

# How do bank-specific characteristics affect lending?

## New evidence based on credit registry data from Latin America

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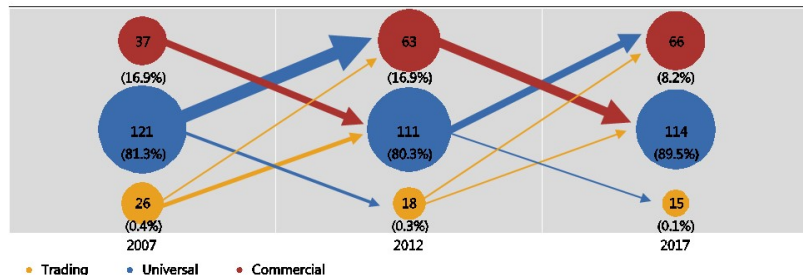
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# Motivation

- Banks' business models are changing.
- Is lending more or less resilient to shocks?

## Transition across models in Latin America

Number of banks; percent of total assets in parenthesis<sup>1</sup>



<sup>1</sup> Percentages do not add up to 100% since there are banks without classification.

Source: Fitch Connect.

# Non-technical Summary

## Focus

Changes in banks' activities and business models after the GFC have had profound effects on how banks grant credit and how banks react to monetary policy and external shocks.

## Contribution

We analyse in a comprehensive way the role of bank characteristics in influencing the supply of credit and how these characteristics affect the reaction of bank lending to shocks.

## Findings

- 1 Banks that are large, well-capitalised, and with a "commercial" business model (i.e. high deposit funding) supply more credit. On the contrary, banks that take more risk, have volatile sources of funding and a "universal" business model are associated with a lower supply of loans.
- 2 The loan supply of well-capitalised banks is less affected by MP shocks, while those with "commercial" business models are more affected by MP shocks.
- 3 Banks with different characteristics react differently to global shocks.

# Common Methodology

The dependent variable in all specifications is the log-change in the total amount (sum of loans) owed by creditor  $i$  to bank  $b$  at time  $t$ . We focus on firms with multiple banking relationships (Khwaja and Mian (2008)).

$$\Delta \log(\text{Credit}_{i,b,t}) = \beta X_{b,t-1} + \alpha_b + \gamma_{i,t} + \varepsilon_{i,b,t} \quad (1)$$

$$\Delta \log(\text{Credit}_{i,b,t}) = (\beta + \beta^* \Delta i_{t-1}) X_{bt-1} + \alpha_b + \gamma_{i,t} + \varepsilon_{ibt} \quad (2)$$

$$\Delta \log(\text{Credit}_{i,b,t}) = (\beta + \beta^* C) X_{b,t-1} + \alpha_b + \gamma_{i,t} + \varepsilon_{ibt} \quad (3)$$

- $X_{b,t-1}$  a vector of bank specific characteristics.
- $\alpha_b$  time invariant bank fixed effects.
- $\gamma_{i,t}$  firm\*time fixed effects
- $\Delta i_{t-1}$  corresponds to the quarterly change in the monetary policy rate.
- $C$  alternates between risk, liquidity, economic policy uncertainty and commodity price shocks

# Meta-analysis Techniques

- The essence of meta-analysis is to obtain a single estimate of the effect by computing a weighted average of the studies' individual estimates.
- We conduct our meta-analysis under the assumption of a random effects model.
  - ▶ We assume that the true effect of bank-specific characteristics on credit  $\theta_i$  has a normal distribution around a mean effect  $\theta$  with standard deviation  $\tau$ .

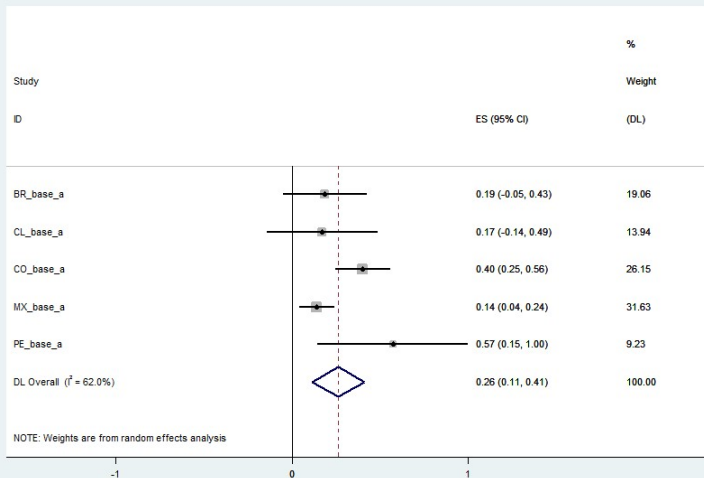
$$y_i | \theta_i \sim N(\theta_i, \sigma_i^2) \quad \text{with} \quad \theta_i \sim N(\theta, \tau^2) \rightarrow y_i \sim N(\theta, \sigma_i^2 + \tau^2) \quad (4)$$

