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Local Credit Markets and Firm Borrowing Costs: Evidence from Chile*

Olivia Bordeu† Gustavo González‡ Maximiliano San Millán§ Marcos Soráq¶

Resumen

Documentamos la presencia de dispersión geográfica en los costos de endeudamiento de las empresas, utilizando datos administrativos que cubren el universo de préstamos a firmas en Chile. Las tasas de interés promedio difieren entre ciudades en 241 puntos básicos entre los percentiles 25 y 75, y en 422 puntos básicos entre los percentiles 10 y 90. Al controlar por características de las empresas, los préstamos, el riesgo y los bancos, estas brechas se reducen a 103 y 196 puntos básicos, respectivamente, aunque persisten primas locales sustanciales sin explicación. Las características de los mercados crediticios locales destacadas en la literatura explican aproximadamente el 20% de esta variación. Manteniendo constantes los demás factores, las tasas son más altas en las ciudades más ricas y en aquellas donde el crédito bancario está más concentrado, lo que es consistente con cierto rol para el poder de mercado local.

Abstract

We document geographic dispersion in firms' borrowing costs using administrative data on the universe of Chilean firm loans. Average interest rates differ across cities by 241 basis points between the 25th and 75th percentiles and 422 basis points between the 10th and 90th. Controlling for firm, loan, risk, and bank characteristics narrows these gaps to 103 and 196 basis points, leaving substantial unexplained local premia. Features of local credit markets emphasized in the literature account for roughly 20 percent of this variation. All else equal, rates are higher in richer cities and in cities with more concentrated bank lending, consistent with a role for local market power.

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1. Introduction

Access to capital is fundamental for investment and development. At the international level, a large literature has studied why interest rates are higher in some countries and how this can hinder their growth.[1] While one could expect capital markets to be fully integrated within countries, a growing body of evidence suggest that credit markets are geographically segmented, motivating studies of how segmentation shapes market power (Aguirregabiria, Clark and Wang, 2025; Drechsler, Savov and Schnabl, 2017), branching decisions (Oberfield et al., 2024), and local development (Quincy and Xu, 2025). Due to data limitations, price differences between markets — a key implication of segmentation — have remained unmeasured.

The main goals of this paper are to quantify differences in interest rates across credit markets and to explore which local characteristics matter for interest rates. Given the importance of private-sector investment for local development, we focus on firm loans and set aside other instruments such as consumer loans or mortgages. Firm loans are also a setting where banks exercise considerable discretion over the terms of credit, since small-firm lending is relationship-based and draws on soft information, unlike more standardized consumer credit.[2] Because interest rates are sensitive to the characteristics of the borrowing firm and to the instrument used, the main empirical challenge is to disentangle location effects from firm sorting and differences in the type of instruments used across space.

To overcome this challenge, we exploit a rich administrative dataset from Chile that covers the universe of bank loans issued to firms between 2012 and 2018. In the raw data there is substantial geographic dispersion in the rates faced by local firms (defined as firms that operate in only one city). Loan-amount-weighted city averages differ by 241 basis points between the 25th and 75th percentiles and by 422 basis points between the 10th and 90th percentiles when focusing on installment loans, which we argue are the instruments better suited for firm investment. We elaborate on these decisions and show average interest rate differences between cities for all instruments in Section 3. These are substantial differences relative to the amount-weighted average interest rate of 854 basis points and even from an international perspective: Chile, one of the most developed and stable countries in Latin America, faces an average interest rate that is 223 basis points lower than the regional average based on the difference in average returns of the EMBI Global Diversified Index.

One of the key characteristics of the dataset is that we observe a rich set of loan and firm characteristics, including several measures of credit risk, for the universe of firms. These features distinguish these data from datasets used in previous studies, especially outside the US and Europe. In a first step, we estimate a linear model of interest rates that accounts flexibly for firm and loan characteristics. Once we adjust for firm, loan, risk, and bank characteristics, the corresponding residual city-level gaps are 103 basis

[1] Hassan and Zhang (2021) survey why interest rates can differ between countries, and Caselli and Feyrer (2007), Monge-Naranjo, Sánchez and Santaeulàlia-Llopis (2019) and Pellegrino, Spolaore and Wacziarg (2025) study international capital misallocation.

[2] See Petersen and Rajan (1994) and Berger and Udell (2002) on the role of lending relationships and soft information in small-firm finance, and Cerqueiro, Degryse and Ongena (2011) for direct evidence of discretion in loan rate setting.

points between the 25th and 75th percentiles and 196 basis points between the 10th and 90th percentiles. These results suggest that differences in the average interest rate between cities go beyond demand-side differences in the type of firms borrowing in each city.

