If the Fed sneezes, who gets a cold?

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Abstract

This paper investigates the global effects of US monetary policy shocks using a two stage approach. First, estimates of US monetary policy shocks are obtained by using an identification scheme that replicates the impulse responses in Gertler and Karadi (2014). This approach allows the inclusion of the recent period with US short-term rates at their lower bound. A large number of real and financial variables at monthly and quarterly frequency are then regressed on the estimated shocks to compute impulse responses in 37 advanced and emerging countries. Countries are grouped on the basis of characteristics like their dollar exchange rate regime or the openness of their capital accounts. The main findings are three. First, US monetary policy shocks have differential effects across advanced and emerging economies, affecting mainly macroeconomic variables in the former, and both macroeconomic and financial variables in the latter. Second, emerging economies display asymmetric responses to expansionary and contractionary US monetary policy. The macroeconomic and financial upswing brought about by the former are bigger and more persistent than the slowdown due to the latter. Finally, the exchange rate regime or the degree of financial openness hardly make a difference in how US monetary policy shocks affect emerging economies. Trade-offs between exchange rate, macroeconomic and financial stabilisation objectives can thus arise for emerging economies.

Keywords: Monetary policy, Trilemma, exchange rate, Federal Reserve, international transmission.

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1 Introduction

According to conventional wisdom, it is impossible for an open-economy to have a fixed exchange rate, free capital movements (no capital controls) and an independent monetary policy at the same time. This impossibility has been enshrined in a well-known trilemma. But it has also been buttressed by a large body of evidence that in the post-Bretton Woods period interest rates are more closely linked in countries that peg and in countries with open capital markets compared with countries that do not peg and impose capital restrictions.[1]

Recently Rey (2013) however has challenged this conventional wisdom and argued that in reality a floating exchange rate generally does not protect from the effects of US monetary policy shocks on the "global financial cycle". The argument is based on evidence that capital flows and stock prices in most countries, regardless of their exchange rate regime with the dollar, display strong comovements with US stock market volatility. The latter in turn is affected by US monetary policy. Monetary autonomy from the US is either not granted by a float or not sufficiently used. The real choice confronting many countries is therefore a much starker dilemma, rather than a trilemma, between monetary policy autonomy and capital controls.

In this paper we contribute to this debate by documenting the effects of US monetary policy shocks on a broad set of macroeconomic and financial variables in 37 advanced and emerging economies. Unlike previous studies, we include variables ranging from output and unemployment to consumer and asset prices, from interest rates to domestic credit and portfolio capital flows. This allows us to better understand the trade-offs in terms of macroeconomic and financial stability for other countries, brought about by a US monetary policy shock.[2]

Specifically, we proceed by first estimating US monetary policy shocks in a VAR identified as to replicate the impulse responses estimated by Gertler and Karadi (2014)

[1] See e.g. Klein and Shambaugh (2010). However, Rose (2013) finds that the macroeconomic and financial consequences of exchange rate regime choices are surprisingly inconsequential. Business cycles, capital flows, and other phenomena for peggers have been similar to those for inflation targeters during the Global Financial Crisis and its aftermath.

[2] Ostry and Ghosh (2014) point out that there may be a need for policy coordination if US monetary policy creates trade-offs for the receiving countries that they cannot (costlessly) undo with their own macroeconomic policy. Nevertheless, Woodford (2007) shows that globalisation does not, in general, imply a loss of monetary control in a model with frictionless international asset markets.

by using external instruments based on high-frequency data as in e.g. Gurkaynak et al. (2005). There are two key advantages in their approach which we inherit. First, they can estimate the responses to a monetary policy shock of several asset prices and spreads, eschewing any unpalatable contemporaneous restrictions, such as a recursive identification scheme. This is an attractive feature for us, given our focus on international asset prices and interest rates, among other variables. Second, their identification and results are robust to the presence of the lower bound on short-term interest rates in the aftermath of the Great Recession. This means that by matching their impulse responses we can also hope to identify similar shocks over a period that includes the recent financial crisis. However, we also recover shocks that, while consistent with their findings for many US variables, also satisfy, at least on impact, the requirements that a measure of short term rates in other major currencies react less than one-to-one to US rates. This ensures that we focus on those US monetary policy shocks which are not too strongly correlated with monetary policy shocks in other major countries. This is especially a concern in the aftermath of the recent financial crisis, when most advanced economies have deployed more or less contemporaneously very expansionary conventional and unconvential monetary policies with a view to achieve unprecendented levels of monetary stimulus. We find that under our identification assumptions, estimated impulse responses in the VAR are indeed robust to the inclusion of the 6 years from January 2008 to December 2013. In particular, the effects of US monetary policy shocks on global (aggregates of) output and stock prices are broadly similar, independently of the inclusion of the last 6 years of data.

Armed with our (estimated) monetary policy shocks, which we show significantly affect not only the US economy but also the VIX and measures of global activity and stock prices, we turn to the estimation of their effects on our sample of countries. Following the literature (e.g. Canova (200x) but also Romer and Romer (200x)), we obtain the impulse response coefficients by estimating, for each realization of the series of shocks, distributed lag models for each variable in each country, including also contemporaneous and lagged values of the shocks. We then aggregate these esimates across countries on the basis of several characteristics. These aggregations are obtained by taking simple averages across countries. In some cases, detailed below and especially in the data appendix, we omit countries with extremely large responses, e.g. Brazil in the case of short-term interest rates and inflation, because of hyperinflationary episodes included in our sample.

In this version we aggregate countries on the basis of the following characteristics: a) income levels — advanced and emerging economies; b) exchange rate regime — floaters and dollar pegs according to the de facto classification in Klein and Shambaugh (2010); c) financial openness according to the de facto classification in Chinn and Ito (2006) on inflow restrictions. Therefore, similar to Miniane and Rogers (2007) and Klein and Shambaugh (2010), we look at the role of receiving countries' structural characteristics and choice of policy regime in influencing the degree to which US monetary policy may impose (positive or negative) externalities abroad. We also estimates separate impulse responses for (positive) shocks entailing a tightening of US monetary policy, and for (negative) shocks entailing an easing of US monetary policy shocks.

Our main findings are the following. First, US monetary policy shocks have differential effects across advanced and emerging economies, affecting mainly real variables in the former, and both real and financial variables in the latter. Specifically, a surprise US monetary policy easing brings about an increase in economic activity, a fall in unemployment and boosts stock prices in both advanced and emerging countries, despite their real exchange rates appreciating. But only in the latter countries, the US monetary easing also leads to sustained portfolio and banking inflows, and a rise in domestic credit and housing prices. Second, only emerging markets display significant asymmetric responses between expansionary and contractionary US monetary policy shocks. The latter only cause a short-lived recession in emerging markets. But the key asymmetries emerge from the responses of financial variables: not only is the fall in bank and portfolio inflows smaller and less persistent in the case of the a US tightening; domestic credit and housing prices even slightly increase, instead of declining. Therefore, the effects of a US monetary policy shock are especially different between advanced and emerging economies in the case of a US easing, that brings about a financial boom in the latter, which in turn results in an amplification of the expansionary macroeconomic consequences of the shock.

Finally, both the exchange rate regime and capital controls do not seem to make a large difference in these effects across emerging economies. Namely, the exchange rate regime seems chiefly to affect the amount of nominal and real depreciation. A relatively closed capital account only prevents capital outflows by domestic residents. The responses of most of other real and financial variables are similar across peggers and floaters, and

countries with relatively more open capital accounts.[3]

Of course, our work is quite closely related to previous contributions in the literature on the transmission of U.S. monetary policy shocks. Mackowiak (2007) finds that US monetary policy shocks affect interest rates and the exchange rate in a typical emerging market quickly and strongly; moreover, the price level and output responds by more than US price level and output themselves. Georgiadis (2015) shows, among other findings, that a floating exchange rate reduces the spill-over from US monetary policy shocks (the more so, the more trade and financially open the receiving countries). Miniane and Rogers (2007) look at whether capital controls insulate countries from US monetary shocks, in particular whether interest rates and exchange rates are less affected, finding no evidence that capital controls are effective. On the other hand, they find that the exchange rate regime matters for the transmission of US shocks, with countries having a fixed exchange rate regime being more affected in terms of output and inflation. Di Giovanni and Shambaugh (2008) look at the effect of foreign interest rates on domestic growth in a large group of countries, finding that the effect is stronger in countries with fixed exchange rate regimes, mainly on account the stronger impact of foreign interest rates on domestic interest rates. Most if not all of these papers do not consider, however, the potential financial stability dimension of the spill-over that plays an important role in this paper. Our paper is also related to the literature on the design of the international monetary system, of which the US is clearly the central element; see among others Mohan, Patra and Kapur (2013).

The paper is organised as follows. We describe the empirical approach in Section 2, and present the data in Section 3. The baseline results for all countries and for the subgroups are in Section 4. Section 5 concludes.

2 Empirical approach

We proceed in two steps. First, we estimate US monetary policy shocks using a large Bayesian VAR including several monthly US and global variables. We identify these shocks imposing sign restrictions based on the findings in Gertler and Karadi (2014). Second,

[3] These results are based on capital openness using the measure on capital inflow restrictions developed by Fernandéz et al .(2015). We are currently working on alternative measures, whose results will be included in future versions of the paper.

similarly to other papers such as Corsetti et al. (2012), we regress on the estimated shocks a host of variables for each country both at monthly and quarterly frequency. We then aggregate the resulting impulse responses across countries according to the latter characteristics.

2.1 The BVAR Model

The empirical model used to estimate US monetary policy shocks is a BVAR with 13 variables. We need to include many US and global variables for two reasons. First, we want to identify the monetary policy shocks by imposing sign restrictions to match the findings in Gertler and Karadi (2014) for as many of their variables as possible. This implies that we need to include several relevant interest rates and spreads in our VAR for which these authors find an effect of monetary policy. Second, given the open-economy focus of our study, in addition to including the US nominal effective exchange rate, we also need to control for global drivers of fluctuations in countries other than the USA. Therefore, we include in the VAR world measures of stock prices, output and inflation, as well as a measure of short-term interest rates of major currencies floating against the US dollar.

Large Bayesian VARs have been introduced by Banbura, Giannone, Reichlin (2010) as a tool to handle systems of many variables avoiding the issue of overfitting. This is possible through the application of Bayesian shrinkage which amounts at increasing the tightness of the priors as more variables are added. The rationale behind this approach is that by using informative priors it is possible to shrink the likely overparametrized VAR model towards a more parsimonious model represented by the prior distributions. Therefore, the choice of the informativeness of the priors is a crucial issue. In this work we follow the approach of Giannone, Lenza and Primiceri (2012), i.e. the appropriate degree of shirinkage is automatically selected treating hyperparameters as any other unknown parameter and producing inference on them. More in details, the VAR model is conceived as a hierarchical model where hyperparameters are assigned a flat hyperprior so that maximizing their posterior simply amounts at maximizing the marginal likelihood with respect to them.

As regards priors, a Normal - Inverse-Wishart distribution is used for the coefficients and the variance-covariance matrix. Bayesian shrinkage is achieved through the combina-

tion of Minnesota, sum-of-coefficients and dummy-initial-observation priors for the VAR coefficients. The Minnesota prior assumes that the limiting form of each VAR equation is a random walk with drift. The sum-of-coefficients prior and the dummy-initial-observation prior are necessary to account for unit root and cointegration.

Because the posterior does not admit analytical characterization, even under gaussianity of the likelihood function, an MCMC algorithm is used for inference, based on a Metropolis step to draw the vector of hyperparameters and on a standard Gibbs sampler to draw the model's parameters conditional on the former. From the conditional posterior distribution we extract 20000 draws, of which the first 10000 are discarded and the last 10000 are used for inference on monetary policy shocks. Further details on the prior specification and estimation procedure can be found in Giannone, Lenza, Primiceri (2012).

This framework allows to estimate the VAR in levels, with variables expressed in annualized terms. Specifically, our model consists of 13 monthly variables, both US-specific and international variables. The US economy is described by an industrial production index, the CPI, the Federal Funds rate, a 1-year government bond yield index, the S&P500 index, the nominal effective exchange rate against 20 trading partners[4], the corporate bond spread, the mortgage spread and the commercial paper spread. The last three variables are the same as in Gertler and Karadi (2014). The global variables consist of the CRB commodity price index, a world industrial production index (excluding construction) calculated by the OECD, a world stock prices index and the difference between a global short-term interest rate and the US 3-month T-bill rate. The global interest rate is computed as an average of the short term rates of four major currency areas (Canada, Euro Area, Japan, UK).[5] As variables are monthly and enter the VAR in levels, the model is estimated with $p = 13$ lags.

[4]The nominal effective exchange rate is calculated against the following 20 trading partners: Australia, Belgium, Brazil, Canada, China, France, Germany, India, Ireland, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, Singapore, Spain, Switzerland, Thailand, UK.

[5]The 3-month T-bill rate is used for UK, the call money rate for Japan, the 3-month Euribor for the Euro area and a general T-bill rate for Canada as calculated by the IMF.

2.2 Identification

Identification of US monetary policy shocks is achieved through sign restrictions on the impulse response functions following the methods pioneered by Faust (1998), Uhlig (2005) and Canova and de Nicolo' (2002). We impose restrictions as to qualitatively replicate the impulse responses estimated by Gertler and Karadi (2014). These authors use external instruments, based on high-frequency data to identify monetary policy shocks, including the period over which US interest rates were at their lower bound. There are two key advantages in their identification approach. First, they can estimate the responses to a monetary policy shock of several asset prices and spreads, eschewing any unpalatable contemporaneous restrictions, such as a recursive identification scheme. This is an attractive feature for us, given our focus on international asset prices. Second, their identification is robust to the presence of the lower bound on short-term interest rates, and yields broadly similar impulse responses irrespective of whether the period after January 2008 is excluded or not. This result means that by matching their impulse responses we can also identify similar shocks over a period that includes the recent financial crisis.

In principle, we could have used the same external instruments as in Gertler and Karadi (2014) to identify US monetary policy shocks with our reduced form VAR residuals. However, while keeping our results for the US economy consistent with theirs, we also want to focus on those US monetary policy shocks which are not too strongly correlated with monetary policy shocks in other major countries. This is especially a concern in the aftermath of the recent financial crisis, when most advanced economies have deployed more or less contemporaneously very expansionary conventional and unconvential monetary policies with a view to achieve unprecendented levels of monetary stimulus. To achieve this aim, we use sign restrictions to recover shocks that, while consistent with Gertler and Karadi (2014) findings for many US variables, also satisfy, at least on impact, the following requirements. First, a measure of short term rates in other major currencies should react less than one-to-one to US rates; second, the US effective exchange rate appreciates. Nevertheless, we conduct extensive robustness checks to document to which extent our results depend on these assumptions.

