The Political-Economy Origins of Economic Geography*

Xin Hu† Renliang Liu‡ Xuebo Wang§

October 17, 2026

Abstract

Prevailing theories of economic geography attribute the spatial concentration primarily to market forces such as agglomeration spillovers. This paper develops a political-economy framework in which political power acts as an independent centripetal force: whereas markets draw activity toward productive locations, political power draws resources toward administrative centers that control their allocation. Politically driven concentration can promote administrative centers by siphoning resources from nearby regions, creating economic discontinuities at administrative boundaries. By contrast, market-driven agglomeration can generate productivity gains and diffuse development to peripheral regions without generating such discontinuities. Thus, market-driven diffusion smooths spatial gradients in economic activity, whereas political siphoning produces a break at the administrative boundary. We test this framework using China's provincial capitals, where economic and political authority are jointly concentrated within a hierarchical administrative system. Applying a boundary-discontinuity design to high-resolution, 1×1 km gridded GDP data, we use economic discontinuities at provincial-capital boundaries as an empirical measure of politically siphoning. Province-level panel estimates show that higher levels of marketization are associated with significantly smaller capital-boundary discontinuities, suggesting that market allocation constrains political concentration. Larger discontinuities are associated with greater within-province factor misallocation, slower long-run growth, and wider spatial inequality. These findings establish political power as an important resource-allocation mechanism that promote central-city development through political siphoning, while disadvantaging nearby regions and generating substantial spatial misallocation and welfare losses.

Keywords: Economic geography, market forces, political siphoning, boundary discontinuities
JEL Classification: R11, R12, O18, O43, P16

*We thank participants at various seminars and conferences for their helpful comments and suggestions. All remaining errors are our own.

†School of Economics, Shanghai University of Finance and Economics; Email: xinhu@163.sufe.edu.cn

‡Li Anmin Institute of Economic Research, Liaoning University; Email: renliangliu@outlook.com

§School of Economics, Shanghai University of Finance and Economics; Email: wang.xuebo@mail.shufe.edu.cn

1 Introduction

Economic activity is highly unevenly distributed across space. A central question in economic geography is why some regions become dominant economic centers while others remain peripheral. A large literature explains spatial concentration through market forces, including transportation costs, increasing returns to scale, market access, and agglomeration externalities (Krugman et al., 1980; Krugman, 1991; Nordhaus, 2006; Redding and Sturm, 2008; Greenstone et al., 2010; Bosker and Buringh, 2017; Cuberes et al., 2021). These forces generate a centripetal pull toward productive locations: firms and workers cluster where proximity increases productivity, reduces transaction costs, and facilitates economic exchange.

This market-based perspective underpins modern theories of spatial equilibrium. It rests, however, on an important implicit assumption: resources are allocated primarily according to market fundamentals. This assumption is incomplete because state authority can also profoundly shape spatial distribution of economic activity. Where the state controls land, infrastructure, fiscal transfers, and access to opportunity, the map of economic activity may trace the location of political authority as closely as it traces the location of productivity. Spatial equilibrium theory, however, has largely overlooked political power as an independent centripetal force—a gap that limits our understanding of concentration and core–periphery dynamics.

This force is especially visible in developing economies, where administrative centers often dominate their surroundings. Yet their effects on surrounding regions can differ sharply. China provides a striking example. Beijing, the national political center, concentrates economic activity while drawing resources from neighboring regions. Shanghai, by contrast, is deeply integrated with the Yangtze River Delta, and its prosperity spills over to neighboring regions. Both are large, prosperous central cities, yet their relationships with surroundings differ fundamentally. This contrast raises a broader question: when does a dominant center lift its periphery, and when does it cast a growth shadow over it?

This question sits at the heart of a long-standing debate in spatial economics. Growth-pole theories stress the diffusion and linkage effects through which leading regions stimulate development in surrounding areas (Perroux, 1955). Theories of cumulative causation stress the opposite: dominant regions may draw resources away from their neighbors and entrench regional divergence (Myrdal and Sitohang, 1957; Hirschman, 1958). Recent empirical work has documented both patterns. Cuberes et al. (2021), for example, show that large cities in the United States shifted from casting "urban growth shadows" on nearby areas—when high transportation costs made proximity a competitive disadvantage—to generating positive spillovers as transport costs declined over the twentieth century. Existing explanations, however, focus almost entirely on market conditions that shape whether concentration helps or harms surrounding regions. They offer less insight into why

opposite center–periphery relationships coexist within the same country and period. We argue that political power is a missing part of the explanation.

This paper introduces political power as a distinct centripetal force in economic geography and develops a political-economy framework of spatial equilibrium in which both market and political forces shape the spatial distribution of economic activity. Market forces concentrate activity when proximity raises productivity, expands market access, or generates agglomeration economies. Political forces concentrate activity for a different reason: proximity to administrative authority can provide privileged access to state-controlled resources and opportunities. Activity may therefore cluster not only where production is most efficient, but where political authority is concentrated.

The distinction between these two forces is central to our analysis. Market-driven concentration responds to economic fundamentals. Firms and workers move toward higher productivity, better market access, and richer complementarities; the resulting clusters can transmit benefits outward through knowledge spillovers, input–output linkages, investment, and labor-market integration. A thriving center may thus become a growth pole whose expansion lifts its surroundings. We call this outward transmission diffusion. Politically driven concentration works differently. It arises when administrative authority confers advantages that are not explained by local productivity, drawing capital, firms, and talent toward the center because proximity provides access to state-controlled opportunities. In this case, political concentration can distort the spatial allocation of resources, and the center's growth may come at the expense of neighboring regions. We call this process political siphoning. The decisive question is thus not simply why economic activity concentrates, but which force drives that concentration and what it means for the periphery.

This distinction yields a sharp, testable prediction. If political authority has little independent influence on resource allocation, factors should move freely across administrative boundaries in response to economic fundamentals. Once geography and local economic conditions are accounted for, the boundaries should have little explanatory power, and economic activity should vary smoothly across them. By contrast, if administrative status confers privileged access to state-allocated resources, locations within administrative center should command a political premium. Holding geographic conditions and economic fundamentals constant, economic activity should fall discontinuously when crossing from the administrative center into surrounding jurisdictions. In this sense, diffusion smooths the spatial gradient of economic activity, whereas political siphoning produces a break at the administrative boundary.

China provides a particularly suitable setting for testing this prediction. Its administrative hierarchy closely links political authority to geographic jurisdiction. Provincial capitals and other administrative centers are both seats of government and major economic hubs, tightly intertwining political authority with economic geography. We examine the determinants of political siphoning and its spatial economic consequences. The first empirical challenge is measurement: how can

we distinguish concentration driven by political power from economic activity attributable to geography, market access, and other local fundamentals?

To address this challenge, we construct a measure of political siphoning based on economic discontinuities at administrative boundaries. Using high-resolution (1×1) km gridded GDP data, we employ a regression discontinuity design (RDD) that compares economic activity immediately inside and outside provincial-capital boundaries. Because locations on either side of a boundary are geographically close, this boundary-discontinuity design provides a local measure of the economic premium associated with being inside the political center's administrative jurisdiction. A large positive discontinuity indicates that resources are disproportionately concentrated within the boundary, consistent with political siphoning; a small or absent discontinuity indicates greater economic integration between the center and its surrounding regions, consistent with diffusion. The measure is designed to capture concentration associated with administrative status, rather than simply the overall economic advantage of a large city.

Figure 1 illustrates the RDD results for Beijing and Shanghai. We construct standardized GDP profiles extending 10 kilometers on either side of their administrative boundaries. Beijing exhibits a pronounced decline in GDP per square kilometer immediately outside its boundary, whereas Shanghai shows a substantially smoother spatial transition into neighboring Jiangsu and Zhejiang. These cases illustrate a central distinction in our framework: a political center may concentrate economic activity within its administrative jurisdiction, while a market-integrated economic center may serve as a growth pole for its surrounding region.

A major concern is that economic discontinuities at administrative borders may reflect factors other than political authority: central cities may have more favorable geographic endowments, better institutions, or greater cultural capital than adjacent areas, any of which could generate sharp differences across boundaries. We address this concern in several ways. First, we test for discontinuities in observable geographic covariates at provincial-capital boundaries and find no significant breaks, suggesting that these factors do not explain the observed patterns.

Second, we exploit a quasi-experimental shift in administrative boundaries: the 2018 merger that incorporated Laiwu, a neighboring prefecture-level city, into Jinan, the provincial capital of Shandong Province. This institutional change provides an opportunity to examine whether boundary discontinuities shift when jurisdictional boundaries change. Before the merger, the Jinan–Laiwu boundary exhibited a substantial GDP discontinuity; after the merger, this discontinuity disappeared. At the same time, discontinuities emerged along Laiwu's boundaries with neighboring cities, where none had previously been observed. These changes are difficult to reconcile with slowly evolving geographic, historical, or cultural factors. Instead, they are consistent with resources being reallocated in response to changes in administrative status. The simultaneous disappearance and emergence of boundary discontinuities thus provide direct evidence that administrative authority—

and the allocation mechanisms associated with it—plays a central role in shaping spatial economic outcomes.

We then extend the analysis to provincial capitals nationwide, examining both the determinants and consequences of administrative boundary discontinuities. Three main findings emerge. First, provincial-capitals boundaries typically exhibit significant economic discontinuities: economic activity is substantially higher just inside the boundary than just outside it.