To quantify the extent of between-city variance in interest rates attributable to local components, we follow the methodology in Card, Rothstein and Yi (2025). We find that 7.4% of the variance in city-specific mean rates can be attributed to differences in the identity of the banks that lend in each city; 33.9% to differences in firm and loan characteristics such as size of the firm in terms of sales and maturity of the loan, and 23.0% to differences in firms' risk classifications between cities. Crucially, 35.7% of the variance in average rates remains unexplained and, in our linear model, is attributed to a local component unrelated to all other covariates.

In the second part of this paper we explore which characteristics of the local credit market are associated with the local component of interest rates identified before. We find that more concentrated local credit markets are associated with higher interest rates: cities with a higher Herfindahl–Hirschman index and fewer banking relationships per firm exhibit larger location premiums, consistent with a role for banks' local market power. More economically developed cities also display higher rates, whereas our proxy for the quality of judicial institutions is not significantly related to the local component. Taken together, these local characteristics account for roughly a fifth of the variation in the estimated location premiums.

Our results contribute to the literature in finance and industrial organization studying the boundary of credit markets. Petersen and Rajan (2002) show, using survey data from the United States, that information technology allowed borrowers to locate increasingly farther away from their lenders since the 1970s. However, Nguyen (2019) analyzes US data from 1999-2012 and finds that branch closures led to substantial and persistent reductions in small business lending at the census tract level, suggesting that despite technological change, proximity still matters. The local nature of credit markets underlies empirical studies in finance (Crawford, Pavanini and Schivardi, 2018; Degryse and Ongena, 2005; Drechsler, Savov and Schnabl, 2017; Whited and Zhao, 2021) and industrial organization (Aguirregabiria, Clark and Wang, 2025). Our contribution to this literature is to document interest rate differences between cities and the role for market power, which are predictions of these models.

While we focus on the local component of interest rates, recent studies have leveraged loan-level datasets to study differences in interest rates more broadly. Gilchrist, Sim and Zakrajšek (2013) studied differences in bond spreads for large US firms, while Amiti et al. (2026), Faria-e Castro, Jordan-Wood and Kozlowski (2025) and Ferreira and Kozeniauskas (2025) cover a broader set of financial instruments and firms using US and Portuguese data. We discuss differences between their results and ours in Section 3.

2. Context and data sources

Chile has a well-developed financial system in which banks serve as the primary providers of credit. Between 2012 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, making Chile a well-suited application to study the determinants of geographic differences in the cost of borrowing using data from bank loans (see Section A.1 and Section A.2).

All banks operating in Chile are nationally chartered, with headquarters located in Santiago and branch networks spread throughout the country. Importantly, there are no geographic restrictions on where banks are allowed to open branches. The regulatory approval process for opening a new branch focuses primarily on the solvency of the bank, rather than the location of the branch. Some countries, most notably the US, historically imposed limits on banks' geographic expansion. Chile has neither such regulations nor major regional banks, offering a useful benchmark for studying geographic segmentation when no bank is tied to a specific region.

Our geographic unit of analysis is the administrative notion of municipality, which we call cities. Municipalities often encompass a local labor market with the exception of Santiago, the capital of the country, which groups 34 metropolitan municipalities. Given our focus on geographic segmentation of credit markets and the observation that Santiago municiplities are smaller and much closer to each other than the rest of the municipalites in the country, we drop Santiago from most of our analysis.

In the second part of the paper we focus on the determinants of the local component of interest rates. One of our candidate mechanisms for the role of space in interest rates is concentration among suppliers of credit. 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 1620, local markets were significantly more concentrated. Both the average and median across local indices fluctuated around 3200 (see Section A.3).

2.1. Data

Our main dataset is administrative loan-level data from 2012-2018, collected by the Financial Market Commission (CMF).[3] 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

[3]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 or the CMF. 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.

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 firm-level 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 the expected loss on each loan, reflecting the bank's projection of potential default costs. Crucially for our analysis, these measures are provided by the bank in charge of pricing the loan. In Section A.4, we complement our risk measures with our own estimate of default probabilities using a probit specification in the panel following all loans through maturity. Including the estimated probability of default makes a negligible difference for our outcomes of interest conditional on our categorial risk measures, validating the content of the latter as measures of risk.

