Bank Competition and Investment Costs across Space*

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Abstract

Using detailed loan-level data from Chile, we document significant geographic differences in interest rates for firm loans. Firms in cities with high borrowing costs pay around 280 basis points more than firms in low-cost cities. While these estimates account for differences in firm and loan characteristics across cities, we find evidence that they are related to the level of concentration in the local loan market. We examine the pass-through of monetary policy to lending rates and find that banks with higher local market shares exhibit stronger pass-through, aligning with models of oligopolistic branch competition.

Key words: banks, local market power, interest rates.

JEL codes: G21, O16, R12.

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1. Introduction

An extensive literature studies interest rate differences across countries. Yet, if local credit markets are segmented, similar disparities can emerge across cities within a single country.[1] Using detailed loan-level data from Chile, we document sizable geographic differences in interest rates between otherwise similar firms and loans. We show that banks' local market power contributes to these cross-sectional disparities and shapes the pass-through of changes in monetary policy to lending rates.

Using administrative data covering the universe of bank loans issued to firms in Chile between 2012 and 2018, we find that interest rates for comparable firms and loans vary substantially across cities: the spread between cities at the 25th and 75th percentile of the distribution is 116 basis points, while the spread between the 10th and 90th percentiles reaches 278 basis points. These geographic differences are economically large relative to the sample average interest rate of 5.75%.[2]

Our data allow us to distinguish supply-side drivers of interest rate variation from demand-side factors such as firm sorting and risk differences across cities. In addition to controlling for firm sector, size, and loan characteristics, we account for two key bank-assessed risk measures. The first is a regulatory-mandated categorical risk rating assigned to firms, and the second is an estimate of expected loan losses reported by banks at the loan level. Our baseline results control for all these characteristics. Most empirical studies on the spatial dimensions of banking rely on city-bank-level data, which report the average interest rate on outstanding loans. As a result, these studies focus on average interest rates in a market without adjusting for changes in loan composition (Gilje et al., 2016) or abstract interest rates altogether (Aguirregabiria et al., 2025; Oberfield et al., 2024). In contrast, our analysis exploits loan-level data, allowing us to control for detailed borrower and loan characteristics. In the context of guaranteed mortgage loans in the US, Hurst et al. (2016) and Scharfstein and Sunderam (2016) adopt a similar approach to ours.

We then study local competition as a driver of interest rate differences across cities. Oligopolistic models of bank competition predict that interest rates should be higher in cities with more concentrated markets, particularly for banks with large local market shares (Aguirregabiria et al., 2025). Consistent with this prediction, we find that, within cities, banks with larger market shares tend to charge higher interest rates. To gauge the amount of variation in interest rates that can be accounted for by competition differences across cities, we control for local competition measures—such as the number of banks per firm and the Herfindahl–Hirschman index (HHI)— and find that the dispersion in city fixed effects is reduced.

To strengthen the case for local market power as one driver of interest rate disparities, we examine how monetary policy pass-through varies across banks and cities. We find that monetary policy pass-through is higher in cities where a bank holds a larger market share, consistent with the idea that market power shapes lending rates. We conduct two additional analyses. First, we restrict our analysis to installment loans, which we argue are the loan type most closely linked to firm investment. Second, because the cost of assessing

[1] There is substantial evidence on the role of distance between borrower and lender. One strand of the literature examines branch openings and closures (Burgess and Pande, 2005; Nguyen, 2019; Ji et al., 2023), while another explores how local deposit shocks propagate within bank networks (Gilje et al., 2016; Gilje, 2019; Bustos et al., 2020). See also Degryse and Ongena (2005); Scharfstein and Sunderam (2016); Drechsler et al. (2017); Crawford et al. (2018); Wang et al. (2020); Aguirregabiria et al. (2025) for studies that incorporate bank market power in local credit markets.

[2] These gaps are large even in an international context. Chile, one of the most developed and stable countries in Latin America, faces an average interest rate 223 basis points lower than the regional average, based on the difference in average returns of the EMBI Global Diversified Index—which tracks liquid, US-dollar-denominated sovereign bonds—between Chile and Latin America.

firms' risk may differ across cities, and the first loan within a firm-bank relationship could reflect such costs, we repeat the analysis excluding the first loan in a firm-bank relationship. All of our findings remain robust and quantitatively very similar in these alternative samples.

Our empirical results contribute primarily to two strands of the literature in finance and industrial organization. One strand studies the role of geography in lending. Petersen and Rajan (2002) document that advances in information technology have allowed U.S. borrowers to access credit from more distant lenders since the 1970s. However, Nguyen (2019) finds that between 1999 and 2012, bank branch closures in the U.S. led to persistent declines in small business lending, suggesting that despite the technological change, distance still matters in finance. The role of distance may be even stronger in less developed economies. Ji et al. (2023) and Fonseca and Matray (2024) study the local economic effects of branch openings in small villages in Thailand and Brazil, respectively, while Burgess and Pande (2005) study the expansion of banks into rural areas in India, and find positive economic effects, indicating that branch presence led to credit availability. These studies focus on banks reaching previously unbanked populations, a priority in developing countries. By focusing on Chile, a financially developed country, our study is concerned with countries higher on the development ladder, where access to *some* bank is widespread, and enhancing competition between banks becomes important.

Related to the role of geography in lending, Hurst et al. (2016) study spatial dispersion in mortgage contract rates across the U.S. They find that while mortgage rates for government-sponsored enterprises exhibit no geographic variation, private loan rates do. We follow their empirical approach by first purging interest rates from variation across space driven by borrower and loan characteristics. We contribute to this literature by focusing on spatial variation in the interest rates for firm loans while still being able to control for a rich set of proxies of risk.

A second strand of literature examines how bank market power affects pricing. Research in developed countries has highlighted its role in both loan and deposit markets (Drechsler et al., 2017; Crawford et al., 2018; Cirelli, 2022; Aguirregabiria et al., 2025; Albertazzi et al., 2024). The richness of our data allows us to substantiate some of the theoretical mechanisms proposed in this literature. Importantly, we can include detailed controls associated with risk for each loan, ruling out that geographic differences in interest rates are related to firm sorting or risk differences across cities. Relative to Crawford et al. (2018), who use Italian data to study short-term borrowing, our focus is on instruments related to firm investment.

