

Inflation Linkages Within The Eurozone: Core Versus Periphery

Georgios Magkonis

Economics & Finance Subject Group, Portsmouth Business School, University of
Portsmouth, Portland Street, Richmond Building, PO1 3DE, UK

Abhijit Sharma

School of Management, University of Bradford, Emm Lane, BD9 4JL, UK

Abstract: We examine the process of inflation transmission among GIIPS countries (Greece, Ireland, Italy, Portugal and Spain) and Germany. Our findings suggest that inflation spillovers have increased since 2001. We also find that peripheral economies are (dis-)inflation transmitters to the core. This finding is significant for policy formulation, given the very low inflation environment that currently exists in the Euro area and the macroeconomic implications that arise from this.

Keywords: Inflation transmission, Eurozone, spillovers

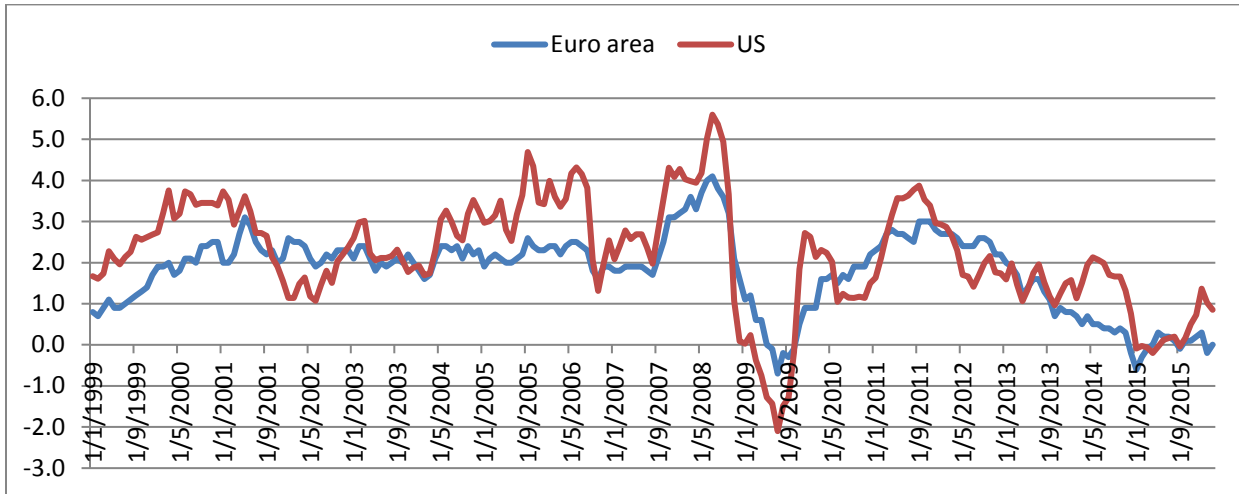
JEL codes: E31; E52

I. INTRODUCTION

Price stability is the main objective of central banking. While they face a multiplicity of policy objectives, central banks have a clear mandate to maintain long term price stability through the use of appropriate policy instruments. For the case of the European Central Bank (ECB), it is officially stated that “the primary objective of the ESCB shall be to maintain price stability” (Article 2, Protocol 4, Statute of the ESCB and ECB). The main policy tool to achieve this target is the interest rate. Since the early 1990s an increasing number of central banks have adopted explicit inflation targets as a way to anchor expectations. Since then, inflation targeting has become an addition to the central banker’s toolkit. Even though empirical evidence is not conclusive (Arestis *et al.*, 2014), inflation targeting is considered to be part of the conventional wisdom relating to optimal monetary policy (Woodford, 2004).

While the ECB has not adopted any explicit target, eurozone monetary policy has focused on a target of 2% inflation. Since its establishment in 1999, the ECB has kept inflation rates below the 2% target for much of the period after the adoption of the Euro with some exceptions such as the period after 2007. Figure 1 shows the inflation performance of the Eurozone as well as the corresponding one for the US. From the creation of Euro until late 2007, the ECB was quite successful in keeping the inflation rate close to 2%. The only exception was the first quarter of 2008 where inflation increased above this target. For the case of the US, the inflation rate reached a maximum of 5.6% in July 2008. After the onset of the global financial crisis, inflation rates showed a significant fall. Since late 2009 the global economic recovery has coincided with an increase of the inflation rate. However, the European sovereign crisis has exacerbated policy concerns as it has contributed significantly to widespread deflation in the Eurozone since 2012.

Figure 1
US & Eurozone Inflation rates



Note: Annual CPI Inflation Rates downloaded from Datastream.

In December 2014 the inflation rate dropped below 0% (Figure 1). This deflationary process was reinforced by the adoption of pro-cyclical fiscal policies (De Grauwe, 2016). This led the ECB to undertake further action by adopting quantitative easing since March 2015. These events highlighted the role of fiscal policy in a monetary union. Long before the outbreak of the European sovereign crisis, part of the literature has already examined the interactions between monetary and fiscal policies in monetary unions.¹ For instance, Hughes Hallett and Weymark (2007) show the importance of fiscal leadership followed by an independent central bank. Furthermore, the presence of centralised monetary policy along with the decentralised fiscal policies has addressed new policy questions. Andersen (2008) stresses the importance of flexible inflation targeting in a monetary union where the multiple fiscal authorities tend to underestimate the role of the central monetary policy in the case of aggregated shocks.

Another part of the related literature examines the transmission of inflation dynamics among different units. This area has been the focus of both theoretical

¹ See Foresti (2018) for a recent survey.

