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INSTITUTIONAL DEVELOPMENT AND FOREIGN BANKS IN CHILE

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Abstract

This paper analyzes the effects of foreign banks on developing countries' bank performance. We study this relationship from a different perspective by focusing on Chile, an emerging market with strong institutions. The results from dynamic panel regressions on hand-collected financial statement data from 2005 to 2014 indicate that foreign banks improve banking sector competitiveness, reduce the volatility of returns, and increase commercial and consumption loans. The overall evidence suggests that, in the presence of solid institutions, foreign banks improve the banking sector in developing countries. Therefore, public policies on foreign banks should be more effective when accompanied by advances in institutions.

JEL Classification: F3, G1, G2, O1

Keywords: Foreign banks; Institutional development; Chile

1. Introduction

Studying the effects of financial institutions in a multi-country analysis posits several challenges that can jeopardize the validity of results. A within-country study can mitigate the risk of heterogeneous sample selection and provide an unbiased insight into the link between institutional development, finance, and economic growth. Our paper adopts this approach and focuses on Chile, a developing country with an institutional framework comparable to that of developed countries. Another element that permeates the debate on the performance of foreign banks is the level of economic development in the host country. Previous literature (Claessens, Demirgüç-Kunt, and Huizinga 2001; Lensink and Hermes 2004) shows that foreign banks behave differently in developing countries than in developed countries. Nevertheless, by selecting a country with a GDP per capita 70 % smaller than the GDP per capita of an OECD country but with a similar level of institutional development, we are able to isolate the behavior of foreign banks in the presence of strong institutions. Furthermore, the presence of a competitive banking system allows for testing the effects of foreign banks in a developing country with strong institutions. By controlling for institutional development and competitiveness, this paper contributes to the debate of the effects of foreign banks on the banking and economic development of an emerging market.

The Chilean economy has distinguished itself from other Latin American countries due to its higher level of institutional development and macroeconomic stability. Beginning in 1974, the government started implementing market friendly reforms, which led to economic growth and stability. The three main goals of the reforms were the reduction of inflation, a decrease in the participation of the government in the economy, and economic liberalization. However, the path to economic growth faced some challenges as the country entered into a severe recession in 1982. As with many economies in the region that were struggling to curb inflation, the government relied on the dollarization of the economy. However, this strategy backfired and Chile's GDP fell by 14%. The crisis had a heavy impact on banks, which were eventually nationalized by the government. Further economic changes included tax and labor reforms that significantly reduced poverty and inequality. The government implemented taxes on short-term capital flows and foreign currency loans in an attempt to decrease the volatility of foreign capital. These measures alleviated the negative effects of the 1997 Asian crisis, but the country still suffered a minor recession. In this paper, we focus on the banking sector and institutional development in Chile from 2005 to 2014.

Prior to the 1982-83 banking crisis, the Chilean financial system was dominated by a few major banks and was weakly regulated. After the crisis, the government implemented major reforms and in 1990 foreign banks began to operate in the country. The Spanish banks Santander and BBV along with Scotiabank had a strong presence in Chile prior to Citigroup's acquisition of the Bank of Chile in 2008. From the early 1990s to the present, about half of the banks operating in Chile are foreign. There have been positive effects derived from the introduction of foreign banks. In particular, they have implemented lending policies that are based on an objective screening of borrowers, which helped to modernize the banking system (Edmunds 2007). Interestingly, even though Chile was an early adopter of institutional changes and modernization of the financial sector in the region, it has not implemented any major reforms since 1997 (Vallejos, 2017).

The level of competition during the period 1997 to 2002 was very high and those banks with the lowest marginal costs were lending the most. The number of banks decreased from 32 in 1997 to 26 in 2002. Foreign banks also decreased from 18 to 14. However, between 2002 and 2005 there was a wave of mergers and acquisitions and the level of competition decreased. One of the most important acquisitions occurred when the Spanish bank Santander purchased Banco Santiago in 2002 (Oda and Silva, 2010). Given that credit allocation was provided by the larger banks, smaller banks started to relax their screening policies and expanded their client base. The level of competition in the period between 2007 and 2009 was similar to the period between 2002 and 2005 and the total number of banks barely

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changed. In 2008, there were 13 domestic banks and 12 foreign banks (Piedrabuena, 2013). Even though the number of domestic and foreign banks remained constant between 2002 and 2009, the level of competition increased because more Chileans were obtaining credit and banks increased their portfolio of consumption lending. The global financial crisis of 2007-2008 posed a big risk for the Chilean banking system given that Spanish banks in 2008 had more than 50% of the foreign bank's consolidated claims on Chile (Chan-Lau, 2010). Nevertheless, Spanish banks were among the European banks that suffered the least from the financial crisis.

Throughout this decade, Chilean banking system can be differentiated from other countries in the region because they have a larger portion of institutional investors. Having a significant number of sophisticated investors creates a more stable source of income that allows them to have a large ratio of loans to deposits (IMF, 2014). This ratio is more pronounced for smaller banks due to their high reliance on institutional depositors. After the financial crisis of 2007-2008, Basel III was developed as a set of parameters to strengthen the financial system. Among those parameters, capital adequacy ratio requirements were increased to 10.5 percent, from 8 percent under Basel I. Since 2011, Chilean banks have been very successful in maintaining a capital adequacy ratio of 13 percent. Currently, Chile is in the process of formally adopting Basel III as part of their banking laws, which in addition will increase the independence of the authority that supervises the banking system (Rojas-Suarez, 2015).

One of the main arguments against the presence of foreign banks in emerging markets has been that foreign banks lend mostly to large corporations and wealthy individuals. As a consequence, local banks start lending to risky clients, which deteriorates their lending portfolio. However, the Chilean case presents a more complex picture. The presence of foreign banks along with the consolidation of the banking system has created segments in which both local and foreign banks compete. Some papers have emphasized the heterogeneity of the Chilean banking system and categorized banks according to their size and operations (Wigodski and Torres, 2004; Jara, Luna and Oda, 2007). Jara and Oda (2014) provide a systematic approach where banks can be separated in seven clusters. Banks have characteristics pertaining to more than one cluster but they mostly operate within their own groups. The first group is composed of large multinational banks and it includes Banco Santander (Spain), Banco de Chile (U.S.), BCI (domestic), and Banco del Estado (domestic – government owned). The second group refers to medium sized multinational banks such as Scotiabank (Canada) and BBVA (Spain). The third cluster comprises medium sized banks that have a niche market (mostly wealthy individuals). These banks are Banco Itaú (Brazil), Corpbanca (domestic), Bice (domestic), Internacional (domestic), and Security (domestic). In the fourth group are banks that specialize in retail banking. Three banks occupy this category: Falabella (domestic), Paris (domestic), and Ripley (domestic). The fifth group has treasury banks (those providing financial services to foreign companies) and includes Deutsche Bank (Germany) and JP Morgan (U.S.). The sixth group focuses on international trade and three banks dominate this category: BNA (Argentina), Banco do Brasil (Brazil), and Tokyo (Japan). Finally, HSBC (UK), Consorcio (domestic), Penta (domestic), and Rabobank (Dutch) are categorized as banks that specialize in financial services.

The Chilean banking system continues to evolve and most recently Chinese banks have started operations in Chile. China Construction Bank entered the country in 2014 and its goal is to become the largest foreign bank in Chile. Their main areas are foreign trade, currency exchange, and corporate lending and they plan to focus on Chilean companies that do business in China (Radic, 2017). The presence of this new foreign bank adheres to the narrative of a heterogeneous banking system, where banks focus on a specific sector rather than displace local banks. Foreign banks are also attracted to Chile because they want to use it as a regional platform for their Latin American operations. The political and economic stability of Chile, along with its developed institutional framework is appealing to foreign banks. Furthermore, Chile is a strong exporting country and foreign banks want to participate in that area (Von Oldershausen, 2016).

Foreign direct investment has traditionally targeted the mining sector, which accounted for 57 percent of FDI from 1990 to 1995. In the second half of the 1990s, President Patricio Aylwin privatized areas of the economy such as telecommunications and energy and more FDI flowed to electricity, gas and water (Salcedo and Akoorie, 2013). During the 1990s, FDI grew in Chile from $700 million to $9 billion at the end of the decade. Even though the mining sector remained the main recipient of FDI throughout the 2000s with a stock of $24 billion in 2009, other areas of the economy such as retailing and financial services also accounted for a significant amount of FDI. By 2009, FDI flows to the country amounted to $12.7 billion and the main investors were the United States, Canada, and Spain (Alatorre and Razo, 2010). FDI flows decreased by 16 percent after the financial crisis but Chile did not suffer a major contraction due to the strength of its mining industry. In the present decade, mining continues to be the main destination of FDI and the US is the main investor while the Netherlands replaced Spain as the second largest investor in the country (U.S. Department of State, 2016). In general, Chile has been very open towards foreign capital and multinational corporations receive the same treatment as domestic companies.

