Banking on Agglomeration: Local Credit Competition and the Geography of Entrepreneurship

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Abstract

We develop a tractable two-region spatial model to evaluate how local credit markets shape entrepreneurial geography. In the presence of oligopolistic banking and imperfect interregional credit integration, stronger local bank competition lowers effective borrowing costs, compresses producer prices, and increases real entrepreneurial returns. We show that this finance-driven agglomeration is strictly bounded by the degree of credit market integration and amplified by a sector's reliance on external finance. Analytical characterizations and numerical simulations confirm that modest banking asymmetries generate economically meaningful shifts in production location, an effect that is substantially magnified when interregional goods trade is highly integrated.

Keywords: Bank competition; entrepreneurial geography; external finance; credit integration
JEL Codes: G21; R12; D43; L11

1 Introduction

A young entrepreneur choosing between two otherwise similar locations may compare one more price before deciding where to produce: the price of credit. If one region has a denser and more competitive banking sector, working-capital loans may be cheaper there, firms may price more aggressively, and mobile entrepreneurs may find that location more attractive even before selling their first unit. However, this logic is not automatic. If credit flows frictionlessly across space, local banking conditions should matter little for where firms locate. If lending remains locally segmented, by contrast, financial advantage can translate into location advantage. This paper formalizes that idea in a two-region model in which entrepreneurs are mobile, banks compete strategically, and firms differ in their dependence on external finance.

This paper bridges two distinct literatures. The first is new economic geography, where increasing returns, market access, trade costs, and local policies shape the spatial distribution of production (Krugman 1991, Holmes 1998, Forslid and Ottaviano 2003). The second is entrepreneurial finance and banking, which documents how financial development, bank competition, and lending distance affect firm entry, innovation, and regional performance (King and Levine 1993, Berger and Udell 1998, Petersen and Rajan 1995, 2002, Black and Strahan 2002, Cetorelli and Gambera 2001, Guiso et al. 2004, Cetorelli and Strahan 2006, Michelacci and Silva 2007, Kerr and Nanda 2009, Hombert and Matray 2017, Granja et al. 2022). Yet, these two traditions rarely intersect. Spatial models typically abstract from the market structure of local credit, while empirical finance papers document the real effects of credit conditions without embedding them in a tractable agglomeration framework.

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This paper makes three theoretical contributions to address this gap. First, it embeds an oligopolistic banking sector into a footloose-entrepreneur geography model, allowing local bank competition to shape spatial allocation through endogenous borrowing rates, producer prices, and real entrepreneurial returns. Second, it introduces both partial external-finance dependence and imperfect interregional credit integration, enabling the model to distinguish sharply between sectors that rely heavily on outside finance and regions where remote lending remains costly. Third, the framework remains analytically tractable: it delivers closed-form propositions showing that stronger local bank competition attracts entrepreneurs, that this effect is capped by the degree of credit integration, and that it is amplified by external-finance dependence. Numerical simulations further illustrate these mechanisms, confirming that the spatial pull of banking asymmetries is magnified both when interregional goods trade is easier and when industries rely heavily on external working capital. Together, the paper offers a compact theory of why entrepreneurial geography is shaped not only by trade costs and market size, but also by the industrial organization of local credit markets.

2 Model

Consider a two-region economy, indexed by $r, s \in \{1, 2\}$ with $r \neq s$, populated by three sectors: agriculture, manufacturing, and banking. The framework builds on the standard footloose-entrepreneur model, but adds imperfectly integrated credit markets. The key novelty is that firms may borrow either locally or from the other region, while the importance of credit for production is governed by a parameter measuring external-finance dependence.

There are two types of agents. First, there are $L > 0$ immobile workers, equally split across the two regions, so that each region contains $L/2$ workers. Second, there are $N > 0$ entrepreneurs, each operating one manufacturing firm and free to relocate across regions. Let $\lambda \in [0, 1]$ denote the share of entrepreneurs located in region 1. Then region 1 hosts λN manufacturing firms, while region 2 hosts $(1 - \lambda)N$ firms.

2.1 Consumers

Each region is populated by a representative consumer. Preferences are Cobb–Douglas between a homogeneous agricultural good C_A and a CES aggregate of differentiated manufacturing varieties C_M:

$$U = C_A^{1-\mu} C_M^{\mu}, \qquad \mu \in (0, 1), \tag{1}$$

where μ is the share of expenditure allocated to manufactures, while $1 - \mu$ is the share allocated to agriculture.

The manufacturing aggregate is:

$$C_M = \left(\int_{\omega \in \Omega} c(\omega)^{\frac{\sigma-1}{\sigma}} \, d\omega \right)^{\frac{\sigma}{\sigma-1}}, \qquad \sigma > 1, \tag{2}$$

where $c(\omega)$ is consumption of variety ω, and σ is the elasticity of substitution between any two varieties. A higher σ means that varieties are closer substitutes and market power is weaker.

The corresponding ideal price index for manufactures in region r is:

$$P_r = \left(\int_{\omega \in \Omega} p_r(\omega)^{1-\sigma} \, d\omega \right)^{\frac{1}{1-\sigma}}, \tag{3}$$

where $p_r(\omega)$ is the consumer price in region r of variety ω.

Agriculture is homogeneous, perfectly competitive, and freely traded across regions. One unit of labor produces one unit of the agricultural good. We choose agriculture as the numeraire, so the wage of immobile workers is normalized to one in both regions.

2.2 Manufacturing

Each entrepreneur operates one monopolistically competitive manufacturing firm producing a single differentiated variety. Producing quantity q requires one entrepreneur as a fixed input and βq units of labor as variable input, where $\beta > 0$ is the unit labor requirement.

Only a fraction $\theta \in (0, 1]$ of the variable wage bill must be financed externally before sales revenues are realized. The parameter θ therefore captures external-finance dependence. When $\theta = 1$, firms must borrow the entire variable cost in advance. When $\theta < 1$, firms can internally finance part of their variable cost.

Manufactured goods are traded subject to iceberg trade costs. Specifically, $T > 1$ units must be shipped for one unit to arrive in the other region. As usual in new economic geography, define:

$$\phi \equiv T^{1-\sigma} \in (0, 1), \tag{4}$$

where ϕ is a convenient measure of trade freeness. A larger ϕ corresponds to lower trade costs and therefore greater goods-market integration.

2.3 Banking and credit-market integration

In each region r, there are $K_r \geq 1$ identical banks. The integer K_r measures the intensity of local banking competition: a larger K_r means more banks and hence stronger competition in the regional loan market.

Banks compete in quantities à la Cournot. Let M_r denote total loan supply by banks located in region r. The inverse demand schedule for local working-capital loans is assumed to be linear:

$$i_r(M_r) = a - bM_r, \qquad a > 0,\ b > 0, \tag{5}$$

where i_r is the interest rate charged on loans originated in region r, a is the intercept of the inverse demand curve, and b is its slope. A larger a shifts loan demand upward, while a larger b makes the interest rate more sensitive to changes in total loan supply.

The novel friction in our model is that a firm located in region r can borrow either from a local bank at rate i_r, or from a bank in the other region s at rate $i_s + \kappa$, where $\kappa \geq 0$ is an interregional monitoring, enforcement, or information cost. Thus, κ summarizes the degree of credit-market segmentation. If κ is large, remote lending is very costly and firms rely mainly on local banks. If $\kappa = 0$, credit markets are fully integrated and firms borrow wherever rates are lowest.

