Federal Reserve Bank of Dallas
Globalization and Monetary Policy Institute
Working Paper No. 314
https://www.dallasfed.org/~/media/documents/institute/wpapers/2017/0314.pdf

Financial Globalisation, Monetary Policy Spillovers and Macro-modelling: Tales from 1001 Shocks*

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May 2017

Abstract

Financial globalisation and spillovers have gained immense prominence over the last two decades. Yet, powerful cross-border financial spillover channels have not become a standard element of structural monetary models. Against this background, we hypothesise that New Keynesian DSGE models that do not feature powerful financial spillover channels confound the effects of domestic and foreign disturbances when confronted with the data. We derive predictions from this hypothesis and subject them to data on monetary policy shock estimates for 29 economies obtained from more than 280 monetary models in the literature. Consistent with the predictions from our hypothesis we find: Monetary policy shock estimates obtained from New Keynesian DSGE models that do not account for powerful financial spillover channels are contaminated by a common global component; the contamination is more severe for economies that are more susceptible to financial spillovers in the data; and the shock estimates imply implausibly similar estimates of the global output spillovers from monetary policy in the US and the euro area. None of these findings applies to monetary policy shock estimates obtained from VAR and other statistical models, financial market expectations and the narrative approach.

JEL codes: F42, E52, C50

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1 Introduction

A salient feature of the global economy since the 1990s has been the dramatic rise of financial globalisation. Whether measured by (gross) capital flows or indicators reflecting the extent of legal capital account restrictions, economies' financial markets have been exhibiting an increasing degree of integration. As a result, the global economy is progressively becoming subject to large cross-country spillovers through financial channels, in particular in case of monetary policies in systemic economies. Indeed, a growing body of empirical research provides evidence that financial interlinkages play a critical role in the transmission of shocks across economies (Ehrmann and Fratzscher, 2003, 2005, 2009; Ehrmann et al., 2011; Hale et al., 2016). Similarly, several studies document the sizable impact of—in particular US—monetary policy on output and inflation in the rest of the world that materialises through financial spillover channels (Kim, 2001; Canova, 2005; Nobili and Neri, 2006; Dedola et al., 2015; Feldkircher and Huber, 2015; Georgiadis, 2016). And related work even suggests that economies' financial markets are subject to a global financial cycle, which is argued to materialise in variations in global risk aversion and to be driven by US monetary policy (Bekaert et al., 2013; Ghosh et al., 2014; Bruno and Shin, 2015b,a; Miranda-Agrippino and Rey, 2015; Passari and Rey, 2015; Rey, 2015).

At the same time, over the last two decades important advances in structural monetary modelling have been achieved, as reflected in the huge amount of work on New Keynesian dynamic stochastic general equilibrium (NK DSGE) models. While the first NK DSGE models focused on frictions in price setting and labor markets (Smets and Wouters, 2003; Christiano et al., 2005), the global financial crisis epitomised the role of frictions in financial markets for the propagation of shocks. The resulting wave of work has focused on introducing frictions in *domestic* financial markets (Gertler and Karadi, 2011; Christiano et al., 2014). Advances have also been made in generalising the initially closed-economy NK DSGE models to analyse the international transmission of shocks and policy design in open economies, giving rise to New Open-Economy Macroeconomics (Obstfeld and Rogoff, 1996). After two decades of continuous development and research it is fair to say that NK DSGE models have become standard elements of macroeconomists' toolbox. In particular at central banks elaborate versions of NK DSGE models are routinely used, for example in order to determine what shocks have been drivers of recent business cycle movements. This is an important exercise, as the appropriate policy response to business cycle fluctuations depends on what type of shocks are driving the economy. Against the background of the continuous strengthening of cross-border financial integration, it is noteworthy that powerful spillover channels based on frictions in international financial markets—for example involving cross-border interbank balance sheet exposures, collateral constraints and currency mismatches—are not routinely incorporated in NK DSGE models.[1] Possible consequences of this particular discrepancy

[1] NK DSGE models that do consider frictions in international financial markets include Devereux and

between empirics and theory have not been explored systematically yet. We aim to fill part of this gap in the literature.

In this paper we hypothesise that the structural monetary models used in the profession typically fail to adequately account for the importance of financial spillover channels in the data. We argue that, as a consequence, when confronted with the data these models label rest-of-the-world monetary policy shocks as domestic ones. We test this hypothesis by verifying—in a meta-study-like fashion—if three predictions are borne out by the NK DSGE models used in the literature. Specifically, under our hypothesis we expect: First, domestic monetary policy shock estimates are contaminated by a common global component and are therefore positively correlated across economies.[2] Second, the contamination by the common global component is more severe and thereby gives rise to larger cross-country correlations for pairs of economies that are more strongly integrated with global financial markets. Third, estimates of the global spillovers from domestic monetary policy obtained using shock estimates from NK DSGE models in time-series regressions are implausibly similar across spillover-sending economies, as they all reflect the response to a common global monetary policy shock.

We provide empirical evidence that is consistent with the predictions from our hypothesis based on a database of monetary policy shock estimates for 29 economies obtained from more than 280 structural and non-structural monetary models used in the literature for the time period from 1993 to 2007. First, we document that when confronted with the data NK DSGE models produce domestic monetary policy shock estimates that are positively correlated across economies. In contrast, monetary policy shock estimates obtained from VAR and other statistical models, derived from financial market expectations and the narrative approach are essentially cross-country uncorrelated. Interestingly, we document that the contamination by a common global component is as severe for monetary policy shock estimates obtained from NK DSGE models used at central banks and international organisations as for shock estimates obtained from stylised NK DSGE models used in academia. Second, the cross-country correlations between monetary policy shock estimates obtained from NK DSGE models are larger for economies that are more strongly integrated with global financial markets. Importantly, this finding is robust to accounting for other possible explanations for the cross-country correlations between monetary policy shock estimates, such as mis-specification of the Taylor-rule or failure to account for spillovers through trade. Third, using shock estimates obtained from NK DSGE models in time-series regressions produces estimates for the global output spillovers from US and euro area monetary policy which are implausibly

Yetman (2010), Kollmann et al. (2011), Dedola and Lombardo (2012), Ueda (2012), Banerjee et al. (2016) as well as Nuguer (2016).

[2]That the true structural shocks are uncorrelated is impossible to verify, but is a fundamental assumption in macroeconomics. For example, Bernanke (1986) states that "shocks should be primitive exogenous forces that are uncorrelated with each other", as only un-correlatedness allows a meaningful interpretation of impulse response functions and variance decompositions. Andrle (2014) discusses in detail the notion that (cross-country) correlated estimates of structural shocks are a sign of model mis-specification in NK DSGE models.

similar. In contrast, the relative magnitudes of the estimates of the global output spillovers from monetary policy in the US and the euro area obtained from time-series regressions are more plausible when using shock estimates that stem from non-NK DSGE models.

Our paper is related to the literature which is concerned with the role of powerful financial spillover channels in structural monetary models for cross-country business cycle correlations (Iacoviello and Minetti, 2006; Ueda, 2012; Yao, 2012; Chin et al., 2015). Within this literature, our paper is most closely related to Justiniano and Preston (2010) as well as Alpanda and Aysun (2014), who find that standard open-economy NK DSGE models fail to replicate the large degree of cross-country business cycle co-movement in the data, and that they imply only an implausibly minor role of foreign disturbances for the evolution of domestic variables. More specifically, these studies find that the theoretical moments implied by standard NK DSGE models—which do not account for powerful financial spillover channels—are much closer to their empirical counterparts if it is assumed that the structural shocks are cross-country correlated. This finding is typically interpreted as suggesting that standard NK DSGE models lack empirically relevant cross-border transmission channels for country-specific shocks or a global dimension that would allow to consider common shocks. This interpretation is consistent with the finding in this paper that NK DSGE models that do not account for powerful financial spillover channels produce cross-country correlated monetary policy shock estimates. At the same time, our findings of course do not imply that the lack of financial spillover channels is the only—or even the most important—source of mis-specification in standard NK DSGE models. Finally, while the analyses of Justiniano and Preston (2010) as well as Alpanda and Aysun (2014) are based on counterfactual simulations of two *specific* structural models, in this paper we consider a database of monetary policy shock estimates from more than 280 monetary—including non-structural—models estimated for a range of economies.

The empirical evidence we obtain in this paper is also consistent with several additional predictions from our hypothesis. First, the evidence supports the hypothesis of a global financial cycle that is driven by US monetary policy (Bekaert et al., 2013; Bruno and Shin, 2015b,a; Miranda-Agrippino and Rey, 2015; Passari and Rey, 2015; Rey, 2015). Specifically, a prediction from the global financial cycle hypothesis in the light of our paper is that monetary policy shock estimates from NK DSGE models which do not feature powerful financial spillover channels should be contaminated by a US component. Indeed, we find that the cross-country correlations between the monetary policy shock estimates obtained from NK DSGE models for non-US economies are larger for country pairs that are more financially integrated with US—in addition to global—financial markets. Second, the evidence we obtain is also consistent with the important role of global banks in financial integration prior to the global financial crisis (Goldberg, 2009; Cetorelli and Goldberg, 2012; Bruno and Shin, 2015b,a; Morais et al., 2015). Specifically, we find that the contamination by a common global component is particularly severe for monetary policy shock estimates for economies which are more financially integrated through international banking linkages. Finally, we also obtain some tentative evidence that is consistent with the trilemma in international macroeconomics (Obstfeld et al., 2005; di Giovanni and Shambaugh, 2008; Klein and Shambaugh, 2015; Obstfeld, 2015): The contamination by a common global component is less severe for monetary policy shock estimates for emerging market economies which impose capital controls and which feature flexible exchange rate regimes.

Failure to account for the global context and powerful financial spillover channels in NK DSGE models may imply inconsistent parameter estimates obtained by likelihood-based methods, as the monetary policy shock estimates entering the likelihood function are mis-measured. Moreover, mis-measured monetary policy shock estimates imply incorrect variance and historical decompositions. Ultimately, this might lead to mis-leading policy recommendations. Having said that, it is important to emphasise that our paper is not to be read as a general critique or dismissal of the use of NK DSGE models in the profession. Consistent with the view of Blanchard (2016), we believe that NK DSGE models "are eminently improvable and central to the future of macroeconomics", and that whether specific elements—such as powerful financial spillover channels—are necessary depends on the purpose the models are used for. The insights from our paper suggest that more efforts need to be devoted to the modelling of the global context as well as powerful financial spillover channels in structural monetary models that are used for policy analysis, especially at central banks and international organisations. Indeed, we also find that the contamination by a common global component is less severe if the monetary policy shock estimates stem from NK DSGE models that do feature an explicit multi-country dimension and/or frictions in international financial markets. Which particular frictions in cross-border financial markets are the most appropriate to be introduced into NK DSGE models to mitigate the contamination by a common global component most plausibly depends on country specifics, and we leave this investigation for future research.

The rest of this paper is organised as follows. In Section 2, we illustrate the mechanics of our hypothesis and derive testable predictions from a stylised counterfactual Monte Carlo experiment. In Section 3 we present our monetary policy shock database and test the predictions from our hypothesis derived in Section 2. Section 4 presents additional testable predictions, competing hypotheses that may explain the positive cross-country correlations between the NK DSGE model monetary policy shock estimates in our database as well as robustness checks. Finally, Section 5 concludes.

2 Financial globalisation, monetary policy spillovers and structural macro-modeling

In this section we consider a counterfactual Monte Carlo experiment in order to motivate our hypothesis. Specifically, the Monte Carlo experiment consists of three steps. First, we simulate data based on a structural multi-country model with financial spillover channels and cross-country uncorrelated monetary policy shocks. The model features "core" (the US) and "non-core" (the euro area and Japan) economies which differ in the magnitude of the financial spillovers they emit. Second, we obtain estimates of the monetary policy shocks for the euro area and Japan by feeding the simulated data into intentionally mis-specified single-country versions of the true data-generating process; specifically, the single country models do not feature financial spillover channels. Third, we determine the cross-country correlation between the monetary policy shock estimates for the non-core economies of the euro area and Japan obtained in step two. We also utilise the shock time series estimates to obtain estimates of the spillovers from monetary policy in the euro area (or Japan) to the US using local projections. We run the Monte Carlo experiment for different parameterisations of the data-generating process in order to assess the role of the strength of financial spillovers for the properties of the monetary policy shock estimates. It is important to emphasise that we consider this Monte Carlo experiment in order to illustrate how failure to account for financial spillover channels can give rise to cross-country correlated monetary policy shock estimates, and not in order to establish that this is the only possible reason for cross-country correlated monetary policy shock estimates. We explore alternative explanations for cross-country correlated monetary policy shock estimates in Section 4.

2.1 The data-generating process

The basic building blocks of the multi-country model of Coenen and Wieland (2002) are an IS-curve, a Phillips curve, an uncovered interest rate parity condition, and a Taylor-rule for each economy.[3] Importantly, we specify the monetary policy shocks in the data-generating process to be uncorrelated across economies. We introduce a financial spillover channel by modifying the original specification of nominal long-term interest rates $i_{it}^{(l)}$ through the term structure in Coenen and Wieland (2002) and consider

$$i_{it}^{(l)} \quad = \quad (1-\vartheta_i) \cdot \left(\frac{1}{8} \sum_{\ell=0}^{7} E_t i_{i,t+\ell}^{(s)} \right) + \vartheta_i \cdot \left(\sum_{j=1, j \neq i}^{N} \omega_{ij} \, i_{jt}^{(l)} \right), \tag{1}$$

[3]The model of Coenen and Wieland (2002) is semi-structural: The components are not explicitly derived from micro-founded optimisation problems, but are very similar to those in rigorously constructed structural monetary models. Appendix C.2 provides a detailed description of the model.

where $i, j \in \{us, ea, ja\}$, $i_{it}^{(s)}$ represents the nominal short-term interest rate, and w_{ij} denotes bilateral weights. The second term on the right-hand side of Equation (1) gives rise to potentially powerful financial spillovers. Specifically, the higher ϑ_i, the stronger the spillovers from foreign to domestic long-term interest rates. Analogously, the higher ω_{ij}, the stronger the spillovers to domestic long-term interest rates in economy i from economy j relative to those from other foreign economies s, $s \neq i, j$. This specification of financial spillovers through long-term interest rates is consistent with their strong co-movement in the data (see, for example, Ehrmann and Fratzscher, 2003, 2005; Ehrmann et al., 2011; Chin et al., 2015).

We examine two polar parameterisations for ϑ_i and $\omega_{i,us}$ in Equation (1), namely a "no financial spillovers" and a "financial spillovers" parametrisation. In the "no financial spillovers" parametrisation we set $\vartheta_i = \omega_{i,us} = 0$. In the "financial spillovers" parametrisation we set $\vartheta_i = 0.2$ and $\omega_{i,us} = 0.8$. For the US we fix $\vartheta_{us} = 0.2$ and $w_{us,j} = 0.5$, reflecting our assumption of the US being the core economy. The dynamics of domestic and foreign variables in response to monetary policy shocks under the two polar parameterisations are qualitatively plausible and—in particular for the "financial spillovers" parametrisation—consistent with the findings on monetary policy spillovers in the empirical literature (see Figures 7 and 8 in Appendix C.2 as well as Dedola et al., 2015; Feldkircher and Huber, 2015; Banerjee et al., 2016; Chen et al., 2016; Georgiadis, 2016).

