If the Fed sneezes, who catches a cold?

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Abstract

Everybody, but with different macroeconomic and financial symptoms. We look at the global effects of US monetary policy shocks using a two stage approach. We find that US monetary policy shocks, assumed to have standard domestic effects, affect differently advanced and emerging economies. In particular, a US monetary policy tightening brings about a contraction in economic activity and an increase in unemployment in both advanced and emerging countries. But only in the latter it results in capital outflows, a domestic credit crunch and falling housing prices. Emerging economies with a floating exchange rate regime and low capital mobility are better insulated from some of the financial repercussions of US monetary policy. A dollar peg with a similarly lowcapital mobility, or a floating regime with high capital mobility are not as helpful. We conclude that, for emerging economies, the dilemma suggested by Rey (2013) may be more relevant than the classic trilemma.

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

JEL: .

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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 or 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 through the latter's influence on the "global financial cycle". This 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 the global cycle. The latter in turn is affected by US monetary policy.[2] 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 dilemma, rather than a trilemma, between monetary policy autonomy and capital controls.

In this paper we document the effects of US monetary policy shocks on a broad set of macroeconomic and financial variables in 18 advanced and 18 emerging economies. Unlike previous studies, we include variables ranging from industrial production, real GDP and unemployment, to consumer and asset prices, from interest rates to domestic credit and portfolio and bank capital flows. This allows us to better document the trade-offs in terms of macroeconomic and financial stability for other countries brought about by a US monetary policy shock.[3] To preview our results, we find evidence that the

[1] See e.g. Klein and Shambaugh (2010). However, Rose (2011) 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] Agrippino and Rey (2014) provide further evidence along the same lines. Using a large Bayesian VAR Agrippino and Rey identify a global factor explaining the variance of a large cross section of returns on risky assets. They also show that US monetary policy is a driver of this global factor. As we explain below, in this paper we go beyond asset returns by documenting the effects of US monetary policy shocks on a borad range of macroeconomic and financial variables.

[3] 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 effects of US monetary policy shocks are quite similar across advanced and emerging economies, countries with pegged and floating exchange rate regimes, countries with relatively closed or open capital markets, and countries with a high or low financial dollar exposure. However, in the case of financial variables we find that only in emerging economies a US monetary tightening results in capital outflows, a fall in domestic credit and in housing prices.[4] When we look at the effects of the exchange rate regime and the degree of financial openness in emerging economies, we find evidence that countries with both lower capital mobility and a floating exchange rate regime are better insulated from the financial repercussions of US monetary policy. A dollar peg with a similarly low capital mobility, or a floating regime with high capital mobility are not as helpful. These results, while not entirely against the received wisdom, then seem to point to the fact that for EMEs, Rey (2013) dilemma is more relevant than the classic trilemma, at least when it comes to US monetary spillovers.

We proceed in two steps. First, we obtain estimates of US monetary policy shocks in a structural VAR identified with sign restrictions based on results in the literature on the effects of these shocks. We then regress third country variables on these shocks. We are effectively asking the question: What are the consequences on the rest of world of a US monetary policy shock, conditional on this shock having the assumed effects on the US economy? Thus, we take for granted that these shocks have "textbook" effects on the US economy, such as that a tightening should reduce economic activity, and operationally rely on the literature to spell them out in detail.[5]

In particular, in our first step we base sign restrictions on the impulse responses estimated by Gertler and Karadi (2014). There are two key advantages in basing our sign restrictions on their results. First, they estimate the responses to a monetary policy shock of several asset prices and interest rate spreads, eschewing any contemporaneous exclusion restrictions, which would require taking a stand on the systematic reaction of monetary policy to movements in asset prices. This is an attractive feature for us, given our focus

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.

[4] While we look at both banking and portfolio flows, we do not look separately at debt and equity flows. Kalemli-Özcan (2015) provides evidence of the different consequences for EMEs output of debt and equity flows.

[5] Thus a more precise title of the paper would be: "If the Fed makes the US sneeze, who catches the cold?"

on the propagation of US monetary policy to 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 is so as their monetary policy shocks include also new information (forward guidance) on both current and future interest rate policy. As we explain in more detail below, this means that by basing our identification on their impulse responses we can also hope to make our results robust over a period that includes the recent financial crisis. However, to sharpen our identification, we also require that shocks, also satisfy, at least on impact, two further restrictions. Specifically, we impose, first, that on impact the US effective nominal exchange rate appreciates following a US tightening. Second, that an aggregate 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 positively correlated with any monetary policy shocks in other major countries. This is especially crucial in the aftermath of the recent financial crisis, when short-term rates in most advanced economies have been close to their lower bound, and more or less contemporaneously very expansionary conventional (and unconventional) monetary policies have been deployed. We find that under our identification assumptions, estimated impulse responses in the VAR are indeed robust to the inclusion of the 5 years from January 2009 to December 2013.[6]

In our second step, armed with the (distribution of) estimated monetary policy shocks from the posterior of our Bayesian VAR, we turn to the estimation of their effects on our sample of countries. Similarly to other papers such as Romer and Romer (2004) and Canova (2005), we regress a host of variables for each country both at monthly and quarterly frequency on the estimated shocks. We then aggregate these estimates across countries on the basis of several structural characteristics. These aggregations are obtained by taking simple averages across countries.[7] In this version we aggregate

[6] In particular, the effects of US monetary policy shocks, particularly on exchange rates, global (aggregates of) output and stock prices, are broadly similar, independently of the inclusion of these last 5 years of data. As we show below, this is not the case when we do not include the interest rate differential in our VAR.

[7] This is consistent with the Pesaran-Smith Mean Group Estimator in heterogeneous panels. 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.

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); d) financial dollar exposure based on the currency composition of gross assets and liabilities in Lane and Shambaugh (2010). 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.[8]

Our main findings are the following. First, a surprise US monetary policy tightening brings about a contraction in economic activity and an increase in unemployment in both advanced and emerging countries, despite the depreciation in their bilateral dollar and real effective exchange rates. Inflation tends to decline in advanced economies, while it rises in emerging ones. But only in the latter countries, a US monetary tightening also leads to sustained portfolio and banking outflows, and a fall in domestic credit and housing prices. These variables instead are not significantly affected in advanced economies. Second, across emerging economies, the exchange rate regime and the degree of capital mobility seem to matter in isolation only in a limited way. Namely, a dollar peg, in addition to obviously more stable nominal and real exchange rates, entails a significantly larger response of domestic short-term rates to US monetary policy shocks. Inflation also persistently increases in pegs in response to the US interest rate hike. These asymmetries with floaters do not imply however significant differences in macroeconomic effects. Yet, financial repercussions are different for countries with a floating rate. If anything, these country experience somehow higher macroeconomic volatility, but less volatile capital flows, with banking inflows and even domestic credit now temporarily increasing in response to a US monetary contraction. Upon further inspection, we find that these results are due to floaters with a relatively closed capital account. In these countries, domestic interest rates respond less than one-to one to US monetary policy shocks.

An important implication of our findings is that US monetary policy shocks may create a trade-off between macroeconomic and financial stability in emerging countries. A

[8] In future versions we plan to consider also differences in trade openness, and explore robustness to use other measures of openness of capital markets and financial dollar exposure.

contractionary US monetary policy shock moves output and inflation in opposite directions, while increasing unemployment and depreciating the receiving emerging economies' exchange rate. At the same time it triggers a capital outflow, with falling asset prices. While a policy of higher short term interest rates may be appropriate to rein in inflation and perhaps stem capital outflows, it may be counterproductive to stabilize both the real and financial side, exacerbating the decline in economic activity and in domestic credit, with high capital mobility. Indeed, some evidence suggests that the interest rate differential with the US is a significant driver of capital inflows (Ahmed and Zlate 2014).[9]

Of course, our work is quite closely related to previous contributions in the literature on the transmission of U.S. monetary policy shocks. Similarly to Shambaugh (2004), we find that pegs follow base country interest rates more than nonpegs, even when controlling for a similar degree of financial openness. Canova (2005) and Mackowiak (2007) also use sign restrictions to study the effects of US monetary policy on emerging economies. Canova (2005) finds that among Latin American countries, floaters and pegs display similar output but different inflation and interest rate responses. Mackowiak (2007) finds that output and the price level respond by more than their US counterparts, with the price level increasing after a US tightening, in line with our findings. 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. More in line with our results, they find that the exchange rate regime does not matter much for the macroeconomic transmission of US shocks, with countries having a fixed exchange rate regime being similarly affected in terms of output and inflation as floaters. 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. Georgiadis (2015) shows, among other findings, that a floating exchange rate reduces the output spill-over from US monetary

[9] Overall, our evidence indicates that the cross border effects of US monetary policy can be characterised as an externality, not only as a spill-over, especially for emerging economies. In this respect, our results qualify the position of Woodford (2007) that globalization does not weaken monetary control, if we integrate financial (stability) variables in the analysis. At the same time, in the absence of international coordination to manage these externalities, country-specific policies, notably macro-prudential policies, can help receiving countries to manage the trade-off that we illustrated, and mitigate the macroeconomic and financial instability that they may entail.

policy shocks (the more so, the more trade and financially open the receiving countries). Aizenman et al. (2015) look at the determinants of spillovers from financial variables in core countries (US, euro area and Japan) on a large number of countries. Among other results, they find that, in support of the trilemma, countries with higher financial openness and greater exchange rate stability experience a stronger link with the center economies through interest rate and real effective exchange rate movements. Most if not all of these papers do not consider, however, the potential financial stability dimension of spillovers, that plays an important role in this paper.

