

## FINANCIAL INSTITUTIONS' BUSINESS MODELS AND THE GLOBAL TRANSMISSION OF MONETARY POLICY

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*Using Dutch, Spanish, and U.S. confidential supervisory data this study finds marked heterogeneity in the transmission of monetary policy across banks, insurance companies, and pension funds, across the three banking systems, and across banks within each banking system. While insurance companies and pension funds do not transmit home-country monetary policy internationally, banks do, with the direction and strength of the transmission determined by their business models and balance sheet characteristics. The paper is part of the latest project of the International Banking Research Network.*

### Introduction

The crisis has provided new arguments and evidence to the debate of the cross-border spillovers of monetary policy. Theoretical and empirical literature has considered, among other aspects, the role of global liquidity, the response of exchange rates or asset prices and the relevance of internationally active financial institutions for the international transmission of monetary shocks.

We analyze the transmission of monetary policy through financial institutions from an outward perspective, exploring how domestic financial institutions adjust their foreign lending to changes in domestic monetary policy, through both their affiliates located in other countries and via direct cross-border lending by headquarters. Specifically, we examine whether banks headquartered in the Netherlands, Spain, and the United States transmit their home country's monetary policy differently to other countries, which banks' characteristics are relevant for the transmission and whether these banks transmit monetary policy differently compared to insurance companies and pensions funds headquartered in the Netherlands. We use supervisory data for financial institutions headquartered in the three countries. We apply a common methodology for each separate country-specific data set and combine only the output, as due to their confidential nature, we cannot share the data. Buch et al. 2018 detail the empirical strategy and refer to the cross-country studies included in the latest project of the International Banking Research Network, of which this research is part.

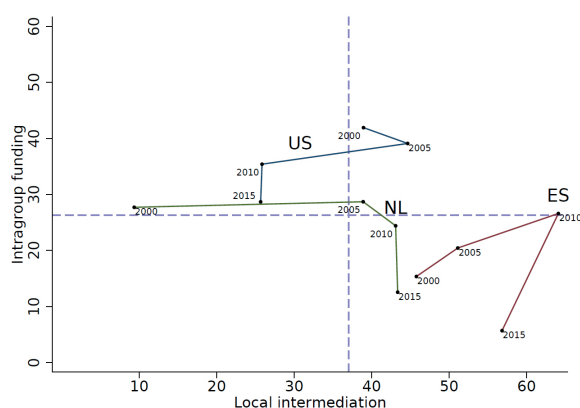
### Business models for international activity

The choice of countries in our study is important, as we not only explore how monetary policy transmits internationally, but also assess whether financial institutions with diverse business models react differently to monetary policy. We explore different dimensions of the internationalization strategy that could explain the different responses.

Figure 1, summarizes the business models of the three banking sectors, along two dimensions (Committee on the Global Financial System, 2010). The first dimension is related to banks' management of liquidity across their global offices. Banks that conduct a substantial amount of intragroup funding are classified as centralized. The second dimension is related to the degree of local intermediation conducted by global banks. Banks that perform most of their global operations through cross-border lending follow a more centralized approach, while decentralized banks use subsidiaries or branches (together labelled local affiliates) to conduct their foreign activities. Such a distinction is similar to the approach followed in McCauley et al. (2010) to classify global banks into multinational and international banks.

DEGREE OF BANKS' (DE)CENTRALIZATION

FIGURE 1



NOTE: Intragroup funding is the share of total foreign intragroup liabilities to total liabilities. A higher score indicates a more centralized country. Local intermediation is the minima of local assets and local liabilities for each counterparty country summed over all counterparties and then divided by total foreign claims. A higher score indicates a less centralized country. The vertical and horizontal dashed lines represent the 75<sup>th</sup> percentile of the historical (since 2000) distribution of the respective variables. The data for this figure are from the BIS International Banking Statistics.

The figure reports measures of intragroup funding and local intermediation for Dutch, Spanish, and U.S. banks at four points in time: 2000:Q4, 2005:Q4, 2010:Q4, and 2015:Q4. At these four points in time, it is clear that the banking sectors of the Netherlands (NL), Spain (ES), and the United States (US) follow different business models to conduct their foreign activities. Spanish banks are mostly located in the lower-right quadrant, with low intragroup funding and high local intermediation, while the U.S. banks are mostly located in the upper left quadrant, with low local intermediation and high intragroup funding. The Dutch banking sector mostly falls in between. These differences in business models may help us explain the reaction of banks located in these countries to monetary policy.

## Monetary policy and business model

To test for the relevance of financial institutions' business models on the international transmission of home-country monetary policy, we divide banks according to the type of foreign activities in which they participate. Specifically, we compare banks that mostly operate by lending to foreign residents from the head office to those banks that establish affiliates abroad to cater to their foreign clients. We label the first type of banks "centralized", while the second type are labeled "decentralized".