- Two sources of variance:
  - ▶ the variance around the mean of the estimated effect  $\tau^2$
  - ▶ the between-study variance  $\sigma_i^2$
- The random effects mean corresponds to the weighted average of coefficients reported in the different estimations. The weights are calculated considering the sampling fluctuation of each effect size (standard error per reported coefficient) and estimated population variance of effect sizes.

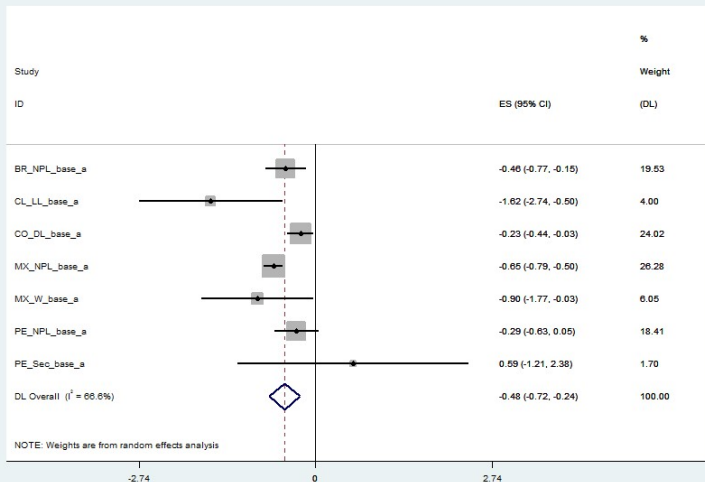
# Bank-specific characteristics classification

- ① **Main indicators:** size (log of total assets), bank capital ratio (equity-to-total assets), and bank liquidity ratio (cash and securities over total assets).
- ② **Risk indicators:** incidence of loan-loss provisions, share of non-performing loans, share of doubtful loans, securitisation activity, and share of write-offs.
- ③ **Revenue mix (commercial business model):** net fees and commissions to operating income, retail loans as a share of total loans, and broad credit.
- ④ **Revenue mix (universal business model):** diversification ratio (non-interest income to total income), trading income to operating income, and assets held for trading as a share of total assets.
- ⑤ **Stable sources of funding:** share of deposits over total liabilities, share of short-term funding, share of long-term funding.
- ⑥ **Volatile sources of funding:** wholesale funding ratio, funding in foreign currency, and funding from foreign sources.
- ⑦ **Profitability:** return on assets, return on equity, efficiency ratio (operating costs to total income), number of employees per total assets, number of branches per total assets.