Second, market institutions substantially constrain politically driven concentration. Using province-level panel data, we show that provinces with higher levels of marketization exhibit significantly smaller capital-boundary discontinuities. This relationship remains robust to province and year fixed effects and persists under instrumental-variable estimation. The evidence is consistent with well-functioning markets limiting the ability of administrative authority to concentrate resources in capital cities. When firms and factors can respond more freely to productivity and market incentives, political proximity becomes less important in shaping location. Marketization thus affects not only the level of economic activity but also the extent to which political hierarchy translates into spatial concentration.

Third, political concentration carries substantial economic costs. Larger boundary discontinuities are associated with greater spatial misallocation of production factors, slower long-run growth, and higher within-province inequality. These results suggest that politically induced concentration is more than a distributional shift in which one region gains at another's expense. By directing resources toward locations favored by administrative authority rather than economic fundamentals, it can misallocate resources across space and reduce aggregate economic performance.

This paper contributes to several strands of literature. First, it contributes to economic geography by identifying political power as an overlooked determinant of spatial equilibrium. Existing research has primarily focused on market forces underlying agglomeration and regional concentration (Krugman, 1991; Redding and Sturm, 2008; Allen and Arkolakis, 2014). We show that political authority operates as an additional centripetal force, generating a distinct form of spatial concentration through politically mediated resource allocation. We also develop a scalable empirical measure of this mechanism by combining high-resolution spatial economic data with a boundary-discontinuity design.

Second, we contribute to the literature on regional development and growth poles by identifying the institutional conditions under which central cities become engines of regional growth or sources of resource extraction. Prior studies document both positive spillovers from leading regions and negative displacement effects (Christaller, 1933; Perroux, 1955; Fujita and Krugman, 1995). We show that the balance between these forces depends on the relative strength of market institutions and administrative power. Some studies find that politically advantaged cities generate positive spillovers to neighboring regions (Bluhm et al., 2026). Our findings suggest that such spillovers are

less likely when a political center's advantage stems from administrative resource allocation rather than market-based productivity gains. In this case, political power may draw resources toward administrative centers, producing siphoning rather than diffusion.

Third, we contribute to the literature on political institutions and economic development by shifting attention from how administrative status benefits privileged cities to how it reshapes economic interactions across regions (Henderson, 2010; Lü and Landry, 2014; Alder et al., 2016). We show that administrative advantages can promote local development while also generating spatial factor misallocation and reducing regional efficiency. We further quantify the general-equilibrium spatial economic consequences of these distortions. More broadly, our findings establish political power as an important mechanism of resource allocation: it can promote the development of central cities through political siphoning, while disadvantaging nearby regions and generating substantial spatial misallocation and welfare losses.

2 Institutional Background and Conceptual Framework

This section develops the political-economy framework underlying our empirical analysis. We begin by describing how China's administrative hierarchy gives provincial capitals privileged access to state-controlled resources. We then distinguish two forces that shape the spatial distribution of economic activity. Political power acts as a centripetal force by making proximity to administrative authority economically valuable, thereby concentrating resources and population inside the political center. Market forces, in contrast, can diffuse economic activity outward as firms and workers respond to productivity, costs, and market access rather than political proximity. The spatial pattern around a provincial capital therefore depends on the relative strength of these two forces. When political allocation dominates, the center may siphon economic activity from neighboring jurisdictions; when market allocation is sufficiently strong, the economic advantages of the center can instead diffuse across administrative boundaries. We use this framework to derive three testable hypotheses.

2.1 Political Power as a Spatial Allocation Mechanism

Political power can shape economic geography because governments do not merely set general rules; they also allocate resources across space. Where the state retains substantial discretion over land, credit, fiscal transfers, infrastructure, administrative approvals, and public services, the spatial distribution of economic activity partly reflects the geography of political authority. The seat of government is therefore more than a symbolic center. It is the location where authority is exercised, policy information is concentrated, and politically mediated resources can be accessed

most directly.

China provides a useful setting for studying this mechanism because its governance operates through a nested administrative hierarchy comprising provinces, prefectures, counties, and townships. Cities function not only as economic agglomerations but also as political and administrative units with defined positions in the hierarchy. Within each province, the provincial capital holds a unique position as the seat of the provincial government and the spatial locus of provincial authority. Provincial-capital status is thus the institutional carrier through which political authority is exercised in space. This arrangement creates scope for systematic political bias in the allocation of public resources (Bluhm et al., 2026; Chen et al., 2017; Henderson et al., 2018; Bai and Jia, 2023; Bo, 2020; Bo and Cheng, 2021).

The incentives facing provincial officials can reinforce this concentration. Under a political promotion system that places substantial weight on local economic performance, officials have strong career incentives to direct resources toward projects and locations where returns are visible, measurable, and administratively controllable (Coase and Wang, 2012; Li and Zhou, 2005)). The provincial capital is the most visible political and economic showcase within the province. Concentrating investment and public resources there can generate observable outcomes while facilitating monitoring, coordination, and control by provincial authorities (Landry, 2008).

Political allocation operates through several concrete channels. Provincial governments have frequently adopted the "Strong Capital" strategy that concentrate fiscal transfers, land quotas, infrastructure projects, and administrative approvals in provincial capitals. Financial and fiscal institutions may reinforce this advantage: politically central cities can obtain more favorable access to credit and intergovernmental transfers, while firms located close to government agencies may face lower costs of obtaining permits, subsidies, land, regulatory approvals, and policy information. Political proximity can therefore generate a location-specific economic premium even when nearby jurisdictions have otherwise similar market fundamentals.

The central implication is that political power is spatially embedded. When politically allocated advantages are sufficiently large, firms, capital, skilled workers, and public services have incentives to locate inside the administrative core. The resulting concentration differs fundamentally from ordinary market-driven agglomeration: the advantage derives not primarily from local productivity or market access, but from the economic value of proximity to political authority. We refer to this process as political siphoning—the concentration of economic activity inside the political center that occurs partly at the expense of neighboring jurisdictions.

Importantly, concentration itself does not imply siphoning. A productive city can attract firms and workers through market forces while simultaneously generating benefits for surrounding areas. The distinguishing feature of political siphoning is therefore not that the center is large, but that the economic advantage associated with political proximity creates a discontinuity between the

administrative core and its immediate surroundings.

2.2 From Administrative Rank to Political Proximity

The idea that politics shapes urban development is not new. A well-established literature identifies two channels. First, political hierarchy or administrative rank directly affects urban development: in countries with weak market institutions, cities designated as capitals or granted higher administrative status tend to grow disproportionately large (Ades and Glaeser, 1995; Henderson, 2003). Second, political favoritism channels resources toward preferred locations, particularly leaders' birthplaces or regions with which they share ethnic or personal ties (Hodler and Raschky, 2014; Campante and Do, 2014).

Neither perspective, however, explains why central cities with the same administrative rank can generate sharply different spatial effects in their surrounding areas. Beijing and Shanghai both occupy the highest level of China's administrative hierarchy, yet Beijing appears to siphon economic activity from its periphery, whereas Shanghai appears to generate stronger diffusion toward neighboring regions. Administrative rank and policymakers' preferences alone cannot account for this divergence.

Our key departure is to argue that the critical factor is not rank or preferences per se, but political power as a centripetal force—one that operates through institutional mechanisms and does not depend on the intentions of individual policymakers. The experience of Xiong'an New Area helps illustrate this point. In an effort to relocate selected non-capital functions from Beijing, the central government designated Xiong'an as a relocation destination and invested heavily in its infrastructure. Yet despite substantial policy support and the relocation of some enterprises, commercial development and population inflows into Xiong'an have remained limited relative to the scale of intervention. This pattern suggests that Beijing's gravitational pull rests on institutional advantages—including proximity to regulatory authority, policy information, administrative networks, and discretionary resources—that cannot be reproduced simply by relocating enterprises or constructing physical infrastructure.

The implication is that political siphoning reflects the institutional operation of political power rather than administrative rank or individual favoritism alone. Rank identifies where political authority is formally located, while political power determines the economic value of proximity to that authority.

This perspective can be formalized within the standard framework of spatial economics. Canonical models of economic geography view spatial concentration as the outcome of opposing centripetal and centrifugal forces (Krugman, 1991; Fujita et al., 1999; Helpman, 1998; Redding, 2024). Centripetal forces—including transportation-cost savings, increasing returns, labor-market

pooling, input-output linkages, and knowledge spillovers—draw firms and workers toward existing economic centers. Centrifugal forces—including land costs, congestion, commuting costs, and other urban disamenities—push activity outward. Spatial equilibrium reflects the balance among these forces.

We introduce political power as an additional centripetal force. Unlike market-based centripetal forces, which attract economic activity because proximity raises productivity or lowers economic costs, political centripetal forces attract activity because proximity to administrative authority increases access to state-controlled resources, information, and opportunities. Political proximity thus creates an institutional advantage that is tied to administrative location rather than to underlying economic fundamentals.

This distinction is central to our empirical strategy. A central city can be economically dominant for two very different reasons. If its dominance reflects productivity and agglomeration economies, its economic advantages may spread to nearby jurisdictions as firms and workers arbitrage differences in costs and opportunities. If its dominance instead reflects political rents, the same administrative boundary can become a barrier that concentrates resources inside the center. The two mechanisms can therefore generate similar levels of urban concentration while producing very different spatial patterns around the center.

