Ensayos sobre Política Económica 32 (74) (2014) 9-17

Ensayos
sobre POLÍTICA ECONÓMICA
www.elsevier.es/espe

Credit Cycles, Credit Risk and Countercyclical Loan Provisions

Martha López[a], Fernando Tenjo[b], and Hector Zárate[c]

[a]Researcher, Research Unit, Banco de la República, Bogotá, Colombia
[b]General Director, CEMLA, Bogotá, Colombia
[c]Econometrist, Research Unit, Banco de la República, Bogotá, Colombia

ARTICLE INFO

History of the article:
Received October 23, 2013
Accepted March 4, 2014

JEL Classification:
E32
E51
E60
G18
G21

Keywords:
Ex ante credit risk
Credit cycles
Countercyclical provisioning

ABSTRACT

In this paper we investigate the impact of rapid credit growth on ex ante credit risk. We present microeconometric evidence of the positive relationship between rapid credit growth and deterioration in lending portfolios: Loans granted during boom periods have higher probability of default than those granted during periods of slow credit growth. In addition, given their importance for macroprudential policy, we evaluate the effectiveness of the implementation of the countercyclical loan provisions. We find a negative relationship between the amplitude of credit cycles and this kind of macroprudential tool.

Clasificación JEL:
E32
E51
E60
G18
G21

Palabras clave:
Riesgo del crédito ex ante
Ciclos de crédito
Provisiones contra-cíclicas

Ciclos de crédito, riesgo de crédito y provisiones contra-cíclicas

RESUMEN

En este documento investigamos el impacto del rápido crecimiento del crédito sobre riesgo de crédito ex ante. Presentamos evidencia micro-econométrica de una relación positiva entre el rápido crecimiento del crédito y el deterioro de la calidad de la cartera de créditos: créditos que se otorgan durante períodos de auge tienen probabilidades de no pago más altas que aquellos otorgados en tiempos de más lento crecimiento del crédito. Adicionalmente, dada la importancia de las provisiones contra-cíclicas como política macro-prudencial, evaluamos su efectividad. Encontramos que existe una relación negativa entre la amplitud del ciclo del crédito y este tipo de instrumento.

1. Introduction

Deep credit cycles are frequently symptoms of macroeconomic turbulence. These comes hand-in-hand with swings in asset prices and strong movements in investment and output. From the point of view of financial stability these are also associated with financial fragility. Credit booms are reinforced and reinforce the business cycle according with the theory developed by Bernanke et al. (1999), and Kiyotaki and Moore (1997). According to this approach, economic agent's net worth is affected by movement in asset prices (driven by expectations of higher dividends) giving place to improvements in collateral. This increase in collateral allows firms and households to access credit. In turn, the rise in credit finances investment and consumption which further rise output and asset prices. The multiplier effect exacerbates the initial increase in credit, investment, asset prices and output. This mechanism is even more important in the case of asset price bubbles because when the bubble bursts loan losses are important and may cause an economic downturn. This mechanism is known in the literature as the financial accelerator mechanism, and empirical evidence about it has been presented by Christensen and Dib (2008) for the United States and López et al. (2009) for Colombia.

*Corresponding author.
E-mail address: mlopezpi@banrep.gov.co (M. López).

In more recent theoretical developments about the Great Recession in the late 2000s, authors such as Aikman et al. (2010), who build on early work by Rajan (1994), explain how the increased competition among banks, originated in the deregulation of the US banking sector in the 1970s and 1980s, resulted in a financial system where banks were increasingly required to keep pace with the returns on equity offered by their rivals leading to increased risk taking.

In the model presented by Rajan (1994), bank management is rational but have short term concerns. In addition to maximizing the bank's earnings, it is concerned with its reputation—i.e. labor market's perception of its abilities. In this model, the market does not observe the bank loan portfolios but its earnings. Consequently, the bank tries to manipulate its current earnings by altering its credit policy using more liberal credit policies that boost current earnings at the expenses of future earnings. A case of competitive coordination failure originated in this kind of behavior of banks is presented by Aikman et al. (2010), who reports that, during 1992-2003, major UK, US and European banks reported high and synchronized returns. But they did so at the expense of higher risk in aggregate. In a dynamic setting, according to Rajan (1994), "when there is only a small probability of an adverse shock to the borrowing sector, banks are forced to maintain excessively liberal credit policies. This in turn leads to overinvestment by the borrowing sector which increases the likelihood of an adverse shock to it. It is only after the condition of the borrowing sector deteriorates considerably that banks have an incentive to tighten the supply of credit. When they retrench, investment is suddently curtail, the excesses are drained out of the borrowing sector and the cycle resumes".