The state of development of the financial sector is associated with the level of economic development in a country. There is a debate regarding whether economic development leads to a higher level of financial development or whether a strong financial structure is necessary as an engine of economic growth (Demirgüç-Kunt and Maksimovic, 1998; Luintel and Khan, 1999). Furthermore, the debate has evolved to differentiate between the banking sector and the stock market (Allen, 1993; Demirgüç-Kunt and Maksimovic, 1996). It could also be that the banking sector is the initial state of financial development and, as the economy grows and institutions solidify, the stock market becomes a more important source of financing for the economy. Even though the stock market allows for a more diversified ownership, it requires regulatory agencies overseeing the quality of listed companies. In our analysis, solid institutions in Chile, measured by the World Bank's Worldwide Governance Indicators, allow foreign banks to enhance economic development by promoting competitiveness and complementary services. However, at the corporate level, the country presents another picture. Chile's largest conglomerate ranks low in terms of corporate governance and transparency. The perception that Chileans have in regard to shareholder protection is amongst the lowest for OECD countries (Brandao Marques, 2016). This is particularly troublesome given that conglomerates represent the majority of the capital on the Santiago Stock Exchange (OECD, 2011). This lack of investor protection is a major source of the lack of liquidity of the exchange. The World Economic forum elaborates the Global Competitiveness Report, which measures the perception of more than 3,000 executives from the country where they work in terms of financial disclosure and availability of information. Chile has not ranked better than 30 from a sample of 140 countries from 2010 to 2016 (World Economic Forum, 2016). Even though Chile has a strong institutional framework in several areas, it definitely lacks in terms of corporate governance (Brandao Marques, Gelos, and Melgar, 2013).

The study of institutions and finance has been pervaded by the work of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998), who study the legal framework that protects stockholders from the inherent agency conflict of managers. They find that common law provides better protection for individual investors but civil law countries compensate investors by requiring mandatory dividends. The effects of institutions on banks can be approached as an asymmetric problem where borrowers possess more knowledge than the lender about future cash flows. Adverse selection is diminished when banks screen potential borrowers and moral hazard decreases when banks can repossess collateral. However, screening requires availability of information about the borrower such as a credit is to expect financial intermediaries to fulfill their role as engines of economic growth.

The influence of foreign banks in the economic development of a country has been the source of an academic debate. Foreign banks can help an economy by providing lower interest rates, better business practices, and act as a cushion against domestic sources of volatility, given their international operations

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(Goldberg, Dages, and Kinney, 2000). However, in the financial 2007-2009 financial crisis, foreign banks affected the host countries' economies by exporting the volatility that was generated by the home country recession. Peek and Rosengreen (2000) argue that foreign banks can export risks from their home countries. On the other hand, a positive aspect about foreign banks is that they are regulated not only by the host country but also by their home country. Thus, if the host country has weak institutions, the local clients of the bank will benefit from the imported regulation and supervision. Some of the arguments against the presence of foreign banks in emerging markets is that they lend only to the most reliable borrowers, they facilitate capital flight, and they may respond to their home country's government rather than the local authorities (Goldberg, Dages, and Kinney, 2000). In the case of Mexico, foreign banks have not followed the government's desires of becoming an engine of economic development. Haber and Musacchio (2005) state that foreign banks avoid commercial loans in Mexico because it is hard to recover their assets. It is argued that foreign banks have a weak environment of property rights enforcement, which has forced them to focus mostly on consumption loans and fees as the main source of income rather than commercial loans. In the case of Chile, foreign banks have taken advantage of the strong institutions and they provide commercial loans and increase the competitiveness of the financial system.

With hand collected data on financial statements from 2005 to 2014 we test the effects of institutions and foreign banks on the competitiveness in the banking system, volatility of returns, and lending portfolio. Given the consistent high scores of governance in Chile, we can analyze the effect of foreign banks in a developing country with strong institutions and competitive banking system. We observe that, in the presence of strong institutions, foreign banks improve the competitiveness in the system, as evidenced by lower net interest margins. A frequent argument against the presence of foreign banks is the instability that they import from their home countries and parent companies. However, in the case of developing countries, foreign banks can serve as a source of stability if the host country suffers from a volatile economy and the business cycles of the home and host countries are uncorrelated. We find that foreign banks decrease the volatility of returns even after controlling for macroeconomic variables like inflation and GDP per capita. In the last set of tests, we provide some evidence to show that foreign banks are increasing their allocation of commercial and consumer loans but there is some mixed evidence with housing loans. Furthermore, there is a negative correlation between commercial loans and consumption and housing loans. Along with a dynamic panel analysis we observe market segmentation where some banks are providing commercial loans while another group of banks prefer to provide consumption and housing loans. An important policy implication from these results is that developing countries should encourage the presence of foreign banks in their country. Governments can benefit from foreign banks by providing regulation and supervision that enhance competition in the banking sector.

The rest of the paper is organized as follows: Section 2 describes the institutional development measures. Section 3 develops testable hypotheses. Section 4 describes the data and methodology and presents summary statistics. Section 5 discusses the results of institutional development and banking in Chile. Section 6 provides the conclusion.

2. Institutional measures and macroeconomic environment

The institutional development of a country influences the behavior of banks. If there is a weak regulatory system that inhibits the enforcement of contracts, then banks will be less willing to provide credit. Chile possesses some advantages for a within-country study on development and banking. Even though Chile is a developing country, it has institutions that have been continuously strengthened to

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improve the economy. Furthermore, government agencies provide information on several areas of the economy including financial statements for all banks that are part of the financial system.

Table 1 provides a macroeconomic snapshot of Chile, Latin America and Caribbean, and the OECD countries. The first variable is the domestic credit provided by the financial sector. The OECD countries provide two times their GDP in credit and Chile 115% of its GDP. Latin American credit lags far behind, although it has grown for the past decade and has almost reached 80% of its GDP in 1980. In terms of GDP per capita, there is a big gap between the OECD countries and the rest of the group. However, there appears to be no economic growth for Chile, Latina America, and the OECD between 2011 and 2014. Total population has been growing slowly for all three regions. Inflation in the past decade is another indicator that shows the disparity between Chile and Latin America. In Chile, the average inflation in the period was 3.36%, which is 1.14 percentage points below inflation in Latin American and 1.19 p.p. above OECD's. At the macroeconomic level, we observe that Chile has a performance between the OECD countries and the rest of Latin America. Even though the country has made major economic reforms and is an OECD member since 2010, its performance is still not on par with the OECD average. This is particularly notorious with the GDP per capita panel observations.

[Insert Table 1 Here]

We include an aggregate institutional measure that consists of an equally-weighted average of the six Worldwide Governance Indicators (WGI) developed by the World Bank. The Governance Index has been previously used to study the determinants of long term economic growth (Easterly and Levine, 2003; Rodrik, Subramanian, and Trebbi, 2004; Alonso, 2011). The WGI project has gathered data on 215 countries from 1996 to 2014. The project's goal is to obtain a measurement of the government's ability to implement policies, regulate itself, and be esteemed by its citizens. The six indicators are built from more than 30 sources that describe the perceptions of different members of society about their government. The first WGI indicator is voice and accountability. This index measures the ability of citizens to select their government and participate in society. The second variable is political stability and absence of violence/terrorism. The variable measures the perceptions of society on the likelihood of political instability. The third variable is government effectiveness and it measures perceptions on quality of public services, implementation of policies, and credibility of the government. Fourth is regulatory quality, which measures perceptions on the ability of the government to formulate and implement policies. Fifth is rule of law, which consists of confidence in quality of contract enforcement, property rights, courts, and likelihood of crime and violence. This variable is of particular interest to the banking system because if banks do not believe that the judicial system will enforce contracts and property rights, then banks will be less likely to provide loans. The last indicator is control of corruption. This variable measures perceptions on the government's pursuance of private benefits; it also takes into account the manipulation of the state by elites and private interests. The highest observations during the period are from Finland and Denmark in 2006, with a value for control of corruption of 2.55. The lowest observation belongs to Somalia in 2009, with a value for political stability of -3.32. These indicators provide a very strong argument for studying a Latin American country with strong institutions. Chile's scores are almost identical to OECD's. The scores of Latin America show the weak institutional framework in which the rest of the region operates.

