



Superintendencia  
de Bancos  
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# Banks' Business Model and Supply of Credit in Chile

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# Motivation

- After the Global Financial Crisis (GFC), banks' activities and business have undergone many changes (Gambacorta and Marques-Ibanez, 2011; Roegpitya et al., 2017, and Gambacorta et al., 2018). Evidence on Chile is relatively scarce.
- Hence the objective of this paper is to understand the Chilean banking system and how its characteristics have affected the drivers of credit supply, including responses to shocks.

# Questions

- We analyze:(i) The role of bank characteristics on lending (i.e., Do better-capitalized banks supply more credit?), (ii) How these bank characteristics affect the bank lending when facing shocks (i.e., Does lending of more capitalized banks react less to a shock?).
- Then we analyze monetary policy and global shocks (financial uncertainty, liquidity, political uncertainty, and commodity prices).
- Finally we study the role of public-owned bank on lending.

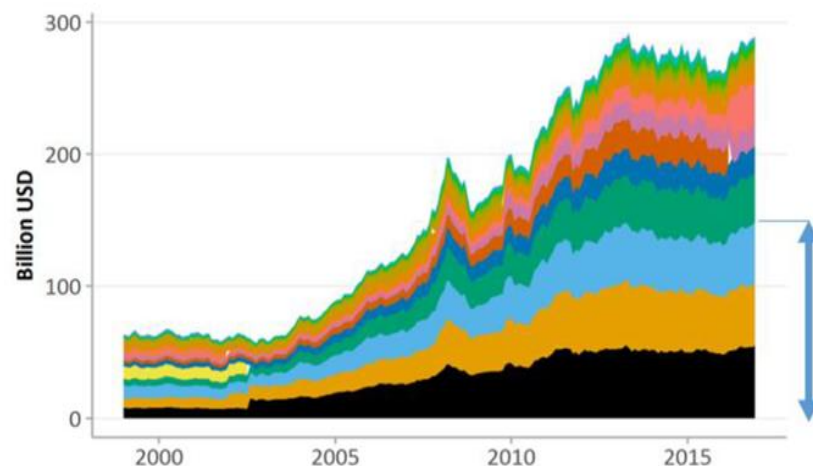
# Related Literature

- In the case of Chile:
- Alfaro et al. (2005), Fernández (2005) and Catão and Pagan (2010) have studied the bank lending channel.
- Salas et al. (2011), Lagos and Tapia (2014) and Mullins and Toro (2018), have focused on the role of the publicly-owned bank on loans.
- Compared to the existent literature, this paper builds on a novel database using granular data at the firm-level, which allows disentangling the effects of credit supply and demand.

# The Chilean Banking Sector

- **Number of actors:** By 2018 the Chilean banking sector comprises 21 institutions, with one publicly-owned bank.
- **Concentration:** Among private owned banks, domestic ones represent about 60% of the market (total credit), and foreign-owned banks representing the remaining 40%.

Figure 1. Assets by institution, billions of USD  
(Total assets, separated by institutions)



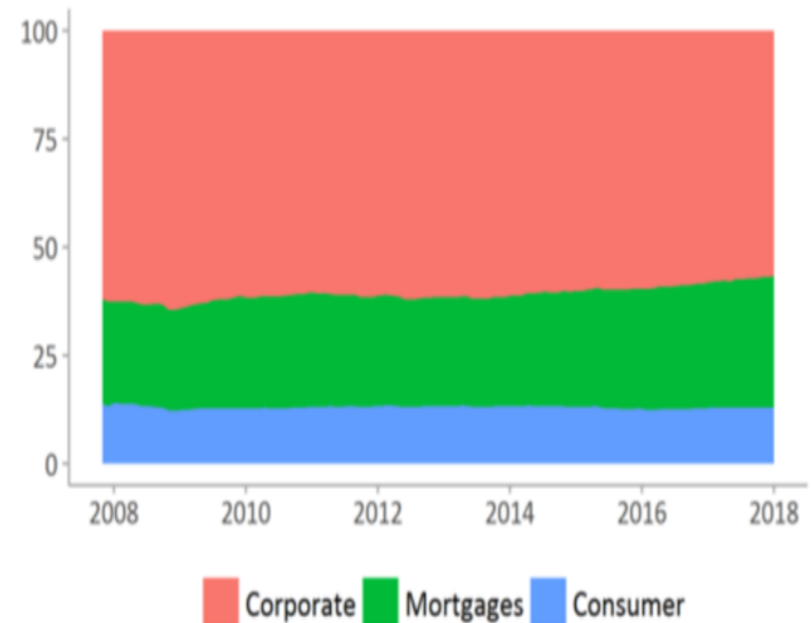
Source: Own elaboration based on SBIF data.