(Chowdhury *et al.*, 2006; Holman and Rioja, 2001; Tillmann, 2008) and empirical research. Jeong and Lee (2001) examine inflation dynamics among G7 economies for the period between 1957 and 1997. Analysing the variance decompositions, they find that the US and the UK are the main 'transmitters' of inflation innovations. Comparing the Bretton Woods with the post Bretton Woods period, their findings support Friedman's (1953) argument according to which an inflationary shock can be much more easily absorbed under a flexible exchange rate regime. In a similar vein, Yang *et al.* (2006) provide evidence for broad linkage within inflation dynamics not only from the US to other economies, but also the other way round. In both studies, the main policy argument made is for better coordination of monetary policy. Due to international linkages, it is difficult for a single central bank to combat inflation effectively. This policy conclusion results from the fact that the focus was restricted to G7 economies. More recently, Jordan (2016) examines the effects of international inflation spillovers on Swiss inflation and Swiss Franc (CHF) nominal effective exchange rates. According to his findings, Switzerland has become a net receiver of shocks since 2008 and this explains Swiss deflation. Mumtaz and Surico (2012) examine the global and the country-specific factors of inflation rates for a panel of advanced OECD economies. Among their finding, they report a significant variation of these two factor categories through time, while their contributions vary across countries. Bianchi and Civelli (2015) also find that global fluctuations affect the dynamics of domestic inflation rates in 18 OECD countries. However, the role of these global factors does not seem to have significantly changed, at least as it would have expected from the globalisation process of the last thirty years. In a similar vein, Altansukh *et al.* (2017) examine the globalisation of core, energy and food inflation rates among 13 OECD countries supporting the view that policy makers should pay increasing attention to the movements of the foreign (imported) inflation.

In this paper we focus on the process of inflation transmission between core and periphery members of the Eurozone. In particular, we examine the degree and the nature of monetary interconnections as measured by the extent of inflation shock transmission. The simultaneous existence of very low inflation in the core (0% for Germany) combined with deflation in some parts of the periphery (-1.1% for Spain and -0.3% in Italy)² lead to new challenges for formulating optimal monetary policy for the Eurozone as a whole. We concentrate on five peripheral European countries: the so called GIIPS (Greece, Ireland, Italy, Portugal and Spain). We focus on these economies due to their key role during the recent sovereign debt crisis. In particular, Greece, Ireland and Portugal officially participated in bail-out programs, while Italy and Spain received financial support from the ECB for their banking sectors, which makes these countries important for such analysis. The core of the Eurozone is represented by Germany which is by far the largest economy within the Eurozone.

The contribution of this study is twofold. First, to the best of our knowledge, this is the first study that examines inflation transmission between the Euro area core and the periphery. Through our analysis, we shed light on inflation linkages and the degree of interdependence across key parts of the European monetary union. Secondly, we extend variance decomposition methodology used previously (see, Yang *et al.*, 2006) by applying spillover analysis developed by Diebold and Yilmaz (2014; 2015). Despite the simplicity of this method, its main advantage is the ability of identifying each country as a gross or/and net transmitter of inflationary shocks to other countries as well as a recipient of inflationary shocks from other countries. In this way, we are able to measure the bidirectional spillovers of shocks among the examined economies.

Consequently, we provide evidence that can be useful in determining optimal monetary policy under conditions of very low inflation. Our results relating to inflation

² ECB, Inflation dashboard, May 2016.

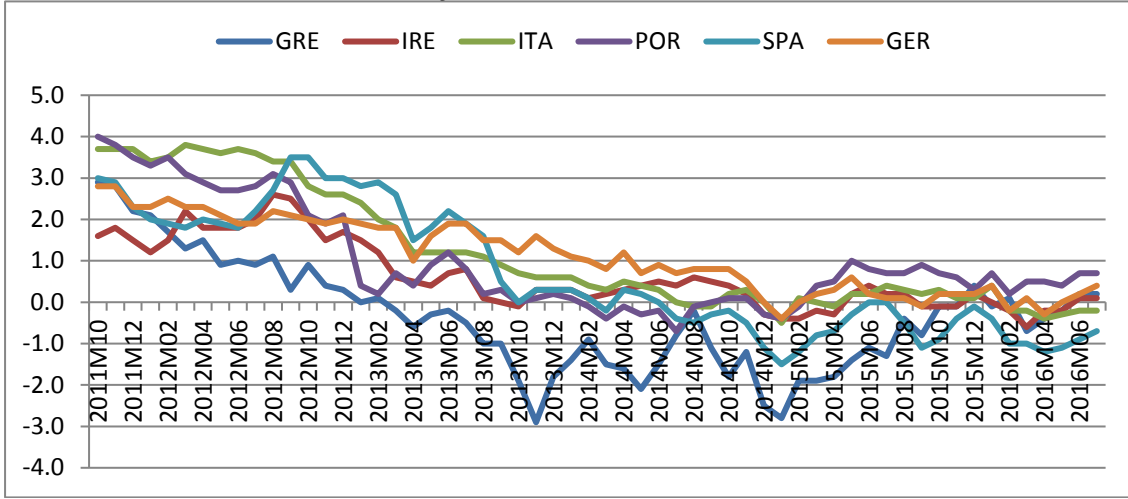
interconnectedness can be viewed as empirical complements to policy recommendations arising from the theoretical study of Eggertsson and Giannoni (2013). According to their analysis, an increase in inflation under a low interest rate environment can help boost the economy by promoting output growth. Even when the economy has fallen to a liquidity trap (Krugman, 1998), the monetary policy still plays an important role. For instance, strategic monetary-fiscal interactions remain an important policy nexus even under zero bound of interest rates (Dhami and al-Nowaihi, 2011). In such an environment, precise information about the interconnectedness of inflation dynamics is essential for a functioning institutional design. By identifying the channels of transmissions, our evidence reveals the potentials effects of an inflation shock in a monetary union. The remaining paper is structured as follows: the next section presents the data and the methodology used. Section II outlines our results, while the last section summarises and concludes.