We complement these data with VAT records obtained from the Chilean tax authority. This database contains monthly information on sales and intermediate purchases by all firms, which is used to construct firm-level controls in the analysis below.

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. Given our focus on differences in interest rates that matter for firms' investment in physical capital and productive purposes, we focus on installment loans in the variance decomposition exercise.

Lack of spatial arbitrage in interest rates should be particularly relevant for firms that operate in a single city and therefore face fewer options. In most of our empirical analysis we focus on these firms, which 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

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	2,215,984	267	7,635	17.0	0.5	762	623	679	2	2	4139.1	149.0
Installments	221,514	299	30,744	341.6	91.1	1052	642	938	10	3	565.8	79.3
Real Estate	11,216	143	1,039	1008.7	299.1	635	445	545	3	2	3132.2	594.8
Foreign Trade	7,814	151	961	712.1	228.4	676	562	638	6	4	3748.0	689.9
B. Single-City Firms												
Factoring	297,994	254	5,251	23.2	3.1	1030	854	893	2	2	414.3	88.8
Installments	119,330	298	22,834	139.6	56.0	1226	854	1175	12	4	161.6	57.8
Real Estate	3,066	111	488	250.4	86.8	844	579	757	5	2	485.4	195.6
Foreign Trade	1,757	91	357	397.2	181.8	777	604	706	7	6	913.0	257.0

Notes: Maturity is denominated in months, and both Loan Amount and Firm Sales are denominated in thousands of USD at market exchange rates. Sales statistics count each firm-year once within the set of firms using each loan type. Interest rates are expressed in basis points. In the column *W. Mean* we compute the average interest rate weighted by the amount of each loan. Sample restricted to non-Santiago-based, non-financial-sector, fixed-rate, private-bank loans, 2012–2018.

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.

3. Firm Interest Rates across Space

3.1. The determinants of interest rates for firm loans

We begin our analysis of interest rates by estimating equation (1),

$$s_{\ell ft} = \beta_0 + \beta_{m(t)} + \gamma' risk_t^{\ell f} + \alpha' X_t^{\ell f} + \beta^{b(\ell)\times q(t)} + \beta^{b(\ell)\times s(f)} + \beta^{c(f)} + \epsilon_{\ell ft}, \tag{1}$$

using the subsample of loans described in the previous section. The outcome variable, $s_{\ell ft}$, is the spread between the interest rate charged for loan ℓ extended to firm f in period t and the yield of a bond of with a similar maturity in the same month.[4] The purpose of focusing on these spreads, instead of the rates directly, is to absorb variation in credit conditions that affect all instruments simultaneously across cities, such as movements in the monetary policy rate.

On the right-hand side, we include a month fixed effect that captures variation in macroeconomic conditions that may affect spreads for all types of firms and loans. Risk is captured in the second variable, $risk_t^{\ell f}$, a vector that includes both a risk-categorization of the firm and the expected loss on the loan. We

[4]The data includes the day on which the loan was issued. We refer to $q(t)$ and $y(t)$ as the quarter and year at which the loan was issued. Spreads are constructed using the interbank rate for loans with maturities up to one year. For longer maturities, they are based on yields of Chilean sovereign bonds denominated in pesos: 2-year bonds for loans with maturities between 1–3 years, 5-year bonds for loans between 3–5 years, and 10-year bonds for loans over 5 years.

include one fixed effect for each of the 16 categories comprising our categorical measure of risk. The term $X_t^{\ell f}$ encompasses the decile of the firm in terms of sales, the type of loan, the size of the loan, and fixed effects for maturity groups. We include fixed effects for the interaction between the bank issuing the loan and the quarter of issuance, $\beta^{b(\ell)\times q(t)}$, which capture variation across periods and banks. We also include a set of fixed effects for the interaction between the bank and the sector of the firm, $\beta^{b(\ell)\times s(f)}$, which capture sectoral specialization of banks.

Our last set of fixed effects, and our main object of interest, are city fixed effects for the city in which the firm operates $\beta^{c(f)}$. These capture any other determinants of interest rates related to the borrowing firm's geographic location.

In Tables 2 and 3, we provide a first approximation to the explanatory power of each of the variables on the right-hand side of equation (1). We focus on the increase in the R^2 as we add the variables in the right-hand side of equation (1) sequentially. As it is well known, this approach understates the contribution of the variables added later, providing a conservative lower bound on the contribution of space to interest rate variation (Gelbach, 2016). In these regressions, observations are weighted by loan amount.