2.2 Cross-country correlations of monetary policy shocks

Figure 1 presents the distribution of the cross-country correlations between the monetary policy shock estimates for the non-core economies of the euro area and Japan obtained from feeding the data simulated from the multi-country data-generating process into the corresponding single-country versions across the 1,000 replications of the Monte Carlo experiment. Under the "no financial spillovers" parametrisation, the cross-country correlations are not noticeably (and statistically significantly) different from zero, which is in line with the absence of such correlation in the data-generating process. In contrast, under the "financial spillovers" parametrisation the cross-country correlations are large and positive, with a mean of around 0.2 across replications. Thus, using single-country models that do not adequately account for the presence of powerful financial spillover channels in the data-generating process produces domestic monetary policy shock estimates which are positively cross-country correlated.

In order to identify the source of this correlation, we run the regression

$$\widehat{e}_{ea,t}^{mp} = \sum_{i \in ea,us,ja} \left(\beta_i^{mp} \cdot e_{it}^{mp} + \beta_i^{d} \cdot e_{it}^{d} + \beta_i^{cp} \cdot e_{it}^{cp} \right) + u_{it}, \tag{2}$$

where $\widehat{e}_{ea,t}^{mp}$ represents the euro area monetary policy shock estimates obtained from the single-country model, and e_{it}^{mp}, e_{it}^{d}, and e_{it}^{cp} denote the true monetary policy, demand and cost-push shocks.[4] Figure 2 presents the distribution of the coefficient estimates $\widehat{\beta}_i^{\ell}$ in Equation (2) across replications of the Monte Carlo experiment. The results suggest that in particular under the "financial spillovers" parametrisation the estimate of the euro area monetary policy shock $\widehat{e}_{ea,t}^{mp}$ obtained from the single-country model is a convolution of the true monetary policy, demand and cost-push shocks of the euro area, the US and Japan. Most importantly, the true US monetary policy shock exhibits the largest loading on the estimated euro area monetary policy shock besides the true euro area monetary policy shock; the results for the regression of $\widehat{e}_{jp,t}^{mp}$ are analogous. Thus, the cross-country correlation between the estimated monetary policy shocks of the euro area and Japan arises due to a common US component. In particular, the contamination of domestic monetary policy shock estimates by a US component occurs because (i) in the true data-generating process a US monetary policy shock spills over to domestic financial markets in the euro area and Japan according to Equation (1); (ii) when using the mis-specified single-country models for the non-core economies of the euro area and Japan for the estimation of the monetary policy shocks, the US monetary policy shock is erroneously labelled as domestic monetary policy shock.

2.3 Spillover estimates

In each replication of the Monte Carlo experiment we estimate spillovers from euro area monetary policy to the US using local projections (Jorda, 2005). Specifically, we estimate

$$y_{us,t+h} = \alpha^{(h)} + \sum_{k=0}^{p} \gamma_k^{(h)} \widehat{e}_{ea,t-k}^{mp} + \sum_{k=1}^{n} \delta_k^{(h)} y_{us,t-k} + \sum_{k=0}^{q} \boldsymbol{x}_{us,t-k} \boldsymbol{\beta}_k^{(h)} + u_{us,t}^{(h)}, \tag{3}$$

for $h = 0, 1, \ldots, H$, where $y_{us,t+h}$ represents the US output gap and $\widehat{e}_{ea,t}^{mp}$ the euro area monetary policy shock estimates obtained from using the single-country model. The control variables in $\boldsymbol{x}_{us,t}$ include inflation, short and long-term interest rates as well as the real effective exchange rate. The data for $y_{us,t}$ and $\boldsymbol{x}_{us,t}$ stem from the simulation of the multi-country data-generating process. In every replication of the Monte Carlo experiment we use the simulated data both to estimate the monetary policy shocks in the single-country models and for the controls in the estimation of the local projections in Equation (3).

Figure 3 presents the estimated spillovers from euro area monetary policy to the US output gap for the "no financial spillovers" (left-hand side panel) and the "financial spillovers" (right-hand side panel) parametrisation. The black solid lines represent the true spillovers in the data-generating process, and the red dashed lines the averages and medians of the spillover estimates across replications of the Monte Carlo experiment. The results suggest that using domestic monetary policy shock estimates obtained from a single-country model that does

[4] We standardise the time-series of all variables in Equation (2) in order to facilitate the comparison of the magnitudes of the coefficient estimates.

not adequately account for the powerful financial spillover channels in the data produces excessively large estimates of the spillovers from euro area monetary policy to the US. The explanation for this result is that the euro area monetary policy shock estimates $\widehat{e}_{ea,t}^{mp}$ used in the local projections in Equation (3) contain a US component. Specifically, as the US component accounts for a large share of the variation in the euro area monetary policy shock estimates under the "financial spillovers" parametrisation, the estimates of spillovers from euro area monetary policy actually represent the effects of a US monetary policy shock on US variables; and, of course, in the true data-generating process the domestic effects of a US monetary policy shock are quantitatively significant (see Figure 7 in Appendix C.2).[5]

2.4 Testable predictions

We hypothesise that NK DSGE models used in the profession are generally subject to the same failure to account for financial spillovers as the single-country models in the counterfactual Monte Carlo experiment presented above. In the rest of this paper we thus test the following three predictions from our hypothesis:

Prediction 1: *Monetary policy shock estimates obtained from NK DSGE models are positively cross-country correlated.*

Prediction 2: *The cross-country correlation is larger for country pairs which are more susceptible to financial spillovers.*

Prediction 3: *Estimating the global effects of domestic monetary policy using the monetary policy shock estimates obtained from NK DSGE models in time-series—such as local projection—regressions results in large and implausibly similar spillover estimates for different spillover-sending economies.*

In order to test our hypothesis, we examine in a meta-study-like fashion whether Predictions 1-3 prevail in a sample of monetary policy shock estimates obtained from a wide range of NK DSGE and non-NK DSGE models in the literature.

3 A monetary policy shock database

The database we have set up contains more than 280 time series of monetary policy shock estimates. The monetary policy shock estimates pertain to 29 economies (see Table 1), and are obtained from estimated NK DSGE models, various blends of VAR models (structural VAR

[5] Analogously, the estimates of the spillovers from euro area monetary policy to Japan would in fact represent spillovers from US monetary policy to Japan, which are—due to the core properties of the US economy in our Monte Carlo experiment—notably larger than the true monetary policy spillovers from the euro area to Japan.

and VECM models, factor-augmented VAR models, dynamic factor models), other statistical models (term-structure models, shadow-rate models, Taylor-rule estimations), approaches based on financial market expectations, as well as the narrative approach (see Table 2). Tables 3 to 6 provide information on the reference, the time period coverage, the model type and other characteristics of the models from which the monetary policy shock estimates are obtained. One noteworthy observation is that only few of the NK DSGE models from which the monetary policy shock estimates in our database stem have an explicit multi-country dimension in the sense that they feature a foreign block (see Table 7); even fewer models feature financial spillover channels based on frictions in international financial markets. The sample period we consider for the analysis in the rest of this paper is 1993q1 to 2007q2. We choose this period in order to maximise the length of the sample period while at the same time having the shock time-series estimates overlap pair-wise for reasonably similar time periods.

3.1 Correlation patterns of monetary policy shock estimates

We start testing the predictions from our hypothesis by examining the correlation patterns of the monetary policy shock estimates in our database. Figure 4 displays a heat map of the correlations between the monetary policy shock estimates obtained from NK DSGE models. The correlations between monetary policy shock estimates which stem from different NK DSGE models but pertain to the same economy are located on the diagonal blocks; the correlations between monetary policy shock estimates which stem from different NK DSGE models and pertain to different economies are located on the off-diagonal blocks. The top panel in Figure 5 shows the distribution of the cross-country correlations between monetary policy shock estimates which stem from NK DSGE models. The mean of the cross-country correlations is positive and statistically significantly different from zero. This evidence is consistent with the first prediction from our hypothesis.

Recall that we hypothesise that monetary policy shock estimates obtained from NK DSGE models are contaminated by a global component because the structure of these models typically does not account for economies' susceptibility to monetary policy spillovers from abroad through financial channels in the data. Given that we also have monetary policy shock estimates obtained from non-NK DSGE models in our database, we can carry out placebo tests of our hypothesis. Specifically, as non-NK DSGE models impose a looser structure on the data, the cross-country correlation between the corresponding monetary policy shock estimates obtained should be significantly smaller than for NK DSGE models.[6] Accordingly, a placebo test of the first prediction from our hypothesis is shown in the second panel in Figure 5: The mean of the cross-country correlations between monetary policy shock estimates

[6]Indeed, when we estimate country-specific VAR models on the simulated data in the Monte Carlo experiment in Section 2 and apply recursive identification, the resulting monetary policy shock estimates for the euro area and Japan are on average uncorrelated.

obtained from non-NK DSGE models is significantly smaller than in case of the NK DSGE models.[7]

One might argue that the mean of the cross-country correlations for the monetary policy shock estimates obtained from NK DSGE models displayed in the top panel in Figure 5—while being positive—is rather small, questioning the importance of this finding. However, recall that according to the second prediction from our hypothesis we expect contamination by a common global component and thereby the cross-country correlations to be quantitatively significantly larger than zero only for country pairs which are susceptible to financial spillovers, and thus not necessarily for *all* country pairs. The third panel in Figure 5 suggests that the evidence from our monetary policy shock estimates database is consistent with this prediction: The cross-country correlations are substantially larger for advanced economies, which are typically more financially integrated and thereby more susceptible to financial spillovers than emerging market economies; and the fourth panel shows that the cross-country correlations are even larger if we consider only pairs of economies which are particularly financially integrated.[8] In the next section we explore the role of financial integration in the light of our hypothesis in more detail.

3.2 The role of financial integration for cross-country correlations between monetary policy shock estimates

According to the second prediction from our hypothesis, we expect contamination by a common global component and thereby the cross-country correlations to be larger for country pairs which are more susceptible to financial spillovers from abroad. Moreover, also consistent with the "global financial cycle" hypothesis (Rey, 2015), if the common component in the monetary policy shock estimates is largely driven by the core economy's monetary policy, we expect the cross-country correlations to be larger for pairs of economies which are more strongly integrated with US financial markets. In order to test these predictions, we consider country-pair regressions. Specifically, suppose we have monetary policy shock estimates for N economies in our database. Furthermore, suppose that for economy i we have a total of L_i monetary policy shock estimates, and that we refer to one of those series by ℓ_i; similarly, suppose we have a total of M_j monetary policy shock estimates for economy j, and that we

[7]Of course one has to keep in mind the caveat that the finding that the monetary policy shock estimates from non-NK DSGE models are uncorrelated across economies does not necessarily imply that they reflect different objects. This point is made forcefully in the literature on the effects of monetary policy shocks in VAR models (see Bagliano and Favero, 1998; Sims, 1998).

[8]We consider the median of economies gross foreign asset and liability position relative to GDP in our sample as cutoff.

refer to one of those time series by m_j. We then estimate the regression

$$\rho_{\ell_i,m_j} = \alpha_i + \gamma_j + \boldsymbol{x}_{ij} \cdot \boldsymbol{\beta} + u_{\ell_i,m_j}, \tag{4}$$
$$i,j = 1,2,\ldots,N, \quad i \neq j, \quad i,j \neq us, \quad \ell_i = 1,2,\ldots,L_i, \quad m_j = 1,2,\ldots,M_j,$$

where α_i and γ_j are country fixed effects, and $\boldsymbol{x}_{ij}$ includes measures of economy i's and j's combined susceptibility to financial spillovers from the rest of the world as well as the US. We measure the former by the product of economy i's and j's overall gross foreign asset and liability position relative to GDP, and the latter by the product of the shares of economy i's and j's bilateral gross foreign asset and liability position with the US in their overall external balance sheet. The data are taken from the External Wealth of Nations (EWN) Database of Lane and Milesi-Ferretti (2007) and the IMF's Coordinated Portfolio Investment Survey (CPIS).[9] For easier interpretation we standardise the explanatory variables in Equation (4) based on the moments in the baseline sample. We run the regression of Equation (4) on the sample of cross-country correlations between monetary policy shock estimates obtained from NK DSGE models. Also, in the baseline regression sample we only include economies for which we have at least three NK DSGE model monetary policy shock time series estimates in our database; this we do in order to preclude that our results are driven by economies for which the information stems from a rather small number of models. Finally, we only include cross-country correlations that are calculated on the basis of at least 16 time series observations. Imposing these requirements implies dropping somewhat more than 10% of the cross-country correlations of monetary policy shock estimates from our sample.[10,11]

The estimation results for Equation (4) are reported in columns (1) to (3) in Table 8. Consistent with the second prediction from our hypothesis, the results indicate that the cross-country correlations between monetary policy shock estimates obtained from NK DSGE models are higher for pairs of economies which are more susceptible to financial spillovers from the rest of the world and the US. The role of economies' susceptibility to financial spillovers for the mis-measurement of domestic monetary policy shock estimates in the NK DSGE models in our database is also quantitatively significant: The cross-country correlation between the monetary policy shock estimates for a pair of economies whose susceptibility to financial spillovers is one standard deviation above the mean of all country pairs is higher by 0.08, which is approximately equal to the average cross-country correlation in our database (see Figure 5).

Finally, also the second prediction from our hypothesis passes the placebo test: The results

[9] Figure 9 in Appendix C.3 presents economies' overall and bilateral financial integration with the US in the data.

[10] We consider all correlations ρ_{ℓ_i,m_j} whether or not they are statistically significantly different from zero in the regression of Equation (4). Robustness checks in Section 4 document that our results are unchanged if we set to zero correlations which are not statistically significantly different from zero.

[11] In the estimation of the regression in Equation (4) we cluster standard errors at the country-pair level.

reported in column (4) in Table 8 document that cross-country correlations between monetary policy shock estimates obtained from non-NK DSGE models are not systematically related to economies' susceptibility to financial spillovers. This finding is not due to (i) differences between the sets of country-pairs included in the sample underlying our baseline regression and the non-NK DSGE sample (column (5)), or (ii) the possibility that the shock time series estimates from VAR models, other statistical models, based on the narrative approach or financial market expectations represent different aspects of monetary policy shocks (columns (6) and (7)).

3.3 Spillover estimates

The third prediction from our hypothesis is that using shock estimates obtained from NK DSGE models in time-series regressions to estimate the effects of domestic monetary policy on the rest of the world produces large and implausibly similar spillover estimates for different spillover-sending economies. In order to test this prediction, we estimate the global output spillovers from domestic monetary policy shocks using the shock estimates in our database in local projections analogous to those in Equation (3). The sample we consider includes quarterly observations for 45 spillover-receiving economies spanning—depending on data availability—the time period from 1993q1 to 2007q2. For the dependent variable in the local projections we consider the logarithm of economies' real GDP. The control variables include domestic and trading-partner short-term interest rates, consumer-price inflation, and real GDP.[12] We focus on the spillovers from monetary policy shocks for the US and the euro area. For each spillover-sending economy we extract the first principal component from all monetary policy shock time series estimates obtained from NK DSGE models which are available for the entire time period from 1993q1 to 2007q2, and use that principal component as shock measure in the estimation of the local projection.