2.3 Market Forces as a Countervailing Force

Political concentration does not operate in isolation. Market forces can counteract the spatial pull of political authority by allowing firms and workers to respond to economic fundamentals.

When markets play a larger role in resource allocation, location decisions depend more heavily on productivity, wages, transportation costs, land prices, market access, and agglomeration economies, and less heavily on political proximity. Firms may locate outside the administrative center when land is cheaper, congestion is lower, transportation links are better, or production networks are more efficient. Workers may similarly live or work across administrative boundaries as labor markets become more integrated. Economic activity can therefore spread from the central city to neighboring jurisdictions even when the center itself remains highly productive.

This process generates what we call market diffusion: the outward transmission of the economic advantages of the central city to nearby jurisdictions through factor mobility, trade, commuting, production linkages, and other market interactions. Unlike political siphoning, diffusion reduces rather than amplifies the economic discontinuity associated with an administrative boundary.

Marketization strengthens this countervailing force through several channels. Greater reliance on market allocation reduces discretionary government intervention; a larger private sector reduces firms' dependence on politically allocated capital; more developed product and factor markets

improve price signals and facilitate mobility; and stronger legal and intermediary institutions make economic transactions less dependent on direct administrative access. Marketization therefore need not eliminate political power. Rather, it reduces the relative return to political proximity by increasing the ability of firms and workers to respond to market opportunities elsewhere.

The spatial outcome is consequently determined by the relative strength of political and market forces. When political allocation dominates, the premium associated with locating inside the administrative center can outweigh the cost advantages of neighboring jurisdictions, producing political siphoning. When market allocation is sufficiently strong, firms and workers can arbitrage these differences, allowing the economic advantages of the center to diffuse outward. The same administrative center can therefore generate either a sharp center–periphery discontinuity or a smooth spatial gradient depending on the institutional environment in which it operates.

2.4 Theoretical Predictions and Testable Hypotheses

The framework yields three predictions that map directly into our empirical analysis.

Prediction 1: Political concentration. If political proximity generates a location-specific economic premium, economic activity should be discontinuously higher immediately inside the boundary of a provincial capital than immediately outside it. The discontinuity reflects the capitalization of politically mediated advantages into the location of firms, capital, workers, and public resources.

Hypothesis 1 (Political Concentration). Provincial capitals exhibit positive GDP discontinuities at their administrative boundaries when political-power-driven allocation concentrates economic activity inside the administrative core—the empirical signature of a siphoning effect.

Prediction 2: Market constraints. The strength of this discontinuity should depend on the institutional environment. Greater marketization increases the ability of firms and workers to respond to economic fundamentals and weakens their dependence on political access. It should therefore reduce the spatial footprint of political siphoning and facilitate diffusion across administrative boundaries.

Hypothesis 2 (Market Constraints). Higher provincial marketization is associated with smaller provincial-capital boundary discontinuities, reflecting weaker siphoning and stronger spatial diffusion as market allocation constrains the premium to political proximity.

Prediction 3: Aggregate consequences. If the boundary discontinuity captures politically driven concentration rather than productive agglomeration, a larger discontinuity should be associated with inefficient spatial allocation. Resources concentrated in the administrative center may otherwise have been deployed in locations where their market returns are higher, generating excessive capital-city primacy and weaker development in surrounding areas.

Hypothesis 3 (Spatial Economic Consequences). Larger provincial-capital boundary discontinuities are associated with greater spatial misallocation of resources, weaker provincial growth, higher capital-city primacy, and greater within-province inequality, representing the welfare cost of politically driven concentration.

Together, these hypotheses provide a coherent empirical test of the framework. Boundary discontinuities measure the local spatial footprint of political concentration relative to market diffusion; marketization captures the institutional strength of market allocation relative to political allocation; and aggregate outcomes assess the broader economic consequences of this spatial distortion. The framework therefore distinguishes not simply between large and small central cities, but between two fundamentally different sources of spatial concentration: agglomeration driven by economic fundamentals and concentration driven by political proximity.

3 Data

The empirical design requires measures of economic activity that are both spatially precise and comparable across provinces. County- or prefecture-level data are too coarse to measure changes in economic activity at administrative boundaries, while a purely city-level comparison would confound boundary effects with broader differences between urban systems. We therefore use the China 1 km × 1 km Gridded GDP dataset compiled by the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. This dataset spatially disaggregates county-level GDP to 1 km grid cells using a multi-factor weighting scheme that combines land-use type, nighttime light intensity, and settlement density—indicators closely correlated with economic activity. The data cover 2000, 2005, 2010, 2015, and 2019 and are reported in units of RMB 10,000.

Specifically, county-level GDP is allocated to grid cells using the following multi-factor weighted method:

$$GDP_{ij} = GDP \times \frac{Q_{ij}}{Q}, \tag{1}$$

where GDP_{ij} denotes the estimated GDP of grid cell (i, j); GDP is the county-level GDP of the grid cell's administrative unit; Q_{ij} is the composite weight for cell (i, j), constructed from land-use type, nighttime light intensity, and settlement density; and $Q = \sum_{(i,j)} Q_{ij}$ is the sum of composite weights across all grid cells within the county.

To assess the reliability of the grid estimates, the Institute compared spatialized GDP with reported GDP for 40 townships across eastern, central, and western China for which complete township-level statistics are available. The relative errors range from 6% to 17%, suggesting satisfactory accuracy for the fine-scale comparisons used here.

Compared with commonly used nighttime-light measures, the spatialized GDP grid offers

several advantages for the boundary design in this study. Directly using nighttime lights at 1-km resolution often produces many zeros near urban boundaries despite the presence of population and economic activity; zeros may arise because artificial lighting is below satellite detection thresholds or is misclassified as transient sources or background noise (Henderson et al., 2012; Michalopoulos and Papaioannou, 2013, 2014). Prior studies (Yang et al., 2022) address boundary zeros by aggregating lights to larger units and applying log transformations, which reduce bias but sacrifice spatial precision and limit fine-scale analysis near administrative boundaries. The gridded GDP dataset used here incorporates additional covariates, including population proxies, land use, and settlement density, mitigating zero-value issues and improving spatial accuracy while preserving the local variation needed for boundary comparisons.

To capture the extent to which market forces constrain politically driven resource allocation, we measure provincial marketization using the China Marketization Index compiled by the Development Research Center of the State Council (Beijing Institute of National Economy). The index provides comparable province-level scores and rankings for 31 provincial units from 1997 to 2019. It covers six dimensions: government–market relations, development of the non-state sector, product-market development, factor-market development, development of market intermediary organizations, and the legal and institutional environment. Table 1 lists the 23 underlying indicators. These dimensions map closely to the mechanism in Section 2: they capture whether firms and factors depend primarily on administrative allocation or can instead obtain capital, inputs, contracts, legal protection, and market access through more market-oriented channels.

We exclude the four centrally administered municipalities—Beijing, Shanghai, Tianjin, and Chongqing—from the province-level analysis because their administrative status and urban structure are not directly comparable to provinces with distinct provincial capitals. The empirical sample therefore focuses on ordinary provinces, where provincial capitals are embedded within the regular provincial administrative hierarchy. Table 2 reports descriptive statistics for the main provincial-level variables. In addition, we compile province- and city-level controls from the China Statistical Yearbook and the China City Statistical Yearbook; descriptive statistics for these controls are reported in the Appendix A.

4 Boundary Discontinuities: Measurement, Interpretation, and Mechanism

This section develops the empirical object used throughout the study: the local discontinuity in gridded GDP at the provincial-capital boundary. The discontinuity makes the political–economy mechanism observable at a fine spatial scale. If administrative authority concentrates resources

inside the capital, economic activity should be higher just inside the capital boundary than in immediately adjacent areas. If market diffusion and spillovers dominate, economic activity should evolve more smoothly across the boundary. The discontinuity is therefore a spatial measure of the local balance between political concentration and market integration. We first construct this measure using high-resolution grid-level data. We then examine three threats to interpretation: discontinuities in geography, generic advantages of large cities, and fixed unobservables at the boundary. Finally, we use micro-level evidence on firms, services, and population to assess whether the observed GDP jumps are consistent with the proposed siphoning mechanism.

4.1 Estimating Boundary Discontinuities

Our empirical strategy measures the boundary footprint of siphoning by the jump in economic activity at the administrative boundary between a provincial capital and surrounding areas. This object follows directly from the conceptual framework. If political allocation concentrates resources in the capital, grid cells just inside the boundary should exhibit higher economic activity than nearby grid cells just outside it. If market integration and spillovers dominate, economic activity should change smoothly across the same boundary. The estimated jump therefore summarizes the extent to which the administrative boundary separates a politically favored core from its nearby periphery.

To implement this idea, we use the 1 km × 1 km gridded GDP data and estimate a boundary-discontinuity regression within a ±10 km buffer around each provincial-capital boundary. Let D_g^{it} indicate whether grid cell g lies on the provincial-capital side of the boundary, and let dist_g^{it} denote signed distance to the boundary, with positive values inside the provincial capital and negative values outside. We first write the boundary-discontinuity design in the following general form:

$$Y_g^{it} = \alpha^{it} + \tau^{it} D_g^{it} + f^{it}\left(D_g^{it}, \text{dist}_g^{it}\right) + \varepsilon_g^{it}, \tag{2}$$

where i, t, and g index city, year, and grid cell, respectively. The outcome Y_g^{it} is gridded GDP standardized within province-year, which puts estimates from different provinces and years on a comparable scale and prevents richer provinces from mechanically generating larger discontinuities. The function $f^{it}(\cdot)$ flexibly controls for smooth distance profiles around the boundary and allows those profiles to differ across the two sides of the boundary. It is normalized so that τ^{it} captures the discrete jump at the administrative cutoff rather than gradual changes with distance from the urban core.