Table 2 shows the results using data from all firms. Panels A and B show the results using all types of loans or installment loans, respectively. As mentioned, installment loans are of particular interest because they are the instrument better suited for firm investment. In both cases, the risk variables have the strongest explanatory power. With the methodological caveat of the previous paragraph in mind, the amount of variation attributable to the firm's location is small; for installment loans, it is roughly half the effect of bank-sector specialization.

Table 2: Incremental R^2: All Firms

	Panel A: All Loans						Panel B: Installment Loans Only					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Risk controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Loan & firm controls			✓	✓	✓	✓			✓	✓	✓	✓
Bank × Quarter FE				✓	✓	✓				✓	✓	✓
Bank × Sector FE					✓	✓					✓	✓
City FE						✓						✓
R^2	0.015	0.477	0.544	0.583	0.601	0.615	0.045	0.538	0.597	0.639	0.657	0.666
ΔR^2	0.015	0.462	0.067	0.039	0.018	0.013	0.045	0.493	0.059	0.042	0.017	0.009
N	2,162,044	2,162,044	2,162,044	2,162,044	2,162,044	2,162,044	161,482	161,482	161,482	161,482	161,482	161,482

Notes: Each column adds a set of controls to the previous specification. ΔR^2 reports the increase in R^2 relative to the previous column. Within each panel, all columns are estimated on the common sample used by the richest specification. All regressions use loan-amount weights. Sample covers non-Santiago, non-financial-sector, fixed-rate, private-bank loans, 2012–2018. Panel B restricts to installment loans.

In Table 3, we repeat the analysis focusing on single-city firms, for which the mapping between firm and city is unambiguous. While the main contribution is still coming from risk-related factors, the role of location is stronger for these firms. The contribution of city fixed effects to the R^2 for installment loans almost doubles compared to the full sample and, as shown in Panel B of Table 3, is similar to the contribution of the bank-sector match in the subsample of installment loans. Bank specialization by sector,

which the bank-sector match arguably captures, has received considerable attention in the literature as a driver of the interest rates firms face on their loans.[5]

Table 3: Incremental R^2: Single-City Firms

	Panel A: All Loans						Panel B: Installment Loans Only					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Risk controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Loan & firm controls			✓	✓	✓	✓			✓	✓	✓	✓
Bank × Quarter FE				✓	✓	✓				✓	✓	✓
Bank × Sector FE					✓	✓					✓	✓
City FE						✓						✓
R^2	0.016	0.438	0.527	0.567	0.582	0.598	0.029	0.442	0.541	0.586	0.602	0.618
ΔR^2	0.016	0.422	0.089	0.040	0.015	0.016	0.029	0.413	0.099	0.045	0.016	0.016
N	433,222	433,222	433,222	433,222	433,222	433,222	118,946	118,946	118,946	118,946	118,946	118,946

Notes: Each column adds a set of controls to the previous specification. ΔR^2 reports the increase in R^2 relative to the previous column. Within each panel, all columns are estimated on the common sample used by the richest specification. All regressions use loan-amount weights. Sample covers non-Santiago, non-financial-sector, fixed-rate, private-bank loans issued to single-city firms, 2012–2018. Risk controls exclude the predicted default probability (`p_default`). Panel B restricts to installment loans.

In recent studies, Ferreira and Kozeniauskas (2025), Amiti et al. (2026) and Faria-e Castro, Jordan-Wood and Kozlowski (2025) estimate equations similar to equation (1) using data from Portugal and the United States. There are important differences between their results and ours. Ferreira and Kozeniauskas (2025) find that risk, measured as the probability of default and the loss given default, plays a minor role in explaining interest rate variation,[6] while it has strong explanatory power in our data. A likely explanation is that there is little dispersion in their risk measures—the median probability of default and loss given default in their data are both close to zero—so that risk has little scope to account for interest rate variation, whereas Chilean firms differ more substantially in their default risk. Consistent with this, before incorporating firm fixed effects into their analog for equation (1) they find an R^2s below 0.4, while ours are above that threshold with month and risk measures only.