The left-hand side panel in Figure 6 presents the averages of the estimates of the output spillovers from US and the euro area monetary policy across spillover-recipient economies. The estimates of the global output spillovers from monetary policy shocks in the US and the euro area are very similar. This finding is at odds with what we would expect given the differences in these two economies' systemic importance for trade and finance in the global economy (Bruno and Shin, 2015b,a; Gopinath, 2015; Casas et al., 2016). However, this finding is consistent with the third prediction from our hypothesis that the spillover estimates reflect

[12]For data on real GDP, consumer price inflation and short-term interest rates we draw on the GVAR Toolbox (see Smith and Galesi, 2011). The economies included are Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Germany, Finland, France, Indonesia, India, Italy, Japan, Mexico, Malaysia, Netherlands, Norway, New Zealand, Peru, Philippines, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, UK, and the US. We add data obtained from Haver Analytics for Bolivia, Colombia, Croatia, Czech Republic, Denmark, Hungary, Ireland, Israel, Poland, Portugal, Paraguay, Romania, and Russia. The trade weights we use for the calculation of country-specific trading partner variables stem from the IMF Direction of Trade Statistics.

the effects of a global or US monetary policy shock by which the domestic monetary policy shock estimates obtained from NK DSGE models for the euro area are contaminated.

Finally, also the third prediction from our hypothesis passes the placebo test: The right-hand side panel in Figure 6 shows that when using the principal components of non-NK DSGE model shock time series estimates in the local projections the estimates of the global output spillovers from US monetary policy are notably larger than those from the euro area, consistent with the extraordinary role of the US in the global economy.

4 Additional testable predictions, alternative explanations and robustness checks

4.1 Additional testable predictions

4.1.1 Role of banking integration

The findings of research on financial integration prior to the global financial crisis allows us to refine the second prediction from our hypothesis. Specifically, the literature has emphasised the role of cross-border banking linkages for the international transmission of monetary policy in our sample period (see Goldberg, 2009; Cetorelli and Goldberg, 2012; Bruno and Shin, 2015b,a; Morais et al., 2015; Hale et al., 2016). We therefore replace the cross-country interaction between economies' gross foreign asset and liability position relative to GDP in Equation (4) by the interactions between portfolio, foreign direct and other investment relative to GDP. The results in column (2) in Table 9 suggest that contamination of monetary policy shock estimates obtained from NK DSGE models in our database by a common global component is indeed more severe for economies for which "other investment"—which includes bank loans—accounts for a larger share in their overall gross foreign asset and liability position. Of course, the category of "other investment" also includes items unrelated to bank loans, for example trade credit and advances, special drawing rights or currency and deposits. Therefore, in column (3) we consider the ratio of non-resident bank loans relative to GDP as an alternative and possibly more accurate measure of the importance of cross-border banking linkages.[13] The results are consistent with the evidence on the importance of global banking integration for the international transmission of monetary policy prior to the global financial crisis.

[13]The data originally stem from the Bank for International Settlements and are consolidated in the World Bank's Financial Development and Structure Dataset (see Cihak et al., 2012).

4.1.2 Open-economy models

Another prediction from our hypothesis is that NK DSGE models that feature an explicit open-economy dimension and/or frictions in international financial markets should be less prone to labelling foreign monetary policy shocks as domestic ones when confronted with the data. We test this prediction by entering dummy variables that equal unity in case at least one of the shock estimates stems from a model with open-economy elements—a multi-country model or a small open-economy model with or without financial spillover channels—interacted with economies' susceptibility to financial spillovers in the regression of Equation (4). The results reported in Table 10 suggest that consistent with our baseline results the contamination of monetary policy shock estimates by a common global component—and thereby the cross-country correlations—is larger for economies which are more financially integrated overall and with the US bilaterally, but that this is mitigated if the modelling framework is a multi-country and/or small open-economy models *with* financial spillover channels.[14]

4.1.3 Capital controls and exchange rate flexibility

According to the Mundellian trilemma in international macroeconomics, economies are less susceptible to financial spillovers if they impose capital controls and/or let their exchange rate float. As a consequence, for a given degree of susceptibility to financial spillovers as measured by the stock of foreign assets and liabilities, we expect cross-country correlations between monetary policy shock estimates in our database to be lower for pairs of economies which impose capital controls and/or feature a higher degree of exchange rate flexibility. In column (2) in Table 11 we therefore report results from the regression of Equation (4) in which we include the products of economies' capital controls and their exchange rate flexibility as additional explanatory variables.[15] Notice that this exercise is complicated by possible endogeneity between the strength of financial spillovers—and thereby the cross-country correlation between monetary policy shock estimates—and the degree of capital controls as well as exchange rate flexibility: Economies which exhibit larger financial spillovers should also be those which impose tighter capital controls and feature a flexible exchange rate, precisely because they intend to shield their domestic financial markets from foreign disturbances. However, notice that this endogeneity bias is working *against* finding evidence for capital controls and flexible exchange rates reducing the cross-country correlations between

[14]We do not consider the observations on the cross-country correlations involving the monetary policy shock estimates from Vitek (2014), as these account for a very large share of the open-economy models in our database and as we want to preclude that the monetary policy shock estimates from one model might drive the results. However, the results are similar when these are included.

[15]We measure capital controls by the first principal component of the capital control/capital account openness indicators of Chinn and Ito (2006), Quinn and Toyoda (2008), as well as Fernandez et al. (2015). The index of exchange rate flexibility is taken from Ilzetzki et al. (2010).

the monetary policy shock estimates in the regression of Equation (4). The results in column (3) indicate that cross-country correlations are indeed lower for—at least emerging market—economies which impose capital controls and/or feature flexible exchange rates, even if the relevant coefficient estimates are not large and/or estimated precisely, with p-values of around 11% and 18%.

4.2 Alternative explanations

4.2.1 Spillovers through trade

One might argue that an alternative explanation for the positive cross-country correlation between the monetary policy shock estimates in our database could be the existence of spillovers through trade combined with common mistakes in assessing current and future economic conditions by central banks in real time. Specifically, suppose the Federal Reserve and non-US central banks, say the ECB and the Bank of Japan, all over-estimated real activity and inflation in the US in real time. As a result, the Federal Reserve would tighten monetary policy. Similarly, in order to mitigate the inflationary pressures from the expected stronger import demand from the US, the ECB and the Bank of Japan would also tighten their monetary policy. Ex post, the monetary policy tightening in the US, the euro area and Japan would be interpreted as contractionary monetary policy shocks by the econometrician. Importantly, these contractionary monetary policy shock estimates would be positively correlated across the euro area and Japan. In this scenario, the cross-country correlation between the monetary policy shock estimates arises due to trade integration between the US and the rest of the world.[16] As trade and financial market integration in the data are strongly positively correlated, our baseline results in Table 8 might reflect omitted variable bias. However, our results are unchanged when we include measures of economies' overall trade integration and their bilateral trade integration with the US as additional explanatory variables (column (2) in Table 12).

4.2.2 Bilateral common component

One could also argue that the monetary policy shock estimates in our database are cross-country correlated not because they contain a common *global* component, but because they share a *bilateral* component. In particular, the cross-country correlation between monetary policy shock estimates of two non-core economies could arise due to their bilateral trade and

[16] A variation of this argument is that the ECB and the Bank of Japan could actually *loosen* monetary policy in order to counter negative spillovers that follow from the tightening of monetary policy in the US. However, also under this scenario the monetary policy shocks of the euro area and Japan would be positively correlated ex post.

financial integration in connection with similar arguments on common mis-assessments of future growth and inflation as in Section 4.2.1. However, our baseline results are unchanged if we include in the regression of Equation (4) measures of the strength of economies' bilateral trade and financial integration (columns (3) and (4) in Table 12).[17]

4.2.3 Mis-specification of the Taylor-rule

Another alternative explanation for the cross-country correlation between the monetary policy shock estimates in our database could be mis-specification of the Taylor-rule in estimated NK DSGE models. For example, economies might be subject to fear-of-floating even in the absence of a formal peg due to currency mismatches on their external balance sheet (see Calvo and Reinhart, 2002; Eichengreen et al., 2003). In such a setting, a depreciation of the domestic currency in response to a tightening of foreign monetary policy increases the home-currency value of domestic firms' foreign liabilities denominated in foreign currency, which are—at least in emerging economies—often not matched by foreign-currency cash flows. In this case, foreign monetary policy would enter directly in the true domestic monetary policy reaction function; estimates of domestic monetary policy shocks would then be contaminated by foreign monetary policy shocks if the Taylor-rule specified in the NK DSGE model does not account for the dependence of domestic on foreign monetary policy. However, our baseline results are unchanged if we enter the interaction between economies' net short position in foreign currency as an additional explanatory variable (column (2) in Table 13).[18] Cross-country correlated monetary policy shock estimates could also arise if policymakers respond to variables that are correlated across countries, but this is not accounted for in the Taylor-rules specified in the NK DSGE models. However, our baseline results are unchanged if we include a dummy variable indicating if at least one model features a Taylor-rule with open economy elements (such as the exchange rate, terms of trade or commodity prices) or variables which indicate susceptibility to global shocks such as the interaction of economies' share of fuel, ore and metal imports and exports in total imports and exports, or a dummy variable indicating if both economies are commodity exporters (see columns (3) to (5) in Table 13).

4.2.4 Common global demand and supply shocks

Finally, as discussed in Section 2, the lack of financial spillover channels in standard NK DSGE models might not only give rise to a global *monetary policy* component in domestic monetary policy shock estimates, but the common component might also consist of global demand and supply shocks. Under this hypothesis, we would expect the global component

[17]For bilateral trade the data are taken from the IMF's Direction of Trade Statistics and for bilateral financial integration from the IMF CPIS.

[18]The data on net foreign currency exposures are taken from Benetrix et al. (2015).

in the domestic monetary policy shock estimates to be less strongly correlated for economies that are more heterogeneous regarding their susceptibility to spillovers from a range of foreign shocks. In order to test this competing hypothesis, we consider additional explanatory variables in the regression of Equation (4) that reflect the heterogeneity of economies along a number of dimensions. Specifically, we enter the absolute value of differences in economies' (i) overall trade integration with the rest of world, (ii) centrality in the global trade network, (iii) position and participation in global value chains, as well as their (iv) output, export and import structures.[19] The results in Table 14 suggest our hypothesis that the common component in the monetary policy shock estimates is indeed mainly related to a global *monetary policy* shock.

4.3 Robustness

4.3.1 Alternative samples

It is worthwhile to slice our sample along several dimensions in order to explore the sensitivity of our results. First, one could argue that most of the NK DSGE monetary policy shock estimates in our database stem from parsimonious academic models that are meant to shed light on a particular transmission channel rather than to produce accurate estimates of the true monetary policy shocks. However, our results are unchanged if we restrict the sample to cross-country correlations between monetary policy shock estimates that are obtained from large and more sophisticated NK DSGE models used for policy advice at central banks and international organisations (column (2) in Table 15). In fact, the average cross-country correlation is equally large for monetary policy shock estimates that stem from structural models used at central banks and international organisations.[20]

Around a quarter of the cross-country correlations in our sample involves monetary policy shock estimates from the 40-country NK DSGE model of Vitek (2014). In order to ensure that our results are not driven by the monetary policy shock estimates from one particular

[19]The measure for the heterogeneity of economies' sectoral composition is the sum of the squared differences between two economies' output shares accounted for by a particular sector; for each sector, the squared difference is weighted by the share of that sector in global output. Global value chain participation and position are measures based on indirect and foreign value added. The data are taken from the World Input-Output Database (WIOD; Timmer et al., 2015). We use real GDP per capita and geographic variables in order to impute the observations on the measure of sectoral composition and global value chain properties for economies in our sample which are not available in the WIOD. Data on the centrality in the global trade network are taken from CEPII.

[20]The average cross-country correlation for monetary policy shock estimates from the NK DSGE models in our database that are used at central banks and international organisations is 0.094, while for the remaining NK DSGE models the average correlation is 0.051. This difference is mostly due to differences between the sets of country-pairs included in the baseline sample and the central bank/international organisations sample: The average cross-country correlation between the monetary policy shock estimates obtained from academic NK DSGE models is 0.093 when only those country-pairs for which we also have shock estimates from models used at central banks or international organisations are considered.

model, we exclude the shocks from Vitek (2014) from the regression sample (column (3) in Table 15). The results suggest that the relationship between the cross-country correlations and economies' susceptibility to financial spillovers in our baseline results is not driven by the monetary policy shock estimates obtained from Vitek (2014).

Recall that in our baseline regression sample we only include economies for which we have at least three time series of monetary policy shock estimates and cross-country correlations which are calculated on the basis of at least 16 time series observations. However, our results do not change when we consider a sample which includes cross-country correlations of all NK DSGE monetary policy shock estimates in our database (column (4) in Table 15).

Not all of the monetary policy shock estimates in our database can be made publicly available due to confidentiality restrictions. However, our baseline results—and all specifications explored in this section—are robust to using only those monetary policy shock estimates which can be made publicly available (column (5)).

One might argue that we should not base our findings on monetary policy shock estimates obtained from studies which have not undergone peer review processes, as these might not (yet) meet the quality standards of the profession. The results reported in Table 16 indicate that our results are not driven by monetary policy shock estimates from non-peer-reviewed studies. Whether we consider only monetary policy shock estimates from studies that have been published in a journal or from studies which have been published in journals ranked above a certain "Keele"-list threshold, our baseline results are—in particular taking into account the substantial reduction in the sample—confirmed.

4.3.2 Alternative model specifications

In our baseline specification for the dependent variable we include cross-country correlations regardless of whether or not they are statistically significantly different from zero. However, our results are robust to setting the cross-country correlations ρ_{ℓ_i,m_j} on the left-hand side in Equation (4) which are not statistically significantly different from zero at the 10% significance level to zero (column (2) in Table 17).

One could also argue that our estimation could be inconsistent as our dependent variable is bounded between minus/plus unity, which is not accounted for by a linear regression. A common approach to circumvent this is to consider the logit transformation of the dependent variable. Our results are not sensitive to this variation of the regression specification (column (3) in Table 17). Moreover, our results are also robust to consider a Tobit regression, which accounts for the censored nature of the dependent variable explicitly (column (4)).

We also consider a more general but significantly more strongly parameterised specification with shock-country instead of country fixed effects in Equation (4) by estimating

$$\rho_{\ell_i,m_j} = \alpha_{\ell_i} + \gamma_{m_j} + \boldsymbol{x}_{ij} \cdot \boldsymbol{\beta} + u_{\ell_i,m_j}. \tag{5}$$

Column (5) in Table 17 documents that our results are unchanged for this alternative regression specification.

Robust (median) regression in column (6) in Table 17 that accounts for possible outliers delivers results which are unchanged relative to the baseline.

Our baseline measure of economies' susceptibility to financial spillovers—the product of their financial integration—might be too crude to adequately capture asymmetries in the contamination of domestic monetary policy shock estimates by a global component. Specifically, consider two country pairs. In the first country pair, both economies are moderately susceptible to financial spillovers from abroad. In the second country pair, one economy is highly susceptible to financial spillovers, while the second economy is almost completely insulated from global financial markets. While the product of economies' susceptibility to financial spillovers might be similar for both country pairs, we should expect different cross-country correlations between their monetary policy shock estimates. In particular, because in the second country pair one economy is essentially immune to financial spillovers in the data its monetary policy shock estimates should not be contaminated by a common global component; as a result, regardless of how severely contaminated the monetary policy shock estimates of the other economy are, the cross-country correlation should be zero. Put differently, while taking the product between economies' susceptibility to financial spillovers as explanatory variables does account for non-linearities, it might be that multiplication features too little curvature in order to capture consistently the relationship between economies' combined susceptibility to financial spillovers and the extent of mis-measurement of the monetary policy shocks. Therefore, as an alternative we consider the minimum of the values of the two economies' susceptibility to financial spillovers. The results in column (7) in Table 17 are unchanged compared to the baseline.