Our results have implications for the literature on misallocation and on modeling banking across space. Midrigan and Xu (2014) study the impact of financial frictions on capital misallocation across firms, assuming that all firms face the same interest rate. Our empirical evidence suggests that the interest rate that firms face varies substantially depending on their location. Cavalcanti et al. (2024) allow for firm-level heterogeneity in interest rates but abstract from the role of local market structure in shaping these differences. A growing literature studies spatial dimensions of banking, with a focus on the deregulation of bank branching in the U.S. (Manigi, 2023; Morelli et al., 2024; Oberfield et al., 2024; D'Amico and Alekseev, 2024). Our main result, establishing that interest rates on loans differ across cities as a function of market power, can inform such models.

Finally, our evidence that monetary policy pass-through varies with local bank market power contributes to the literature on the transmission of monetary policy (Scharfstein and Sunderam, 2016; Beraja et al., 2019; Wang et al., 2020), highlighting how credit market concentration can amplify or dampen policy effects across regions. While Scharfstein and Sunderam (2016) study how concentration affects the pass-through of monetary policy into mortgage rates, our paper focuses on the effect on investment costs.

The remainder of this paper is organized as follows. In Section 2, we provide an overview of the Chilean banking sector, detail our data sources and report summary statistics from the loan data. Section 3 documents the extent of interest rate dispersion across cities and explores its determinants. Section 4 examines how local concentration shapes the transmission of monetary policy to lending rates, and Section 5 concludes.

2. Context and data sources

Chile has a well-developed financial system in which banks serve as the primary providers of credit. Between 2010 and 2018, the level of credit to the private sector was comparable to that in high-income countries, with banks providing nearly 80% of this credit. Survey data reveal that firms of all sizes rely heavily on banks.[3] This makes Chile a well-suited application to study the determinants of geographic differences in the cost of capital using data from bank loans. Importantly, all banks operating in Chile are nationally chartered, with headquarters in Santiago and branches across the country.

Our geographic unit of analysis is the municipality, which we call the city. In Chile, municipalities often encompass a local labor market. One notable exception is Santiago, the capital of the country. Thus, we group the 34 metropolitan municipalities comprising Santiago into one geographical unit.

Our focus on banks' market power is motivated by the low number of banks competing in the average Chilean city. During 2012-2018, the average number of banks per city fluctuated between 4.3 and 4.6, while the median remained stable at 3 for all years. Although the national HHI in the loan market fluctuated around 0.16, local markets were significantly more concentrated. The average across local indices fluctuated around 0.3 and reached 0.78 in certain cities.[4]

We analyze geographic dispersion in interest rates using administrative loan-level data from 2012-2018, collected by the Financial Market Commission (CMF).[5] As part of its mandate to oversee the proper functioning, development and stability of Chilean financial markets, the CMF collects detailed loan-level data from financial institutions under its regulatory oversight. We restrict our analysis to loans that private firms take from commercial banks, denominated in Chilean pesos, not associated with any public guarantee, and with maturities of at least three days. We keep fixed-interest rate loans and exclude loans issued by *BancoEstado*, the only state-owned commercial bank in Chile.

The dataset includes two measures of loan risk. The first is a categorical risk rating assigned by banks when a firm applies for a loan. For large firms, banks conduct individual assessments, classifying them into one of 16 risk categories: A1–A6 (low risk), B1–B4, and C1–C6 (high risk). For smaller firms, the risk is assessed after the banks classify firms with similar characteristics together. The second measure of risk is

[3] See Supplemental Appendix Section 6.1 and Section 6.2 for the empirical results in this paragraph.

[4] See Table 7 in Supplemental Appendix Section 6.3.

[5] This study was developed within the scope of the research agenda conducted by the Central Bank of Chile (CBC) in economic and financial affairs of its competence. The CBC has access to anonymized information from various public and private entities, by virtue of collaboration agreements signed with these institutions. To secure the privacy of workers and firms, the CBC mandates that the development, extraction and publication of the results should not allow the identification, directly or indirectly, of natural or legal persons. Officials of the Central Bank of Chile processed the disaggregated data. All the analysis was implemented by the authors and did not involve nor compromise the SII, the CMF, and AFC. The information contained in the databases of the Chilean IRS is of a tax nature originating in self-declarations of taxpayers presented to the Service; therefore, the veracity of the data is not the responsibility of the Service.

Table 1: Summary Statistics by Loan Type (2012-2018)

	Count			Amount		Interest Rate			Maturity		Sales	
	Loans	Cities	Firms	Mean	Median	Mean	W. Mean	Median	Mean	Median	Mean	Median
A.All Firms												
Factoring	3,224,206	271	14,708	19.9	0.7	8%	6%	7%	2	2	87,783	4,331
Installments	397,396	303	54,716	357.9	87.5	11%	6%	10%	11	3	1,251	184
Real Estate	19,125	147	1,847	1,167.7	288,9	6%	4%	6%	4	2	3,976	825
Foreign Trade	12,952	155	2,011	700.7	199.5	8%	5%	7%	6	4	4,725	1,058
B.Single-City Firms												
Factoring	850,358	264	11,734	225.0	2.2	10%	8%	9%	2	2	1,403.2	338.8
Installments	263,880	302	44,918	222.3	63.6	12%	7%	11%	12	4	486.9	117.2
Real Estate	7,884	126	1,101	518.5	135.3	8%	5%	7%	5	2	1,112.8	368.7
Foreign Trade	5,205	107	1,145	409.6	150.6	9%	6%	8%	7	5	1,805.6	387.4

Source and notes: Authors' calculations using data from the CMF. Maturity is denominated in months, and both Loan Amount and Firm Sales are denominated in thousands of USD at market exchange rates. In the column *W. Mean* we compute the average interest rate weighted by the amount of each loan.

the expected loss on each loan, reflecting the bank's projection of potential default costs. Crucial for our analysis, these measures are provided by the bank in charge of pricing the loan.[6]

Panel A of Table 1 presents summary statistics by loan type. Factoring loans, which allow firms to obtain liquidity by selling their receivables to banks, are the most common. These loans tend to be small, reinforcing their role in short-term liquidity management rather than long-term investment. Installment loans are the second most common type and are widely used, as shown by the number of firms borrowing under this category. These loans are significantly larger in amount and have longer maturities, making them better suited for investment. Our baseline analysis includes all loan types, controlling for loan types with fixed effects. We also conduct an analysis focusing exclusively on installment loans.