II. DATA AND METHODOLOGY

We use monthly data for the Harmonised Index of Consumer Price (HICP) provided by Eurostat. For the period under examination, viz. 1996:2-2015:8, the annualised monthly HICP series for all six countries are found to be stationary. For robustness purposes, we also employ inflation data obtained from an alternative source, the International Financial Statistics (IFS) provided by the IMF. Our results remain unchanged. We employ HICP in our analysis since it is widely regarded as a more consistent measure of inflation. Figure 2 shows the inflation rates of GIIPS and Germany since the climax of the sovereign debt crisis in late-2011³. There is a clear declining trend of all inflation series, with Greece and Spain being in a deflationary phase for a prolonged period.

³ Since there is no clear consensus about the time-line of the European debt crisis, we consider as a distinguishing point the decision of the ECB to provide liquidity support through the long-term refinancing operations (LTROs) program in December 2011 (see, Darracq-Paries and De Santis, 2015).

Figure 2
Germany and GIIPS Inflation rates



Note: Annual Harmonised Index of Consumer Price (HICP) downloaded from Eurostat.

In line with prior work (Eun and Jeong, 1999; Yang *et al.*, 2006), we carry out variance decomposition of inflationary innovations. However, we extend and improve upon previous analysis by employing the spillover analysis proposed by Diebold and Yilmaz (2014; 2015). By doing so we are able to assess the shares of forecast error variation in several locations arising from inflation shocks that arise elsewhere. Specifically, this approach provides information about the contributions of shocks to variables to the forecast error variances for all the variables within the model. This model is briefly written as an N -variable VAR:

$$Y_t = \sum_{k=1}^K \Phi Y_{t-k} + \varepsilon_t \quad (1)$$

where $Y_t = (Y_{1t}, Y_{2t}, \dots, Y_{Nt})$ is the vector of the N endogenous variables and ε_t is the vector of disturbances that are independently distributed over time. Based on the moving average representation of (1) we have

$$Y_t = \sum_{j=0}^{\infty} \Theta_j \varepsilon_{t-j} \quad (2)$$

where $\Theta_j = \Phi_1 \Theta_{j-1} + \Phi_2 \Theta_{j-2} + \dots + \Phi_p \Theta_{j-p}$, with Θ being the $N \times N$ coefficient matrices. In this paper, we follow the work of Diebold and Yilmaz (2012) in which they use the generalized VAR modelling approach. Under this framework, the variance decompositions are invariant to the variable ordering. More precisely, the ij entry of the H -step-ahead variance decomposition is equal to

$$z_{ij}(H) = \frac{\sigma_{jj}^{-1} \sum_{h=0}^{H-1} (\varepsilon_i' \Theta_h \varepsilon_j)^2}{\sum_{h=0}^{H-1} (\varepsilon_i' \Theta_h \Sigma \Theta_h' \varepsilon_i)} \quad (3)$$

where σ_{jj} is the standard deviation of ε for the j^{th} equation, Σ is the variance matrix of error vector epsilon. The drawback of the generalized VAR modelling is that the own and cross-variable variance contributions shares do not equal to one. This is addressed by using the following normalization:

$$\% \phi_{ij}(H) = \frac{z_{ij}(H)}{\sum_{j=1}^N z_{ij}(H)} \quad (4)$$

where $\sum_{j=1}^N \% \phi_{ij}(H) = 1$ and $\sum_{i,j=1}^N \% \phi_{ij}(H) = N$.

Given the result above, the total spillover index (SI) is equal to:

$$SI = \frac{\sum_{i,j=1, i \neq j}^N \% \phi_{ij}(H)}{\sum_{i,j=1}^N \% \phi_{ij}(H)} \cdot 100 \quad (5)$$

The value of this index shows the average contribution of spillovers from shocks to all variables to the total forecast error variance. Alternatively, the spillover index gives the degree of connectedness of the K -variable system. In simpler terms, this index provides an overall measure of how interdependent the examined variables are. The main

advantage of this analysis is that the directional spillovers can also be easily calculated. More precisely, the directional spillovers received by variable i from all the other variables are defined as

$$DSI_{i \leftarrow j} = \frac{\sum_{j=1, i \neq j}^N \vartheta_{ij}^{\alpha}(H)}{\sum_{i, j=1}^N \vartheta_{ij}^{\alpha}(H)} \cdot 100 \quad (6)$$

Also, the directional spillover (DSI) transmitted by the variable i to all the other variables is defined as:

$$DSI_{i \rightarrow j} = \frac{\sum_{j=1, i \neq j}^N \vartheta_{ij}^{\alpha}(H)}{\sum_{i, j=1}^N \vartheta_{ij}^{\alpha}(H)} \cdot 100 \quad (7)$$

Finally, in order to examine whether a variable is net receiver or transmitter of shock, the net spillover effects (NSI) are calculated as follows:

$$NSI_i = DSI_{i \rightarrow j} - DSI_{i \leftarrow j} \quad (8)$$

The measures described above are static. This means that they are calculated for the whole period under study. However, the period that we examine in this study contains certain sub-periods of special interest. Therefore, static analysis may omit several aspects of stress transmission. In order to address this limitation, we employ a dynamic version of spillover analysis using rolling estimation with a 60-month window. To test for robustness, we also experimented with 65, 70 and 75-month rolling windows. The results remain almost identical.