3. **Related literature and hypotheses development**

The level of institutional development has a strong influence on the financial sector of a country. Shleifer and Vishny (1997) and Levine (1999) find that the differences in legal systems across countries affect the financial system. In particular, in countries where creditors are well protected by the judicial system, there are stronger financial intermediaries. Levine (1999) also finds that the financial system is

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more developed when borrowers provide reliable information and the government enforces contracts. La Porta et al. (1998) show that common-law countries have the strongest protection to investors. Given the information asymmetry that prevails between creditors and borrowers, these governments have created institutions to decrease the information gap. If there is information about borrowers in the form of credit bureaus, then adverse selection is reduced whereas enforceability of contracts reduces moral hazard.

Even though the effects of law on finance have been generally accepted, the interaction between institutions, finance and growth has been more difficult to establish. King and Levine (1993) test Schumpeter's affirmation that finance promotes economic growth. They compile a sample of 80 countries and conclude that the financial industry promotes growth through the accumulation and efficient use of capital. Levine and Zervos (1996) study 49 countries from 1976 through 1993 and find that well-developed stock markets and banking systems promote economic growth. Demirgüç-Kunt and Maksimovic (1998) perform a growth simulation on firms from 30 different countries and provide evidence that the highest growing firms are from countries that have strong stock markets and legal systems.

However, Lucas (1988) believes that finance does not have such a strong effect on development. Furthermore, there is a stream of literature that criticizes the methodology of previous studies in determining the importance of finance. Dornbusch and Reynoso (1989) discuss the risk of sample selection bias that can lead to spurious results. Quah (1993) states that pooled regressions incorporate countries with different growth paths, which weaken any generalization. Luintel and Khan (1999) use a VAR analysis and find a bidirectional causal relationship between finance and growth. Christopoulos and Tsionas (2004) argue that cross-sectional data leads to spurious correlations and finance affects growth only on the long run.

The research difficulties arising from cross-country data have reinvigorated a within-country approach. Berkowitz et al. (2014) study privatized state-banks in Russia and find that those banks with no political connections in areas with strong property rights tend to increase growth. Berkowitz et al. (2015) analyze a property law that was approved in China in 2006 and gave creditors more rights over the collateral and gave private firms more power against expropriation by local governments. After property rights were enhanced, firms experienced economic growth. Brown, Cookson, and Heimer (2016) study the effects of state courts and tribal courts on Native American reservations. They find that reservations that are assigned to state courts, which are more predictable than tribal courts when enforcing contracts, develop stronger credit markets and have a higher income. These studies stress the advantages of examining the interaction between law and finance in one country. By focusing on Chile, we can isolate the effects of foreign banking in an emerging Latin American country with strong institutions.

In the presence of asymmetric information, banks play a fundamental role of screening creditors and allocating capital. In the stock market, free riders can benefit from active shareholders which may discourage investing in the exchange. Banks do not suffer from the free rider problem because they are the sole beneficiary of creditor screening. In their analysis of financial intermediaries, Boot and Thakor (1997) underlie the differences between the type of borrowers and the financial institution that best serves their interests. If the industry in which the borrower operates is heavily monitored by the government, then the stock market will prevail. However, if there is a need for constant monitoring, borrowers will use banks. Furthermore, if there is an absence of collateral, borrowers will use the venture capital industry for funds. Beck and Levine (2004) also find that both the stock market and banks provide complementary financial services that increase economic growth. There are other economic conditions such as the competitiveness in the banking sector that will determine the influence of the financial system in the economy. Beck, Demirgüç-Kunt, and Maksimovic (2004) analyze the effects of bank concentration on several countries and show that a heavily contracted banking industry limits

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the access to finance, but only in the presence of weak institutions. Interestingly, they find that the presence of foreign banks and a credit registry decreases the negative effects of concentration.

We test the following hypotheses:

Hypothesis 1: *Foreign banks will decrease the net interest margin.*

If foreign banks increase the competitiveness of the financial system, then banks' profits as measured by the net interest margin should experience a decline. In their comprehensive analysis of 80 countries between 1988 and 1995, Claessens et al. (2001) find that foreign banks decrease the interest rate margins of domestic banks. Lensink and Hermes (2004) incorporate the effects of economic development and find that in less developed economies, the presence of foreign banks increases the spreads of domestic banks. Peria and Mody (2004) study the effect of foreign banks in Latin America and find that when there is competition, there is a decrease in the net interest margin. Berger, Hasan, and Zhou (2009) observe the effect of foreign ownership on Chinese banks and find that foreign ownership improves efficiency. Jeon, Olivero, and Wu (2011) also conclude that foreign banks in Asia and Latin America increase competition. However, Moguillansky, Stuart, and Vergara (2004) argue that foreign banks can exploit the economic conditions in the host country and increase their net interest margin.

The effect of foreign banks on a local economy is heavily dependent on the level of development of the host country's institutions. Engermann and Sokoloff (1997) perform a historical study on the effect of factor endowments in the New World economies and find that better institutions decrease interest margins. Demirgüç-Kunt, Laeven, and Levine (2004) provide evidence that institutions that protect property rights and promote economic freedom decrease net interest margin. Naceur and Omran (2011) find that banks have a lower cost of intermediation when the banking system and the stock market are well developed. Additionally, they show that corruption increases net interest margin while better law and order decreases costs. In a more detailed analysis, Bianco, Jappelli, and Pagano (2005) develop a model where institutional development is more ambiguous. Improvements in judicial efficiency increase lending, but the net effect on interest rate depends on competition. Chen and Liao (2011) expand the study on institutions and foreign banks by incorporating the institutions and economic development of the foreign bank's home country. They find that the spread is thinner when the foreign banks come from a developing country but the home country's macroeconomic environment has no effect on the spread. They also find that better financial regulation and supervision in the home country has an increasing effect on spreads. In regards to host country characteristics, better governance, higher GDP, and more competition lowers the interest margin but inflation has the opposite effect.

Hypothesis 2: *Foreign banks will decrease a bank's volatility of net interest margin and the volatility of return on assets. In addition, foreign banks will increase the z-score.*

If foreign banks suffer from more information asymmetry than their domestic competitors then they will increase the volatility of returns. Goldberg et al. (2000) and Peek and Rosengreen (2000) argue that foreign banks can be a source of instability if there is a financial crisis in their home country that requires a capital flight to the parent companies. Goldberg et al. (2000) state that foreign banks cherry-pick the most profitable borrowers and this allow them to suffer from less volatility. Wu et al. (2011) show that foreign banks serve as a cushion to contractionary monetary policies in the host country but also conditions in their home country affect lending in host countries. Given that emerging markets are more volatile, then the presence of foreign banks should have an overall diminishing effect on volatility. Bang et al. (2016) find that foreign banks take more risk and this can be due to information asymmetry disadvantages, differences between the home and host countries, and importing the financial condition of their parent company. If there is a strong institutional framework that diminishes information asymmetry and if a foreign bank home country is less volatile than the host country, then we can expect

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a decreasing effect in volatility derived from the presence of foreign banks. It would be intuitive that in a stronger institutional framework, economic agents would be more willing to take risks. However, Acharya, Amihud, and Litov (2011) find that firms in countries with well-developed creditor rights incur in less debt. Houston et al. (2010) perform a similar analysis but they focus on lenders and show that stronger creditor rights leads to lower bank risk. Mathur and Marcelin (2015) also find that better institutions reduce risk and improve capital allocation.

Hypothesis 3: *Foreign banks will have a positive effect on bank's commercial, consumption, and housing loans.*

If foreign banks can obtain capital from their home countries and there is a strong institutional framework in the host country, foreign banks should promote economic growth by allocating capital. Goldberg et al. (2000) argue that due to their parent companies, foreign banks should facilitate the inflow of capital. De Haas and Lelyveld (2010) find that foreign banks with strong parent banks provide credit more rapidly. However, Haber, and Musacchio (2005) claim that foreign banks do not provide commercial loans when there is a weak enforcement of contracts. Schulz (2006) find that the low impact of foreign banks in Mexico is more related to the prevailing level of competition in the Mexican banking system. Beck and Martínez Pería (2010) show that credit by foreign banks is a more complicated story. In Mexico, foreign banks increased their presence only in rich municipalities which is consistent with the cherry picking argument. Gormley (2010) states that foreign banks in India specialize only in the most profitable firms. Serrano (2016) divides foreign banks in Mexico by nationality and finds that large foreign banks do increase their loans. Given the strong institutions in Chile and bank competitiveness we can expect more credit by foreign banks.