- Three out of the 21 banks in the system hold about half of total assets (Figure 1).

# The Chilean Banking Sector

- **Business model:** Lending is the main source of revenue, with corporate loans comprising more than half of the joint portfolio, followed by mortgages and consumers' credit (Figure 2).

Figure 2. Debt stock composition, percentage



Source: Own elaboration based on SBIF data.

# Methodology

- The model estimated is an unbalanced panel data that builds on the econometric specification used in Gambacorta and Marques-Ibanez (2011), Jiménez et al. (2012) and Cantu et al. (2018).
- We use both balance sheets and credit registry data at the firm level with quarterly frequency for the period 2000:Q1-2016:Q4.
- Firms included have one or more loans during the period of study.



# Methodology: Descriptive Statistics

Variables	Units	Observations	Min	Median	Average	Max
<b>Dependent Variable</b>						
Δ Log credit	log (CLP)	7 794 210	-4,5336	-0,0180	-0,0097	4,7116
<b>Independent Variables</b>						
<b>Main lending indicators</b>						
ln (total assets)	log (CLP)	1 453	17,0530	17,8465	18,1782	21,0371
Bank capital ratio	Ratio	1 453	0,0501	0,0983	0,1067	0,1444
Bank liquidity ratio	Ratio	1 453	0,0625	0,2227	0,2408	0,4010
<b>Risk profile</b>						
Loan-loss provisions as a share of total loans	Ratio	1 453	0,0111	0,0193	0,0213	0,0421
<b>Revenue mix</b>						
Share of net fees and comission income	Ratio	1 453	0,0375	0,0794	0,0889	0,2086
Share of trading income	Ratio	1 453	0,0000	0,0750	0,1306	0,4146
Retail loans as a share of total loans	Ratio	1 453	0,0214	0,1805	0,2109	0,5411
<b>Funding</b>						
Share of short-term funding	Ratio	1 453	0,7426	0,9701	0,9451	1,0000
Share of funding in foriegn currency	Ratio	1 453	0,0359	0,1754	0,1725	0,2704
<b>Other</b>						
Other bank-specific characteristics used (ROA)	Ratio	1 453	-0,0019	0,0027	0,0025	0,0069
<b>Other controls</b>						
Firm specific caracteristiscs (dummy indicating NPLs)	Ratio	5 191 931	0,0000	0,0000	0,0711	1,0000

# Methodology: Baseline Model

$$\Delta \log L_{fbt} = \beta X_{b,t-1} + b + f * t + \varepsilon_{fbt}$$

- Where:  $L_{fbt}$  denotes the amount lent by bank  $b$  to firm  $f$  at time  $t$ ,  $X_{b,t-1}$  is a vector of bank  $b$  characteristics at time  $t-1$ ,  $b$  is a vector of time-invariant bank  $b$  fixed-effects,  $f * t$  is a vector of firm-time fixed effects, and  $\varepsilon_{fbt}$  is an error term.
- In this specification we are **interested in the estimated  $\beta$  coefficients**, which tell about the **interaction between a particular bank set of characteristics and their loan granting process**.

# Main Results: Baseline Model

$\Delta$ Log credit	(1)	(2)	(3)	(4)	(5)	(6)
ln (Total assets) (t-1)	-0.032 (0.077)*	-	-	-	-	-0.014 (0.433)
Bank capital ratio (t-1)	0.140 (0.407)	-	-	-	-	-
Bank liquidity ratio (t-1)	0.005 (0.959)	-	-	-	-	-
Loan-loss provisions as a share of total loans (t-1)	-	-1.300 (0.022)**	-	-	-	-1.648 (0.002)***
Share of net fees and comission income (t-1)	-	-	-0.197 (0.291)	-	-	-
Share of trading income (t-1)	-	-	0.036 (0.357)	-	-	-
Retail loans as a share of total loans (t-1)	-	-	0.188 (0.007)***	-	-	0.201 (0.002)***
Share of short-term funding (t-1)	-	-	-	0.266 (0.004)***	-	0.300 (0.001)***
Share of funding in foriegn currency (t-1)	-	-	-	-0.160 (0.086)*	-	-0.079 (0.442)
Return on assets (t-1)	-	-	-	-	3.888 (0.075)*	2.869 (0.194)
Number of banks	36	36	36	36	36	36
Observations	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902
R-squared	0.414	0.414	0.414	0.414	0.414	0.414
Adjusted R-squared	0.062	0.062	0.062	0.062	0.062	0.062