The paper is organized 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 the empirical literature on the effects of monetary policy shocks, in particular Gertler and Karadi (2014). Second, following the literature (e.g. Romer and Romer (2004)), we obtain impulse responses by estimating, for each realization of the series of shocks, simple autoregressive models for each variable in each country, including also contemporaneous and lagged values of the shocks. We then aggregate the resulting impulse responses across countries according to the latter characteristics. A way to view our approach is the following. Conditional on recovering US monetary policy shocks that have "textbook" domestic effects, we want to investigate the consequences of these shocks for the rest of world. Thus, we take for granted that these shocks have domestic effects on the US economy, such as that a tightening should reduce economic activity and at some point also inflation. We rely on the empirical literature to spell these effects out in an empirically plausible way, so that we can estimate the underlying monetary policy shocks.

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 in the spirit of 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, especially in the case of countries other than the USA. Therefore, we include in the VAR global aggregates of stock prices, output and commodity prices, as well as an aggregate 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, building on the seminal contributions by Litterman (1986) and Sims and Zha (1998). 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 shrinkage 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 combination 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[10], 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 the G-7 ex-US short-term interest rate and the US 3-month T-bill rate. The former rate is computed as an average of the short term rates of the four major currency areas (Canada, Euro Area, Japan, UK).[11] As variables are monthly and enter the VAR in levels, the model is estimated with $p = 13$ lags.

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 mimic effects of US monetary policy consistent with those estimated by Gertler and Karadi (2014). These authors use external instruments, based on high-frequency financial data (see also e.g.

[10] 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.

[11] 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.

Gurkaynak et al. (2005)), to identify monetary policy shocks, including the period over which US short-term interest rates have been at their lower bound.

There are two key advantages in their results that make mimicking them appealing for our purposes. First, they estimated the responses to a monetary policy shock of several asset prices and spreads, while eschewing any unpalatable contemporaneous exclusion restrictions, such as those implied in a recursive identification scheme. The zero restrictions implied by the latter approach would require taking a stand on the systematic reaction of monetary policy to movements in asset prices, while assuming that the latter respond with a delay to monetary policy shocks. Conversely, the ability to model the contemporaneous responses of several US interest rates and spreads based on Gertler and Karadi (2014) is an attractive feature for us, given our focus on the financial transmission through international asset prices, among other things.

Second, Gertler and Karadi (2014) identify monetary policy shocks that include news on forward guidance about future interest rates. As such, their approach is reasonably robust to the presence of the lower bound on short-term interest rates. Indeed, their impulse responses are broadly similar, irrespective of whether the period after January 2008 is excluded or not from their estimates. This result means that by replicating their impulse responses we can also hope to identify similarly robust shocks, including over the period that encompasses the recent financial crisis. While we will look at results both including or excluding this most recent period, the latter could be important to identify the transmission of US monetary policy shocks. On the one hand, to the extent that the systematic reaction of monetary policy has been constrained by the lower bound on short-term rates, this has effectively resulted in a series of contractionary shocks. This intuition is borne out by standard New Keynesian models in which systematic monetary policy follows a rule for the short-term interest rate and is constrained by the lower bound (see e.g. Eggertsson and Woodford (2003)). On the other hand, when the lower bound binds, the current level of the short-term rate may not be a good gauge of the stance of monetary policy by itself, if the central bank is able to credibly rely on forward guidance and thus still affect longer-dated interest rates. Neglecting this aspect may then result in an overestimation of the size of contractionary shocks over this period. However, our identification in this respect possesses a key safeguard, in line with the results in Gertler and Karadi (2014). We require that a contractionary shock not only increases the short-

term rate (relative to its normal level in line with macroeconomic conditions), but that also the 1-year rate and a series of interest rate spreads go up. Therefore, any lack of accommodation in short-term rates over the more recent period will be interpreted as a contractionary shock only if associated with increases in all these other longer-dated interest rates.

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.[12] However, while keeping our results for the effects of monetary policy on the US economy consistent with theirs, we also want to focus on US monetary policy shocks which should not be too positively correlated with monetary policy shocks in other major countries.[13] This is especially a concern in the aftermath of the recent financial crisis, when short-term interest rates in most advanced economies have beeen at their lower bound, as more or less contemporaneously very expansionary conventional (and unconventional) monetary policies have been deployed. Moreover, the inclusion of this interest rate differential is also likely to make our results more robust to the risk of giving too much weight to contractionary shocks during the lower bound period. This is similar to the argument above regarding other longer-dated interest rates. Any deviation of the US short-term rate over this period from its estimated systematic relation with the underlying state of the economy is going to be mapped into a discretionary lack of accommodation and thus a contractionary monetary policy shock only if associated with a higher interest rate than in the other major economies.

To achieve this aim, we thus will 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.

[12] Indeed, we could use their instruments directly in IV estimates of regressions of third-countries variables on US interest rates.

[13] Moreover, we obtain a longer series of monetary policy shocks as we impose our restrictions on the whole sample starting in 1980, rather than the shorter one for which their external instruments are available. There is consensus that US monetary policy has been relatively stable since the 1980s.

In more details, 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 broadly in line with the 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 the table help in ensuring the identification of a US-specific monetary policy shock. The fall in the interest differential does not require interest rates in other major currencies to fall, but only that they increase by less than their US counterparts on impact. Observe that these assumptions are conservative for our purposes, as we are constraining interest rates in major currencies to increase by less than US rates and thus to be more accommodative, other things equal. This can then result in an attenuation of the effects of US monetary policy on the rest of the world.

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 intial unrestricted 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 orthogonalizations 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 check implies that our restrictions do not implausibly constrain the reduced form VAR posterior.

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. Romer and Romer (2004)), we obtain the impulse response coefficients by estimating, for each realization of the series of shocks, the following regression 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 characterize uncertainty of our estimates by reporting their distributions over the realizations of the estimated shocks.

This approach allows us to consider variables at both monthly and quarterly frequency for each country i, as discussed in the next section, and for samples shorter than those for which we obtain our shocks. Its flexibility represents a key advantage given the quite heterogenous panel of data we use. 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; c) financial and trade openness; d) dollar exposure. This approach can be justified as similar to the computation of mean group estimators advocated by Pesaran and Smith (1995) in the presence of parameter heterogeneity in rich autoregressive models like (2). 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.

3 Data description

The tables in the appendix describe in detail 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 36 countries, namely: Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, Estonia, 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. We consider euro area countries individually for all variables but short term rates and bilateral US dollar exchange rates. These series refer only to euro area aggregates after 1999 (or the date of euro adoption).

For each country we consider both monthly and quarterly variables. *Monthly variables* include: (i) the bilateral dollar exchange rate;[14] (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

[14]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.

(scaled by the average of the sum of import and export over the whole 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. Finally, as a gauge of macroeconomic volatility we also report results for the sum of the absolute changes in unemployment and inflation (as measured by the GDP deflator) — a "misery index". Details about the source of each series are provided in Tables 8 and 9.[15]

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

Country characteristics

The second 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. We mostly consider sample averages for each indicator unless otherwise specified. The values of the indicators are reported in Table 3a-b.

Advanced vs. emerging economy. The classification according to advanced or emerging country is consistent with the one contained in the IMF World Economic Outlook. In this case we refer to the latest classification and do not average over the sample.

Exchange rate regime. The choice of the exchange rate regime is not a straightforward

[15]The sources of the variables we use are: Datastream, Reuters, Haver Analytics, Eurostat, Oxford Economics, the Global Financial Data database (GFD), the International Financial Statistics (IFS), Balance of Payments Statistics and Direction of Trade Statistics 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.

one since there is more than one meaningful classification (see Rose 2011). We mainly draw from the classification of Klein and Shambaugh (2010).

Financial openness. We collect two variables to capture financial openness and capital controls, namely (i) the Chinn-Ito index, which measures de iure financial openness, and (ii) the *kai* index of Fernandez et al. (2015), which measures overall capital inflow restrictions.

Trade openness. We consider countries' trade openness in general (sum of exports and imports over domestic GDP) and vs. the United States in particular (exports to and imports from the US as a share of domestic GDP).

Dollar exposure. This is computed on the basis of Benetrix et al. (2015) data on the currency composition of gross foreign assets and liabilities. In this version we focus on gross rather than net exposure, although the choice is not uncontroversial.

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 the respective aggregations. Unless differently specified, countries are split in two different groups depending on whether the value of their indicators fall above or below the median value.

4 The effects of monetary shocks on 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. As it is customary, 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 rise persistently. 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's response (which we leave unrestricted) 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. Finally, international variables respond as would be expected according to standard textbook predictions. 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. This appreciation however 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, qualitatively and in most cases quantitatively — see *Figure 2 A-B*. The only notable exception 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. Conversely, the corporate bond spread increases significantly. 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 four 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 reestimate 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. As

discussed above, this result underscores the importance of including the short-term interest rate differential in our analysis to make results more robust to the inclusion of the most recent period with interest rates at their lower bound. Indeed, this interest rate differential has been remarkably stable over this period.

Second, we computed the responses of the US stock prices, the nominal and real effective exchange rate and the interest rate differential to the shocks estimated by Gertler and Karadi (2014), using the same specification as in (2). Point estimates and the 16th and 84th percentiles are presented in *Figure 4* for the sample until 2013.[16] They verify that the identifying restrictions we impose on these three variables are not patently inconsistent consistent with the effects of the monetary policy shocks estimated by these authors. Namely, the interest rate differential and stock prices drop, while the nominal effective exchange rate (and the real effective one) appreciates.

Third, we computed impulse responses of the monthly US VIX index to our identified shocks, again using a specification like (2). We could not include the VIX directly in the BVAR 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 again over both samples. Similarly to the other impulses responses, 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 tightening 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 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 argued by Rey (2013).