If there are strong institutions protecting creditors, enforcing contracts, and decreasing asymmetric information, then banks should be more willing to provide loans. However, the type of lending can differ according to the institutional environment. Haber and Musacchio (2005) argue that foreign banks in Mexico do not provide commercial loans due to the weak enforcement of contracts. Therefore, banks make most of their income from fees and consumption loans. Ergungor (2008) studies the judicial system in 46 countries and finds that when there is an inflexible judicial system, the economy grows when it is supported by a market-oriented financial system. Hassan, Sanchez, and Yu (2011) find that domestic credit helps economic growth in Latin America but it has a negative effect on high-income countries. Hsueh, Hu, and Chien-Heng Tu (2013) also find that financial development leads growth in Asian countries. However, when studying the link between finance and economic growth across different regions, Narayan and Narayan (2013) find that, except in the Middle East, banking has a negative effect on economic growth. Mathur and Marcelin (2015) study the effects of institutional development and show that in countries with better institutions banks provide more credit.

4. Data and methodology

Hand collected financial statement data is available from the *Superintendencia de Bancos e Instituciones Financieras de Chile*. The sample covers the period from 2005 to 2014 and has 245 bank-year observations. We divide our tests based on the three hypotheses stated in the previous section. The dependent variable for efficiency is the net interest margin, *NIM*, which we calculate as interest received minus interest paid divided by total earning assets. The measures for volatility of returns are *Vol_nim*, measured by the standard deviation of net interest margin, and *Sd_roa*, calculated as the standard deviation of returns over assets. The risk measure we use is *Ln(Z-score)* computed as the natural logarithm of the Z-score, which is calculated as the return on assets plus the capital-asset ratio

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(car) divided by the standard deviation of asset returns [Z-score=(roa+car)/sd_roa]. A higher Z-score indicates a higher level of bank stability. Our final hypothesis tests the allocation of credit. The indicators that we use are as follows. *Commloans is* computed as commercial loans divided by total loans, *Consumloans* is consumption loans divided by total loans, and *Housloans* is measured by housing loans divided by total loans.

The control variables are *INST*, which is an equal-weighted index that comprises the six Worldwide Governance Indicators (WGI) control of corruption, government effectiveness, political stability and absence of violence, voice and accountability, rule of law, and regulatory quality. *Foreign* is a dummy variable equal to 1 if firm is foreign. *Costeff* is equal to administrative expenses divided by assets plus deposits. *Credit_risk* is net loans divided by total assets. *Ln(size)* is the natural logarithm of total assets. *Inflation* is the GDP deflator (annual %) calculated by the World Development Indicators. *Ln(dom_cred)* is the natural logarithm of the domestic credit to private sector by financial intermediaries (% of GDP) calculated by the World Development Indicators. *Ln(gdpcap)* is the natural logarithm of the GDP per capita (current US$) calculated by the World Development Indicators.

Table 2 presents the summary statistics. It can be observed from the statistics that the allocation of credit can range from zero to 100% of the portfolio, except for housing loans. However, the mean commercial loans are 53% whereas consumption and housing loans are around 15%. From the correlations in Table 3, there is a negative association between commercial loans and the other two categories of loans. This is an indication that certain banks specialize in a specific type of credit allocation. Consumption and housing loans are positively correlated, which shows that some banks have the general public as their main client. According to Haber and Musacchio (2005), foreign banks in Mexico do not provide commercial loans due to the poor enforceability of contracts. From the loan allocation, in Chile there appears to be a separation between banks that provide commercial loans and banks that specialize in the other two categories of loans.

[Insert Table 2 Here]

The net interest margin ratio (*NIM)* shows that the maximum value is above 10% of earnings and can reach negative values if they pay more for interest. However, the mean value is 2% which can be an indicator that Chilean banks are conforming to international standards and deriving revenue from fees and investments. *NIM* is also highly correlated with consumer loans, so we can infer that banks that specialize in consumer loans are obtaining high revenue from interest rate differential. In contrast, there is a negative association between *NIM* and commercial loans. Possibly banks that specialize in commercial loans are providing additional services to compensate for the low interest margin. In terms of volatility of returns measured by *Vol_nim* and *Sd_roa*, *NIM* is a more stable measurement than returns on assets. Even though they both have the same mean, *Sd_roa* has twice the standard deviation of *Vol_nim* and a maximum value four times larger than the maximum value of *Vol_nim*. *Ln(Z-score)* has a range between -0.73 and 5.89 but with a mean of 3.58. This shows that values are more concentrated in the upper tail and the standard deviation is about 25% the value of the mean. There are no correlations above .5 between *Ln(Z-score)* and any other variables.

[Insert Table 3 Here]

We use a dynamic panel approach in our analysis to address the endogeneity bias that is a potential problem on empirical works on bank profitability as discussed by Naceur and Omran (2011). Guyot et al. (2014) argue that ordinary least squares (OLS) estimators are less efficient when employed to panel datasets because individual effects, if significant, cause correlation between the explanatory variables and the error term, occasioning in an upwards bias in the estimation. They add that the use of a fixed effects method (FEM) estimator usually eliminates this problem in static models, but not in the case of dynamic models, where the correlation between the dependent lagged variable and the individual fixed effects biases the estimated parameters downwards.

In addition, in dynamic panel models both OLS and FEM are inconsistent when the time span is small (Nickell, 1981). The generalized method of moments (GMM) estimator (Arellano and Bond, 1991) is widely used in that case. Yet, Blundell and Bond (1998) argue that this estimator suffers from a weak instrument problem and propose a system GMM procedure which uses moment conditions based on the level equations together with the usual Arellano-Bond orthogonality conditions.

We adopt the SGMM estimator of Arellano and Bover (1995) and Blundell and Bond (1998), which takes into account the unobserved fixed effects, removing them from the equation through first differences, and utilizes lagged values of the regressors as instruments, efficiently addressing the endogeneity bias. We specify the variable foreign as exogenous in the SGMM model, and assume reverse causation from the dependent variable to credit risk, following Tayler and Zilberman (2016) who find an endogenous credit risk as the source of financial frictions. In our paper, the idea is that credit risk is potentially reversely impacted by changes in bank efficiency, risk factors and credit availability.

We follow Roodman (2009) by adopting collapsed instruments in the two-step GMM regressions with Windmeijer (2005) correction of standard errors. As result of the collapse, the number of instruments is smaller than the number of banks, avoiding the overidentification bias; the Windmeijer correction addresses the downward bias of two-step GMM standard errors. In regard to the specification tests, we check the validity of instruments and the absence of serial correlation of residuals through the Hansen and Arellano-Bond tests, for which the p-values are reported at the bottom of each regression table.

For robustness of results, the dynamic panel model is compared to OLS and FEM, tables are not reported. The results support the null hypotheses of no serial correlation and no overidentifying restrictions, as shown respectively in the p-values above 0.10 for the AB(2) and the Hansen tests. Since these parameters are consistent, results can be interpreted with confidence.

The linear dynamic panel model used to test our Hypothesis 1 is the following:

$$NIM_{it} = \beta_1 NIM_{it-1} + \beta_2 INST_{it} + \beta_3 Foreign_{it} + \beta_4 B_{it} + \beta_5 M_{it} + \beta_6 F_{it} + \eta_i + \varepsilon_{it} \qquad (1)$$

where *NIM* is the bank's net interest margin, our dependent variable for efficiency; INST is institutional development, *Foreign* is a dummy that is equal to 1 if the bank is foreign, B is a vector of bank-specific characteristics represented by the measures of cost efficiency, credit risk and bank size, M is a vector of macroeconomic variables which are inflation and per capita GDP, F is the financial development variable which is equivalent to our domestic credit variable, η is the vector of unobserved fixed effects and ε is the error term.

To test Hypothesis 2, we adopt the following linear dynamic panel model:

$$Risk_{it} = \beta_1 Risk_{it-1} + \beta_2 INST_{it} + \beta_3 Foreign_{it} + \beta_4 B_{it} + \beta_5 M_{it} + \beta_6 F_{it} + \eta_i + \varepsilon_{it} \qquad (2)$$

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where Risk is our dependent variable that measures bank risk, represented alternately by the measures of volatility of net interest margin and return on assets; the remaining variables are previously described.

Finally, the third model is used to test Hypothesis 3 which is related to bank loans:

$$Loans_{it} = \beta_1 Loans_{it-1} + \beta_2 INST_{it} + \beta_3 Foreign_{it} + \beta_4 B_{it} + \beta_5 M_{it} + \beta_6 F_{it} + \eta_i + \varepsilon_{it} \qquad (3)$$

where Loans is the dependent variable that corresponds to bank loans that alternates among commercial loans, consumption loans and housing loans; the remaining variables are previously described.