Accordingly, the effective borrowing cost faced by firms located in region r is:

$$\tilde{i}_r = \min\{i_r,\ i_s + \kappa\}. \tag{6}$$

Because only the fraction θ of variable cost must be financed externally, the effective marginal production cost of a firm in region r is:

$$c_r = \beta\big(1 + \theta\tilde{i}_r\big). \tag{7}$$

Here, 1 is the wage cost per efficiency unit of labor, $\tilde{i}_r$ is the relevant loan rate, and $\theta\tilde{i}_r$ is the finance premium embedded in unit cost.

Under Dixit–Stiglitz monopolistic competition, firms set a constant markup over marginal cost:

$$p_r = \frac{\sigma}{\sigma - 1} c_r. \tag{8}$$

Following the standard normalization in this literature, we choose

$$\beta = \frac{\sigma - 1}{\sigma}, \tag{9}$$

which simplifies the pricing rule to

$$p_r = 1 + \theta\tilde{i}_r. \tag{10}$$

Equation (10) shows directly that local producer prices rise with firms' effective borrowing costs, and that this effect is stronger the larger is θ.

2.4 Demand, income, and entrepreneurial returns

Let Y_r denote total nominal expenditure in region r. This includes labor income, entrepreneurial income, and any lump-sum redistribution of bank profits. The exact income decomposition is not central for the comparative statics below; what matters is that Y_r is the total spending power of consumers in region r.

Given CES demand, sales of a representative variety produced in region 1 and region 2, respectively, are:

$$x_1 = \mu p_1^{-\sigma} \left(\frac{Y_1}{P_1^{1-\sigma}} + \phi \frac{Y_2}{P_2^{1-\sigma}} \right), \tag{11}$$

$$x_2 = \mu p_2^{-\sigma} \left(\phi \frac{Y_1}{P_1^{1-\sigma}} + \frac{Y_2}{P_2^{1-\sigma}} \right). \tag{12}$$

These equations have the usual interpretation: demand for a variety depends positively on expenditure levels Y_1 and Y_2, negatively on its own price, and positively on the degree of trade freeness ϕ.

Under CES monopolistic competition, operating profit of a representative entrepreneur in region r is a constant share of revenue:

$$\pi_r = \frac{p_r x_r}{\sigma}. \tag{13}$$

Substituting Equation (11)–(12) into Equation (13) gives:

$$\pi_1 = \frac{\mu}{\sigma} p_1^{1-\sigma} \left(\frac{Y_1}{P_1^{1-\sigma}} + \phi \frac{Y_2}{P_2^{1-\sigma}} \right), \tag{14}$$

$$\pi_2 = \frac{\mu}{\sigma} p_2^{1-\sigma} \left(\phi \frac{Y_1}{P_1^{1-\sigma}} + \frac{Y_2}{P_2^{1-\sigma}} \right). \tag{15}$$

Entrepreneurs care about real returns, not merely nominal profits. The real entrepreneurial return in region r is therefore defined as nominal operating profit deflated by the local manufacturing price index:

$$\omega_r = \frac{\pi_r}{P_r^{\mu}}. \tag{16}$$

The exponent μ appears because only the manufacturing component of the consumption basket is affected by the CES price index, while agriculture remains the numeraire.

Finally, entrepreneurs relocate according to a reduced-form migration law:

$$\dot{\lambda} = \chi\lambda(1-\lambda)\big[\ln\omega_1 - \ln\omega_2\big], \qquad \chi > 0. \tag{17}$$

The parameter χ measures the speed of relocation. A larger χ implies that entrepreneurial location responds more quickly to differences in real returns across regions.

2.5 Short-run banking equilibrium

Lemma 1. *Suppose banks in region r compete in loan quantities under the inverse demand schedule $i_r(M_r) = a - bM_r$. Then the symmetric Cournot equilibrium local loan rate is*

$$i_r^* = \frac{a}{K_r + 1}. \tag{18}$$

Proof. Let bank j in region r choose its loan quantity m_{rj} to maximize its profit, taking the loan quantities of all other banks as given. Assume the marginal cost of providing a loan is zero. Total local lending is the sum of loans provided by all K_r banks:

$$M_r = \sum_{k=1}^{K_r} m_{rk} = m_{rj} + M_{-j},$$

where $M_{-j} = \sum_{k\neq j} m_{rk}$ represents the aggregate loan quantity supplied by all other banks in the region.

The profit function for bank j is its revenue from lending:

$$\Pi_{rj} = i_r(M_r)m_{rj} = (a - bM_r)m_{rj}.$$

Substituting the breakdown of M_r, we can rewrite this as:

$$\Pi_{rj} = (a - b(m_{rj} + M_{-j}))\, m_{rj} = am_{rj} - bm_{rj}^2 - bM_{-j}m_{rj}.$$

To find the profit-maximizing quantity, we take the first-order condition (F.O.C.) with respect to m_{rj}, treating M_{-j} as a constant:

$$\frac{\partial \Pi_{rj}}{\partial m_{rj}} = a - 2bm_{rj} - bM_{-j} = 0.$$

To express this in terms of the total market quantity M_r, we add and subtract bm_{rj}:

$$\begin{aligned} a - bm_{rj} - b(m_{rj} + M_{-j}) &= 0 \\ a - bm_{rj} - bM_r &= 0. \end{aligned}$$

To ensure this critical point is a profit maximum, we verify the second-order condition (S.O.C.):

$$\frac{\partial^2 \Pi_{rj}}{\partial m_{rj}^2} = -2b < 0.$$

Since $b > 0$, the profit function is strictly concave, guaranteeing a unique global maximum.

In a symmetric equilibrium, all identical banks choose the same optimal loan quantity, so $m_{rj} = m_r$ for all $j \in \{1, \ldots, K_r\}$. Consequently, total lending is $M_r = K_r m_r$. Substituting this into the F.O.C.

yields:

$$\begin{aligned} a - b(K_r m_r) - b m_r &= 0 \\ a - b(K_r + 1) m_r &= 0. \end{aligned}$$

Solving for the individual bank's loan quantity m_r:

$$m_r = \frac{a}{b(K_r + 1)}.$$

The total equilibrium loan quantity in region r is then:

$$M_r = K_r m_r = \frac{aK_r}{b(K_r + 1)}.$$

Finally, we substitute the total equilibrium quantity M_r back into the inverse demand schedule to find the equilibrium local loan rate, i_r^*:

$$\begin{aligned} i_r^* &= a - bM_r \\ &= a - b\left(\frac{aK_r}{b(K_r + 1)}\right) \\ &= a - \frac{aK_r}{K_r + 1} \\ &= \frac{a(K_r + 1) - aK_r}{K_r + 1} \\ &= \frac{a}{K_r + 1}. \end{aligned}$$

□

Lemma 1 shows that more intense local bank competition, captured by a higher K_r, reduces the equilibrium loan rate in region r.

2.6 Finance-driven location incentives

Proposition 1 (Credit integration compresses borrowing-cost differentials). *Assume without loss of generality that $i_1^* \le i_2^*$. Then effective borrowing rates satisfy*

$$\tilde{i}_1 = i_1^*, \qquad \tilde{i}_2 = \min\{i_2^*,\ i_1^* + \kappa\}. \tag{19}$$

Hence

$$0 \le \tilde{i}_2 - \tilde{i}_1 \le \kappa. \tag{20}$$

In particular, if $\kappa = 0$, then $\tilde{i}_1 = \tilde{i}_2$.