Specifically, we impose the following restrictions:

$$\begin{aligned}
FFR > 0 \quad &\text{for} \quad t = 1, \ldots, 6 \\
IP_{US} < 0 \quad &\text{for} \quad t = 2, \ldots, 6 \\
CPI_{US} \leq 0 \quad &\text{for} \quad t = 4 \\
1Y : GBY_{US} > 0 \quad &\text{for} \quad t = 1, \ldots, 4 \\
MS_{US} > 0 \quad &\text{for} \quad t = 2 \\
CPS_{US} > 0 \quad &\text{for} \quad t = 1, 2, 3 \\
SP_{US} < 0 \quad &\text{for} \quad t = 1 \\
NEER_{US} > 0 \quad &\text{for} \quad t = 1 \\
DiffIR < 0 \quad &\text{for} \quad t = 1
\end{aligned}$$

Here FFR is the Fed Funds rate, IP_{US} is the US industrial production, CPI_{US} is the US consumer price index, $1Y : GBY_{US}$ are 1-year government bond yields, MS_{US} is the mortgage spread, CPS_{US} is the commercial paper spread, SP_{US} is the S&P500 index, $NEER_{US}$ is the nominal effective exchange rate and $DiffIR$ is the difference between the global interest rate and the US short-term rate. The first six restrictions are in line with results in Gertler and Karadi (2014) as reported in their Figures 2-8. We also impose that US stock prices fall on impact and the US effective nominal exchange rate appreciates. As discussed above, the last two sign restrictions in table help in ensuring the identification of a US-specific monetary policy shock. The fall in the interest differential does not require that interest rates in other major currencies fall, but only that they increase by less than their US counterparts. Finally, the impulse response functions of the remaining four variables we include are left unrestricted. Namely, the US corporate bond spread, commodity prices, world industrial production, and world stock prices are free to react to the shock according to the data. These last three variables then will provide prima-facie evidence of the aggregate effects of US monetary policy shocks on the rest of the world.

The algorithm to estimate the posterior distribution of impulse response functions and of monetary policy shocks is standard. As discussed above, we obtain 10000 draws from the conditional posterior distributions of the reduced-form coefficients and variance-covariance matrix. For each draw, following the procedure in Uhlig (2005), 1000 random

orthogalizations of the variance-covariance matrix are evaluated , discarding those that do not satisfy the sign restrictions. The algorithm always finds at least one suitable orthogonalization for more than 99% of the draws from the conditional posterior distributions. This implies that our restrictions do not implausibly constrain the reduced form VAR.

2.3 Estimation of the impact on countries other than the US

The above procedure, in addition to impulse response functions in the BVAR, allows us to obtain an estimate of the posterior distribution of our US monetary policy shocks. Armed with these shocks, for each variable j in country i, y_{ji}, we compute a vector of impulse responses at horizon h

$$IRF_{j,i,h} = \frac{\partial y_{j,i,t+h}}{\partial \varepsilon^{MP}_{US,t}} \tag{1}$$

for all the countries in our sample other than the US. Following the literature (e.g. Canova (200x) but also Romer and Romer (200x)), we obtain the impulse response coefficients by estimating, for each realization of the series of shocks, the following distributed lag model for each variable, including also contemporaneous and lagged values of the shocks:

$$y_{j,i,t} = \alpha_{i,j} + \phi_{i,j}(L)\, y_{j,i,t-1} + \beta_{i,j}(L)\, \varepsilon^{MP}_{US,t} + \varepsilon_t, \tag{2}$$

where we also include monthly and quarterly dummies and a time trend.

We consider both variables at monthly and quarterly frequency for each country i, as discussed in the next section. Rather than reporting results country by country, in the main text we find it convenient to aggregate them on the basis of several characteristics. These aggregations are obtained by taking simple averages across countries. In some cases, detailed below and especially in the data appendix, we omit countries with extremely large responses, e.g. Brazil in the case of short-term interest rates and inflation, because of hyperinflationary episodes included in our sample. In this version we aggregate countries on the basis of the following characteristics: a) income levels — advanced and emerging economies; b) exchange rate regime — floaters and dollar pegs according to the classification in Klein and Shambaugh (2010); c) financial openness according to the classification in Chinn-Ito concerning inflow restrictions. This approach can be justified as similar to the computation of mean group estimators advocated by Pesaran et al. (199x) in the presence of parameter heterogeneity in models like (2).

3 Data description

Table 1 contains all variables used in the empirical analysis. The Bayesian VAR model to identify US monetary policy shocks consists of 13 monthly variables which were discussed above. Table 1 lists all the variables used in the BVAR with their sources.

In order to study the international effects of US monetary policy, a large number of country-specific variables are regressed on the estimated monetary policy shocks and the impulse response functions are computed. Our sample consist of 37 countries, namely: Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, Estonia, Euro Area, Finland, France, Germany, Greece, Hungary, India, Italy, Japan, Korea, Latvia, Lithuania, Malaysia, Mexico, Netherlands, Norway, Philippines, Poland, Portugal, Russia, South Africa, Spain, Sweden, Thailand, Turkey and UK.

For each country we consider both monthly and quarterly variables. *Monthly variables* include: (i) the bilateral dollar exchange rate;[6] (ii) the real effective exchange rate; (iii) the short-term interest rate differential with the UD; (iv) CPI inflation; (v) industrial production; (vi) real stock prices (deflated with the CPI); the nominal trade balance (scaled by the average of the sum of import and export over the sample); (viii) the differential of long-term government bond yields vis-á-vis the US. The short term rates are defined in Table 2.

Quarterly variables include: (i) real GDP; (ii) the GDP deflator; (iii) the unemployment rate; (iv) real housing prices (deflated by CPI); (v) real domestic credit (deflated by CPI); (vi)-(vii) total portfolio inflows and outflows, and (viii) total bank inflows, all scaled by GDP.

The sources of the variables we use are: Datastream, Reuters, Haver Analytics, Eurostat, Oxford Economics, the Global Financial Data database, the International Financial Statistics database and the Balance of Payments Statistics database of the IMF, the Main Economic Indicators database of the OECD, the Bank for International Settlements and the European Central Bank. Data about total credit to private sector come from the Banking Institution database of the IMF. Details about the source of each series are provided in Tables 8 and 9.

The series of monetary policy shocks extracted from the BVAR starts in February 1981

[6] It is defined as the amount of local currency needed for 1$ so that an increase in the exchange rate represents an appreciation of the US dollar.

(as we use 13 lags in the model) so that the regressions can be estimated from that date on. When coming to quarterly regressions the monetary policy shocks are aggregated taking their quarterly average. Regressions can be estimated starting from Q2 1981. As not all variables are available over the whole sample, we are forced to run some the regressions over shorter samples. The sample available for each time series is displayed in Table 6 and 7.

The last step of our analysis consists of aggregating the impulse response functions of single-country variables according to some country-specific characteristics. The main distinctions is between advanced and emerging economies, countries whose exchange rate is pegged or left free to float and finally financially open or less open countries.[7] Table 3 reports the countries in each of these groups. These classifications are then combined to derive sub-samples of countries with interesting common characteristics so that we also consider advanced floaters, emerging floaters, advanced open, emerging financially open and emerging less-financially open countries.

Finally, Tables 4 and 5 report the list of countries used in aggregations. Not all the impulse response functions could be used as some of them display extremely large values, which makes them not comparable with those of other countries.

4 The global transmission of US monetary policy shocks

4.1 BVAR results for US and international variables

We begin by presenting our results for a contractionary US monetary policy shock in the BVAR in *Figure 1 A-B* over the full sample period, until the end of 2013. The figure reports the 16th, 50th (median) and 84th percentiles of the point by point distribution of the estimated impulse responses (the dotted red lines), as well as the mean. It is clear from the figure that the typical shock is estimated to have larger and more persistent effects than we impose. The federal fund rate and the 1-year rate soar persistently, with a median

[7] This classification is based on the Chinn-Ito measure of financial openness. For each country, the average of the Chinn-Ito index is calculated over the sample 1980-2011 and then the median of the averages is used to discriminate whether a country can be defined to be financially open or less-financially open. This classification coincides with that based on Fernandez et al. (2015) for the countries included in both datasets.

value around 100 basis points. These responses are significant (i.e. the 16th percentile is above zero) for almost 12 months. This interest rate hike is associated with a shorter-lived widening in the mortgage spread, the commercial paper spread and the corporate bond spread, where only the latter is not significant even on impact. As a result, the US price level, industrial production and stock prices drop significantly on impact and in later periods, with the effects dissipating after one year to 4 years. Their median responses are also large, falling by around 1%, 3% and 15%, respectively. Finally, international variables respond as would be expected according to standard textbook theory. The persistent fall in the interest differential closely mirrors the hike in US rates, and is thus consistent with interest rates in other major currencies barely responding to the shock, while the dollar effective exchange rate strongly appreciates, with a large median effect of around 6%. This appreciation hower becomes insignificant after 6 months, as the 16th percentile returns below zero. Despite the dollar appreciation, industrial production and stock prices fall in the rest of the world, while the large median decrease in commodity prices is always bracketed between a positive 16th percentile and negative 68th percentile. The contraction in world industrial production and stock prices is similar in magnitude to that in their US counterparts, albeit somehow less persistent. These responses are consistent with a transmission involving strong complementarities between US and foreign manufacturing goods or a limited degree of exchange rate pass-through — see e.g. Corsetti, Dedola and Leduc (2010).

The impulse responses estimated excluding the most recent period after 2008 are broadly similar to those in Figure 1 A-B, quantitatively and qualitatively — see *Figure 2 A-B*. The only notable exeception concerns the response of the mortgage spread and the commercial paper spread, which is now much smaller than when the financial crisis period is included. Therefore, in the rest of the current version of the paper we will focus on results using the shocks estimated over the whole sample including 2013.

We conclude this section by reporting on three exercises we carried out to provide further validation of our approach. First, we re-estimated the BVAR impulse responses by dropping the interest rate differential from it. The results for the whole sample until 2013 are reported in *Figure 3 A-B*. These impulse response functions are similar to those in Figure 1 A-B, but there are some quantitative differences. In particular, the responses of interest rates are now much more persistent, with the 16th percentile staying positive

for the all 40 months in the charts. This is not the case when we restimate the VAR over the sample ending in 2008 (not shown here). Also, the responses of many variables are somehow larger than in Figure 1, especially those of the international variables.

Second, we computed the responses of the US stock prices, the nominal effective exchange rate and the interest rate differential and the international variables to the shocks estimated by Gertler and Karadi (2014), using a specification like (2).

The point estimates of these impulses responses are presented in Figure 4 for two samples, including and excluding the financial crisis. They show that the identifying restrictions we impose on these three variables are consistent with the effects of the monetary policy shocks estimated by these authors. Namely, stock prices and the interest rate differential drop, while the effective exchange rate appreciates.

Third, we computed the impulse responses of the monthly US VIX index to our identified shocks, again using a specification like (2). We could not include this variable directly in the B-VAR because it is available only after the early 1990s. This could be an important omission in light of the results in Rey (2013) who, taking the VIX as a proxy for the "global financial cycle", shows that capital flows and asset prices across countries are correlated with it, and that a US monetary policy tightening affects this variable by increasing it. *Figure 5* reports the impulse responses of the VIX to our monetary policy shocks, estimated over both samples. Similarly to the BVAR, the (red) dotted lines represent the point-by-point 16th, 50th and 84th percentiles, while the (black) solid line is the average response. It is clear that an unexpected monetary tigthening in the US, as measured by our shocks, results in a substantial and persistent increase in the VIX, in line with the results in Rey (2013). This result, together with our finding that US and especially global stock prices fall in response to a US interest rate hike, shows that our estimated monetary policy shocks are consistent with salient features of the effect of US monetary policy on the "global financial cycle" as claimed by Rey (2013). Together, these exercises lend support to the credibility of our benchmark identification and the effects of the resulting monetary policy shocks.

4.2 Results for the country groupings

In this subsection, we turn to the discussion of the impulse responses for countries other than the US. While some country by country results will be discussed in the next section,

here we present the impulse responses aggregated across countries. We find it convenient to organize the results for both monthly and quarterly data by country groupings. Therefore, for each figure panel A will depict impulse responses for monthly variables, while Panel B will depict impulse responses for quarterly variables. Recall that monthly variables include: (i) the bilateral dollar exchange rate; (ii) the real effective exchange rate; (iii) the short-term interest rate differential with the UD; (iv) CPI inflation; (v) industrial production; (vi) real stock prices; (vii) the nominal trade balance; (viii) the differential of long-term government bond yields vis-á-vis the US. Quarterly variables include: (i) real GDP; (ii) the GDP deflator; (iii) the unemployment rate; (iv) real housing prices; (v) real domestic credit; (vi)-(vii) total portfolio inflows and outflows, and (viii) total bank inflows, all scaled by GDP. As before, the (red) dotted lines represent the point-by-point 16th, 50th and 84th percentiles, while the (black) solid line is the average response. Country classifications are reported in Table 3.

All countries. We start with the impulses responses obtained by taking simple averages across all countries, displayed in *Figure 6 A-B*. These responses confirm and extend our previous results from the BVAR that a US monetary tightening has substantial cross-border effects .Panel A shows that in the average country in the rest of the world, such a tightening is associated with persistent bilateral dollar appreciation, a fall in industrial production, CPI price level and real stock prices. In addition, it triggers a persistent real effective depreciation and trade surplus, and an increase in the short-term and long-term interest rate differential relative to the US. This latter result may seem in contrast with the VAR, but it reflects the fact that now many more countries comprise our sample, not only major currency ones.

Panel B shows that, in the average country, the contraction in industrial production is associated with a persistent fall in broad-based output as measured by real GDP, and in a persistent increase in unemployment. Conversely, domestic prices as measured by the GDP deflator increase, in contrast to the fall in the CPI. Most interestingly, Panel B also shows that the US monetary tightening brings about a fall in real housing prices and real domestic credit, and especially capital outflows, through a reversal of portfolio and bank foreign inflows and an increase in portfolio domestic outflows.

Overall, these results are remarkable as the almost 40 countries included in our sample

are quite heterogeneous along several dimensions, such as their income levels or exchange rate regime. We turn next to the analysis of the effects of some of these dimensions on the transmission of US monetary policy shocks.