To the extent that we have monetary policy shock estimates from several NK DSGE models for a given economy in our database, the sample we consider for the regression of Equation (4) in the baseline in general includes a different number of observations on cross-country correlations for country pair (i, j) than country pair (m, ℓ). One reason we choose this specification is that it implies a weighting of country-pair observations: A larger number of monetary policy shock estimates exists for economies which have been studied more intensively and for which data are more readily available; country pairs involving one or both of these economies receive a greater weight in our baseline regression. However, one might want to ensure that our results are not driven by such an implicit weighting. Therefore, we consider as dependent variable in Equation (4) observations of the cross-country correlations ρ_{ℓ_i,m_j} averaged within country pairs. However, at least for the overall susceptibility to financial spillovers, our results are robust to this alternative specification (column (8) in Table 17).

4.3.3 US vs. euro area as core economy

Finally, one may wonder if the common global component in domestic monetary policy shock estimates exclusively reflects a US component. In particular, for the many European economies in our sample the common component may also be driven by a euro area component. Column (2) in Table 18 reports results from a regression of Equation (4) in which we drop the cross-country correlations for country pairs that involve the euro area, in addition to those that involve the US; we also enter as additional explanatory variable the share of economies' overall financial integration accounted for by the euro area. Essentially, we hereby allow both the US and the euro area to represent core economies. The results for the coefficient estimate on economies' overall financial integration are unchanged. More importantly, the coefficient estimates of the shares of economies' overall financial integration accounted for by the US or the euro area are both positive. This finding is consistent with the notion that the common component in the monetary policy shock estimates contains both a US and a euro area component. While the coefficient estimates are not statistically significant at conventional significance levels, this finding nevertheless raises some doubts concerning the unique role of the US in driving a global financial cycle as well as the common component in the NK DSGE model monetary policy shock estimates in our database. Indeed, if we augment the regression of Equation (4) by a variable reflecting the share of economies' overall financial integration accounted for by the *regional* core—the euro area for European and the US for all other country pairs—then among the bilateral share variables only the coefficient estimate on this variable is statistically significant. Thus, the results are consistent with notion of the euro area being the driver of the European financial cycle, while the US that of the financial cycle of the rest of the world.

5 Conclusion

In this paper we provide evidence that is consistent with the hypothesis that many estimated NK DSGE models in the literature erroneously label foreign monetary policy shocks as domestic ones because they fail to adequately account for financial spillovers in the data. Specifically, we document that there is a statistically and economically significant, positive cross-country correlation between monetary policy shock estimates obtained from NK DSGE models. Also, the correlations are larger for pairs of economies which are more susceptible to financial spillovers in the data, as measured by their financial integration with the rest of the world and the US. Finally, we document that shock estimates from NK DSGE models imply large and implausibly similar estimates for the global output spillovers from monetary policy in a range of economies, such as the US and the euro area. The insights from this paper suggest that if NK DSGE models are to be used for policy advice, they should feature powerful financial spillover channels. Models without such elements are likely to provide misleading historical decompositions and inconsistent parameter estimates.

6 Acknowledgments

We would like to thank for sharing their code and/or data (in alphabetical order) Pablo Aguilar, Shahzad Ahmad, Viktors Ajevskis, Harun Alp, Sami Alpanda, Martin Andreasen, Katrin Assenmacher-Wesche, Uluc Aysun, Oxana Babecka-Kucharcukova, Emanuele Bacchiocchi, Gregor Baeurle, Mehmet Balcilar, Alina Barnett, Mahdi Barakchian, Jean Barthelemy, Joselito Basilio, Daniel Beltran, Jonathan Benchimon, Konstantins Benkovskis, Alon Binyamini, Hilde Bjørnland, Martin Bodenstein, Michal Brzoza-Brzezina, Daniel Buncic, Matthias Burgert, Petre Caraiani, Julio Carrillo, Fabia de Carvalho, Michele Ca'Zorzi, Ambrogio Cesa-Bianchi, Jaqian Chen, Xiaoshan Chen, Kai Christoffel, Hess Chung, Edda Claus, Francesco Columba, Mihai Copaciu, Vesna Corbo, Tobias Cwik, Vincent Dadam, Riccardo DiCecio, Taeyoung Doh, Mardi Dungey, Michael Ehrmann, Adam Elbourne, Selim Elekdag, Angelo Fasolo, Daniel Felcser, Martin Feldkircher, Daria Finocchario, Jorge Fornero, Matteo Fragetta, Takuji Fueki, Alain Gabler, Vasco Gabriel, Luca Gambetti, Carlos Garcia, Andrea Gazzani, Javier Garcia-Cicco, Paolo Gelain, Andrea Gerali, Karsten Gerdrup, Taniya Ghosh, Federico Giri, Caio Goncalves, Wildo Gonzalez, Denis Gorea, Rangan Gupta, Yuong Ha, Adnan Haider, Richard Harrison, Klemens Hauzenberger, Reinhold Henlein, Yasuo Hirose, Mathias Hoffmann, Nikolay Hristov, Patrick Huertgen, Matteo Iacoviello, Punnoose Jacob, Nils Jannsen, Jiadan Jiang, Monika Junicke, Alain Kabundi, Sohei Kaihatsu, Gunes Kamber, Muneesh Kapur, Peter Karadi, Mitsuru Katagiri, Tae Bong Kim, Markus Kirchner, Bohdan Klos, Lena Körber, Jenny Körner, Dimitris Korobilis, Kevin Kotze, Michael Kühl, Abhishek Kumar, Romain Lafarguette, Sean Langcakes, Stefan Laseen, Jungick Lee, Kirdan Lees, Stefan Leist, Fernando Linardi, Marco Lo Duca, Matteo Luciani, Lena Malesevic Perovic, Shuyun May Li, Krzysztof Makarski, Martin Mandler, Pym Manopimoke, Bruno Martins, Renee McKibbin, Rossana Merola, Fabio Milani, Stephen Millard, Silvia Miranda-Agrippino, Benoit Mojon, Konstantinos Mouratidis, Haroon Mumtaz, Jouchi Nakajima, Ruthira Naraidoo, Jean-Marc Natal, Eliphas Ndou, Daniel Nemec, Matthias Neuenkirch, Eric Ng, Anh Nguyen, Kris Nimark, Victoria Nuguer, Alberto Ortiz, Oguzhan Özcelebi, Alessia Paccagnini, Michael Paetz, Matthias Paustian, Jesper Pedersen, Tao Peng, Napat Phongluangtham, Massimiliano Pisani, Alexey Ponomarenko, Raluca Pop, Ioannis Pragidis, Dominic Quint, Mala Raghavan, Tovonony Razafindrabe, Daniel Rees, Muhammad Rehman, Sigal Ribon, Tim Robinson, Ørjan Robstad, Diego Rodriguez, Norberto Rodriguez Nino, Barbara Rudolph, Yuliya Rychalovska, Jakub Rysanek, Kouji Takahashi, Konstantinos Theodoridis, Dawid Trzeciakiewicz, Tomohiro Tsugura, Stanislav Tvrz, Jean-Guillaume Sahuc, Luca Sala, Frank Schorfheide, Roman Semko, Andrei Shulgin, Martin Slanicay, Juste Some, Rudi Steinbach, Grzegorz Szafranski, Surach Tanboon, Jaromir Tonner, Lenno Uusküla, Joab Dan Valdivia Coria, Osvald Vasicek, Gauthier Vermandel, Fabio Verona, Alejandro Vicondoa, Stefania Villa, Francis Vitek, Balazs Vonnak, Graham Voss, Marija Vukotic, Ben Zhe Wang, Raf Wouters, Bo Yang, Pawel Zabzcyk, Francesco Zanetti, Juraj Zeman, Xuan Zhang, Jasmine Zheng, Peng Zhou and Sarah Zubairy.

Moreover, we would like to thank colleagues at Bank of Canada, Bank of Finland, Bank of Israel, Bank of Italy, Bank of Japan, Bank of Korea, Bank of Mexico, Bank of Russia, Bank of Thailand, Bundesbank, Central Bank of Brazil, Central Bank of Chile, Central Bank of Colombia, Central Bank of Iceland, Czech National Bank, European Central Bank, Federal Reserve Board, International Monetary Fund, National Bank of Poland, National Bank of Romania, Norges Bank, Reserve Bank of South Africa, Reserve Bank of Australia, Reserve

Bank of New Zealand, Sveriges Riksbank, and Swiss National Bank, who helped the colleagues listed above to make the data available to us.

We would also wish to thank for their comments Michael Binder, Alberto Ortiz Bolanos, Benjamin Born, Giancarlo Corsetti, Luca Dedola, Jesus Fernandez-Villaverde, Wouter den Haan, Jordi Gali, Robert Kollmann, Falk Mazelis, Paul McNelis, Luca Onorante, Gert Peersman, Bruce Preston, Giorgio Primiceri, Stephanie Schmitt-Grohe, Livio Stracca, Georg Strasser, Roland Straub, Cedric Tille, and Stanislav Tvrz.

Finally, we would also like to thank conference and seminar participants at European Central Bank, Asian Development Bank, Center for Latin American Monetary Studies, the Bank of England-ECB-IMF workshop on "Global Spillovers: How much do we really know?", the CEPR-IMFS Conference "New Methods for Macroeconomic Modelling, Model Comparison and Policy Analysis", the 6th Bangko Sentral ng Pilipinas International Research Conference on "Revisiting Macro-financial Linkages", the 6th IWH/INFER Workshop on "(Ending) Unconventional Monetary Policy", the National Bank of Slovakia conference on "Monetary Policy Challenges from a Small Country Perspective", the 20th International Conference on Macroeconomic Analysis and International Finance, the 31st Irish Economic Association Annual Conference, the 21st Spring Meeting of Young Economists, the 9th FIW Research Conference on International Economics, and the 2016 Ioannina Meeting on Applied Economics and Finance.

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A Tables

Table 1: Country Coverage of the Monetary Policy Shocks Database

	DSGE	FME	NARR	SM	VAR	Total
AUS	8	1	0	1	5	15
BRA	6	0	0	1	1	8
CAN	6	0	0	1	3	10
CHE	6	0	0	0	1	7
CHL	3	0	0	0	2	5
CHN	4	0	0	0	1	5
COL	5	0	0	0	2	7
CZE	12	0	0	0	2	14
EAR	35	1	0	0	13	49
GBR	12	3	1	0	7	23
HUN	1	0	0	0	0	1
IND	4	0	0	2	1	7
ISL	1	0	0	0	0	1
ISR	3	0	0	0	1	4
JPN	6	0	0	1	1	8
KOR	5	0	0	0	0	5
MEX	2	0	0	0	1	3
NOR	2	1	0	0	2	5
NZL	6	1	0	0	1	8
PAK	2	0	0	0	0	2
PER	1	0	0	0	2	3
POL	8	0	0	0	2	10
ROU	3	0	0	0	1	4
RUS	5	0	0	0	0	5
SWE	5	1	0	0	3	9
THA	2	0	0	0	0	2
TUR	2	0	0	0	0	2
USA	27	5	2	3	20	57
ZAF	4	0	0	1	3	8
Total	186	13	3	10	75	287

Table 2: Model Type Coverage of the Monetary Policy Shocks Database

	Number of shocks	Percent
DSGE	186	64.8
FME	13	4.5
NARR	3	1.0
SM	10	3.5
VAR	75	26.1
Total	287	100.0

Table 3: Overview of US Monetary Policy Shock Time Series Estimates

Reference	**Acronym**	**Type**	**Sample period**	**MC**	**SOE**	**FS**	**Pub**	**Keele**
Aguilar and Vzquez (2015)	agv	DSGE	1965q2-2007q3	n	n	n	n	
Alpanda and Aysun (2014)	aya	DSGE	1996q1-2009q2	y	n	y	y	3
Bacchiocchi and Fanelli (2015)	bf	VAR	1956q2-2008q3				y	3
Bacchiocchi et al. (forthcoming)	bfc	VAR	1961q1-2008q2				y	2
Barakchian and Crowe (2013)	bc	FME	1988m12-2008m6				y	4
Bernanke and Kuttner (2005)	bk	FME	1988m12-2008m6				y	4
Bernanke and Mihov (1998)	bm	VAR	1990m1-2007m11				y	4
Bernanke et al. (2005)	bbe	VAR	1960q1-2007q2				y	4
Binder et al. (2010)	bcz	VAR	1978m1-2006m12				n	
Brayton et al. (2014)	frb	DSGE	1970q1-2010q4	y	n	n	y	3
Breuss and Fornero (2009)	forn	DSGE	1984q1-2015q3	y	n	n	n	
Burlon et al. (2016)	bnp	DSGE	1995q2-2014q4	y	n	*	n	
Caglayan et al. (2016)	ckm	NARR	1970q4-2008q4				n	3
Carabenciov et al. (2008)	gpm	DSGE	1994q1-2008q1	y	n	y	n	
Carlstrom et al. (2014)	cfop	DSGE	1972q2-2008q4	n	n	n	y	3
Ca'Zorzi et al. (2016)	jp	DSGE	1975q1-2013q3	n	n	n	y	3
Chin et al. (2015)	cft	DSGE	1976q1-2013q2	n	n	n	n	
Christiano et al. (1999)	cee	VAR	1989q4-2007q3				y	0
Christiano et al. (2014)	cmr	DSGE	1981q1-2010q2	n	n	n	y	4
Chung et al. (2010)	edo	DSGE	1984q4-2016q2	n	n	n	n	
Claus and Dungey (2012)	cld	SM	1994m1d1-2008m10d31				y	3
Claus et al. (2016)	cck	SM	1996m1d1-2015m11d30				n	
Consensus Forecast	cpf	FME	1990q1-2013q1				n	
Dungey and Osborn (2014)	duo	VAR	1983q1-2007q4				y	3
Dungey et al. (2014)	dor	VAR	1984q3-2008q1				y	2
Feldkircher and Huber (2016)	fel	VAR	1995q1-2012q4				y	4
Forni and Gambetti (2010)	fg	VAR	1990m1-2007m11				y	4
Fragetta and Melina (2013)	frm	VAR	1965q4-2007q4				y	2
Furlanetto et al. (2014)	fgs	DSGE	1964q2-2009q4	n	n	n	n	
Galí and Gambetti (2015)	gag	VAR	1960q1-2011q4				y	3
Gazzani and Vicondoa (2016)	gvi1	VAR	1991m1-2007m7				n	
Gazzani and Vicondoa (2016)	gvi2	VAR	1991m1-2007m7				n	
Gertler and Karadi (2015)	kg	FME	1991m1-2012m6d30				y	3
Gertler et al. (2008)	gst	DSGE	1960q1-2005q1	n	n	n	y	3
Heinlein and Krolzig (2013)	hek	VAR	1972m3-2010m8				n	
Iacoviello and Neri (2010)	in	DSGE	1965q1-2006q4	n	n	n	y	3
Kaihatsu and Kurozumi (2014)	kak	DSGE	1985q1-2008q4	n	n	n	y	3
Kamber et al. (2015)	kst	DSGE	1954q3-2011q4	n	n	n	y	2
Kollmann et al. (2016)	quest	DSGE	1999q1-2015q1	y	n	n	y	4
Luciani (2015)	luc	VAR	1983q1-2010q4				y	3
Merola (2015)	swrm	DSGE	1965Q1-2012Q4	n	n	n	y	2
Merola (2015)	swrmff	DSGE	1965q1-2012q4	n	n	n	y	2
Miranda-Agrippino (2016)	sma	FME	1990m1-2009m12				n	
Nguyen (2015)	ngu	DSGE	1960q1-2007q1	n	n	n	n	
Phan (2014)	pta	VAR	1982q4-2007q4				y	2
Poutineau and Vermandel (2015b)	pov1	DSGE	1993q1-2012q3	n	n	n	y	1
Pragidis et al. (2013)	pgt	SM	1980m1-2011m10				n	
Razafindrabe (2016)	raz	DSGE	1999q1-2011q2	y	n	n	y	2
Romer and Romer (2004)	rr	NARR	1988m1-2008m6				y	4
Rossi and Zubairy (2011)	roz	VAR	1955q3-2006q4				y	3
Rychalovska (2013)	ryc1	DSGE	1954q1-2008q3	n	n	n	y	3
Sims and Zha (2006)	sz	VAR	1989q4-2008q2				y	2
Some (2014)	som	DSGE	1973q1-2005q4	y	n	n	n	
Villa (2016)	vbgg	DSGE	1983q1-2008q3	n	n	n	y	2
Villa (2016)	vgk	DSGE	1983q1-2008q3	n	n	n	y	2
Vitek (2015)	vit	DSGE	1999q3-2008q4	y	n	y	n	
Voss and Willard (2009)	vow	VAR	1985q2-2007q4				y	2