Proof. By definition, the effective borrowing rate in region 1 is the minimum of the local rate and the remote rate plus the integration friction:

$$\tilde{i}_1 = \min\{i_1^*,\ i_2^* + \kappa\}.$$

By assumption, $i_1^* \le i_2^*$. Since the credit friction is non-negative ($\kappa \ge 0$), it strictly follows that:

$$i_1^* \le i_2^* \le i_2^* + \kappa.$$

Because the local rate is unambiguously lower than or equal to the cost of remote borrowing, firms in region 1 will borrow locally. Therefore, the effective rate simplifies to:

$$\tilde{i}_1 = i_1^*.$$

Firms in region 2 similarly compare their local rate i_2^* with their remote option $i_1^* + \kappa$. The effective borrowing rate in region 2 is:

$$\tilde{i}_2 = \min\{i_2^*,\ i_1^* + \kappa\}.$$

To find the effective borrowing-cost differential, we evaluate $\tilde{i}_2 - \tilde{i}_1$. Substituting our established expressions yields:

$$\tilde{i}_2 - \tilde{i}_1 = \min\{i_2^*,\ i_1^* + \kappa\} - i_1^*.$$

Using the algebraic property $\min\{A, B\} - C = \min\{A - C, B - C\}$, we can bring i_1^* inside the minimum operator:

$$\tilde{i}_2 - \tilde{i}_1 = \min\{i_2^* - i_1^*,\ (i_1^* + \kappa) - i_1^*\} = \min\{i_2^* - i_1^*,\ \kappa\}.$$

Next, we establish the bounds for this differential. First, by the premise $i_1^* \leq i_2^*$, we know that $i_2^* - i_1^* \geq 0$. Since $\kappa \geq 0$, the term $\min\{i_2^* - i_1^*,\ \kappa\}$ is the minimum of two non-negative numbers, meaning the result must be non-negative:

$$\tilde{i}_2 - \tilde{i}_1 \geq 0.$$

Second, by the definition of the minimum function, the output cannot exceed any of its arguments. Therefore:

$$\min\{i_2^* - i_1^*,\ \kappa\} \leq \kappa.$$

Combining these two inequalities, we obtain the required bounds:

$$0 \leq \tilde{i}_2 - \tilde{i}_1 \leq \kappa.$$

Finally, consider the case of perfect credit integration where $\kappa = 0$. Substituting $\kappa = 0$ into the bounded inequality yields:

$$0 \leq \tilde{i}_2 - \tilde{i}_1 \leq 0,$$

which strictly implies $\tilde{i}_2 - \tilde{i}_1 = 0$, and therefore $\tilde{i}_1 = \tilde{i}_2$. □

Proposition 1 states that the interregional lending friction κ acts as an upper bound on the effective financing wedge between the two regions.

Proposition 2 (The lower-cost region attracts entrepreneurs). *Consider the symmetric allocation $\lambda = \frac{1}{2}$, and suppose regional expenditures are equal, $Y_1 = Y_2 = Y$. If $p_1 < p_2$, then $\pi_1 > \pi_2$ and $\omega_1 > \omega_2$. Consequently,*

$$\dot{\lambda} > 0, \tag{21}$$

so entrepreneurs relocate toward region 1.

Proof. Let

$$A \equiv p_1^{1-\sigma}, \qquad B \equiv p_2^{1-\sigma}.$$

Because $p_1 < p_2$ and the elasticity of substitution $\sigma > 1$ implies $1 - \sigma < 0$, it strictly follows that

$A > B > 0$. At the symmetric allocation $\lambda = \frac{1}{2}$, the local price indices satisfy:

$$P_1^{1-\sigma} = \frac{N}{2}(A + \phi B), \tag{22}$$

$$P_2^{1-\sigma} = \frac{N}{2}(\phi A + B). \tag{23}$$

Substituting these price index expressions and the symmetric expenditure $Y_1 = Y_2 = Y$ into the nominal profit Equations (14) and (15) yields:

$$\pi_1 = \frac{2\mu Y}{\sigma N} A \left[\frac{1}{A + \phi B} + \frac{\phi}{\phi A + B}\right], \tag{24}$$

$$\pi_2 = \frac{2\mu Y}{\sigma N} B \left[\frac{\phi}{A + \phi B} + \frac{1}{\phi A + B}\right]. \tag{25}$$

Define the relative price transformation u as:

$$u \equiv \frac{A}{B} = \left(\frac{p_2}{p_1}\right)^{\sigma-1}.$$

Since $p_2 > p_1$ and $\sigma > 1$, it follows that $u > 1$. Dividing π_1 by π_2 and substituting u, we obtain:

$$\frac{\pi_1}{\pi_2} = \frac{u\left[\frac{1}{u+\phi} + \frac{\phi}{\phi u+1}\right]}{\frac{\phi}{u+\phi} + \frac{1}{\phi u+1}}. \tag{26}$$

To evaluate whether $\pi_1 > \pi_2$, we simplify the ratio by finding a common denominator for the bracketed terms:

$$\begin{aligned}\frac{\pi_1}{\pi_2} &= \frac{u\left[\frac{\phi u+1+\phi(u+\phi)}{(u+\phi)(\phi u+1)}\right]}{\frac{\phi(\phi u+1)+1(u+\phi)}{(u+\phi)(\phi u+1)}} \\ &= \frac{u(2\phi u + 1 + \phi^2)}{\phi^2 u + 2\phi + u}.\end{aligned}$$

Subtracting 1 from both sides yields:

$$\begin{aligned}\frac{\pi_1}{\pi_2} - 1 &= \frac{2\phi u^2 + u + u\phi^2 - (\phi^2 u + 2\phi + u)}{\phi^2 u + 2\phi + u} \\ &= \frac{2\phi u^2 - 2\phi}{\phi^2 u + 2\phi + u} \\ &= \frac{2\phi(u^2 - 1)}{\phi^2 u + 2\phi + u}.\end{aligned}$$

Factoring the numerator gives the final simplified expression:

$$\frac{\pi_1}{\pi_2} - 1 = \frac{2\phi(u-1)(u+1)}{\phi^2 u + 2\phi + u}. \tag{27}$$

Since trade is subject to frictions ($\phi \in (0, 1)$) and $u > 1$, all terms in the numerator and denominator are strictly positive. Therefore, $\frac{\pi_1}{\pi_2} - 1 > 0$, which unequivocally implies $\pi_1 > \pi_2$.

Moreover, since $A > B$, we can compare the components of the price indices:

$$A + \phi B > \phi A + B \quad \Longleftrightarrow \quad (1 - \phi)(A - B) > 0.$$

Because trade freeness $\phi < 1$, this inequality holds, implying $P_1^{1-\sigma} > P_2^{1-\sigma}$. Given that the exponent $1-\sigma$ is strictly negative, the function is monotonically decreasing, which requires:

$$P_1 < P_2.$$

Using the definition of real entrepreneurial return from Equation (16), we obtain:

$$\frac{\omega_1}{\omega_2} = \frac{\pi_1}{\pi_2}\left(\frac{P_2}{P_1}\right)^{\mu}.$$

Because $\frac{\pi_1}{\pi_2} > 1$, $P_2 > P_1$, and the expenditure share $\mu > 0$, it follows strictly that:

$$\frac{\omega_1}{\omega_2} > 1.$$

Finally, substituting $\omega_1 > \omega_2$ into the migration law Equation (17) yields:

$$\dot{\lambda} = \chi\lambda(1-\lambda)\big[\ln\omega_1 - \ln\omega_2\big] > 0.$$

Entrepreneurs will continuously relocate toward region 1. □

Proposition 2 shows that a region with a lower producer price, and hence lower effective financing cost, offers both higher firm profits and a lower local cost of living, making it more attractive to entrepreneurs.

