4];

b) To choose a different regime somewhere on lines A or C if, or when, inflation or periods of deflation become a problem. This would of course involve giving up a strict adherence to free and unregulated capital flows, or fixed exchange rates, to regain the ability to control inflation when needed 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 reasserted through other mechanisms, not through monetary policy alone.

These three options imply revised priorities, institutional reform, and structural reforms in the economy respectively. We have already dealt with option a). We review b) and c) under those headings next, but note some limits on what can be done ("unavoidable" and hence uncontrollable inflation, especially from external sources) in section 6.

2.4 The Triffin dilemma extension

The Triffin dilemma highlights the conflict between domestic goals (low inflation) and global goals (financial stability) for any economy that wishes to support the latter as well as the former. To achieve the latter under financial integration, a country needs to ensure that sufficient currency is made available to its trading partners for the latter to make their payments. Financial stability system-wide therefore requires at least one or more of the larger economies, in trade terms, to run a trade deficit to make sure that the others have the financial resources to satisfy their demand for reserves and payments. The implied increase in money supplies will generate inflation, a current account deficit and a falling exchange rate. This implies an extension of the dilemma described above, with extra inflation added at least for some. It illustrates that the inability to control inflation may come from the conflict between domestic goals and the desire for financial stability in world markets.

[4] This has been called "rounding the corners" of the trilemma (Klein and Shambaugh, 2013), but it is really a question of how to choose the preferred position in Figure 1.

3. IS IT POSSIBLE TO RESTORE THE ABILITY TO CONTROL INFLATION UNDER FINANCIAL INTEGRATION?

3.1 Empirical support for the "globalisation reduces the ability to control inflation" hypothesis

The definitive empirical study of the loss of monetary autonomy in practice, 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, de facto fixed exchange rates and free capital movements); the mature Bretton Woods era (1959-1970, 21 countries, fixed exchange rates with extensive capital and currency controls); and the post-Bretton Woods era: 1973-2000, 103 countries with a mix of fixed (pegged) and flexible (unpegged) exchange rates, varying hegemon currencies and varying degrees of capital controls year-by-year. This gives us a full range of regimes in the sense of Figure 1.

After a careful econometric analysis, and even more careful data analysis to identify, define and measure the degree of exchange rate flexibility and effective degree of capital controls that applied in each country in each period, Obstfeld et al. conclude that a loss of ability to control inflation was in fact observed in those countries and periods where fixed exchange rates but free capital movements/financial integration (regime B) were operating – exactly as section 2.3 predicts. Nevertheless the ability to inflation control remains in the countries operating under regimes A and C, with flexible exchange rates and/or capital controls, since those regimes eliminate any need for a reversal of an independent monetary contraction or expansion of the type in the example in section 2.3.

3.2 Policy variations that may restore the ability to control inflation

These results were confirmed in later studies (Aizenman, Chinn and Ito 2010, Aizenman and Ito 2011, Aizenman 2013) that extend the data up to 2010, and to a new range of emerging market economies and other developing countries. The same conclusions appear. But several new variations emerge as ways to restore inflation control.

i) The first is to sterilise[5] the capital inflows that follow from the monetary contraction example studied in section 2.3, by buying foreign currency bonds with the stock of money removed from circulation in the money supply contraction. This will stabilise the exchange rate temporarily and transfer the re-expansion of the domestic money supply abroad. But it is unlikely to work for long because it would widen the foreign-domestic interest rate differentials further. One could expect further capital inflows therefore.

ii) A variation on this idea is to hold a higher level foreign exchange reserves within the banking system by buying the foreign currency inflow directly. That will again stabilise the exchange rate and transfer the implicit monetary re-expansion abroad, but without creating further increases in the interest rate differential. So the period of monetary autonomy can be made to last longer.[6] A more secure way to do the same thing is to have the country's sovereign wealth fund buy the foreign currency inflow and use it to buy foreign assets to be held within the fund, thereby stabilising the exchange rate and sterilising the implicit re-expansion of the money supply.