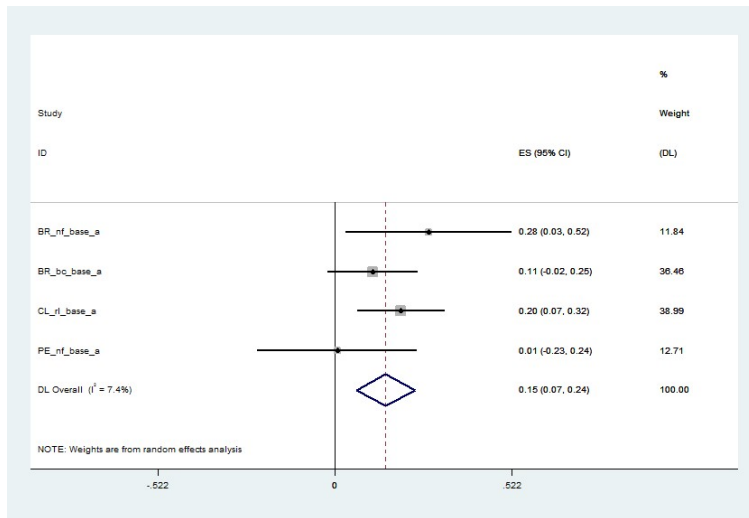
# Effect of bank capital on credit



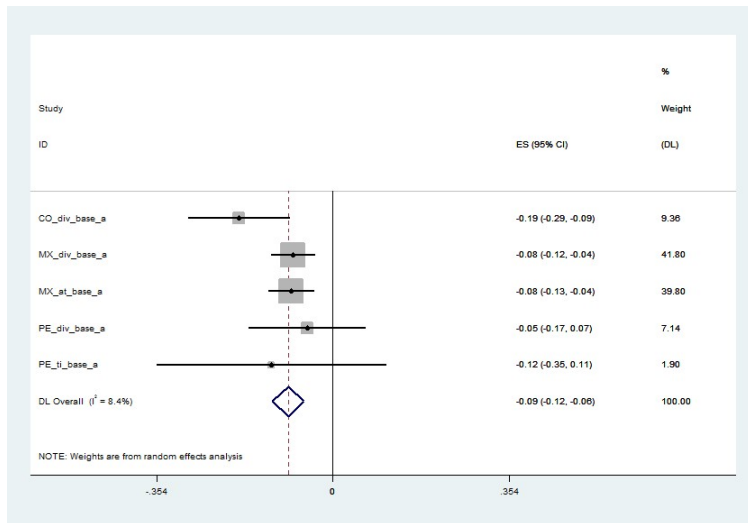
# Effect of banks' risk profile on credit



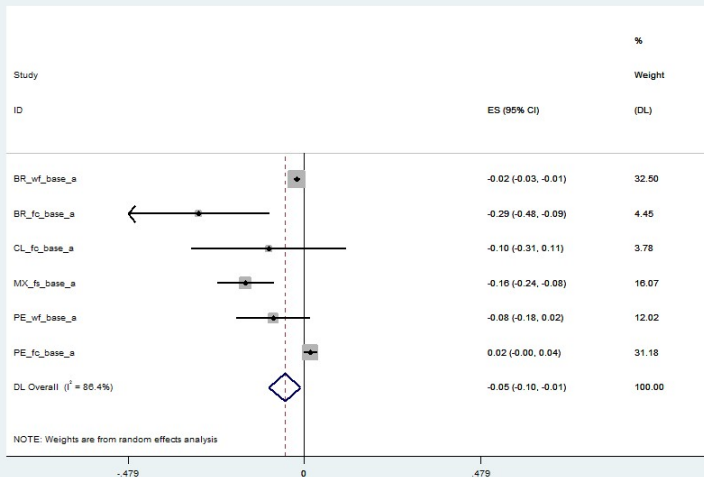
# Effect of revenue indicators in commercial business models on credit



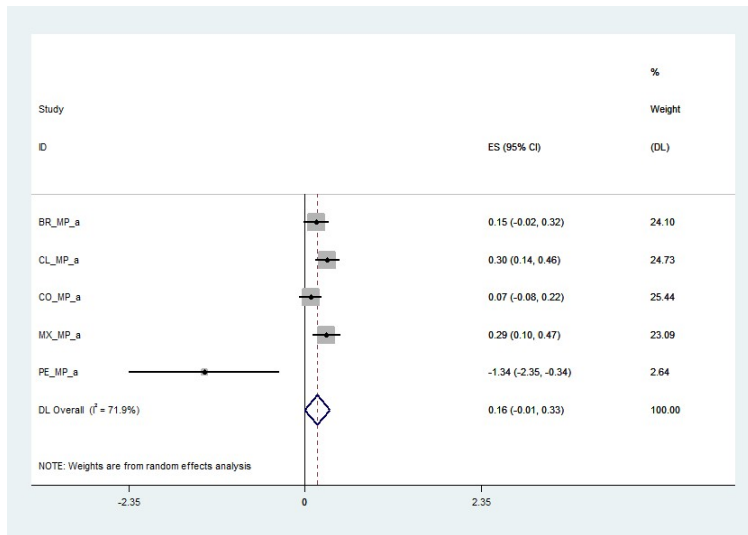
# Effect of revenue indicators in universal business models on credit