Amiti et al. (2026) and Faria-e Castro, Jordan-Wood and Kozlowski (2025) study loans of more than $1 million issued by the largest US banks between 2012 and 2024. Saturating a regression similar to equation (1) with almost 7,000 variables, Amiti et al. (2026) find an R^2 of 0.53. Our comparatively parsimonious installment-loan specification, estimated on loans suited to firm investment with a median amount near 56,000 USD, reaches a comparable and somewhat higher R^2 of roughly 0.62. One possible explanation for the discrepancy is that Amiti et al. (2026) focus on large firms, for which unobservable characteristics of the firm or firm-bank relationship may play a larger role. While loans are smaller in our Chilean data, we repeat the analysis restricting our sample to loans higher than 43,134 USD (the 75th

[5] Blickle, Parlatore and Saunders (2026) document that large U.S. banks concentrate their lending in a small set of industries and offer more generous loan terms, including lower interest rates, to borrowers in their preferred industry. Blickle et al. (2025) provide a complementary information-based pricing mechanism and show that specialized lenders charge systematically lower rates than non-specialized lenders on otherwise similar loans.

[6] In particular, see Figure 5 in Ferreira and Kozeniauskas (2025).

percentile of loan amounts). Table 10 in Appendix Section A.5 shows that the R^2 is approximately 0.6, and the contribution of city fixed effects is similar to that in our baseline sample. Exploring why the role of unobservables is smaller in Chile than in Portugal or the US is beyond the scope of this paper.

Given the methodological limitations of the previous approach, we turn to an approach based on Card, Rothstein and Yi (2025) to study the role of location in explaining variation in interest rates. In Section 3.2 our focus is explaining between-loan variation in the full sample of loans, while in Section 3.3 we study between-city variation in the average interest rate, the main focus of the paper.

3.2. Variance decomposition

We estimate equation (1) via weighted OLS on the subsample of single-city firms, using only installment loans.[7] With our estimates at hand, we define the de-meaned spread $\delta_\ell \equiv s_{\ell ft} - \hat{\beta}_0 - \hat{\beta}_{m(t)}$. This object captures the spread after netting out the overall and monthly means.

We split the demeaned spreads into four additive terms and a residual: a risk-pricing component $\hat{\gamma}^{r(\ell)} \equiv \hat{\gamma}' risk_t^{\ell f}$, a component capturing the pricing of other covariates $\hat{\gamma}^{x(\ell)} \equiv \hat{\alpha}' X_t^{\ell f}$, a bank component $\hat{\gamma}^{b(\ell)} \equiv \hat{\beta}^{b(\ell)\times q(t)} + \hat{\beta}^{b(\ell)\times s(f)}$, and a city component $\hat{\gamma}^{c(\ell)} \equiv \beta^{c(\ell)}$. By construction,

$$\delta_\ell = \hat{\gamma}^{r(\ell)} + \hat{\gamma}^{x(\ell)} + \hat{\gamma}^{b(\ell)} + \hat{\gamma}^{c(\ell)} + \hat{\varepsilon}^\ell, \tag{2}$$

and the OLS residual $\hat{\varepsilon}^\ell$ is orthogonal to each of the four components. Taking weighted variances yields

$$\text{Var}(\delta) = \sum_j \text{Var}(\hat{\gamma}^j) + 2\sum_{j<k} \text{Cov}(\hat{\gamma}^j, \hat{\gamma}^k) + \text{Var}(\hat{\varepsilon}),$$

where $j, k \in r, x, b, c$. We attribute to each component its total contribution $\text{Var}(\hat{\gamma}^j) + \sum_{k\neq j} \text{Cov}(\hat{\gamma}^j, \hat{\gamma}^k)$.

The first two columns in Table 4 show the variance decomposition at the loan-level. Panel A reports, for each component, the standard deviation and the contribution to total variance, including covariance terms. As in the R^2 analysis above, the main takeaway is that risk and covariates are the primary determinants of interest rates. The contribution of city fixed effects is slightly above 2%, around half of the total contribution of bank-related fixed effects.

Panel B focuses on the correlation between components. Quantitatively, the main element is the positive covariance between risk and other firm and loan characteristics, capturing, for example, that smaller firms tend to be more risky. The second most important element is the negative correlation between bank fixed effects and firm covariates, capturing that smaller firms tend to sort to banks that charge lower interest rates. We do not find strong evidence of firm sorting across cities by risk in this specification.

[7] Given our focus on the city fixed effects later on, we implement a final restriction to the sample. We drop cities with fewer than 20 loans or fewer than 3 borrowing firms, which represent 0.54% of the observations in the sample and where the estimated city fixed effects are noisy. This step leads the number of cities represented in our sample to drop from 299 to 235.

The small contribution of bank and local components to loan-level variance suggest that demand-side factors are relatively more important determinants of interest rates in the aggregate. From a policy perspective, however, understanding differences in prices driven by supply-side factors is important to determine whether the market is allocating loans efficiently.