[5] Discussed in Grenville (2013)

[6] Aizenman and Ito (2011). If foreign owners of domestic currency were subsequently to decide to sell their holdings as surplus to requirements, the upward pressure on the exchange rate would be removed and the incipient re-expansion of the domestic money supply negated.

If these foreign assets are more widely dispersed, having different maturities, risk profiles and more uncertain revenue streams than the government bonds sought by the capital inflows generated by small interest rate differentials, then the market interest rate differentials will not widen further, and will be less prone to create and may actually deter the capital inflows that remove the space for monetary policy autonomy in the first place.

iii) This last point opens the way to a more systematic set of policies that could preserve, or at least reinstate, the ability to control inflation under full financial integration and fixed exchange rates. The key is the assumption of perfect substitutability between assets in the argument of the example in section 2.3. If that were removed or significantly weakened, there would, in normal circumstances, be sufficient space to reassert control over inflation using conventional policies. The sovereign wealth fund idea provides a mechanism by which we can insert frictions between the perfect substitutability of assets, systematically and as a matter of policy, to create a degree of imperfect substitutability at times and to an extent that we choose. Capital mobility will remain free as before, legally and physically, but market conditions can now be altered so that the degree to which that freedom is actually used in practice is chosen to suit our policy needs at the time (in particular with respect to inflation). Essentially what the sovereign wealth fund is doing is altering the composition of assets held in the economy, not only between domestic and foreign, but between degrees of risk, liquidity, and uncertainty of returns. That alters the supply and hence the cost of acquiring assets equal to those that would justify moving capital between jurisdictions for small interest rate differentials. Some might argue that this infringes free capital mobility; but it does so through market mechanisms and if the ability to control inflation is important such an infringement may be the necessary price to pay.

iv) An easier way to get the same effect, for those countries not in a currency union or not living under strict currency board, is to declare a fixed exchange rate band (rather than a point fixed exchange rate). If that band is relatively narrow, it operates as if the economy had a de facto fixed exchange rate - yet implies a degree of uncertainty about the precise value that can be expected at a specific date in the future. This may be sufficient to insert a wedge between the returns to be expected from holding domestic and foreign bonds larger than the interest rate differentials created by the independent use of monetary policy in normal times.[7] For those in a currency union, this option is only available for the union's external exchange rate and hence the ability to control union inflation, not for the ability to control individual country inflation rates.

[7] To the extent that transaction fees, taxes or regulation play a role, then the wedge will be larger. If the band is adjustable, or not fully credible, then the wedge will be larger again as a currency risk premium must be added. But in that case destabilising speculation may become a danger.

4. THE POSSIBLE USE OF POLICIES OF STRUCTURAL CHANGE

i) One observation in Obstfeld et al (2005) is that, even if there is no monetary autonomy in an economy with a fixed exchange and free capital movements (so that interest rates are tied down), real interest rates are not fixed. That does not allow us to leave things as they are in the hope that varying real interest rates will control inflation for us, since an increase in inflation would make the real interest rate move the wrong way: higher inflation would mean lower real interest rates, so higher investment demand and borrowing by households – the opposite of what we want. But it does encourage the thought that we could engineer real interest rate change that go in the right direction. Structural reform policies, although traditionally aimed at creating greater competitiveness, would if successful lower the price level relative to the trading partners and therefore lower the inflation rate in the process. That is helpful in itself, but it would also raise the real interest rate and hence lower the demand for investment goods and household loans as increased nominal interest rates might have done.

   However, whether this is actually helpful as a practical policy is another question. Attempts to get structural reform policies accepted and implemented have not been a great success, especially in Europe. Worse, they take a long time to become effective and produce the desired outcomes – probably 6-8 years at least in the best circumstances (see Hughes Hallett and Oliva Martinez 2015). So this is not a practical proposition for dealing with periodic bouts of inflation.

ii) A more useful structural innovation might be to start coordinating fiscal and monetary policies explicitly. The traditional analysis considered so far assumes monetary policy is the only weapon we have available for controlling inflation. This is not true; fiscal policy, if less effective, could also be used. Fiscal contractions on their own lower aggregate demand and put downward pressure on prices in the medium term. And also lead to lower interest rates in the short term. If such a policy were paired with a monetary contraction, the lower interest rates induced by the fiscal contraction could be constructed to balance the higher interest rates from the monetary contraction, such that the net effect is zero. It would then be possible to control inflation without the interest rate rise that induced the capital inflow in section 2.3, eliminating the need for the self-defeating re-expansion of the money supply to preserve the exchange rate.