5. Results

5.1 Interest rate spread

The system GMM regressions of the net interest margin are presented in Table 4. Interestingly, in model 1 *foreign* has no significant effect on *NIM* but when we control for institutional development, *foreign* becomes statistically significant. With a strong institutional background, foreign banks improve the competitiveness of the banking sector by decreasing the net interest margin by a factor hovering between -0.006 and -0.010. The results are robust for models 2 through 5 when different macro variables are used as controls.

[Insert Table 4 Here]

Inflation decreases the spread but it has a very small magnitude with no statistical significance therefore it does not have a major impact that would change the significance of other variables. *Ln(dom_cred)* has a negative coefficient and also decreases the spread and, in regression 4, it modifies the effect of size on *NIM*. After controlling for *ln(dom_cred)*, the size of banks also reduces the *NIM* by a factor of -0.024 and is significant at the 5% level. The cost efficiency of banks is measured by *costeff*. A higher *costeff* means that the administrative expenses are increasing relative to assets and deposits, therefore the larger the *costeff* the less efficient the bank. In the first regression, costeff increases the interest margin by 0.76 but after controlling for *ln(dom_cred)* and *ln(gdpcap)* an increase in expenses has a decreasing effect on spreads and the magnitude is between -0.64 and -0.86. The effects of costs efficiency are driven by the allocation of credit and GDP per capita, which also generates the same effects on size. Banks will provide more domestic credit when the GDP per capita is high and these factors are increasing the assets of banks and decreasing their efficiency. *Credit_risk* consistently increases the spread across all five models but the magnitude of the coefficient is halved to 0.024 when *ln(dom_cred)* and *ln(gdpcap)* are included. If the bank is providing more loans, it is increasing its risk profile and it is compensated with a higher net interest margin. The GDP per capita shows that an increase in the population wealth leads to a decrease in the net interest margin with magnitude of -0.027.

Even though the main drivers of *NIM* are the lag of *NIM* and *credit risk*, the effect of foreign banks when institutions are included is consistent in models 2 through 5. Evidence supports hypothesis 1 once it shows that foreign banks improve the efficiency of the banking system. Our results are consistent with Peria and Mody (2004), Berger, Hasan, and Zhou (2009), and Jeon, Olivero, and Wu (2011) who also find a positive effect from foreign banks. Lensink and Hermes (2004) and Moguillansky, Stuart, and Vergara

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(2004) argue that the level of economic development is a defining factor that will determine whether a bank promotes efficiency or increases the interest rate spreads. Our study in Chile contributes to the literature by showing that it is not the level of economic development what determines the behavior of foreign banks but rather the presence of strong institutions.

5.2 Volatility of returns and risk

In Table 5, we are interested in measuring the overall effect of foreign banks in the volatility of the net interest margin as stated in hypothesis 2. The coefficients of the binary variable *foreign* are statistically significant at 5% level in models 2, 3 and 4 with a magnitude varying from -0.005 to -0.009. The presence of foreign banks decreases the volatility of the spread the most after accounting for the effect of *inflation.* Institutions are increasing *vol_nim* and the effect is significant at the 1% level in models 2 and 3 with coefficients of 0.061 and 0.092, respectively. From the results obtained, it appears that banks will take more risk if the institutions in a country enable property rights and enforceability of contracts. We obtain the opposite effects of *INST* on *vol_nim* as in previous literature Acharya et al. (2011), Houston et al. (2010) and Mathur and Marcelin (2015).

[Insert Table 5 Here]

The effect of *inflation* on the volatility of NIM is negative with similar magnitude to the impact on *NIM* (Table 4) and the statistical significance is reduced, at the 10% level. Curiously, after accounting for inflation, the effect of institutions on the volatility is highest. *Costeff* increases the volatility in the first two models with an average magnitude of 0.392 but after controlling for *ln(dom_cred)* and *ln(gdpcap)* an increase in expenses has a decreasing effect on volatility as in section 5.1. Interestingly, the GDP per capita decreases the volatility of *NIM* but by a factor of -0.022 and significance at the 5% level.

The second measure that we use for volatility is the standard deviation in returns on assets. Table 6 presents similar results that are consistent with Table 5. *Foreign* consistently shows negative coefficients in all the models with high statistical significance. These results provide stronger evidence that foreign banks are decreasing the volatility of returns as formulated in hypothesis 2. *INST* increases volatility in models 2, 4 and 5 but it loses significant after controlling for *inflation*. The main difference between both measures of volatility is that with *sd_roa*, *foreign* decreases the volatility even without controlling for institutional effects. *Ln(Size)* shows that the larger the bank the less volatile the ROA. Given that size is measured by assets it is expected to have the strongest influence on *sd_roa.* Size is statistically significant across all models of Table 5. *Ln(dom_cred)* and *ln(gdpcap)* have decreasing effects on volatility but only the former is significant at the 10% level with a small coefficient of 0.0002. Foreign banks are reducing the volatility and the results provide some evidence to support hypothesis 2 that foreign banks in developing countries serve as a stabilizing agent in the presence of domestic shocks. Even though foreign banks are susceptible to the business cycles of their home countries and risks of parent companies, they minimize local volatility. However, the results are heavily influenced by the dependent variable of choice. In Table 5, foreign banks decrease *vol_nim* the most in the presence of *inflation*. When the dependent variable is *sd_roa*, foreign banks consistently decrease the volatility of returns across the five models. Goldberg et al. (2000), Peek and Rosengreen (2000), and Bang et al. (2016) argue that foreign banks can be a source of instability whereas Wu et al. (2011) state that volatility will depend on the conditions in the home and host countries. We provide some evidence that in the case of Chile, foreign banks are decreasing volatility. These results should provide some

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encouragement to governments of developing countries that want to open their banking sector to foreign subsidiaries. Furthermore, in the case of a financial crisis, foreign banks can join efforts to provide much needed capital to protect the financial system.

[Insert Table 6 Here]

Table 7 provides additional evidence that foreign banks are promoting stability in the Chilean banking sector. The effect of *foreign* is statistically significant in all models at the 1% level. In general, foreign banks are not exporting volatility from their home countries and are enhancing the stability of the system. Bang et al. (2016) suggest that foreign banks take more risk due to information asymmetry disadvantages. In the Chilean case, probably the institutional framework decreases the negative consequences of information asymmetry and foreign banks take less risk. Consistent with Acharya, Amihud, and Litov (2011), Houston et al. (2010), and Mathur and Marcelin (2015) institutions also strengthen the stability of banks. Interestingly, *INST* coefficient is not significant in any of the models while *costeff* has large coefficients varying from 67.7 to 124.0 with significance at the 1% level, suggesting that banks spend large amounts of capital to maintain stability. It could be expected that the size of a bank could serve as a cushion against volatility. However, *ln(size)* has a decreasing effect on *ln(Z-score)* but it is only significant at the 10% level when controlling for *ln(dom_cred)*. It is not clear if larger banks are taking more risk, a result that indicates that *size* is secondary to the impact of *foreign*. *Inflation* is decreasing the stability of banks with a magnitude of -0.025. *Ln(dom_cred)* and *ln(gdpcap)* have increasing effects on stability, which is the opposite effect from Tables 5 and 6. Overall, Table 7 provides further evidence that foreign banks and institutions are increasing the stability of the banking sector, which is congruent with hypothesis 2.

[Insert Table 7 Here]

5.3 Lending portfolio.

The last set of tests focus on the role of banks as a financial intermediary in the economy, where banks not only capture capital but also allocate it in different areas. Table 8 presents the effects of foreign banks on commercial loans. These results are of significant importance to the development of the economy in emerging markets. Foreign banks have a positive effect on commercial loan, which provides some evidence to support hypothesis 3. All models are statistically significant at the 1 or 5% level and with magnitudes from 0.034 to 0.137. When a country such as Chile has strong institutions, foreign banks perform their role as agents of growth by providing commercial loans.

In the case of institutions, models 2 and 4 show that institutions help to increase the level of commercial loans with a high average magnitude of 2.41. The results show the opposite effect in

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regression 5 when *ln(gdpcap)*is accounted for, although the coefficient is not statistically significant. From the correlations table, we observe the negative interaction between *credit_risk* and commercial loans but positive correlation between *credit_risk* and consumer and housing loans. The nature of this interaction is observed by the negative and statistically significant coefficient of *credit_risk* across most models and with a very high magnitude. It appears that banks specialize in providing either commercial loans or the other two types of loans. *Ln(Size)* indicates that the largest banks have a negative effect on commercial loans, probably they can derive their income from fees or other loans. Smaller banks can focus on commercial loans and in the presence of strong institutions, if there is a nonperforming loan they will be able to recover their collateral or have the contract enforced. *Ln(dom_cred)* and *ln(gdpcap)* have negative effects on commercial loans and both variables are significant at the 1% level.