Proposition 3 (External-finance dependence amplifies finance-based agglomeration)**.** *Suppose $i_1^* < i_2^*$ and $i_1^* + \kappa < i_2^*$, so firms in region 2 choose to borrow remotely from region 1. Then*

$$p_1 = 1 + \theta i_1^*, \qquad p_2 = 1 + \theta(i_1^* + \kappa). \tag{28}$$

At $\lambda = \frac{1}{2}$ and $Y_1 = Y_2$, the real-return ratio ω_1/ω_2 is increasing in both θ and κ:

$$\frac{\partial}{\partial\theta}\ln\left(\frac{\omega_1}{\omega_2}\right) > 0, \qquad \frac{\partial}{\partial\kappa}\ln\left(\frac{\omega_1}{\omega_2}\right) > 0. \tag{29}$$

Proof. Under the stated condition, region 1 firms borrow locally and region 2 firms borrow remotely, so Equation (28) follows directly from Equation (10). Define the relative price transformation $u(\theta,\kappa)$ as:

$$u(\theta,\kappa) \equiv \left(\frac{p_2}{p_1}\right)^{\sigma-1} = \left(\frac{1+\theta(i_1^*+\kappa)}{1+\theta i_1^*}\right)^{\sigma-1}. \tag{30}$$

From Proposition 2, the ratio of real entrepreneurial returns is:

$$\frac{\omega_1}{\omega_2} = \frac{\pi_1}{\pi_2}\left(\frac{P_2}{P_1}\right)^{\mu}.$$

At the symmetric allocation $\lambda = \frac{1}{2}$, the price indices are $P_1^{1-\sigma} = \frac{N}{2}(A + \phi B)$ and $P_2^{1-\sigma} = \frac{N}{2}(\phi A + B)$. Factoring out $B \equiv p_2^{1-\sigma}$, we can write these as:

$$\begin{aligned} P_1^{1-\sigma} &= \frac{N}{2}B(u+\phi), \\ P_2^{1-\sigma} &= \frac{N}{2}B(\phi u + 1). \end{aligned}$$

Dividing the second equation by the first gives $(P_2/P_1)^{1-\sigma} = \frac{\phi u+1}{u+\phi}$. Raising this to the power of $\frac{\mu}{1-\sigma}$

yields the real price index ratio:

$$\left(\frac{P_2}{P_1}\right)^{\mu} = \left(\frac{u+\phi}{\phi u+1}\right)^{\frac{\mu}{\sigma-1}}.$$

Using the nominal profit ratio $R(u,\phi) \equiv \frac{\pi_1}{\pi_2}$ defined in Equation (26), we rewrite the real return ratio as:

$$\frac{\omega_1}{\omega_2} = R(u,\phi)\left(\frac{u+\phi}{\phi u+1}\right)^{\frac{\mu}{\sigma-1}}, \tag{31}$$

where

$$R(u,\phi) = \frac{u\left[\frac{1}{u+\phi} + \frac{\phi}{\phi u+1}\right]}{\frac{\phi}{u+\phi} + \frac{1}{\phi u+1}} = \frac{2\phi u^2 + (1+\phi^2)u}{\phi^2 u + 2\phi + u}.$$

To determine how ω_1/ω_2 behaves with respect to u, we differentiate both components. First, applying the quotient rule to $R(u,\phi)$:

$$\begin{aligned}\frac{\partial R}{\partial u} &= \frac{(4\phi u + 1 + \phi^2)(\phi^2 u + 2\phi + u) - (2\phi u^2 + (1+\phi^2)u)(\phi^2+1)}{(\phi^2 u + 2\phi + u)^2} \\ &= \frac{2\phi(\phi^2 u^2 + \phi^2 + 4\phi u + u^2 + 1)}{(\phi^2 u + 2\phi + u)^2} > 0.\end{aligned}$$

Second, we differentiate the logarithmic price index component:

$$\begin{aligned}\frac{\partial}{\partial u}\ln\left(\frac{u+\phi}{\phi u+1}\right) &= \frac{1}{u+\phi} - \frac{\phi}{\phi u+1} \\ &= \frac{\phi u + 1 - \phi(u+\phi)}{(u+\phi)(\phi u+1)} \\ &= \frac{1-\phi^2}{(u+\phi)(\phi u+1)} > 0.\end{aligned}$$

Because both multiplicative components of ω_1/ω_2 strictly increase in u, the ratio ω_1/ω_2 is strictly increasing in u.

Next, we establish how u responds to changes in θ and κ. Taking the natural logarithm of u yields:

$$\ln u = (\sigma-1)\left[\ln\big(1+\theta(i_1^*+\kappa)\big) - \ln\big(1+\theta i_1^*\big)\right].$$

Differentiating with respect to θ yields:

$$\begin{aligned}\frac{\partial \ln u}{\partial \theta} &= (\sigma-1)\left[\frac{i_1^*+\kappa}{1+\theta(i_1^*+\kappa)} - \frac{i_1^*}{1+\theta i_1^*}\right] \\ &= (\sigma-1)\frac{(i_1^*+\kappa)(1+\theta i_1^*) - i_1^*\big(1+\theta(i_1^*+\kappa)\big)}{\big(1+\theta(i_1^*+\kappa)\big)\big(1+\theta i_1^*\big)} \\ &= (\sigma-1)\frac{i_1^* + \theta(i_1^*)^2 + \kappa + \theta\kappa i_1^* - i_1^* - \theta(i_1^*)^2 - \theta\kappa i_1^*}{\big(1+\theta(i_1^*+\kappa)\big)\big(1+\theta i_1^*\big)} \\ &= (\sigma-1)\frac{\kappa}{\big(1+\theta i_1^*\big)\big(1+\theta(i_1^*+\kappa)\big)} > 0.\end{aligned}$$

Differentiating $\ln u$ with respect to κ gives:

$$\frac{\partial \ln u}{\partial \kappa} = (\sigma-1)\frac{\theta}{1+\theta(i_1^*+\kappa)} > 0. \tag{32}$$

Since u is strictly increasing in both θ and κ, and ω_1/ω_2 is strictly increasing in u, it follows by the chain rule that:

$$\frac{\partial}{\partial\theta}\ln\left(\frac{\omega_1}{\omega_2}\right) > 0, \qquad \frac{\partial}{\partial\kappa}\ln\left(\frac{\omega_1}{\omega_2}\right) > 0.$$

□

Proposition 3 makes the economic mechanism explicit. The larger is θ, the more strongly firms' marginal costs respond to borrowing conditions. The larger is κ, the harder it is for firms in the disadvantaged region to access cheaper outside credit. Both forces magnify the real-return gap and strengthen the tendency for entrepreneurs to agglomerate in the financially favored region.

Our model yields three sharp implications. First, more intense local bank competition, summarized by a larger K_r, lowers the equilibrium loan rate i_r^*. Second, imperfect credit integration, summarized by κ, limits but does not eliminate financing differentials across space. Third, the sensitivity of entrepreneurial location to those financing differentials depends on θ, the degree of external-finance dependence. Thus, banking-market structure shapes entrepreneurial geography most strongly when firms rely heavily on outside finance and when remote lending remains costly.

2.7 Equilibrium characterization

This subsection closes the model by making regional expenditure explicit and by characterizing both the short-run equilibrium for a given entrepreneurial allocation and the long-run spatial equilibrium. To keep the banking channel parsimonious, we assume that aggregate bank profits are rebated lump-sum and equally across the two regions. This assumption isolates the effect of borrowing costs on entrepreneurial location from any separate income effect generated by the regional ownership of banks.

2.7.1 Short-run equilibrium for a given entrepreneurial allocation

Fix $\lambda \in [0,1]$. A short-run equilibrium conditional on λ is a collection

$$\{i_r^*, \tilde{i}_r, p_r, P_r, \pi_r, Y_r, \omega_r\}_{r=1,2}$$

such that: (i) banks play the symmetric Cournot equilibrium in each regional loan market; (ii) manufacturing firms set the Dixit–Stiglitz markup over marginal cost; (iii) consumers allocate expenditure optimally across all available varieties; and (iv) regional expenditure equals factor income plus the lump-sum transfer of bank profits.