Table 4: Variance Decomposition of Interest Rate Spreads

	Loan level		City level	
	SD	Share	SD	Share
Spread (bp)	336.1	1.000	180.0	1.000
A. Variance components (SD and share of total variance)				
Bank effects	83.8	0.046	39.1	0.074
Risk covariates	91.4	0.169	49.6	0.230
Other covariates	183.5	0.375	79.5	0.339
City effects	45.6	0.022	85.1	0.357
Residual	209.3	0.388		
B. Covariance components (correlation and share of total variance)				
Bank & risk	-0.013	-0.002	0.165	0.020
Bank & covariates	-0.131	-0.036	-0.107	-0.020
Bank & city	0.079	0.005	0.261	0.054
Risk & covariates	0.639	0.190	0.788	0.192
Risk & city	0.037	0.003	0.370	0.096
Covariates & city	-0.003	-0.000	0.280	0.117
N	118,296		235	

Notes: Decomposition following Card, Rothstein and Yi (2025).

3.3. Variance decomposition of local average interest rates

Average interest rates differ between cities. In the single-city installment-loan sample used for the variance decomposition, the gap between percentiles 10 and 90 of loan-amount-weighted city averages is 422 basis points, and the gap between percentiles 25 and 75 is 241 basis points. Naturally, the characteristics of firms and loans differ between cities.

To delve deeper into the factors driving differences in average interest rates across cities, we take the within-city average of each component in equation (2), using loan amounts as weights. Given that we use the same weights we used in the regression and we include city fixed effects, the within-city average of the residual $\hat{\epsilon}_\ell$ is zero, and the average demeaned spread satisfies

$$\overline{\delta}_c = \overline{\gamma}^r_c + \overline{\gamma}^x_c + \overline{\gamma}^b_c + \hat{\gamma}^c \tag{3}$$

The last two columns in Table 4 show a variance decomposition of δ_c across cities following the same definitions we used for the loan-level analysis. There are differences between cities in terms of the firm

characteristics of the borrowing firms and, in particular, their risk profiles. Differences in risk and other covariates across cities explain 23% and 34%, respectively, of the differences in average local rates. Around 35% of the differences are captured by the city fixed effects. Understanding which characteristics of the local credit market covary with $\hat{\gamma}^c$ is the focus of Section 4. In the remainder of this section, we discuss an unweighted version of the previous analysis.

3.4. Unweighted version

In our previous analysis, we weighted observations by loan amount both when estimating equation (1) and when taking the within-city average of the components in equation (2). Here we present results when we drop weights from both steps.

The results are shown in Table 5. Most results in the first two columns align with the weighted version of the analysis. The main distinction is that there is an increased role for the correlation between the risk-city and bank-city components, which becomes the second-strongest correlation. This suggests that firm sorting on the basis of risk matters more for smaller firms and for firms that tend to borrow smaller amounts.

The results from the city-level analysis are mostly unchanged compared to the weighted version of the analysis. While the role of bank differences between cities grows considerably, the local component remains the most important.

Table 5: Variance Decomposition of Interest Rate Spreads (Unweighted)

	Loan level		City level	
	SD	Share	SD	Share
Spread (bp)	456.5	1.000	179.4	1.000
Variance components (SD and share of total variance)				
Bank effects	149.8	0.117	73.8	0.225
Risk covariates	134.1	0.180	51.6	0.233
Other covariates	219.9	0.313	75.8	0.263
City effects	57.1	0.021	82.3	0.278
Residual	277.2	0.369		
Covariance components (correlation and share of total variance)				
Bank & risk	0.079	0.015	0.283	0.067
Bank & covariates	-0.009	-0.003	-0.022	-0.008
Bank & city	0.081	0.007	0.139	0.053
Risk & covariates	0.588	0.166	0.676	0.164
Risk & city	0.079	0.006	0.263	0.069
Covariates & city	-0.014	-0.002	0.033	0.013
N	118,296		235	

Notes: Decomposition following Card, Rothstein and Yi (2025).

4. What Characterizes High-Interest Rate Cities?

Our analysis allowed for variation in interest rates across space unexplained by variation in demand-side variables, which we captured with location fixed effects β^c. In this section, we delve deeper into what characterizes high-interest rate locations.