Finally, in *Figure 6 A-B* we report, for both the shocks estimated over the whole sample and those estimated over the sample until 2008, the responses of the US counterparts of our quarterly variables, namely: (i) real GDP; (ii) the GDP deflator; (iii) the unemployment rate; (iv) real housing prices; (v) real domestic credit; (vi)-(vii) total

[16] We use a wild bootstrap procedure, as e.g. in Ramey (2015), to characterize estimation uncertainty.

portfolio inflows and outflows, and (viii) total bank inflows, all scaled by GDP. Across both samples, the monetary contraction persistently and significantly decreases real GDP and its deflator, while it increases unemployment. Somehow counterintuitively, however, real house prices rise. Concerning the financial side of the economy, while real credit does not respond significantly (not an uncommon result in the VAR literature on US monetary policy shocks), the contraction is associated with portfolio outflows by US residents and a decline in banking inflows into the US. Across the two samples, the main difference is that uncertainty is a bit smaller for estimates over the whole sample in panel A, in line with our prior that properly including the more recent period can help in identifying the transmission of US monetary policy.

To sum up, these exercises together lend support to the credibility of our benchmark identification and the effects of the resulting monetary policy shocks.

5 The global transmission of US monetary policy shocks

5.1 Results for country groupings

In this section, 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 show 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; (ix) "the misery index". 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 groupings used in this subsection are reported in Table

3.

Advanced vs. emerging countries. We start presenting results by splitting countries on the basis of their income levels (see first and second column in Table 3b), displayed in *Figure 7 A-B*. The distributions of the average responses of the 18 AEs are shown in the solid (red) lines, while those of the 18 EMEs are shown in dotted (blue) lines. 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 depreciation both nominally against the US dollar and on a real trade-weighted basis — here a fall indicates depreciation. Industrial production declines, while stock prices seem to react less than in the US and their VAR aggregate counterpart (possibly reflecting different aggregation, based on stock market capitalization, and composition, as the country coverage differs). The responses of other variables, however, display significant heterogeneity between AEs and EMEs. Interest rates are more linked to US ones and (their differentials) increase more in the former group than in the latter, while the trade balance improves by more. The CPI falls in AEs, similarly to the US, but it increases in EMEs. This is consistent with a higher degree of exchange rate pass-through in these countries.

The responses of quarterly variables displayed in Panel B confirm and further sharpen these results. In the advanced and emerging average country, the contraction in industrial production is also associated with a persistent fall in broad-based output as measured by real GDP, and an increase in unemployment. Most interestingly, the other variables react quite differently across the two country groups. In line with the CPI, the GDP deflator also increases more in EMEs. 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,[17] they fall substantially and quite persistently in emerging economies in response to a US monetary tightening. Concerning capital flows, the only similarity is that capital outflows by domestic residents increase across the board.

A first important result then is that the consequences of a US monetary policy shock for economic activity are qualitatively similar across advanced and emerging economies, since

[17] Among AEs, bank inflows turn significantly and persistently negative only in Belgium and Japan.

a US tightening brings about a recession and an increase in unemployment in both groups. However, interest rate responses and especially and inflation dynamics is opposite in the two country groupings. Moreover, AEs are spared the financial repercussions broadly experienced by EMEs, especially concerning capital outflows. This in turn may result in an amplification of the macroeconomic volatility of the shock in emerging economies, as captured by the sum of absolute changes in inflation and unemployment (the "misery index", MI), also reported in Panel B.

We turn next to the analysis of the effects of other country-specific dimensions on the transmission of US monetary policy shocks, such the exchange rate regime, the degree of capital mobility and exposure to the US and the dollar, with a view of understanding the sources of the asymmetric response of EMEs.

Foreign exchange regime in EMEs. Next, *Figure 8 A-B* displays results when we group countries between EMEs floaters and dollar pegs according to Klein and Shambaugh (2010) (where the latter then include China, India, Malaysia, Mexico, Philippines and Thailand).[18] The former's responses are shown with dotted (blue) lines, while the latter's with thick (red) lines.

Besides the obvious fact that nominal and real exchange rates are less volatile in countries pegging to the dollar, monetary autonomy seems to make a significant difference for nominal variables, in an intuitive way. Short-term interest rates increase more in pegs than in floaters, where even fall on impact; the dynamics of long-term rates is quite similar instead. CPI inflation also follows an opposite pattern: after decreasing, is persistently higher in the former countries; while it initially but only temporarily climbs in the latter. Therefore, the higher CPI inflation in EMEs relative AEs seems mainly driven by the countries with a more flexible exchange rate relative to the dollar. Yet, the responses of industrial production and stock prices are quite similar, and also the trade balance response in not significantly different.

A similar picture emerges from the responses of quarterly variables in Panel B of Figure 8. On the one hand, in line with the CPI, the GDP deflator increases by more in floaters than in dollar pegs, where instead it falls. Unemployment raises more persistently in the

[18] Recall that we consider countries as pegs or floats according to their average behaviour in the sample period. Mexico, for example, is considered as a peg even though it currently floats against the US dollar.

former, while it even declines after a couple of years in the latter. The decline in real GDP is not significantly different, though the fall in housing prices is larger in floating EMEs. On the other hand, domestic credit and banking inflows are much more affected in pegs, which experience a sustained credit crunch associated with banking outflows. Foreign banks instead channel funds into floating EMEs, on average.

A key result thus emerges: on average, a floating exchange rate seems to grant the ability to decouple monetary policy from the US one, and thus shield the nominal side of the economy, and to some extent the financial side, from the adverse consequences of a US monetary policy tightening. As a result, some variables like bank inflows in EMEs floaters respond a bit more similarly to AEs than EMEs dollar pegs to US monetary policy shocks. Nevertheless, despite these differences in the transmission, the macroeconomic consequences of US monetary policy shocks are remarkably similar irrespective exchange rate flexibility, as also summarized by our index of macroeconomic volatility. Conversely, starker differences in the financial effects of these shocks seem to exist between emerging and advanced economies, regardless of the exchange rate regime, especially concerning capital flows. Because AEs 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 in EMEs To try and shed light on this issue, we split emerging countries in two more groupings, depending on the degree of openness of their capital account to inflows (as measured by Chinn and Ito (2006)). Specifically, we select countries depending on whether they are above or below the median value of the index, computed taking into account both EMEs and AEs. According to this metric, less financially open EMEs include Brazil, China and India, while those more open comprise the Baltic countries and the Czech Republic (see Table 3, fifth and sixth columns). *Figure 9 A-B* presents the impulse responses for these relatively closed (in red solid lines) and relative open emerging economies (in blue dotted lines), respectively. Because many emerging economies in our sample have been relatively closed to capital inflows, the impulse responses of the former group are quite similar to those in Figure 7 A-B for all EMEs. A few notable findings emerge instead when looking at the small, open European EMEs, as

US monetary policy shocks seem to have quite different effects on this group of countries, on average. First, from Panel A it is clear that the short-term interest rate differential widens on impact in the more open EMEs, while it falls in more closed EMEs, pointing to the fact that capital controls may allow domestic interest rates to decouple more from US interest rates, rather than the exchange rate regime per se. Notwithstanding a short-lived nominal depreciation vis-à-vis the dollar, the real effective exchange rate also appreciates instead of depreciating in this more open EMEs. This result, however, mainly reflects the responses of Latvia and Lithuania, while in Estonia and the Czech Republic real effective exchange rates depreciate. Second, after an initial significantly larger increase the CPI stabilizes, while the fall in stock prices is also larger. The responses of the long-term interest differential and of industrial production are instead similar across these EMEs.

Turning to panel B, the more financially open emerging economies seem to display larger responses in most variables, but confidence bands are also wider. While the dynamics in the GDP deflator mimics that in the CPI, crucial differences seem to involve financial variables, especially portfolio and capital flows. Real housing prices decline more in open EMEs, while barely falling in more closed economies in a significant way. In the latter, real credit initially raises instead of falling. Capital controls do not seem to matter in an intuitive way. On the one hand, outflows by domestic residents after a while increase persistently in less open countries, although differences across groups are not significant. On the other hand, portfolio and banking inflows display statistically significant, opposite pattern: they retrench persistently in more financially closed economies, while quickly stabilizing and even turning positive in open ones. Therefore, it seems that capital controls mainly allow domestic interest rates to decouple more from US ones, but are not very effective in affecting capital flows. However, among the more financially closed EMEs we have included all dollar pegs, which show different patterns in the responses of financial variables than the other EMEs. Therefore, we next investigate the differential effects of the exchange rate regime for countries with a similar low degree of financial openness.

The exchange rate regime in less financially open EMEs *Figure 10A-B* reports results for the less financially open EMEs on the basis of their exchange rate regime. Effectively, our dollar pegs (China, India, Malaysia, Mexico, Philippines and Thailand, shown in the figure with a red solid line) are also relatively closed to capital flows. The

other relatively closed EMEs with a more flexible exchange rate against the dollar include Brazil, Chile, Colombia, Hungary, Poland, Russia, South Africa and Turkey whose aggregate response are reported in the figure with a dotted (blue) line. From panel A, it is clear that short-term interest rates in these group fall, while they climb in pegs. Importantly, this shows that lower financial openness allows more control on interest rates especially if associated with a flexible exchange rate regime. A second result is that the CPI tends to increase more in the medium run in floats. Also, the trade balance responds differently, improving in floats and deteriorating in pegs. These effects are consistent with the larger (but not significantly so) exchange rate depreciation in the former group.

Concerning Panel B of the figure, the key differences emerge from the responses of real domestic credit and bank inflow, which respond in opposite ways than in dollar pegs. It is then clear that the contraction in the latter variable is confined to emerging economies pegging to the dollar, while it is spared to all floating countries, independently of their degree of financial openness. However, in less financially open but floating EMEs, also the dynamic of real domestic credit turns out to be less affected by US monetary policy shocks. Therefore, a combination of capital controls and a flexible exchange rate regime does seem to provide a better degree of insulation from US monetary spillovers than one of the two features in isolation.