In our empirical analysis we focus on firms that operate in a single city, which allows us to establish an unambiguous link between a firm and a city. Single-city firms contributed 51% of private-sector employment in 2018. Panel B of Table 1 shows summary statistics from the subsample of single-city firms. Compared to the full sample, single-city firms face higher interest rates and borrow smaller amounts, consistent with their generally smaller size. However, as in the broader dataset, installment loans remain the primary credit instrument for larger borrowing needs.

As we do not observe the specific bank branch in which a firm took a specific loan, in what follows, we will assume that single-city firms conduct their financial activities in the city where they operate. Reassuringly, 87% of firm loans are issued by banks with branches in the city of the borrowing firm. In addition, to the extent that firms seek loans outside of their city, they are likely doing so to access lower interest rates. As a result, any measurement error introduced by this assumption would likely bias our estimates toward understating the true differences in interest rates across cities.

[6]This is a difference with respect to Crawford et al. (2018), who use a measure of risk constructed by the Central Bank of Italy in their analysis of Italian loan-level data.

3. Geographic dispersion in interest rates

How important are geographic determinants of interest rates vis-a-vis other determinants like the sector, risk, and amount borrowed by the firm? We start by decomposing the overall variance in interest rate along these two broad dimensions. We estimate

$$i_{\ell ft} = \tilde{\gamma}_0 + \tilde{\gamma}_{c(f)\times q(t)\times b(\ell)} + \epsilon_{\ell ft} \tag{1}$$

$$\text{and } i_{\ell ft} = \gamma_0 + \gamma_{s(f)\times q(t)} + \gamma_1' X_{ft} + \gamma_2' X_{\ell t} + \epsilon_{\ell ft} \tag{2}$$

using micro-data on loans extended to single-city firms during 2012-2018. The outcome variable in both equations, $i_{\ell ft}$, is the interest rate charged for loan ℓ extended to firm f in period t.[7] In equation (1), we include fixed effects for the interaction of the city in which the firm operates $c(f)$, the quarter of issuance $q(t)$, and the bank issuing the loan, $b(\ell)$. In equation (2), we include sector-quarter fixed effects, which absorb variation in both credit and sectoral conditions over time, as well as characteristics of the firm X_{ft}, including the firm's size in terms of employment and the first risk measures described in the previous section.[8] We also include characteristics of the loan $X_{\ell t}$, including the amount lent (in logs), the type of loan, maturity, expected loss (our second risk measure) and bank-quarter fixed effects. Observations are weighted by loan amount in all regressions.

The first two columns of Table 2 show the results. The adjusted R^2 of the first model is 0.36 and 0.61 for the second model. Although the geographic component accounts for a somewhat smaller share of the variance in interest rates, its explanatory power remains quantitatively relevant relative to that of the characteristics of the firm and the loan.[9]

Towards quantifying purely geographic dispersion in interest rates, we residualize interest rates with respect to firm characteristics, loan characteristics, and bank-quarter fixed effects by estimating

$$i_{\ell ft} = \beta_0 + \beta_{b(\ell)\times q(t)} + \beta_{s(f)\times q(t)} + \beta_1' X_{ft} + \beta_2' X_{\ell t} + \epsilon_{\ell ft}, \tag{3}$$

where the definition of the sub-indices used in fixed effects and the type of firm and loan controls is the same as above.

In a second step, we analyze whether there are systematic geographic differences in the residualized interest rates by estimating

$$\hat{\epsilon}_{\ell ft} = \delta_0 + \delta_{c(f)} + \nu_{\ell ft}, \tag{4}$$

where $\hat{\epsilon}_{\ell ft}$ are the residuals from the estimated version of equation (3). Given the full set of fixed effects in equation (3), dispersion in the city fixed effects from equation (4) can be interpreted as within bank-quarter geographic variation in interest rates which cannot be explained by differences in firm or loan characteristics across cities.

[7] The data includes the day in which the loan was issued. We will refer to $q(t)$ and $y(t)$ as the quarter and year at which the loan was issued.

[8] We include one fixed effect for each of the 16 categories comprising our categorical measure of risk.

[9] Naturally, the city-bank-time fixed effects capture not only the city-bank effects but also differences in risk, sector composition, and firm characteristics across cities. With this in mind, we control for these characteristics in the remaining analysis. We can think of R^2 of equation (1) as an upper bound of variance explained by geographic factors.

Table 2: All Loans issued to Single-City Firms

	Variance decomposition		**Dispersion**			**Pass-Through**
	Interest Rate	Interest Rate	Interest Rate	Interest Rate	Interest Rate	Interest Rate
City fixed effects from the second step						
p10			-93.27	-85.23	-84.30	-89.61
p25			-42.78	-44.11	-42.3	-43.06
p50			0	0	0	0
p75			73.79	68.17	64.99	67.17
p90			185.25	165.06	153.89	160.51
Coefficients of interest from the first step						
α_{bct}				117.36***	79.34***	122.00***
$\widetilde{MP}_t$						0.77***
$\widetilde{MP}_t \times \alpha_{bct}$						0.32*
Control variables in the first step						
City-Bank-Quarter FE	✓					
City FE			✓	✓	✓	✓
Firm Characteristics		✓	✓	✓	✓	✓
Loan Characteristics		✓	✓	✓	✓	✓
Sector-Quarter FE		✓	✓	✓	✓	
Bank-Quarter FE			✓	✓	✓	
Sector-Year FE						✓
Bank-Year FE						✓
Credit Market Characteristics					✓	
Adjusted R^2	0.36	0.61	0.64	0.63	0.63	0.63
Observations	1,128,814	1,129,515	1,129,504	1,046,088	1,046,088	1,046,100
Number of Banks	18	19	18	18	18	18
Number of Firms	48,234	49,051	49,050	46,502	46,502	46,503
Number of Cities	292	303	303	292	292	292

Notes: Outcome variable in basis points. Statistical significance denoted as *p $<$ 0.10, **p $<$ 0.05, ***p $<$ 0.01. The sample for this regression is the universe of fixed-rate loans from single-city firms. Firm characteristics include size and risk; loan characteristics include maturity, amount in logs, and type of loan. City fixed effects are normalized by subtracting the median fixed effect across cities. Local credit market characteristics include the local HHI, the local HHI squared, the number of banks per firm, and the number of banks per firm squared.