Advanced vs. emerging countries. *Figure 7 A-B* and *8 A-B* presents results by splitting countries on the basis of their income levels, with Figure 7 aggregating over advanced economies and Figure 8 over emerging economies (see first and second column in Table 3). Panel A in Figure 7 shows that the average advanced country reacts differently than the overall average. It experiences a larger real effective depreciation and a larger fall in its CPI, but a smaller increase in its trade balance and interest rate differentials, especially concerning the long-term differential. The responses of quarterly variables displayed in Panel B confirm and further sharpen these differences. The fall in real GDP and unemployment is less persistent, while now the GDP deflator, domestic credit and housing prices even increase, although only the latter somehow significantly. Also portfolio capital outflows only reflect increased investment abroad by domestics, while both portfolio and bank inflows now increase, but only the latter significantly.

By the same token, Figure 8 shows that the average emerging country is a great deal more affected by the US monetary policy contraction than the average advanced country. Panel A shows that both nominal and real exchange rates tend to depreciate a bit less in emerging economies than in advanced ones; consistently, interest rates also rise by more. However, trade surpluses are also larger and more persistent. Panel B shows that broad based variables differ even more, with real GDP and unemployment reacting more and for longer than in advanced countries. But the key differences emerge from the responses of housing prices, domestic credit and bank and portfolio inflows: while all these variables are barely or even positively affected in advanced countries, they fall substantially and quite persistently in emerging economies in response to a US monetary tightening. A first key result then is that the macroeconomic consequences of a US monetary policy shock are qualitatively similar across advanced and emerging economies, whereas a US tightening brings about a recession in both groups. However, the former are spared the financial repercussions broadly experienced by the latter, which in turn result in an amplification of the macroeconomic consequences of the shock in emerging economies.

Foreign exchange regime. Next, *Figures 9 A-B and 10 A-B* display results when we group countries between floaters and dollar pegs (the latter include China, India, Malaysia, Mexico, Philippines and Thailand). When comparing Panels A in Figures 9 and 10 it does not seem that monetary autonomy makes a significant difference, besides the obvious fact that nominal and real exchange rates depreciate by less in countries pegging to the dollar. Somehow consistently, the trade surplus is also larger in countries with a floating exchange rate. Yet, the responses of industrial production and stock prices are quite similar, while the main difference in the effect on the CPI is that the latter persistenly increases after a few months in floaters. Wider discrepancies characterize the effects on interest rate differentials. The short- and long-term differentials widen only for a few months after the shock in floaters. Conversely, in dollar pegs the short-term differential increases persistently, while the long-term differential decreases somehow.

Nevertheless, a clearer picture emerges from the responses of quarterly variables in Panels B of Figures 9 and 10. On the one hand, real GDP and (un)employment contract by less in dollar pegs than in floaters, while the increase in the GDP deflator is more persistent. On the other hand, housing prices, domestic credit and portfolio and banking flows are much more affected in pegs, which experience sustained outflows driven by foreign and domestic investors, including foreign banks. A key result thus emerges: on average, a floating exchange rate seems successful in shielding the financial side of the economy from the adverse consequences of a US monetary policy tightening. Nevertheless, despite the different financial transmission, the macroeconomic consequences of the US monetary policy shock are remarkably similar across peggers and floaters.

To delve more into these results, we further split floaters between advanced and emerging economies — all advanced economies in our sample have a floating dollar exchange rate. Figure 11 A-B presents the responses of emerging floaters (all the countries in the second column in Table 3 excluding the six pegs in column 4). These responses are very similar to those of all emerging markets together in Figure 8 A-B. Hence, as already discussed above, they are quite different from those of advanced economies, depicted in Figure 7 A-B, despite the similar floating exchange rate regime. Comparing Figure 11 A-B with Figure 10 A-B, it is clear that there are even less differences between emerging markets floating their exchange rate against the dollar or mantaining a peg, apart from the obvious fact that nominal and real exchange rates depreciate by less in countries peg-

ging to the dollar; the trade surplus is also larger in emerging economies with a floating exchange rate. Industrial production and stock prices respond again similarly, while the main difference in the effect on the CPI is that the latter increases after a few months in emerging floaters. Wider discrepancies characterize the effects on interest rate differentials. The short- and long-term differentials widen only for a few months after the shock in emerging floaters.

A similar picture emerges from the responses of quarterly variables in Panel B of Figure 11. Real GDP and especially unemployment are more adversely affected in emerging floaters, whereas the increase in the GDP deflator is short-lived, rather than persistent as in dollar pegs. Housing prices, domestic credit and portfolio capital flows decline in a similar way across emerging floaters and pegs, with both groups experiencing sustained outflows driven by foreign investors. However, domestic outflows are never significant in floaters, while banking inflows are even persistently positive.

Overall, these results confirm and extend those in Rey (2013). In stark contrast with received wisdom, a floating exchange rate results only in limited decoupling of the average emerging economy from both the macroeconomic and financial repercussions of a US monetary policy shocks, relative to a peg.[8] Conversely, starker differences in the financial effects of these shocks seem to exist between emerging and advanced economies, regardless of the exchange rate regime. Because the latter generally enjoy also open capital accounts, it seems difficult to argue that capital controls per se could be beneficial in this respect. Yet, it could be the case that capital controls could be helpful in economies that are less developed financially. We now turn to an analysis of the role of financial openness.

Financial openness. To try and shed light on this issue, we split emerging countries in two more groups, depending on the degree of openness of their capital account to inflows (as measured by Fernández, Klein, Rebucci, Schindler and Uribe (2015) and Chinn and Ito (2006)). Emerging countries with more restricted inflows include Brazil, China and India, while those more open comprise the Baltic countries and the Czech Republic (see Table 3, fifth and sixth columns). Figures 12 A-B and 13 A-B present the impulse responses for relatively closed and relative open emerging economies, respectively. Because many

[8] Magud et al. (2011) argue that a flexible exchange rate regime is important for curbing the effects of capital inflows on domestic credit. this does not seem to be te case for US monetary policy shocks.

emerging economies in our sample have been relatively closed to capital inflows, the impulse responses of the former group are similar to those in Figure 8 A-B. A few notable findings emerge instead when comparing Figures 12 and 13, as US monetary policy shocks seem to have quite different effects across these two groups of countries, on average. First, from Figure 12A it is clear that, notwithstanding a short-lived nominal depreciation vis-á-vis the dollar, the real effective exchange rate appreciates instead of depreciating in more open countries. Second, the fall in stock prices is larger, while the trade surplus improves by less than in more closed economies. Third, after an initial increase the CPI stabilizes, while the short-term interest rate differential widens on impact. The responses of the long-term differential and of industrial production instead are instead similar across emerging economies.

Turning to panel B, more open emerging economies seem to display large responses in most variables, but confidence bands are also wide. The key differences seem to involve financial variables, especially portfolio capital flows, perhaps not too surprisingly. Real housing prices barely fall in more closed economies in a signficant way, while real credit initially raises. Capital controls seem to make a difference concerning outflows by domestic residents, as the latter increase persistently in more open countries, while barely reacting in the other economies. Foreign capital inflows display the opposite pattern: they retrench persistently in more closed economies, while quickly stabilizing in open ones. Therefore, it seems that capital controls do provide some limited degree of insulation for the financial side of the economy.

Expansionary vs contractionary monetary policy shocks. In this subsection we report results when we distinguish in regression (2) between shocks that entail a hike in US monetary policy rates, and shocks that entail a cut in US monetary policy rates. Specifically, we estimate a different set coefficients in the regression for positive and begative shocks. Interestingly, we found that that this split matters only for emerging economies. Therefore we report results in Figure 14 A-B for this group of countries for the case of contractionary (positive) shocks. Figure 14 shows that the average emerging country is a great deal less affected by a US monetary policy contraction than by an expansion — this can be gleaned by looking at Figure 8, where we did not distinguish between contractionary and expansionary shocks. Panel A shows that both nominal and

real exchange rates tend to depreciate a bit less persistently; consistently, interest rates also rise by less. Trade surpluses are also smaller and less persistent. Panel B shows that the effects on broad based macroeconomic variables also differ, with a less persistent decline in real GDP than in Figure 8. But the key differences emerge from the responses of financial variables: not only is the contraction in bank and portfolio inflows smaller and less persistent in the case of the a US tightening; housing prices and doemstic credit even slightly increase, instead of declining. Therefore, the effects of a US monetary policy shock are especially different between advanced and emerging economies in the case of a US easing, that brings about a financial boom in the latter, which in turn result in an amplification of the macroeconomic consequences of the shock.[9]

5 The geography of the effects of US monetary policy shocks

In this section, we look at the responses of some specific countries, which are especially relevant because of their characteristics.

(*To be completed: in the next version of the paper we will include more relevant country specific results.*)

6 Conclusions

In this paper we have looked at the external effects of US monetary policy shocks, including effects on both real and financial variables. It is important to include a large set of variables in order to understand whether US monetary policy shocks create trade-offs that policy makers abroad cannot easily undo. This would be the case, for example, if US monetary policy shocks were contractionary for output and inflation but expansionary for, say, credit and capital flows.

From a methodological aspect, we follow a two step approach. We first identify monetary policy shocks using an identification scheme that qualitatively replicates the impulses responses estimated by Gertler and Karadi (2014). We then regress a large number of real

[9] To be completed: in the next version of the paper we will further investigate whether similar asymmetric effects arise also when we consider country groupings based on the other characteristics above.

and financial variables on the estimated shocks and compute impulse responses. Overall, our main findings are two. First, we find that US monetary policy shocks tend to move real and financial variables (including house prices, credit and capital flows) in the same direction, thus creating no fundamental trade-off between real and financial stabilisation. In particular, a contractionary US monetary policy shock leads to a fall in economic activity, a rise in unemployment and a slowdown of credit, capital flows and house prices abroad. Second and related to the literature on the trilemma vs dilemma (Rey 2013), we find that the effects are stronger for emerging countries than for advanced countries, whereas the exchange rate regime and the capital account openness do not make a large difference.

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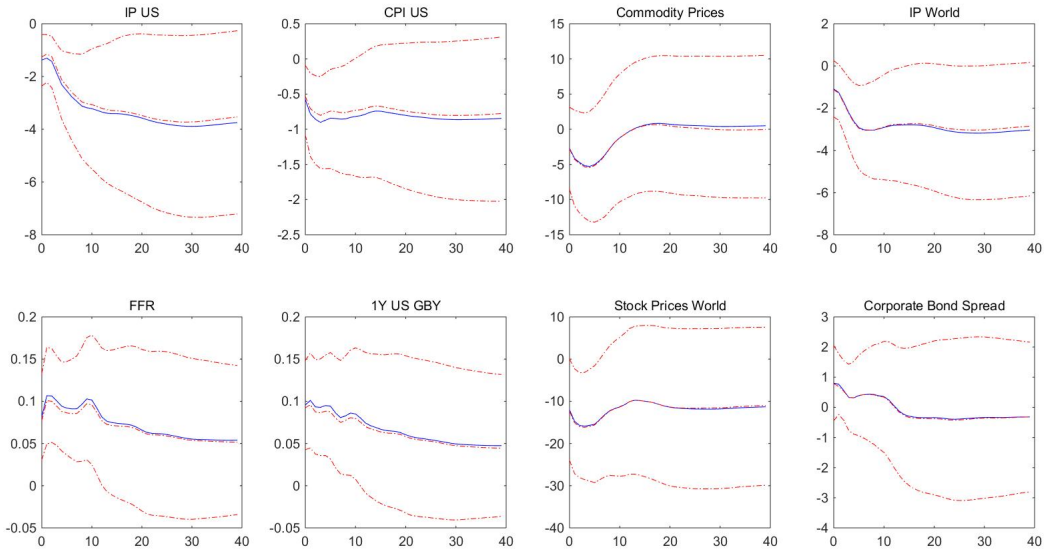
Appendix A. Figures

Figure 1: IRFs from Baseline BVAR Estimated over the Sample 1980 - 2013

(a)



(b)

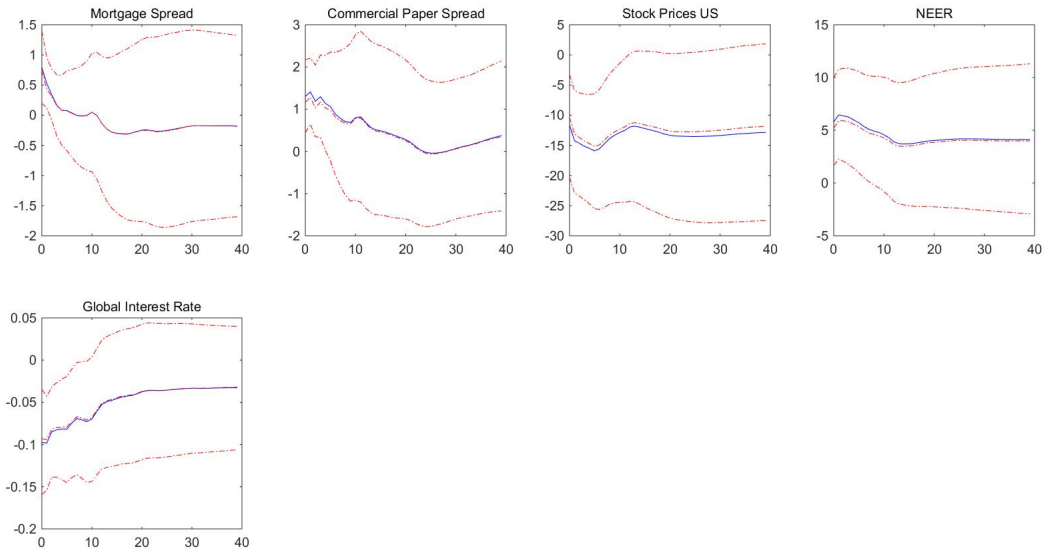
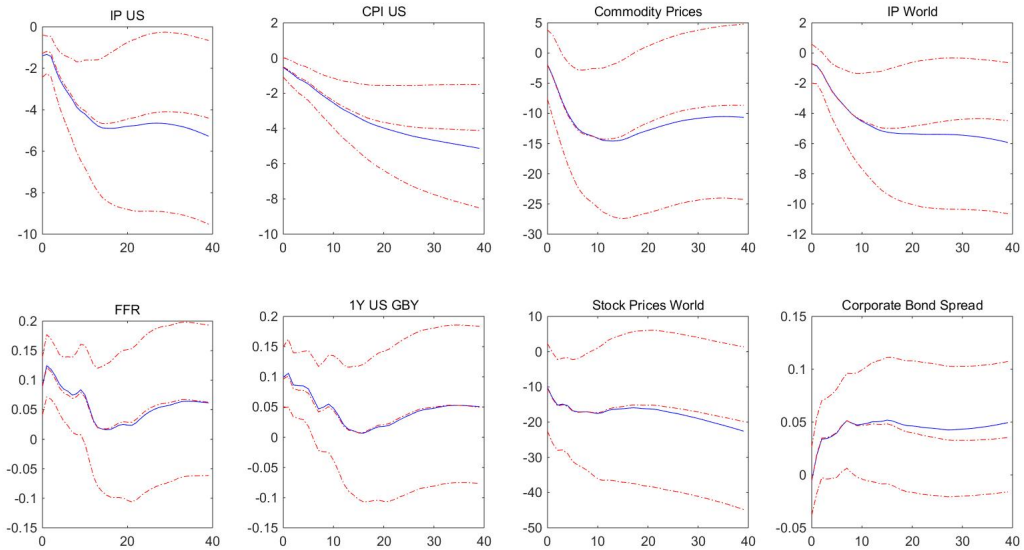


