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The role of banking regulation in an economy under credit risk and liquidity shock☆

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ABSTRACT

This paper develops a Dynamic Stochastic General Equilibrium model which includes a financial sector to analyze the effects of liquidity shock and credit risk in the Brazilian economy. Banks use equity capital and deposits from agents to finance investments of the productive sector. The sources of financial frictions are default rate and liquidity shock, due to deposits withdrawn in advance. The banking supervisor injects liquidity in the deposit market. Using data for the Brazilian economy in the period from 1995 to 2009, the structural parameters are estimated by Bayesian methods. Impulse response functions are computed to describe the dynamic effects of exogenous shocks. The major results show that credit risk is pro-cyclical and default risk depends on structural features. The banking regulator is able to set up a policy to promote financial stability and efficiently reduce fluctuations in the output.

1. Introduction

The stability of the international financial system has been through tough times in the past couple of years, after the bankruptcy of Lehman Brothers bank in the United States in September of 2008.

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According to the International Monetary Fund (2010), the estimated loss in assets between 2007 and 2010 was US $2.276 trillion. Around two-thirds of this amount (US $1.5 trillion) had been realized by the end of 2009. Most of these losses were in the financial markets of the US (38.9%) and the European Union (49.2%). However, the financial crisis has spread to other regions due to credit restrictions. In this scenario, the Brazilian banking system was affected by the reduction of international liquidity, specially the smaller banks which had the deposit cost risen from 4.3% in June 2008 to 8.7% in December 2008. According to the Central Bank of Brazil's financial stability report (2010), the rise of the financial intermediation costs is explained by the increase in risk premium and a real exchange rate depreciation around 33% between August and December 2008.

In the following months, the financial crisis had spread to the real economy, triggering a worldwide economic recession. In 2009, the major economies showed a real decline in gross domestic product, such as United States (−2.4%), Euro zone (−4.1%), United Kingdom (−5.0%) and Japan (−5.2%). Interestingly, however, emerging economies and developing economies were less affected by the crisis and had an average economic growth of 2.4%. China and India, for instance, grew 8.7 and 5.7%, respectively, in the period.

In order to mitigate the effects of the financial crisis, several measures of economic stabilization were adopted. In Brazil, these measures included reducing the supply of government bonds in order to avoid upward pressure on interest rates, replacement of reverse swaps for traditional swaps to meet the demand for hedging instruments in the derivatives market during the period of strong devaluation, liberalization of reserve requirements for banks to regulate the liquidity of the financial system, fiscal relief for the production of consumer durables goods aiming at stimulating domestic demand, and preservation of the bank liquidity primarily by the realization of repo operations.

The international crisis has highlighted the need to promote improvements in banking regulation. Therefore, the Basel Committee on Banking Supervision (BCBS) is studying the adoption of new regulations that limit the leverage and improve the management and allocation of financial institutions' equity. Moreover, proposals to regulate the financial system are being handled by the US Congress, aiming at restricting the playing field of banks and limit their exposure to high-risk financial instruments, including derivatives, and forms of investment that may cause systemic risk, such as hedge and private equity. Those measures reopen the discussion about the adequacy of bank regulation, notably regarding to economic efficiency and moral hazard.[1]

In the traditional neoclassical models, it is assumed that the financial market operates in a flawless economic environment. In this market structure, the financial system would not be subject to distortions such as asymmetric information, credit risk, market risk, bankruptcy costs, and other frictions. According to Miller (1995), in such framework, the banking market becomes irrelevant for purposes of economic analysis, because operations in financial intermediation would not affect the real side of the economy. However, empirical evidence shows that the financial system has made major contribution to the process of economic growth, by allocating resources to more efficient finance projects. Mavrotas and Son (2006) and Biggs et al. (2009), for instance, identified a positive correlation between credit supply and economic growth. Moreover, banks have also been blamed for the spread of economic crisis. Keeley and Furlong (1990), Eichengreen and Arteta (2000) and Gai, Kapadia, and Millard (2008) point out the financial system as a source of economic crisis enhancement.

According to Allen and Gale (2007), contracts available on the market are not enough to protect the financial system against aggregate economic shocks. Consequently, the failure of one bank can affect other financial institutions through the contagion effect. Such shocks can also spread to other sectors of the economy, causing a drop in the price of assets, lessening of economic activity, and fiscal burden of restructuring the banking system.

The objective of this study is to develop a dynamic stochastic general equilibrium (DSGE) model with frictions in the credit market (default risk) and in the market for deposits (liquidity shock) in order to examine the channels of transmission of a financial crisis to the real side of the economy. Specifically, we analyze the behavior of the credit risk over the business cycle and evaluate which

[1] See, for instance, Shehzad and Haan (2013) and Klomp (2010) for a discussion on the elements of the recent financial crisis.