Review of Economic Dynamics 30 (2018) 125–144

Contents lists available at ScienceDirect

Review of Economic Dynamics

www.elsevier.com/locate/red

Risky banks and macro-prudential policy for emerging economies

Gabriel Cuadra [a], Victoria Nuguer [b,c,*]

[a] Bank of Mexico, General Directorate of Financial Stability, Directorate of Macrofinance Risk Analysis, Av. 5 de Mayo #1, 06059 Ciudad de México, Mexico
[b] Bank of Mexico, General Directorate of Economic Research, Directorate of Economic Studies, Av. 5 de Mayo #18, 06059 Ciudad de México, Mexico
[c] Inter-American Development Bank, Department of Research and Chief Economist, 1300 New York Ave. NW, Washington, DC 20016, United States of America [1]

ARTICLE INFO

Article history:
Received 12 August 2015
Received in revised form 30 April 2018
Available online 8 May 2018

JEL classification:
G28
E44
F42
G21

Keywords:
Cross-border bank flows
Emerging market economies
Financial frictions
Macro-prudential policy
DSGE models

ABSTRACT

We develop a two-country DSGE model with financial intermediaries to analyze the role of cross-border bank flows in the transmission of a U.S. bank's balance sheet shock to emerging market economies (EMEs). In the model, banks in both countries face an agency problem when borrowing from domestic households. EME banks might also be constrained in borrowing from U.S. banks, what we call risky EME banks. A negative quality of capital shock in the United States generates a global financial crisis. EME's macro-prudential policy that targets non-core liabilities (cross-border bank flows) makes the domestic economy resilient to the volatility of cross-border bank flows and makes EME's households better off.

1. Introduction

The 2008 global financial crisis demonstrated that adverse financial shocks in advanced economies (AEs) generate spillovers to emerging market economies (EMEs). Cetorelli and Goldberg (2011) find evidence that the main channel of transmission of the 2008 financial crisis from AEs to EMEs was the reduction in cross-border lending by foreign banks. Moreover, scholars and policymakers in EMEs have expressed concern regarding negative spillover effects of AEs' events through cross-border flows (see Sánchez, 2013; Powell, 2013; Rajan, 2014), particularly cross-border *bank* flows (see Takáts and Vela, 2014). EMEs are thus required to deal with the risks of these spillover effects, and in recent years there has been extensive discussion of macro-prudential policies. However, in order to assess the use of these policies as a response to AEs' financial shocks, it is necessary to have a better understanding of how adverse financial events in AEs are transmitted to

* Corresponding author.
E-mail addresses: gcuadra@banxico.org.mx (G. Cuadra), victorian@iadb.org (V. Nuguer).
[1] Current address.

https://doi.org/10.1016/j.red.2018.05.001
1094-2025/

EMEs. This requires additional empirical studies on the subject and the development of quantitative models that capture the relevant transmission channels.

This paper aims to contribute to that discussion. First, we present new VAR-based evidence of spillovers from the United States to EMEs. Second, we develop a theoretical model to explain this empirical evidence. Third, we analyze a macro-prudential policy carried out by an EME to mitigate the negative impact of AEs' financial shocks on the EME. The VAR-based evidence suggests that a shock to the quality of capital in the United States, captured by an increase in the net charge-offs of U.S. commercial banks, negatively affects output and credit in EMEs. To explain this evidence, we build a two-country model with banks in both the United States and the EME where AE banks lend to EME banks, thus allowing for cross-border bank flows. The model additionally contains financial frictions, in particular an agency problem that constrains how much banks can borrow from households. Finally, we consider a macro-prudential policy that targets cross-border bank flows. We show that this policy improves welfare for EMEs' households.