[Insert Table 8 Here]

There is some evidence on Table 9 consistent with the implications of hypotheses 3. In the five regressions, *foreign* is positive and statistically significant at the 1% or 5% level and the average coefficient magnitude is on a par with Table 8. Institutions also are positive and statistically significant at the 1% level in all models but its magnitude is only one third as compared to Table 8. Institutions facilitate consumption loans and foreign banks also provide consumption loans. *Costeff* has a positive and significant effect in the first three models and its magnitude varies between 0.561 and 1.212. The variable *credit_risk* has a negative effect on consumption loans, consistently with the effect from Table 8 and provides more evidence of bank specialization. *Ln(Size)* has the opposite effect than it does on commercial loans, having the largest banks an increasing effect on consumption loans but the magnitude is one fifth as compared to its coefficient with commercial loans. Inflation is positively related to consumption loans, which may indicate that people are borrowing more in dollar terms and banks are providing these funds. *Ln(dom_cred)* has negative effect on consumption loan with the same small coefficient of -0.001 from Table 8 with significance at the 1% level. However, *ln(gdpcap)* has positive impact on consumption loans, which has the opposite sign than with commercial loans. It appears that as the economy grows, banks focus more on consumption loans. However, the positive coefficient of 0.07 on consumer loans is much smaller than the negative coefficients observed with commercial loans. The results are pointing towards a segmented banking sector where large banks focus on consumption and smaller banks are focusing on commercial loans. The negative correlation between *credit_risk* and commercial loans provides more evidence that there is specialization in the Chilean banking sector. However, given the strong institutions in the country, foreign banks are improving competition and complementing the allocation of capital by the local banks.

[Insert Table 9 Here]

Table 10 measures the effects of foreign banks on housing loans. *Foreign* does not seem to have a strong impact on housing loans, showing only one coefficient with statistical significance at the 10% level with a negative sign in regression 2. Foreign banks have a much greater influence in providing commercial and consumption loans than housing loans. This table provides mixed evidence with regards to hypothesis 3, which may be due to having fewer observations and the impact of the 2007-2009 crisis on the real estate market. *INST* increases housing loans across all models. *Costeff* has a negative and

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significant effect in all models; the increase in expenses is decreasing the allocation of real estate loans. *Ln(Size)* is not statistically significant in most regressions, indicating that the largest banks are focusing on housing and consumption loans. *Inflation* and *domestic credit* have small coefficients although with significance at the 1% level with respectively positive and negative impacts on housing loans, similarly to the effects on consumption loans. The remaining control variables have similar effects as with commercial loans, although *inflation* is positive and highly significant, in line with the result for consumption loans.

[Insert Table 10 Here]

The last three tests provide evidence that corroborates hypothesis 3, foreign banks are increasing the overall loans in Chile. However, if we compare the magnitude and significance of the regression coefficients, foreign banks have a larger effect on commercial and consumption loans than on housing loans. Consistent with Haber and Musacchio's (2005) claim that foreign banks do not provide credit in Mexico due to weak institutions, the case of Chile provides evidence that, in the presence of strong institutions, foreign banks have a very strong impact on the allocation of commercial and consumption credit. Even though Chile does not have the economic development level of an OECD country, its strong institutions facilitate the large provision of commercial and consumption loans by foreign banks.

6. Concluding remarks

In this paper, we study the effects of foreign banks on the Chilean banking system. Focusing on a developing country with strong institutions permits us to control for several variables like macroeconomic heterogeneity, uncorrelated business cycles, culture, and other factors that may render our results invalid. The studies that measure the effects of foreign banks have found contradicting results. Of our particular interest is the article by Haber and Musacchio (2005), who argue that foreign banks do not provide commercial loans in Mexico due to weak institutions. The Chilean case provides a suitable experiment to test this argument. In the presence of strong institutions, we find that foreign banks do have a positive effect on the allocation of commercial and consumption credit. After controlling for size, we also observe that large banks provide consumption loans while the small banks specialize in commercial loans. Furthermore, the correlations table provides more evidence of complementary services. There is a group of banks that provides commercial loans and another group of banks that provides consumption loans.

We also contribute to the literature of foreign banks in emerging markets by providing further evidence that foreign banks increase the competitiveness of the banking sector by reducing the interest rate spread. The selection of Chile as a case study proved particularly helpful to obtain these results. Foreign banks by themselves are not statistically significant in the reduction of the net interest margin. However, after controlling for institutions, the effect of foreign banks is highly significant. Furthermore, the results are robust to several macroeconomic controls. In terms of the volatility of returns, foreign banks consistently reduce the standard deviation of ROA. When we study the standard deviation of the net interest margin, we observe that foreign banks decrease volatility across all regressions. The results obtained from measuring the z-score show that foreign banks help to stabilize banks in Chile.

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In general, in the presence of strong institutions, foreign banks are a source of economic stability that enhances the competitiveness in the banking sector. Even though foreign banks decrease the interest spread, banks are still providing a diversified lending portfolio. Rather than foreign banks searching for high rents, there is a complementarity of financial services. These results confirm the clustering of banks based on business characteristics that benefit most Chileans. These findings have important implications for public policies in developing countries. Governments should focus on improving the institutions in their countries in order to benefit from the presence of foreign banks.

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Table 1. Macroeconomic and Institutional Indicators

Chile, Latin America, and the OECD 2005-2014.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic credit provided by financial sector (% of GDP)										
Chile	79.49	78.72	85.26	102.71	105.73	104.77	109.17	112.62	115.48	119.97
Latin America & Caribbean	48.19	53.62	57.60	60.34	62.56	65.47	69.37	73.55	74.07	78.58
OECD members	180.67	185.17	187.55	187.06	203.36	206.66	207.16	210.23	208.75	211.09
GDP per capita (current US$ in thousands)										
Chile	$7.73	$9.50	$10.51	$10.79	$10.22	$12.79	$14.58	$15.25	$15.76	$14.57
Latin America & Caribbean	$5.09	$5.90	$6.89	$7.90	$7.34	$8.97	$10.05	$10.07	$10.23	$9.98
OECD members	$30.90	$32.35	$35.12	$36.87	$34.26	$35.68	$38.06	$37.76	$37.86	$38.31
Total Population (in Millions)										
Chile	16.10	16.28	16.46	16.65	16.83	17.02	17.20	17.39	17.58	17.76
Latin America & Caribbean	562.81	570.05	577.27	584.46	591.60	598.69	605.69	612.64	619.51	626.29
OECD members	1,196.96	1,205.73	1,214.79	1,224.34	1,233.17	1,241.45	1,249.55	1,256.01	1,265.80	1,272.99
Inflation										
Chile	3.05	3.39	4.41	8.72	0.07	1.41	3.34	3.01	1.79	4.40
Latin America & Caribbean	4.70	4.30	5.54	8.58	2.59	3.86	5.13	4.11	2.74	3.40
OECD members	2.37	2.40	2.38	4.06	0.80	1.83	3.32	2.47	1.45	0.60
Worldwide Governance indicators										
Chile	1.24	1.14	1.13	1.12	1.15	1.21	1.19	1.19	1.18	1.18
Latin America & Caribbean	0.13	0.12	0.12	0.12	0.11	0.12	0.15	0.13	0.13	0.07
OECD members	1.20	1.19	1.19	1.18	1.16	1.17	1.18	1.16	1.16	1.17

Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. GDP per capita is gross domestic product divided by midyear population. Data are in current U.S. dollars. Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Worldwide Governance indicators are an equally-weighted average of the six Worldwide Governance Indicators (WGI) developed by the World Bank.