III. RESULTS

We begin our analysis by firstly estimating the static spillovers. The results are presented in Table 1 where the connectedness matrix is depicted. The main upper table is the

variance decomposition matrix. Each diagonal element (i,i) shows the percentage of forecast error variation due to a shock in the same variable (i) . Accordingly, the non-diagonal element (i,j) depicts the percentage of variation in variable i explained by a shock in variable j . As explained in the previous section, we focus on the bilateral relations of GIIPS economies with Germany. For example, the last row of the upper part of Table 1 shows that an inflationary shock in Spain is responsible for 9% of the forecast error variance of Germany. On the other hand, a shock in Germany explains only a 3.7% of forecast error variance of Spain. In net pairwise terms, this is equivalent to claiming that Spain is a net transmitter of an inflationary shock to Germany ($i_{Germany \leftarrow Spain} - i_{Spain \leftarrow Germany} = 9 - 3.7 = 5.3\%$). The same is true for Italy. Specifically, a shock in Italy explains 7.4% of the forecast error variance of Germany, while a 'German' shocks explains only 3% of the 'Italian' forecast error variance. In net pairwise terms, Italy is a net transmitter of inflationary shock to Germany ($i_{Germany \leftarrow Italy} - i_{Italy \leftarrow Germany} = 7.4 - 3 = 4.4\%$). A similar situation holds true for Portugal, which is found to be net receiver (as $i_{Germany \leftarrow Portugal} - i_{Portugal \leftarrow Germany} = 9.5 - 6.2 = 3.3\%$). The opposite is true for the case of Ireland and Greece. An inflation shock that takes place in Ireland explains only 5.3% of the German forecast error variance, while a shock in Germany explains 7.5% of the Irish variance. This means that Ireland in a net receiver of shocks from Germany ($i_{Germany \leftarrow Ireland} - i_{Ireland \leftarrow Germany} = 5.3 - 7.5 = -2.2$). The same is true for Greece, where $i_{Germany \leftarrow Greece} - i_{Greece \leftarrow Germany} = 1 - 2.6 = -1.6$.

Apart from bilateral relations, Table 1 provides information about each economy's overall percentage of variation. In particular, the bottom row of Table 1 shows the total contribution of each examined economy to other economies' variation. Interestingly, Spain's and Italy's contribution is quite high reaching 93% and 84%, respectively. This indicates the important role of these two economies as transmitters of inflationary shocks to others. In contrast, the overall contribution of Germany to other countries is much

smaller with a value of 23%. In a similar vein, the last column shows the total contribution that each economy receives from the remaining ones. A high value indicates a high degree of ‘sensitivity’ to inflation shocks that take place elsewhere. Interestingly, Spain and Italy are highly susceptible to foreign inflation shocks, while simultaneously they are the main receivers of spillovers. The rest of the GIIPS economies also have high values (with Greece having the maximum value of 68%). Finally, the rightmost value in the last row of Table 1 shows the overall interdependence of our system (equation 5). The total spillover index (57.4%) shows that more than half of the total forecast error variance of the six economies examined is explained by the connectedness of shocks across these countries. Even though we restrict our study to only a subset of Eurozone, we find that the level of interconnectedness is fairly high.

Table 1
Average Total Spillovers

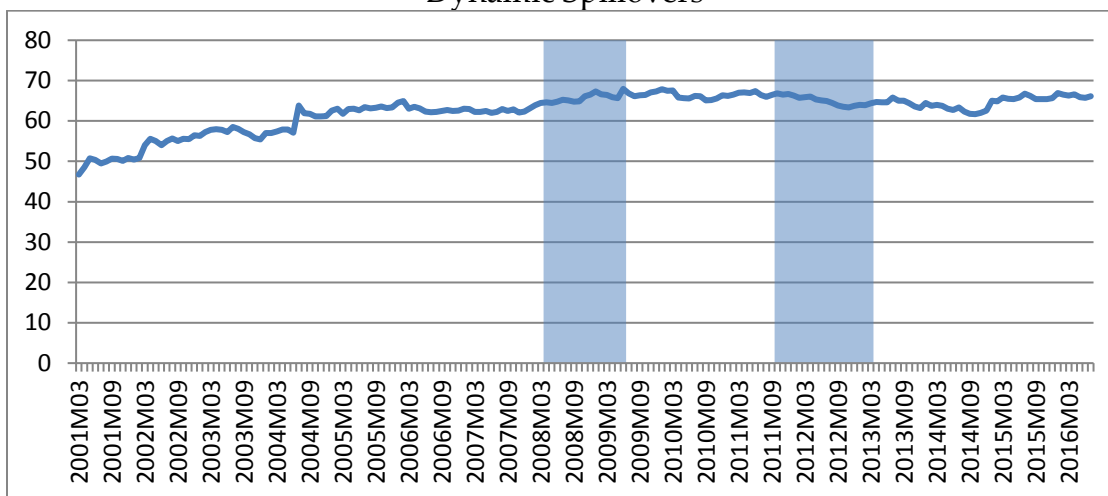
	Greece	Ireland	Italy	Portugal	Spain	Germany	From Others
Greece	31.8	17.1	19.4	8.1	21	2.6	68
Ireland	10.8	46.4	11.1	10.4	13.8	7.5	54
Italy	9.3	9.1	37.4	10.9	30.4	3	63
Portugal	6.9	14.4	18.3	35.6	18.6	6.2	64
Spain	9.1	10.8	28	11.8	36.6	3.7	63
Germany	1	5.3	7.4	9.5	9	67.8	32
Contribution to others	37	57	84	51	93	23	344
Contribution including own	69	103	122	86	129	91	57.40%

Note: Spillover indexes based on equations (5)-(7), calculated from variance decompositions based on 10-step-ahead forecasts.