Figure 2: IRFs from Baseline BVAR Estimated over the Sample 1980 - 2008

(a)



(b)

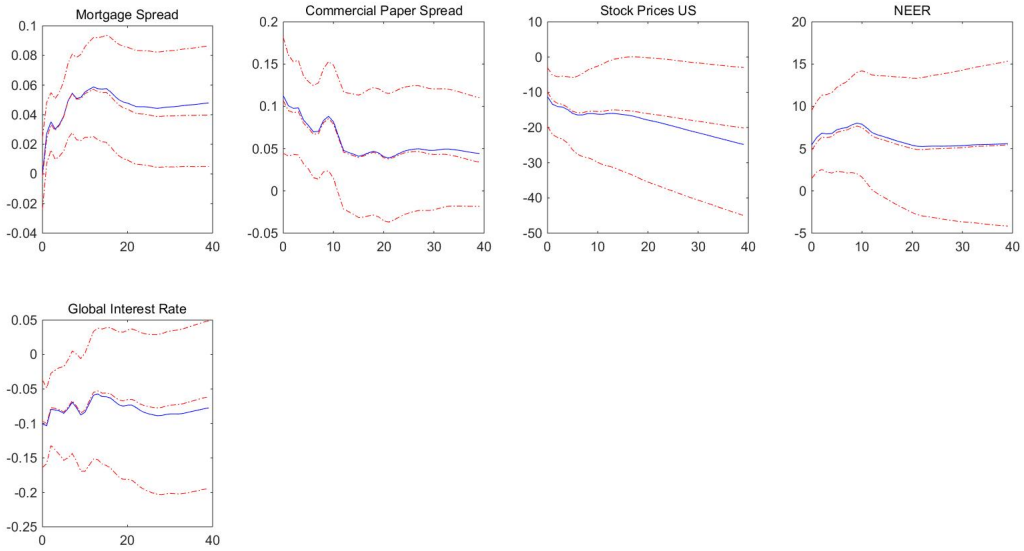
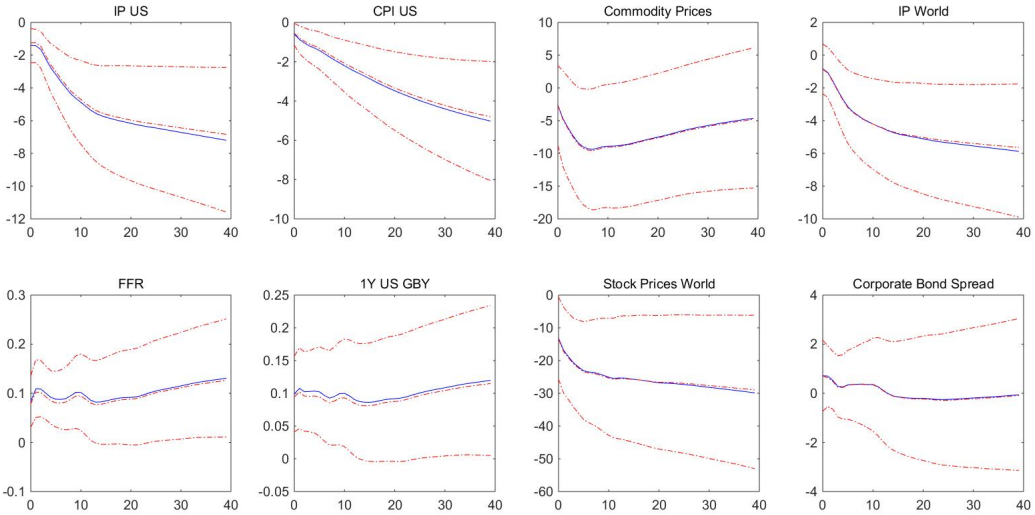


Figure 3: IRFs from BVAR without Global Interest Rate Differential

(a)



(b)

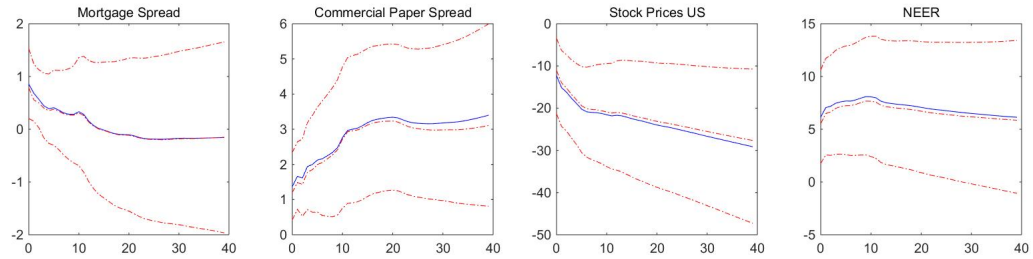
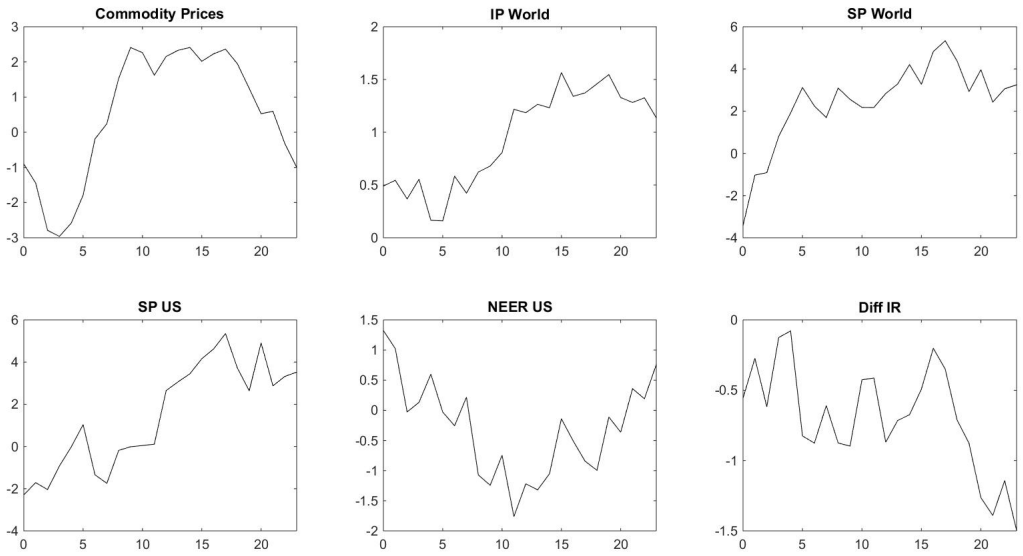


Figure 4: Response of Variables in our BVAR to Gertler and Karadi (2014)'s Monetary Policy Shocks

(a) Sample 1991 - 2012:06



(b) Sample 1991 - 2008

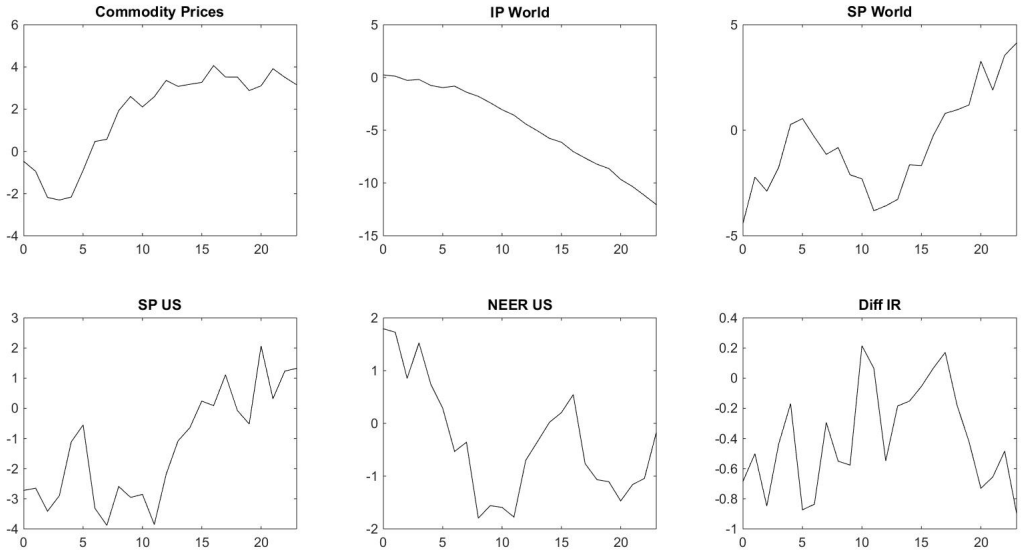
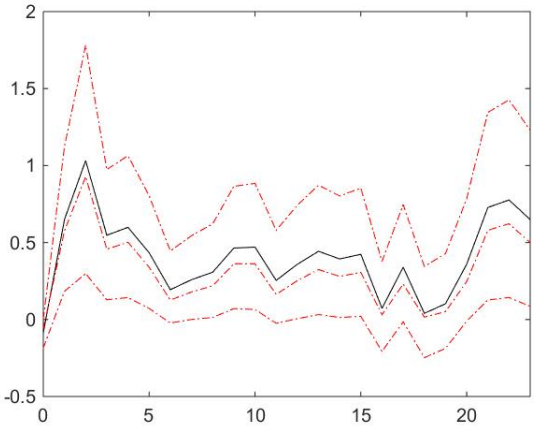


Figure 5: Vix Response to US Monetary Policy Shocks

(a) Sample 1990 - 2013



(b) Sample 1990 - 2008

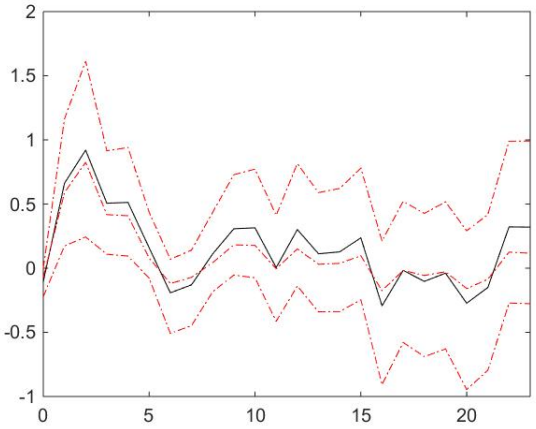
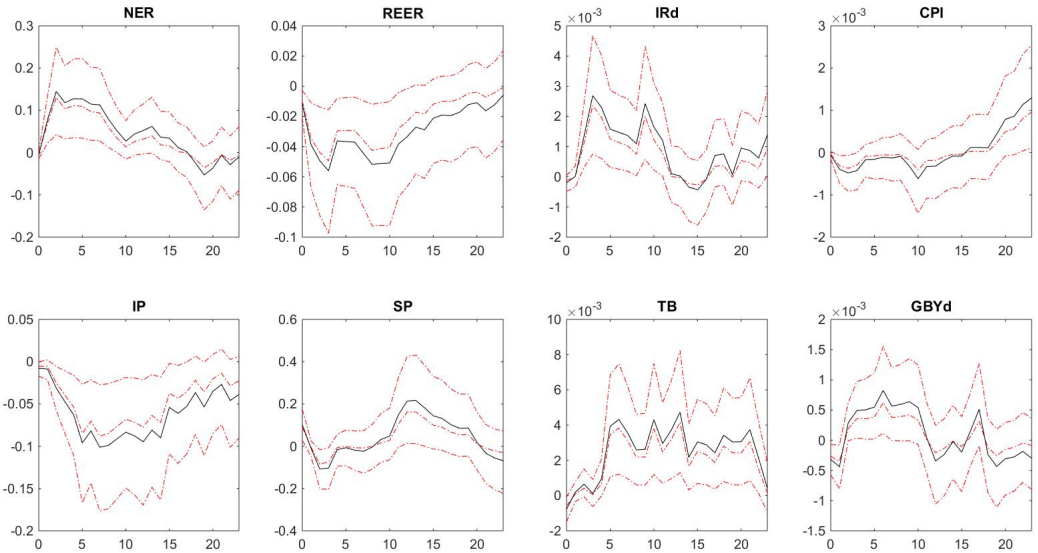