The coefficient of interest is τ^{it}, which measures the boundary discontinuity. It compares predicted standardized GDP immediately inside the provincial-capital boundary with predicted standardized GDP immediately outside the boundary. A positive τ^{it} indicates that economic activity is higher just inside the provincial capital than just outside it, consistent with siphoning

or administrative concentration. A value close to zero indicates a smooth spatial profile across the boundary, consistent with spatial integration or the absence of a sharp siphoning footprint. A negative value implies that nearby adjacent areas are more economically active than capital-side cells and should be interpreted cautiously.

In the baseline implementation, we approximate the smooth distance component in the general specification using a quadratic polynomial in signed distance. Concretely, the regression includes the linear distance term, the squared distance term, and their interactions with the provincial-capital-side indicator:

$$Y_g^{it} = \alpha^{it} + \tau^{it} D_g^{it} + \delta_1^{it} \text{dist}_g^{it} + \gamma_1^{it} D_g^{it} \text{dist}_g^{it} + \delta_2^{it} \left(\text{dist}_g^{it}\right)^2 + \gamma_2^{it} D_g^{it} \left(\text{dist}_g^{it}\right)^2 + \varepsilon_g^{it}, \tag{3}$$

where the quadratic terms allow economic activity to vary nonlinearly with distance from the boundary, while the interaction terms allow the slope and curvature of the GDP–distance profile to differ between the provincial-capital side and the adjacent non-capital side. This matters because GDP may decline or increase smoothly with distance from an urban core. The design separates those smooth gradients from the discrete institutional contrast at the boundary, so that τ^{it} captures a sharp jump rather than gradual spatial decay.

Because $\text{dist}_g^{it} = 0$ at the boundary, all distance terms and interaction terms vanish at the cutoff. Thus, τ^{it} directly measures the difference in predicted standardized GDP immediately inside versus immediately outside the provincial-capital boundary. The ±10 km bandwidth keeps the comparison local, reducing confounding from broad regional differences while retaining enough grid cells for stable estimation. Robustness checks vary the polynomial order, bandwidth, and nonparametric implementation. The design therefore provides a disciplined local measure of sharp spatial jumps at administrative boundaries; the validation exercises below give this measure its substantive interpretation as political concentration or siphoning.

Figure 2 maps the provincial capitals used in the analysis. For each capital, we extract all 1 km grid cells within ±10 km of the administrative boundary and estimate Equation (3) for 2019. Figure 3 plots the resulting boundary profiles. Most provincial capitals display an upward jump at the boundary, but the magnitude varies substantially across cities. This heterogeneity is central to the analysis below: it provides the province-level variation used to examine why some capitals exhibit sharper center–periphery gaps than others, and whether those gaps are associated with broader patterns of spatial allocation. Appendix Tables A.2–A.4 report the corresponding province-year estimates.

4.2 Validity and Alternative Explanations

Interpreting boundary discontinuities as evidence of siphoning requires ruling out several alternative explanations. First, discontinuities may reflect geography rather than political authority: if terrain, soil, or transport access changes sharply at the boundary, GDP may jump for reasons unrelated to provincial-capital status. Second, discontinuities may reflect generic advantages of large cities rather than the distinctive role of provincial capitals. Third, they may reflect fixed unobservables embedded in particular boundaries. We address these threats in sequence using balance tests on observables, matched comparisons with non-capital cities, and the Jinan–Laiwu administrative merger. The goal is not to make any single exercise carry the entire interpretation, but to build cumulative evidence that the observed jumps are tied to administrative authority.

4.2.1 Balance Tests on Observables

We first examine whether observable geographic characteristics differ discontinuously at the provincial-capital boundary. The threat is straightforward: if the capital side of the boundary has better terrain, more favorable soil, or denser transportation infrastructure, the estimated GDP jump could reflect local endowments rather than administrative concentration. Focusing on provincial capitals with pronounced GDP discontinuities, we test for jumps in slope, soil type, and transportation density. Figure 4 and Table 3 show no significant discontinuities in these covariates. The balance tests therefore reduce the concern that the GDP jumps are mechanically generated by sharp changes in observable geography or transport access at the administrative boundary.

4.2.2 Matching Provincial Capitals with Non-capital Cities

We next ask whether the discontinuities simply reflect the fact that provincial capitals are large cities. Large non-capital cities may also concentrate firms, workers, and services, so a provincial-capital discontinuity is informative only if it is larger than the discontinuity around comparable non-capital cities. To assess this threat, we estimate boundary discontinuities for provincial capitals, match each capital to the most similar non-capital city within the same province based on economic size and development stage, and compare the resulting boundary effects.

Matching is feasible for 16 of the 27 provincial capitals. The remaining 11 capitals are so much larger or more dominant than other cities in their province that no suitable within-province match can be found. Table 4 shows that provincial capitals exhibit large and significant discontinuities, whereas matched non-capital cities show small and statistically insignificant discontinuities. The difference between the two groups is also significant. This comparison suggests that the boundary jumps are not merely a generic feature of urban size or agglomeration; they are stronger where the city also holds provincial-capital status and therefore occupies the political center of the province.

4.2.3 Quasi-Experiment: The Jinan–Laiwu Merger

The preceding exercises address observable geography and generic urban status. A remaining concern is that provincial-capital boundaries differ along fixed unobservable dimensions. We therefore use the 2018 administrative merger that dissolved Laiwu and incorporated it into Jinan, the provincial capital of Shandong, as evidence on whether discontinuities move with administrative status. The merger was approved by the State Council on December 26, 2018. As illustrated in Figure 5, the administrative map changed sharply after the reform: the former Jinan–Laiwu boundary became an internal district boundary (red line), while the former Laiwu–neighbor boundary became the new provincial-capital border (blue line).

This setting provides a useful quasi-experimental test of the administrative-status interpretation. If the boundary discontinuity reflects siphoning associated with provincial-capital status, then the Jinan–Laiwu jump should disappear once Laiwu becomes part of Jinan. Panels A and B of Figure 6 are consistent with this prediction: a significant GDP discontinuity is present before the merger in 2015, but it vanishes after incorporation in 2019.

We also examine Laiwu's boundaries with other neighboring non-capital areas. Before the merger, these boundaries do not display significant discontinuities; after Laiwu is absorbed into Jinan, they do. Panels C and D of Figure 6 document this pattern. The rapid disappearance and emergence of discontinuities after a discrete administrative change is difficult to reconcile with fixed geography or long-standing local endowments alone. It instead supports the interpretation that administrative status can reshape the spatial allocation of economic activity.

We do not treat the Jinan–Laiwu merger as the sole source of identification for the paper. Rather, it provides direct status-change evidence that boundary discontinuities are responsive to administrative status. Together with the balance tests and matched-city comparison, the evidence supports the view that political authority, rather than fixed locational advantages alone, helps shape the spatial distribution of economic activity around provincial capitals.

4.3 Mechanisms Behind Boundary Discontinuities: Micro-level Evidence

Having shown that the boundary jumps are not explained by observable geography or generic urban status, we next examine whether micro-level spatial patterns align with the proposed mechanism. The chain is: political authority concentrated in provincial capitals creates preferential access to public resources and policy rents; these advantages affect firm and household location choices; location choices concentrate firms, services, population, and output inside the administrative core; and this concentration appears in the data as a provincial-capital boundary discontinuity.

4.3.1 Political Incentives and Location Choices

As noted earlier, China's resource allocation is not purely market driven. Central and provincial authorities retain substantial discretionary power, and provincial capitals often receive direct policy support and preferential access to public resources (Bluhm et al., 2026; Chen et al., 2017; Henderson et al., 2018; Bai and Jia, 2023; Bo, 2020; Bo and Cheng, 2021). This institutional structure gives provincial governments incentives to concentrate resources in the capital, where policy achievements are visible and administratively easier to implement. For example, Hunan's 2022 "Strong Provincial Capital" policy explicitly mobilizes authority, finance, land, talent, and fiscal tools to channel resources toward Changsha.

These incentives can affect both firms and households. For firms, proximity to government may lower the cost of obtaining permits, approvals, subsidies, credit, land, and other policy advantages, consistent with the "corridors of power" logic emphasized by Ades and Glaeser (1995). For households, provincial capitals often offer better access to public services, education, healthcare, and hukou-related opportunities. The mechanism therefore predicts not only higher output on the capital side of the boundary, but also a concentration of firms, services, and population there.

4.3.2 Micro-level Evidence from POI and Population Data

To provide mechanism-consistent evidence, we use December 2019 Amap (Gaode) point-of-interest data and compare the distribution of firms, service establishments, and population density on either side of Beijing's administrative boundary.[1] These exercises are not standalone causal estimates. They instead assess whether the spatial distribution of micro-level activity aligns with the political-authority mechanism. The evidence is summarized in Figures 7 and 8.

Figure 7 shows that the density of firms is substantially higher inside Beijing than immediately outside the boundary. The same pattern holds for business and residential service facilities. Figure 8 documents a similarly sharp increase in population density on the central-city side of the boundary. These micro-level patterns are consistent with the proposed chain from politically mediated access to resources and policy rents to firm and household location choices, and ultimately to GDP discontinuities. They show that the boundary jump is mirrored in the location of firms, services, and people, supporting the interpretation that the GDP discontinuity reflects concentrated economic activity inside the administrative core.