Financial dollar exposure in EMEs Finally, *Figure 11 A-B* displays results for EMEs depending on their degree of financial exposure to dollar-denominated assets and liabilities, where again we distinguish between countries above and below the overall median (in the red solid and blue dotted line, respectively). While this dimension entails few significant differences across advanced economies (results are not reported to save space), it is associated with some heterogeneity in the transmission of US monetary policy across emerging economies. In the EMEs more exposed to the dollar, short-term interest rates react less to US monetary policy, while inflation, stock prices and domestic credit fall by more. However, this does not translate in other significant differences in macroeconomic or financial volatility.

Overall, these results qualify and extend those in previous papers, such as Shambaugh (2004), Miniane and Rogers (2007) and Rey (2013). A floating exchange rate together with a low level of financial openness dampens the effects of US monetary policy on

macroeconomic and financial variables in emerging economies. Pegs with equally low capital mobility and floating countries with higher capital mobility are less insulated from US monetary policy. On the one hand, a flexible exchange rate regime per se does not seem to prevent short-term rates from strongly reacting to US monetary policy. Indeed the short-term interest rate differential widens for both AEs and floating, open EMEs. But a more flexible exchange rate does shield EMEs somehow from financial spillovers, especially in terms of banking inflows. Nevertheless housing and stock prices, portfolio inflows, and real domestic credit all contract more in financially open, floating EMEs, than in closed ones.[19] On the other hand, even in a relatively financially closed EME a dollar peg results in a great deal of exposure to US monetary spillovers. Not only do the short-term differential widen and the CPI fall, but also domestic credit and banking inflows contract by more than in comparably financially closed, but floating EMEs. Indeed among EMEs, banking flows decline persistently in dollar pegs such as China, India, Malaysia and the Philippines.[20]

These results, while not entirely against the received wisdom, then seem to point to the fact that, at least for EMEs, Rey (2013) dilemma is more relevant than the classic trilemma, at least when it comes to US monetary spillovers.

6 Conclusions

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 based sign restrictions in line with the results in Gertler and Karadi (2014). This allows modeling the reposnse of a range of interest rates and spreads to a US monetary policy shock. A number of real and financial variables at monthly and quarterly frequency are then regressed on the estimated shocks to compute impulse responses in 18 advanced and 18 emerging economies. 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 two. First, US monetary policy shocks have differential effects across advanced and emerging economies, affecting mainly macroeconomic vari-

[19] 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 the case for US monetary policy shocks.

[20] Among other EMEs, banking inflows decline somehow only in Brazil and the Czech Republic.

ables in the former, and both macroeconomic and financial variables in the latter. Only in emerging economies a US monetary tightening results in capital outflows, a domestic credit crunch and falling housing prices. Second, looking at the effects of the exchange rate regime and of financial openness in emerging economies, countries with lower capital mobility and a floating exchange rate regime are better insulated from the financial repercussions of US monetary policy. Conversely, despite a low degree of capital mobility, US monetary policy has a larger effect on interest rates, portfolio and banking inflows and domestic credit in dollar pegs than in floaters. These results, while not entirely against the received wisdom, then seem to point to the fact that, at least for emerging economies, the dilemma suggested by Rey (2013) is more relevant than the classic trilemma, at least when it comes to spillovers of US monetary policy.

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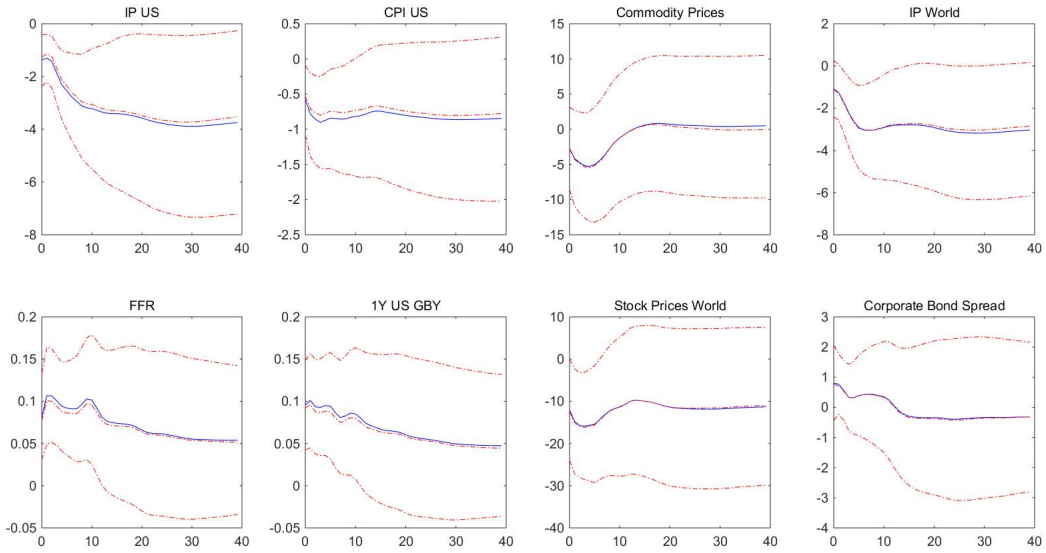
Appendix A. Figures

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

(a)



(b)

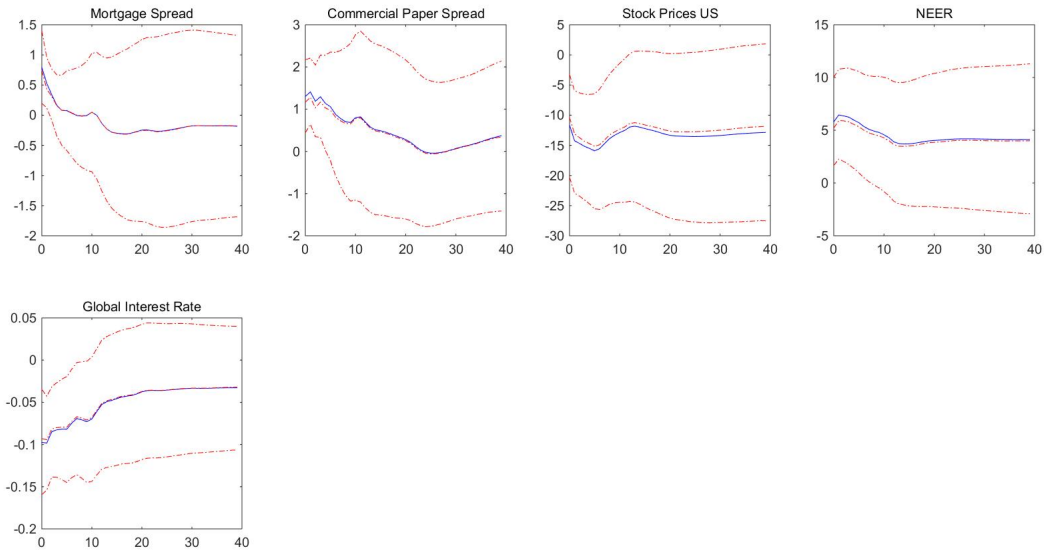
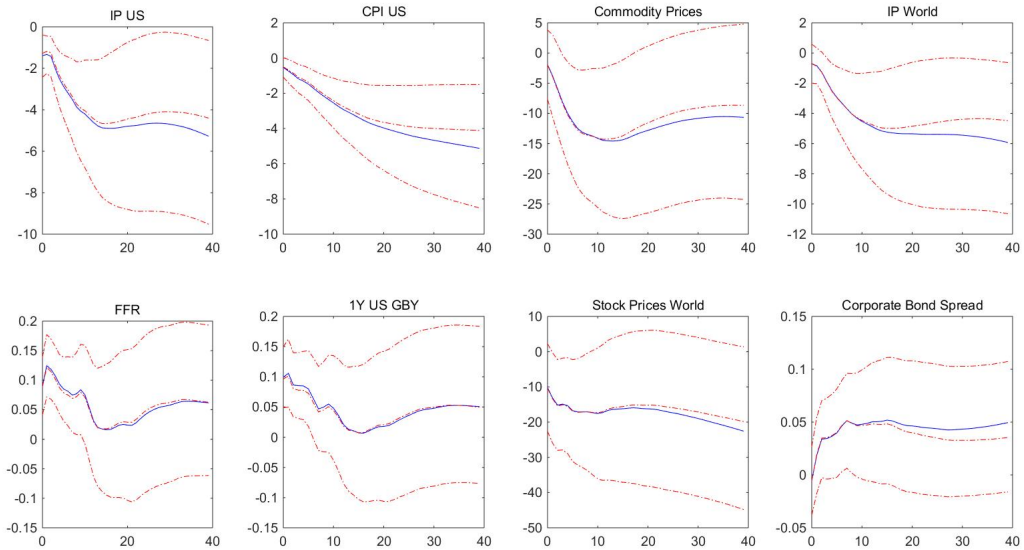


Figure 2: IRFs from Baseline BVAR Estimated over the Sample 1980 - 2008

(a)



(b)