From Lemma 1, the symmetric Cournot equilibrium in region r implies

$$i_r^* = \frac{a}{K_r+1}, \qquad M_r^* = \frac{aK_r}{b(K_r+1)}, \tag{33}$$

so total bank profit earned by banks located in region r is:

$$\Pi_r^B = i_r^* M_r^* = \frac{a^2 K_r}{b(K_r+1)^2}. \tag{34}$$

Let

$$\bar{\Pi}^B \equiv \frac{\Pi_1^B + \Pi_2^B}{2} \tag{35}$$

denote the per-region lump-sum transfer of aggregate bank profits.

Given the credit-market integration friction, effective borrowing rates are:

$$\tilde{i}_1 = \min\{i_1^*,\ i_2^* + \kappa\}, \qquad \tilde{i}_2 = \min\{i_2^*,\ i_1^* + \kappa\}. \tag{36}$$

Therefore, producer prices are:

$$p_r = 1 + \theta \tilde{i}_r, \qquad r \in \{1, 2\}. \tag{37}$$

Because each entrepreneur operates one variety, the mass of varieties produced in region 1 is λN, while that produced in region 2 is $(1-\lambda)N$. Hence, the manufacturing price indices satisfy:

$$P_1^{1-\sigma}(\lambda) = N\Big[\lambda p_1^{1-\sigma} + (1-\lambda)\phi p_2^{1-\sigma}\Big], \tag{38}$$

$$P_2^{1-\sigma}(\lambda) = N\Big[\lambda \phi p_1^{1-\sigma} + (1-\lambda) p_2^{1-\sigma}\Big]. \tag{39}$$

Given Equation (38)–(39), per-firm operating profits can be written as:

$$\pi_1 = \frac{\mu}{\sigma} p_1^{1-\sigma}\left(\frac{Y_1}{P_1^{1-\sigma}} + \phi \frac{Y_2}{P_2^{1-\sigma}}\right), \tag{40}$$

$$\pi_2 = \frac{\mu}{\sigma} p_2^{1-\sigma}\left(\phi\frac{Y_1}{P_1^{1-\sigma}} + \frac{Y_2}{P_2^{1-\sigma}}\right). \tag{41}$$

It is convenient to define the four reduced-form coefficients

$$\alpha_1(\lambda) \equiv \frac{\mu}{\sigma} p_1^{1-\sigma} P_1^{\sigma-1}, \qquad \beta_1(\lambda) \equiv \frac{\mu\phi}{\sigma} p_1^{1-\sigma} P_2^{\sigma-1}, \tag{42}$$

$$\alpha_2(\lambda) \equiv \frac{\mu\phi}{\sigma} p_2^{1-\sigma} P_1^{\sigma-1}, \qquad \beta_2(\lambda) \equiv \frac{\mu}{\sigma} p_2^{1-\sigma} P_2^{\sigma-1}, \tag{43}$$

so that

$$\pi_1 = \alpha_1(\lambda) Y_1 + \beta_1(\lambda) Y_2, \qquad \pi_2 = \alpha_2(\lambda) Y_1 + \beta_2(\lambda) Y_2. \tag{44}$$

Regional nominal expenditure equals labor income, entrepreneurial profit income, and the lump-sum transfer of bank profits:

$$Y_1 = \frac{L}{2} + \lambda N \pi_1 + \bar{\Pi}^B, \tag{45}$$

$$Y_2 = \frac{L}{2} + (1-\lambda) N \pi_2 + \bar{\Pi}^B. \tag{46}$$

Substituting (44) into Equation (45)–(46) yields the linear system:

$$\begin{pmatrix} 1 - \lambda N \alpha_1(\lambda) & -\lambda N \beta_1(\lambda) \\ -(1-\lambda) N \alpha_2(\lambda) & 1 - (1-\lambda) N \beta_2(\lambda) \end{pmatrix} \begin{pmatrix} Y_1 \\ Y_2 \end{pmatrix} = \begin{pmatrix} \frac{L}{2} + \bar{\Pi}^B \\ \frac{L}{2} + \bar{\Pi}^B \end{pmatrix}. \tag{47}$$

Let

$$\begin{aligned} A_{11}(\lambda) &\equiv 1 - \lambda N \alpha_1(\lambda), & A_{12}(\lambda) &\equiv -\lambda N \beta_1(\lambda), \\ A_{21}(\lambda) &\equiv -(1-\lambda) N \alpha_2(\lambda), & A_{22}(\lambda) &\equiv 1 - (1-\lambda) N \beta_2(\lambda), \end{aligned} \tag{48}$$

and define the determinant

$$\mathcal{D}(\lambda) \equiv A_{11}(\lambda) A_{22}(\lambda) - A_{12}(\lambda) A_{21}(\lambda). \tag{49}$$

Then, provided $\mathcal{D}(\lambda) > 0$, the regional expenditure pair is uniquely determined by:

$$Y_1(\lambda) = \frac{\left(\frac{L}{2} + \bar{\Pi}^B\right)\left[A_{22}(\lambda) - A_{12}(\lambda)\right]}{\mathcal{D}(\lambda)}, \tag{50}$$

$$Y_2(\lambda) = \frac{\left(\frac{L}{2} + \bar{\Pi}^B\right)\left[A_{11}(\lambda) - A_{21}(\lambda)\right]}{\mathcal{D}(\lambda)}. \tag{51}$$

Finally, real entrepreneurial returns are:

$$\omega_1(\lambda) = \frac{\pi_1(\lambda)}{P_1(\lambda)^\mu}, \qquad \omega_2(\lambda) = \frac{\pi_2(\lambda)}{P_2(\lambda)^\mu}. \tag{52}$$

Proposition 4 (Short-run equilibrium conditional on λ)**.** *For any fixed $\lambda \in [0,1]$, suppose $\mathcal{D}(\lambda) > 0$. Then there exists a unique short-run equilibrium conditional on λ, given by (33)–(52).*

Proof. The short-run equilibrium conditional on a fixed λ follows a recursive determination structure.

First, equations (33) through (37) determine the banking equilibrium loan quantities, interest rates, effective borrowing rates, and producer prices independently of regional income. Since $K_r \geq 1$, $a > 0$, and $b > 0$, these values are uniquely defined and strictly positive.

Second, given uniquely determined prices p_r and a fixed spatial allocation $\lambda \in [0,1]$, the CES manufacturing price indices $P_1^{1-\sigma}$ and $P_2^{1-\sigma}$ formulated in equations (38) and (39) are uniquely determined. Consequently, the reduced-form profit coefficients $\alpha_1(\lambda)$, $\beta_1(\lambda)$, $\alpha_2(\lambda)$, and $\beta_2(\lambda)$ defined in (42) and (43) evaluate to unique scalar values.

The regional nominal expenditures Y_1 and Y_2 are simultaneously determined by the linear system established in (47):

$$\begin{pmatrix} A_{11}(\lambda) & A_{12}(\lambda) \\ A_{21}(\lambda) & A_{22}(\lambda) \end{pmatrix} \begin{pmatrix} Y_1 \\ Y_2 \end{pmatrix} = \begin{pmatrix} \frac{L}{2} + \bar{\Pi}^B \\ \frac{L}{2} + \bar{\Pi}^B \end{pmatrix}.$$

Let $\mathbf{M}$ denote this 2×2 coefficient matrix. The determinant of $\mathbf{M}$ is defined as $\mathcal{D}(\lambda) \equiv A_{11}(\lambda)A_{22}(\lambda) - A_{12}(\lambda)A_{21}(\lambda)$. By assumption, $\mathcal{D}(\lambda) > 0$, meaning the matrix $\mathbf{M}$ is non-singular and strictly invertible.