Local characteristics. We relate the estimated location premiums to city-level characteristics. The first two summarize the local economy and are built from gridded estimates of local GDP in constant 2021 USD from Rossi-Hansberg and Zhang (2025). *Income* is the city's GDP per capita, averaged over 2012–2018; we aggregate each 0.25° cell to the municipality by weighting its GDP and population by the share of the cell's area that falls within the municipality, and divide aggregated GDP by aggregated population. *Location risk* is the standard deviation of the municipality's annual log GDP growth over 2012–2022, computed from the same series for cities with at least five annual growth observations.

The next two measures capture the competitiveness of the local credit market. *Bank concentration* (HHI_c) is a Herfindahl–Hirschman index that we measure within our estimation sample of fixed-rate installment loans and take the median across years. *Banks per firm*, the average number of distinct bank relationships per firm in the city, is a complementary measure of local market power.

Finally, *Judicial delay* proxies for the efficiency of local contract enforcement. We measure it as the average duration, in days, of resolved civil commercial cases—contract enforcement, insolvency, and related business matters—over 2015–2018, computed at the Court of Appeals level and assigned to cities through each court's territorial jurisdiction. Higher values indicate slower local courts.

We then estimate

$$\hat{\beta}_c = \kappa_0 + \kappa_1 \, Income_c + \kappa_2 \, LocationRisk_c + \kappa_3 \, HHI_c + \kappa_4 \, BanksPerFirm_c + \kappa_5 \, JudicialDelay_c + \nu_c. \quad (4)$$

Because $\hat{\beta}_c$ is itself estimated with sampling error that varies across cities, we report both an unweighted specification and a specification that weights cities by the inverse standard error of the estimated fixed effect. Table 6 shows the results.

Local credit-market concentration is positively associated with the location premium. The precision-weighted coefficient on the HHI implies that a city with an HHI 1,000 points higher carries a location premium about 9 basis points larger. The complementary measure, banks per firm, enters negatively throughout, consistent with the same interpretation. Richer cities carry higher local premiums: a one-thousand-2021-USD increase in GDP per capita is associated with roughly 9 basis points higher spreads. By contrast, neither local GDP volatility nor judicial delay is significantly related to the location premium in either specification. Overall, the local characteristics jointly explain slightly lesss than 20% of the cross-city variation in $\hat{\beta}_c$.

Table 6: City Fixed Effects and Local Characteristics

	(1) Unweighted	(2) Inv. SE
GDP per capita	8.256***	9.239***
	(2.070)	(1.848)
GDP volatility	-4.905	-16.80
	(80.95)	(72.94)
Bank HHI	0.00758	0.00899**
	(0.00423)	(0.00341)
Banks per firm	-227.2***	-150.8***
	(42.40)	(43.56)
Judicial delay	0.0641	0.0368
	(0.119)	(0.0941)
Constant	82.45	-15.21
	(92.51)	(80.07)
Observations	235	235
R^2	0.200	0.169
Adjusted R^2	0.182	0.151

Notes. The dependent variable is the estimated city fixed effect $\hat{\beta}_c$ (in basis points). Columns weight cities equally (1) and by the inverse standard error of $\hat{\beta}_c$ (2). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5. Conclusion

Evidence from different sources indicates that credit markets are local to some extent and that firms rely on local bank branches for their loans. In this paper, we quantified the magnitude of interest rate differentials across space — one of the key implications of market segmentation — using administrative data from Chile.

We showed that location effects account for a small share of the overall variation in interest rates across individual loans, but a substantial share of the variation in average interest rates across cities. The gap between the 10th and 90th percentiles of city average spreads is 422 basis points and remains 196 basis points after controlling for firm, loan, risk, and bank characteristics. In the variance decomposition, location effects account for 2.2% of loan-level variation and 35.7% of the variation in city average spreads. These magnitudes complement previous evidence on the local nature of credit markets and provide empirical targets for models of geographic segmentation.

Among the characteristics of local credit markets that are associated with these differentials, we find some role for the concentration of local lending. Location premiums are higher in cities where bank lending is more concentrated and lower in cities where firms borrow from more banks, patterns that are consistent with local market power. These associations are descriptive, however, and the local characteristics we consider account for only around one-fifth of the variation in location premiums. Distinguishing among candidate mechanisms that account for the remaining variation is a natural avenue for future research.

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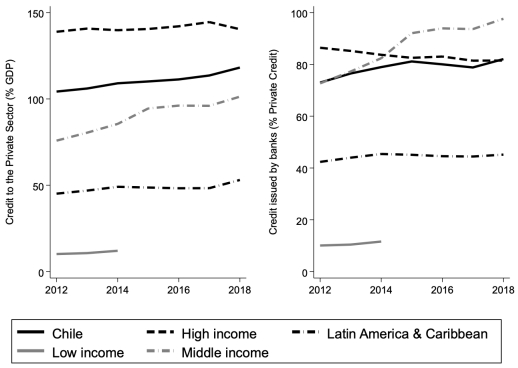
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A. Appendix

A.1. Chile's financial development

Figure 1 below shows the evolution of the two indicators of financial development mentioned in the main text.