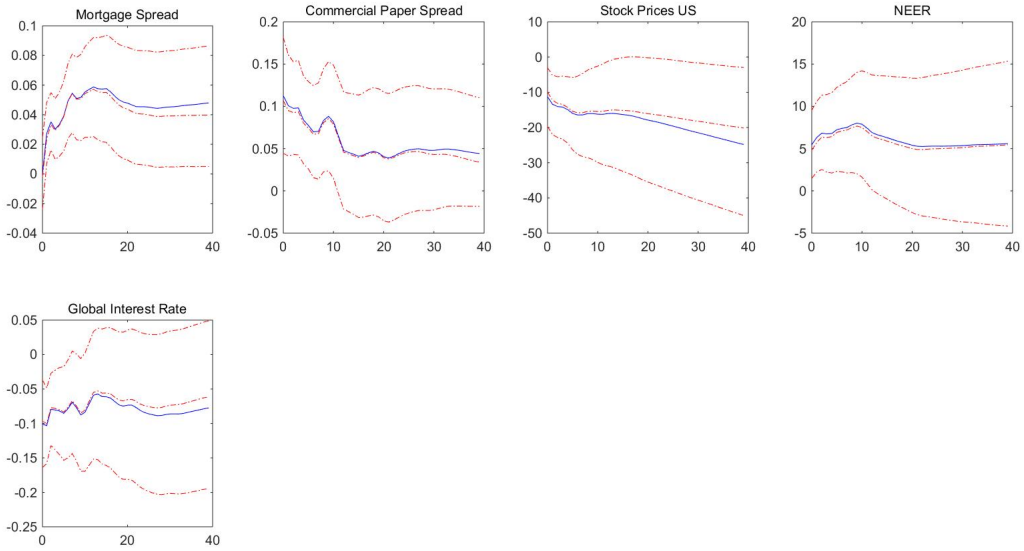
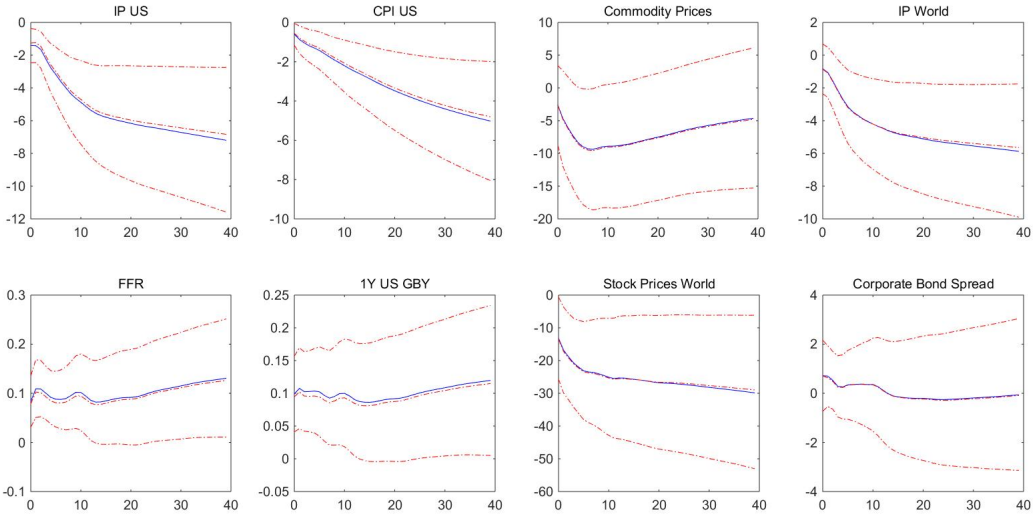


Figure 3: IRFs from BVAR without Global Interest Rate Differential

(a)



(b)

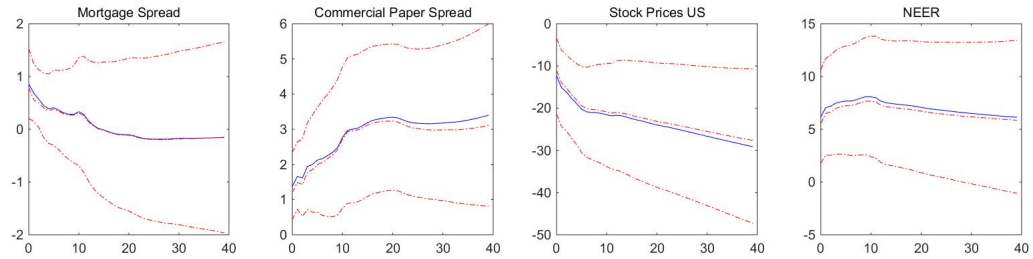


Figure 4: Responses of Selected Variables Gertler and Karadi's Monetary Policy Shocks

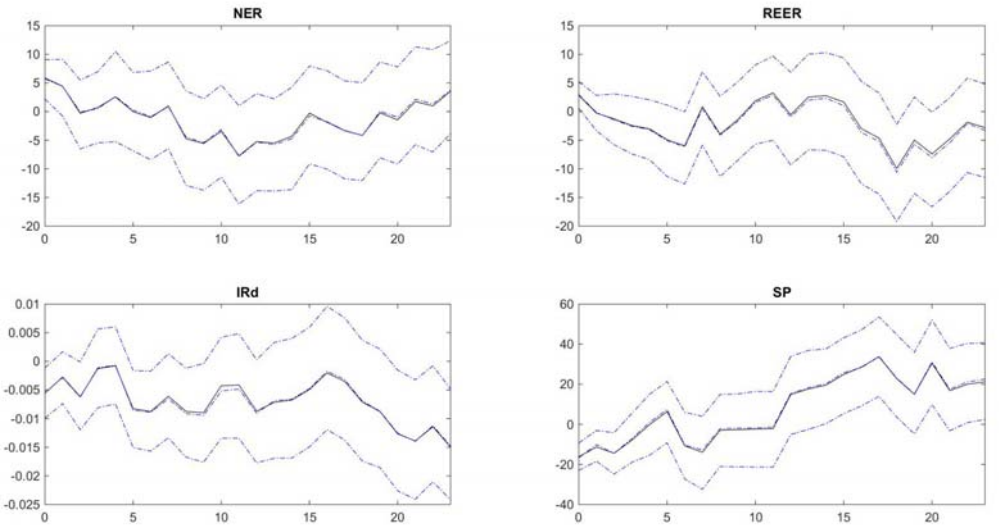
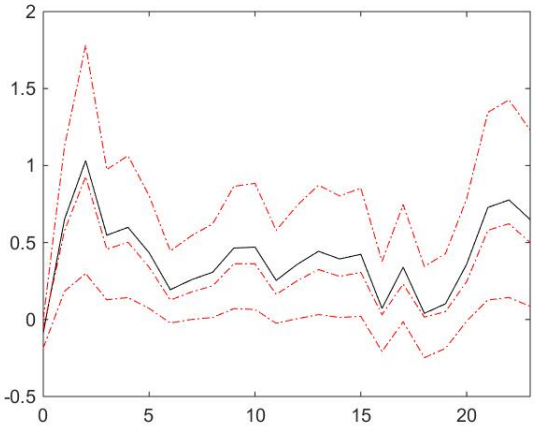


Figure 5: Vix Response to US Monetary Policy Shocks

(a) Sample 1990 - 2013



(b) Sample 1990 - 2008

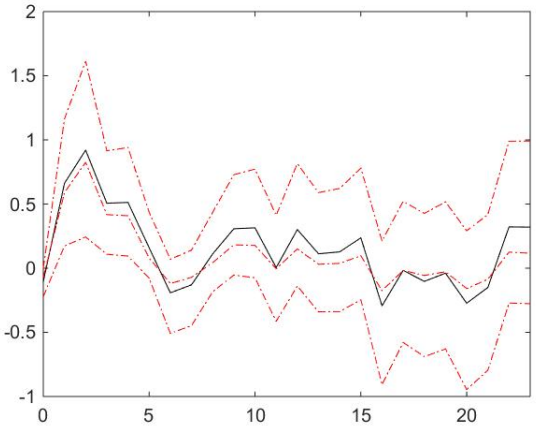
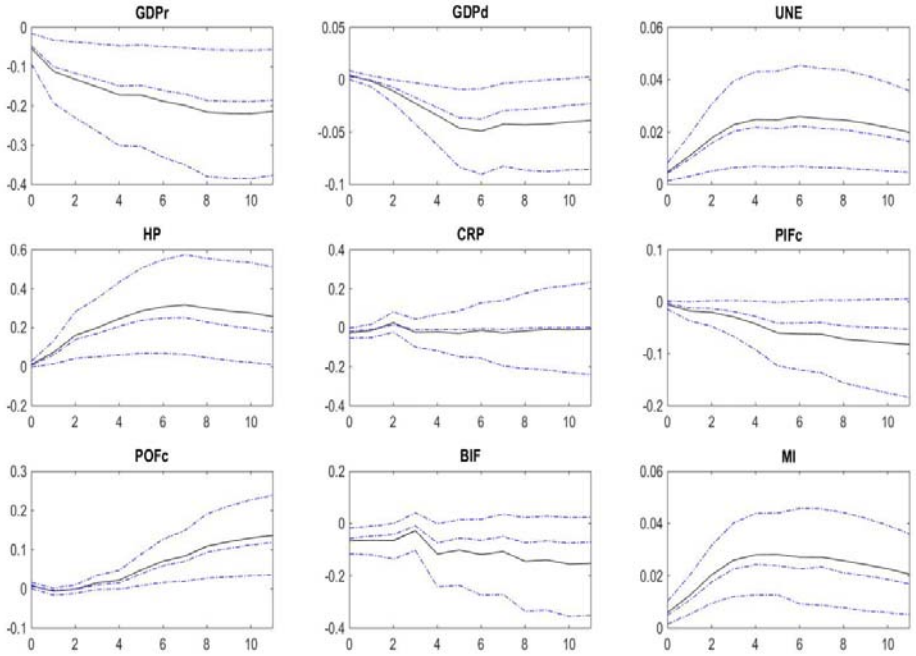


Figure 6: US Responses to US Monetary Policy Shocks (Quarterly Variables)