[1] See Appendix B for data details.

5 The Origins of Siphoning: Marketization and Boundary Discontinuities

The preceding analysis establishes the boundary discontinuity as a local measure of economic concentration inside the provincial-capital boundary. We now examine why this concentration is stronger in some provinces than in others. The conceptual framework points to marketization as the key institutional force: stronger market institutions should weaken politically driven concentration by reducing the value of proximity to administrative authority. If boundary jumps capture the spatial footprint of political allocation, provinces with stronger market institutions should exhibit smaller jumps at provincial-capital boundaries. When firms and factors can obtain finance, land, inputs, contracts, legal protection, and market access through market channels, location choices become less dependent on political proximity. When political allocation remains dominant, policy rents and discretionary resources continue to sustain concentration inside the capital, generating a larger local jump at the boundary. The analysis below therefore examines whether marketization attenuates the link between political authority and spatial concentration.

5.1 Marketization and Boundary Discontinuities: Baseline Results

We first estimate the relationship between provincial marketization and provincial-capital boundary discontinuities using a province-level panel for 2000, 2005, 2010, 2015, and 2019. The dependent variable is the estimated GDP discontinuity from the first-stage boundary-discontinuity regression; the main regressor is the provincial marketization index. We estimate:

$$\text{Discontinuity}_{it} = \beta\,\text{Marketization}_{it} + \gamma X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}, \tag{4}$$

where i and t index province and year, respectively. The dependent variable $\text{Discontinuity}_{it}$ is the estimated GDP jump at the provincial-capital boundary, obtained from Equation (3). The regressor $\text{Marketization}_{it}$ is the province-year marketization index. The vector X_{it} includes province-level controls that may affect both the depth of market institutions and the spatial concentration of economic activity: industrial structure, urbanization, log GDP per capita, human capital, population density, agglomeration, industrial development, infrastructure, information development, and openness. These controls help separate the association between marketization and boundary discontinuities from broader differences in provincial development and economic structure. Province fixed effects α_i absorb time-invariant provincial characteristics, such as persistent geography, historical institutions, and long-run administrative structure. Year fixed effects λ_t absorb national shocks common to all provinces. The coefficient β captures whether provinces become less discontinuous at the provincial-capital boundary as marketization rises; a negative coefficient is the

empirical counterpart of the framework's prediction that market allocation attenuates politically driven siphoning.

Estimation proceeds in two steps. In the first stage, we estimate the boundary discontinuity for each provincial capital using grid-level GDP within ±10 km of the administrative boundary. In the second stage, we regress the resulting discontinuity estimates on provincial marketization and controls. Because the second-stage dependent variable is an estimated boundary discontinuity rather than a directly observed outcome, conventional second-stage standard errors may understate uncertainty. We therefore compute bootstrap standard errors using a two-step procedure that accounts for the uncertainty introduced by using an estimated dependent variable in the second-stage regression (Dumont et al., 2005). In each of 100 bootstrap replications, we resample grid cells with replacement within each province-year first-stage sample, drawing the same number of grid observations as in the original sample. We then re-estimate the boundary discontinuities and re-run the second-stage province-year regression. Based on roughly 1,556,526 grid observations in the first stage, the cross-province mean and standard deviation of the estimated discontinuities are 0.162 and 0.282, respectively.

Table 5 reports the results. The marketization coefficient is negative and statistically significant in every specification. The estimates are stable as controls are added sequentially, indicating that the relationship is not driven by the particular set of province-level covariates included in the model. In the full specification, the point estimate is -0.069. Given a marketization standard deviation of 2.310 and a discontinuity standard deviation of 0.282, a one-standard-deviation increase in provincial marketization is associated with a decline in the provincial-capital discontinuity of about 0.57 standard deviations ($-0.069 \times 2.310/0.282 \approx -0.57$). This magnitude is economically meaningful: it implies that marketization is associated not only with statistically detectable differences in boundary jumps, but also with substantial attenuation of the local spatial concentration measured by the discontinuity.

Appendix Tables C.1 and C.2 examine whether this relationship depends on how the first-stage discontinuity is estimated. Alternative first-stage specifications replace the baseline quadratic distance function with linear and nonparametric boundary-discontinuity estimators, testing sensitivity to the functional form imposed on the GDP–distance profile around the boundary. Alternative bandwidths of 4, 6, 8, and 10 km test whether the result depends on the width of the local comparison window. Across these specifications, the marketization coefficient remains negative and statistically significant. The robustness checks therefore indicate that the baseline result is not an artifact of a particular functional form or bandwidth choice in the boundary-discontinuity design.

We also consider whether the result is driven by the broad marketization index or by dimensions more directly related to resource allocation. Appendix Tables C.3 and C.4 replace the aggregate index with two conceptually closer measures: the reduction in government intervention in firms

and the share of non-state fixed-asset investment. Both measures yield the same qualitative pattern. Provinces with weaker government intervention and a larger non-state sector exhibit smaller provincial-capital boundary discontinuities. These component results connect directly to the mechanism: when governments intervene less in firm decisions and non-state investment plays a larger role, firms are less dependent on political access to obtain resources and the boundary footprint of political concentration weakens.

Although the fixed effects and controls absorb many confounders, provincial marketization may be jointly determined with unobserved changes in economic development, governance, or spatial structure. The next subsection therefore complements the baseline estimates with an instrumental-variable strategy designed to isolate plausibly exogenous variation in marketization.

5.2 Instrumental-Variable Estimates

Because provincial marketization may itself be endogenous, the baseline estimates could partly reflect province-specific trends that affect both market institutions and spatial concentration. More prosperous provinces, for example, may experience both faster marketization and smaller boundary gaps. The instrumental-variable analysis addresses this concern by using historical exposure to market-oriented institutions to predict differential responses to national marketization shocks.

We construct a Bartik-style instrument that interacts national time variation in marketization with cross-province historical exposure to market-oriented institutions. The shift component is national variation in marketization over time. The share component is the historical prevalence of indigenous private firms during the Republican period (1911–1949), which proxies for a province's pre-existing marketization potential.

The logic is that national marketization reforms after 1978 created common shocks, but provinces differed in their capacity to respond to those shocks. Provinces with a stronger historical base of private enterprise should have been more exposed to national marketization because they had deeper market-oriented institutions, networks, and entrepreneurial capacity. Prior research shows that the Republican-period distribution of private firms reflects persistent market-oriented institutional endowments and long-run marketization potential (Bo et al., 2023).

The instrument is therefore designed to isolate variation in provincial marketization generated by the interaction between national marketization shocks and predetermined historical exposure. Province fixed effects absorb the time-invariant component of historical exposure, while year fixed effects absorb the national marketization shock common to all provinces. Identification comes from whether provinces with higher historical exposure respond more strongly to national marketization over time. The exclusion restriction requires that this interaction affect provincial-capital boundary discontinuities only through provincial marketization, conditional on controls and fixed effects.

The first-stage specification is:

$$\text{Marketization}_{it} = \delta \left(\log \text{Firms}_i \times \text{Marketization}_{\text{nation},t} \right) + \gamma X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}, \quad (5)$$

where i and t index province and year; the dependent variable $\text{Marketization}_{it}$ is the province-year marketization index; $\log \text{Firms}_i$ is the logarithm of the share of Republican-period private firms in province i; $\text{Marketization}_{\text{nation},t}$ is the national marketization index in year t; X_{it} is a vector of province-level controls; and α_i and λ_t are province and year fixed effects.

Table 6 reports the IV estimates. The coefficients of interest in Columns (3)–(5) are negative and statistically significant, and the first stage is strong by the reported weak-instrument diagnostics. The preferred IV estimate in Column (5) is −0.212, larger in magnitude than the OLS estimate. Using the same standard deviations as above, a one-standard-deviation increase in marketization reduces the boundary discontinuity by approximately 1.73 standard deviations ($-0.212 \times 2.310/0.282 \approx -1.73$).

The results remain robust when we replace the baseline shift-share instrument with alternative instruments, as shown in Appendix Table C.5. The baseline instrument interacts the logarithm of historical private firms in a province with the contemporaneous national marketization index. The alternatives use: (i) per capita historical private firms interacted with the logarithm of contemporaneous national non-state enterprise profits; (ii) the logarithm of historical private firms interacted with the contemporaneous national share of non-state enterprise profits, excluding the target province; and (iii) per capita historical private firms interacted with the contemporaneous national marketization index. Across these alternative constructions, the IV estimates remain negative and statistically significant.

A valid Bartik-style design requires that the shift component is not systematically related to province-specific unobserved shocks through channels other than marketization. Following Borusyak et al. (2022), we examine whether contemporaneous national marketization is correlated with lagged province-level observables, which would indicate differential pretrends or exposure to omitted shocks. We find no systematic correlation, supporting the plausibility of the shift exogeneity assumption. Additional diagnostics appear in Appendix Table C.6.

Overall, the evidence in this section supports the central implication of the framework: stronger marketization weakens the ability of political centers to sustain provincial-capital boundary discontinuities. Across baseline specifications, first-stage robustness checks, alternative marketization measures, and instrumental-variable estimates, higher marketization is consistently associated with smaller jumps in economic activity at the administrative boundary. The results show that marketization is not merely a background institutional condition. It is the force that shifts the local balance from political concentration toward spatial diffusion.

