Bank Risk Determinants

Systemic Banking crises are a recurrent phenomenon that affects society, and there is a need for a better understanding of the risk factors to support prudential regulation and reduce unnecessary risk intake in the financial system. This paper examines the main bank risk determinants in Latin America. The period analysed covers the timespan from 1999 to 2013, including the systemic banking crisis episodes in Argentina (2001–2003) and Uruguay (2002–2005). We apply a new data-driven comparable methodology to classify and select commercial banks from the sample.

1. Introduction

Banking crises and banking regulation are recurrent topics in the economic policy debate. Since the early seventies, banking crises have frequently affected developing and transitioning economies to a greater extent than others. Nonetheless, there is a lack of understanding of the factors that generate banking crises. Regulators tend to assist, more than to resolve the causes of, insolvent institutions . Prudential regulation aims to reduce excessive bank risk-taking and capital shortages in an attempt to protect society . Unfortunately, these controls tend to arrive too late, after a crisis is already spreading. Therefore, a better understanding of the risk factors could be helpful in further reducing risk, mainly when regulators' powers enable authorities to address situations of distress before they spread to the wider financial system .

In this paper, we study the determinants of bank risk in Latin America. Although several studies have focused on bank risk determinants such as capitalization, asset and management quality, profitability, and liquidity , their results are inconclusive, which implies the need for further research. Moreover, we focus on the Latin American banking sector, the particularities of which create an interesting case study. Rojas-Suárez and Weisbrod (1996) show that banking crises in Latin America are different from those in the developed world. For instance, Latin American markets are highly concentrated, and possess significant barriers of entry that might increase the risk of financial distress . In highly concentrated banking systems, the collapse of a banking institution can cause distress in the entire financial system. The five largest banks in South America hold three-quarters of the total banking assets of the region (BIS 2007). Agnoli and Vilan (2008) show that banking systems in Latin America have higher concentrations and market power than European and Asian banking systems. Another key issue is the way banking crises are managed; Laeven and Valencia (2012) showed that banking crises in developed countries tend to apply macroeconomic policies, while the bank restructuring approach is more popular in developing countries. An additional peculiarity of Latin American economies is inflation and hyperinflation, which influences the banking sector, financial leverage, and financing sources. Latin American banks have experienced distress after the stabilization of inflation. Financial intermediaries profit from float of payments in scenarios of chronic high inflation, meaning that when the inflation is reduced, a source of income disappears (Demirgüç-Kunt and Detragiache 1998). Finally, Latin America has a special pressure from rising interest rates due to financial risks and market volatility (Enoch et al. 2016). Additionally, risks persist in the form of possible changes in US policies, principally those towards greater trade protectionism or those that increase the risk aversion of investors, which is a consequence of the tighter financial conditions of international markets (Banco de España 2017).

2. Literature Review and Research Hypotheses

There are differing approaches to studying the determinants and leading indicators of banking crises in the literature. Some authors, e.g., (Eichengreen and Rose 1998; Kaminsky and Reinhart 1999), focus on macroeconomic shocks, while some others, e.g., (Kaminsky and Reinhart 1999), examine the macroeconomic factors (e.g., the ratio of domestic credit to nominal GDP, the real interest rate on deposits, the ratio of lending-to-deposit interest and the deficit as a percentage of

the GDP, among others). In emerging markets, banking crises are associated with four main macroeconomic factors: macroeconomic volatility (e.g., large relative price changes, trade fluctuations, interest rates, and changing capital flows), connected lending, government involvement and the failure of prudential regulation (Eichengreen and Rose 1998).

The recent literature analysing banking crises complements the previous analysis by considering both bank specific and macroeconomic variables, e.g., (Elsinger et al. 2006; Oet and Ong 2011; Lang and Schmidt 2016). Specifically, Elsinger et al. (2006) developed a framework in which they identify that the main sources of systemic risk are the level of correlation of a bank's portfolio exposure, high bankruptcy costs and ineffective crisis resolution strategies.

