



Macroeconomic relevance of credit channels: Evidence from an emerging economy under inflation targeting[☆]

Matias Carlos Auel^a, Helder Ferreira de Mendonça^{b,*}

^a Brazilian Development Bank (BNDES), Fluminense Federal University, Department of Economics, Av. República do Chile, 100 Rio de Janeiro, RJ, CEP 20031-917, Brazil

^b Fluminense Federal University, Department of Economics, National Council for Scientific and Technological Development (CNPq), Rua Dr. Sodré, 59, Vila Suíça, Miguel Pereira, Rio de Janeiro, CEP: 26900-000, Brazil

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ABSTRACT

This article presents a contribution to the empirical literature concerning credit channels in emerging economies. Based on data from 2002 to 2009, three sets of GMM models are considered in this article for analyzing the macroeconomic relevance of the credit channels in Brazil: (i) the first set analyzes the effects of shocks on economic variables which are essential for credit supply; (ii) the second set considers the effects of the same variables used in the previous case on credit spread; and (iii) the third set takes into account the effects of changes in the credit market conditions on the product. In addition, with the intention of showing the effects of shocks on the variables which are relevant in the GMM models for credit supply, spread, and product, a VAR analysis is made. Finally, with the objective of testing the results, a GMM system model is built. The findings denote that the effects of economic shocks on credit supply and on credit spread are in accordance with the credit channel theory. In particular, it is observed that shocks on the interest rate are not transmitted directly to the economy but through the credit channels.

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1. Introduction

Nowadays, episodes in the real world, as the subprime crisis, strengthen the necessity to study the relevance of the credit market for the economy. The pioneer ideas concerning asymmetric information (Akerlof, 1969; Stiglitz and Weiss, 1981) reveal that the credit market is subject to failures and inefficiencies and thus causes effects on the aggregate economic activity (Greenwald et al., 1984). In particular, it is recognized that problems of information create a set of mechanisms that propagate and amplify initial shocks to the economy (Bernanke, 1983). There are two main types of such mechanisms, called credit channels: (i) the bank lending channel, which emphasizes the existence of shocks that can affect the ability/willingness of banks to supply credit to bank-dependent firms, and (ii) the balance sheet channel, that emphasizes the existence of shocks that can affect the financial position of firms and households and thus their ability to access the credit market (Hubbard, 1995; Bernanke and Gertler, 1995). Furthermore, as pointed out by Stiglitz (1989) and Bernanke (1993), the conditions in the credit market are important to the determination of the level of economic activity. As a consequence, the

credit channels play a central role in the analysis of the macroeconomic phenomenons.

Although the empirical evidence regarding the operation of credit channels for monetary policy in the case of developed economies is well-known (see Bernanke, 2007), empirical evidence for emerging economies is scarce. It is important to note that in the emerging economies the credit markets are less developed and the market failures are greater. Therefore, the effects of propagation and amplification of shocks through the credit market tend to be more powerful. Moreover, although scarce, expensive, and volatile, banking credit is the most important source of external funding of firms and households in Brazil and in other emerging economies (Inter-American Development Bank, 2005).

As highlighted by Bogdanski et al. (2000), a low credit/GDP ratio in the Brazilian economy is an indication that the credit channels have small macroeconomic relevance. Another factor which can be responsible for the obstruction of credit channels is the strong indexation of the public debt, which in turn decreases the power of the monetary policy in the search for a low inflation, and thus implies a high interest rate for decreasing the inflation.

With the intention of eliminating a vacuum in the literature concerning the transmission of economic shocks through the credit market in developing economies, Brazil – which is one of the most important emerging economies – is considered in this analysis. Hence, the main contribution of this study is the presentation of empirical evidence from the transmission of several macroeconomic shocks to

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* Corresponding author.

E-mail addresses: matias_auel@yahoo.com (M.C. Auel), helderfm@hotmail.com (H.F. de Mendonça).

the economy through the credit channels after the adoption of inflation targeting.

Besides this introduction, this article is structured as follows. The next section presents a small survey of the empirical literature on credit channels. Section 3 makes a presentation of data and methodology which are used in this study. Section 4 shows empirical evidence through the application of generalized method of moments (GMM), vector autoregression analysis (VAR), and GMM system. The last section presents the conclusion.

2. A brief review of the empirical literature on credit channels

There exists a huge academic literature on empirical evidence on credit channels, especially concerning monetary policy in developed countries, based on aggregate time series data and microdata. Among the literature which uses aggregate time series data, [Bernanke and Blinder \(1992\)](#), making use of vector autoregression analysis (VAR), found evidence that a tight monetary shock due to an increase in Federal Funds Rate implies after six months a decrease in the aggregate amount of loans. This delay in the response of the credit to a shock would be explained by the rigidity of contracts. Notwithstanding, the analysis is subject to the criticism regarding the identification problem because the fall in the amount of loans can, in fact, reflect the fall in demand (and not in supply) for loans.