6 The Welfare Consequences of Boundary Discontinuities

Having shown that marketization is associated with smaller provincial-capital boundary discontinuities, we next ask whether these discontinuities are related to economically meaningful outcomes. The conceptual framework predicts that larger discontinuities reflect stronger administrative concentration. If the boundary jump captures politically mediated resource concentration rather than benign spatial heterogeneity, it should be linked to factor misallocation, weaker regional performance, and greater within-province inequality. This section traces those downstream implications.

We examine three sets of outcomes: factor misallocation, provincial GDP growth, and concentration or inequality within the province. These outcomes do not exhaust welfare, but they map directly into the paper's mechanism. If boundary discontinuities capture resource concentration inside the administrative core, the first implication should appear in factor allocation: capitals should receive more capital than an efficient allocation would imply, while nearby non-capital areas should receive less. The broader implications should then appear in weaker provincial growth, higher capital-city primacy, and greater inequality.

Using province-year panel data for 2000, 2005, 2010, 2015, and 2019, we estimate the following specification:

$$Y_{it} = \beta \,\text{Discontinuity}_{it} + \gamma X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}, \tag{6}$$

where i and t index province and year; Y_{it} is a provincial performance or distributional outcome, such as capital or labor misallocation, annual GDP growth, provincial-capital primacy, or a Gini coefficient; $\text{Discontinuity}_{it}$ is the estimated GDP discontinuity at the provincial-capital boundary; X_{it} is a vector of controls; and α_i and λ_t are province and year fixed effects. The coefficient β captures whether provinces with sharper local boundary footprints also exhibit stronger signs of misallocation, weaker growth, or greater concentration.

First, we examine spatial misallocation of capital and labor. This is the most direct implication of the mechanism. Political allocation in China operates especially through capital, land, approvals, credit, infrastructure, and public investment. If these instruments concentrate resources inside the administrative core, factors should be over-allocated to provincial capitals and under-allocated to nearby non-capital areas. Following Hsieh and Klenow (2009), for each prefecture-level city within a province we construct a factor-misallocation index defined as the ratio of actual factor use to the counterfactual efficient allocation, that is, the quantity assigned under an optimal allocation. Values above one indicate over-allocation, whereas values below one indicate under-allocation.[2] We relate these indices to the provincial-capital boundary discontinuity separately for the provincial capital, adjacent non-capital cities, and other non-adjacent cities in the same province.

Table 7 reports the estimates for capital misallocation. The coefficient is positive for the

[2]Detailed procedures of measuring misallocation are provided in Appendix D.

provincial capital, indicating that larger boundary discontinuities are associated with greater capital over-allocation inside the administrative core. For adjacent non-capital cities, the coefficients are negative, implying that larger discontinuities are associated with relative capital under-allocation in the areas closest to the capital. The weighted-average estimates deliver the same pattern. By contrast, the estimates for non-adjacent cities are small and statistically insignificant. This spatial pattern is central to the mechanism: the distortion is localized around the provincial-capital boundary, consistent with capital being drawn from nearby jurisdictions rather than uniformly from all cities in the province.

By contrast, Table 8 shows a weaker and less systematic relationship between boundary discontinuities and labor misallocation. The estimates for the provincial capital and adjacent non-capital cities are small relative to their standard errors and statistically insignificant. The significant estimate for the labor-weighted measure among non-adjacent cities does not match the localized siphoning pattern observed for capital. Overall, the labor results point to a mechanism operating more strongly through capital allocation than through labor reallocation.

A plausible explanation is that labor is less mobile than capital in this setting. China's hukou system and related policies impose substantial barriers to migration into large cities, and urban policy has often aimed to limit population growth in major centers. Under these constraints, labor may not flow into provincial capitals as freely as capital. The contrast between Tables 7 and 8 is therefore informative rather than anomalous: political allocation can reallocate capital, land, credit, infrastructure, and public investment more directly than it can reallocate labor.

Second, factor misallocation may weaken regional growth. If resources are concentrated in the administrative core rather than allocated to their most productive locations across the province, the local boundary footprint should be associated with lower aggregate performance. To examine this implication, we regress annual provincial GDP growth on the provincial-capital boundary discontinuity in Equation (6); the results are reported in Table 9. The discontinuity is negatively and significantly associated with provincial growth, and the relationship remains robust as controls are added. In the fully specified model, Column (6), the estimated coefficient is -0.009. Given a standard deviation of 0.282 for the discontinuity measure, a one-standard-deviation increase in the discontinuity is associated with an approximate 0.25 percentage point decline in annual provincial GDP growth ($0.282 \times 0.009 \approx 0.0025$).

Third, resource concentration inside provincial capitals should be reflected in the spatial distribution of output within the province. Using the capital's share of provincial GDP as a measure of primacy and estimating Equation (6), Table 10 reports a positive and statistically significant coefficient in Column (1). Larger boundary discontinuities are associated with greater provincial-capital primacy, consistent with the interpretation that discontinuities capture concentration of economic activity in the administrative core rather than only a narrow border statistic.

We also examine within-province inequality using two Gini measures. The regional Gini is computed across prefecture-level units and captures disparities in per capita economic output across subprovincial regions. The individual income Gini is derived from grouped household income data using a Lorenz-curve fit and captures inequality across individuals within a province. These measures capture distinct dimensions of inequality, and both range from 0 to 1, with higher values indicating greater inequality.[3] Columns (2)–(3) of Table 10 show that the boundary discontinuity is positively and significantly associated with both measures. The results suggest that provinces with sharper provincial-capital boundary discontinuities also exhibit greater between-region and within-province income inequality.

Taken together, the results show that larger provincial-capital boundary discontinuities are associated with capital over-allocation in capitals, capital under-allocation in adjacent non-capital cities, lower provincial growth, higher provincial-capital primacy, and greater inequality. These patterns support the interpretation that political-authority-driven siphoning is not merely a local spatial pattern at the boundary. It is also associated with economically meaningful differences in factor allocation, regional performance, and distributional outcomes. The downstream evidence therefore connects the local boundary measure to the broader question of spatial misallocation within provinces.

7 Conclusion

This paper investigates how political power shapes economic geography. Using high-resolution gridded GDP data and a boundary-discontinuity research design, we document widespread economic discontinuities at provincial-capital boundaries across China. The Beijing–Shanghai comparison illustrates two different center–periphery regimes: Beijing exhibits a sharp boundary profile consistent with siphoning, whereas Shanghai exhibits a smoother profile consistent with stronger outward diffusion. In the province-level analysis, greater marketization is associated with smaller provincial-capital boundary discontinuities, suggesting that stronger market institutions attenuate politically driven resource concentration. Larger discontinuities are also associated with capital misallocation, lower provincial growth, higher capital primacy, and greater within-province inequality.

The paper's central message is that political authority is a spatial allocation force. Administrative centers are not only urban agglomerations; they are locations where public authority, policy rents, and discretionary resource allocation are concentrated. When political allocation dominates, these advantages can create sharp local discontinuities between the administrative core and surrounding jurisdictions. When market forces are stronger, the spatial imprint of political power weakens and

[3] Details of the construction are provided in Appendix E.

economic activity diffuses more smoothly across administrative boundaries.

The paper contributes to economic geography by showing that central places need not generate the same spatial relationship with their hinterlands. A political center can operate as a growth pole whose advantages diffuse outward, or it can cast a local shadow by concentrating resources within its own administrative boundary. Which regime emerges depends in part on the institutional balance between political allocation and market allocation. This perspective complements work on capital-city advantages by shifting attention from whether political centers grow to how their authority reshapes the center–periphery relationship around them.

Methodologically, the paper develops an operational framework for quantifying siphoning versus spillover by measuring economic discontinuities at administrative boundaries. Substantively, it highlights political authority and institutional context as determinants of spatial outcomes, contributing to the literature on market–government interactions in resource allocation. By integrating growth-pole theory with modern political economy, the paper explains why cities operating under a common national institutional framework can nonetheless exhibit markedly different spatial interaction patterns.

The broader implication is that the spatial allocation of political authority can shape the geography of economic activity. Marketization and stronger factor-mobility institutions can limit the extent to which political allocation concentrates resources in administrative centers, helping transform center–periphery relations from siphoning toward diffusion. Future research could examine the dynamic effects of institutional reforms—such as marketization, fiscal decentralization, and administrative restructuring—on spatial equilibria, and use firm- and household-level microdata to identify the behavioral mechanisms through which boundary discontinuities emerge and dissipate.

References

Ades, Alberto F and Edward L Glaeser, "Trade and circuses: explaining urban giants," *The Quarterly Journal of Economics*, 1995, *110* (1), 195–227.

Alder, Simon, Lin Shao, and Fabrizio Zilibotti, "Economic reforms and industrial policy in a panel of Chinese cities," *Journal of economic growth*, 2016, *21* (4), 305–349.

Allen, Treb and Costas Arkolakis, "Trade and the topography of the spatial economy," *The Quarterly Journal of Economics*, 2014, *129* (3), 1085–1140.

Bai, Ying and Ruixue Jia, "The economic consequences of political hierarchy: Evidence from regime changes in China, 1000–2000 CE," *Review of Economics and Statistics*, 2023, *105* (3), 626–645.

Bluhm, Richard, Christian Lessmann, and Paul Schaudt, "The political geography of cities," *American Economic Journal: Applied Economics*, 2026, *18* (3), 1–42.