The third column of Table 2 shows the results of estimating equation (4) and states our baseline result on interest rate dispersion. After controlling for a rich set of demand characteristics, loan characteristics, and bank-quarter fixed effects, interest rates have substantial dispersion across cities. Given our focus on the dispersion of the city fixed effects, we normalize them by the median estimated fixed effect. The gap in rates between cities at the 25th and 75th percentiles of the distribution is 116 basis points, while the difference between the 10th and 90th percentiles is 278 basis points. The standard deviation among precisely estimated fixed effects is 67 basis points.[10]

In estimating the fixed effects of equation (4), we set Santiago as the omitted city. We find that approximately 72% of the estimated city-level fixed effects are statistically significant, suggesting that moving a firm from Santiago to most other cities would substantially alter their cost of investment. The full set of fixed effects and their standard errors is shown in Appendix Figure 3.

The geographic distribution of these fixed effects is presented in Appendix Figure 6. There is no strong spatial pattern: Fixed effects do not systematically increase with remoteness or proximity to economic centers. Rather than simply reflecting geographic isolation, local investment costs appear to be shaped by other factors. We now examine whether differences in bank competition across cities play a role.

3.1. What characterizes high-interest-rate cities?

Market Share. Across various models of oligopolistic competition, firms with larger market shares face more inelastic demand, leading to higher markups (Atkeson and Burstein, 2008; Melitz and Ottaviano, 2008; Aguirregabiria et al., 2025). Building on this insight, we consider the city-bank specific market share as a control when estimating the first step (equation (3)), and study how this affects the city fixed effects estimated in the second step (equation (4)).

For each city-bank-year, we calculate the lagged market share as

$$\alpha_{bcy(t)} = \frac{\sum_{\ell \in bc} L_{\ell bcy(t)-1}(1 + i_{\ell bcy(t)-1})}{\sum_{v \in c} \sum_{\ell \in vc} L_{\ell vcy(t)-1}(1 + i_{\ell vcy(t)-1})}, \tag{5}$$

where the numerator sums over all loans issued by bank b in city c during the previous year, and the denominator also sums across all banks in city c. We lag market shares so as not to have interest rates on both sides of our estimated equation.

The fourth column of Table 2 shows the coefficients of interest from the new specification of the first step and summary statistics from the city fixed effects estimated in the second step. We find a positive and statistically significant impact of the bank's own market share on interest rates. This result aligns with oligopolistic models of bank competition in local credit markets (Aguirregabiria et al., 2025). Moreover, dispersion in city fixed effects goes down between the third and fourth columns of Table 2, indicating that supply-side factors, such as differences in banks' market shares, underlie part of the geographic dispersion in interest rates. The percentage of city fixed effects estimated to be statistically significant in this specification goes down from 72% to 68%, and the standard deviation among precisely estimated city fixed effects goes down from 67 to 62 basis points.

Local Concentration. Market power may not be fully captured by banks' own market share, and it may

[10] We label city fixed effects as precisely estimated if the standard error is below 15 basis points.

also depend on the total number of banks competing in a city and their market shares.

In the fifth column of Table 2, we expand equation (3) by adding competition-related characteristics of the local credit market. We include the local HHI, the HHI squared, the number of banks per firm, and the number of banks per firm squared. Adding these controls in the first step leads to a further reduction in the dispersion of the city fixed effects, indicating that differences in concentration underlie part of the geographic dispersion in interest rates. The percentage of city fixed effects estimated to be statistically significant in this specification goes down from 72% in our baseline specification to 67%, and the standard deviation among precisely estimated fixed effects goes down from 67 to 60 basis points, implying a 20% reduction in variance.

We analyze the robustness of our results on interest rate dispersion within two sub-samples of the data and, as a falsification exercise, for the sample of multi-city firms.

3.2. Extensions and robustness

Installment loans. As discussed in Section 2, installment loans are arguably the borrowing instrument more suitable for firm investment, and the real consequences of interest rate dispersion in this type of loan would be particularly relevant. The results of replicating our baseline analysis with this subsample are shown in Table 3. Comparing the adjusted R^2 of the first two columns of Table 3 indicates that geography plays a comparable role for this type of loans as it did for the entire sample.

The third column of Table 3 shows the results of our baseline specification on the dispersion of interest rates. The results are qualitatively unchanged and quantitatively very similar. The gap in rates between cities at the 25th and 75th percentiles of the distribution is 108 basis points, while the difference between the 10th and 90th percentiles is 265 basis points. The standard deviation among precisely estimated city fixed effects is 50 basis points. Figure 5 in the Appendix shows the full set of city fixed effects and their standard errors.

The fourth and fifth columns of Table 3 repeat the analysis, including banks' market shares and local competition measures in the first step. As in the analysis with the entire loan sample, competition-related measures underline part of the geographic differences in interest rates. The number of statistically significant city fixed effects decreases from 59% in the third column to 54% in the fifth column, and the standard deviation among precisely estimated city fixed effects decreases from 50 to 44 basis points, implying a reduction in variance of 23%.

These results indicate that banks' market structure affects the cost of local investment, with implications for the misallocation of capital across regions. A fully fledged analysis of the general equilibrium response of local investment to interest rate gaps of this magnitude is beyond the scope of this paper.

Excluding the first loan in a firm-bank relationship. Although we control for the risk assessment made by the bank, the banks' cost of acquiring the necessary knowledge to assess the firm may differ across cities. Our results in Table 2 could capture the pass-through of such costs to interest rates. To address this possibility, we repeat the analysis, keeping only loans with a pre-existing firm-bank relationship. Arguably, the bank already has information about the firm in such cases. Table 4 shows the results. Comparing the adjusted R^2 in the first two columns of Table 4 shows that the geographic component of interest rates is even higher in this sample.