In the empirical part of the paper, we examine how a shock to U.S. banks' net charge-offs is transmitted internationally through cross-border bank flows. Net charge-offs represent the value of loans that banks know will not be repaid, and we assume that they have a direct impact on the other variables in the exercise; because we are analyzing the Great Recession episode, we assume that this shock drives events. We estimate two VARs, the first using U.S. and Mexican data and the second using U.S. and Turkish data. The difference between the two EMEs lies in their banking regulation: Mexico has had prudential banking regulation in place since the 1990s, while Turkey only implemented it after the 2008 financial crisis. Four important findings emerge from the VAR-based evidence. First, in response to an increase in their net charge-offs, U.S. banks decrease how much they lend to EME banks. Second, the EME experiences a decrease in credit and in GDP. Third, there is asset price co-movement across countries. Fourth, the estimated VAR with Turkish data shows a deeper fall in domestic credit and GDP than the estimated VAR with Mexican data. We propose a framework that accounts for these four empirical facts, building on the open-economy framework of Nuguer (2016).

In the baseline model, there are two countries (AE and EME), and we assume that there are domestic financial frictions in both economies *à la* Gertler and Kiyotaki (2010) and Gertler and Karadi (2011) and cross-border bank flows. The EME is a relatively small country with a small banking sector, such as Mexico or Turkey, while the AE is a relatively big economy with a big banking sector, such as the United States. Banks in both countries use their net worth and local deposits (core bank liabilities) to finance domestic non-financial businesses. In particular, banks purchase securities issued by local businesses, and we assume that there are no financial frictions between banks and non-financial business. However, we introduce an agency problem and assume that banks face a financing constraint in raising domestic deposits from households. AE banks have a larger net worth (relative to the size of their economy) than EME banks and consequently lend to EME banks using cross-border bank flows (non-core bank liabilities) and actively participate in financing EME projects.[2]

In order to account for the difference in the results between the estimated VAR for Mexico and the estimated VAR for Turkey, we extend our baseline model and introduce an additional friction: banks in the EME are constrained in how much they borrow from AE banks. We refer to this extension of the model as *risky* EME banks, in contrast to *safe* EME banks that correspond to the financial intermediaries in the baseline model.

Once we have the empirical results from the VAR analysis and a theoretical framework that allows us to interpret them, we proceed to evaluate the model's ability to replicate the empirical facts in response to shocks to the quality of capital in the AE. We compare the impulse response functions of the model with the ones from the estimated VAR. The quality of capital shock resembles the U.S. banks net charge-offs shock implemented in the VAR analysis, and the baseline model with safe EME banks replicates the first three facts that result from the VAR-based evidence. In response to a reduction in the value of capital (and securities) in the AE, banks in this economy become more constrained in raising deposits. Therefore, they have to reduce lending to domestic AE businesses, which further depresses the value of securities and banks' net worth in the AE. In addition, AE banks also contract lending to EME banks. Accordingly, EME banks' net worth falls and their liability side shrinks. Since EME banks are now more financially constrained, they reduce lending to domestic EME firms, which leads to a fall in asset prices. In this way, shocks originating in the AE are transmitted to the EME through cross-border bank flows. In the extension of the model we assume that EME banks are risky. Therefore, in response to an adverse financial shock, AE banks further reduce lending to risky EME banks; in our baseline calibration, on impact, cross-border bank flows fall 58% more in the model with risky EME banks, this translates into a 9% further decrease in credit to domestic firms, 8% lower asset prices, and a 10% larger fall in output. Accordingly, the impact on the EME is larger, which allows us to replicate the fourth finding from the VAR estimation. The baseline and the extended model reproduce the shape and the magnitudes of the two estimated VARs. Furthermore, we show that a model without cross-border bank flows, i.e., in financial autarky, does not replicate the findings from the VAR evidence.

Overall, the above results suggest that the framework presented in this paper is useful for studying the transmission of AE financial shocks to the EME. To mitigate the effects that these AE shocks prompt in the EME, we propose a macro-prudential policy. The main purpose of the policy is to smooth the effect of cross-border bank flows' volatility on the EME financial system through a levy on non-core bank liabilities. In particular, when bank credit is growing faster than bank deposits,

[2] In the model, we assume that international flows are only bank-to-bank for three main reasons. First, financial systems in EMEs are bank based. Second, the prudential regulation implemented in Mexico in the 1990s focused on the banking system. Third, EME non-financial firms are mainly financed through domestic bank credit, as shown for Mexico in Appendix A.3.