*Note: The table lists the studies from which we obtained monetary policy shock time series estimates for the US. Regarding model types, "FME" stands for financial market expectations, "NARR" for the narrative approach, and "SM" for statistical model. "MC" for multi-country model, "SOE" for small open-economy model, "FS" for whether the model involves frictions in international financial markets, "Pub" for published, and "Keele" for the journal ranking in the Keele list. For journals which are not included in the original Keele list, we allocated the International Journal of Central Banking, the American Economic Journal: Macroeconomics, the Journal of Financial Stability, and the Economic Journal to rank three, and The B.E. Journal of Macroeconomics, Manchester School, and the South African Journal of Economics to rank two. We construct monetary policy shocks for the US based on Consensus Forecast data as described in Appendix C.1. * indicates that no model documentation is currently available.*

Table 4: Overview of Euro Area Monetary Policy Shock Time Series Estimates

Reference	**Acronym**	**Type**	**Sample period**	**MC**	**SOE**	**FS**	**Pub**	**Keele**
Albonico et al. (2014)	alb1	DSGE	1993q2-2012q4	n	n	n	n	
Albonico et al. (forthcoming)	alb2	DSGE	1985q1-2012q4	n	n	n	y	2
Alpanda and Aysun (2014)	aya	DSGE	1996q1-2009q2	y	n	y	y	3
Avouyi-Dovi and Sahuc (2016)	ads	DSGE	1980q2-2007q4	n	n	n	y	4
Babecka Kucharcukova et al. (2016)	bab	VAR	2001m4-2015m7				y	2
Gregor Bäurle and Känzig (2016)	bgk	VAR	1992q3-2011q2				n	
Barigozzi et al. (2014)	bcl	VAR	1984q1-2007q4				y	3
Benchimol and Fourcans (forthcoming)	benf	DSGE	1995q2-2013q1	n	n	n	y	2
Benkovskis et al. (2011)	bbfw	VAR	1999q3-2010q3				y	0
Boivin et al. (2009)	bgm	VAR	1988q1-2007q3				n	
Breuss and Fornero (2009)	forn	DSGE	1984q1-2015q3	y	n	n	n	
Burlon et al. (2016)	bnp	DSGE	1995q2-2014q4	y	n	*	n	
Carabenciov et al. (2008)	gpm	DSGE	1994q1-2008q1	y	n	y	n	
Ca'Zorzi et al. (2016)	jp	DSGE	1975q1-2013q3	n	y	n	y	3
Christoffel et al. (2008)	nawm	DSGE	1985q1-2011q4	n	y	n	y	3
Consensus Forecast	cpf	FME	1990q1-2013q1					
DiCecio and Nelson (2010)	dcn	DSGE	1981q1-2005q4	y	n	n	y	0
Dungey and Osborn (2014)	duo	VAR	1983q1-2007q4				y	3
Dungey et al. (2014)	dor	VAR	1984q3-2008q1				y	2
Errit and Uusküla (2014)	ues	VAR	2000q3-2012q4				y	0
Feve and Sahuc (2016)	fes	DSGE	1980q2-2007q4	n	n	n	y	3
Gadatsch et al. (2016)	gear	DSGE	1999q2-2013q4	n	y	n	y	2
Gelain (2010)	gel	DSGE	1980q1-2008q3	n	n	n	y	1
Gerali et al. (2010)	ger	DSGE	1998q1-2009q4	n	n	n	y	3
Giri (2014)	gir	DSGE	1998q1-2014q2	n	n	n	n	
Herber and Nemec (2012)	hen2	DSGE	1999q1-2009q4	n	y	n	y	0
Hristov (2016)	ifo	DSGE	2000q1-2016q2	n	y	n	n	
Jannsen and Klein (2011)	jk	VAR	1990q1-2008q4				n	
Kollmann et al. (2016)	quest	DSGE	1999q1-2015q1	y	n	n	y	4
Kühl (2016)	kue	DSGE	1997q4-2013q3	n	n	n	n	
Mandler et al. (2016)	msv	VAR	1999q1-2014q3				n	
Neuenkirch (2013)	neu	VAR	1999m1-2012m12				y	3
Peersman and Smets (2001)	ovar	VAR	1990q2-2011q2				n	
Phan (2014)	pta	VAR	1982q4-2007q4				y	2
Poutineau and Vermandel (2015a)	pov2	DSGE	1999q1-2013q3	n	n	n	y	3
Poutineau and Vermandel (2016)	pov3	DSGE	1999q1-2013q4	n	n	n	n	
Quint and Rabanal (2014)	qir	DSGE	1996q1-2011q4	n	n	n	y	3
Razafindrabe (2016)	raz	DSGE	1999q1-2011q2	y	n	n	y	2
Senaj et al. (2012)	svz	DSGE	1997q1-2016q2	y	n	n	y	0
Slanicay (2011)	rep2	DSGE	1999q1-2010q2	n	y	n	y	0
Slanicay (2013)	cjef	DSGE	2000q2-2011q3	y	n	n	y	0
Slanicay (2016b)	sta	DSGE	2000q2-2014q1	y	n	n	y	0
Slanicay (2016a)	rep1	DSGE	2000q2-2014q1	y	n	n	y	0
Smets et al. (2013)	sww	DSGE	1970q2-2010q2	n	n	n	y	2
Some (2014)	som	DSGE	1973q1-2005q4	y	n	n	n	
Toroj and Konopczak (2012)	tor	DSGE	1995q2-2011q2	y	n	n	y	0
Villa (2016)	vbgg	DSGE	1983q1-2008q3	n	n	n	y	2
Villa (2016)	vgk	DSGE	1983q1-2008q3	n	n	n	y	2
Vitek (2015)	vit	DSGE	1999q3-2008q4	y	n	y	n	

Note: See the note to Table 3.

Table 5: Overview of UK Monetary Policy Shock Time Series Estimates

Reference	**Acronym**	**Type**	**Sample period**	**MC**	**SOE**	**FS**	**Pub**	**Keele**
Ajevskis and Vitola (2011)	vaj	DSGE	1996q1-2010q1	n	y	n	n	
Andreasen (2012)	and	DSGE	1990q1-2008q3	n	n	n	y	4
Babecka Kucharcukova et al. (2016)	bab	VAR	2001m4-2015m7				y	2
Bhattaraia and Trzeciakiewiczb (2017)	bht	DSGE	1987q2-2011q1	n	n	n	y	2
Bjørnland and Jacobsen (2010)	bjo	VAR	1983q1-2006q4				y	3
Burgess et al. (2013)	boe	DSGE	1987q3-2007q4	n	y	n	n	
Ca'Zorzi et al. (2016)	jp	DSGE	1975q1-2013q3	n	y	n	y	3
Cesa-Bianchi et al. (2016)	ctv	FME	1997m7d1-2015m6d30				n	
Chen and Macdonald (2012)	cmc	DSGE	1975q2-2010q2	n	y	n	y	3
Chin et al. (2015)	cft	DSGE	1976q1-2013q2	n	y	y	n	
Cloyne and Hürtgen (forthcoming)	clh	NARR	1975m1-2007m12				y	3
Consensus Forecast	cpf	FME	1990q1-2013q1					
DiCecio and Nelson (2010)	dcn	DSGE	1981q1-2005q4	y	n	n	y	0
Ellis et al. (2014)	mum	VAR	1976q1-2005q4				y	3
Faccini et al. (2013)	fmz	DSGE	1971q1-2009q4	n	n	n	y	2
Felcser and Vonnak (2014)	fev	VAR	1993q2-2007q4				n	
Harrison and Oomen (2010)	harr	DSGE	1958q1-2007q1	n	y	n	n	
Heinlein and Krolzig (2013)	hek	VAR	1972m3-2010m8				n	
Kamber and Millard (2012)	km	VAR	1979q4-2007q4				y	3
Miranda-Agrippino (2016)	sma	FME	2000m1-2012m6				n	
Mumtaz and Theophilopoulou (2016)	mut	VAR	1976q2-2009q1				n	
Razafindrabe (2016)	raz	DSGE	1999q1-2011q2	y	n	n	y	2
Vitek (2015)	vit	DSGE	1999q3-2008q4	y	n	y	n	

Note: See the note to Table 3.

Table 6: Overview of Non-US, Non-Euro Area and Non-UK Monetary Policy Shock Time Series Estimates

Reference	Acronym	Country	Type	Sample period	MC	SOE	FS	Pub	Keele
Adame et al. (2016)	acrz	MEX	DSGE	2001q1-2016q2	n	y	n	n	
Adolfson et al. (2011)	ado	SWE	DSGE	1980q2-2007q3	n	y	n	y	3
Adolfson et al. (2013)	rams	SWE	DSGE	1995q2-2015q2	n	y	n	n	
Ahmad (2017)	ahm	PAK	DSGE	1980q4-2016q2	n	y	n	n	
Ahmed et al. (2014)	amr	PAK	DSGE	1991q1-2012q4	n	n	n	n	
Ajevskis and Vitola (2011)	vaj	CZE, POL, SWE	DSGE	1996q1-2010q1	n	y	n	n	
Alp and Elekdag (2013)	has	TUR	DSGE	2002q1-2010q4	n	y	n	y	0
Alp et al. (2012)	ael	KOR	DSGE	2000q1-2012q4	n	y	n	n	
Argov et al. (2012)	moi	ISR	DSGE	1992q1-2011q4	n	y	n	n	
Assenmacher-Wesche (2008)	asw	CHE	VAR	1975q1-2006q4				y	1
Azoulay and Ribon (2010)	azr	ISR	VAR	2000m1-2008m12				n	
Babecka Kucharcukova et al. (2016)	bab	SWE, POL, CZE	VAR	2001m4-2015m7				y	2
Bank of Korea	bok	KOR	DSGE	2001q1-2015q2	*	*	*		
Bank of Thailand	bot	THA	DSGE	2002q1-2015q3	n	n	n	n	
Baranowski et al. (2016)	bgms	POL	DSGE	1997q1-2012q4	n	n	n	y	0
Barnett et al. (2015)	gho	IND	VAR	1996m1-2013m12				y	1
Beltran and Draper (2008)	bel	CHE	DSGE	1970q2-2005q2	n	y	n	n	
Benchimol (2016)	ben	ISR	DSGE	1995q2-2013q1	n	n	n	y	2
Bjørnland and Jacobsen (2010)	bjo	NOR, SWE	VAR	1983q1-2006q4				y	3
Brzoza-Brzezina and Makarski (2011)	bbm	POL	DSGE	1997q1-2009q2	n	y	n	y	3
Melecky and Buncic (2008)	bud	AUS	DSGE	1984q1-2005q4	n	y	n	y	2
Melecky and Buncic (2008)	buv	AUS	VAR	1984q1-2005q4				y	2
Carabenciov et al. (2008)	gpm	JPN	DSGE	1994q1-2008q1	y	n	y	n	
Caraiani (2013)	car	HUN	DSGE	2000q1-2010q2	n	y	n	y	2
Ca'Zorzi et al. (2016)	jp	AUS, CAN	DSGE	1975q1-2013q3	n	y	n	y	3
Chen and Columba (2016)	cco	SWE	DSGE	1996q1-2014q4	n	y	n	n	
Claus and Dungey (2016)	cd	AUS, CAN	SM	1993m1d1-2014m11d30				y	2
Claus et al. (2016)	cck	JPN	SM	1998m1d1-2015m6d30				y	0
Copaciu et al. (2016)	cnb	ROM	DSGE	2005q1-2014q1	y	n	y	n	
Cuche-Curti et al. (2009)	cdn	CHE	DSGE	1995q2-2015q4	n	y	n	n	
Dadam and Viegi (2014)	dav	ZAF	DSGE	1994q1-2013q3	n	n	n	n	
Dai et al. (2015)	dmz	CHN	DSGE	1978q2-2007q4	n	n	n	y	2
de Carvalho and Castro (2015)	dc	BRA	DSGE	1999q3-2013q4	n	y	n	n	
de Carvalho and Valli (2011)	dv	BRA	DSGE	1999q1-2010q2	n	y	n	n	
de Carvalho et al. (2014)	dcc	BRA	DSGE	1999q3-2012q4	n	n	n	n	
Bong et al. (2016)	dpb	AUS, NZL, CAN	DSGE	1989q2-2006q4	n	y	n	n	
Dorich et al. (2013)	tot	CAN	DSGE	1990q1-2014q4	n	y	n	n	
Drygalla (2015)	dry	POL	VAR	1994q1-2013q4				n	
Felcser and Vonnak (2014)	fev	AUS, CAN	VAR	1993q2-2007q4				n	
Fueki et al. (2016)	fue	JPN	DSGE	1990q1-2008q4	n	n	n	y	3
Gabriel et al. (2012)	glpy	IND	DSGE	1996q1-2008q4	n	n	n	y	0
Gabriel et al. (2016)	gly	IND	DSGE	1996q1-2008q4	n	y	n	y	0
Gallic and Vermandel (2016)	gav	NZL	DSGE	1989q1-2014q2	n	y	n	n	
Garcia and Gonzalez (2014)	gga	AUS, CHL, COL, NZL, PER	VAR	1995q1-2015q4				y	2
Gerdrup et al. (2017)	nemo	NOR	DSGE	1994q1-2016q3	*	*	*		
Gervais and Gosselin (2014)	lens	CAN	DSGE	1993q1-2014q4	*	*	*	n	
Gonzalez et al. (2015)	ghr	COL	DSGE	1999q1-2013q3	n	y	n	n	
Goyal and Kumar (2016)	gku	IND	DSGE	1996q3-2015q4	n	n	n	n	
Grabek and Klos (2013)	grk	POL	DSGE	1999q1-2011q3	n	y	n	n	
Gupta and Steinbach (2013)	gs	ZAF	VAR	1981q2-2010q4				y	2
Herber and Nemec (2009)	hen1	CZE	DSGE	1996q2-2008q4	n	n	n	n	
Herber and Nemec (2012)	hen2	CZE	DSGE	1999q1-2009q4	y	n	n	y	0
Hernan Hernandez and Ortiz Bolanos (2016)	hhob	BRA, CHL, COL, MEX, PER	DSGE	1999q1-2015q3	n	y	n	n	
Hirose (2014)	hir	JPN	DSGE	1983q2-2013q1	n	n	n	n	
IMF (2017)	gfsr	AUS, NOR, NZL, SWE	FME	1999m1-2016m12					
Jacob and Munro (2016)	jam	NZL	DSGE	1998q4-2014q3	n	y	n	n	
Jiang and Kim (2013)	jkc	CHN	VAR	1993q1-2009q3				y	0
Junicke (2015)	mju	POL	DSGE	1996q4-2012q4	n	y	n	n	
Kamber et al. (2016)	nzsim	NZL	DSGE	1993q2-2013q1	n	y	n	y	2
Kapur and Behera (2012)	kbe	IND	SM	1999q3-2010q3				n	
Katagiri and Takahashi (2016)	kta	JPN	DSGE	1987q1-2016q1	n	y	n	n	
Kim (2014)	tbk	KOR	DSGE	2000q2-2012q4	n	y	n	y	0
Kimura and Nakajima (2016)	nik	JPN	VAR	1990q1-2015q3				y	2
Körner (2015)	koe	CZE	VAR	1999m1-2011m9				y	0
Kreptsev and Seleznev (2016)	krs	RUS	DSGE	2003q1-2013q1	n	y	n		
Leist (2013)	lei	CHE	DSGE	1989q1-2010q2	n	y	n	y	0
Li and Spencer (2015)	lsp	AUS	DSGE	1993q1-2013q4	n	y	n	y	2
Linardi (2016)	lin	BRA	DSGE	2000q1-2014q1	n	y	n	n	
Lopez and Rodriguez (2008)	lro	COL	DSGE	1980q1-2005q4	n	n	n	n	
Lopez et al. (2008)	lpr	COL	DSGE	1980q1-2005q4	n	y	n	n	
Malakhovskaya and Minabutdinov (2014)	mmi	RUS	DSGE	1999q3-2011q3	n	y	n	y	0
Medina and Soto (2007)	mas	CHL	DSGE	2001q2-2016q1	n	y	n	n	
Milani (2011)	mil2	AUS, CAN, NZL	DSGE	1982q3-2007q2	y	n	n	y	3
Milani and Park (2015)	mil	KOR	DSGE	1991q2-2012q4	n	y	n	y	2
Minetti and Peng (forthcoming)	tpe	CHN	DSGE	1999q1-2011q3	n	n	n	y	3
Naraidoo and Paya (2012)	run	ZAF	SM	1986m1-2008m11				y	2
Ncube and Ndou (2011)	nd1	ZAF	VAR	1976q1-2009q4				y	0
Ncube and Ndou (2013)	nd2	ZAF	VAR	1983q3-2010q1				n	
Paetz and Gupta (2016)	pag	ZAF	DSGE	1971q1-2013q1	n	y	n	y	2
Patra and Kapur (2012)	pka	IND	SM	1998q1-2009q1				y	0
Perez (2015)	pef	BRA, CHL, COL, MEX, PER	VAR	1999m12-2013m12				n	
Phan (2014)	pta	AUS	VAR	1982q4-2007q4				y	2
Pop (2016)	pre	ROM	VAR	2001q1-2015q4				y	2
Pragidis et al. (2013)	pgt	BRA	SM	1980m1-2011m10				n	
Raghavan et al. (2016)	ras1	CAN	VAR	1974m3-2007m12				y	3
Raghavan et al. (2016)	ras2	CAN	VAR	1975m1-2007m12				y	3
Razafindrabe (2016)	raz	JPN, CHE, CHN	DSGE	1999q1-2011q2	y	n	n	y	2
Rees et al. (2016)	rsh	AUS	DSGE	1992q1-2013q4	n	y	n	y	2
Robstad (2014)	rob	NOR	VAR	1994q3-2013q4				n	
Rudolf and Zurlinden (2014)	ruz	CHE	DSGE	1983q2-2015q4	n	y	n	n	
Rysanek et al. (2012)	tov	CZE	DSGE	1998q3-2010q4	n	y	n	y	0
Semko (2013)	sem	RUS	DSGE	2003q1-2012q1	n	y	n	y	0
Seneca (2010)	ice	ISL	DSGE	1992q1-2016q1	n	y	n	n	
Sheena and Wang (2016)	shw	AUS	DSGE	1993q2-2013q1	n	y	n	y	2
Shulgin (2017)	shu	RUS	DSGE	2001q1-2014q2	*	*	*	y	0
Slanicay (2011)	rep2	CZE	DSGE	1999q1-2010q2	n	y	n	y	0
Slanicay (2013)	cjef	CZE	DSGE	2000q2-2011q3	y	n	n	y	0
Slanicay (2016b)	sta	CZE	DSGE	2000q2-2014q1	y	n	n	y	0
Slanicay (2016a)	rep1	CZE	DSGE	2000q2-2014q1	y	n	n	y	0
Steinbach et al. (2009)	sms	ZAF	DSGE	1990q1-2007q4	n	y	n	y	2
Sveriges Riksbank	bvar	SWE	VAR	1995q4-2014q4					
Tonner et al. (2011)	tpv	CZE	DSGE	1999q3-2010q2	n	y	n	y	0
Tonner et al. (2015)	tvt	CZE	DSGE	1998q1-2014q4	n	y	n	n	
Toroj and Konopczak (2012)	tor	POL	DSGE	1995q2-2011q2	y	n	n	y	0
Tvrz and Vasicek (2016)	tvv	CZE, HUN, POL	DSGE	1999q2-2014q4	n	y	n	y	0
Vitek (2015)	vit	NZL, AUS, SWE, CAN, ZAF, KOR, CHN, JPN, CHE, ISR, CHL, IND, TUR, COL, CZE	DSGE	1999q3-2008q4	y	n	y	n	
Voss and Willard (2009)	vow	AUS	VAR	1985q2-2007q4				y	2