The third column of Table 4 shows the results of our baseline specification, which are qualitatively

Table 3: Installment Loans issued to Single-City Firms

	Variance decomposition		**Dispersion**			**Pass-Through**
	Interest Rate	Interest Rate	Interest Rate	Interest Rate	Interest Rate	Interest Rate
City fixed effects from the second step						
p10			-81.86	-79.40	-73.84	-79.80
p25			-38.15	-34.72	-38.46	-36.40
p50			0	0	0	0
p75			70.12	69.55	71.34	64.36
p90			183.18	140.99	144.65	143.50
Coefficients of interest from the first step						
α_{bct}				77.78***	63.17***	84.36***
$\widetilde{MP}_{tt}$						0.76***
$\widetilde{MP}_{tt} \times \alpha_{bct}$						0.25*
Control variables in the first step						
City-Bank-Quarter FE	✓					
City FE			✓	✓	✓	✓
Firm Characteristics		✓	✓	✓	✓	✓
Loan Characteristics		✓	✓	✓	✓	✓
Sector-Quarter FE		✓	✓	✓	✓	
Bank-Quarter FE			✓	✓	✓	
Sector-Year FE						✓
Bank-Year FE						✓
Credit Market Characteristics					✓	
Adjusted R^2	0.39	0.64	0.67	0.66	0.66	0.65
Observations	248,678	255,804	255,793	232,504	232,479	232,514
Number of Banks	18	19	18	18	18	18
Number of Firms	42,582	43,895	43,893	41,808	41,806	41,809
Number of Cities	286	302	302	290	290	290

Notes: Outcome variable in basis points. Statistical significance denoted as *p < 0.10, **p < 0.05, ***p < 0.01. The sample for this regression is the universe of fixed-rate installment loans from single-city firms. Firm characteristics include size and risk; loan characteristics include maturity and amount in logs. City fixed effects are normalized by subtracting the median fixed effect across cities. Local credit market characteristics include the local HHI, the local HHI squared, the number of banks per firm, and the number of banks per firm squared.

Table 4: All Loans issued to Single-City Firms with a Pre-Existing Firm-Bank Relationship

	Variance decomposition		**Dispersion**			**Pass-Through**
	Interest Rate	Interest Rate	Interest Rate	Interest Rate	Interest Rate	Interest Rate
City fixed effects from the second step						
p10			-98.46	-93.65	-101.10	-102.19
p25			-43.91	-42.27	-50.59	-43.04
p50			0	0	0	0
p75			74.99	77.36	70.82	71.09
p90			200.26	179.97	174.35	181.04
Coefficients of interest from the first step						
α_{bct}				118.51***	65.65***	122.90***
$\widetilde{MP}_t$						0.82***
$\widetilde{MP}_t \times \alpha_{bct}$						0.27*
Control variables in the first step						
City-Bank-Quarter FE	✓					
City FE			✓	✓	✓	✓
Firm Characteristics		✓	✓	✓	✓	✓
Loan Characteristics		✓	✓	✓	✓	✓
Sector-Quarter FE		✓	✓	✓	✓	
Bank-Quarter FE			✓	✓	✓	
Sector-Year FE						✓
Bank-Year FE						✓
Credit Market Characteristics					✓	
Adjusted R^2	0.47	0.63	0.67	0.66	0.66	0.66
Observations	1,073,813	1,073,454	1,073,440	1,003,345	1,003,345	1,003,363
Number of Banks	18	18	18	18	18	18
Number of Firms	30,997	31,606	31,605	30,778	30,778	30,779
Number of Cities	279	300	300	292	292	292

Notes: Outcome variable in basis points. Statistical significance denoted as *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. The sample for this regression is the universe of fixed-rate loans from single-city firms, excluding the first loan that we observe for a firm-bank relationship. Firm characteristics include size and risk; loan characteristics include maturity, amount in logs, and type of loan. Local credit market characteristics include the local HHI, the local HHI squared, the number of banks per firm, and the number of banks per firm squared.

unchanged and quantitatively very similar to those of the baseline analysis. The gap in rates between cities at the 25th and 75th percentiles of the distribution is 119 basis points, while the difference between the 10th and 90th percentiles is 299 basis points. The standard deviation among precisely estimated city fixed effects is 68 basis points. Figure 5 in the Appendix shows the full set of fixed effects and their standard errors.

The fourth and fifth columns of Table 4 repeat the analysis, incorporating banks' market shares and local competition measures. As in the previous analysis, we find that measures related to competition underlie part of the geographic differences in interest rates. The number of statistically significant city fixed effects decreases from 73% in the third column to 66% in the fifth one, and the standard deviation among precisely estimated city fixed effects goes down from 68 to 62 basis points, implying a 17% reduction in variance.

Geographic dispersion shrinks for multi-city firms. As a falsification exercise, we repeat the analysis, focusing exclusively on firms that operate in five or more cities. We assign each firm to the city where its headquarters are located. For this subset of firms, interest rates should be less tightly linked to local banking competition, either because firms do not borrow in the headquarters' city or because banks understand they are competing with a larger set of banks and adjust their offered rates. Regardless of the specific mechanism, we expect geographic dispersion in interest rates, and the influence of local banking concentration, to decline. Table 5 shows the gap between the city at the 25-75th and 10-90th percentiles for this subsample. Gaps decrease by around 10% relative to our baseline with single-city firms in the sample with all loans, and similarly once we exclude first loans in a firm-bank relationship.

Table 5: Geographic Dispersion for Single-City vs. Multi-City Firms

	All Loans		**Installment**		**Excluding First**	
	Single-City	Multi-City	Single-City	Multi-City	Single-City	Multi-City
p75-p25	116	103	108	106	119	103
p90-p10	278	250	265	260	299	276

4. Heterogeneous pass-through of monetary policy across cities

During the period we study, the Central Bank of Chile operated under an inflation-targeting regime. The main instrument was the monetary policy rate, which the Central Bank determined by adjusting liquidity in the interbank market. Crucially for our analysis, the interbank rate serves as a proxy for the marginal cost of issuing loans, either as a direct funding cost or as an opportunity cost (depending on a bank's position in the interbank market).

Figure 1 shows the evolution of the monetary policy rate and the weighted average of the interest rate for new loans. In the aggregate, there is clear evidence that banks respond to changes in the interbank rate with changes in their lending rates. In a range of oligopolistic competition models, banks with higher local market shares exhibit greater pass-through from shocks to marginal costs that affect all competitors. In particular, if markups depend on local bank market shares, city-bank interest rates can be written as

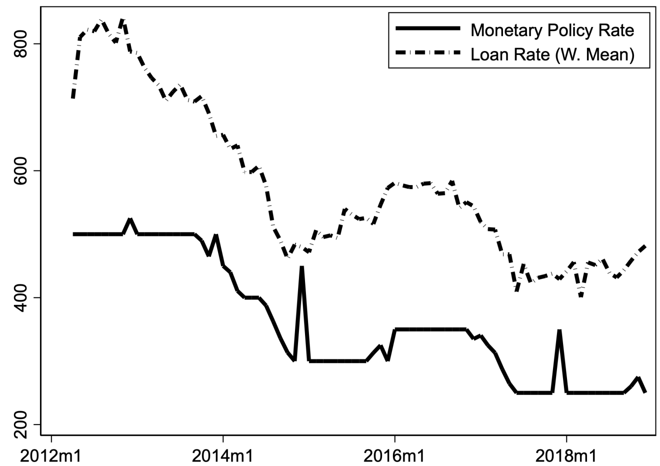
$$1 + r_n^b = \mu(s_n^b)(1 + r^{MP}) \tag{6}$$

where r_n^b and s_n^b denote the interest rate charged by bank b in city n and its local market share, respectively. The markup $\mu(s_n^b)$ can depend on the market share for the mechanisms outlined above, and r^{MP} is the monetary policy rate. Whenever market shares are homogeneous of degree zero in local interest rates, an increase in the monetary policy rate will not affect markups.[11] In this environment, changes in the monetary policy would lead to changes in city-bank specific rates that are proportional to local markups.