To formally test our hypothesis, we estimate equations that explain the change in foreign claims of a bank  $b$  on a given country  $j$  at a given time  $t$  ( $\Delta Y_{b,j,t}$ ), using bank-level confidential quarterly reports submitted by banks to the prudential supervisor of the corresponding country (the DNB, the BdE, and the Federal Reserve), covering the period 2000:Q1 to 2014:Q4 for Spanish banks and 2000:Q1 to 2015:Q4 for U.S. and Dutch banks. For insurance companies and pension funds, the data on foreign claims by country is collected by DNB as part of the Dutch balance of payment statistics, which is available at a quarterly frequency over the period 2006:Q1-2015:Q4. We merge this information with quarterly balance sheet reports submitted by financial institutions to their respective supervisors.

Monetary policy is captured by either the nominal policy rate or the shadow rate (Krippner, 2013) for the home country of a given bank (the euro area rates for Dutch and Spanish banks) ( $\Delta MP_{t-k}^{domestic}$ ). Although during most of the period under consideration monetary policy was loosened, there were also periods when policy became more restrictive. For instance, there is a monetary tightening cycle just prior to the Global Financial Crisis (GFC).

To identify the channels of monetary policy transmission for banks, we use the technique introduced by Kashyap and Stein (2000) and later applied by Cetorelli and Goldberg (2012) to the international context. We explore both the lending channel, with variables that may capture funding frictions such as size, and the portfolio channel with frictions that may affect the asset side of banks' balance sheets such as the capital ratio. To identify the effect of monetary policy in the cross-section of banks and specifically the role of banks' business model, we introduce an indicator of bank's centralization ( $Decentral_{b,t-4}$ ). We also include control variables for banks ( $X_{b,t-1}$ ), for domestic macro-financial conditions ( $Z_{t-1}^{domestic}$ ), for destination-country credit demand ( $Z_{j,t-1}$ ) and for global factors ( $VIX_{t-1}$ ). In particular, we estimate the following equation:

$$\Delta Y_{b,j,t} = \alpha_0 + \sum_{k=0}^K (\alpha_{1,k} \Delta MP_{t-k}^{domestic} + \alpha_{2,k} \Delta MP_{t-k}^{domestic} * Decentral_{b,t-4}) + \alpha_3 Decentral_{b,t-4} + \alpha_4 X_{b,t-1} + \alpha_5 Z_{t-1}^{domestic} + \alpha_6 Z_{j,t-1} + \alpha_7 VIX_{t-1} + f_b + f_j + \varepsilon_{b,j,t}$$

We expect that banks that follow a centralized model are more likely to be affected by domestic monetary policy. In contrast, those that operate mostly through decentralized foreign offices may be less sensitive to changes in domestic monetary policy. In particular, we expect that monetary policy tightening leads to a reduction in both cross-border and local claims for centralized banks. In contrast, we do not have a prior on the total effect of monetary policy on cross-border claims for decentralized banks and we expect no effect on local claims.

Our results show that U.S. banks, which follow a more centralized business model, are more sensitive to domestic monetary policy changes than Dutch and Spanish banks. When we conduct tests to assess the importance of the bank lending channel on these banks, we find that larger U.S. banks increase their foreign exposures as monetary policy tightens. In contrast, monetary policy appears to have a more negative effect on the foreign exposures of the more decentralized Dutch and Spanish banks.

We also test whether banks react to monetary policy through the portfolio channel. We find that U.S. banks with higher capital levels decrease their international exposures as monetary policy tightens. We find similar differences based on capitalization for the Netherlands for cross-border claims, while Spanish banks do not show any significant differences in their reaction to monetary policy across levels of capitalization.

We further analyze the impact of monetary policy on banks by comparing the reaction of centralized

and decentralized institutions to policy rate changes within a country. We find that Dutch and Spanish banks change their international exposures depending on their business models. Decentralized Dutch banks increase their cross-border claims as domestic monetary policy tightens. Similarly, decentralized banks in Spain increase their cross-border and total claims as policy tightens, tilting their portfolios towards foreign claims. It appears that global Spanish banks with foreign affiliates are more willing to increase their cross-border claims as a response to tighter monetary policy, perhaps as a complement to the activities conducted in those foreign offices.

Lastly, we find that insurance companies and pension funds do not change their foreign claims in response to monetary policy changes.

## Conclusions

The existence of spillover effects from monetary policy into financial institutions' lending activity across countries affects policy efficiency and financial stability. Bank-specific characteristics and specifically its international business model, as captured by an indicator

of decentralized management, affects how banks international lending adjusts to domestic monetary policy stance.

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