The inverse of matrix $\mathbf{M}$ is given by:

$$\mathbf{M}^{-1} = \frac{1}{\mathcal{D}(\lambda)} \begin{pmatrix} A_{22}(\lambda) & -A_{12}(\lambda) \\ -A_{21}(\lambda) & A_{11}(\lambda) \end{pmatrix}.$$

To solve for regional expenditures, we multiply the inverse matrix by the constant vector of exogenous structural income:

$$\begin{pmatrix} Y_1 \\ Y_2 \end{pmatrix} = \frac{1}{\mathcal{D}(\lambda)} \begin{pmatrix} A_{22}(\lambda) & -A_{12}(\lambda) \\ -A_{21}(\lambda) & A_{11}(\lambda) \end{pmatrix} \begin{pmatrix} \frac{L}{2} + \bar{\Pi}^B \\ \frac{L}{2} + \bar{\Pi}^B \end{pmatrix}.$$

Expanding this matrix multiplication yields the unique, closed-form solutions for regional expenditures:

$$Y_1(\lambda) = \frac{\left(\frac{L}{2} + \bar{\Pi}^B\right)\left[A_{22}(\lambda) - A_{12}(\lambda)\right]}{\mathcal{D}(\lambda)},$$

$$Y_2(\lambda) = \frac{\left(\frac{L}{2} + \bar{\Pi}^B\right)\left[A_{11}(\lambda) - A_{21}(\lambda)\right]}{\mathcal{D}(\lambda)}.$$

Finally, with unique solutions for nominal expenditures Y_1 and Y_2, nominal entrepreneurial profits π_1 and π_2 are uniquely determined via the linear combinations in (44). Substituting these profits and the previously determined price indices into (52) guarantees a unique value for the real entrepreneurial returns $\omega_1(\lambda)$ and $\omega_2(\lambda)$.

Thus, for any given λ, the collection of variables defining the short-run equilibrium exists and is uniquely determined. □

2.7.2 Long-run spatial equilibrium

Given the short-run equilibrium conditional on λ, define the real-return differential

$$H(\lambda) \equiv \ln \omega_1(\lambda) - \ln \omega_2(\lambda). \tag{53}$$

The migration law can then be written compactly as:

$$\dot{\lambda} = \chi\lambda(1-\lambda)H(\lambda), \qquad \chi > 0. \tag{54}$$

A long-run spatial equilibrium is a value $\lambda^* \in [0,1]$ such that

$$\dot{\lambda} = 0. \tag{55}$$

Because of the multiplicative term $\lambda(1-\lambda)$, both corner allocations $\lambda^* = 0$ and $\lambda^* = 1$ are always stationary. Any interior long-run equilibrium $\lambda^* \in (0,1)$ must satisfy:

$$H(\lambda^*) = 0, \qquad \text{or equivalently} \qquad \omega_1(\lambda^*) = \omega_2(\lambda^*). \tag{56}$$

Proposition 5 (Existence and stability of long-run equilibria)**.** *Suppose $\mathcal{D}(\lambda) > 0$ for all $\lambda \in [0,1]$. Then $H(\lambda)$ is continuous on $[0,1]$, and the following statements hold.*

1. *The corner allocations $\lambda^* = 0$ and $\lambda^* = 1$ are stationary equilibria.*
2. *Any interior stationary equilibrium $\lambda^* \in (0,1)$ satisfies $H(\lambda^*) = 0$.*
3. *If $H(0)H(1) < 0$, then there exists at least one interior equilibrium $\lambda^* \in (0,1)$.*
4. *An interior equilibrium $\lambda^* \in (0,1)$ is locally stable if and only if*
$$H'(\lambda^*) < 0. \tag{57}$$
5. *The corner equilibrium $\lambda^* = 0$ is locally stable if $H(0) < 0$, while the corner equilibrium $\lambda^* = 1$ is locally stable if $H(1) > 0$.*

Proof. Let the continuous migration dynamics be governed by the phase equation:

$$f(\lambda) \equiv \dot{\lambda} = \chi\lambda(1-\lambda)H(\lambda).$$

A spatial equilibrium requires $f(\lambda) = 0$.

For part (i), evaluating the phase equation at the boundaries yields $f(0) = 0$ and $f(1) = 0$, confirming that the corner allocations $\lambda^* = 0$ and $\lambda^* = 1$ are always stationary equilibria.

For part (ii), any interior stationary equilibrium $\lambda^* \in (0,1)$ must satisfy $f(\lambda^*) = 0$. Because $\lambda^*(1-\lambda^*) > 0$ for all strictly interior allocations, it must necessarily be true that $H(\lambda^*) = 0$.

For part (iii), the function $H(\lambda)$ is the difference of the natural logarithms of the real entrepreneurial returns. Since the short-run equilibrium values are uniquely determined and continuous in λ, and because the condition $\mathcal{D}(\lambda) > 0$ rules out any singularities in the linear expenditure system, $H(\lambda)$ is continuous on the closed interval $[0, 1]$. If $H(0)H(1) < 0$, then $H(0)$ and $H(1)$ have opposite signs. By the Intermediate Value Theorem, there exists at least one point $\lambda^* \in (0, 1)$ such that $H(\lambda^*) = 0$, establishing the existence of an interior equilibrium.

For parts (iv) and (v), we determine local asymptotic stability by evaluating the first derivative of the phase equation:

$$f'(\lambda) = \chi(1 - 2\lambda)H(\lambda) + \chi\lambda(1 - \lambda)H'(\lambda).$$

An equilibrium λ^* is locally stable if and only if $f'(\lambda^*) < 0$.

Evaluating stability for an interior equilibrium $\lambda^* \in (0, 1)$: Because $H(\lambda^*) = 0$ from part (ii), the first term of the derivative vanishes, leaving:

$$f'(\lambda^*) = \chi\lambda^*(1 - \lambda^*)H'(\lambda^*).$$

Since $\chi > 0$ and $\lambda^*(1 - \lambda^*) > 0$, the condition $f'(\lambda^*) < 0$ is satisfied if and only if:

$$H'(\lambda^*) < 0.$$

This proves part (iv).

Evaluating stability for the corner equilibria: At $\lambda^* = 0$, the derivative simplifies to:

$$f'(0) = \chi(1 - 0)H(0) + 0 = \chi H(0).$$

Since $\chi > 0$, local stability at the origin ($f'(0) < 0$) strictly requires $H(0) < 0$.

At $\lambda^* = 1$, the derivative simplifies to:

$$f'(1) = \chi(1 - 2)H(1) + 0 = -\chi H(1).$$

Since $\chi > 0$, local stability at full agglomeration ($f'(1) < 0$) strictly requires $-\chi H(1) < 0$, which simplifies to $H(1) > 0$. This proves part (v). □

2.7.3 Symmetric benchmark

The fully symmetric benchmark is useful for orientation. Suppose

$$K_1 = K_2 \equiv K,$$

so that both regions have the same number of banks and hence identical local banking competition. Then Lemma 1 implies

$$i_1^* = i_2^* = \frac{a}{K + 1},$$

which in turn implies

$$\tilde{i}_1 = \tilde{i}_2 = \frac{a}{K + 1}, \qquad p_1 = p_2 = 1 + \theta\frac{a}{K + 1}.$$

At $\lambda = \frac{1}{2}$, it follows from Equation (38)–(39) that $P_1 = P_2$. By symmetry of the income system, $Y_1 = Y_2$, hence $\pi_1 = \pi_2$ and $\omega_1 = \omega_2$. Therefore,

$$H\left(\frac{1}{2}\right) = 0, \qquad \dot{\lambda} = 0 \quad \text{at} \quad \lambda = \frac{1}{2}. \tag{58}$$

This confirms that the symmetric allocation is a stationary equilibrium when the two regions are ex ante identical.