The above analysis is useful but not precise enough. Its main drawback is that results found are static. This means that the analysis carried out does not take allow for any potential change in the relations among the examined economies. A dynamic analysis would therefore be much more informative. Static analysis may also omit several aspects of stress transmission. For this reason, we obtain a dynamic estimate of the above-

mentioned measures using 60-month rolling regressions. Figure 3 shows the dynamic version of the total interdependence index (57.4%) discussed in the previous section. We find clear evidence for considerable variation over time with an increasing trend since the creation of Euro. As shown in Figure 3, the index increases from 50% to roughly 67.5% over the period under examination. This means that the system represented by GIIPS countries and Germany gradually becomes more and more interconnected over time. This is in line with theoretical expectations that countries become more interdependent under a new monetary regime arising from the adoption of a single currency.

Figure 3
Dynamic Spillovers

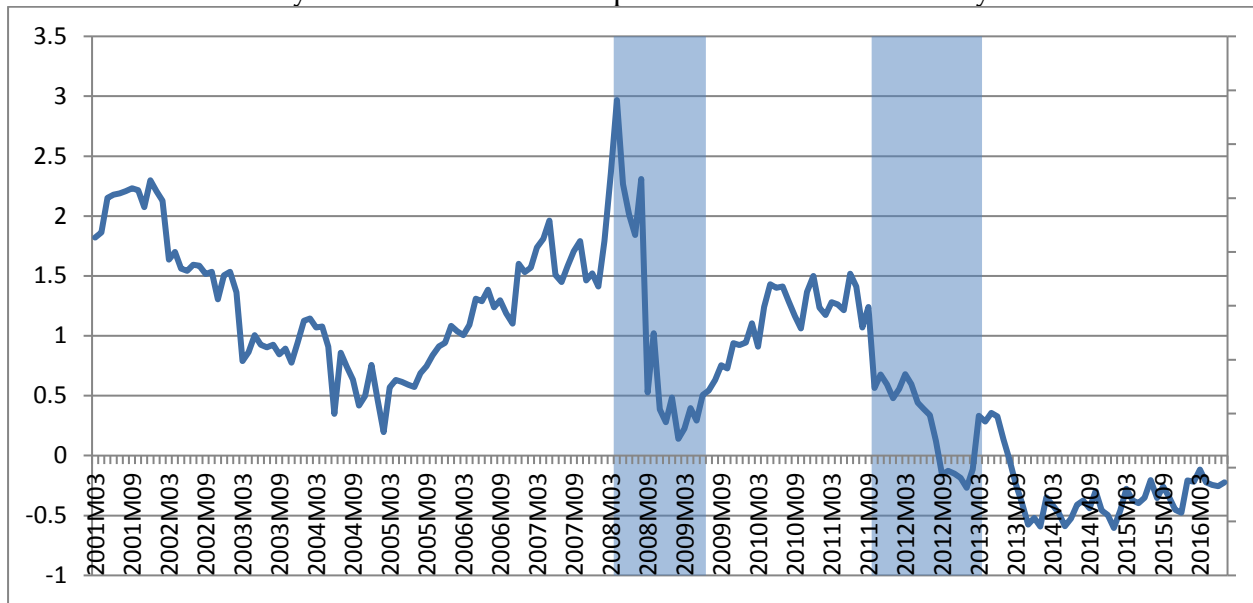


Note: Dynamic spillover index is calculated using rolling regressions with a 60-month window. Shaded areas denote Eurozone recessions based on CEPR business cycle dating committee.

The remaining figures (Figures 4-8) show the net pairwise spillovers between each periphery country vis-a-vis Germany which is considered to be net transmitter of inflation whenever the net effect lies below zero. On the other hand, if the net effect exceeds zero, Germany is a receiver of inflationary shocks. Starting from Greece (Figure 4), our results indicate that Greece remains an inflation transmitter for the longest period of time. This

is an interesting result, given the macroeconomic conditions prevailing in Greece including as a result of recent sovereign debt crisis. However, since 2011 the net effect for Greece becomes almost zero, whilst by the end of 2013 Greece becomes an inflation receiver. As far as the Irish economy is concerned (Figure 6), before 2005 it was a net transmitter of inflation but after 2005 it became a net receiver. This seems to have changed from mid-2014 onwards. The picture is fairly clear for the three remaining countries (Figures 6-8). For almost the whole period examined net-pairwise spillovers for Italy, Portugal and Spain are positive indicating that they remain net transmitters of shocks to Germany. Overall, the dynamic analysis shows that until the most recent data used in our study (mid-2015), all periphery countries (with the exception of Greece) are net transmitter of inflation to the core.