Bo, Shiyu, "Centralization and regional development: Evidence from a political hierarchy reform to create cities in China," *Journal of Urban Economics*, 2020, *115*, 103182.

_ **and Chao Cheng**, "Political hierarchy and urban primacy: Evidence from China," *Journal of Comparative Economics*, 2021, *49* (4), 933–946.

_ **, Cong Liu, and Yan Zhou**, "Military investment and the rise of industrial clusters: Evidence from China's self-strengthening movement," *Journal of Development Economics*, 2023, *161*, 103015.

Borusyak, Kirill, Peter Hull, and Xavier Jaravel, "Quasi-experimental shift-share research designs," *The Review of economic studies*, 2022, *89* (1), 181–213.

Bosker, Maarten and Eltjo Buringh, "City seeds: Geography and the origins of the European city system," *Journal of Urban Economics*, 2017, *98*, 139–157.

Campante, Filipe R and Quoc-Anh Do, "Isolated capital cities, accountability, and corruption: Evidence from US states," *American Economic Review*, 2014, *104* (8), 2456–2481.

Chen, Ying, J Vernon Henderson, and Wei Cai, "Political favoritism in China's capital markets and its effect on city sizes," *Journal of Urban Economics*, 2017, *98*, 69–87.

Christaller, Walter, *Die zentralen Orte in Süddeutschland: eine ökonomisch-geographische Untersuchung über die Gesetzmässigkeit der Verbreitung und Entwicklung der Siedlungen mit städtischen Funktionen*, Wissenschaftliche Buchgesellschaft, 1933.

Coase, Ronald and Ning Wang, *How China became capitalist*, Springer, 2012.

Cuberes, David, Klaus Desmet, and Jordan Rappaport, "Urban growth shadows," *Journal of Urban Economics*, 2021, *123*, 103334.

Dumont, Michel, Glenn Rayp, Olivier Thas, and Peter Willemé, "Correcting standard errors in two-stage estimation procedures with generated regressands," *Oxford Bulletin of Economics and Statistics*, 2005, *67* (3), 421–433.

Fujita, Masahisa and Paul Krugman, "When is the economy monocentric?: von Thünen and Chamberlin unified," *Regional science and urban Economics*, 1995, *25* (4), 505–528.

_ , _ , and Anthony J. Venables, *The Spatial Economy: Cities, Regions, and International Trade*, Cambridge, MA: MIT Press, 1999.

Greenstone, Michael, Richard Hornbeck, and Enrico Moretti, "Identifying agglomeration spillovers: Evidence from winners and losers of large plant openings," *Journal of political economy*, 2010, *118* (3), 536–598.

Helpman, Elhanan, "The size of regions," *Topics in public economics: Theoretical and applied analysis*, 1998, (5), 33–54.

Henderson, J Vernon, "The urbanization process and economic growth: The so-what question," *Journal of Economic growth*, 2003, *8* (1), 47–71.

_ , "Cities and development," *Journal of regional science*, 2010, *50* (1), 515–540.

_ , Adam Storeygard, and David N Weil, "Measuring economic growth from outer space," *American economic review*, 2012, *102* (2), 994–1028.

_ , Tim Squires, Adam Storeygard, and David Weil, "The global distribution of economic activity: nature, history, and the role of trade," *The Quarterly Journal of Economics*, 2018, *133* (1), 357–406.

Hirschman, Albert O, "The strategy of economic development," 1958.

Hodler, Roland and Paul A Raschky, "Regional favoritism," *The Quarterly Journal of Economics*, 2014, *129* (2), 995–1033.

Hsieh, Chang-Tai and Peter J Klenow, "Misallocation and manufacturing TFP in China and India," *The Quarterly journal of economics*, 2009, *124* (4), 1403–1448.

Krugman, Paul, "Increasing returns and economic geography," *Journal of political economy*, 1991, *99* (3), 483–499.

_ **et al.**, "Scale economies, product differentiation, and the pattern of trade," *American economic review*, 1980, *70* (5), 950–959.

Landry, Pierre F, *Decentralized Authoritarianism in China: the Communist Party's control of local elites in the post-Mao era*, Cambridge University Press, 2008.

Li, Hongbin and Li-An Zhou, "Political turnover and economic performance: the incentive role of personnel control in China," *Journal of public economics*, 2005, *89* (9-10), 1743–1762.

Lü, Xiaobo and Pierre F Landry, "Show me the money: Interjurisdiction political competition and fiscal extraction in China," *American political science Review*, 2014, *108* (3), 706–722.

Michalopoulos, Stelios and Elias Papaioannou, "Pre-colonial ethnic institutions and contemporary African development," *Econometrica*, 2013, *81* (1), 113–152.

_ **and** _ , "National institutions and subnational development in Africa," *The Quarterly journal of economics*, 2014, *129* (1), 151–213.

Myrdal, Gunnar and Paul Sitohang, "Economic theory and under-developed regions," 1957.

Nordhaus, William D, "Geography and macroeconomics: New data and new findings," *Proceedings of the National Academy of Sciences*, 2006, *103* (10), 3510–3517.

Perroux, François, "Note sur la notion de" pôle de croissance"," *Économie appliquée*, 1955, *8* (1-2), 307–320.

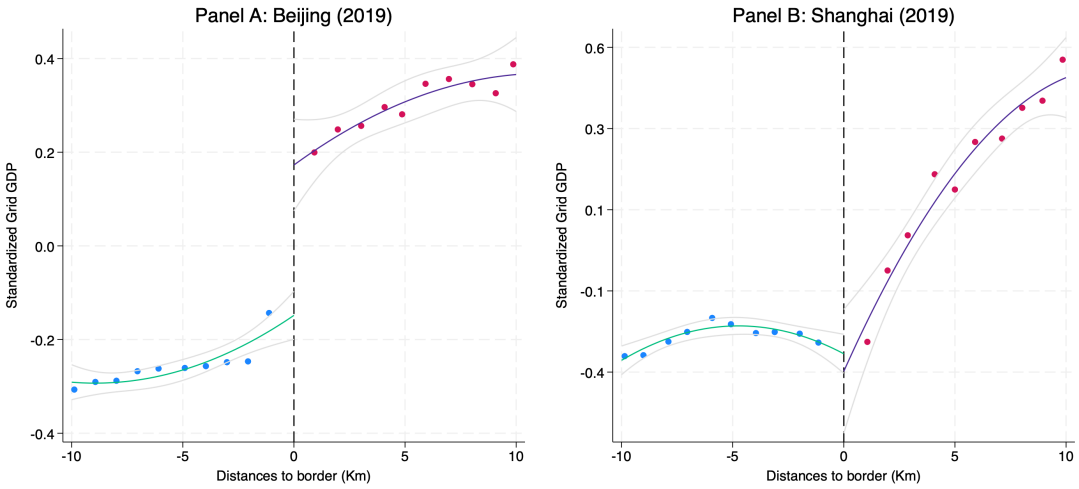
Redding, Stephen J, "Spatial economics," *NBER Working Paper*, 2024.

_ **and Daniel M Sturm**, "The costs of remoteness: Evidence from German division and reunification," *American Economic Review*, 2008, *98* (5), 1766–1797.

Yang, Benjian, Mark D Partridge, and Anping Chen, "Do border effects alter regional development: evidence from a quasi-natural experiment in China," *Journal of economic geography*, 2022, *22* (1), 103–127.