Note: (1) Main lending indicators, (2) Risk profile, (3) Revenue mix, (4) Funding, (5) Profitability, (6) All,  $p < 0.1$

\* Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

# Main Results: Baseline Model

- Negative relationship between past provisions and loans. **Backward-looking adjustment process by banks to comply with loan-loss provision requirements** (Bouvatier and Lepetit, 2012).
- Positive relationship between past retail loans and loans. **Business models more based on retail loans would provide a more stable funding base, fostering lending** Blundell-Wignall and Roulet (2013).
- Positive relationship between the past short-term funding and loans. **Short-term funding reduces the fraction of actively monitoring intermediaries, enabling lax credit choices, increasing loans growth**, Perotti and Suárez (2009).

# Methodology: Bank Lending Channel

$$\Delta \log L_{fbt} = \beta X_{b,t-1} + \delta (\Delta i_{t-1} * X_{b,t-1}) + b + f * t + \varepsilon_{fbt}$$

- Where:  $\Delta i_{t-1}$  represents the quarterly change in the monetary policy rate at time t-1.
- In this case we are **interested in the sign and size of the  $\delta$  estimated coefficients, which correspond to the interaction between monetary policy and banks' specific characteristics.**

# Main results: Bank Lending Channel

$\Delta$ Log credit	(1)	(2)	(3)	(4)	(5)	(6)
<b>Bank-specific characteristics (BSC)</b>						
ln (Total assets) (t-1)	-0.032 (0.085)*	-	-	-	-	-0.014 (0.465)
Loan-loss provisions as a share of total loans (t-1)	-	-1.281 (0.023)**	-	-	-	-1.660 (0.001)***
Retail loans as a share of total loans (t-1)	-	-	0.187 (0.007)***	-	-	0.211 (0.000)***
Share of short-term funding (t-1)	-	-	-	0.253 (0.007)***	-	0.302 (0.002)***
Return on assets (t-1)	-	-	-	-	3.896 (0.075)*	2.563 (0.231)
<b>Interaction between MP stance and BSC</b>						
Bank capital ratio (t-1) * $\Delta i(t-1)$	0.153 (0.015)***	-	-	-	-	0.296 (0.002)***
Number of banks	36	36	36	36	36	36
Observations	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902
R-squared	0.414	0.414	0.414	0.414	0.414	0.414
Adjusted R-squared	0.062	0.062	0.062	0.062	0.062	0.062

Note: (1) Main indicators, (2) Risk profile, (3) Revenue mix, (4) Funding, (5) Profitability, (6) All,  $p < 0.1$

\* Significant at 10%; \*\*significant at 5%; \*\*\* significant at 1%.

# Main Results: Bank Lending Channel

- Incorporating the monetary policy stance does not translate into major changes, but for those with a higher bank capital ratio.
- Positive coefficient for the interaction between the bank's capital ratio and monetary policy. **When observed an interest rate tightening, those banks better capitalized are more likely to buffer monetary policy shocks, and less likely to affect the loans supply.**

# Methodology: Global Factors

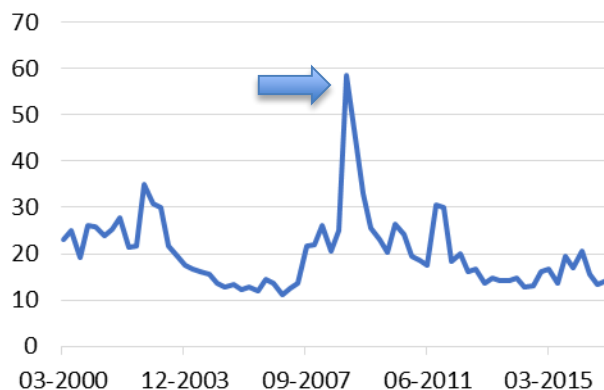
$$\Delta \log Lf_{bt} = \beta X_{b,t-1} + \gamma (C_t * X_{b,t-1}) + b + f * t + \varepsilon_{f_{bt}}$$