Figure 6: IRFs Aggregations: All Countries

(a) Monthly Variables



(b) Quarterly Variables

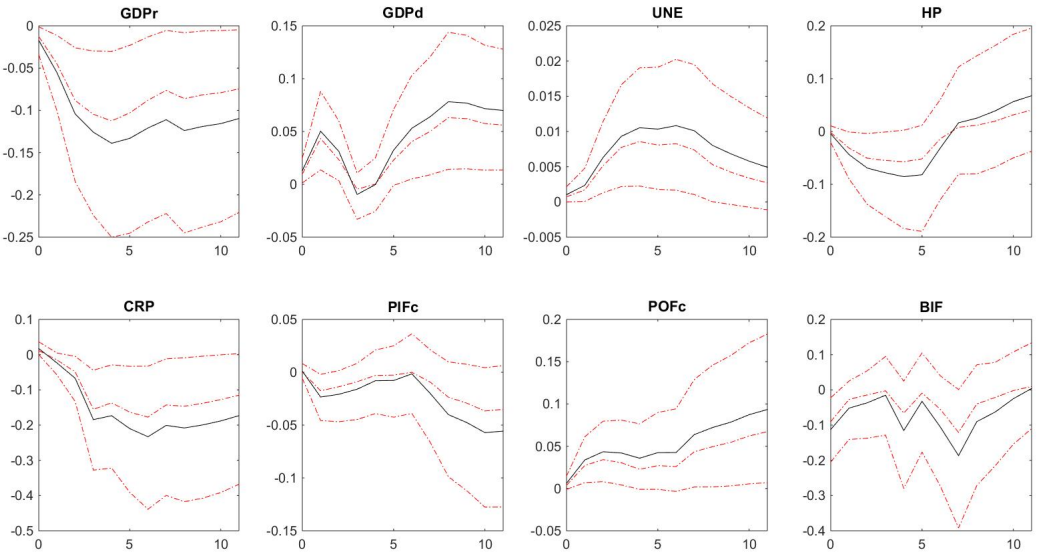
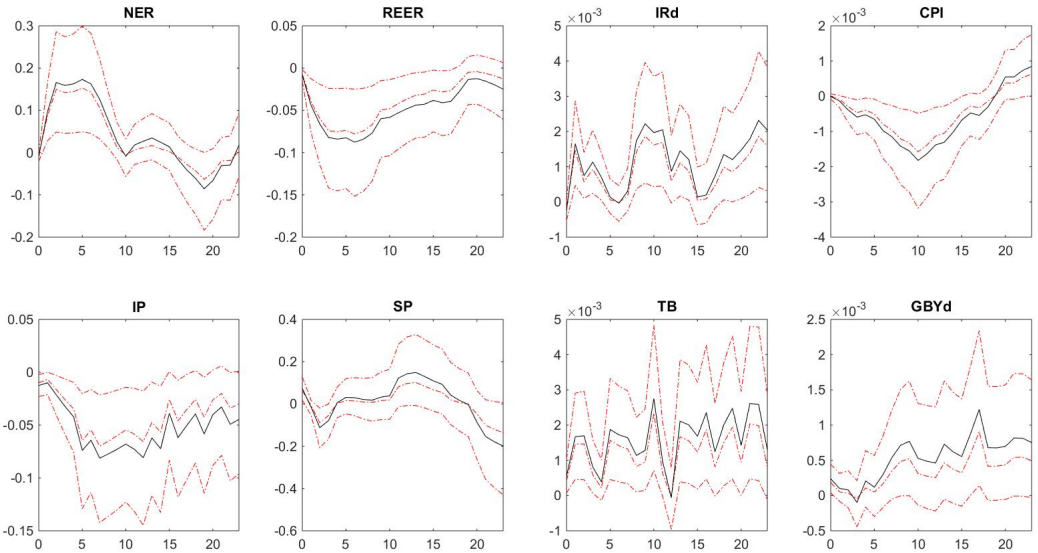


Figure 7: IRFs Aggregations: Advanced Economies

(a) Monthly Variables



(b) Quarterly Variables

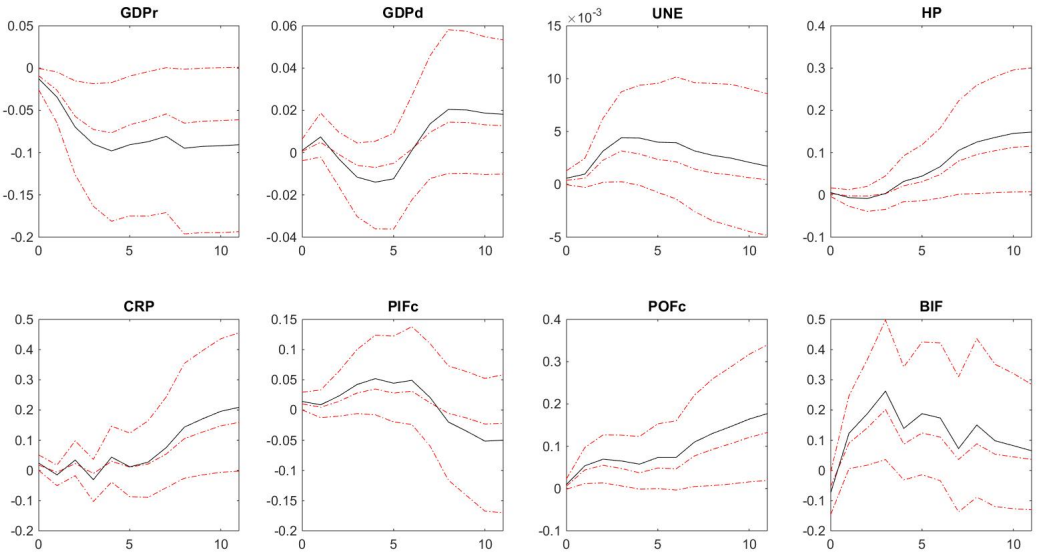
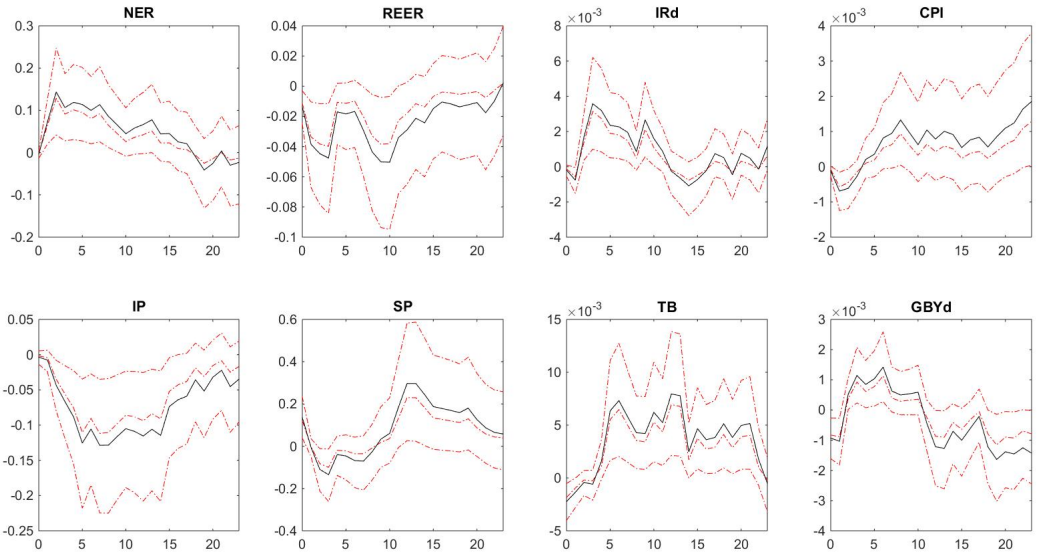


Figure 8: IRFs Aggregations: Emerging Economies

(a) Monthly Variables



(b) Quarterly Variables

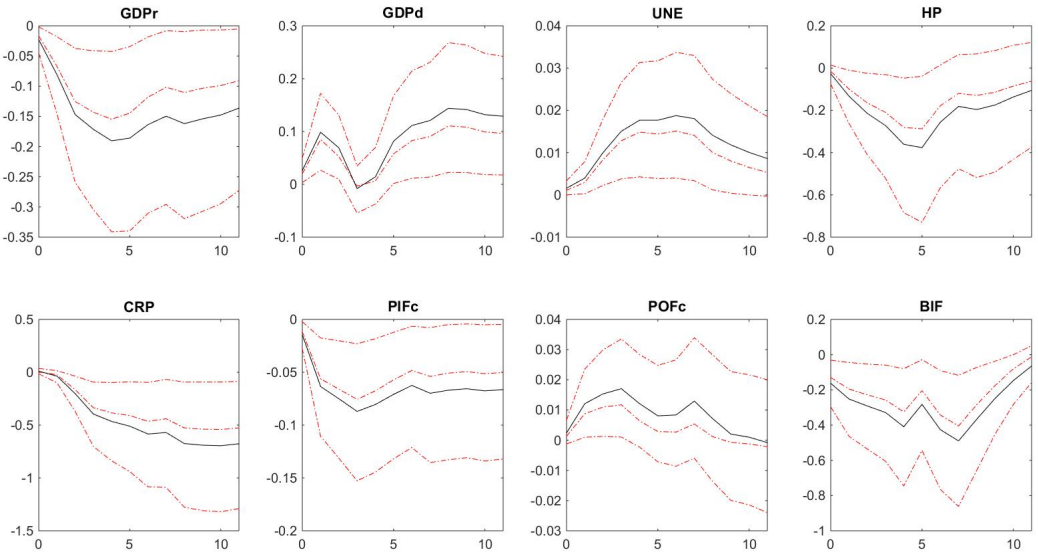
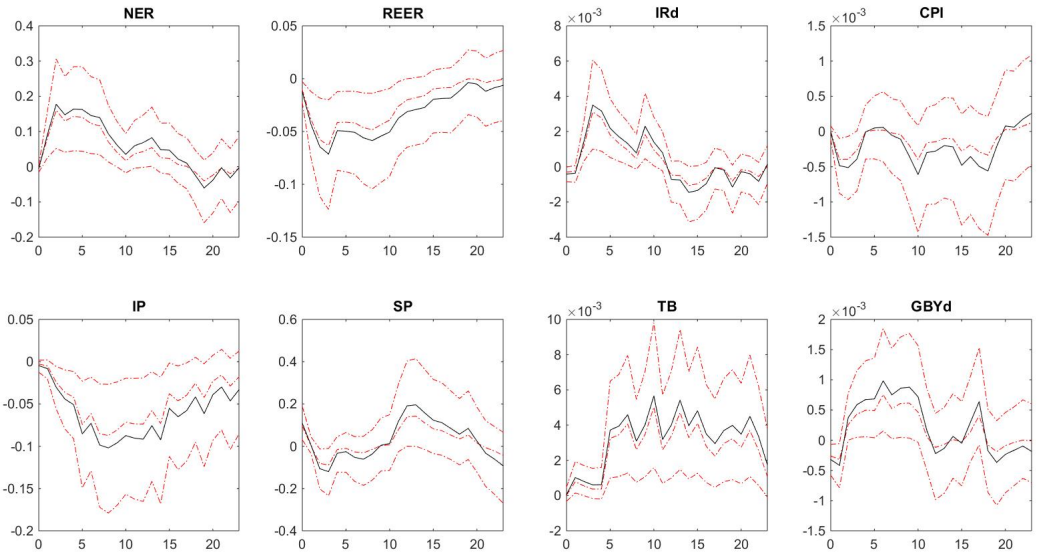


Figure 9: IRFs Aggregations: Countries with Floating Currency

(a) Monthly Variables



(b) Quarterly Variables

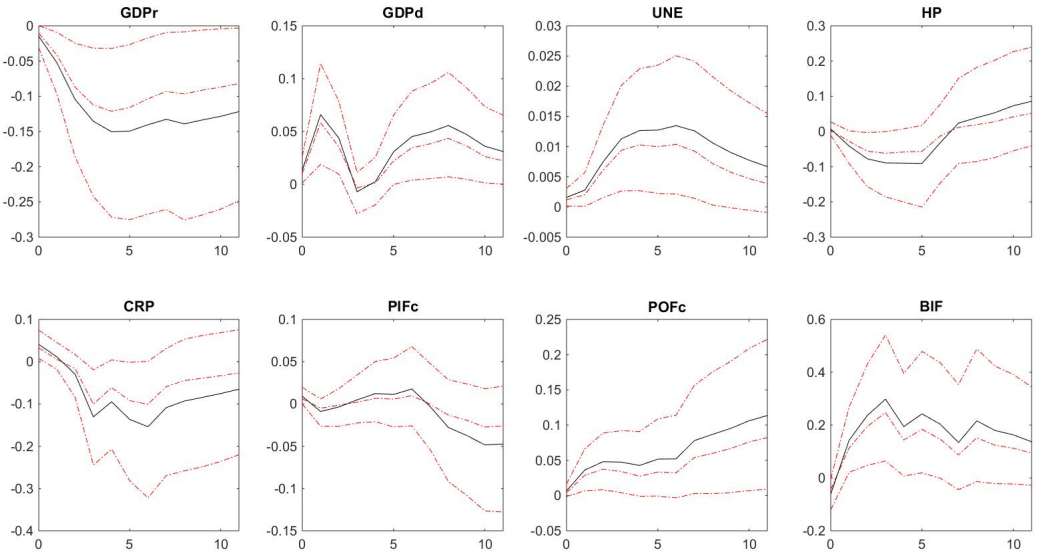
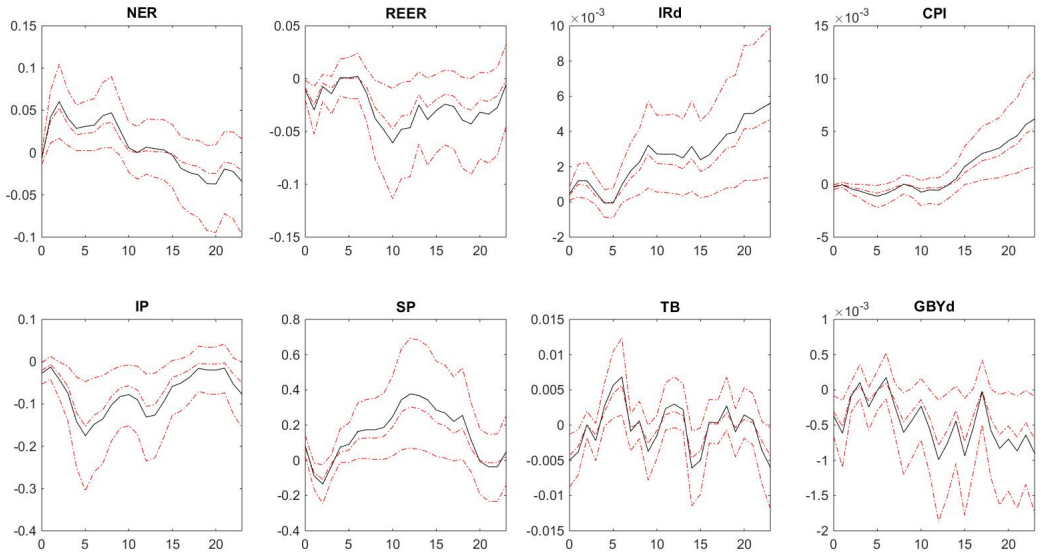