In recent years, we found large developments in early warning systems that combine macroeconomic and microeconomic variables. For instance, Oet and Ong (2011) included bank-specific and macroeconomic variables to identify imbalances that could be associated with bubbles that explain financial stress (e.g., securitization, the currency exchange rate concentration, bank capital at risk, the economic value of loan portfolio, leverage, GDP, property, investments, the interest rate, credit to GDP, solvency and credit). This holistic approach can be observed in the recent publications on early warning systems by several central banks, e.g., (Borio et al. 2018; Nyman et al. 2018). In our study, we follow this approach by selecting regulatory, macroeconomic and bank-specific variables.

Across the literature we find a broad spectrum of variables that explain bank risk. To conduct a systematic analysis and classification of these variables, we use the CAMEL (Capital, Asset Quality, Management, Earnings and Liquidity) rating system. This rating system was introduced in the 1980s by US supervisors for the on-site examination of banking institutions, and it allows supervisors to assign financial institutions a rating based on different variables. This rating enables comparisons of banks with their peers over time (Stackhouse 2018).

The CAMEL rating is extensively used in the literature, e.g., (Chiaramonte et al. 2015; Stiroh and Rumble 2006; Mäkinen and Solanko 2017). The CAMEL classification is also applied by several international banking supervisors to classify the variables in their Early Warning Systems, e.g., (Lang et al. 2018; Nyman et al. 2018).

Following the CAMEL procedure, we develop five hypotheses.

2.1. Capital (Adequacy)

Capital can be defined as the variable that determines a financial institutions' robustness to withstand shocks to its balance sheet (Gelos 2015). Capital can also be defined as a measure of a bank's sensitivity to difficulties, since the bank's losses end up reducing bank capital (Lang and Forletta 2019). However, there is no consensus on the effect of capital ratios on bank risk. Higher capital requirements are still under debate, as there is no agreement as to how capital changes could affect the likelihood of a new crisis (D'erasmo 2018).

Recent literature shows a negative relationship between a bank's capital and its risk, i.e., (Laeven et al. 2016; Acosta-Smith et al. 2018), supporting the Basel Accords. Acosta-Smith et al. 2017 state that higher capital requirements create more stable and resilient banks, while Laeven et al. (2016) provide empirical evidence that better capitalized banks tend to have lower risk, with this effect being more pronounced for large financial institutions.

Some authors are more critical of the Basel criteria, which they consider to be excessively reductionist. In this vein, Hughes and Mester (1998) state the need to also consider bank efficiency when looking at capital and risk, suggesting that more efficient banks should be allowed to have more flexibility with respect to their capitalization. Similarly, Calem and Rob (1999) show a non-linear (U-shaped) relationship between capital and risk, suggesting that imposing stricter regulatory requirements on banks is a good strategy for regulators only if banks hold a relatively low amount of capital. In contrast, if banks are already highly capitalized, an increase in capital would lead to a higher risk exposure. Schliephake (2016) confirms that capital requirements seem to reduce risk unless banks operate in a highly competitive environment during and in the aftermath of a crisis. In such a scenario, stricter capital requirements could increase bank risk exposure.

Finally, Gelos (2015) and (Nguyen et al. 2019) found a positive relationship between bank capitalization and risk. Gelos (2015) stated that the bank capital ratio can also be used to explain the propagation speed of distress across financial institutions. Likewise, (Nguyen et al. 2019) suggested that larger capital ratios could induce banks to increase risk.

Although in emerging economies capital requirements have not limited risk intake during expansion cycles (Rojas-Suarez 2001), it is necessary for Latin American banks to hold capital to cope with the volatility of the depositors' demands. Latin American banks can use capital reserves as liquidity buffers for these moments in which the risk increases because of the increase in depositors' demands due to special market volatility (Rojas-Suárez and Weisbrod 1996).

