The Evaluation of Bank Credit as a Channel of Transmission of Monetary Policy: An Overview

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Abstract: In a context of significant information asymmetries and weak credit market development, the asymmetric sensitivity of bank's credit activity to monetary shocks could be caused by their inability to adjust their assets. Our analysis is based on the hypothesis that there is a link between bank characteristics and the response of credit supply to monetary policy. Our literature review aims to identify the main findings of rigorous studies on the evaluation of bank lending as a transmission channel from monetary policy to the real sphere. Thus, we seek to understand the mechanisms by which the various balance sheet variables of banks influence the sensitivity of credit activity to monetary impulses, in order to situate our study in the broad context of the overall review of credit theory in an environment of information asymmetries.

Keywords: Bank credit channel; monetary policy; Bank assets; Bank liquidity; Microeconomic data; Macroeconomic data; Balance sheet variables.

Codes JEL: E51; E52; G21.

1. INTRODUCTION

Work on the bank credit channel and its role in monetary transmission through the supply response of credit to the economy has often been examined through econometric tests on aggregated data, largely based on the use of statistical techniques such as VECM, VAR and SVAR. In a vector auto regression framework, the use of such aggregated time-series data produces somewhat questionable results due to the identification problem, which subsequently leads to difficulties in assessing the effects of the monetary policy stance (Kashyap and Stein, (1995); Bernanke and Gertler (1995)). This problem stems from the difficulty of determining whether the effects of monetary shocks on the supply of bank credit are caused by changes in the supply of bank credit (the credit channel) or by changes in the demand for credit (the interest rate channel).

In light of the extensive reforms and liberalization of the financial sector, a new generation of research on the role of banks in the transmission of monetary policy aims to overcome the identification problem by assessing the distributional effects of the credit channel. Using disaggregated data, these studies have shown that the strength of banks' balance sheets specifies the response of real variables to monetary and financial parameters. Consequently, the use of different bank characteristics as variables in the microeconomic data approach becomes the compatible way to study the credit channel.

This paper is a synthesis of theoretical and empirical research that has explored the empirical assessment of bank credit as a monetary policy transmission channel. In order to explore this research further, the paper is divided into two distinct parts. First, we will examine the various studies that have focused on the evaluation of the bank credit channel using aggregate and disaggregated data. We will highlight the methodologies used in these studies and the conclusions they have drawn. Second, we will look at work that has focused on the hypothesis of asymmetric sensitivity of bank lending to balance sheet variables, namely liquidity, capitalization and asset size. We will analyze the different conclusions that have been drawn from this hypothesis.

2. BANK CREDIT TRANSMISSION CHANNEL: TO-WARDS A NEW WAVE OF RESEARCH

2.1. Evaluation of the Lending Channel Based on Macroeconomic Data

Bernanke and Blinder (1992) assess the impact of monetary policy shocks on bank deposits. They use the Fed funds rate as an indicator of US monetary policy and a predictor of the business cycle. Since this indicator is less sensitive to demand shocks and provides a better translation of monetary policy stances, the authors highlight that monetary tightening is immediately accompanied by a decline in banks' securities portfolios and demand deposits in the first few months. However, the response of bank credit to this monetary contraction is somewhat later, at about 6-9 months, allowing monetary policy to slow down. The authors conclude that the weakening of spending takes place through the reduction of credit via activity. Using this conclusion as a basis for testing the credit channel, Kashyap and Stein (1995) alternatively agree that the decline in economic activity and credit is due to a decline in money demand, as in the money view theory. For Romer (1990), this decline in money demand is not ex-

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plained by the contraction in credit, and monetary variables predict economic activity rather than credit.

Kashyap, Stein and Wilcox (1993) observe whether a monetary shock affects the commercial paper¹ and bank credit. Their results show asymmetric movements in the two variables. Indeed, a restrictive monetary policy leads to an increase in commercial paper issuance and a decrease in bank credit. As a result, the contraction in credit is independent of demand.

In reality, this research based on aggregate data poses an identification problem, which has led researchers to focus on the distributional effects of the credit channel to assess the latter.

2.2. Evaluation of the Lending Channel Based on Microeconomic Data

Early work on the sensitivity of banks to monetary policy decisions via their characteristics has been applied to developed countries such as the US. Kashyap and Stein (1995), who pioneered the evaluation of the credit channel using disaggregated data, show that the credit activity of small banks is more sensitive to monetary policy guidelines.

Kishan and Opiela (2000) examine the responses of US banks to monetary policy using dynamic panel data from 1980 to 1995. Using ordinary least squares (OLS), they show that smaller and less liquid US banks are more sensitive to monetary policy shocks than larger and more liquid banks.