We now analyze this prediction in the context of firm loans.

[11] See Appendix 6.6 for a model of loan demand where market shares are homogeneous of degree zero.

Figure 1: Pass-Through of Monetary Policy to Loan Rates



Sources and notes: Authors' calculations using public data from the Central Bank of Chile on the Monetary Policy Rate, and microdata on local-currency denominated and fixed interest rate loans from the CMF. The dashed line shows the average interest rate, weighed by the amount of each loan.

In our first step, we replace equation (3) with

$$i_{\ell ft} = \tilde{\beta}_0 + \tilde{\beta}_{b(\ell)\times y(t)} + \tilde{\beta}_{s(f)\times y(t)} + \tilde{\beta}_1' X_{ft} + \tilde{\beta}_2' X_{\ell t} + \tilde{\beta}_3 \alpha_{bct} + \tilde{\beta}_4 \widetilde{MP}_t + \tilde{\beta}_5 \alpha_{bct} \times \widetilde{MP}_t + \epsilon_{\ell ft}, \tag{7}$$

which includes the de-meaned monetary policy rate in period t ($\widetilde{MP}_t$) and an interaction between the de-meaned monetary policy rate and the market share, defined in equation (5).[12] Monetary policy only varies at the month level (when it does). Therefore, we replace quarter-fixed effects with year-fixed effects interacted with banks and sectors for this specification.

The last column of Table 2 shows the results for the full sample. The coefficient on the monetary policy rate is positive, indicating that banks do pass through changes in the monetary policy rate to firms. More importantly, as shown by the coefficient in the interaction, the pass-through is higher where banks have a higher market share, consistent with models of oligopolistic competition.

The estimated effect of local competition on monetary policy pass-through is economically large. A 100-basis-point increase in the monetary policy rate raises lending rates by 86 basis points for a city-bank with the average market share of 0.29. A one standard deviation increase in market share (0.25) amplifies this response, leading to an increase of 94.3 basis points in lending rates following the same policy shock.

The last columns of Table 3 and Table 4 show how our results on pass-through extend to both our subsamples. All our results are robust, and magnitudes remain comparable in all subsamples.

5. Conclusion

In this paper, we analyze detailed loan-level data from Chile and document substantial geographic differences in interest rates—278 basis points between cities at the 10th and 90th percentiles and 116 basis

[12] We de-mean the monetary policy rate so that we can interpret the coefficient on α_{bct} in this regression ($\tilde{\beta}_3$).

points between the 25th and 75th percentiles of the distribution. While these estimates account for different compositions in terms of firm, risk, and loan characteristics across cities, we find evidence that they are related to local concentration in the loan market. We test the prediction stemming from oligopolistic models of competition, whereby banks with higher market shares face more inelastic demand and charge higher markups, and find evidence in favor of this view in the loan data. Our empirical results also indicate that there is significant unexplained heterogeneity in interest rates across cities after accounting for differences in local concentration. We view the exploration of additional local factors that drive geographic variation in interest rates as an important avenue for future research.

Geographic differences in interest rates have implications for differences in the marginal productivity of capital and the potential misallocation of capital across cities. However, characterizing the appropriate policy response to these disparities is nuanced, as it must account for the equilibrium effects on bank entry. We view the integration of oligopolistic competition and bank entry in a spatial context as an important avenue for future research.

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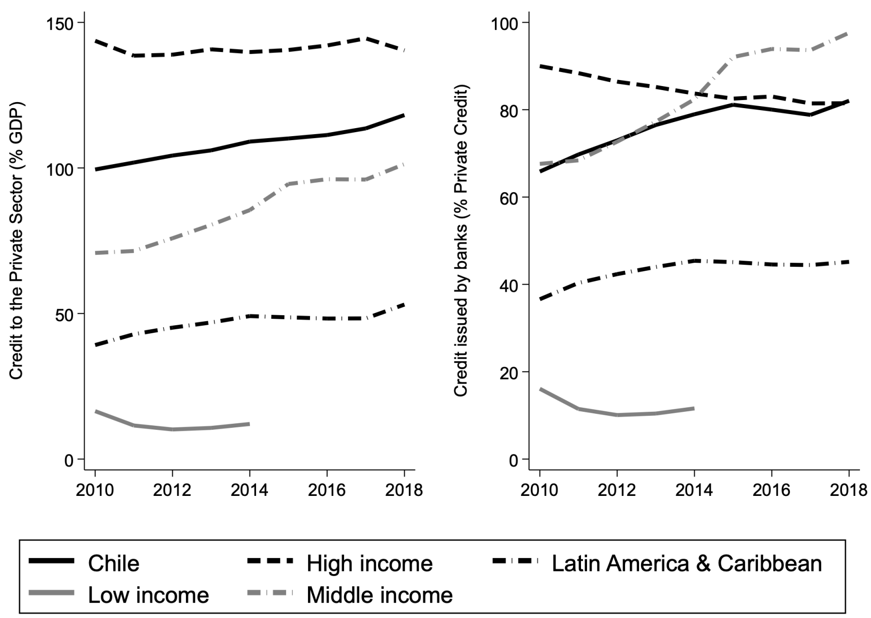
6. Supplemental Appendix

6.1. Chile's financial development

Figure 2 below shows the evolution of the two indicators of financial development mentioned in the main text.

Figure 2: Financial development



Source and notes: Authors' calculations using public data from the World Bank.

6.2. The importance of banks for domestic credit in Chile

We analyze firm-level data from the 2015 *Encuesta longitudinal de empresas* (ELE), a nationally representative survey that includes a module on firms' sources of credit. We calculate the percentage of private firms that borrow from banks and the percentage of firms for which banks constitute the primary source of credit. We exclude Santiago. The first two columns of Table 6 show that banks are the main source of credit for large private firms.