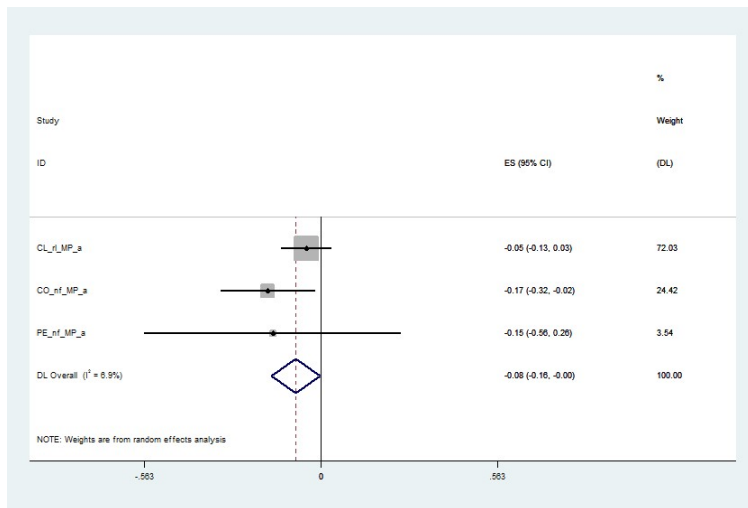
# Effect of volatile sources of funding on credit



# Interaction effect between bank capital and monetary policy shock



# Interaction effect between revenue indicators in commercial business models and monetary policy shock



# Interaction effect between BSC and high risk dummy

Equation 3: Interaction between BSC and high risk dummy

Table 3

	Assets	Capital	Liquidity	Risk Indicators	Revenue Universal BM	Revenue Commercial BM	Stable sources of funding	Volatile sources of funding	Profitability
Q* (1)	2.19	2.30	1.45	8.05	20.10***	3.70	3.00	21.52***	0.24
Degrees of freedom	4	4	4	5	5	2	3	4	1
F <sup>2</sup> (2) (%)	0.00	0.00	0.00	37.90	75.12	45.90	0.00	81.41	0.00
$\tau^2$ (3)	0.0000	0.0000	0.0000	0.1005	0.0189	0.0279	0.0000	0.0314	0.0000
Random effects mean (4)	-0.0013	0.21***	0.0514***	-0.1303	-0.0431	0.1279	0.0597***	-0.1348	0.0377
95% confi. interval	-0.0056 to 0.0029	0.1165 to 0.3106	0.0282 to 0.0747	-0.5895 to 0.3290	-0.1812 to 0.0949	-0.1375 to 0.3934	0.0295 to 0.0900	-0.3169 to 0.0472	-0.0803 to 0.1557

# Interaction effect between BSC and FFR (shadow rate)

Equation 3: Interaction between BSC and FFR (shadow rate)

Table 4

	Assets	Capital	Liquidity	Risk Indicators	Revenue Universal BM	Revenue Commercial BM	Stable sources of funding	Volatile sources of funding	Profitability
Q* (1)	2.81	11.37	28.19	49.62	11.92	4.00	7.96	48.56	0.69
Degrees of freedom	4	4	4	4	3	3	1	4	3
I <sup>2</sup> (2) (%)	0.00	64.81	85.81	91.94	74.84	25.05	87.44	91.76	0.00
$\tau^2$ (3)	0.0000	0.0020	0.0008	0.1580	0.0017	0.0002	0.0030	0.0026	0.0000
Random effects mean (4)	-0.002***	0.0364	0.0115	-0.2823	0.0229	-0.0292**	0.0431	-0.026	-0.0199**
95% confi. interval	-0.0032 to - 0.0005	-0.0155 to 0.0883	-0.0185 to 0.0415	-0.6634 to 0.0988	-0.0242 to 0.0699	-0.0556 to - 0.0028	-0.0384 to 0.1246	-0.0738 to 0.0218	-0.0371 to - 0.0028

# Interaction effect between BSC and high economic policy uncertainty dummy

Equation 3: Interaction between BSC and high economic uncertainty dummy

Table 5

	Assets	Capital	Liquidity	Risk Indicators	Revenue Universal BM	Revenue Commercial BM	Stable sources of funding	Volatile sources of funding	Profitability
Q* (1)	4.17	0.80	6.49	3.22	16.87***	5.55	2.13	16.82***	0.25
Degrees of freedom	4	4	4	2	3	3	2	3	1
F <sup>2</sup> (2) (%)	4.15	0.00	38.39	37.97	82.22	45.94	6.16	82.16	0.00
$\tau^2$ (3)	0.00	0.00	0.00	0.59	0.03	0.01	0.00	0.02	0.00
Random effects mean (4)	0.0028	0.24***	-0.011	-0.8757	0.0388	0.0225	0.0927***	-0.092	0.0354
95% confi. interval	-0.0062 to 0.0007	0.1515 to 0.3290	-0.0694 to 0.0474	-2.2024 to 0.4510	-0.1606 to 0.2381	-0.0829 to 0.1279	0.0299 to 0.1554	-0.2616 to 0.0776	-0.1030 to 0.1737