- $C_t$  corresponds to one of these sources of global shocks:
  - (i) Global financial uncertainty (GFU) **proxied with the VIX**;
  - (ii) Global liquidity (GL) measured by the **Wu-Xia shadow rate for the US monetary policy**, as in Wu and Xia (2016);
  - (iii) Economic and political uncertainty (GPU) approximated with the **Baker, Bloom and Davis index**, as in Baker et al. (2016);
  - (iv) Global commodity prices (CP) measured by the **IMF commodity price index**.
- **Our interest is in the significance, sign, and magnitude of the estimated  $\gamma$  coefficients.**

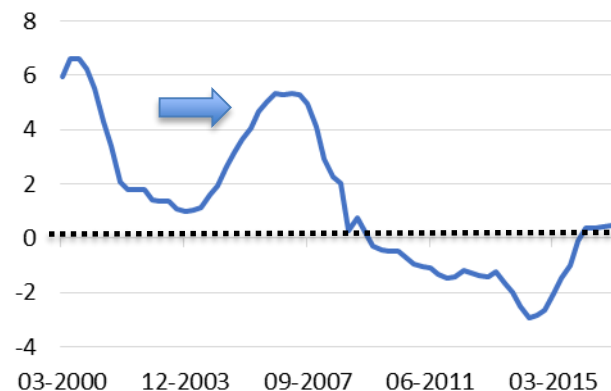


# Methodology: Global Factors

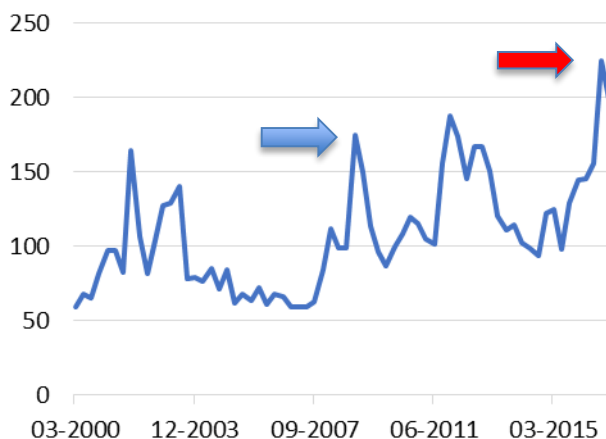
Global Financial Uncertainty  
(VIX)



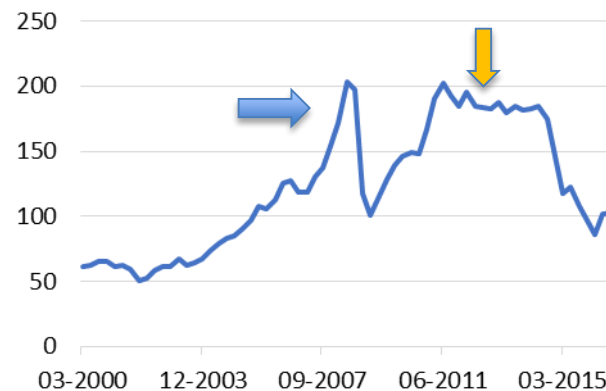
Global Liquidity  
(Wu-Xia Index)



Global Political Uncertainty  
(Baket et al. Index)



Global Commodity Prices  
(IMF Commodity Price Index)



# Main Results: GFU

$\Delta$ Log credit	(1)	(2)	(3)	(4)	(5)	(6)
<b>Bank-specific characteristics (BSC)</b>						
ln (Total assets) (t-1)	-0.041 (0.055)*	-	-	-	-	-0.027 (0.268)
Share of net fees and comission income (t-1)	-	-	-0.567 (0.020)**	-	-	-0.767 (0.053)*
Retail loans as a share of total loans (t-1)	-	-	0.232 (0.021)**	-	-	0.183 (0.007)***
<b>Interaction between GFU and BSC</b>						
Loan-loss provisions as a share of total loans (t-1) *C	-	-0.080 (0.001)***	-	-	-	-0.088 (0.015)***
Number of banks	36	36	36	36	36	36
Observations	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902
R-squared	0.414	0.414	0.414	0.414	0.414	0.414
Adjusted R-squared	0.062	0.062	0.062	0.062	0.062	0.062

Note: (1) Main indicators, (2) Risk profile, (3) Revenue mix, (4) Funding, (5) Profitability, (6) All,  $p < 0.1$

\* Significant at 10%; \*\*significant at 5%; \*\*\* significant at 1%.