Table 2

Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
INST	245	1.17	0.04	1.12	1.24
commloans	232	0.53	0.30	0	1
consumloans	233	0.16	0.26	0	0.99
housloans	161	0.12	0.12	0	0.38
NIM	245	0.02	0.02	-0.01	0.12
costeff	245	0.01	0.01	0	0.08
ln(Z-score)	243	3.58	0.91	-0.73	5.89
vol_nim	243	0.01	0.01	0	0.06
sd_roa	243	0.01	0.02	0	0.25
npl	236	0.03	0.04	0	0.19
ln credit_risk	245	0.71	1.62	0	24.94
ln(size)	245	7.63	1.92	3.44	10.86
inflation	245	5.15	3.70	0.47	12.81
ln(dom_cred)	222	4.58	0.14	4.37	4.75
ln(gdpcap)	222	9.34	0.23	8.94	9.66

INST is an equal-weighted index that comprises the six Worldwide Governance Indicators (WGI) control of corruption, government effectiveness, political stability and absence of violence, voice and accountability, rule of law and regulatory quality, and voice and accountability. Commloans are commercial loans divided by total loans. Consumloans are the consumption loans divided by total loans. Housloans are the housing loans divided by total loans. Nim is equal to (Interest received−interest paid)/ total earning assets. Costeff is equal to Administrative Expenses/(Assets+Deposits). Ln(Z-score) is the natural logarithm of the Z-score, which is calculated as the return on assets plus the capital-asset ratio (car) divided by the standard deviation of asset returns [Z-score=(roa+car)/sd_roa]. Vol_nim is the standard deviation of net interest margin over the period 2005–2014. Sd_roa is the standard deviation of return over assets over the period 2005–2014. Credit_risk is net loans divided by total assets. Ln(size) is the natural logarithm of total assets. Inflation is the GDP deflator (annual %) calculated by the World Development Indicators. Ln(dom_cred) is the natural logarithm of the domestic credit to private sector by banks (% of GDP). Ln(gdpcap) is the natural logarithm of the GDP per capita (current US$) calculated by the World Development Indicators.

Table 3

Correlations

	INST	foreign	comm loans	consum loans	hous loans	nim	costeff	ln (Z-score)	vol nim	sd_roa	credit risk	ln(size)	inflation	ln (dom_cred)	ln (gdpcap)
INST	1.00														
foreign	-0.01	1.00													
commloans	-0.05	0.12	1.00												
consumloans	0.02	-0.40	-0.67	1.00											
housloans	0.08	-0.21	-0.37	0.33	1.00										
nim	0.00	-0.33	-0.62	0.90	0.29	1.00									
costeff	0.02	-0.22	-0.43	0.63	-0.01	0.62	1.00								
Ln(Z-score)	-0.06	0.28	0.13	-0.22	-0.44	-0.16	-0.02	1.00							
vol_nim	-0.02	-0.33	-0.61	0.89	0.24	0.96	0.62	-0.16	1.00						
sd_roa	0.13	0.11	-0.07	-0.02	-0.16	-0.04	0.02	-0.44	0.00	1.00					
credit_risk	0.14	-0.10	-0.19	0.20	0.50	0.04	0.05	-0.02	0.05	-0.03	1.00				
ln(size)	0.02	-0.20	0.14	-0.08	0.70	-0.12	-0.32	-0.43	-0.15	-0.08	-0.03	1.00			
inflation	0.16	0.01	-0.14	0.02	0.01	0.07	0.00	-0.02	0.07	0.08	0.05	-0.09	1.00		
ln(dom_cred)	0.05	0.00	0.26	-0.03	0.10	-0.10	0.02	0.02	-0.10	-0.10	-0.12	0.14	-0.72	1.00	
ln(gdpcap)	0.02	-0.01	0.27	-0.01	0.12	-0.08	0.03	0.05	-0.09	-0.12	-0.14	0.17	-0.53	0.86	1.00

Note: Foreign is a dummy variable equal to 1 if firm is foreign. All other variables are explained in Table 2.

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Table 4

Net Interest Margin

Dependent variable:	nim_t	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
$foreign_t$	-0.003	-0.006[b]	-0.006[c]	-0.006[a]	-0.010[a]
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
$INST_t$		0.103[a]	0.121[a]	0.027[c]	0.074[a]
		(0.017)	(0.017)	(0.016)	(0.014)
nim_{t-1}	0.247[a]	0.227[c]	0.157	0.004	0.004
	(0.036)	(0.126)	(0.120)	(0.075)	(0.089)
$costeff_t$	0.764	0.511	0.458	-0.864[c]	-0.635
	(0.464)	(0.513)	(0.549)	(0.500)	(0.512)
$credit\_risk_t$	0.057[a]	0.071[a]	0.077[a]	0.023[a]	0.024[a]
	(0.003)	(0.011)	(0.011)	(0.007)	(0.009)
$\ln(size)_t$	0.026[b]	0.025[a]	0.025[c]	-0.024[b]	-0.015
	(0.012)	(0.009)	(0.015)	(0.011)	(0.019)
$\ln(size)^2_t$	-0.002[a]	-0.002[a]	-0.002[b]	0.002[b]	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$inflation_t$			-0.0003		
			(<0.001)		
$\ln(dom\_cred)_t$				-0.0003[a]	
				(<0.001)	
$\ln(gdpcap)_t$					-0.027[a]
					(0.009)
Constant	-0.080[c]	-0.190[a]	-0.210[a]	0.085	0.212
	(0.043)	(0.059)	(0.067)	(0.069)	(0.135)
Hansen (p-value)	0.169	0.188	0.302	0.689	0.149
AR (2)	0.957	0.642	0.630	0.169	0.115
Number of instruments	22	22	22	20	20
Wald Chi^2	63.7	29.1	34.8	89.8	81.0
Observations	215	215	215	192	192

Note: Windmeijer standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.

Table 5
Volatility of Net Interest Margin

Dependent variable:	vol_nim$_t$	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
foreign$_t$	-0.005^c	-0.008^b	-0.009^b	-0.005^b	-0.006^c
	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)
INST$_t$		0.061^a	0.092^a	-0.002	0.026^c
		(0.011)	(0.016)	(0.009)	(0.015)
vol_nim$_{t-1}$	0.147^a	0.069	-0.102	0.029	0.004
	(0.036)	(0.067)	(0.071)	(0.060)	(0.112)
costeff$_t$	0.474^a	0.310^b	0.122	-0.169^c	-0.047
	(0.143)	(0.155)	(0.133)	(0.089)	(0.114)
credit_risk$_t$	0.037^a	0.050^a	0.065^a	-0.014	-0.017
	(0.003)	(0.006)	(0.007)	(0.013)	(0.019)
ln(size)$_t$	0.014	0.014	0.016	-0.019	-0.011
	(0.012)	(0.012)	(0.014)	(0.020)	(0.027)
ln(size)^2_t	-0.001^c	-0.001^c	-0.002^c	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
inflation$_t$			-0.0004^c		
			(<0.001)		
ln(dom_cred)$_t$				-0.0002^b	
				(<0.001)	
ln(gdpcap)$_t$					-0.022^b
					(0.009)
Constant	-0.030	-0.100^c	-0.130^a	0.096	0.212
	(0.043)	(0.053)	(0.046)	(0.065)	(0.161)
Hansen (p-value)	0.171	0.121	0.108	0.544	0.402
AR (2)	0.936	0.244	0.365	0.331	0.469
Number of instruments	22	22	22	20	20
Wald Chi^2	27.3	31.7	25.6	21.0	17.7
Observations	215	215	215	192	192

Note: Windmeijer-corrected GMM standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.

Table 6

Volatility of Return on Assets

Dependent variable:	sd_roa$_t$	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
foreign$_t$	-0.012^a	-0.014^a	-0.010^a	-0.010^a	-0.010^a
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
INST$_t$		0.054^a	-0.022	0.053^a	0.043^b
		(0.011)	(0.016)	(0.014)	(0.017)
sd_roa$_{t-1}$	0.099^a	0.113^a	0.089^c	0.092^b	0.103^a
	(0.015)	(0.021)	(0.047)	(0.045)	(0.038)
costeff$_t$	-3.917^a	-4.180^a	-2.673^a	-1.838^a	-2.664^a
	(0.143)	(0.195)	(0.131)	(0.083)	(0.113)
credit_risk$_t$	0.001	0.008	-0.010	-0.017	-0.015
	(0.012)	(0.013)	(0.010)	(0.015)	(0.024)
ln(size)$_t$	-0.078^a	-0.075^a	-0.096^a	-0.062^a	-0.055^a
	(0.012)	(0.015)	(0.016)	(0.011)	(0.010)
ln(size)^2_t	0.005^a	0.005^a	0.0069^a	0.005^a	0.004^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
inflation$_t$			0.001^a		
			(<0.001)		
ln(dom_cred)$_t$				-0.0002^c	
				(<0.001)	
ln(gdpcap)$_t$					-0.002
					(0.009)
Constant	0.296^a	0.228^a	0.360^a	0.179^a	0.177^c
	(0.043)	(0.045)	(0.063)	(0.035)	(0.094)
Hansen (p-value)	0.153	0.160	0.148	0.128	0.165
AR (2)	0.499	0.445	0.679	0.764	0.611
Number of instruments	22	22	22	20	20
Wald Chi^2	14.6	39.9	265.4	61.2	44.6
Observations	213	213	213	190	190

Note: Windmeijer standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.