[Kashyap et al. \(1993\)](#) analyzed the firm's financing mix, defined as the ratio between the volume of banking loans and the sum of volume of banking loans and commercial papers (substitute for banking credit). Under this view, while increases or decreases in both banking loans and commercial papers would indicate changes in credit demand, falls in the mix (relative falls of banking loans in regard to commercial papers) would indicate a decrease in credit supply. Based on the VAR analysis, it was observed that tight monetary shocks provoke a fall in the volume of banking loans in regard to the volume of commercial papers. The authors also analyzed the behavior of the spread between commercial papers rates and the American treasury bonds. The result denotes a significant increase in the spread after tight monetary shock, which in turn confirms the idea of credit channels.¹

[Hallsten \(1999\)](#) also analyzed the behavior of the firm's financing mix and the behavior of the spread for the Swedish case based on the VAR models and the results are similar to those found by [Kashyap et al. \(1993\)](#). In short, tight monetary shocks imply a relative decrease in credit supply and an increase in the spread which in turn affects the output.

The analysis made by [Gertler and Gilchrist \(1993, 1994\)](#) detected that a monetary shock implies different effects on credit flow for small and large borrowers. Through a VAR analysis the findings denoted that a decrease in housing credit and consumer credit is greater than that observed for commercial and industrial credit in response to a tight monetary shock.

The presence of credit channels for the monetary policy in housing markets is analyzed by [Iacoviello and Minetti \(2008\)](#) for Finland, Norway, Germany and the United Kingdom. As in the studies mentioned above, a VAR analysis was made. The results indicate that in spite of the European integration process, the different countries presented heterogeneous institutional features in their housing finance system which in turn affects how the credit channels work. In brief, the study found evidence for the presence of a bank lending channel for Finland and United Kingdom, the existence of a balance sheet channel for Germany, and non-evidence for the Norway case.

Taking into account microdata, [Kashyap and Stein \(2000\)](#) analyzed the possibility of a bank lending channel in the USA for the period

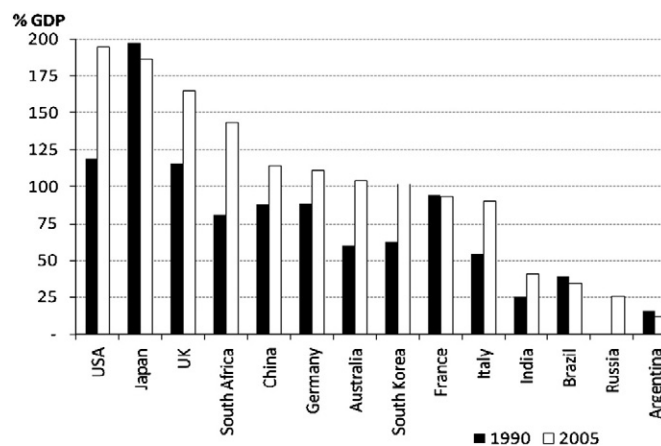


Fig. 1. Domestic credit to private sector/GDP.
Source: International Financial Statistics.

from 1976 to 1993. Based on 2LS and panel estimations, the main conclusion is that the impact caused by monetary shocks on credit supply is greater for banks which have lower balance sheet liquidity. This standard behavior is stronger for the case of smaller banks and thus confirms the presence of a bank lending channel in the USA.

Based on the panel estimations making use of microdata from the European banks, [Ehrmann et al. \(2003\)](#) found evidence that the bank lending channel is operating in Eurozone both in the individual (countries) and aggregate levels. In a general way, a tight monetary shock decreases the bank credit supply. Different from the studies regarding banks in the USA, the size of the banks in Europe does not affect the banking credit response to monetary policy shocks.

In brief, the studies concerning empirical evidence on the credit channels can be divided into two groups: one which uses aggregate time series data and one which uses microdata. The analysis making use of the aggregate data is more adequate when the objective is to analyze the macroeconomic importance of the credit channels, while the use of microdata or cross-sections is more appropriate for observing the effect of credit market failures on different banks or to distinguish between the different types of channels.

3. Data and methodology

The macroeconomic stability is crucial for creating a favorable environment for fomenting the credit operations growth in the economy. However, although the introduction of the Real plan in 1994 represents the corner-stone of the success of inflation stabilization in Brazil, two main reasons justify the obstruction of credit channels until the end of the 1990s: a low credit/GDP ratio and the strong indexation of the public debt.

As can be observed in [Fig. 1](#), Brazil is a country with a low GDP ratio when it is compared with developed countries. On the other hand, a direct observation regarding similar economies such as BRICs (Brazil, Russia, India, and China) and Argentina reveals that Brazil has a ratio similar to that observed for Russia and India, greater than Argentina, and lower than China.

It is important to note that in environments of risk or market stress, the demand for prefixed bonds falls and the demand for bonds indexed by interest rate or exchange rate increases ([de Mendonça and Silva, 2009](#)).² As a consequence, when the proportion of interest rate bonds in the bank's portfolio is high the monetary policy is less effective because the banking credit can present a behavior contrary

¹ This interpretation is subject to criticism, see [Oliner and Rudebusch \(1996\)](#) and [Friedman and Kuttner \(1993\)](#).

² For example, according to information available from Central Bank of Brazil (CBB – see <http://www.bcb.gov.br>), the proportion of interest rate indexed bonds and exchange rate indexed bonds reached 67.7% in April 2003 and 32.9% in October 2001, respectively.

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