   The only difference from the traditional analysis is that inflation would now be controlled through reductions in aggregate demand rather than through the financial markets. But it still uses an independent monetary contraction, paired with fiscal interventions, to produce a change in the policy mix. This is as we might expect: we need two instruments (monetary and fiscal) to achieve two targets (lower inflation; and no change in the exchange rate), given a world of financial integration and globalisation.

iii) The fear that this approach could be costly to implement because it involves a double contraction is unfounded because each contraction would be roughly half the size of that required in section 2.3 to get the same effect. But the policies themselves would have to be carefully calibrated to match.

   The problem, if there is one, is that a small country used to borrowing easily on the inter-national capital markets might find it difficult to create a fiscal contraction large enough to create downward pressures on domestic interest rates large enough to match the upward pressures being created by the monetary contraction. There may nonetheless be scope to use budget savings (foreign currency reserves) to prevent a consequent exchange rate rise.

5. A VIEW FROM THE CREDIT AND ASSET MARKETS

A more recent set of papers provide a different perspective on the trilemma which implies that financial integration/globalisation reduces an economy's ability to control inflation (Rey 2013, 2015). The argument here is that extensive financial integration means that assets of all kinds, risky and otherwise, have developed strong components in prices or yields. Given free capital flows, that means in turn 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 depending on the cyclical position of the country at issue but irrespective of exchange rate regime in place (this effect will be enhanced if the national cycles become more synchronised through the globalisation of trade[8]). Thus, when capital is mobile, the world financial cycle will typically constrain domestic monetary policies whatever the exchange regime. This then makes the case for throwing sand in the wheels of the domestic financial and credit markets, discussed in the analysis introducing risk and imperfect asset substitutability (Section 3 part iii) above).

There are a number of ways we can deal with this: targeted capital controls; policies undertaken to restrain the drivers of the world financial cycle (this would require coordination between the major economies and central banks, which seems unlikely); macro-prudential policies to restrain cyclical increases of credit and leverage in recipient economies; 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. 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 most advanced economies: the US and UK for example. The fifth was discussed in section 3, part iii). Some aspects appeared in the bail-out plans of Ireland or Spain, recent policy in China, 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 a root cause (but not the only cause) of inflation directly in the credit markets, rather than indirectly by creating space for independent monetary policies.

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

6. DO WE NEED TO CONTEND WITH UNAVOIDABLE INFLATION?

Is it the case that some inflation pressures are unavoidable in that they come from outside the economy, and are therefore beyond our control? More specifically, are commodity price changes large enough to influence domestic prices and hence inflation? If so, are we still able to control domestic inflation? Similarly does the integration of production processes (network production) mean that it is more difficult to control domestic inflation?

i) Commodity prices: It is certainly the case that rising commodity prices have at times increased domestic inflation which Central Banks have found very difficult to control - a prime example being the period before 2008 when most OECD and Euro-economies faced rising prices for energy and basic commodities and were unable to prevent themselves breaching their specified upper limits on inflation. But this can also happen in reverse; since 2012, oil/energy prices have fallen 50% and, allied with a slowdown in emerging markets and falling prices in network production, this has lead to active deflation in most economies. So it can cut both ways.

On the other hand, the impacts may not be so large numerically. In which case, the loss of ability to control inflation on this score, as seen in recent events, becomes a less pressing issue. For example, if oil (or other commodity) prices fall 50% but only make up 5% of the price index, then prices will drop 2.5%. That is comparable to the inflation target itself, and is of course a one-off event (commodity prices cannot go on falling for ever). The impact may be more serious for energy prices since they affect many production processes. But other commodities do not, and even then, unless we are price level targeting, the effect is transitory. More serious is if these temporary inflation spikes get into the wage bargaining process. That could then induce a wage-price spiral.