Using quarterly observations from 1976 to 1993, Kashyap and Stein (1997, 2000) confirm the role of bank liquidity in the transmission of monetary policy. They find that the credit supply of the least liquid US banks is more sensitive to monetary policy. Engler and al. (2007) study the case of Austria and introduce bank capitalization in their model. They also use GMM estimates and confirm the importance of the credit channel for weakly capitalized banks. These results support the theory by confirming the negative correlation between bank characteristics and the bank credit channel of Peek and Rosengren (1995). In an international sample, Brei and al. (2013) test various structural changes in bank credit supply using data on large international banks in fourteen advanced economies over the period 1995-2010. The authors argue that the strength of bank balance sheets is a key criterion for the sensitivity of bank credit supply to bank recapitalization.

In the European context, several studies evaluating the bank lending channel have produced conflicting results. Gambacorta and Mistrulli (2004) use the GMM method to estimate the lending responses of Italian banks to monetary shocks. They also show that the interaction between the money market rate and capitalization and liquidity characteristics has a positive effect on bank lending. Kakes and Sturm (2002), estimating the behavior of German banks using the VECM method, find that small banks transmit monetary policy decisions more extensively. Meanwhile, Hernando and Martínez-Pagés (2001), in their article based on quarterly data from 1991 to 1998, cannot confirm the existence of the bank lending channel in Spain. On the other hand, Altunbas and *al.* (2002) study the case of banks in several European countries. They use autoregressive models for annual data. According to their results, Italy and Spain, unlike Germany, show an asymmetry in monetary transmission depending on the level of bank capital. Using the same estimation techniques, Westerlund (2003) finds that poorly capitalized banks are more sensitive to monetary tightening.

Loupias, and *al*, (2002) use GMM to estimate the responses of 312 French banks to changes in monetary policy using quarterly data from 1993 to 2000. Size and capitalization characteristics do not seem to affect banks' credit supply. However, the most liquid banks are less responsive to changes in monetary policy rates. Worms (2001) contributes to the empirical evidence on the bank lending channel with a study of German banks. Using dynamic panel data estimates that include information on the individual balance sheets of German banks, he shows that banks with a higher liquidity ratio appear to be less sensitive to monetary shocks.

Using a sample of eighteen Asian and Latin American economies, Olivero and *al.* (2011b) analyze the relationship between bank consolidation and the monetary policy transmission process over the period 1996-2006. They show that greater concentration in the banking sector leads to a weakening of the bank lending channel, which limits the effectiveness of the monetary policy transmission mechanism. They also explain how the specific characteristics of bank balance sheets depend on the different levels of concentration in banking systems.

Within the framework of time series data, Kovacevic (2015) studies the asymmetric sensitivity of bank lending to various domestic and external shocks in Bosnia and Herze-govina. Indeed, the author shows that the response of both large and small banks in terms of lending activity is more pronounced in the face of the last financial crisis in 2007. He also shows that the liquidity shock was mainly transmitted by large banks. Simpasa and *al.* (2015), in their article, show a transmission asymmetry by bank size. However, this asymmetry is only slightly moderate for medium-sized banks and non-existent for small banks.

Khan and *al.* (2016) also examine the impact of bank competition through the bank credit channel using bank-level data from five ASEAN countries. The authors show that the monetary transmission of the bank credit channel is remarkably sensitive to different levels of competition in the banking system.

The response of banks operating in this system to monetary policy is a function of their financial strength (capital, liquidity, and asset levels). Yang and Chao (2016) find similar results for China, showing that banks with less market power are less sensitive to monetary policy shocks, while the impact of monetary policy remains stronger for highly capitalized and highly liquid urban banks.

In a case study of ASEAN countries, Lerskullawat (2017) finds that the credit supply of rank banks, which are the most liquid and highly capitalized, is less affected by monetary

¹This is the Anglo-Saxon version of commercial paper. They used commercial paper as a substitute for bank loans to see if variations in the substitutes could shed light on the demand for loans by non-financial agents.

policy. Kapan and Minoiu (2018) study the link between the transmission of financial sector shocks and the financial health of banks during the 2007-2008 financial crisis. According to their results, banks with very high levels of capital were able to maintain their lending activity during the crisis.

Bustamante and al. (2019) assess the specific characteristics of Peruvian banks, particularly liquidity, capitalization, and asset levels on credit supply and find that the most liquid, highly capitalized, and profitable banks appear to be less sensitive to monetary policy impulses. In addition, Naiborhu (2020) validates the hypothesis of asymmetric sensitivity of bank credit response to changes in monetary policy according to banks' liquidity and capital adequacy.