A. Sample 1980-2013



B. sample 1908-2008

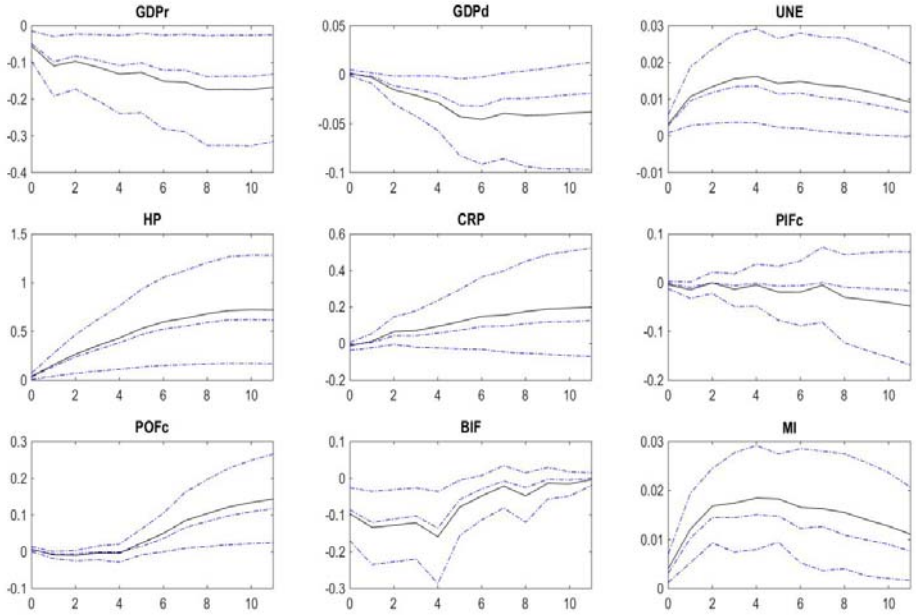
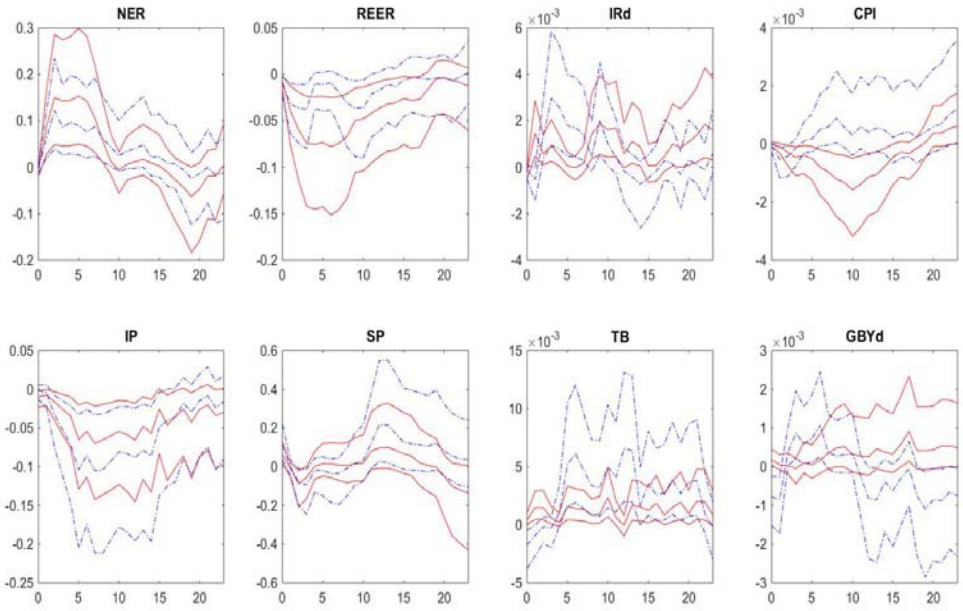
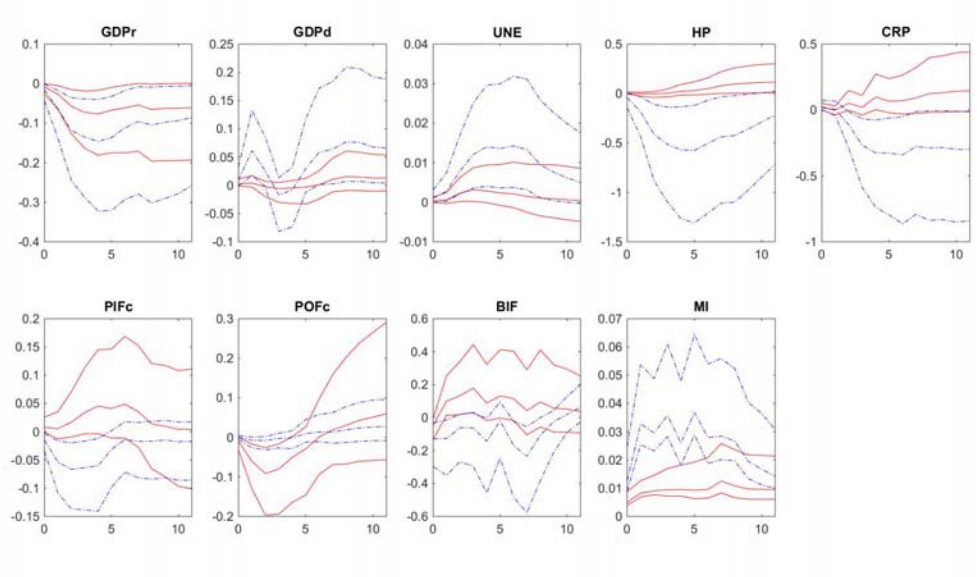


Figure 7: Responses of Advanced (solid line) and Emerging Economies (dotted line) to US Monetary Policy Shocks*

A. Monthly Variables



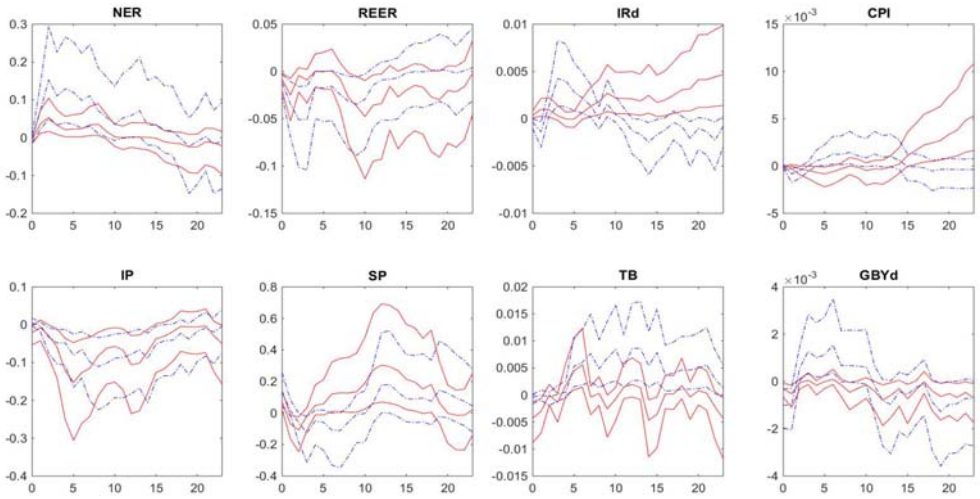
B. Quarterly Variables



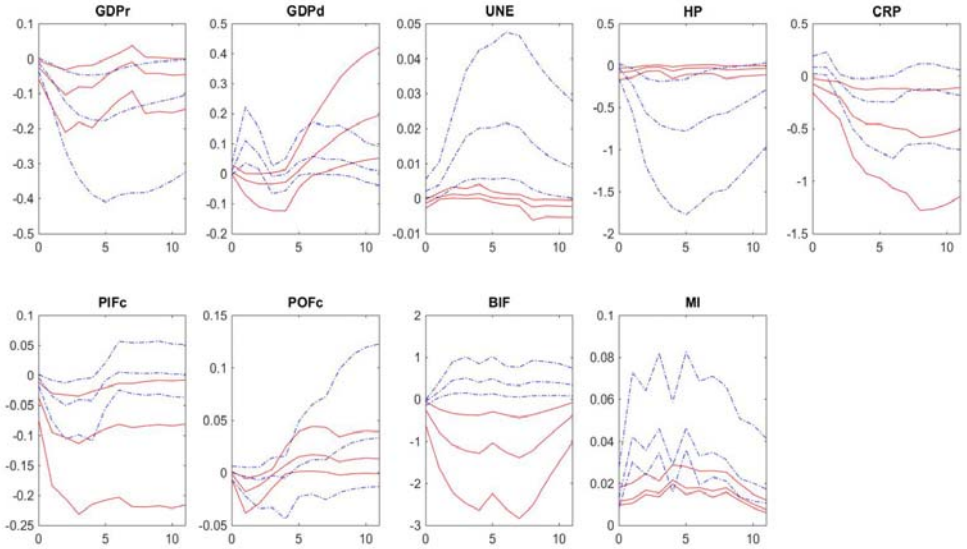
* The impulse responses are based on equation (2) in the paper. Included variables are the bilateral dollar exchange rate (NER), the real effective exchange rate (REER), the short term interest rate differential vs. the US (IRd), the CPI, industrial production (IP), the real stock price (SP), the nominal trade balance (TB) and the sovereign spread vs. the US (GBYd) at monthly frequency; real GDP (GDPy), the GDP deflator (GDPd), the unemployment rate (UNE), the real house price (HP), real credit to the private sector (CRP), portfolio inflows (PIFc), portfolio outflows (POFc), banking inflows, all cumulated and scaled by GDP (BIF) and the "misery index", the sum of the unemployment rate and the absolute change in the inflation rate (MI).