Note: See the note to Table 3.

Table 7: Number of Monetary Policy Shock Time-Series Estimates obtained from Small Open-economy and Multi-country NK DSGE Models with and without Financial Spillovers

	Small open-economy	Multi-country	Of which: with financial spillovers	Closed-economy
EAR	6	13 (12)	3 (2)	15
GBR	6	3 (2)	2 (1)	3
USA	0	8 (7)	3 (2)	18
Other	60	28 (13)	17 (2)	14

Note: The table provides the number of monetary policy shock time series estimates obtained from NK DSGE with specific model elements. The numbers in parentheses represent the frequencies without the monetary policy shock time-series estimates obtained from the model of Vitek (2015). The sum of monetary policy shock estimates obtained from NK DSGE models across economies reported in this table is smaller than that in Tables 1 and 2 because for some models there is no documentation available so that we cannot determine the model elements (see Tables 3 to 6).

Table 8: Relationship between the Monetary Policy Shock Time Series Estimates' Cross-country Correlations and Economies' International Financial Integration

	(1) DSGE	(2) DSGE	(3) DSGE	(4) Non-DSGE	(5) DSGE	(6) VAR	(7) Non-DSGE/non-VAR
Overall financial integration	0.09***		0.08***	0.02	0.10***	0.01	0.03
	(0.00)		(0.00)	(0.31)	(0.00)	(0.82)	(0.80)
Share of US in overall financial integration		0.09***	0.08***	0.00	0.07***	0.00	0.08
		(0.00)	(0.00)	(0.89)	(0.00)	(0.99)	(0.68)
Country 1 dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.15	0.15	0.16	0.03	0.17	0.05	-0.01
Observations	9214	8658	8658	1758	7360	1006	97
Country pairs	171	153	153	120	120	120	45

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Testing Additional Predictions—Role of Banking Integration

	(1)	(2)	(3)
Overall financial integration	0.08***		
	(0.00)		
Share of US in overall financial integration	0.08***	0.07***	0.08***
	(0.00)	(0.00)	(0.00)
FDI assets and liabilities/GDP		0.04	0.03
		(0.11)	(0.20)
Portfolio assets and liabilities/GDP		-0.10*	0.00
		(0.05)	(0.86)
Other inv. assets and liabilities/GDP		0.32***	
		(0.00)	
Non-resident bank loans/GDP			0.03***
			(0.00)
Country 1 dummies	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes
Adj. R-squared	0.16	0.16	0.16
Observations	8658	8658	8658
Country pairs	153	153	153

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Testing Additional Predictions—Structural Multi-country Models, Models with International Financial Frictions, and Small-open Economy Models

	(1)	(2)	(3)	(4)
Overall financial integration	0.10***	0.10***	0.11***	0.11***
	(0.00)	(0.00)	(0.00)	(0.00)
Share of US in overall financial integration	0.09***	0.09***	0.09***	0.08***
	(0.00)	(0.00)	(0.00)	(0.00)
At least one multi-country model	-0.00	-0.01	-0.00	-0.01
	(0.71)	(0.68)	(0.80)	(0.61)
Over. fin. integr. x at least one multi-country model			-0.01	-0.01
			(0.20)	(0.54)
Share of US in over. fin. integr. x at least one multi-country model			-0.01	-0.01
			(0.52)	(0.51)
At least one MC-model with fin. spillovers		0.00		0.01
		(0.94)		(0.51)
At least one MC-model with fin. spillovers x Overall fin. integr.				-0.04**
				(0.02)
At least one MC-model with fin. spillovers x Share of US in overall fin. integr.				0.03
				(0.15)
At least one SOE model	-0.00	-0.01	-0.00	-0.00
	(0.77)	(0.60)	(0.86)	(0.78)
Over. fin. integr. x at least one SOE model			-0.00	-0.00
			(0.63)	(0.83)
Share of US in over. fin. integr. x at least one SOE model			0.01	0.01
			(0.51)	(0.32)
At least one SOE model with fin. spillovers		0.01		0.01
		(0.46)		(0.45)
At least one SOE model with fin. spillovers x Overall fin. integr.				-0.02
				(0.12)
At least one SOE model with fin. spillovers x Share of US in overall fin. integr				-0.07***
				(0.00)
Country 1 dummies	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes
Adj. R-squared	0.16	0.16	0.16	0.16
Observations	6101	6017	6017	6017
Country pairs	153	153	153	153

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Testing Additional Predictions—Capital Controls and Exchange Rate Flexibility

	(1)	(2)	(3)
Overall financial integration	0.083***	0.076***	0.072***
	(0.000)	(0.000)	(0.004)
Share of US in overall financial integration	0.079***	0.079***	0.079***
	(0.000)	(0.000)	(0.000)
Capital controls (PC)		0.006	0.053*
		(0.550)	(0.099)
FX flexibility		-0.015	0.009
		(0.795)	(0.868)
Capital controls x At least one economy is EME			-0.053
			(0.106)
FX flexibility x At least one economy is EME			-0.041
			(0.177)
At least one economy is EME			0.058
			(0.320)
Country 1 dummies	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes
Adj. R-squared	0.16	0.16	0.16
Observations	8658	8658	8658
Country pairs	153	153	153

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Robustness Checks—Alternative Explanations I

	(1)	(2)	(3)	(4)	(5)
Overall financial integration	0.08***	0.08***	0.06**	0.06***	0.06**
	(0.00)	(0.00)	(0.01)	(0.00)	(0.02)
Share of US in overall financial integration	0.08***	0.08***	0.08***	0.07***	0.08***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Trade integration		0.02			0.02
		(0.38)			(0.37)
Share of US in trade integration		-0.00			-0.00
		(0.78)			(0.70)
Bilateral financial integration			0.01***		0.01
			(0.00)		(0.37)
Bilateral trade integration				0.01**	0.00
				(0.03)	(0.77)
Country 1 dummies	Yes	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.16	0.16	0.16	0.16	0.16
Observations	8658	8658	8658	8658	8658
Country pairs	153	153	153	153	153

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Robustness Checks—Alternative Explanations II

	(1)	(2)	(3)	(4)	(5)	(6)
Overall financial integration	0.08***	0.10***	0.08***	0.08***	0.08***	0.09***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Share of US in overall financial integration	0.08***	0.08***	0.08***	0.08***	0.07***	0.07***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Foreign currency net short position		-0.02				-0.02
		(0.15)				(0.22)
At least one model with open-economy variables in Taylor rule			0.00			0.00
			(0.69)			(0.67)
Ratio of fuel/ore/metals exports to GDP				0.01		-0.00
				(0.33)		(0.82)
Ratio of fuel/ore/metals imports to GDP				-0.02		-0.02
				(0.20)		(0.14)
Both commodity exporters					0.05*	0.08
					(0.06)	(0.12)
Country 1 dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.16	0.16	0.16	0.16	0.16	0.16
Observations	8658	8658	7911	8658	8658	7911
Country pairs	153	153	153	153	153	153

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Robustness Checks—Alternative Explanations III

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Overall financial integration	0.08***	0.08***	0.08***	0.08***	0.07***	0.09***	0.08***	0.09***	0.07***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Share of US in overall financial integration	0.08***	0.08***	0.08***	0.10***	0.09***	0.10***	0.10***	0.10***	0.10***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in trade integration		-0.01							-0.01
		(0.18)							(0.23)
Difference in centrality			-0.00						-0.01
			(0.48)						(0.12)
Difference in GVC position				0.00					0.01
				(0.64)					(0.44)
Difference in GVC participation					-0.01				-0.01
					(0.28)				(0.47)
Heterogeneity in output structure						0.01			0.01
						(0.44)			(0.54)
Heterogeneity in export structure							0.01		0.01
							(0.30)		(0.27)
Heterogeneity in import structure								0.01	0.00
								(0.58)	(0.81)
Country 1 dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Observations	8658	8658	8658	8250	8250	8250	8250	8250	8250
Country pairs	153	153	153	136	136	136	136	136	136

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Robustness Checks—Alternative Samples

	(1) Baseline	(2) CBs/IOs	(3) w/o Vitek	(4) Max. sample	(5) Public
Overall financial integration	0.08***	0.12*	0.10***	0.06***	0.07***
	(0.00)	(0.06)	(0.00)	(0.00)	(0.00)
Share of US in overall financial integration	0.08***	0.13***	0.10***	0.07***	0.08***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Country 1 dummies	Yes	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.16	0.30	0.16	0.15	0.15
Observations	8658	258	6448	10555	7298
Country pairs	153	120	153	325	153

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Robustness Checks—Published Papers

	(1) Baseline	(2) Published	(3) Keele> 1	(4) Keele> 2
Overall financial integration	0.08***	0.07***	0.05*	0.11
	(0.00)	(0.00)	(0.08)	(0.27)
Share of US in overall financial integration	0.08***	0.10***	0.12***	0.16*
	(0.00)	(0.01)	(0.00)	(0.08)
Country 1 dummies	Yes	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes	Yes
Adj. R-squared	0.16	0.17	0.18	0.24
Observations	8658	1963	666	149
Country pairs	153	105	66	28

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Robustness Checks—Alternative Model Specifications

	(1) Baseline	(2) Insign.=0	(3) Logit	(4) Tobit	(5) FE	(6) rreg	(7) Min.	(8) Collapsed
Overall financial integration	0.08***	0.06***	0.18***	0.08***	0.08***	0.09***	0.08***	0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Share of US in overall financial integration	0.08***	0.06***	0.17***	0.08***	0.08***	0.08***	0.08***	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.12)
Country 1 dummies	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Country 2 dummies	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Country-shock 1 dummies	No	No	No	No	Yes	No	No	No
Country-shock 2 dummies	No	No	No	No	Yes	No	No	No
Adj. R-squared	0.16	0.12	0.16		0.28	0.15	0.16	0.05
Observations	8658	8658	8658	8658	8658	8658	8658	153
Country pairs	153	153	153		153		153	