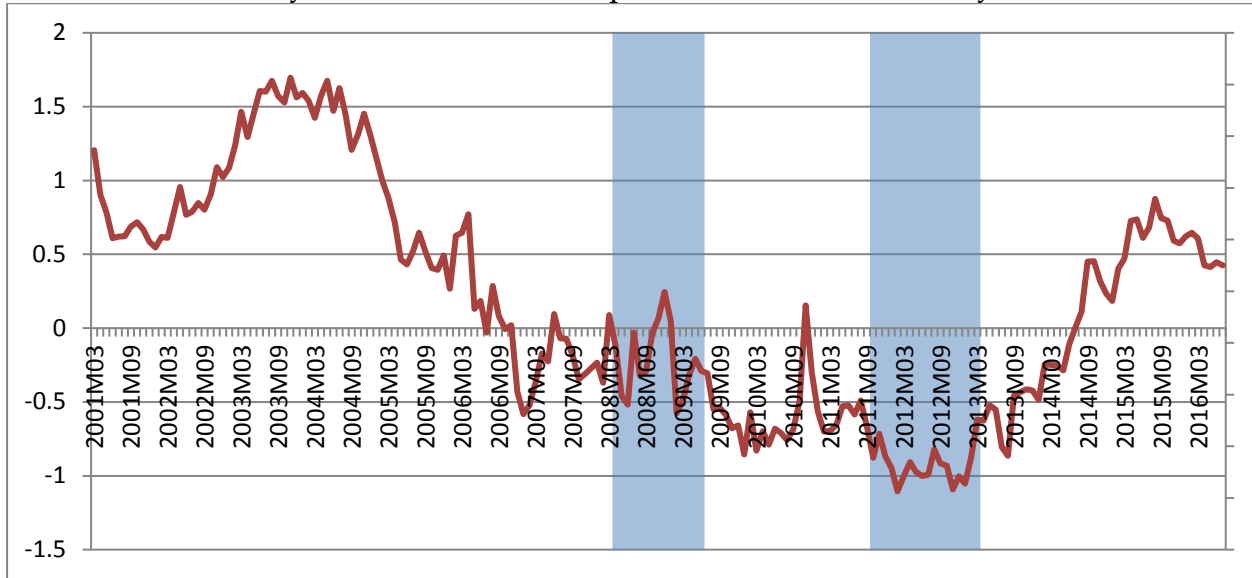
Figure 4
Dynamic Net Pairwise Spillovers: Greece-Germany



Note: Dynamic net-pairwise spillover index is calculated using rolling regressions with a 60-month window. Positive values indicate that Greece is a net transmitter to Germany. Shaded areas denote Eurozone recessions based on CEPR business cycle dating committee.

Figure 5

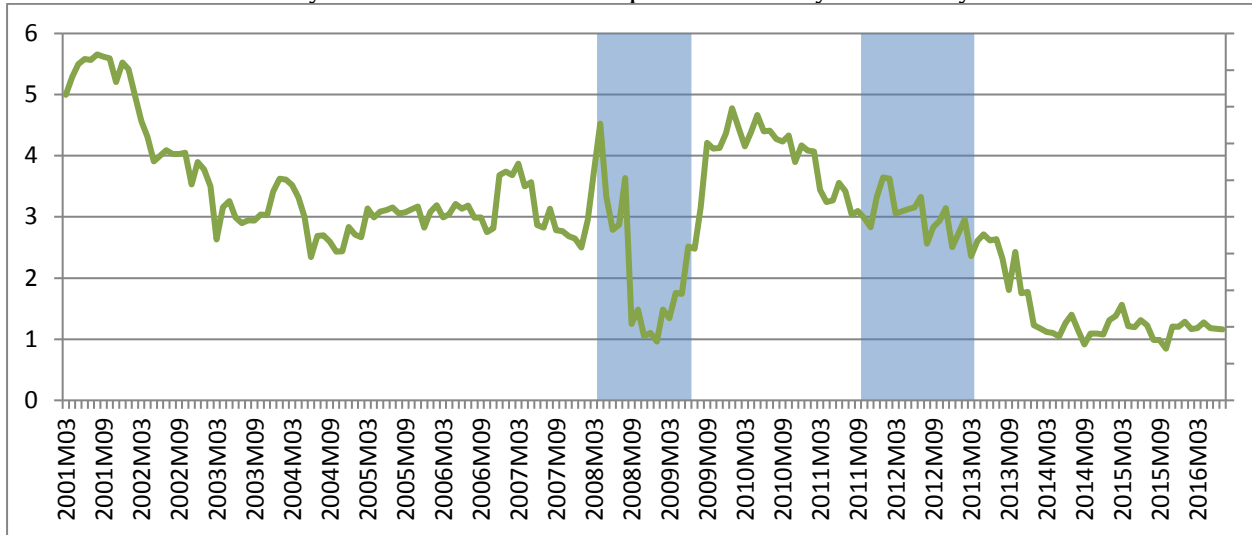
Dynamic Net Pairwise Spillovers: Ireland-Germany



Note: Dynamic net-pairwise spillover index is calculated using rolling regressions with a 60-month window. Positive values indicate that Ireland is a net transmitter to Germany. Shaded areas denote Eurozone recessions based on CEPR business cycle dating committee.