# Main Results: CP

$\Delta$ Log credit	(1)	(2)	(3)	(4)	(5)	(6)
<b>Bank-specific characteristics</b>						
Loan-loss provisions as a share of total loans (t-1)	-	-1.301 (0.021)**	-	-	-	-1.632 (0.001)***
Retail loans as a share of total loans (t-1)	-	-	0.208 (0.002)***	-	-	0.236 (0.000)***
Share of short-term funding (t-1)	-	-	-	0.272 (0.001)***	-	0.339 (0.000)***
Share of funding in foreign currency (t-1)	-	-	-	-0.184 (0.032)**	-	-0.088 (0.342)
<b>Interaction between global factor and BSC</b>						
Loan-loss provisions as a share of total loans (t-1)*C	-	-0.005 (0.735)	-	-	-	0.018 (0.182)
Retail loans as a share of total loans (t-1)*C	-	-	-0.002 (0.072)*	-	-	-0.002 (0.015)**
Share of short-term funding (t-1)*C	-	-	-	0.002 (0.365)	-	0.001 (0.779)
Share of funding in foreign currency (t-1)*C	-	-	-	0.005 (0.081)*	-	0.003 (0.069)*
Return on assets (t-1)*C	-	-	-	-	0.112 (0.036)**	0.106 (0.011)**
Number of debtors	104 109	104 109	104 109	104 109	104 109	104 109
Number of banks	36	36	36	36	36	36
Observations	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902	4 629 902
R-squared	0,4144	0,4144	0,4144	0,4144	0,4144	0,4145
Adjusted R-squared	0,0617	0,0617	0,0617	0,0617	0,0617	0,0618

Note: (1) Main indicators, (2) Risk profile, (3) Revenue mix, (4) Funding, (5) Profitability, (6) All,  $p < 0.1$

\* Significant at 10%; \*\*significant at 5%; \*\*\* significant at 1%.

# Main Results: Global Factors

- Among the global economic conditions we found that uncertainty and commodity prices affect the banks characteristics and then loans decisions.

# The Role of the publicly-owned bank

- The Chilean publicly-owned bank provides financial services to households and firms, with a focus on national coverage and a particular emphasis on the unbanked and small-medium firms, although serving all types of businesses.
- Is the country's largest mortgage originator and largest issuer of debit cards.

# The Role of the publicly-owned bank

$\Delta$ Log credit	Full sample	Without Banco Estado
<b>Bank-specific characteristics (BSC)</b>		
Loan-loss provisions as a share of total loans (t-1)	-1.632 (0.001)*	-1.852 (0.001)*
Retail loans as a share of total loans (t-1)	0.236 (0.000)*	0.234 (0.000)*
Share of short-term funding (t-1)	0.339 (0.000)*	0.337 (0.000)*
<b>Interaction between global commodity prices index and BSC</b>		
Retail loans as a share of total loans (t-1) *C	-0.002 (0.015)*	-0.001 (0.189)
Share of funding in foreign currency (t-1) *C	0.003 (0.069)*	0.002 (0.158)
Return on assets (t-1) *C	0.106 (0.011)*	- -
Number of debtors	104 109	104 109
Number of banks	36	35
Observations	4 629 902	4 342 815
R-squared	0.415	0.438
Adjusted R-squared	0.062	0.062

Note:  $p < 0.1$

\* Significant at least at 10%.

# The Role of the publicly-owned bank

- **Removing the publicly-owned bank from the sample increased and reinforced the interactions between private banks' characteristics and bank lending, probably because all remaining banks are more alike.**
- **Coefficients representing the interaction between the global uncertainty and commodity prices indices, and banks' specific characteristics (full sample) become non-significant when excluding the publicly-owned bank .**

# Final Remarks

- Negative relationship between **past loan-loss provisions and the credit growth supply.**
- Positive relationship between **past retail loans and the credit growth supply.**
- Positive relationship between the **past share of short-term funding and the credit growth supply.**
- **Incorporating the monetary policy stance does not translate into significant changes in the bank lending channel.**
- We found that **global uncertainty and commodity prices might affect banks' lending decisions.**



# Final Remarks

- Many possible avenues for future research.
- Among them:
  - (i) Study the performance of **individual or group of similar banks**;
  - (ii) Chilean banks' granting business **before and after the GFC**;
  - (iii) **Study individual hypotheses** for the main individual indicators, risk profile, sources of revenues, and funding, among others;
  - (iv) Use **alternative indices to proxy global shocks**, especially those reflecting uncertainty and commodity prices.

Thank you!