Remark 1. The equilibrium system above is deliberately parsimonious. The banking block is reduced-form, in the sense that the inverse loan-demand schedule summarizes firms' working-capital needs and bank market power. This is sufficient for the paper's purpose because all spatial effects operate through the endogenous borrowing rate wedge, which then feeds into prices, profits, and entrepreneurial migration.

2.7.4 Comparative-static

When region 1 has stronger local banking competition than region 2, i.e. $K_1 > K_2$, Lemma 1 implies the local loan-rate differential

$$\Delta_i^L \equiv i_2^* - i_1^* = \frac{a}{K_2 + 1} - \frac{a}{K_1 + 1} = \frac{a(K_1 - K_2)}{(K_1 + 1)(K_2 + 1)} > 0. \tag{59}$$

However, because firms can borrow remotely, the relevant effective financing wedge is:

$$\Delta_i \equiv \tilde{i}_2 - \tilde{i}_1 = \min\left\{\frac{a(K_1 - K_2)}{(K_1 + 1)(K_2 + 1)}, \kappa\right\}. \tag{60}$$

Since producer prices satisfy $p_r = 1 + \theta\tilde{i}_r$, the induced producer-price gap is:

$$p_2 - p_1 = \theta\Delta_i. \tag{61}$$

Equation (60) is especially useful because it makes clear that stronger local banking competition affects spatial outcomes only to the extent that interregional credit frictions prevent firms from perfectly arbitraging across regional loan markets.

2.8 Numerical simulation

This subsection illustrates the model's mechanism using a simple numerical exercise. The goal is not calibration, but to show how regional banking asymmetries translate into entrepreneurial relocation through the borrowing-cost channel.

Setup. We use the following baseline parameter values:

$$L = 100, \qquad N = 30, \qquad \mu = 0.35, \qquad \sigma = 4, \qquad \theta = 0.8,$$

$$a = 0.18, \qquad b = 1, \qquad \kappa = 0.10, \qquad K_1 + K_2 = \bar{K} = 12, \qquad T = 1.6.$$

These values imply a moderate expenditure share on manufactures, standard monopolistic-competition markup forces, substantial but incomplete external-finance dependence, and positive credit-market segmentation. The total number of banks is fixed at $\bar{K} = 12$, while the regional allocation of banks is allowed to vary.

To summarize regional banking asymmetry, define the bank share of region 1 as:

$$s_B \equiv \frac{K_1}{K_1 + K_2} \in [0.5, 0.9]. \tag{62}$$

Thus, larger s_B means that region 1 hosts a larger fraction of the aggregate banking sector and therefore enjoys stronger local bank competition. In the numerical exercise, $K_1 = s_B \bar{K}$ and $K_2 = (1 - s_B)\bar{K}$. For simulation purposes, K_1 and K_2 are treated as continuous, which is standard in comparative-static exercises of this kind.

Equilibrium computation. For each value of s_B, we proceed in four steps. First, we compute the regional loan rates

$$i_r^* = \frac{a}{K_r + 1}, \qquad r \in \{1, 2\}.$$

Second, we construct effective borrowing costs,

$$\tilde{i}_1 = \min\{i_1^*, i_2^* + \kappa\}, \qquad \tilde{i}_2 = \min\{i_2^*, i_1^* + \kappa\},$$

and then producer prices,

$$p_r = 1 + \theta \tilde{i}_r.$$

Third, for a given entrepreneurial allocation λ, we solve the short-run equilibrium characterized in the previous appendix subsection, including regional expenditure (Y_1, Y_2), profits (π_1, π_2), and real entrepreneurial returns (ω_1, ω_2). Finally, the long-run entrepreneurial allocation is obtained from the stationary condition:

$$H(\lambda) \equiv \ln \omega_1(\lambda) - \ln \omega_2(\lambda) = 0, \tag{63}$$

together with the local stability condition:

$$H'(\lambda^*) < 0. \tag{64}$$

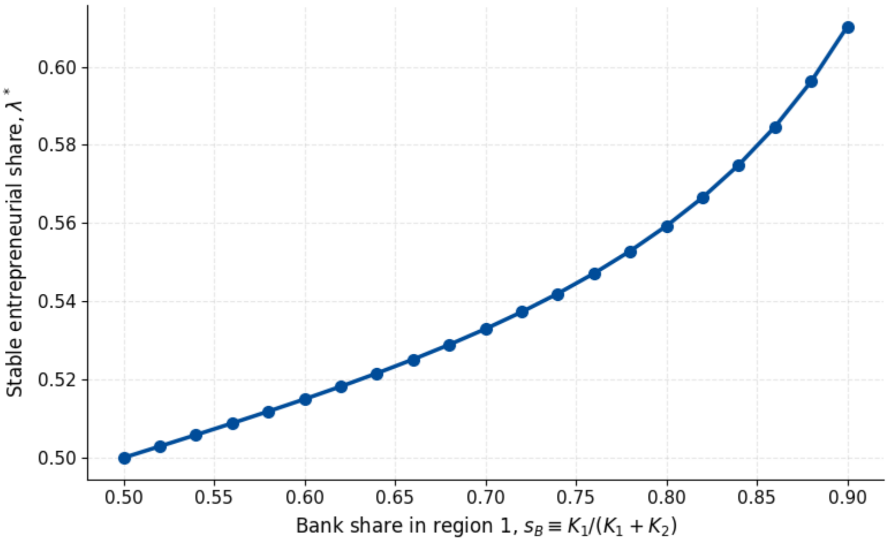
When an interior stable equilibrium exists, we report that value as λ^*. In the simulations below, the economically relevant equilibrium is the stable interior root.

Main result. Figure 1 plots the stable entrepreneurial share λ^* against the bank share s_B. The relationship is strictly increasing. When region 1 hosts a larger fraction of banks, local loan competition intensifies, its equilibrium loan rate declines, firms located there face lower effective marginal cost, and region 1 becomes more attractive to mobile entrepreneurs. The quantitative response is nonlinear: the effect becomes stronger as s_B moves further away from the symmetric benchmark $s_B = 0.5$.

Mechanism. Figure 2 shows the mechanism more directly. The solid line plots the local loan-rate gap $i_1^* - i_2^*$, while the dashed line plots the real-return ratio ω_1/ω_2, both evaluated at the symmetric entrepreneurial allocation $\lambda = 1/2$. As s_B rises, the local loan-rate gap becomes more negative, meaning that region 1's loan market becomes increasingly favorable relative to region 2's. At the same time, the real-return ratio rises above one, indicating that entrepreneurship becomes relatively more profitable in region 1. This figure makes clear that the location effect operates through the endogenous borrowing-cost differential.