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

Figure 1: Financial development

A.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 7 show that banks are the main source of credit for large private firms.

Table 7: 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.*

A.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 *BancoEstado* 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 *Itaú* and *Corpbanca* in 2014 or the merger between *BBVA* and *Scotiabank* in 2018. For calculating market shares in Panel D we consider *BancoEstado* but exclude cities where it was the only active bank.

Table 8: Bank Network outside the Metropolitan Region

	2012	2013	2014	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	1678	1662	1619	1625	1643	1678	1664
Average across local indices	3519	3505	3317	3318	3318	3248	3069
Median across local indices	3159	3098	2785	2728	2690	2599	2545

Source and notes: Authors' calculations using data from the CMF. Panels A-C exclude *BancoEstado*.

A.4. Adding an estimate of the default probability

Our baseline controls for borrower risk rely on the bank-assessed risk category together with continuous provisioning and indebtedness measures. As a robustness check, we augment these controls with a predicted probability of default estimated outside the loan-pricing regression. Specifically, we estimate a discrete-time hazard (probit) model of firm default as a function of lagged firm characteristics—the debt-to-sales ratio, firm age and its square, the wage bill, value added per worker, log sales, and sales growth—together with sector and year fixed effects, and use it to predict a default probability for each firm-year. We then add this predicted default probability to the risk controls and repeat the incremental R^2 analysis on single-city firms. Because the default probability requires firm financials that are not available for every loan, this exercise is run on a somewhat smaller sample than the baseline. Table 9 shows that the results are nearly unchanged: city fixed effects continue to raise the R^2 by about 1.8 percentage points in the richest specification, confirming that the local component is not an artifact of incompletely controlling for borrower risk.

Table 9: Incremental R^2: Single-City Firms

	Panel A: All Loans						Panel B: Installment Loans Only					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Risk controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Loan & firm controls			✓	✓	✓	✓			✓	✓	✓	✓
Bank × Quarter FE				✓	✓	✓				✓	✓	✓
Bank × Sector FE					✓	✓					✓	✓
City FE						✓						✓
R^2	0.016	0.440	0.531	0.573	0.586	0.603	0.029	0.462	0.564	0.605	0.618	0.636
ΔR^2	0.016	0.424	0.090	0.042	0.013	0.018	0.029	0.434	0.101	0.041	0.013	0.018
N	316,578	316,578	316,578	316,578	316,578	316,578	76,853	76,853	76,853	76,853	76,853	76,853

Notes: Each column adds a set of controls to the previous specification. ΔR^2 reports the increase in R^2 relative to the previous column. Within each panel, all columns are estimated on the common sample used by the richest specification. All regressions use loan-amount weights. Sample covers non-Santiago-based, non-financial-sector, fixed-rate, private-bank loans issued to single-city firms, 2012–2018. Panel B restricts to installment loans.

A.5. Big loans

The 75th percentile of loan amounts among single-city firms is 43,134 USD.

Table 10: Incremental R^2: Single-City Firms, Large Loans

	Panel A: All Loans						Panel B: Installment Loans Only					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Risk controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Loan & firm controls			✓	✓	✓	✓			✓	✓	✓	✓
Bank × Quarter FE				✓	✓	✓				✓	✓	✓
Bank × Sector FE					✓	✓					✓	✓
City FE						✓						✓
R^2	0.025	0.397	0.490	0.541	0.552	0.574	0.039	0.427	0.518	0.566	0.579	0.602
ΔR^2	0.025	0.373	0.093	0.051	0.012	0.022	0.039	0.388	0.091	0.048	0.013	0.023
N	78,383	78,383	78,383	78,383	78,383	78,383	47,676	47,676	47,676	47,676	47,676	47,676

Notes: Each column adds a set of controls to the previous specification. ΔR^2 reports the increase in R^2 relative to the previous column. Within each panel, all columns are estimated on the common sample used by the richest specification. All regressions use loan-amount weights. Sample restricted to single-city firms with loan amounts at or above the 75th percentile of the single-city loan amount distribution (43,134 USD), 2012–2018. Panel B restricts to installment loans.

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