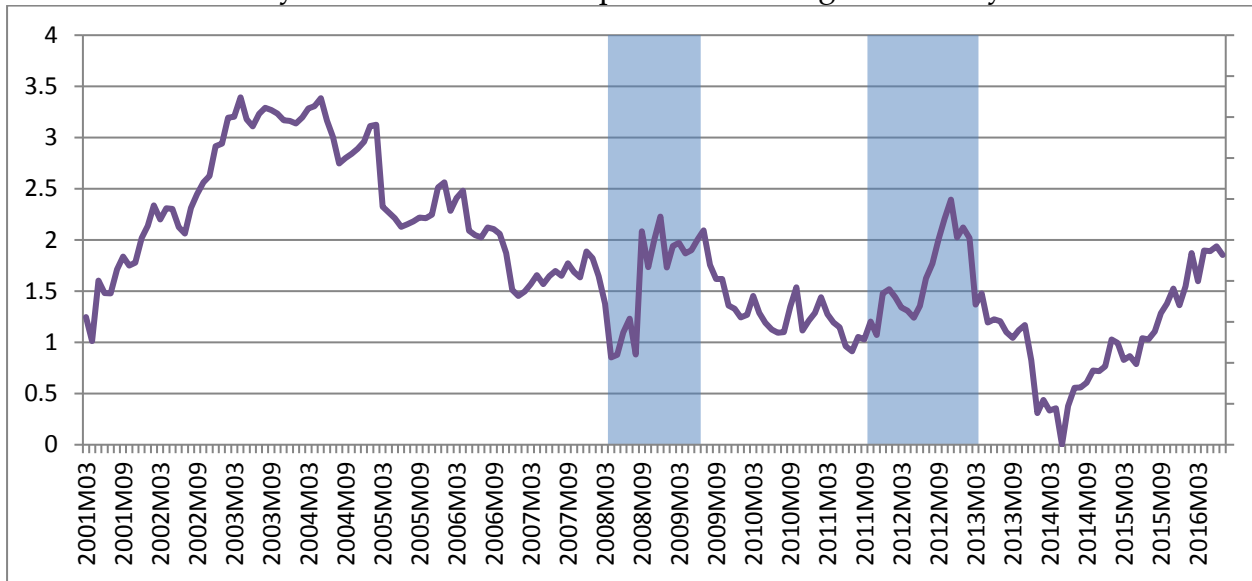
Figure 6

Dynamic Net Pairwise Spillovers: Italy-Germany



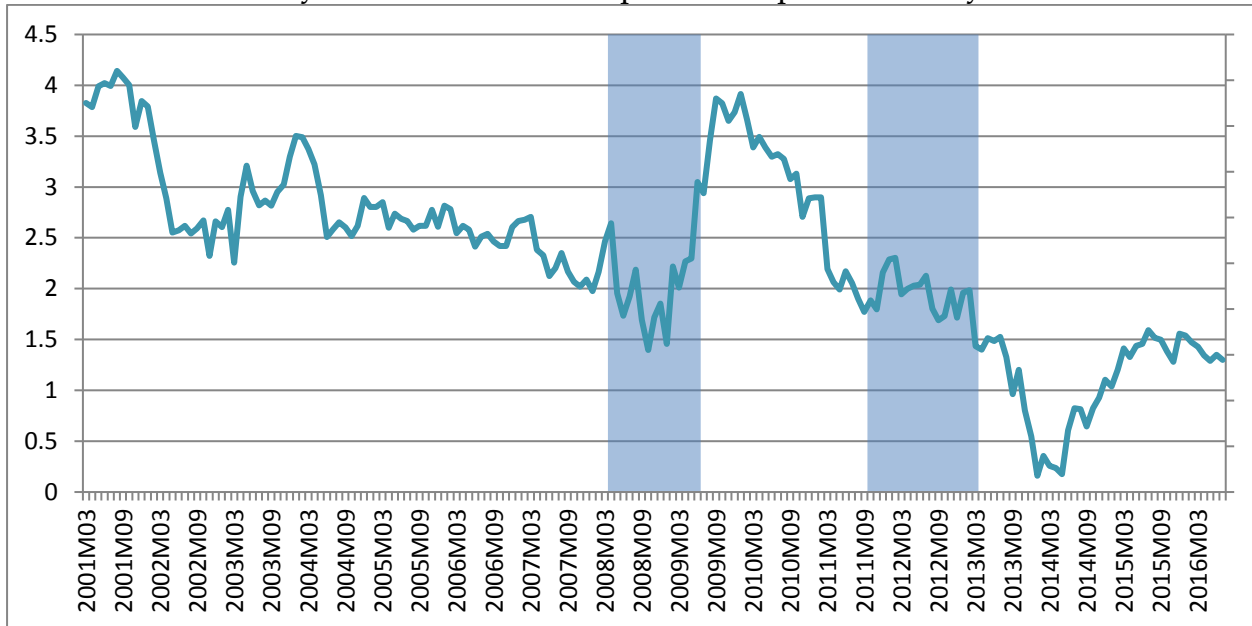
Note: Dynamic net-pairwise spillover index is calculated using rolling regressions with a 60-month window. Positive values indicate that Italy is a net transmitter to Germany. Shaded areas denote Eurozone recessions based on CEPR business cycle dating committee.

Figure 7
Dynamic Net Pairwise Spillovers: Portugal-Germany



Note: Dynamic net-pairwise spillover index is calculated using rolling regressions with a 60-month window. Positive values indicate that Portugal is a net transmitter to Germany. Shaded areas denote Eurozone recessions based on CEPR business cycle dating committee.

Figure 8
Dynamic Net Pairwise Spillovers: Spain-Germany



Note: Dynamic net-pairwise spillover index is calculated using rolling regressions with a 60-month window. Positive values indicate that Spain is a net transmitter to Germany. Shaded areas denote Eurozone recessions based on CEPR business cycle dating committee.

IV. DISCUSSION AND CONCLUSIONS

This paper identifies the transmission channels of inflation between the periphery (GIIPS countries) and the core (Germany) of the Eurozone. Using spillover analysis and in conjunction with a dynamic estimation method, we contribute to the existing literature by providing new evidence on how shocks in inflation rates are transmitted across economies that share the same currency. According to our results, a potential shock in GIIPS countries can be transmitted to the core. For instance, a potential deflationary shock to the periphery can be transmitted to the core. In the symmetrical opposite case of an inflationary shock, our results suggest that GIIPS countries can ‘export’ inflation to the core. This result is highly significant considering the current deflationary environment within the European periphery, especially after the sovereign debt crisis in the Eurozone. Given that peripheral economies can export deflation to the core, the need to combat deflation becomes more urgent. In an economic system like Eurozone, where one monetary authority controls monetary policy within a number of different economies, while fiscal policies are largely the preserve of national governments and not effectively coordinated within the Eurozone, the study of interconnectedness between periphery and core is essential. A positive inflation shock in the periphery, for instance through a mixture of expansionary fiscal policies, will be exported to the core. The current debates about the level of inflation in Germany (Nienaber, 2018) and its relation with the stance of fiscal policy, shows that proper identification of the inflation linkages needs deeper understanding.