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

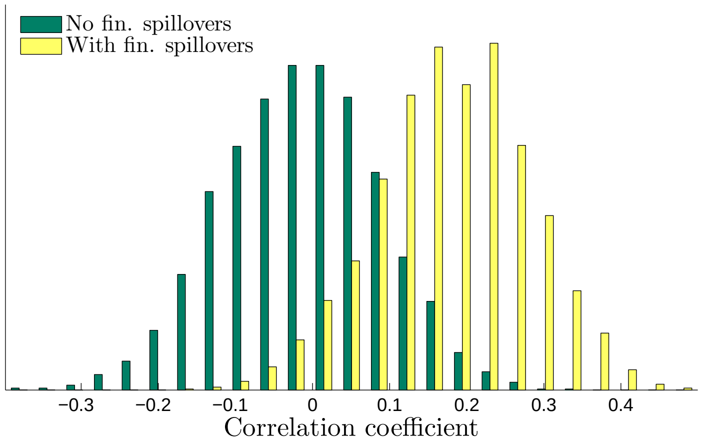
Table 18: Robustness Checks—US vs. Euro Area as Core Economy

	(1) Baseline	(2) US+EA core	(3) Regional core
Overall financial integration	0.08***	0.06***	0.06**
	(0.00)	(0.00)	(0.01)
Share of US in overall financial integration	0.08***	0.04	0.00
	(0.00)	(0.12)	(0.94)
Share of EA in overall financial integration		0.04	-0.03
		(0.19)	(0.46)
Share of regional core in overall financial integration			0.03***
			(0.01)
Country 1 dummies	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes
Adj. R-squared	0.16	0.10	0.11
Observations	8658	5022	5022
Country pairs	153	136	136

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

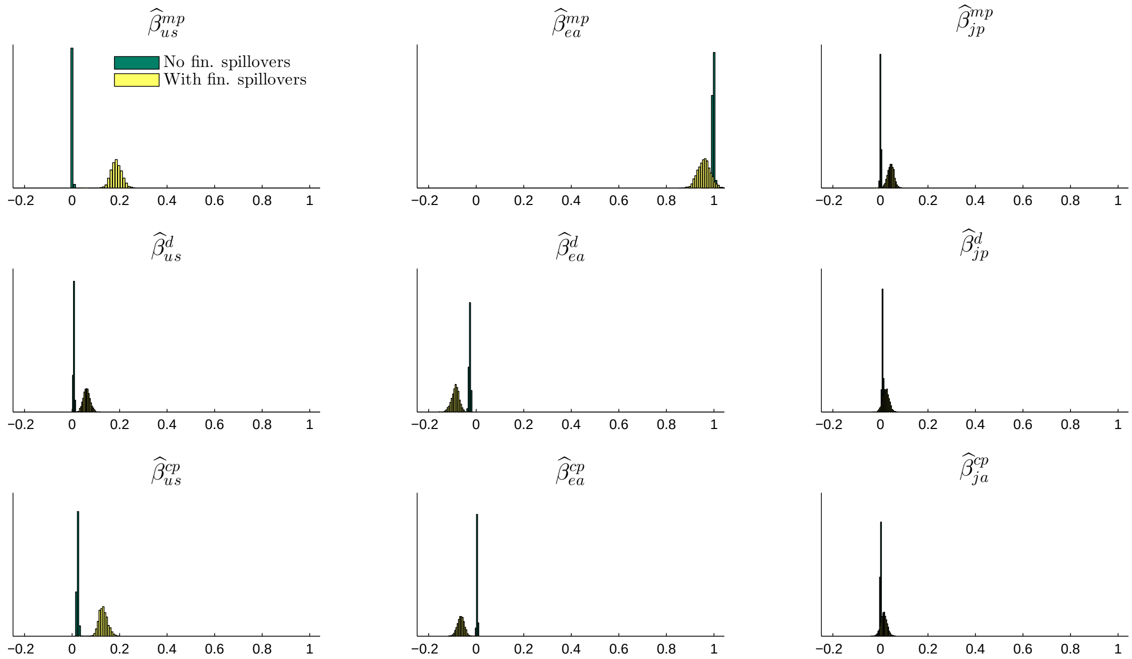
B Figures

Figure 1: Distribution of Correlation between Smoothed Monetary Policy Shocks for the Euro Area and Japan across Replications in the Monte Carlo Experiment



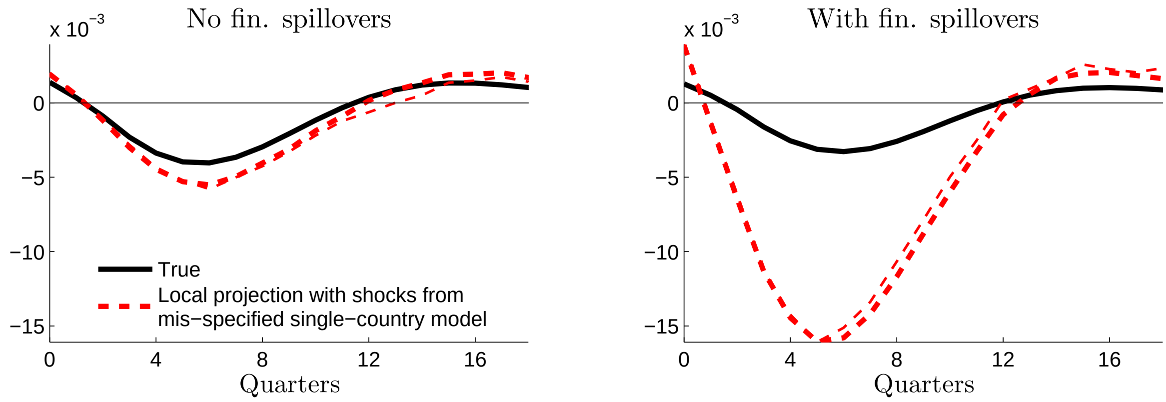
Note: The figure shows the distribution of the correlations between the smoothed monetary policy shocks for the non-core economies of the euro area and Japan across the 1,000 replications of the Monte Carlo experiment. The smoothed monetary policy shocks are obtained from applying the Kalman-filter with the corresponding single-country models on the data simulated based on the multi-country data-generating process. The dark green bars refer to the distribution of the cross-country correlations under the "no financial spillover" parametrisation of the data-generating process, and the light yellow bars to the distribution of the cross-country correlations under the "financial spillover" parametrisation.

Figure 2: Distribution of Coefficient Estimates in the Regression of Estimated Euro Area Monetary Policy Shocks on the True Shocks Across Replications of the Monte Carlo Experiment



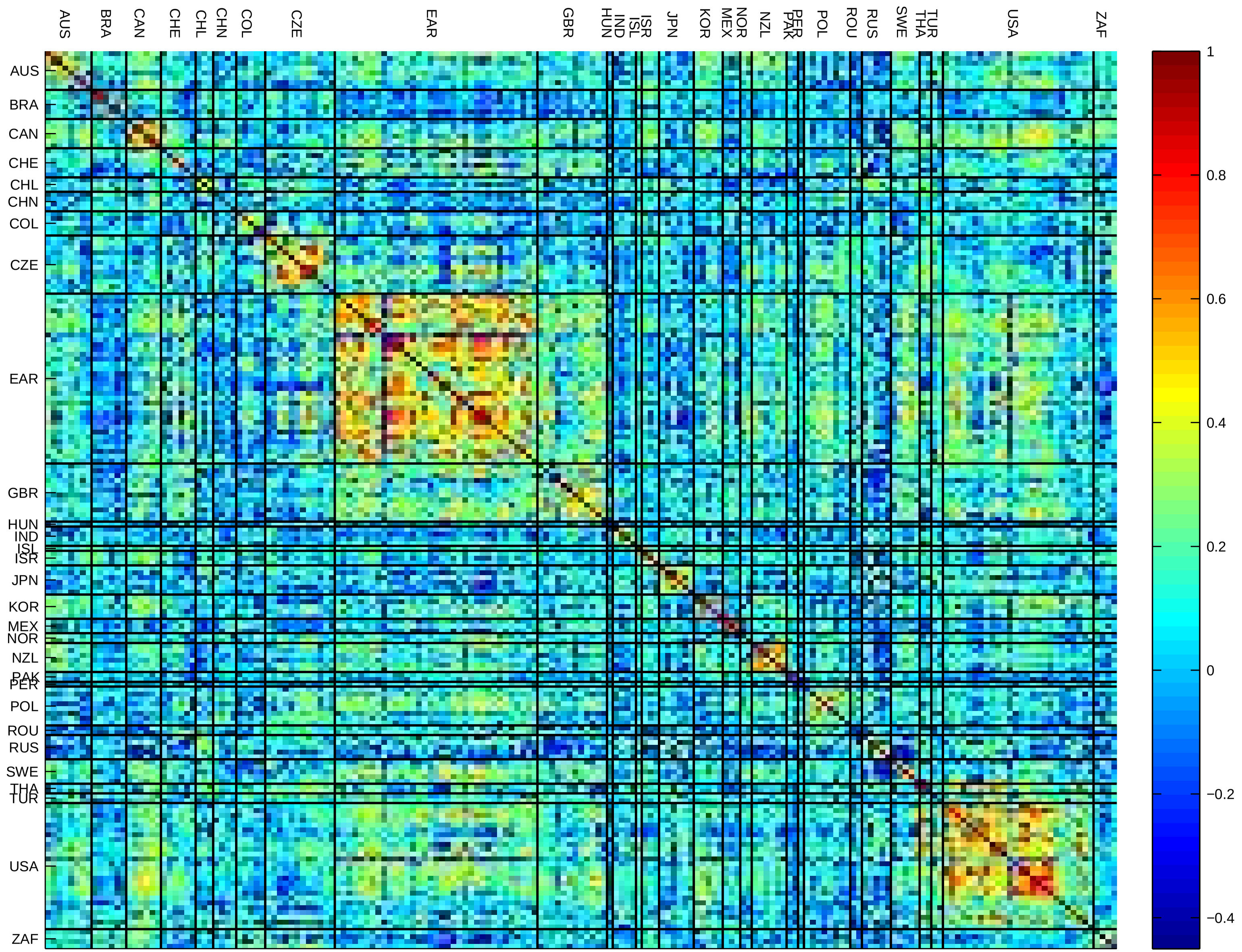
Note: The figure displays the distribution of the coefficient estimates in the regression of Equation (2).

Figure 3: True and Local Projection Spillover Estimates for Euro Area Monetary Policy Shocks to the US in the Monte Carlo Experiment



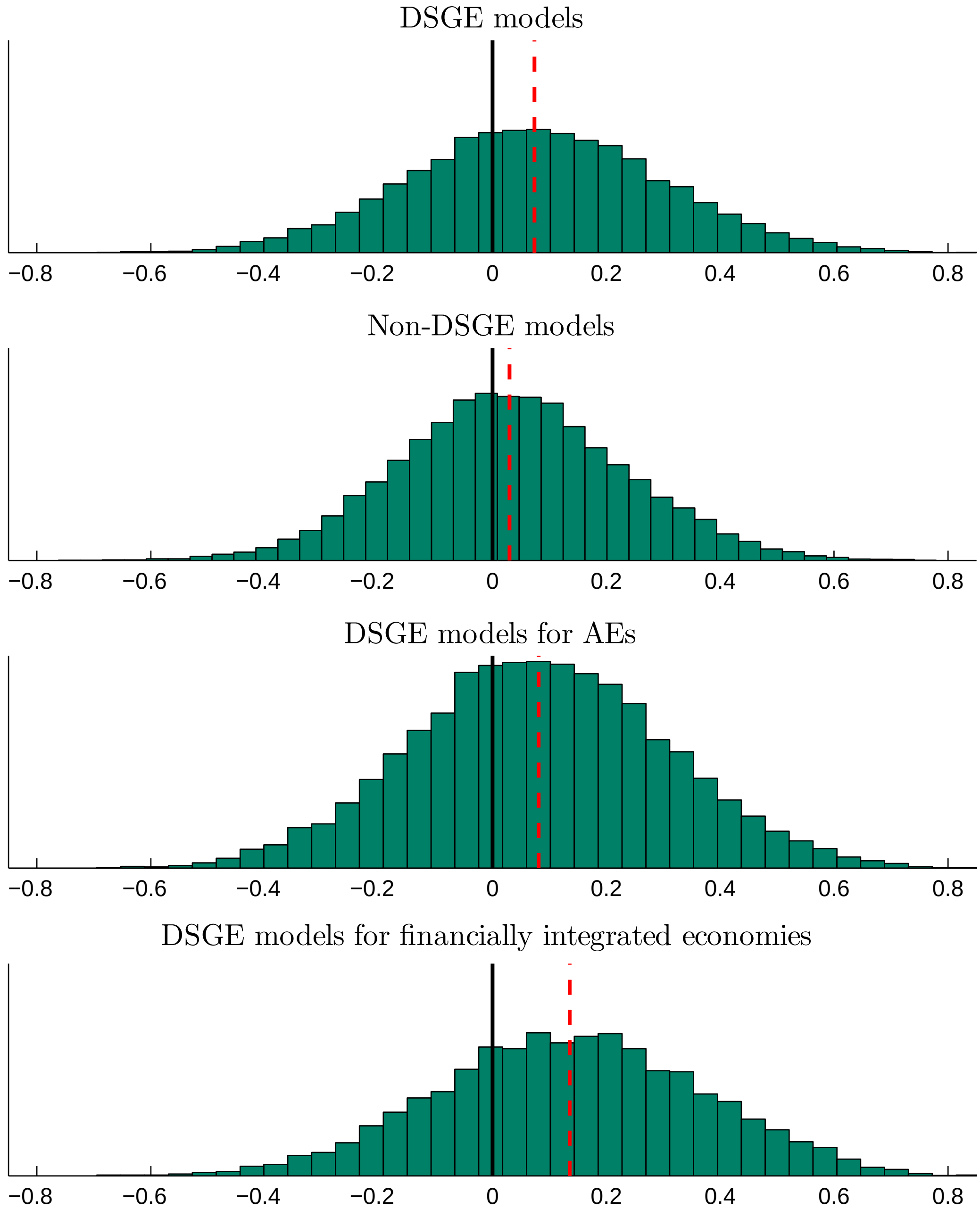
Note: The figure shows the spillovers from a euro area monetary policy shock to the US output gap. The black solid line represents the true value of the spillover implied by the multi-country model of Coenen and Wieland (2002), and the thick (thin) red dashed line the average (median) spillover estimate across all replications of the Monte Carlo experiment. The left-hand side panel displays the spillovers for the "no financial spillover" parametrisation, and the right-hand side panel under the "financial spillover" parametrisation. The spillover estimates are obtained using the smoothed monetary policy shocks and data on the US output gap in local projections. In each replication of the Monte Carlo experiment, the smoothed monetary policy shocks are obtained applying the Kalman-filter with the corresponding single-country models on the data simulated based on the multi-country data-generating process. The US output gap data stem from the corresponding simulations of the multi-country data-generating process.