Figure 8: Responses of EMEs with Dollar Pegs (solid line) and Floating Regime (dotted line) to US Monetary Policy Shocks*

A. Monthly Variables



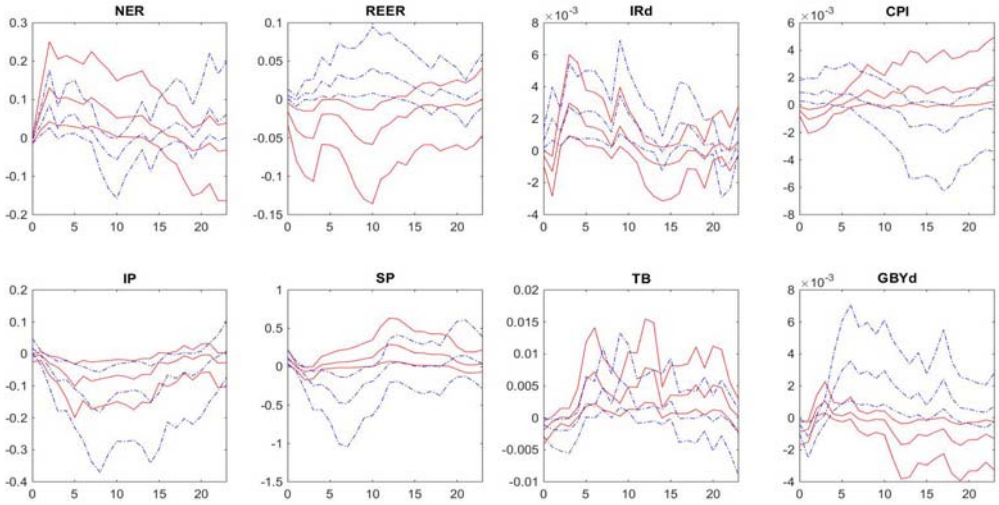
B. Quarterly Variables



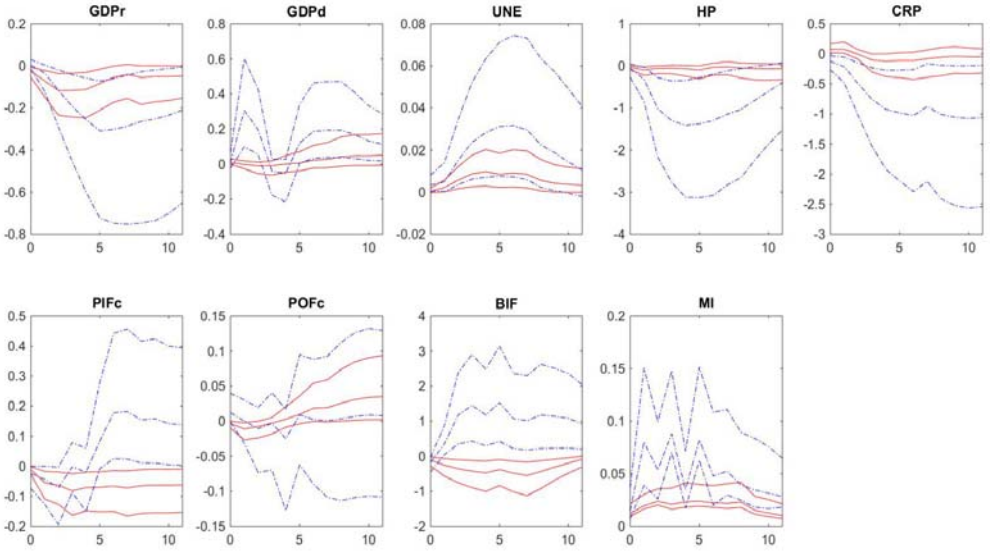
* The impulse responses are based on equation (2) in the paper. Included variables are the bilateral dollar exchange rate (NER), the real effective exchange rate (REER), the short term interest rate differential vs. the US (IRd), the CPI, industrial production (IP), the real stock price (SP), the nominal trade balance (TB) and the sovereign spread vs. the US (GBYd) at monthly frequency; real GDP (GDPy), the GDP deflator (GDPd), the unemployment rate (UNE), the real house price (HP), real credit to the private sector (CRP), portfolio inflows (PIFc), portfolio outflows (POFc), banking inflows, all cumulated and scaled by GDP (BIF) and the "misery index", the sum of the unemployment rate and the absolute change in the inflation rate (MI).

Figure 9: Responses of EMEs with Lower (solid line) and Higher Capital Mobility (dotted line) to US Monetary Policy Shocks*

A. Monthly Variables



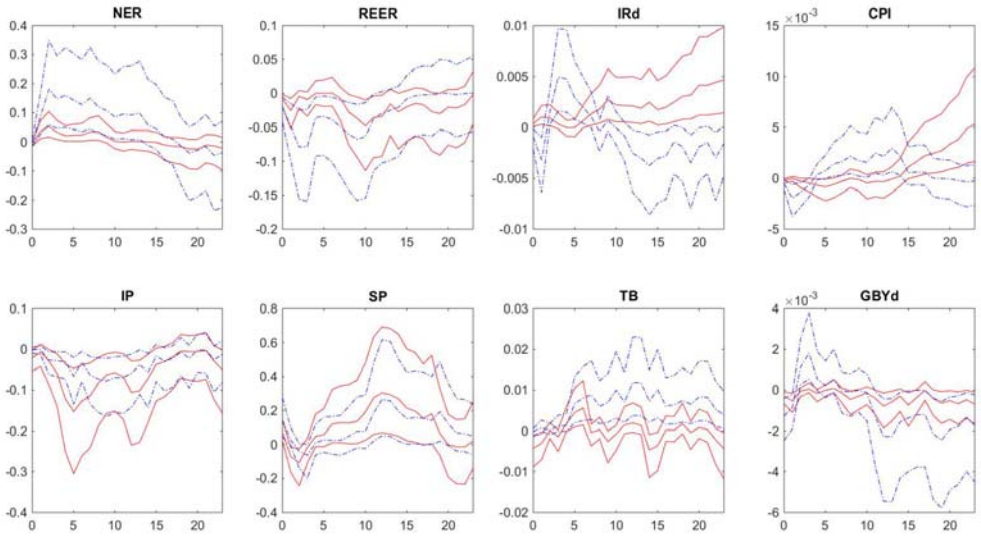
B. Quarterly Variables



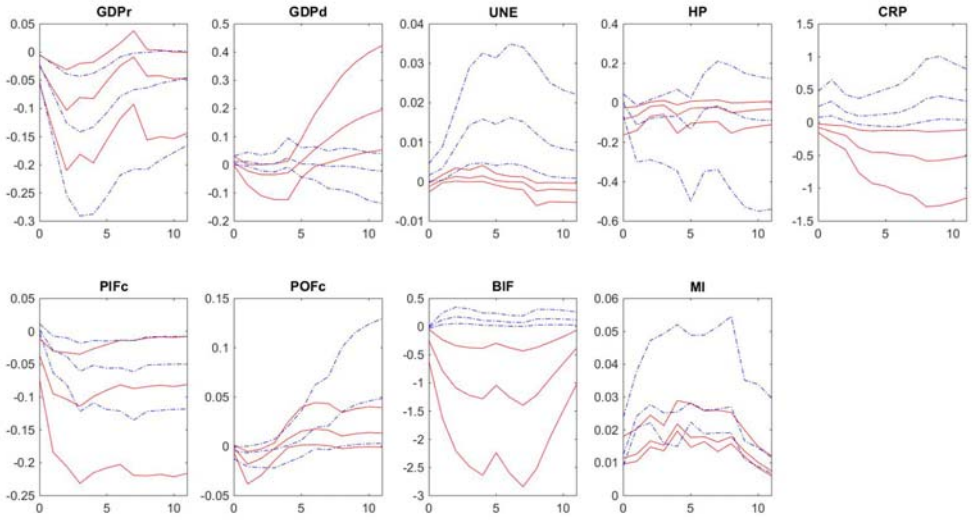
* The impulse responses are based on equation (2) in the paper. Included variables are the bilateral dollar exchange rate (NER), the real effective exchange rate (REER), the short term interest rate differential vs. the US (IRd), the CPI, industrial production (IP), the real stock price (SP), the nominal trade balance (TB) and the sovereign spread vs. the US (GBYd) at monthly frequency; real GDP (GDPy), the GDP deflator (GDPd), the unemployment rate (UNE), the real house price (HP), real credit to the private sector (CRP), portfolio inflows (PIFc), portfolio outflows (POFc), banking inflows, all cumulated and scaled by GDP (BIF) and the "misery index", the sum of the unemployment rate and the absolute change in the inflation rate (MI).

Figure 10: Responses of EMEs with Low Capital Mobility, Pegs (solid line) and Floaters (dotted line) to US Monetary Policy Shocks*

