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# Towards an explanation of cross-country asymmetries in monetary transmission ☆

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ABSTRACT

This paper quantifies the importance of financial structure, labor market rigidities and industry mix for the monetary transmission mechanism. To do so, I determine how closely the impulse responses to a monetary policy shock obtained from country-specific vector-autoregressive (VAR) models and a non-standard panel VAR model match. In the country-specific VAR models, the impulse responses vary across countries in an unrestricted fashion. In the panel VAR model, the impulse responses also vary across countries, but only to the extent that countries differ regarding their financial structure, labor market rigidities and industry mix. For a sample of 20 industrialized countries over the time period from 1995 to 2009, I find that up to 70% (50%) of the cross-country asymmetries in the responses of output (prices) to a monetary policy shock can be replicated by accounting for cross-country differences in financial structure, labor market rigidities and industry mix. Moreover, while in the short run asymmetries in the output responses arise mainly due to cross-country differences in industry mix, in the medium run differences in financial structure and labor market rigidities are more important. Finally, cross-country differences in industry mix appear to be of rather minor importance for cross-country asymmetries in the transmission of monetary policy to prices.



## 1. Introduction

What determines the monetary transmission mechanism? How important are financial structure, labor market rigidities and industry mix? Do these structural characteristics shape the monetary transmission mechanism at different horizons? In this paper, I shed light on these issues by establishing several stylized facts about the quantitative importance of a set of an economies' structural characteristics for the monetary transmission mechanism. In particular, I find that in a sample of 20 industrialized countries over the time period from 1995 to 2009 up to 70% (50%) of the cross-country asymmetries in the responses of output (prices) to a monetary policy shock can be replicated by accounting for differences in countries' financial structure, labor market rigidities and industry mix. Moreover, while in the short run asymmetries in the output responses

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arise mainly due to cross-country differences in industry mix, in the medium run differences in financial structure and labor market rigidities are more important. Finally, cross-country differences in industry mix appear to be of rather minor importance for cross-country asymmetries in the transmission of monetary policy to prices.

Numerous papers have attempted to identify the determinants of the monetary transmission mechanism by exploiting asymmetries in the effects of monetary policy on output and prices across countries (or regions and/or industries). The standard approach is to regress a feature of countries' impulse responses to a monetary policy shock (typically the maximum or the cumulated response) on time averages of countries' structural characteristics in a cross-section regression (see Carlino and DeFina, 1998; Hayo and Uhlenbrock, 1999; Mihov, 2001; Arnold and Vrugt, 2004; Dedola and Lippi, 2005; Peersman and Smets, 2005).[1]

The standard approach is inefficient and provides only limited guidance for policymakers. First, it does not exploit the time-series variation in countries' structural characteristics to identify the determinants of the monetary transmission mechanism. This is inefficient, as many determinants of the monetary transmission mechanism display variation over time. The panel vectorautoregressive (VAR) model employed in this paper does exploit the time-series variation in countries' structural characteristics and should, therefore, pin down more precisely the importance of financial structure, labor market rigidities and industry mix for the monetary transmission mechanism.

Second, the standard approach focuses only on a few of the features of the monetary transmission mechanism. However, besides the maximum and the cumulated impulse response to a monetary policy shock routinely examined, other features of the monetary transmission mechanism such as the persistence of the response or the time it takes until output and prices reach their trough response are of interest as well. In the panel VAR model employed in this paper, the entire shape of the impulse responses of output and prices to a monetary policy shock is conditioned on countries' structural characteristics.

Third, because the standard approach focuses on identifying the determinants of the monetary transmission mechanism rather than assessing their quantitative importance, it provides no guidance to policy—for example in a currency union—as to how large the returns of different harmonization policies (in terms of reducing asymmetries in monetary transmission) are. In contrast, the purpose of this paper is to quantify the importance of financial structure, labor market rigidities and industry mix for the monetary transmission mechanism, which would allow policy makers in currency unions to compare the cost-benefit analyses of different harmonization policies.

The remainder of this paper is organized as follows: Section 2 presents the empirical evidence on cross-country asymmetries in monetary transmission. In Section 3, I show that financial structure, labor market rigidities and industry mix differ across countries, and discuss the mechanisms through which these structural characteristics may affect monetary transmission. In Section 4, I motivate the design of the panel VAR model employed in this paper, lay out how impulse responses can be constructed and describe the empirical model specification. Section 5 presents results and Section 6 robustness checks as well as a discussion of several elements of the empirical approach taken in this paper. Finally, Section 7 concludes.

## 2. Cross-country asymmetries in monetary transmission

Numerous papers have analyzed the monetary transmission mechanism from a cross-country perspective.[2] Similar to most of this work, I obtain estimates of the monetary transmission mechanism in specific countries from parsimonious, identical country VAR models given by

$$\boldsymbol{y}_{it} = \boldsymbol{\delta}_i + \sum_{j=1}^{p} \boldsymbol{A}_{ij} \cdot \boldsymbol{y}_{i,t-j} + \sum_{j=0}^{q} \boldsymbol{D}_{ij} \cdot \boldsymbol{x}_{i,t-j} + \boldsymbol{u}_{it}, \quad \boldsymbol{u}_{it} \overset{i.i.d.}{\sim} (\boldsymbol{0}, \Sigma_{u,i}), \tag{1}$$

where $i = 1, 2, \ldots, N$ indexes countries, $t = 1, 2, \ldots, T$ indexes time, $\boldsymbol{y}_{it}$ is a $K \times 1$ vector of endogenous variables, $\boldsymbol{x}_{it}$ is an $M \times 1$ vector of exogenous variables, $\boldsymbol{u}_{it}$ is a vector of serially uncorrelated reduced-form disturbances and $\boldsymbol{A}_{ij}$, $\boldsymbol{D}_{ij}$ are $K \times K$ and $K \times M$ coefficient matrices, respectively. The vector of endogenous variables $\boldsymbol{y}_{it}$ includes the logarithm of real GDP, the logarithm of the price level and a short-term interest rate. The vector of exogenous variables $\boldsymbol{x}_{it}$ includes the Commodity Research Bureau's index of commodity prices to account for interest rate increases in anticipation of supply-side shocks. To conserve degrees of freedom, I include only six lags of the endogenous variables in the model, $p = 6$, and only the contemporaneous value of the exogenous variables, $q = 0$.[3] The monetary policy shocks are identified by a Choleski

[1] Assenmacher-Wesche and Gerlach (2008), split their sample based on the value of a structural characteristic and compare the averages of the impulse responses across country sub-samples. The results of this approach may be hard to interpret, as one cannot control for more than one structural characteristic at a time. This is because the full country sample in this type of analysis is typically rather small (about ten to fifteen countries), so that sample splits based on more than one structural characteristic will result in country sub-samples too small for averaging to produce reliable estimates.

[2] See Table 1 for an overview.

[3] Recent empirical work has emphasized the importance of common factors in output and inflation (see Canova et al., 2007; Ciccarelli and Mojon, 2010). The commodity price index may be able to pick up part of this cross-section dependence. A more explicit approach to addressing cross-section dependence is the global VAR model of Pesaran et al. (2004). I leave the analysis of heterogeneity in the global VAR model along the lines of this paper to future research. A similar approach to accounting for cross-section dependence is the common correlated effects augmentation (CCEA) proposed by Pesaran (2006). While the results for the panel VAR model introduced below are hardly changed when using the CCEA, the corresponding impulse responses of the country VAR models turn out to be rather implausible, most likely due to the small number of degrees of freedom (the results are available upon request).