Figure 4: Correlation heat map of NK DSGE Monetary Policy Shock Time Series Estimates



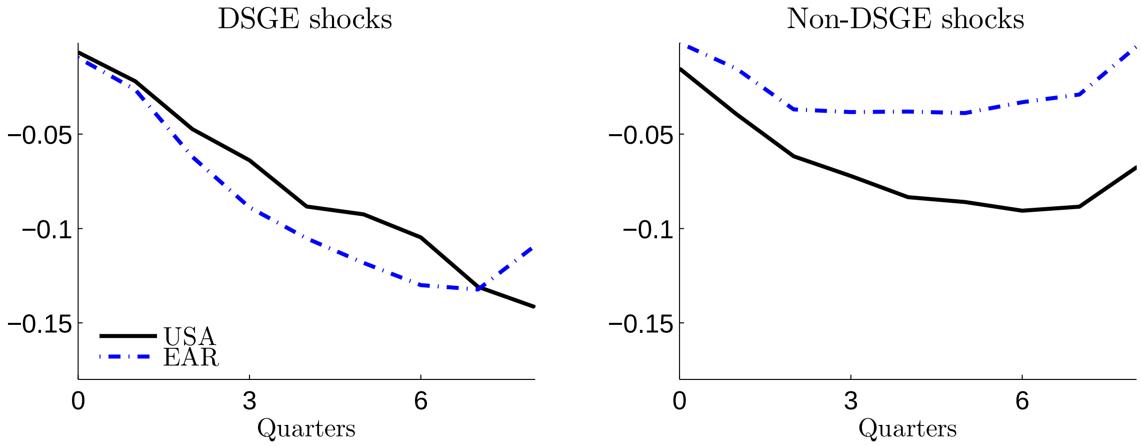
Note: The figure displays the heat map of the correlations between the monetary policy shock time series estimates obtained from NK DSGE models in the database.

Figure 5: Distribution of Cross-country Correlations Between Monetary Policy Shock Time Series Estimates



Note: The figure displays the distributions of the cross-country correlations between the monetary policy shock time series estimates in our database. The red dashed lines indicate the mean of the distributions.

Figure 6: Estimates of Global Output Spillovers from Monetary Policy based on Local Projections and Monetary Policy Shock Estimates from DSGE Models and Non-DSGE Approaches



Note: The figure shows the cross-country averages of the estimates of the spillovers from US (black solid line) and the euro area (blue dash-dotted line) monetary policy to global output. The spillovers are estimated using local projections with the first principal component of all monetary policy shock estimates available over the time period 1993 to 2007 for the US and the euro area. The left-hand side panel displays the spillover estimates for the case when only DSGE model monetary policy shocks are used to determine the principal component, and the right-hand side panel for the case when only non-DSGE model shocks are used.

C Online Appendix

C.1 Construction of monetary policy shocks based on Consensus Forecast data

We use monthly data on three-month ahead financial market expectations about of short-term interest rates from Consensus Economics in order to form monetary policy shock time series. To identify the benchmark interest rate to use for the construction of monetary policy surprise series we follow closely the target interest rate for the surveyed financial institutions as reported by Consensus Economics and change the benchmark according to changes reported. For the US we first subtract from the actual realised short-term interest rate one-quarter lagged, three-month ahead Consensus Forecast short-term interest rate expectation. We then regress the resulting difference on four lags of the log-difference of US industrial production and the consumer price index. The residual from this regression in our time series of US monetary policy shocks constructed based on Consensus Forecast data. For the time period from 2003 onwards, we additionally regress this time series of residuals on Citi-Group macroeconomic surprises, and use the residuals from this regression as US monetary policy shocks. For the euro area and the UK, in the first regression in addition to domestic variables we also include US industrial production and inflation. For the euro area, prior to January 2005, when a euro area survey was established, the financial-market expectations are a weighted average of the euro area countries' data. From January 1990 through December 1998, the euro area average was weighted by GDP at purchasing power parities. From January 1999 onwards the euro area average was weighted by the nominal stock of government bonds.

C.2 The Model of Coenen and Wieland (2002)

C.2.1 Model description

For $i \in \{us, ea, ja\}$, the IS-curve for the domestic output gap q_{it} is given by

$$q_{it} = \sum_{j=1}^{3} \delta_{ij}^{q} q_{i,t-j} + \delta_i^z z_{it} + \delta_i^{rl} (r_{i,t-1}^{(l)} - \overline{r}_i^{(l)}) + \sigma^{e^d} e_{it}^d, \tag{C.1}$$

where $z_{it} = \sum_{j=1,j\neq i}^{N} w_{ij} \cdot \omega_{ij,t}$ is an economy's real effective exchange rate with w_{ij} representing bilateral trade shares and $\omega_{ij,t}$ bilateral exchange rates; $r_{it}^{(l)}$ is the real long-term interest rate; and e_{it}^d is a demand shock. Quarter-on-quarter inflation is determined in a backward-looking Phillips-curve

$$\pi_{it} = \left(\sum_{j=1}^{3} \phi_{ji} \right)^{-1} \left(\sum_{j=0}^{3} \phi_{ji} cwp_{i,t-j} - (\phi_{2i} + \phi_{3i}) \pi_{i,t-1} - \phi_{3i} \pi_{i,t-2} \right), \tag{C.2}$$

where cwp_{it} is the contract wage. Based on specification tests Coenen and Wieland (2002) consider fixed-duration Taylor-style wage contracts for the euro area and Japan

$$\begin{aligned} cwp_{it} = &(\phi_{1i} + \phi_{2i} + \phi_{3i}) E_t \pi_{i,t+1} + (\phi_{2i} + \phi_{3i}) E_t \pi_{i,t+2} + \phi_{3i} E_t \pi_{i,t+3} \\ &+ \gamma_i \sum_{j=0}^{3} \phi_{ji} E_t q_{i,t+j} + \sigma_i^{cw} e_{it}^{cw}, \qquad i \in \{ea, ja\}, \end{aligned} \tag{C.3}$$

and relative real wage contracts for the US

$$\begin{aligned} cwp_{us,t} &= \sum_{j=0}^{3} \phi_{j,us} E_t \varpi_{us,t+j} + \gamma_{us} \sum_{j=0}^{3} \phi_{j,us} E_t q_{us,t+j} + \sigma_{us}^{cw} e_{us,t}^{cw}, \\ \varpi_{us,t} &= \sum_{j=0}^{3} \phi_{j,us} cwp_{us,t-j}. \end{aligned} \tag{C.4}$$

The model is closed by monetary policy rules which determine the nominal short-term interest rate $i_{it}^{(s)}$ according to

$$i_{it}^{(s)} = \rho_{i^s} i_{i,t-1}^{(s)} + \alpha_i \left(\pi_{it}^{(4)} - \pi_i^T \right) + \beta_i q_{it} + (1 - \rho_i) \left(\overline{r}_i^{(l)} + \pi_{it}^{(4)} \right) + \sigma_i^{i^s} e_{it}^{mp}, \tag{C.5}$$

where π_i^T represents the inflation target, and e_{it}^{mp} is a monetary policy shock. Year-on-year inflation $\pi_{it}^{(4)}$ is given by

$$\pi_{it}^{(4)} = \sum_{j=0}^{3} \pi_{i,t-j}. \tag{C.6}$$

The real long-term interest rate is defined as

$$r_{it}^{(l)} = i_{it}^{(l)} - \frac{1}{8} \sum_{j=1}^{8} E_t \pi_{i,t+j}. \tag{C.7}$$

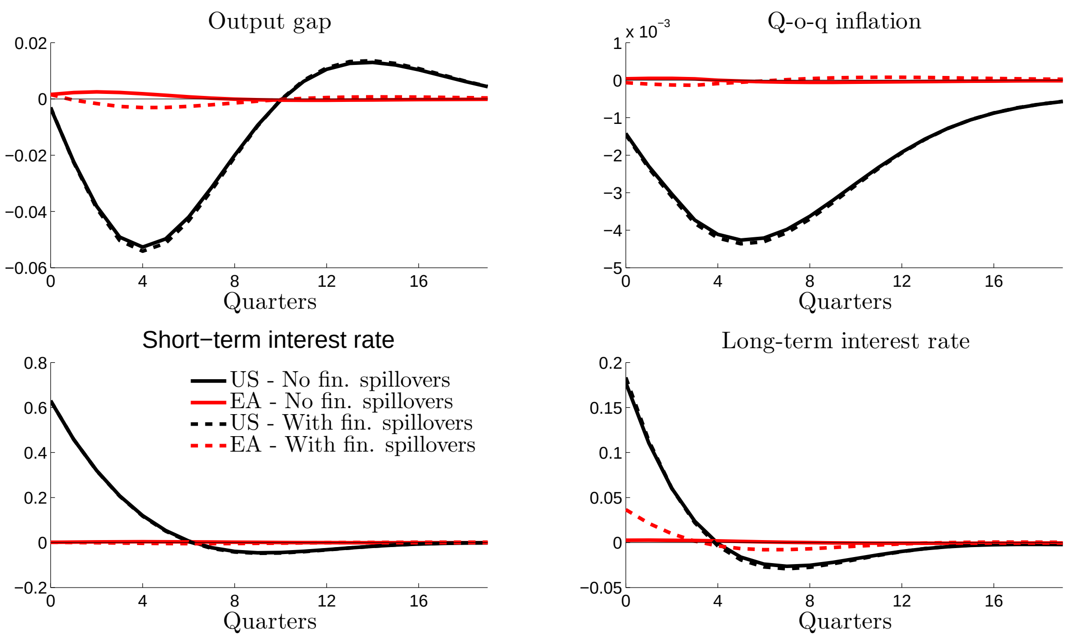
Finally, the uncovered interest rate parity condition is given by

$$\omega_{i,us,t} = E_t \omega_{i,us,t+1} + 4 \cdot E_t \pi_{i,t+1} - i_{it}^{(l)} + i_{us,t}^{(l)} - 4 \cdot E_t \pi_{us,t+1}. \tag{C.8}$$

C.2.2 Responses of domestic and foreign variables to monetary policy shocks

Figure 7 displays the responses of the US and the euro area to a contractionary monetary policy shock in the US. The impulse responses under the "no financial spillovers" scenario are depicted by the solid lines, and those under the "financial spillovers" scenario by the dashed lines. While the domestic responses in the US economy are rather similar under the two scenarios, the spillovers to output and inflation in the euro area from a monetary policy shock abroad are substantially larger in the "financial spillovers" scenario. In particular, under the "no financial spillovers" scenario the spillovers are small and expansionary as those arising through trade dominate: The euro depreciates in response to a monetary policy tightening in the US, stimulating the euro area's net exports through expenditure switching. In contrast, under the "financial spillovers" scenario the expansionary effects from a US monetary policy tightening in the euro area are dominated by the contractionary spillovers through financial markets: Euro area long-term interest rates rise in tandem with those in the US, dampening domestic demand in the euro area.

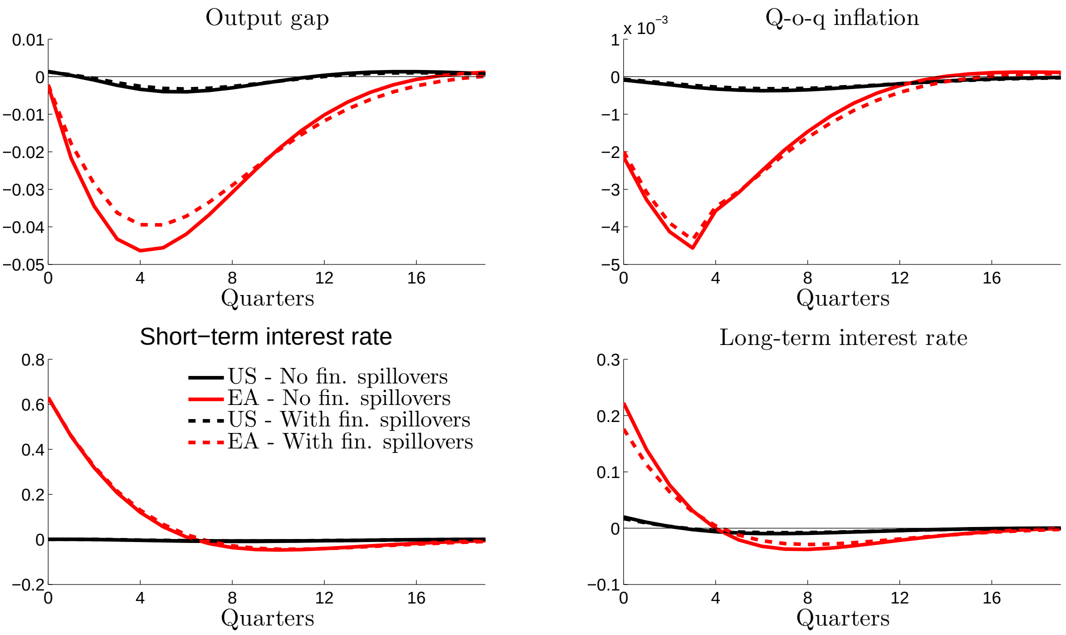
Figure 7: True Model Impulse Responses to a US Monetary Policy Shock for Parametrisations with and without Financial Spillovers



Note: The figure shows the impulse responses of several macroeconomic variables to a US monetary policy shock in the model of Coenen and Wieland (2002) and described in Appendix C.2. The dark black lines represent the responses of the euro area variables, and the light red lines those of the US variables. The solid lines represent the responses under the "no financial spillovers" parametrisation, and the dashed lines those under the "financial spillovers" parametrisation.

Figure 8 displays the responses of the US and the euro area to a contractionary monetary policy shock in the euro area. In contrast to the spillovers from US monetary policy, those emitted from the euro area are contractionary both under the "no financial spillovers" and the "financial spillovers" scenarios. This is due to the relatively large susceptibility of US long-term interest rates to foreign shocks in our calibration compared to the polar case of the "no financial spillovers" scenario calibration for the euro area. For the euro area, the domestic impact of a euro area monetary policy shock is smaller under the "financial spillovers" scenario as the transmission from short to long-term interest rates is weaker. This is consistent with the recent "dilemma hypothesis" according to which financial globalisation reduces monetary policy autonomy and effectiveness, partly due to a dampened transmission of short term to long-term interest rates (Ito, 2014; Miyajima et al., 2014; Obstfeld, 2015; Rey, 2015).

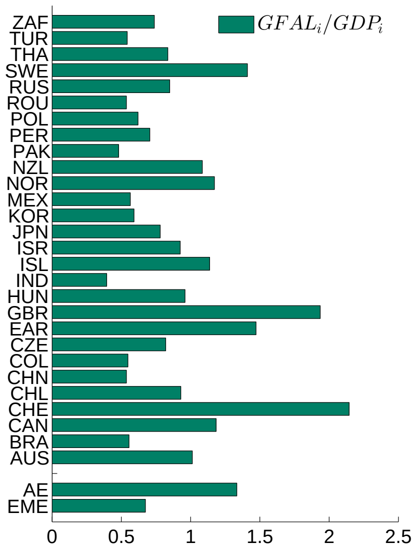
Figure 8: True Model Impulse Responses to a Euro Area Monetary Policy Shock for Parametrisations with and without Financial Spillovers



Note: The figure shows the impulse responses of several macroeconomic variables to a euro area monetary policy shock in the model of Coenen and Wieland (2002) and described in Appendix C.2. The dark black lines represent the responses of the euro area variables, and the light red lines those of the US variables. The solid lines represent the responses under the "no financial spillovers" parametrisation, and the dashed lines those under the "financial spillovers" parametrisation.

C.3 Additional figures

Figure 9: Economies' International Financial Integration Patterns



Note: The figure displays economies' gross foreign asset and liability positions relative to GDP (left-hand side panel) as well as the share of economies' gross foreign asset and liability position accounted for by the US (right-hand side panel). The overall gross foreign asset and liability positions are taken from Lane and Milesi-Ferretti (2007), and the bilateral gross foreign asset and liability positions with the US from the IMF CPIS. The latter refer only to portfolio investment assets and liabilities. The depicted values are averages over the time period from 1993 to 2007 for the left-hand side panel and 2001 to 2007 for the right-hand side panel. The depicted values are one plus the logarithm of the original values. There are no data on portfolio asset holdings for China and Peru in the IMF CPIS. The data on the gross foreign assets and liabilities in the left-hand side panel are not plotted for the US.