A. Monthly Variables



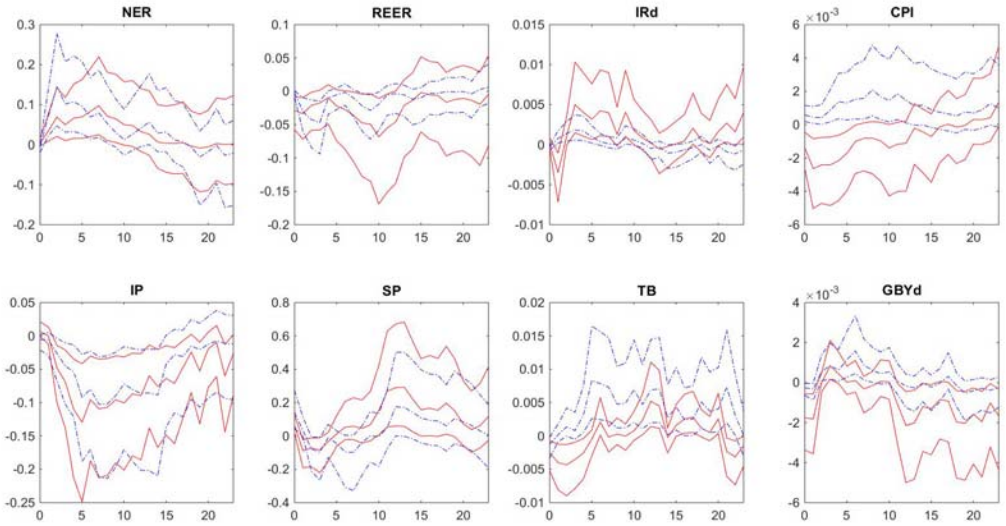
B. Quarterly Variables



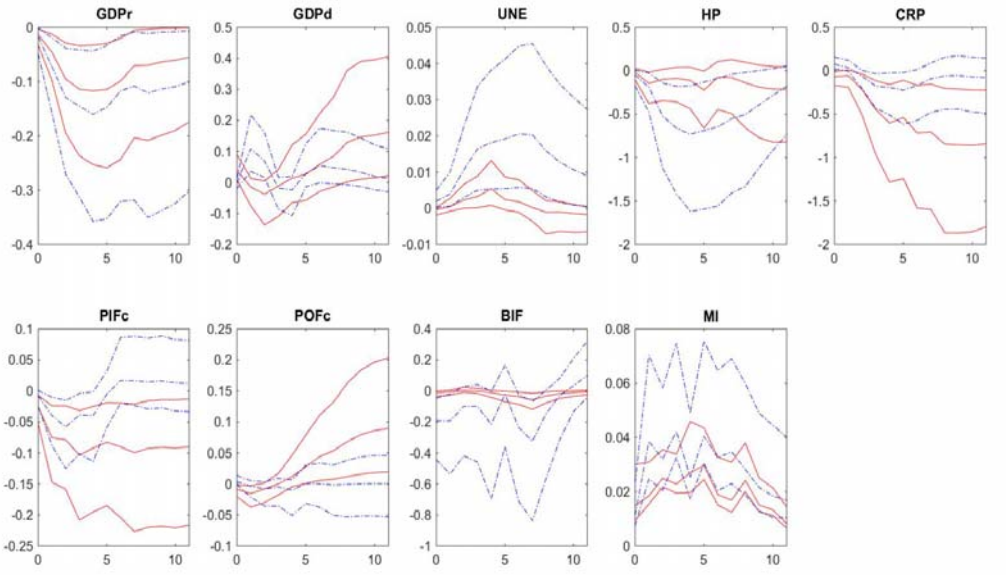
* The impulse responses are based on equation (2) in the paper. Included variables are the bilateral dollar exchange rate (NER), the real effective exchange rate (REER), the short term interest rate differential vs. the US (IRd), the CPI, industrial production (IP), the real stock price (SP), the nominal trade balance (TB) and the sovereign spread vs. the US (GBYd) at monthly frequency; real GDP (GDPy), the GDP deflator (GDPd), the unemployment rate (UNE), the real house price (HP), real credit to the private sector (CRP), portfolio inflows (PIFc), portfolio outflows (POFc), banking inflows, all cumulated and scaled by GDP (BIF) and the "misery index", the sum of the unemployment rate and the absolute change in the inflation rate (MI).

Figure 11: Response of EMEs with High (solid) and Low Dollar Financial exposure (dotted) to US Monetary Policy Shocks*

A. Monthly Variables



B. Quarterly Variables



* The impulse responses are based on equation (2) in the paper. Included variables are the bilateral dollar exchange rate (NER), the real effective exchange rate (REER), the short term interest rate differential vs. the US (IRd), the CPI, industrial production (IP), the real stock price (SP), the nominal trade balance (TB) and the sovereign spread vs. the US (GBYd) at monthly frequency; real GDP (GDPy), the GDP deflator (GDPd), the unemployment rate (UNE), the real house price (HP), real credit to the private sector (CRP), portfolio inflows (PIFc), portfolio outflows (POFc), banking inflows, all cumulated and scaled by GDP (BIF) and the "misery index", the sum of the unemployment rate and the absolute change in the inflation rate (MI).

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 3a: Country Factors

	Emerging (2014)	Reinhard and Rogoff FX regime	Base country (Klein and Shambaugh)	Average for US pegged countries (Klein and Shambaugh)	Euro Area member or pegged (2015)	Chinn-Ito financial openness	Capital inflow restrictions	Net total dollar exposure	Net debt dollar exposure	Gross total dollar exposure	Trade with US / GDP	Forex reserves / GDP	Trade Openness
Australia	0	3.8	US	0	0	1.4	0.3	23%	1%	52%	4%	4%	31%
Austria	0	1.0	Germany	-	1	1.9	0.1	5.4%	2%	42%	2%	6%	63%
Belgium	0	1.0	Germany	-	1	1.7	0.0	7%	3%	97%	9%	5%	159%
Brazil	1	3.9	US	0.03	0	-1.1	0.7	17%	-11%	34%	4%	11%	18%
Canada	0	2.3	US	0.22	0	2.4	0.1	30%	12%	97%	38%	3%	55%
Chile	1	2.8	US	0.06	0	-0.3	0.4	33%	-9%	76%	9%	17%	49%
China	1	2.0	US	0.47	0	-1.3	1.0	27%	-29%	35%	5%	19%	39%
Colombia	1	2.9	US	0	0	-1.1	0.7	21%	-9%	44%	10%	10%	18%
Czech Republic	0	2.2	-	-	0	1.6	0.1	-3%	-49%	33%	2%	22%	105%
Denmark	0	1.6	Germany	-	1	1.7	0.1	15%	17%	70%	3%	11%	54%
Estonia	0	1.4	-	-	1	2.4	-	10%	-11%	18%	3%	13%	130%
Finland	0	1.5	Germany	-	1	1.9	0.2	2%	-5%	47%	3%	5%	52%
France	0	1.2	Germany	-	1	1.4	0.0	8%	-1%	46%	3%	2%	39%
Germany	0	2.8	US	0	1	2.4	0.1	7%	-3%	40%	4%	3%	50%
Greece	0	1.4	Germany	-	1	0.5	0.0	10%	4%	15%	1%	4%	29%
Hungary	1	2.6	Germany	-	0	0.3	0.2	18%	-11%	24%	3%	22%	107%
India	1	1.9	US	0.24	0	-1.2	0.9	13%	-24%	24%	2%	8%	20%
Italy	0	1.6	Germany	-	1	1.4	0.0	4%	-1%	26%	2%	3%	49%
Japan	0	4.0	US	0	0	2.3	0.0	12%	-4%	50%	5%	9%	21%
Korea	0	2.5	US	0.34	0	-0.3	0.4	23%	-2%	42%	11%	14%	60%
Latvia	0	3.1	-	-	1	2.3	0.1	-4%	-25%	25%	1%	17%	74%
Lithuania	1	2.1	-	-	1	2.2	-	1%	-26%	24%	2%	13%	94%
Malaysia	1	1.9	US	0.37	0	0.9	0.7	16%	-29%	69%	22%	31%	141%
Mexico	1	3.2	US	0.28	0	0.4	0.6	37%	-6%	44%	28%	8%	40%
Netherlands	0	1.1	Germany	-	1	2.4	0.0	12%	-2%	95%	6%	5%	97%
Norway	0	3.0	Germany	-	0	1.3	0.1	16%	16%	73%	3%	14%	51%

Table 3a: Country Factors

Philippines	1	2.4	US	0.31	0	-0.4	0.7	30%	18%	50%	13%	12%	59%
Poland	1	3.5	Germany	-	0	-1.2	0.7	10%	-3%	26%	1%	16%	53%
Portugal	0	1.5	Germany	-	1	1.1	0.1	10%	4%	18%	2%	7%	50%
Russia	1	3.4	-	-	0	-0.3	0.7	-5%	-43%	60%	2%	15%	38%
South Africa	1	4.4	US	0.09	0	-1.3	0.4	-16%	-62%	31%	4%	4%	44%
Spain	0	1.5	Germany	-	1	1.3	0.0	10%	2%	23%	2%	5%	35%
Sweden	0	2.6	Germany	-	0	1.8	0.1	12%	7%	69%	4%	6%	52%
Thailand	1	1.8	US	0.62	0	-0.3	0.6	25%	3%	42%	11%	23%	85%
Turkey	1	4.3	US	0.06	0	-0.8	0.3	-5%	-26%	31%	2%	8%	33%
UK	0	2.9	Germany	-	0	2.4	0.0	17%	14%	207%	5%	3%	39%

Note: The data refer to period averages (1980 to latest available observation), with the exception of the dummy for emerging country and euro area membership. Countries are defined as emerging or advanced economies according to the IMF classification in the April 2014 WEO. The variable peg refers to the exchange rate regime coarse classification by Reinhart and Rogoff and is calculated during the period 1980-2010 (subject to data availability). The variable euro area membership takes value 1 if a country was a member of the euro area in 2015. Financial openness is measured by the Chinn-Ito index over the period 1980-2012 (subject to data availability). Capital inflow restrictions are measured by the Fernández et al. (2015) *kai* index (overall capital inflow restrictions) and refer to the period 1995-2013 (subject to data availability). Figures on net dollar exposure are computed using the database of Benetrix et al. (2015) over the period 1990-2012. Net total dollar exposure is the difference between the share of dollar total assets and the share of dollar total liabilities; gross dollar exposure is the sum of dollar asset and liabilities in USD as a share of domestic GDP. The net debt dollar exposure is the difference between the share of foreign debt assets in USD and the share of foreign debt liabilities in USD. Trade with the US to GDP is calculated by dividing the sum of a country exports to US and imports from the US by its domestic GDP (in US dollars) over the period 1980-2013 (subject to data availability). Foreign reserves to GDP do not include gold reserves and are calculated over the period 1980-2013 (subject to data availability). Trade openness is calculated by dividing the sum of total exports and import by domestic GDP over the period 1980-2013 (subject to data availability).

Table 3b: Country Classifications

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

Table 3b: Country Classifications

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.