Another important policy implication is related to the nature of monetary policy itself. The conventional wisdom of long run commitment to price stability being the key to fighting inflation (e.g. Woodford, 2004) has to be re-examined under the new conditions prevailing within the core and periphery of the Eurozone. Contrary to the pre-crisis experience where positive inflation rates were the norm, the new post-crisis deflationary period leads to new challenges about what can be considered to be optimal monetary policy under conditions of both deflation and low growth. Overall, our empirical results suggest that the next challenge to Eurozone policy makers is to deal with deflation and its consequences for managing fiscal crises effectively. The dangers of debt-deflationary spiral require new policy responses from central banks. Under deflationary conditions the issue of inflation transmission and inflation dynamics are of significant policy interest. This is an important aspect, especially for the case of Eurozone, where one monetary authority controls monetary policy within a number of different economies, while fiscal policies are largely the preserve of national governments and not effectively coordinated within the Eurozone. One potential area for future research is disaggregating analysis as well as the modelling of inflation channels within the Eurozone.

REFERENCES

- Altansukh, G., Becker, R., Bratsiotis, G. and Osborn, D.R. (2017). 'What is the globalization of Inflation?' *Journal of Economic Dynamics & Control*, 74, 1-27.
- Andersen, T. M. (2008). 'The Macroeconomic Policy Mix in a Monetary Union with Flexible Inflation Targeting'. *Journal of International Money & Finance*, 27, 411-37.
- Arestis, P., Chortareas G., Magkonis G.& Moschos D. (2014) 'Inflation Targeting and Inflation Converge: International Evidence', *Journal of International Financial Markets, Institutions and Money*, 31, 285-295.
- Bianchi, F. and Civelli, A. (2015). 'Globalization and Inflation: Evidence from a Time-varying VAR'. *Review of Economic Dynamics*, 18 (2), pp. 406-33.
- Chowdhury, I., Hoffmann M. & Schabert A. (2006) 'Inflation dynamics and the cost channel of monetary transmission', *European Economic Review*, 50, 995-1016.
- Darracq-Paries, M & De Santis, R.A. (2015) 'A non-standard monetary policy shock: The ECB's 3-year LTROs and the shift in credit supply' *Journal of International Money and Finance*, 54, 1-34.
- de Grauwe, P. (2016) 'The legacy of the Eurozone crisis and how to overcome it', *Journal of Empirical Finance*, 39, B, 147-155.
- Dhami, S. and al-Nowaihi, A. (2011). 'Optimal Institutional Design when there is a Zero Lower Bound on Interest Rates'. *Oxford Economic Papers*, 63, 700-21.
- Diebold, F. X. & Yilmaz, K. (2014) 'On the network topology of variance decompositions: Measuring the connectedness of financial firms', *Journal of Econometrics*, 182, 119-34.
- Diebold, F. X. & Yilmaz, K. (2015) *Financial and Macroeconomic Connectedness: A Network Approach to Measurement and Monitoring*, Oxford University Press.
- Eggertsson G.B. & Giannoni, M. (2013) 'The inflation-output trade-off revisited', *Staff Reports 608*, Federal Reserve Bank of New York.
- Eun, C. S. & Jeong, J.-G. (1999) 'International price level linkages: Evidence from the post-Bretton Woods era', *Pacific-Basin Finance Journal*, 7, 331-49.
- Friedman, M. (1953) *The case for flexible exchange rates*. In: *Essays in positive economics*, 157-201. University of Chicago.
- Foresti, P. (2018). 'Monetary and Fiscal Policies Interaction in Monetary Unions'. *Journal of Economic Surveys*, 32, 226-48.
- Holman, J.A. & Rioja F.K. (2001) 'International transmission of anticipated inflation under alternative exchange-rate regimes', *Journal of International Money and Finance*, 20, 497-519.

- Hughes Hallett, A. and Weymark, D. N. (2007). 'Fiscal Leadership and Central Bank Design'. *Canadian Journal of Economics*, 40 (2), pp. 607-27.
- Jeong, J.-G. & Lee, Y. (2001) 'International transmission of inflation under alternative exchange rate regimes: empirical evidence and its implications', *Global Finance Journal*, 12, 121-37.
- Jordan, T.J. (2016) 'The impact of international spillovers on Swiss inflation and the exchange rate', *Journal of International Money and Finance*, 68, 262-265.
- Krugman, P. (1998). 'It's Baaack! Japan's Slump and the Return of the Liquidity Trap'. *Brookings Papers on Economic Activity*, 2, 137-87.
- Mumtaz, H. and Surico, P. (2012). 'Evolving International Inflation Dynamics: World and Country-specific Factors'. *Journal of the European Economic Association*, 9, 1-20.
- Nienaber, M. (2018). 'Weak German Inflation backs up ECB's cautious approach'. Reuters, 30 January.
- Tillmann, P. (2008) 'Do interest rates drive inflation dynamics? An analysis of the cost channel of monetary transmission', *Journal of Economic Dynamics and Control*, 32, 2723-2744.
- Woodford, M. (2004) 'Inflation targeting and optimal monetary policy', *Federal Reserve Bank of St. Louis Review*, 86, 15-41.
- Yang, J., Guo, H. & Wang, Z. (2006) 'International transmission of inflation among G-7 countries: A data-determined VAR analysis', *Journal of Banking & Finance*, 30, 2681-700.