Table 6: Credit sources for firms (excluding Santiago)

Firm size	2015 ELE		
	% borrows from banks	% biggest loan comes from banks	% private employment
Micro	57.1	16.7	7.7
Small	66.4	29.6	39.3
Medium	77.7	42.1	21.9
Large	80.5	50.4	30.1

Source and notes: Authors' calculations using data from the *Encuesta longitudinal de empresas.*

6.3. The network of bank branches

The following results rely on publicly available data on loans aggregated at at the city-bank level from the CMF. For Panels A-C we exclude *Banco del Estado de Chile* from the sample and count city-bank pairs where a bank has a positive value of outstanding loans in a given year. For Panel B we exclude new city-bank pairs that can be attributed either to the merger between *Itau* and *Corpbanca* in 2014 or the merger between *BBVA* and *Scotiabank* in 2018. For calculating market shares in Panel D we consider *Banco del Estado de Chile*.

Table 7: Bank Network outside the Metropolitan Region (excluding *Banco del Estado de Chile*)

	2012	2013	2013	2015	2016	2017	2018
A.							
City-Bank Pairs	391	384	386	366	366	345	345
Cities	85	86	83	83	83	82	80
B. Year-on-year change (excluding mergers)							
New city-bank pairs	4	8	5	0	0	1	1
Disappearing city-bank pairs	15	4	20	1	1	2	9
C. Banks per City							
Mean	4.6	4.6	4.6	4.4	4.4	4.2	4.3
Standard Deviation	3.6	3.5	3.5	3.1	3.1	2.7	2.7
Median	3	3	3	3	3	3	3
D. Herfindahl–Hirschman Index							
National	0.17	0.17	0.16	0.16	0.16	0.17	0.17
Average across local indices	0.33	0.32	0.31	0.32	0.32	0.31	0.3
Maximum across local indices	0.77	0.66	0.69	0.73	0.78	0.78	0.54

Source and notes: Authors' calculations using data from the CMF.

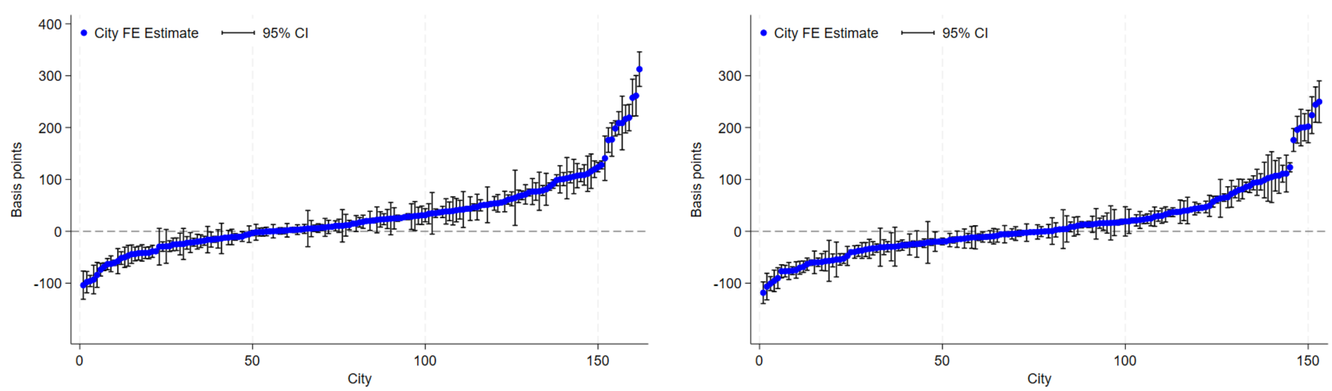
6.4. Statistical significance

Figures 3, 5 and 4 show the estimates of city fixed effects together with their standard errors in different samples. The left and right panels show the estimates from the third and fifth columns, respectively.

Figure 3: All Loans

(a) Estimated City FE Column (3)

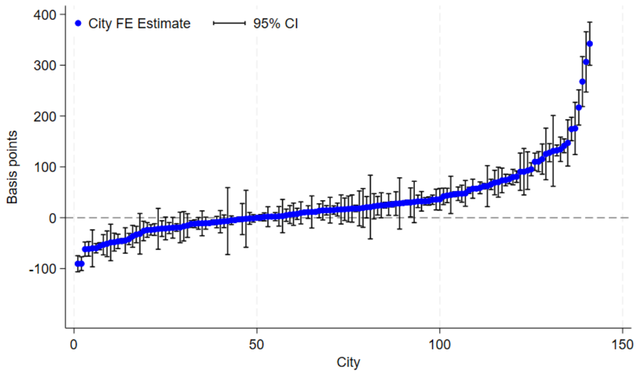
(b) Estimated City FE Column (5)



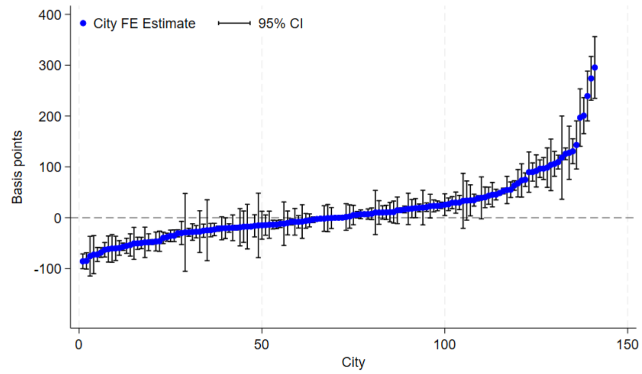
Source and notes: Authors' calculations using data from the CMF.