# Interaction effect between BSC and low commodity price dummy

Equation 3: Interaction between BSC and low commodity prices dummy

Table 6

	Assets	Capital	Liquidity	Risk Indicators	Revenue Universal BM	Revenue Commercial BM	Stable sources of funding	Volatile sources of funding	Profitability
Q* (1)	1.02	2.86	50.54***	21.36***	16.69***	0.02	52.39***	52.14***	11.76**
Degrees of freedom	4	4	4	4	4	1	3	3	4
F <sup>2</sup> (2) (%)	0.00	0.00	92.09	81.27	76.03	0.00	94.27	94.25	66.00
$\tau^2$ (3)	0.00	0.00	0.00	1.32	0.01	0.00	0.00	0.07	0.01
Random-effects mean (4)	0.0003***	0.01***	0.0068	-0.6688	0.0077	0.0726	0.0627	-0.1670	0.0186
95% confi. interval	-0.0005 to -0.0001	0.0060 to 0.0210	-0.0564 to 0.0699	-1.8471 to 0.5095	-0.0869 to 0.1023	-0.0485 to 0.1937	-0.0157 to 0.1411	-0.4405 to 0.1064	-0.0947 to 0.1320

# Conclusions

- This paper studies how bank-specific characteristics influence loan supply in the main Latin America economies, including their responses to shocks.
- Our main results are the following:
  - ▶ Within banks, those that are large, well-capitalised, and with a commercial business model (i.e. more deposits) supply more credit. On the contrary, banks that have high-risk indicators, volatile sources of funding and a universal business model, other things being equal, are associated with a lower supply of loans.
  - ▶ The lending supply of well-capitalised banks is less affected by MP shocks, while those with commercial business models are more affected by MP shocks.
  - ▶ Banks with high capital, high liquidity and more stable sources of funding are less affected by VIX shocks. In high liquidity periods, banks that are small, less profitable and with a universal business model increase more their credit supply. Banks with high levels of capital and stable sources of funding are more sheltered against economic policy uncertainty shocks. Finally, banks that are large and well capitalised reduce less their credit supply when faced with a commodity price shock.

Thank you!

# Appendix: Tables

Equation 1: Effects of Bank Characteristics on Credit

Table 1

	Assets	Capital	Liquidity	Risk Indicators	Revenue Universal BM	Revenue Commercial BM	Stable sources of funding	Volatile sources of funding	Profitability
Q* (1)	3.52	10.52**	15.50***	17.96***	4.37	3.24	11.83***	36.66***	1.91
Degrees of freedom	4	4	4	6	4	3	1	5	2
F <sup>2</sup> (2) (%)	0.00	61.99	74.19	66.60	8.41	7.36	91.54	86.36	0.00
$\tau^2$ (3)	0	0.0161	0.0014	0.0522	0.0001	0.0006	0.0360	0.0015	0
Random effects mean (4)	0.010**	0.26***	0.00	-0.48***	-0.09***	0.15***	0.18	-0.05**	0.00
95% confi. interval	0.0004 to 0.0188	0.1130 to 0.4132	-0.0477 to 0.0522	-0.7201 to - 0.2369	-0.1220 to 0.0579	0.0658 to 0.2369	-0.0988 to 0.4492	-0.0968 to -0.0097	0.0011 to 0.0012

# Appendix: Tables

Equation 2: Interaction between BSC and Monetary Policy Shock

Table 2

	Assets	Capital	Liquidity	Risk Indicators	Revenue Universal BM	Revenue Commercial BM	Stable sources of funding	Volatile sources of funding	Profitability
Q* (1)	10.6**	14.2***	37.8***	59.26***	26.13***	2.15	6.10**	45.58***	7.53*
Degrees of freedom	4	4	4	6	4	2	2	3	3
I <sup>2</sup> (2) (%)	62.31	71.87	89.42	89.88	84.69	6.87	67.21	93.42	60.17
$\tau^2$ (3)	0.0000	0.0240	0.0103	0.5352	0.0608	0.0005	0.0033	0.0840	0.0086
Random effects mean (4)	-0.0023	0.1601*	0.0619	-0.4799	0.0286	-0.0796**	0.105	-0.1817	0.0017
95% confi. interval	-0.0104 to 0.0058	-0.0108 to 0.3309	-0.0411 to 0.1648	-1.1274 to 0.1675	-0.2186 to 0.2759	-0.1572 to 0.0021	0.0224 to 0.1875	-0.4805 to 0.1172	-0.1193 to 0.1226