The economic literature evaluating the credit channel in Africa remains rather limited compared to developed countries and shows contradictory results. Matouseka and Solomon (2018) focus on the impact of monetary policy on the banking sector in Nigeria. They apply GMM estimates to data on 23 banks observed from 2002 to 2008, and obtain results that highlight the importance of bank size and capitalization in the transmission of monetary policy decisions. A study of the same country by Ezema (2014), based on panel data of 40 banks over the period 1999 to 2008, also estimated using the GMM, shows that bank assets and liquidity have a greater impact on the transmission of monetary policy. On the other hand, the author finds no evidence for the capitalization characteristic in the transmission of monetary policy decisions.

In a study using data from the MENA region (Morocco, Tunisia, Jordan, Egypt), Boughara and Ghazouani (2009) confirm the existence of the bank credit channel in Tunisia, Morocco and Jordan. Using data from 1998 to 2007, observed annually and estimated using the GMM method, the authors show that the sensitivity of bank capital to the monetary policy stance is asymmetric in Jordan. In Tunisia and Morocco, however, the transmission of monetary shocks is only affected by bank size and liquidity. On the other hand, less capitalized banks are more sensitive to monetary tightening in Egypt. Oliveira and Ramos (2011) and Sichei (2005) find similar results, showing that bank size and liquidity play an important role in the transmission of monetary policy decisions in Brazil and South Africa.

3. SENSITIVITY OF BANK CREDIT SUPPLY TO BALANCE SHEET VARIABLES

The ability of banks to respond appropriately to monetary policy changes is related to their efficiency. Indeed, banks' resilience is related to balance sheet variables, in particular capital, liquidity and asset levels.

3.1. Size Characteristic

First, bank size is measured empirically in terms of total assets. According to Kashyap and Stein (1994a, 2000), the impact of changes in the federal funds rate on the supply of bank credit is greater for small banks than for large banks. More specifically, a potential increase in the federal funds rate leads to a more pronounced decline in the level of bank loans offered by small banks than by large banks. This can be explained by the latter's ability to increase capital more

easily than other banks. In addition, information asymmetry problems are less important for large banks due to their better reputation, their ability to properly and actively manage credit risk, and their liquidity availability (Kishan and Opiela, 2000; Sichei, 2005). Similarly, small firms are more sensitive to the supply of credit because they do not have alternative sources of financing to absorb the contraction in bank credit resulting from a tightening of monetary conditions. For this reason, a monetary policy shock can affect banks of different sizes.

3.2. Capital Characteristic

Moreover, several studies have shown that the sensitivity of bank credit to monetary policy is asymmetric according to bank capitalization. It should be recalled that in the theory of the credit cycle, capital is the main component that determines the supply of credit. An improved capital adequacy ratio enables a bank to bear the expected risks associated with its activities and, consequently, to strengthen its soundness, *i.e.* its ability to remain solvent and profitable in the face of adverse changes in monetary policy. To this end, sufficient capitalization increases the bank's ability to defend itself against monetary shocks (Altunbas, 2009; Peek and Rosengren, 1995). Moreover, some empirical studies show a negative relationship between capital adequacy and credit risk. This can be explained by the fact that high bank capitalization limits the impact of monetary policy impulses on credit risk (Brissimis and Delis, 2009).

Shaw and *al.*, (2013) conclude in their article that an increase in capital requirements does not reduce the volume of bank credit supply. By developing a dynamic general equilibrium model of the banking system, the authors analytically address the macroeconomic implications of capital requirements. They find that there is an inverse relationship between the capital adequacy ratio and capital accumulation. They also find that macroeconomic activity is affected by monetary policy through the bank credit channel. However, capital requirements negatively affect the effectiveness of monetary policy.

In a study based on a sample of European banks, Sáiz *et al.*, (2018) compare the sensitivity of these banks' credit supply to monetary shocks according to their capital and show that they are affected by monetary shocks regardless of their capital. They also find that the impact of monetary impulses on the credit channel differs during monetary expansions and contractions. Other work on European banks, however, excludes the role of capital.

The role of bank capital in the transmission of monetary policy during periods of monetary restraint, given the important role of bank capital in mitigating problems of information asymmetries, European banks focus more on using bank capital to solve these problems than on allocating it to the supply of bank loans (Ehrmann et al., 2003; Gambacorta and Marques- Ibanes, 2011).