Figure 10: IRFs Aggregations: Countries with Pegged Currency

(a) Monthly Variables



(b) Quarterly Variables

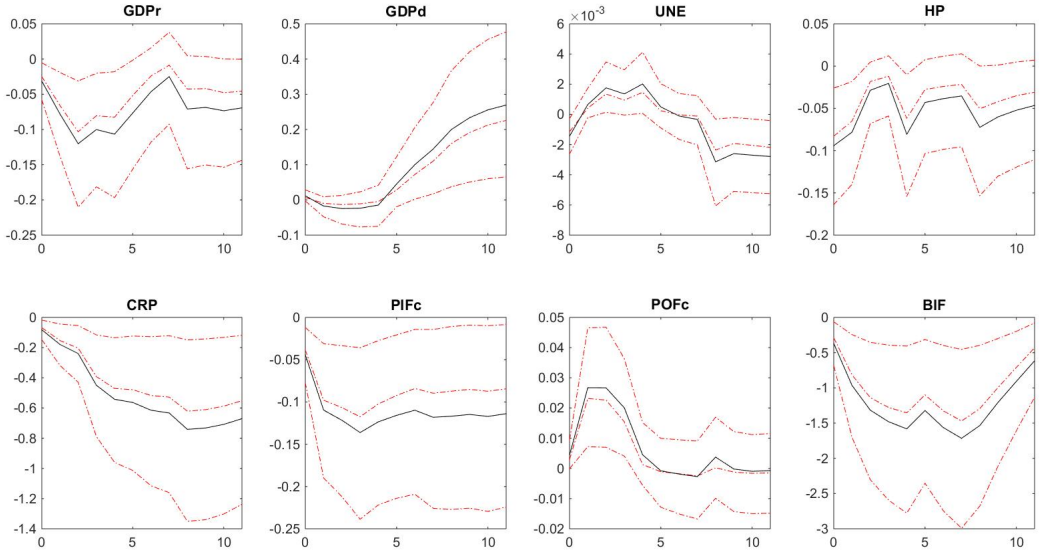
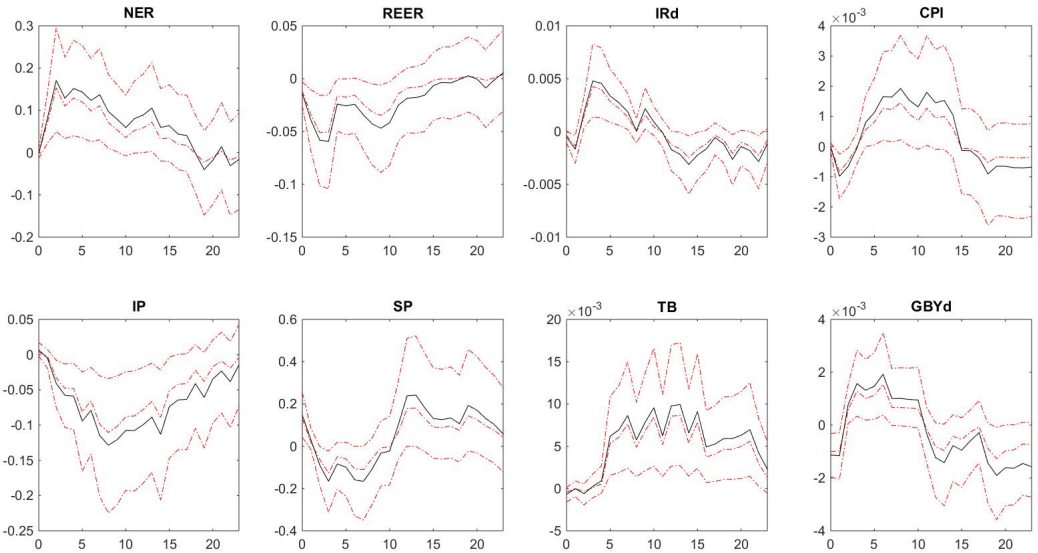


Figure 11: IRFs Aggregations: Emerging Economies with Floating Currency

(a) Monthly Variables



(b) Quarterly Variables

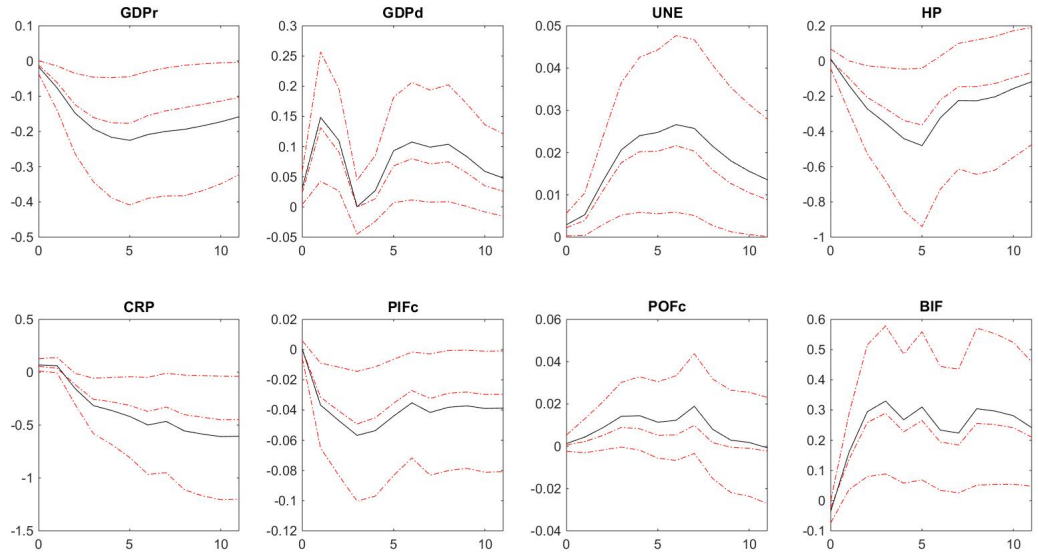
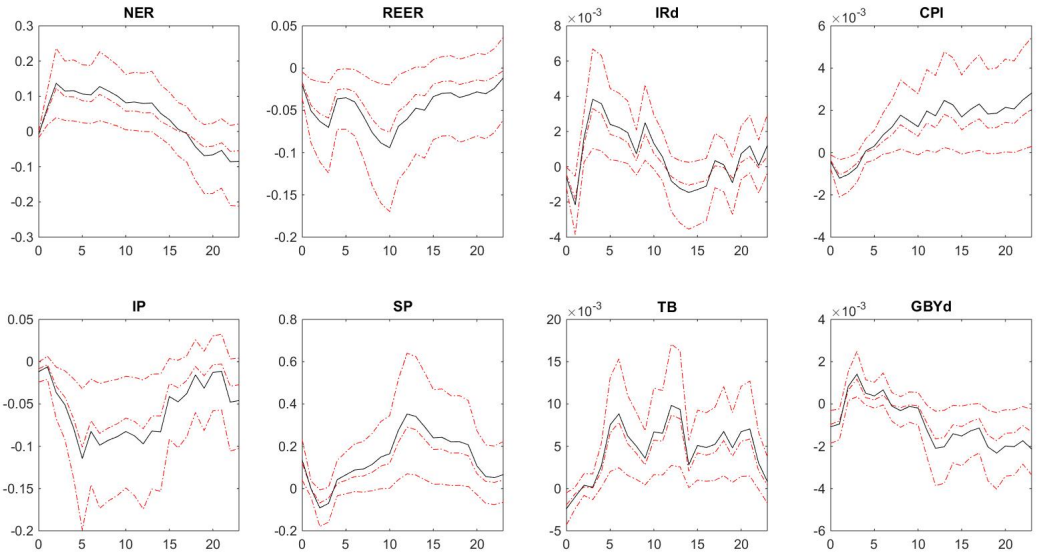


Figure 12: IRFs Aggregations: Emerging Economies with More Inflow Restrictions

(a) Monthly Variables



(b) Quarterly Variables

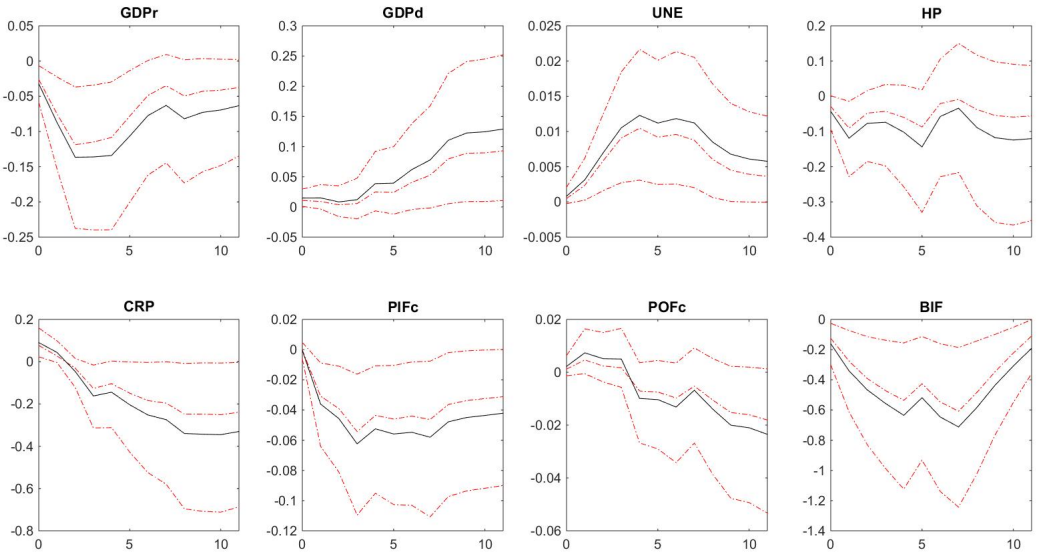
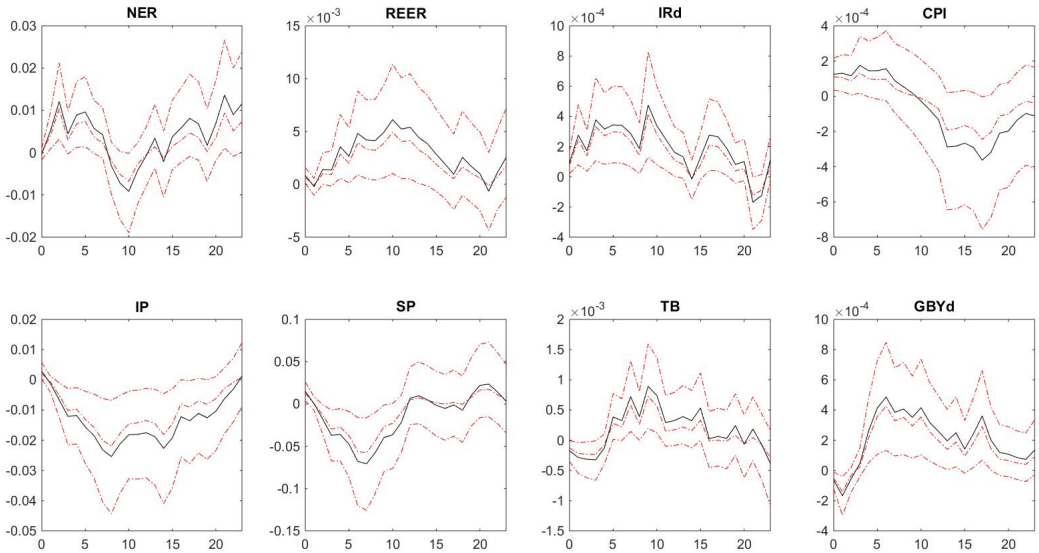


Figure 13: IRFs Aggregations: Relatively Open Emerging Economies

(a) Monthly Variables



(b) Quarterly Variables

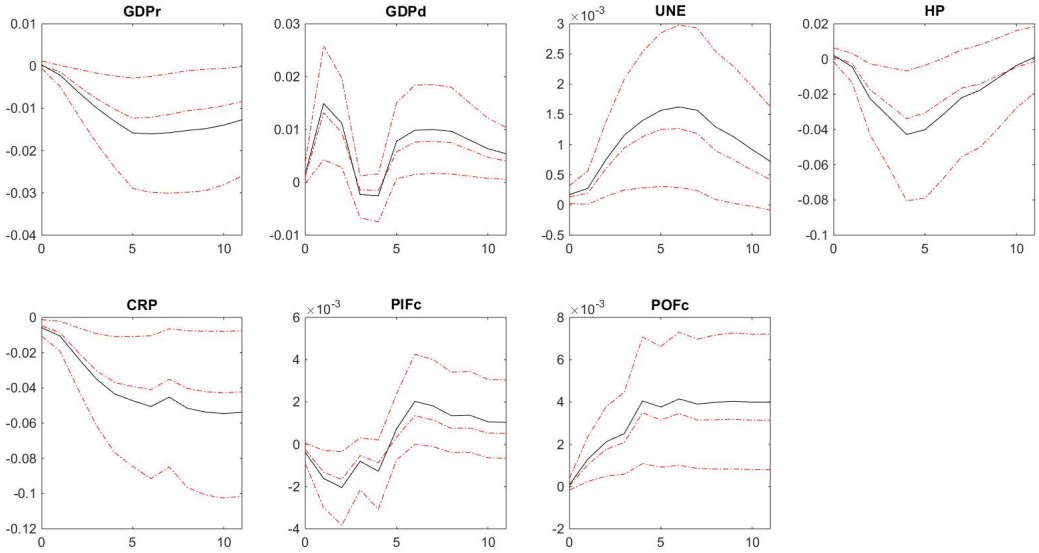
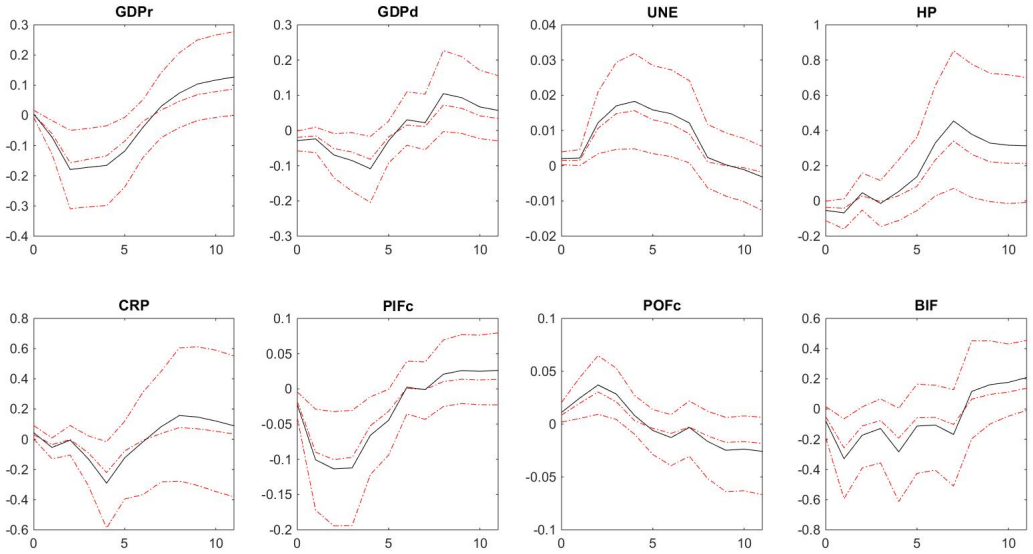