Usually, Capital Adequacy is measured through reversed leverage proxies, e.g., (López 1999; Stackhouse 2018; Bornemann et al. 2014). Therefore, we select the ratio Equity to Total Assets (E/TA) as a proxy for Capital Adequacy (Uhde and Heimeshoff 2009; Chortareas et al. 2011). As equity decreases, with total assets remaining constant, the proportion of debt of a bank will rise, causing higher leverage and increasing their risk (Federico and Vázquez 2012). Therefore, we state the following:

Hypothesis 1 (H1). *There is a negative relationship between capital adequacy measured through the E/TA of a bank and its risk.*

2.2. Asset (Quality)

According to the Federal Deposit Insurance Corporation, asset quality measures "the quantity of existing and potential credit risk associated with the loan portfolio, other real estate owned and other assets, as well as off-balance sheet transactions".

Assets can be affected by the market valuation and other risks (i.e., reputational, compliance or strategic risk), which can affect the assets' pricing (Rono and Traore 2018). There is a broad consensus concerning the existence of an inverse relationship between a bank's asset quality and its risk (Agresti et al. 2008).

In the literature, we can find different measures of asset quality, such as the following examples: non-performing loans to total gross loans, the sectoral distribution of loans to total loans, and the share of loan loss provisions to total average loans (Betz et al. 2013). Due to the limited data on non-preforming loans, we use Net Loans to Total Assets (*NL/TA*) as a proxy of asset quality. As we will develop in more detail in Section 3, our sample is constituted only by commercial banks, which tend to decrease lending to improve solvency ratios (Maurin and Toivanen 2012).

Another reason to use the *NL/TA* ratio as a proxy of asset quality is to analyse the lending focus of the institution in comparison to the overall business. Based on recent experiences, it is not necessarily beneficial for commercial banks to venture into non-traditional businesses (e.g., pensions, insurance, asset management, and investment banking, among others) to increase their profitability. Well-known commercial banks such as NatWest, Barclays and Deutsche Bank failed in these ventures and finally returned to their original retail business. We support Miller (1998), who states that the idiosyncrasies of each business should make commercial and investment banking separate.

Poor asset quality in a bank will lower interest income, increase provisions, and affect the regulatory capital of a bank (Baudino et al. 2018). An increase in a bank's regulatory capital will affect its profitability and, by extension, the bank risk. Thus, we hypothesize the following:

Hypothesis 2 (H2). *There is a negative relationship between the asset quality (NL/TA) of a bank and its risk.*

2.3. Management (Quality)

Management measures the performance of the individuals in leadership roles at a bank. Regulators expect a bank to operate in a safe and sound manner, promoting a culture of compliance (Stackhouse 2018).

Senior management and the board of directors, to a large extent, are responsible for the financial soundness and performance of the financial institution. Regulators aim to strengthen the quality of the management team responsible for oversight of the bank as it is relevant factor in the process of risk management. Regulators have standards for banks manager in place to be fulfilled (Greuning and Bratanovic 2009).

Management is proxied in the literature by the characteristics of board-members, the CEO, and the chairperson, but also by quantitative ratios such as the cost to income ratio, earnings, the interest margin, and efficiency, among others (Petropoulos et al. 2017; Demsetz and Strahan 1997; Stiroh and Rumble 2006).

We use the Cost to Income ratio (CostI) to measure the management efficiency (BIS 2017; Francis 2014). More efficient banks tend to have lower average costs and lower cost-to-income ratios (Huljak et al. 2019), which are further expected to reduce the probability of a bank failure (Betz et al. 2013).

Banks with higher costs and lower levels of efficiency may be tempted to take on higher risks to compensate for the lost returns (Altunbas et al. 2007). Thus, we hypothesise the following:

Hypothesis 3 (H3). *There is a positive relationship between "bad quality" management measured through CostI and a bank's risk.*

2.4. Earnings

Earnings and profitability indicators are used to assess the financial health and monitor the efficient allocation of a bank's resources (Agresti et al. 2008). Banks that lose money over significant periods of time do not remain in business. Like other firms, banks do not stay in business unless they are profitable (Stackhouse 2018). Subsequently we can consider that more profitable banks have less propensity to undertake risk-taking incentives (Jensen and Meckling 1976).