Using the 2007-2008 financial crisis as a negative liquidity shock to US banks, Dursun-de Neef (2019) confirms the crucial role of bank capital in the transmission of shocks by showing that the lending activity of well-capitalized banks did not change during the crisis, while less capitalized banks contributed strongly to the transmission of these liquidity shocks to the real economy through their lending activity. More recently, Thornton and di Tommaso (2020) find that bank capital has a positive effect on the growth of bank lending by European banks and show that its increase is positively associated with the level of bank liquidity.

3.3. Liquidity Characteristic

In contrast, the interaction between bank liquidity, monetary policy, and bank lending is examined in a recent study by Mishra and Burns (2017) by separating the effects of monetary policy shocks and liquidity shocks on the bank lending channel. The authors find that monetary policy indirectly affects bank lending through fluctuations in bank liquidity. They also find a backward effect between monetary policy and bank lending, with a lag of about six to nine months. Theoretically, a monetary contraction restricts bank liquidity, depending on the increase in the federal funds rate, which leads to a reduction in the supply of bank loans and subsequently to a reduction in consumption, investment spending and economic contraction.

In turn, Khwaja and Mian (2008) use the interbank liquidity ratio to study the impact of liquidity shocks due to unexpected nuclear tests in Pakistan. They find that a decline in liquidity of more than 1% leads to a decline of 0.6 of bank lending). Chatelain and *al.*, (2003) confirm that the response of bank loans to the effects of monetary policy differs according to the characteristics of the bank balance sheet. Their results show that the size characteristic is not a good indicator for analyzing the effects of monetary policy on the supply of bank loans.

They show that banks react to changes in short-term interest rates according to their degree of liquidity. Similarly, banks with excess liquidity are able to withstand the effects of a restrictive monetary policy.

Using a dynamic panel data approach, Chileshe (2017) argues that capitalization has no effect on credit supply, while bank size and liquidity contribute positively to bank credit growth in Zambia. Using generalized method of moment's estimates, Armas (2021) finds that more liquid banks are more responsive to monetary shocks than less liquid banks, leading to a weakening of the bank credit channel in the Philippines. Farajnezhad (2022) examines the impact of bank characteristics and macroeconomic variables on credit supply in South Africa. The author confirms the existence of a negative relationship between the interaction of bank liquidity ratio and macroeconomic variables on bank credit.

Authors	Study Periods	Samples	Data	Main Results
Kashyap and Stein (1995)	1976-1992	United States	Quarterly data	A new approach to testing the lending channelbanking.
Kishan and Opiela (2000)	1980-1995	U.S. banks	Quarterly data	A transmission asymmetry depending on the bank's size and liquidity.
Kashyap and Stein (1997, 2000)	1976-1993	U.S. banks	Quarterly data	Less liquid US banks are more sensitive to shocks monetary.
Hernando and Martínez-Pagés (2001)	1991-1998	Spanish banks	Quarterly data	No credit channel in Spain.
Altunbas and <i>al.</i> (2002)	1991-1999	Banks in 11 European countries	Annual data	Credit supply is more sensitive to bank capital.
Loupias, Savignac and Sevestre (2002)	1993-2000	French banks	Quarterly data	Unlike liquidity, size and capitalization characteristics do not appear to have an impact on the loan offer from banks.
Sichei (2005)	1999-2004	South African banks	Quarterly data	Less capitalized banks more sensitive to tightening monetary.
Sáiz and <i>al.</i> , (2018)	1999-2012	European banks	Annual data	Highly capitalized banks are more responsive to expan- sions monetary.
Matouseka and Solomon (2018)	2002-2008	Niger banks	Annual data	Growth in bank loans is more sensitive to variables of size and type. capitalization of banks.

Table 1. Summary of some empirical studies on the bank lending channel.

Source: Authors.

4. CONCLUSION

The recognition of informational asymmetries has led to a considerable evolution in banking theory in recent years. These developments have created a broad consensus on the role of banks in the transmission of monetary policy.

They represent a source of asymmetric transmission of monetary policy, while offering a more complete explanation of its effects, not only through their liabilities, but especially through their assets. This idea is also at the heart of much of the research into the future role of credit. In fact, information processed efficiently by the bank makes a major contribution to the credit decision.

According to these studies, in a context where credit markets are underdeveloped, large, highly liquid and wellcapitalized banks can leverage their additional resources and purchasing power to protect themselves against variations in the central bank's key interest rate, and also to insulate their lending activities from the risk of default.

In emerging and developing countries, the central role of the banking central within the financial system is highlighted by the channel of bank credit. The latter is the main source of financing in the economies of the above-mentioned countries.

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