All and all, it is clear that the increasing attention among scholars and policy makers about regulation, competition and risk taking is justified. Some of the responses have addressed the relevance of using macroprudential tools to rein in credit excesses. For example, Jiménez et al. (2012) point out that some tools like countercyclical capital buffers help, first, to mitigate credit crunches because the increase in provisioning requirements in booms provide additional buffers in downturns. And second, higher requirements on bank own funds can cool credit-led booms, either because banks internalize more of the potential social costs of credit defaults (through a reduction in moral hazard) or charge a higher loan rate due to the higher cost of bank capital (Holmstrom and Tirole, 1997; Morrison and White, 2004; Adrian and Song Shin, 2010; Shleifer and Vishny, 2010).

In the case of Colombia, Amador et al. (2013) study the relationship between abnormal loan growth and bank's risk-taking behavior using information on individual Colombian banks' balance sheets. Their results show that abnormal loan growth is positively related with nonperforming loans and negatively related with bank solvency. Regarding macroprudential policies, the banking supervisory authority (Superfinanciera) introduced a countercyclical component on banks' individual provisions since July 2007. This component is accrued in an additional form for each borrower with the goal of accumulate provisions that will be used later on by each bank in moments of deterioration of the lending activity.

In this paper, first, we present microeconometric evidence of the positive relationship between rapid credit growth and deterioration in lending portfolios in Colombia. We find empirical evidence of a positive relationship between credit cycles and ex ante credit risk: Loans granted during boom periods have higher probability of default than those granted during periods of slow credit growth. In this sense, this paper constitutes the first study based on loan-to-loan information for Colombia.

Second, given their importance for macroprudential policy, we evaluate the effectiveness of the implementation of the countercyclical loan provisions in Colombia in terms of smoothing the credit cycle and the risk taking behavior of banks. To draw inferences aboutthe causal effects of treatments (i.e. interventions), in this case thecountercyclical provisions, we need a homogeneous database that allows us to have the "history" of a loan during the period of the intervention and before the intervention. We implement a matching technique that allows us to have this homogeneous database to be used later on in our econometric analysis. Our findings are that these kinds of provisions have had the effect of dampening the credit cycle in Colombia.

2. Credit Growth and Credit Risk

We focus in an individual loan level analysis to draw conclusion regarding the relationship between rapid credit growth and credit risk. We test if those loans granted during credit booms are riskier than those granted when the bank is reining in loan growth. This analysis would provide empirical microfoundations for prudential regulatory tools in policies regarding rapid credit growth.

The database we use in our study is recorded by banks and reported to the Superfinanciera, which is the supervisor in Colombia of the banking system. The database consists of over two million commercial loans whose amount represents near 70 percent of the total amount of loans granted by banks in Colombia. We focus on new loans granted to non financial firms with maturity larger than one year and keep track of them the following years. The period analyzed covers from March 2003 – June 2011. Following Saurina and Jimenez (2006), the equation to be estimated relates the probability of default at an individual loan level and its relation to the cyclical position of the bank credit policy:

$$\begin{aligned} Pr(DEFAULT_{blt+k}=1) = F(\theta + \alpha(LOANG_{bt} - averageLOANG_{b}) + \beta \mid LOANG_{bt} - \\ - averageLOANG_{b} \mid + \chi LOANCHAR_{lt} + \delta_1 BANKCHAR_{bt} + \\ + \delta_2 BORROWERCHAR_{ft} + \phi_t + \eta_i \end{aligned} \quad (1)$$

where the probability of default of loan *l*, in bank *b*, some *k* years after being granted (i.e., at $t+2$, $t+3$, and $t+4$)[1] is a logistic function of the characteristics of the loan, *LOANCHAR*, such as the amount of the loan, LN(SIZE OF THE LOAN), collateral (COLLATERAL) and maturity of the loans using dummies for 1 to 3 years and 3 and more years, benchmark being short-term loans (from 0 to 1 year). We also control for bank characteristics, *BANKCHAR*, which include SIZE (each bank total assets/bank system total assets), OWN FUNDS/TOTAL ASSETS (the amount of bank equity over total assets), a measure of risk appetite measured by BANK NPLb-NPL (the difference between the bank and banking system non-performing loans) and INTERBANK POSITION (which is bank net interbank lending). Other valuable feature of our database is that it allows us to include not only loan characteristics but also borrower characteristics, *BORROWERCHAR*, that help to disentangle supply and demand effects as the composition of the pool of borrowers and loans may change over time. The variable LN (1+NUMBER OF BANK RELATIONSHIPS) allows us to identify the number of bank connections of each borrower. The variable LN(2+AGE AS BORROWER) measures the age of the borrower in the financial system and the variable BORROWER RISK measures if the borrower was overdue 6 months before it was granted another loan. We also control for macroeconomic characteristics φ_t such as GDP growth and the interest rate. Finally, we control for the great heterogeneity due to firm effects η_i.

1. Following Saurina and Jimenez (2006), we consider that a loan is in default when its doubtful part is >5% of its total assets. The doubtful part of the loan is calculated based on information recorded in the form 341. It corresponds to PI*EA*PDI, where PI is the non-payment probability, EA is the asset exposure at the time of no payment and PDI is the loss given no payment.