If it possible to control this kind of external shock? Most Central Banks in fact target a consumer price index that excludes the prices of certain key commodities and taxes in order to exclude the external factors they cannot control – see Table 1 below for an illustration of how this has been done in the past. If that is acceptable, because those elements of inflation cannot be controlled anyway, then we still have the ability to control the remainder and price shocks of this kind are insulated from the wage-price setting process.

ii) Wage inflation: Has globalisation cost us the ability to control wage inflation? In fact labour mobility itself is not so large and, more to the point, has not increased very much in quantitative terms for the past few decades. So it is hard to argue that globalisation in the sense of more integrated labour markets, has had much effect on wage inflation. But what can, and clearly has had an effect is the capital mobility which comes with financial integration and a currency union. The effect however is one way. Capital mobility carries the threat of moving financial or physical capital to lower cost production facilities elsewhere. So the effect, if any, is downward pressure on wages rather than upward on inflation.[9] That is good for inflation and employment, if less good for earnings and the income distribution. In-migration and productivity growth would lead to the same effect; so none of these aspects pose a threat to the ability to control inflation – unless we are concerned to raise prices to bring a period of deflation to an end.

[9] See for example, Freeman (1995).

Table 1

Operational Aspects of Inflation Targets

Country (date of adoption)	*Target Series Definition*	*Target Level (percentage annual inflation)*
Australia (1993)	Underlying CPI (excluding fruit and vegetables, petrol, interest costs, public sector prices and other volatile prices)	2–3
Canada (February 1991)	Core CPI (excluding food, energy and first-round effects of indirect taxes)	1–3
Finland (February 1993)	Underlying CPI (excluding government subsidies, indirect taxes, housing prices and mortgage interest payments)	about 2
Israel (December 1991)	CPI	8–11
New Zealand (March 1990)	Underlying CPI (excluding changes in indirect taxes or government changes, significant changes in import or export prices, interest costs and natural disasters)	0–2 (until November 1996; 0–3 thereafter)
Spain (January 1995)	CPI (excluding first-round effects of indirect tax changes)	below 3
Sweden (January 1993)	CPI	2 ± 1
United Kingdom (October 1992)	RPIX (RPI excluding mortgage interest payments)	lower half of 1–4 until spring 1997; 2.5 or less thereafter

Source: Bernanke and Mishkin (1997)

7. CONCLUSIONS

It is true that the ability to control inflation may be lost in conventional models of monetary policy, but it is not necessarily the result of globalization as such. The traditional view is the result of the perception that monetary policy is the only instrument for controlling inflation. But there are many other ways of controlling inflation, or reinstating that control. Extending conventional monetary policy to include the use of reserves, or vary the composition of assets used to carry it out, or adopt exchange rate target bands, is one approach. Coordination of those policies with fiscal policy is another. And to use financial regulation as an explicit policy instrument to control credit and leverage directly is a third. But they all require reforms to the policy instruments or policy institutions.

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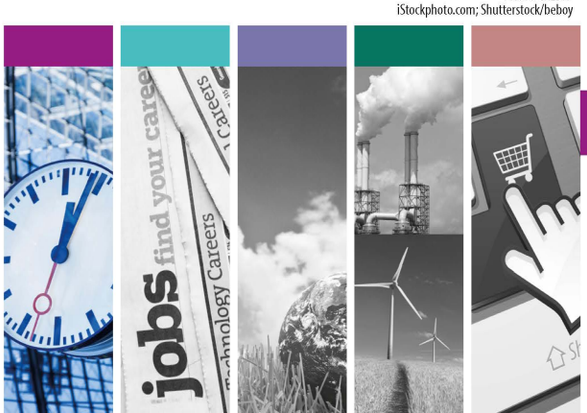

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