Figure 14: IRFs Aggregations (Contractionary Shock): Emerging Economies

(a) Monthly Variables

(b) Quarterly Variables



Appendix B. Tables

Table 1: Variables used in the BVAR Model

VARIABLE	**SOURCE**
Federal Funds Rate - US	IMF (IFS)
CPI - US	Haver Analytics
Industrial Production - US	Haver Analytics
Stock Price Index - US (S&P500)	Haver Analytics
Nominal Eff. Exchange Rate - US	Haver Analytics
Corporate Bond Spread - US	Gertler, Karadi (2014)
Mortgage Spread - US	Gertler, Karadi (2014)
Commercial Paper Spread - US	Gertler, Karadi (2014)
1-year Gov.t Bond Yield - US	Haver Analytics
Commodity Prices (TR/J CRB Index)	Haver Analytics
Industrial Production - OECD countries	OECD (MEI)
Stock Price Index - Developed World	Datastream
Short-Term Rate - US (3-month T-bill rate)	IMF (IFS)
Short-Term Rate - Canada (T-bill rate)	IMF (IFS)
Short-Term Rate - Euro Area (3-month Euribor)	ECB and GFD
Short-Term Rate - Japan (Call money rate)	IMF (IFS)
Short-Term Rate - UK (3-month T-bill rate)	IMF (IFS)

Table 2: Short-Term Rate Definition

COUNTRY	**SHORT-TERM RATE**
Australia	Money Market Rate
Brazil	Money Market Rate
Canada	T-bill Rate
Chile	Lending Rate
China	Call Money Rate
Colombia	Discount Rate
Czech Republic	Money Market Rate
Denmark	Call Money Rate
Estonia	Deposit Rate
Euro Area	Euribor (3 months)
Hungary	Deposit Rate
India	Call Money Rate
Japan	Call Money Rate
Korea	Money Market Rate
Latvia	Money Market Rate
Lithunia	Money Market Rate
Malaysia	Money Market Rate
Mexico	Average Cost of Funds
Norway	Interbank Rate (3 months)
Philippines	Lending Rate
Poland	Money Market Rate
Russia	Money Market Rate
South Africa	Money Market Rate
Sweden	Call Money Rate
Thailand	Money Market Rate
Turkey	Deposit Rate
UK	T-bill Rate (3 months)

Table 3: Countries Classification

FLOATERS	**PEGGERS**	**ADVANCED**	**EMERGING**	**OPEN**	**LESS OPEN**
Australia	China	Australia	Brazil	Australia	Brazil
Austria	India	Austria	Chile	Austria	Chile
Belgium	Malaysia	Belgium	China	Belgium	China
Brazil	Mexico	Canada	Colombia	Canada	Colombia
Canada	Philippines	Denmark	Czech Republic	Czech Republic	Greece
Chile	Thailand	Finland	Estonia	Denmark	Hungary
Colombia		France	Hungary	Estonia	India
Czech Republic		Germany	India	Finland	Korea
Denmark		Greece	Latvia	France	Malaysia
Estonia		Italy	Lithuania	Germany	Mexico
Finland		Japan	Malaysia	Italy	Norway
France		Korea	Mexico	Japan	Philippines
Germany		Netherlands	Philippines	Latvia	Poland
Greece		Norway	Poland	Lithuania	Portugal
Hungary		Portugal	Russia	Netherlands	Russia
Italy		Spain	South Africa	Spain	South Africa
Japan		Sweden	Thailand	Sweden	Thailand
Korea		UK	Turkey	UK	Turkey
Latvia					
Lithuania					
Netherlands					
Norway					
Poland					
Portugal					
Russia					
South Africa					
Spain					
Sweden					
Turkey					
UK					

Table 4: Countries used in Aggregations of IRFs - Monthly

NOMINAL EXCH. RATE	REAL EFF. EXCH. RATE	INT. RATE DIFFERENTIAL	CPI	IND.PRODUCTION	REAL STOCK PRICES	TRADE BALANCE ADJ	10Y GOVT BOND YIELDS
Australia	Australia	Australia	Austria	Austria	Austria	Australia	Australia
Brazil	Austria	Canada	Belgium	Belgium	Belgium	Austria	Austria
Canada	Belgium	Chile	Canada	Brazil	Brazil	Belgium	Belgium
Chile	Brazil	China	Chile	Canada	Canada	Brazil	Brazil
China	Canada	Colombia	China	Chile	Chile	Canada	Canada
Colombia	Chile	Czech Republic	Colombia	China	Colombia	Chile	Chile
Czech Republic	China	Denmark	Czech Republic	Colombia	Czech Republic	China	China
Denmark	Colombia	Estonia	Denmark	Czech Republic	Denmark	Colombia	Colombia
Estonia	Czech Republic	Euro Area	Estonia	Denmark	Estonia	Czech Republic	Czech Republic
Euro Area	Denmark	Hungary	Finland	Estonia	Finland	Denmark	Denmark
Hungary	Estonia	India	France	Finland	France	Estonia	Estonia
India	Euro Area	Japan	Germany	France	Greece	Finland	Finland
Japan	Finland	Korea	Greece	Germany	Hungary	France	France
Korea	France	Latvia	Hungary	Greece	India	Germany	Germany
Latvia	Germany	Lithuania	India	Hungary	Italy	Greece	Greece
Lithuania	Greece	Malaysia	Italy	India	Japan	Hungary	Hungary
Malaysia	Hungary	Mexico	Japan	Italy	Korea	India	India
Mexico	India	Norway	Korea	Japan	Latvia	Italy	Italy
Norway	Italy	Philippines	Latvia	Korea	Lithuania	Japan	Japan
Philippines	Japan	Poland	Lithuania	Latvia	Malaysia	Korea	Korea
Poland	Korea	Russia	Malaysia	Lithuania	Mexico	Latvia	Latvia
Russia	Latvia	South Africa	Mexico	Mexico	Netherlands	Lithuania	Lithuania
South Africa	Lithuania	Sweden	Netherlands	Netherlands	Norway	Malaysia	Malaysia
Sweden	Malaysia	Thailand	Norway	Norway	Philippines	Mexico	Mexico
Thailand	Mexico	Turkey	Philippines	Philippines	Poland	Netherlands	Netherlands
Turkey	Netherlands	UK	Poland	Poland	Portugal	Norway	Norway
UK	Norway		Portugal	Portugal	Russia	Philippines	Philippines
	Philippines		Russia	Russia	South Africa	Poland	Poland
	Poland		South Africa	South Africa	Spain	Portugal	Portugal
	Portugal		Spain	Spain	Sweden	Russia	Russia
	Russia		Sweden	Sweden	Thailand	South Africa	South Africa
	South Africa		Thailand	Thailand	Turkey	Spain	Spain
	Spain		Turkey	Turkey	UK	Sweden	Sweden
	Sweden		UK	UK		Thailand	Thailand
	Thailand					Turkey	Turkey
	Turkey					UK	UK
	UK						

Table 5: Countries used in Aggregations of IRFs - Quarterly

REAL GDP	GDP DEFLATOR	NOMINAL GDP IN $	UNEMPLOYMENT	HOUSE PRICES	CREDIT TO PVT. SECTOR	PORTFOLIO INFLOWS	PORTFOLIO OUTFLOWS	BANK INFLOWS
Australia	Australia	Australia	Australia	Australia	Australia	Australia	Australia	Australia
Austria	Austria	Austria	Austria	Austria	Austria	Austria	Austria	Austria
Belgium	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium
Brazil	Brazil	Brazil	Brazil	Canada	Brazil	Brazil	Brazil	Brazil
Canada	Canada	Canada	Canada	Czech Republic	Canada	Canada	Canada	Canada
Chile	Chile	Chile	Chile	Denmark	Chile	Chile	Chile	Chile
China	China	China	China	Estonia*+	China	Colombia	Colombia	China
Colombia	Colombia	Colombia	Colombia	Finland	Czech Republic	Czech Republic	Czech Republic	Colombia
Czech Republic	Czech Republic	Czech Republic	Czech Republic+	France	Denmark	Denmark	Denmark	Czech Republic
Denmark	Denmark	Denmark	Denmark	Germany	Estonia	Finland	Finland	Denmark
Estonia	Estonia	Estonia	Estonia	Greece	Finland	France	France	Finland
Finland	Finland	Finland	Finland	Hungary	France	Germany	Germany	France
France	France	France	France	Italy	Germany	Greece	Greece	Germany
Germany	Germany	Germany	Germany	Japan	Greece	Hungary	Hungary	Greece
Greece	Greece	Greece	Greece	Korea	India	India	India+	Hungary
Hungary	Hungary	Hungary	Hungary	Malaysia	Italy	Italy	Italy	India
India	India	India	India	Mexico+	Japan	Japan	Japan	Italy
Italy	Italy	Italy	Italy	Netherlands	Korea	Korea	Korea	Japan
Japan	Japan	Japan	Japan	Norway	Latvia	Latvia	Latvia	Korea
Korea	Korea	Korea	Korea	Philippines	Lithuania	Lithuania	Lithuania	Latvia
Latvia	Latvia	Latvia	Latvia	Poland	Malaysia	Malaysia	Malaysia	Lithuania
Lithuania	Lithuania	Lithuania	Lithuania	Portugal	Mexico	Mexico	Mexico	Malaysia
Malaysia	Malaysia	Malaysia	Malaysia	Russia	Netherlands	Netherlands	Netherlands	Mexico
Mexico	Mexico	Mexico	Mexico	South Africa	Norway	Norway	Norway	Netherlands
Netherlands	Netherlands	Netherlands	Netherlands	Spain	Philippines	Philippines	Philippines	Norway
Norway	Norway	Norway	Norway	Sweden	Portugal	Poland	Poland	Philippines
Philippines	Philippines	Philippines	Philippines	Thailand	Russia	Portugal	Portugal	Poland
Poland	Poland	Poland	Poland	UK	South Africa	Russia	Russia	Portugal
Portugal	Portugal	Portugal	Portugal	Thailand	Spain	South Africa	South Africa	Russia
Russia	Russia	Russia	Russia	UK	Sweden	Spain	Spain	South Africa
South Africa	South Africa	South Africa	South Africa		Thailand	Sweden	Sweden	Spain
Spain	Spain	Spain	Spain		Turkey	Thailand	Thailand	Sweden
Sweden	Sweden	Sweden	Sweden		UK	Turkey+	Turkey+	Thailand
Thailand	Thailand	Thailand	Thailand			UK	UK	Turkey+
Turkey	Turkey	Turkey	Turkey+					UK
UK	UK	UK	UK					

+ These countries has been dropped from aggregations of only positive or only negative shocks.

* Estonia is considered only in aggregations of impulse response functions coming from regressions up to 2013.

Table 6: Data Samples - Monthly

COUNTRIES	NOMINAL EXCH. RATE	REAL EFF. EXCH. RATE	INT. RATE DIFFERENTIAL	CPI	IND.PRODUCTION	REAL STOCK PRICES	TRADE BALANCE ADJ	10Y GOVT BOND YIELDS
Australia	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	-	-	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Austria	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Belgium	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2014	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Brazil	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2015	Feb 1981 - Dec 2015	Feb 1981 - Dec 2013	Feb 1991 - Dec 2013	Feb 1981 - Dec 2013	Dec 1999 - Dec 2013
Canada	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2016	Feb 1981 - Dec 2016	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Chile	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Mar 1990 - Dec 2017	Feb 1981 - Dec 2017	Feb 1981 - Dec 2013	Jan 1990 - Dec 2013	Jan 1996 - Dec 2013	Apr 2007 - Dec 2013
China	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2018	Jan 1993 - Dec 2018	Jan 1997 - Dec 2013	Dec 1990 - Dec 2013	Oct 1983 - Dec 2013	Jun 1992 - Dec 2013
Colombia	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2019	Feb 1981 - Dec 2019	Jan 1990 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Oct 2002 - Dec 2013
Czech Republic	Jan 1993 - Dec 2013	Jan 1990 - Dec 2013	Jan 1993 - Dec 2020	Jan 1993 - Dec 2020	Jan 1990 - Dec 2013	Jan 1994 - Dec 2013	Jan 1991 - Dec 2013	Apr 2000 - Dec 2013
Denmark	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Jan 1987 - Dec 2021	Feb 1981 - Dec 2021	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Estonia	Jan 1994 - Dec 2013	Jan 1994 - Dec 2013	Feb 1993 - Dec 2022	Jan 1992 - Dec 2022	Jan 1998 - Dec 2013	Jun 1996 - Dec 2013	Jan 1993 - Dec 2013	Apr 1997 - Dec 2013
Euro Area	Jan 1999 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Jan 1990 - Dec 2023	Jan 1991 - Dec 2013	Dec 1986 - Dec 2013	Jan 1990 - Dec 2013	Feb 1981 - Dec 2013
Finland	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2024	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
France	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2025	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Germany	-	Feb 1981 - Dec 2013	-	Jan 1991 - Dec 2026	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Greece	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2027	Feb 1981 - Dec 2013	Jan 1985 - Dec 2013	Feb 1981 - Dec 2013	Sep 1992 - Dec 2013
Hungary	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2028	Feb 1981 - Dec 2028	Jan 1985 - Dec 2013	Jan 1992 - Dec 2013	Feb 1981 - Dec 2013	Jun 1999 - Dec 2013
India	Feb 1981 - Dec 2013	Jan 1994 - Dec 2013	Feb 1981 - Dec 2029	Feb 1981 - Dec 2029	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Italy	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2030	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Japan	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2031	Feb 1981 - Dec 2031	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Korea	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2032	Feb 1981 - Dec 2032	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Oct 2000 - Dec 2013
Latvia	Feb 1992 - Dec 2013	Jan 1994 - Dec 2013	Aug 1993 - Dec 2033	Jan 1992 - Dec 2033	Jan 2000 - Dec 2013	Apr 1996 - Dec 2013	Jan 1995 - Dec 2013	Dec 1998 - Dec 2013
Lithuania	Jan 1992 - Dec 2013	Jan 1994 - Dec 2013	Dec 1993 - Dec 2034	May 1992 - Dec 2034	Dec 1995 - Dec 2013	Jan 2001 - Dec 2013	Jan 1994 - Dec 2013	Jan 1997 - Dec 2013
Malaysia	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2035	Feb 1981 - Dec 2035	-	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Mexico	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2036	Feb 1981 - Dec 2036	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Jul 2001 - Dec 2013
Netherlands	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2037	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Norway	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2038	Feb 1981 - Dec 2038	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Philippines	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2039	Feb 1981 - Dec 2039	Jan 1998 - Dec 2013	Jan 1987 - Dec 2013	Feb 1981 - Dec 2013	Feb 2001 - Dec 2013
Poland	Feb 1981 - Dec 2013	Jan 1988 - Dec 2013	Dec 1990 - Dec 2040	Jan 1988 - Dec 2040	Jan 1985 - Dec 2013	May 1991 - Dec 2013	Aug 1989 - Dec 2013	May 1999 - Dec 2013
Portugal	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2041	Feb 1981 - Dec 2013	Jan 1988 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Russia	Jun 1992 - Dec 2013	Nov 1993 - Dec 2013	Jan 1996 - Dec 2042	Jan 1992 - Dec 2042	Jan 1993 - Dec 2013	Sep 1997 - Dec 2013	Jun 1992 - Dec 2013	Dec 1996 - Dec 2013
South Africa	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2043	Feb 1981 - Dec 2043	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Spain	-	Feb 1981 - Dec 2013	-	Feb 1981 - Dec 2044	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Sweden	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2045	Feb 1981 - Dec 2045	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Thailand	Feb 1981 - Dec 2013	Jan 1994 - Dec 2013	Feb 1981 - Dec 2046	Feb 1981 - Dec 2046	Jan 2000 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013
Turkey	Feb 1981 - Dec 2013	Jan 1994 - Dec 2013	Feb 1981 - Dec 2047	Feb 1981 - Dec 2047	Feb 1981 - Dec 2013	Jan 1986 - Dec 2013	May 1990 - Dec 2013	Dec 2005 - Dec 2013
UK	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2048	Feb 1981 - Dec 2048	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013	Feb 1981 - Dec 2013