Table 7

Ln Z-Score $_{t+1}$

Dependent variable:	Ln_zscore$_{t+1}$	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
foreign$_t$	0.487[a]	0.484[a]	0.695[a]	0.549[a]	1.139[a]
	(0.002)	(0.002)	(0.003)	(0.003)	(0.008)
INST$_t$		-0.117	1.103	-0.936	-3.048
		(0.868)	(1.075)	(1.313)	(1.607)
lnzscore$_t$	-0.362[c]	-0.362[c]	-0.384	-0.398	-0.345
	(0.200)	(0.198)	(0.307)	(0.764)	(0.950)
costeff$_t$	67.71[a]	68.18[a]	98.59[a]	73.28[a]	124.0[a]
	(0.344)	(0.515)	(0.517)	(0.422)	(0.686)
credit_risk$_t$	-1.805	-1.827	-0.910	-0.024	2.198
	(1.209)	(1.262)	(2.293)	(2.011)	(5.139)
ln(size)$_t$	-0.288	-0.275	0.646	-0.595[c]	0.378
	(0.265)	(0.413)	(0.430)	(0.327)	(0.795)
ln(size)^2_t	0.005	0.005	-0.0676	0.010	-0.092
	(0.026)	(0.041)	(0.043)	(0.034)	(0.094)
inflation$_t$			-0.025[a]		
			(<0.001)		
ln(dom_cred)$_t$				0.006[a]	
				(<0.001)	
ln(gdpcap)$_t$					1.854[a]
					(0.009)
Constant	7.142[a]	7.219[a]	2.796[a]	8.767[a]	-8.175[a]
	(0.043)	(0.057)	(0.062)	(0.054)	(0.214)
Hansen (p-value)	0.550	0.464	0.747	0.379	0.403
AR (2)	0.214	0.233	0.294	0.283	0.494
Number of instruments	22	22	22	20	20
Wald Chi^2	15.6	17.3	20.8	22.5	21.7
Observations	213	213	213	213	213

Note: Windmeijer standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.

Table 8

Commercial loans

Dependent variable:	commloans$_t$	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
foreign$_t$	0.203^a	0.137^a	0.034^b	0.035^b	0.092^a
	(0.010)	(0.012)	(0.014)	(0.014)	(0.021)
INST$_t$		2.227^c	0.913	2.594^c	-1.858
		(1.241)	(4.060)	(1.514)	(1.460)
commloans$_{t-1}$	0.328^a	0.327^a	0.333^a	0.365^a	0.343^a
	(0.036)	(0.048)	(0.049)	(0.050)	(0.065)
costeff$_t$	-74.86^a	-83.13^a	-75.61^a	-17.49^a	1.375
	(0.344)	(0.442)	(0.488)	(0.778)	(1.347)
credit_risk$_t$	-1.364^a	-1.663^a	-1.167	-2.570^c	-2.972^a
	(0.242)	(0.325)	(0.746)	(1.392)	(0.611)
ln(size)$_t$	-0.965^a	-1.136^a	-1.057^a	-0.609	-0.408
	(0.265)	(0.362)	(0.370)	(0.487)	(0.881)
ln(size)^2_t	0.075^a	0.091b	0.083^b	0.069	0.060
	(0.026)	(0.037)	(0.039)	(0.049)	(0.093)
inflation$_t$			-0.005^a		
			(<0.001)		
ln(dom_cred)$_t$				-0.001^a	
				(<0.001)	
ln(gdpcap)$_t$					-0.198^a
					(0.009)
Constant	4.776^a	7.854^a	5.962^a	6.018^a	6.013^a
	(0.043)	(0.056)	(0.087)	(0.080)	(0.265)
Hansen (p-value)	0.371	0.248	0.487	0.236	0.409
AR (2)	0.355	0.174	0.244	0.210	0.268
Number of instruments	22	22	22	20	20
Wald Chi^2	25.0	16.8	24.7	32.3	28.0
Observations	203	203	203	181	181

Note: Windmeijer standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.

Table 9

Consumption loans

Dependent variable:	consumloans$_t$	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
foreign$_t$	0.063[b]	0.109[a]	0.133[a]	0.079[a]	0.073[b]
	(0.026)	(0.029)	(0.022)	(0.020)	(0.032)
INST$_t$		0.803[a]	0.748[a]	1.047[a]	0.705[a]
		(0.022)	(0.032)	(0.036)	(0.042)
consumloans$_{t-1}$	0.474[a]	0.502[a]	0.549[a]	0.623[a]	0.577[a]
	(0.036)	(0.047)	(0.094)	(0.112)	(0.108)
costeff$_t$	0.561[a]	1.212[a]	0.743[b]	0.091	-0.035
	(0.202)	(0.437)	(0.307)	(2.013)	(3.036)
credit_risk$_t$	-0.101[a]	-0.136[a]	-0.202[a]	-0.065	0.001
	(0.012)	(0.039)	(0.038)	(0.048)	(0.055)
ln(size)$_t$	0.170[a]	0.187[a]	0.079	0.155[b]	0.227[a]
	(0.012)	(0.030)	(0.078)	(0.066)	(0.034)
ln(size)$^2{}_t$	-0.011[a]	-0.013[a]	-0.005	-0.011[b]	-0.018[a]
	(0.001)	(0.002)	(0.005)	(0.005)	(0.003)
inflation$_t$			0.003[a]		
			(<0.001)		
ln(dom_cred)$_t$				-0.001[a]	
				(<0.001)	
ln(gdpcap)$_t$					0.070[a]
					(0.009)
Constant	-0.470[a]	-1.300[a]	-0.890[a]	-1.490[a]	-1.990[a]
	(0.043)	(0.182)	(0.326)	(0.291)	(0.313)
Hansen (p-value)	0.259	0.152	0.105	0.108	0.131
AR (2)	0.461	0.472	0.269	0.407	0.484
Number of instruments	22	22	22	20	20
Wald Chi^2	96.1	459.2	393.2	814.1	489.8
Observations	201	201	201	179	179

Note: Windmeijer standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.

Table 10

Housing loans

Dependent variable:	housloans$_t$	Estimation:	Arellano-Bover/Blundell-Bond (System GMM) dynamic panel		
VARIABLES	(1)	(2)	(3)	(4)	(5)
foreign$_t$	-0.055	-0.061^c	-0.047	0.031	0.024
	(0.035)	(0.035)	(0.033)	(0.070)	(0.060)
INST$_t$		0.270^a	-0.009	0.160^a	0.345^a
		(0.022)	(0.047)	(0.061)	(0.081)
housloans$_{t-1}$	0.537^a	0.526^a	0.578^a	0.036	0.105
	(0.036)	(0.041)	(0.065)	(0.070)	(0.080)
costeff$_t$	-3.228^a	-3.374^a	-3.298^a	-0.903^b	-0.991^a
	(0.344)	(0.269)	(0.538)	(0.444)	(0.308)
credit_risk$_t$	-0.174^a	-0.144^a	-0.155^a	0.093	0.088
	(0.012)	(0.019)	(0.022)	(0.145)	(0.178)
ln(size)$_t$	-0.039	-0.058^b	-0.042	0.041	0.013
	(0.024)	(0.027)	(0.026)	(0.049)	(0.044)
ln(size)^2_t	0.003^c	0.004^c	0.003	-0.0003	0.001
	(0.002)	(0.002)	(0.002)	(0.005)	(0.004)
inflation$_t$			0.003^a		
			(<0.001)		
ln(dom_cred)$_t$				-0.002^a	
				(<0.001)	
ln(gdpcap)$_t$					-0.047^a
					(0.009)
Constant	0.290^a	0.035	0.286^a	-0.233	-0.099
	(0.043)	(0.046)	(0.079)	(0.172)	(0.152)
Hansen (p-value)	0.3600	0.1900	0.2440	0.5300	0.5780
AR (2)	0.2290	0.1690	0.2460	0.2080	0.2440
Number of instruments	19	19	19	17	17
Wald Chi^2	81.8	152.7	95.4	128.8	116.0
Observations	134	134	134	112	112

Note: Windmeijer standard errors are shown in parentheses. Superscripts a, b and c: 0.01, 0.05 and 0.10 levels of significance, respectively. We specify the variable *foreign* as an exogenous variable in the model and address the endogeneity bias by controlling for the potential reverse causation from the dependent variable to credit risk. We follow Roodman (2009) by adopting collapsed instruments to avoid the overidentification bias in the two-step GMM procedure. All other variables are explained in Table 2.