Figure 4: Installment Loans

(a) Estimated City FE from Column (3)



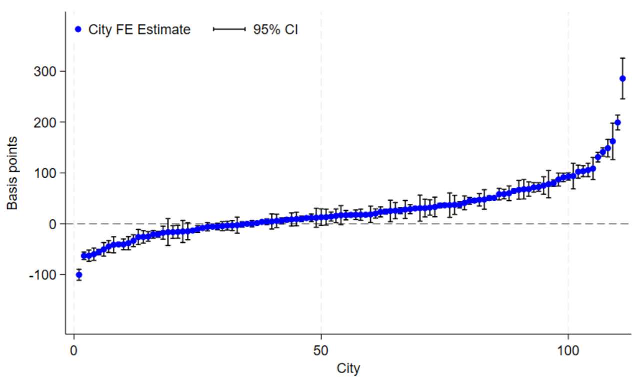
(b) Estimated City FE from Column (5)



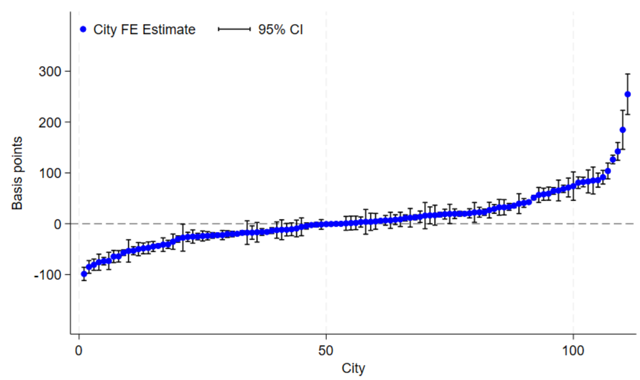
Source and notes: Authors' calculations using data from the CMF.

Figure 5: Excluding First Firm-Bank Loans

(a) Estimated City FE from Column (3)



(b) Estimated City FE from Column (5)



Source and notes: Authors' calculations using data from the CMF.

6.5. Geographic distribution of interest rates

Figure 6 shows the distribution of fixed effects from column 3 of Table 2.

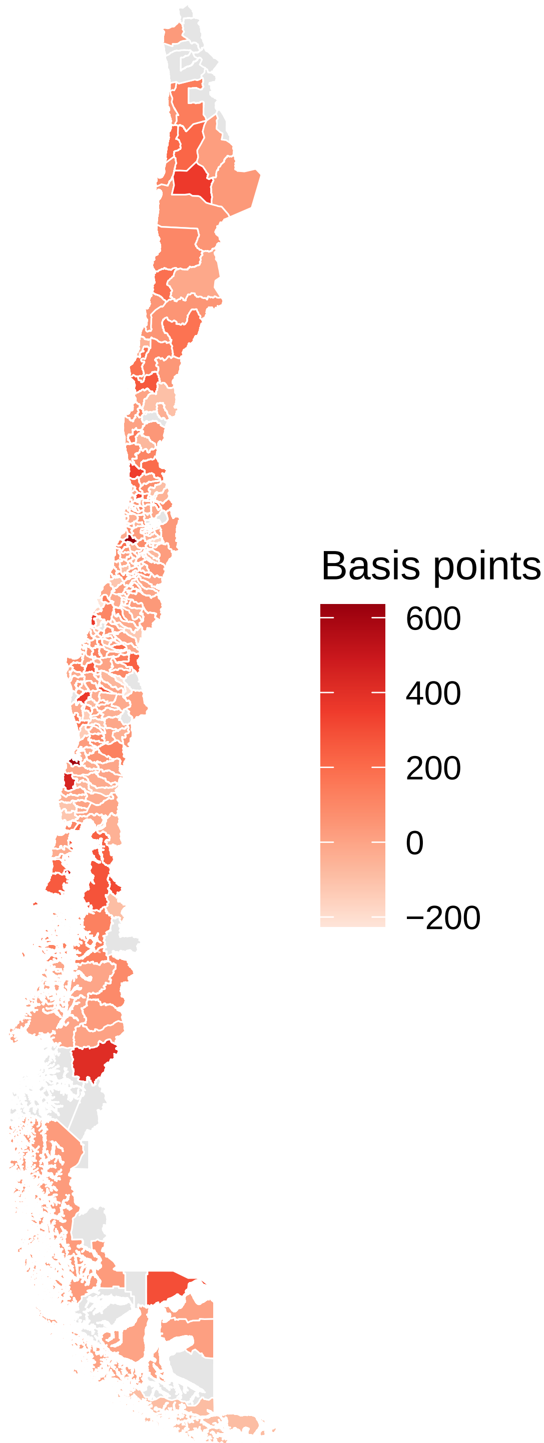
6.6. A Simple Model of Loan Demand

Assume that firms in the city n need to borrow from local banks to finance their local investment, and loans from different banks are imperfect substitutes. A unit of investment good is produced by borrowing from different banks and using the borrowed amounts to buy the final good,

$$i_{nt} = \Big[\sum_{b\in\mathcal{B}^n} \big(\frac{L^b_{nt+1}}{P_{nt}}\big)^{\frac{\sigma-1}{\sigma}}\Big]^{\frac{\sigma}{\sigma-1}}, \tag{8}$$

where L_{nt+1} denotes loans issued in period t and maturing in $t+1$, $\mathcal{B}^n$ the identity of banks with branches in n and P_{nt} is the price index. Equation (8) captures, in a parsimonious way, heterogeneity between banks, which are specialized in funding different types of businesses. The elasticity of substitution between banks σ underlies banks' ability to exploit local market power in interest rate setting. The cost of investment for firms is derived from solving

Figure 6: City Fixed Effects



Source and notes: Geographic distribution of city-fixed-effects in baseline regression.

$$\mathcal{L}_{nt}(i_{nt}) = \min_{\{L^b_{nt+1}\}_b} \sum_{b\in\mathcal{B}^n} L^b_{nt+1}(1 + r^b_{nt+1}) \;\; s.t : \textit{equation } (8).$$

Manipulating the first-order conditions from this problem, we can express the equilibrium demand of loans from bank b in period t as

$$\frac{L^b_{nt+1}}{P_{nt}} = \Big(\frac{R_{nt+1}}{1 + r^b_{nt+1}}\Big)^{\sigma} i_{nt} \;\text{ where } R_{nt+1} \equiv \Big[\sum_{b\in\mathcal{B}}(1 + r^b_{nt+1})^{1-\sigma}\Big]^{\frac{1}{1-\sigma}}. \tag{9}$$

From equation (8) and equation (9) it follows that

$$\mathcal{L}_{nt}(i_{nt}) = i_{nt}R_{nt+1}P_{nt}. \tag{10}$$

The interest rate index R_{nt} is homogeneous of degree one in banks' interest rates and, from equation (9), market shares

$$s^b_n = \frac{(1 + r^b_{nt+1})L^b_{nt+1}}{\sum_v(1 + r^v_{nt+1})L^v_{nt+1}} \tag{11}$$

are homogeneous of degree zero in gross interest rates.