Table 7: Data Samples - Quarterly

COUNTRIES	REAL GDP	GDP DEFLATOR	UNEMPLOYMENT	HOUSE PRICES	CREDIT TO PVT SECTOR	PORTFOLIO INFLOWS / GDP$	PORTFOLIO OUTFLOWS / GDP$	BANK INFLOWS / GDP$
Australia	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Austria	Q1 1988 - Q4 2013	Q1 1988 - Q4 2013	Q1 1994 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1988 - Q4 2013	Q1 1988 - Q4 2013	Q4 1999 - Q4 2013
Belgium	Q2 1981 - Q4 2013	Q1 1995 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q2 1988 - Q4 2013	Q1 2002 - Q4 2013	Q1 2002 - Q4 2013	Q4 1999 - Q4 2013
Brazil	Q1 1990 - Q4 2013	Q1 1994 - Q4 2013	Q4 2001 - Q4 2013	-	Q4 1989 - Q4 2013	Q3 1994 - Q4 2013	Q4 1994 - Q4 2013	Q4 1999 - Q4 2013
Canada	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Chile	Q1 1992 - Q4 2013	Q1 1996 - Q4 2013	Q1 1986 - Q4 2013	-	Q2 1981 - Q4 2013	Q1 1991 - Q4 2013	Q2 1993 - Q4 2013	Q4 1999 - Q4 2013
China	Q1 1992 - Q4 2013	Q1 1992 - Q4 2013	Q1 2000 - Q4 2013	-	Q1 1991 - Q4 2013	-	-	Q4 1999 - Q4 2013
Colombia	Q1 1995 - Q4 2013	Q1 2000 - Q4 2013	Q1 2001 - Q4 2013	-	-	Q1 1996 - Q4 2013	Q1 1996 - Q4 2013	Q4 1999 - Q4 2013
Czech Republic	Q1 1995 - Q4 2013	Q1 1996 - Q4 2013	Q1 2005 - Q4 2013	Q1 1993 - Q4 2013	Q1 1991 - Q4 2013	Q1 1995 - Q4 2013	Q3 1996- Q4 2013	Q4 1999 - Q4 2013
Denmark	Q2 1981 - Q4 2013	Q1 1991 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1990 - Q4 2013	Q1 1990 - Q4 2013	Q4 1999 - Q4 2013
Estonia	Q1 1993 - Q4 2013	Q1 1993 - Q4 2013	Q1 1989 - Q4 2013	Q1 2005 - Q4 2013	Q1 1992 - Q4 2013	-	-	-
Euro Area	Q1 1995 - Q4 2013	Q1 1995 - Q4 2013	Q2 1998 - Q4 2013	Q1 1990 - Q4 2013	Q2 1981 - Q4 2013	Q1 1998 - Q4 2013	Q1 1998 - Q4 2013	-
Finland	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1988 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
France	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Germany	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1991 - Q4 2013	Q2 1981 - Q4 2013	Q1 1991 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Greece	Q1 2000 - Q4 2013	Q2 1981 - Q4 2013	Q2 1998 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 2000 - Q4 2013	Q1 2000 - Q4 2013	Q4 1999 - Q4 2013
Hungary	Q1 1995 - Q4 2013	Q1 1995 - Q4 2013	Q1 2001 - Q4 2013	Q1 1991 - Q4 2013	-	Q1 1995 - Q4 2013	Q2 1995 - Q4 2013	Q4 1999 - Q4 2013
India	Q2 1996 - Q4 2013	Q2 1996 - Q4 2013	Q2 1981 - Q4 2013	-	Q2 1981 - Q4 2013	Q2 1996 - Q4 2013	Q2 2006 - Q4 2013	Q4 1999 - Q4 2013
Italy	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Japan	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Korea	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q3 1982 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1988 - Q4 2013	Q4 1999 - Q4 2013
Latvia	Q1 1990 - Q4 2013	Q1 1990 - Q4 2013	Q1 1993 - Q4 2013	Q1 2006 - Q4 2013	Q3 1993 - Q4 2013	Q1 1996 - Q4 2013	Q1 1995 - Q4 2013	Q4 1999 - Q4 2013
Lithuania	Q3 1993 - Q4 2013	Q1 1995 - Q4 2013	Q1 1993 - Q4 2013	Q1 2006 - Q4 2013	Q1 1993 - Q4 2013	Q1 1995 - Q4 2013	Q1 1995 - Q4 2013	Q4 1999 - Q4 2013
Malaysia	Q1 1989 - Q4 2013	Q1 1991 - Q4 2013	Q1 1998 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1999 - Q4 2013	Q1 1999 - Q4 2013	Q4 1999 - Q4 2013
Mexico	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 2000 - Q4 2013	Q1 2005 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Netherlands	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Norway	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1989 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013
Philippines	Q4 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1984 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1987 - Q4 2013	Q2 1991 - Q4 2013	Q4 1999 - Q4 2013
Poland	Q2 1995 - Q4 2013	Q1 1995 - Q4 2013	Q1 1990 - Q4 2013	Q1 1989 - Q4 2013	-	Q1 2000 - Q4 2013	Q1 2000 - Q4 2013	Q4 1999 - Q4 2013
Portugal	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1986 - Q4 2013	Q1 1992 - Q4 2013	Q4 1999 - Q4 2013
Russia	Q1 1995 - Q4 2013	Q1 1995 - Q4 2013	Q1 1994 - Q4 2013	Q1 2000 - Q4 2013	Q4 1993 - Q4 2013	Q3 1995 - Q4 2013	Q3 1995 - Q4 2013	Q4 1999 - Q4 2013
South Africa	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 2000 - Q4 2013	Q2 1981 - Q4 2013	Q1 1992 - Q4 2013	Q1 1985 - Q4 2013	Q1 1986 - Q4 2013	Q4 1999 - Q4 2013
Spain	Q2 1981 - Q4 2013	Q1 1995 - Q4 2013	Q2 1986 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1981 - Q4 2013	Q4 1999 - Q4 2013
Sweden	Q2 1981 - Q4 2013	Q1 1993 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1993 - Q4 2013	Q1 1993 - Q4 2013	Q4 1999 - Q4 2013
Thailand	Q1 1993 - Q4 2013	Q1 1993 - Q4 2013	Q1 2000 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1993 - Q4 2013	Q1 1997 - Q4 2013	Q4 1999 - Q4 2013
Turkey	Q1 1987 - Q4 2013	Q1 1987 - Q4 2013	Q1 2005 - Q4 2013	-	Q2 1981 - Q4 2013	Q1 2007 - Q4 2013	Q1 2007 - Q4 2013	Q1 2007 - Q4 2013
UK	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q1 1983 - Q4 2013	Q2 1981 - Q4 2013	Q3 1986 - Q4 2013	Q2 1981 - Q4 2013	Q2 1981 - Q4 2013	Q4 1999 - Q4 2013

Table 8: Data Sources - Monthly*

COUNTRIES	NOMINAL EXCH. RATE	REAL EFF. EXCH. RATE	INT. RATE DIFFERENTIAL	CPI	IND.PRODUCTION	REAL STOCK PRICES	TRADE BALANCE ADJ	10Y GOVT BOND YIELDS
Australia	IMF (IFS)	BIS	IMF (IFS)	-	-	IMF (IFS)	OECD (MEI)	Reuters
Austria	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	Haver Analytics	ECB
Belgium	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Brazil	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	IMF (IFS)	Haver Analytics	Datastream
Canada	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	GFD
Chile	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	OECD (MEI)	OECD (MEI)	OECD (MEI)	Datastream
China	IMF (IFS)	IMF (IFS)	OECD (MEI)	OECD (MEI)	Haver Analytics	IMF (IFS)	Haver Analytics	Datastream
Colombia	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	Haver Analytics	IMF (IFS)	Haver Analytics	Datastream
Czech Republic	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	OECD (MEI)	OECD (MEI)	Reuters
Denmark	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	BIS	IMF (IFS)	GFD
Estonia	BIS	BIS	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	GFD
Euro Area	IMF (IFS)	IMF (IFS)	ECB, GFD	ECB	Haver Analytics	OECD (MEI)	OECD (MEI)	OECD (MEI)
Finland	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	GFD
France	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Germany	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Greece	-	IMF (IFS)	-	IMF (IFS)	OECD (MEI)	OECD (MEI)	OECD (MEI)	ECB
Hungary	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	IMF (IFS)	Reuters
India	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	Haver Analytics	IMF (IFS)	IMF (IFS)	GFD
Italy	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Japan	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	ECB
Korea	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	GFD
Latvia	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	Haver Analytics	IMF (IFS)	Haver Analytics	GFD
Lithuania	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	Haver Analytics	IMF (IFS)	Haver Analytics	GFD
Malaysia	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	-	BIS	IMF (IFS)	GFD
Mexico	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	GFD
Netherlands	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Norway	IMF (IFS)	IMF (IFS)	OECD (MEI)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	GFD
Philippines	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	Haver Analytics	BIS	IMF (IFS)	Datastream
Poland	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	OECD (MEI)	OECD (MEI)	GFD
Portugal	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Russia	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	IMF (IFS)	OECD (MEI)	GFD
South Africa	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	GFD
Spain	-	IMF (IFS)	-	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	ECB
Sweden	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	IMF (IFS)	IMF (IFS)	GFD
Thailand	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	Haver Analytics	BIS	IMF (IFS)	IMF (IFS)
Turkey	IMF (IFS)	BIS	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	OECD (MEI)	BIS
UK	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	IMF (IFS)	GFD

* The following acronyms have been used: BIS: Bank for International Settlements; GFD: Gloal Financial Data database; IMF (IFS) : International financial statistics database of the International Monetary Fund; OECD (MEI): Main economic indicators database of the Organization for Economic Cooperation and Development.

Table 9: Data Sources - Quarterly*

COUNTRIES	REAL GDP	GDP DEFLATOR	NOMINAL GDP IN $	UNEMPLOYMENT	HOUSE PRICES	CREDIT TO PVT. SECTOR	PORTFOLIO INFLOWS	PORTFOLIO OUTFLOWS	BANK INFLOWS
Australia	Datastream	Datastream	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Austria	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Belgium	GFD	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Brazil	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	-	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Canada	IMF (IFS)	IMF (IFS)	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Chile	GFD	IMF (IFS)	Haver Analytics	OECD (MEI)	-	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
China	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	-	IMF (IFS)	-	-	BIS (CBS - ibb)
Colombia	GFD	Haver Analytics	Haver Analytics	Haver Analytics	-	-	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Czech Republic	GFD	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Denmark	GFD	Haver Analytics	Haver Analytics	Haver Analytics	BIS	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Estonia	IMF (IFS)	IMF (IFS)	-	Haver Analytics	Eurostat	IMF (IFS)	-	-	-
Euro Area	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	-
Finland	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
France	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Germany	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Greece	Haver Analytics	OECD (MEI)	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Hungary	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	-	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
India	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	-	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Italy	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Japan	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Korea	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Latvia	GFD	IMF (IFS)	Haver Analytics	Haver Analytics	Eurostat	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Lithuania	GFD	Haver Analytics	Haver Analytics	Haver Analytics	Eurostat	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Malaysia	GFD	Haver Analytics	Haver Analytics	Oxford Economics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Mexico	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Netherlands	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Norway	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Philippines	GFD	Haver Analytics	Haver Analytics	Haver Analytics	-	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Poland	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	-	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Portugal	GFD	IMF (IFS)	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Russia	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
South Africa	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	Haver Analytics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Spain	GFD	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Sweden	GFD	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Thailand	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Oxford Economics	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
Turkey	Haver Analytics	Haver Analytics	Haver Analytics	OECD (MEI)	-	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)
UK	Haver Analytics	Haver Analytics	Haver Analytics	Haver Analytics	Datastream	IMF (IFS)	IMF (BOP)	IMF (BOP)	BIS (CBS - ibb)

*The following acronyms have been used: BIS: Bank for International Settlements; BIS (CBS - ibb): Consolidated banking statistics database (on immediate borrower basis) of the Bank for International Settlements; GFD: Gloal Financial Data database; IMF (BOP) : Balance of payment statistics database of the International Monetary Fund; IMF (IFS) : International financial statistics database of the International Monetary Fund; OECD (MEI): Main economic indicators database of the Organization for Economic Cooperation and Development.