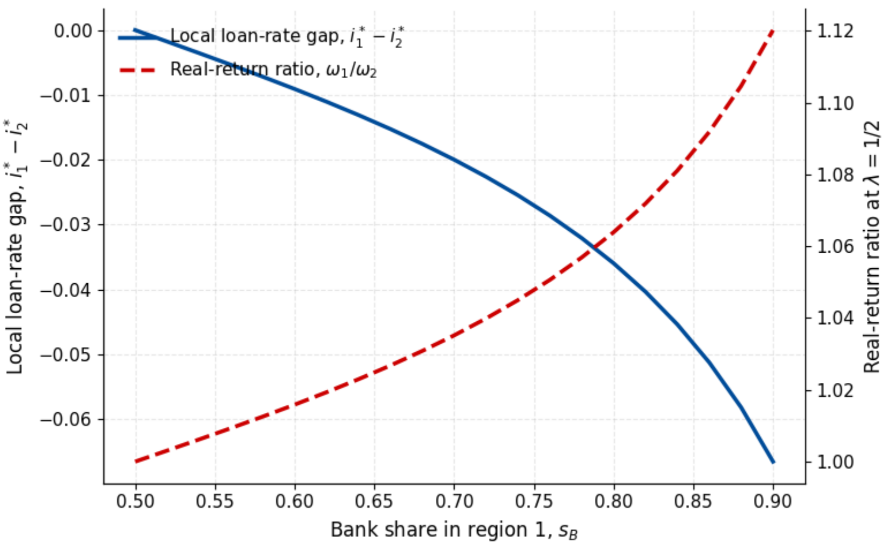
Trade costs and amplification. Figure 3 compares two values of iceberg trade costs, $T = 1.3$ and $T = 2.0$, holding all other parameters fixed. Lower trade costs produce a much steeper λ^*-schedule.

Figure 1: Bank competition and entrepreneurial location



Note: The figure plots the stable entrepreneurial share in region 1, λ^*, against the bank share s_B.

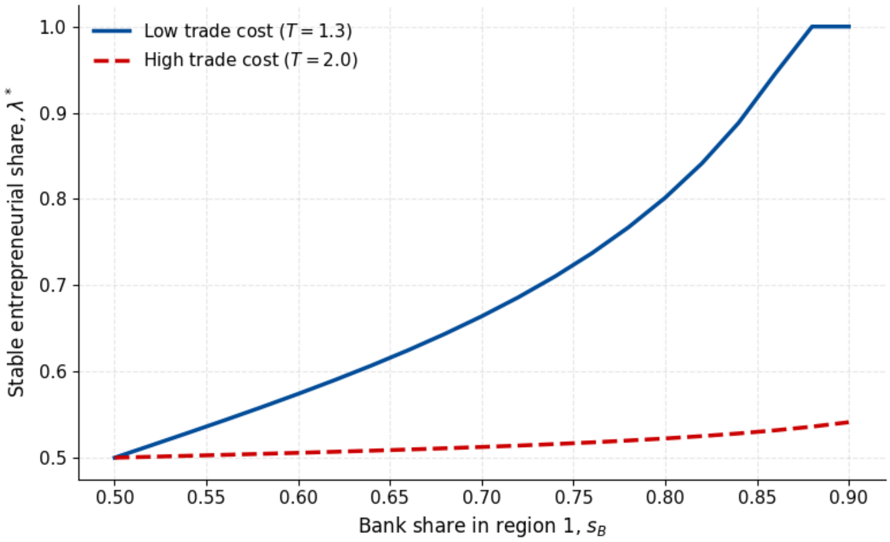
Figure 2: Loan rates and real returns



Note: The solid line shows the local loan-rate gap $i_1^* - i_2^*$; the dashed line shows the real-return ratio ω_1/ω_2 at $\lambda = 1/2$.

Intuitively, when goods markets are more integrated, firms in the financially favored region can serve the other market at lower trade cost, so the profitability advantage generated by cheaper finance is amplified. By contrast, when trade costs are high, the entrepreneurial response to banking asymmetry is considerably weaker.

Figure 3: Trade costs amplify the banking channel



Note: The figure compares the stable entrepreneurial share λ^* under low trade costs ($T = 1.3$) and high trade costs ($T = 2.0$).

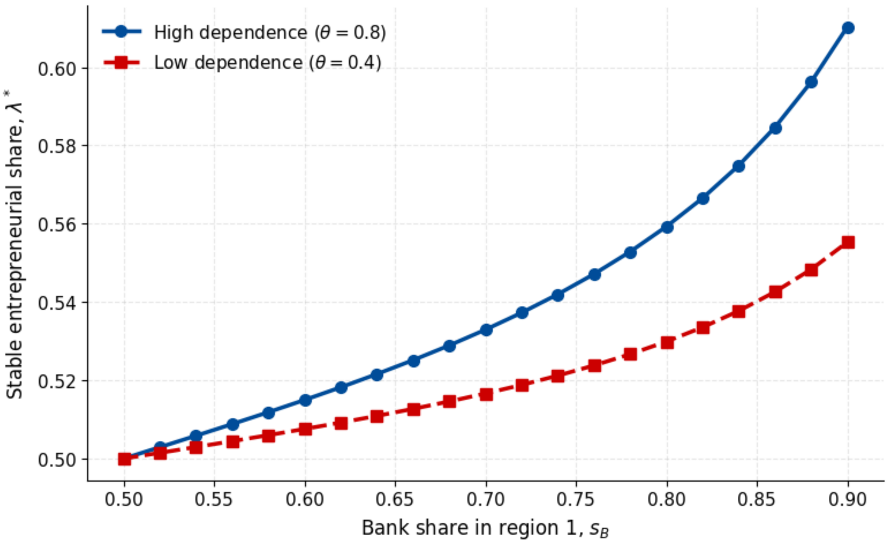
External-finance dependence. Figure 4 illustrates the amplifying role of external-finance dependence, echoing the analytical results of Proposition 3. The figure compares the baseline simulation ($\theta = 0.8$) against a low-dependence calibration ($\theta = 0.4$). When manufacturing firms can largely self-finance their variable costs, the λ^*-schedule flattens significantly. The regional advantage in borrowing costs still exists, but its pass-through into producer prices and real entrepreneurial returns is muted. This confirms that the spatial pull of a deep banking sector is most powerful for industries that rely heavily on external working-capital finance.

Discussion. The numerical exercise delivers four key conclusions. First, stronger local banking competition attracts entrepreneurs by lowering the equilibrium borrowing rate and thus production cost. Second, the effect is transmitted through real entrepreneurial returns rather than through a pure accounting identity. Third, this finance-based location mechanism is stronger when interregional goods trade is easier, because lower trade costs magnify the market-access value of a financial advantage. Fourth, the spatial pull of a deep banking sector is highly sensitive to external-finance dependence, confirming that industries heavily reliant on outside working capital are most responsive to regional credit asymmetries. Overall, the simulations complement the analytical propositions by showing that modest differences in banking structure can generate economically meaningful shifts in entrepreneurial geography.

3 Conclusion

This paper develops a tractable, two-region theory to demonstrate how local credit-market conditions shape entrepreneurial geography. By embedding an oligopolistic banking sector into a footloose-

Figure 4: External-finance dependence amplifies agglomeration



Note: The figure compares the stable entrepreneurial share λ^* under high external-finance dependence ($\theta = 0.8$) and low dependence ($\theta = 0.4$).

entrepreneur framework, the model shows that stronger local bank competition attracts mobile entrepreneurs by lowering effective borrowing costs, compressing producer prices, and raising real entrepreneurial returns. Crucially, this finance-driven agglomeration is not unconditional. Analytical and numerical results confirm that the spatial pull of a competitive banking sector is strictly bounded by interregional credit integration, magnified when goods trade is easier, and highly sensitive to a sector's reliance on external finance.

These mechanisms yield three distinct policy implications. First, local initiatives aimed at deepening bank competition or improving SME credit access act as *de facto* spatial policies, actively influencing where new entrepreneurship takes root. Second, reducing frictions in cross-regional lending—whether through financial technology or unified regulatory frameworks—can dampen inefficient, finance-driven agglomeration by decoupling local production costs from local banking structures. Finally, because the spatial banking channel is most pronounced in external-finance-dependent sectors and highly integrated goods markets, policymakers cannot treat financial, entrepreneurial, and regional integration policies in isolation. Joint policy design is essential to ensure that local financial advantages translate into broad economic growth rather than zero-sum geographic clustering.

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