However, during the recent financial crisis (2008), some highly profitable financial institutions proved to have engaged in risky investments. Martynova (2015) showed that highly profitable banks may have incentives to take on risky investments, as they can borrow greater amounts, thus accumulating larger risks. Another incentive for profitable banks to assume more risk is due to the lack of competition. Banks with a dominant position in the market can engage risk in alternative activities (Boyd and De Nicoló 2005; Carlson and Mitchener 2006; Calomiris and Haber 2013). An increase in bank competition could lead to a more expensive cost of capital, which could encourage risk taking (Altunbas et al. 2007; Lee and Hsieh 2013). Banks need stable and increasing profits. To obtain stable profitability, a bank must manage its risk, capital, and profitability to develop a business that augments capital resources over time (Greuning and Bratanovic, 2009)

Some common metrics to proxy this category are the return on assets, the return on equity, e.g., (Altunbas et al. 2007; Lee and Hsieh 2013), interest margin to gross income, or non-interest expenses to gross income, e.g., (Agresti et al. 2008; Petropoulos et al. 2017). To measure Earnings, we use the Return on Equity (*ROAE*). This ratio measures the profitability of a bank's assets.

For our fourth hypothesis, we state the following:

Hypothesis 4 (H4). *There is a negative relationship between bank profitability measured by ROAE and its risk.*

2.5. Liquidity

Liquidity is related to the fundamental maturity transformation mission of a bank, which consists of transforming deposits and other liabilities into loans. Since the maturity of deposits and loans can differ, the bank needs to manage its liquidity by meeting deposit outflows whiel at the same time satisfying the demand for loans (Stackhouse 2018). However, during the recent financial crisis of 2008, when the European Central Bank (ECB) cut interest rates to below zero—making it expensive for banks to have deposits at the central bank—banks allocated the liquidity to assets, which increased the home-bias risk. This was particularly the case for banks with a high share of retail deposit funding and/or located in lower-rated countries (Macchiarelli 2018).

Petropoulos et al. (2017) and Köhler (2012) measure liquidity by comparing loans to different types of assets (e.g., loans to customer deposits, loans to total assets, and loans to volatile liabilities). Furthermore, Federico and Vázquez (2012) used the liquidity coverage ratio to show the relationship between a bank's dependence on short-term funding to finance the expansion of their balance sheet and their risk. Additionally, Greuning and Bratanovic (2009) determined that the liquidity risk of a bank is related to the bank's dependence on limited sources of funding.

Similar to Petria et al. (2015) and Federico and Vázquez (2012), we proxy liquidity using the Loans to Customer Deposits (*L/CD*) ratio. Petria et al. (2015) and Federico and Vázquez (2012) showed that banks with a dependence on short-term funding to finance their balance sheet in the period prior to a crisis are more likely to fail during the crisis. A bank with an *L/CD* ratio above 100% is financing its loans with wholesale funding. Wholesale funding is less stable than customer deposits and could trigger an increase in the bank's funding liquidity risk (Bonfim and Kim 2012). Therefore, our last hypothesis posits the following:

Hypothesis 5 (H5). *There is a positive relationship between the "illiquidity" of a bank as measured by its L/CD and its risk.*

Although previous results of the bank risk determinants remain inconclusive in the literature, based on the previous analysis, and taking into consideration that we are focusing on commercial banks located in Latin America, we expect well-capitalized, loan-focused (traditional bank), well-managed, profitable and liquid banks to have better Z-score ratios, and, consequently, lower risk.

References

1. (BIS 2017) BIS. 2017. The Regulatory Treatment of Sovereign Exposures—Discussion Paper. Bank for International Settlements (BIS) https://www.bis.org/bcbs/publ/d425.pdf accessed on 01 June 2018.

2. (Blundell and Bond 1998) Blundell, Richard, and Stephen Bond. 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics 87: 115–43.

3. (Bofondi and Ropele 2011) Bofondi, Marcello, and Tiziano Ropele. 2011. Macroeconomic Determinants of Bad Loans: Evidence from Italian banks. Bank of Italy occasional papers, 89.

4. (Bonfim and Kim 2012) Bonfim, Diana, and Moshe Kim. 2012. Liquidity Risk in Banking: Is There Herding? EBC Discussion Paper, 2012-024. ECB.

Retrieved from https://encyclopedia.pub/entry/history/show/5013