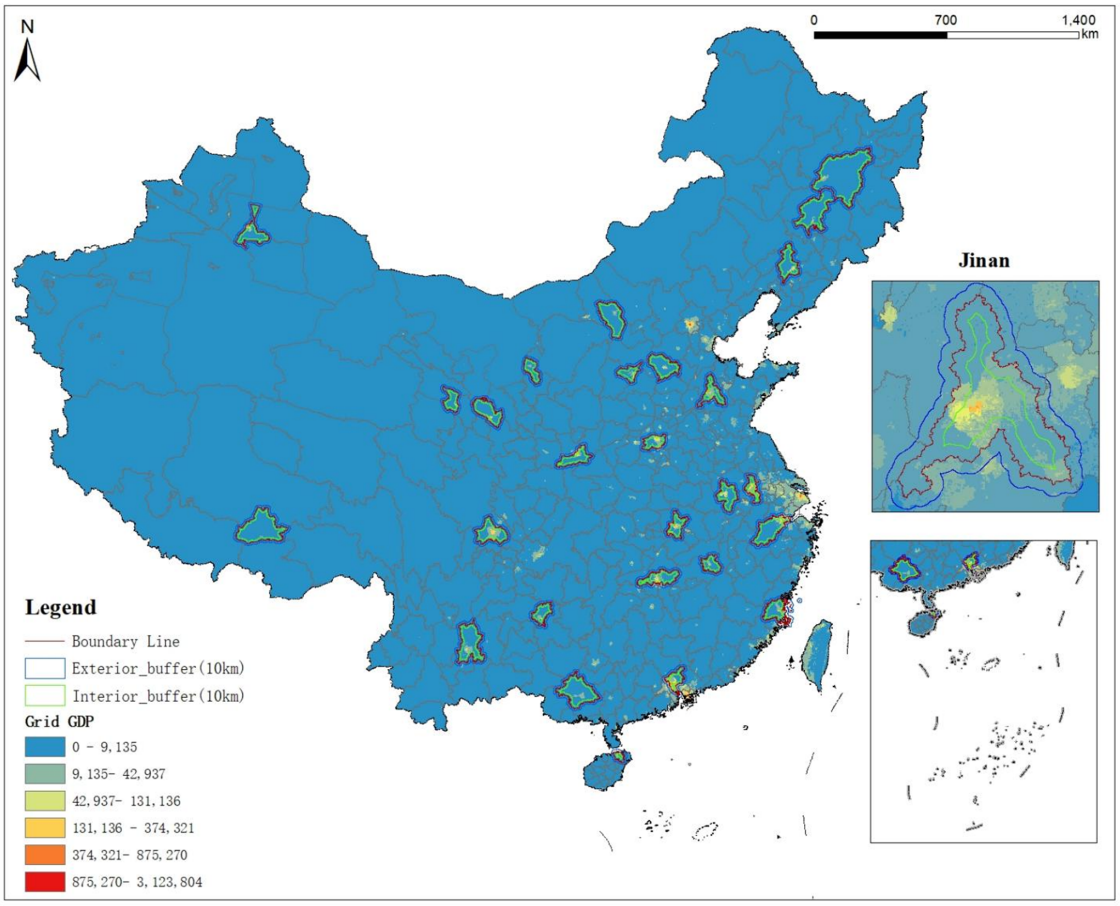
Figures

Figure 1: Boundary Discontinuities in Gridded GDP: Beijing and Shanghai



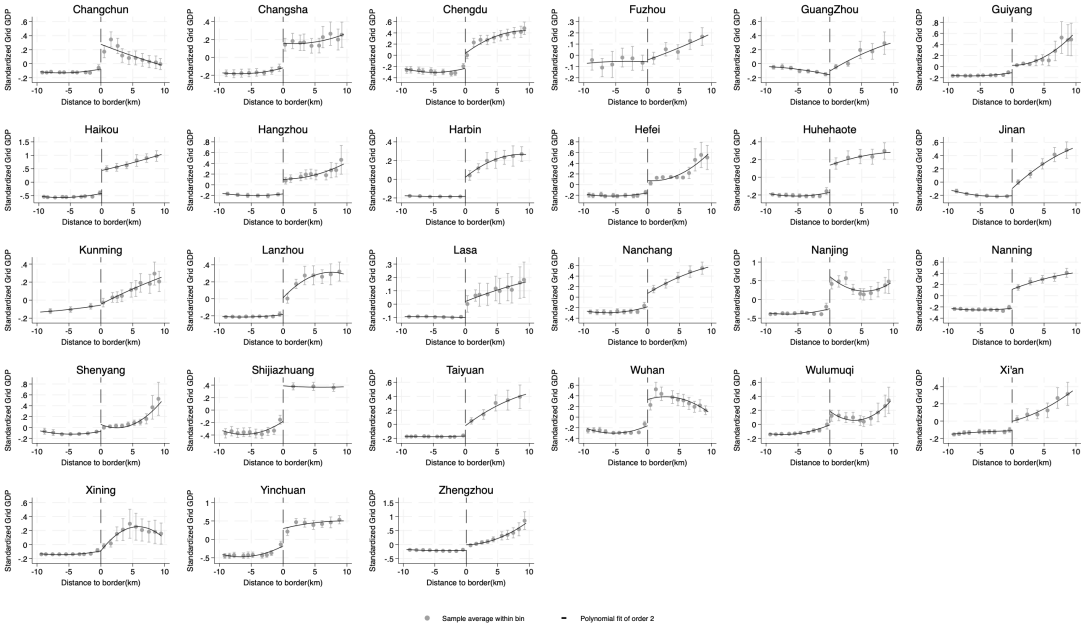
Note: The figure plots standardized gridded GDP around the administrative boundaries of Beijing and Shanghai. Distance is measured in kilometers from the boundary; positive values denote grid cells inside the central city and negative values denote grid cells outside the central city.

Figure 2: Provincial Capitals in the Analysis Sample



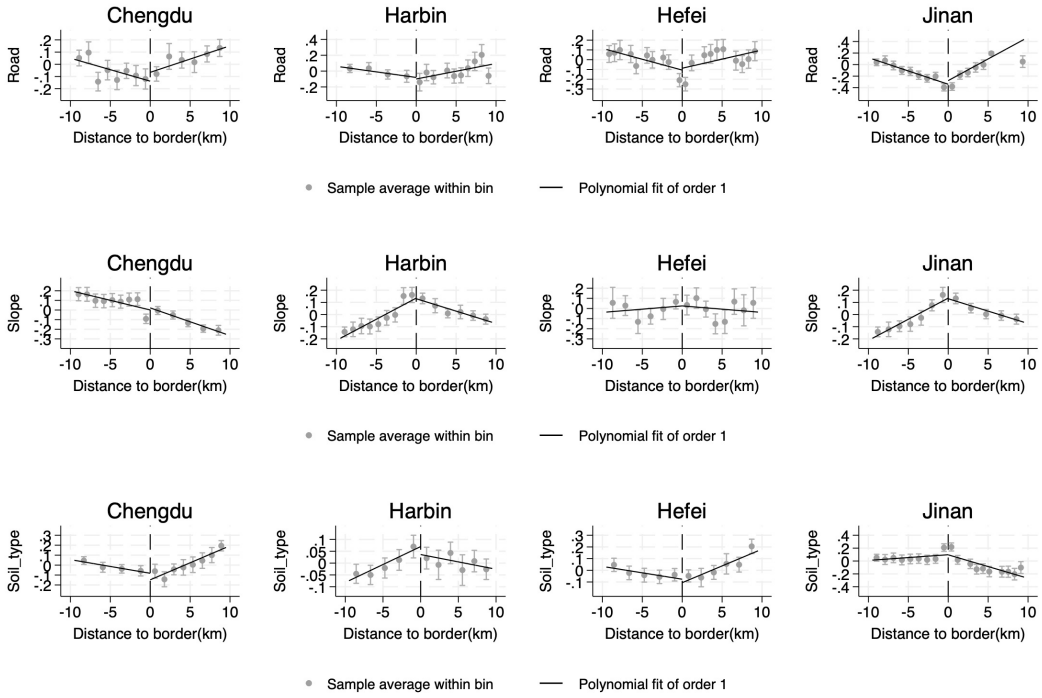
Note: The figure maps the provincial capitals used in the province-level analysis. Centrally administered municipalities are excluded because their administrative structure is not comparable to provinces with distinct provincial capitals.

Figure 3: Provincial-Capital Boundary Discontinuities in Gridded GDP



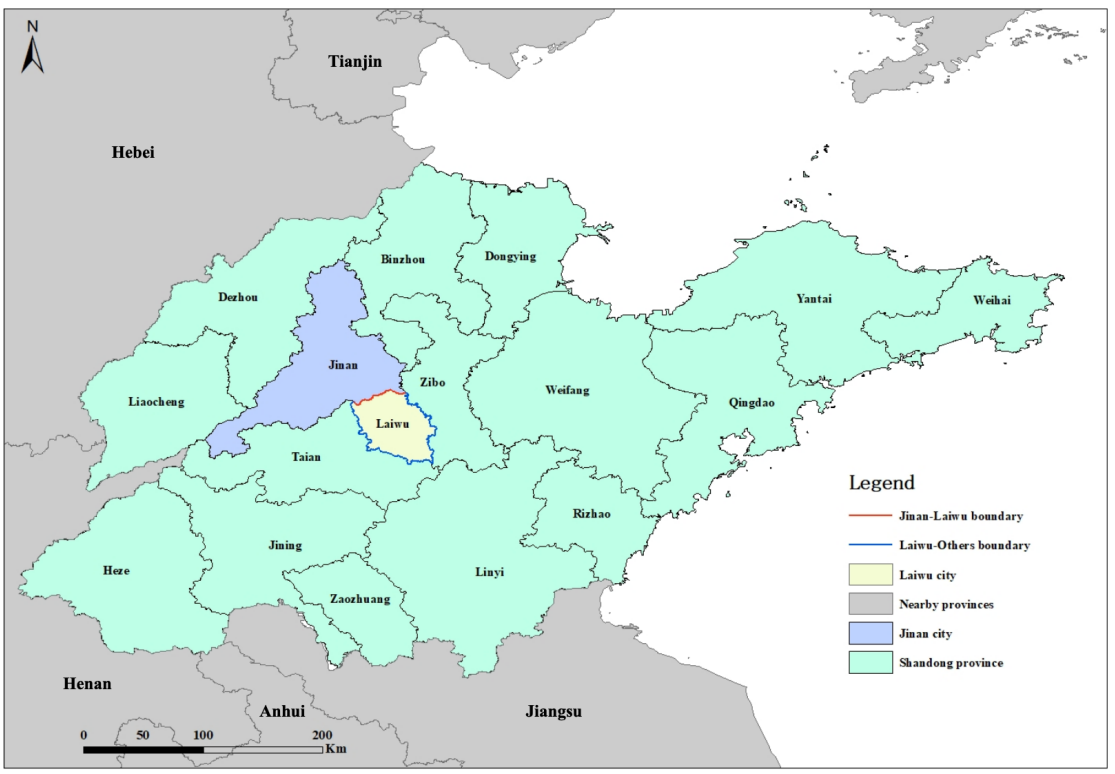
Note: The figure plots standardized gridded GDP around provincial-capital boundaries in the sample. Distance is measured in kilometers from the boundary; positive values denote grid cells inside the provincial capital and negative values denote grid cells in adjacent non-capital areas.

Figure 4: Balance Checks at Provincial-Capital Boundaries



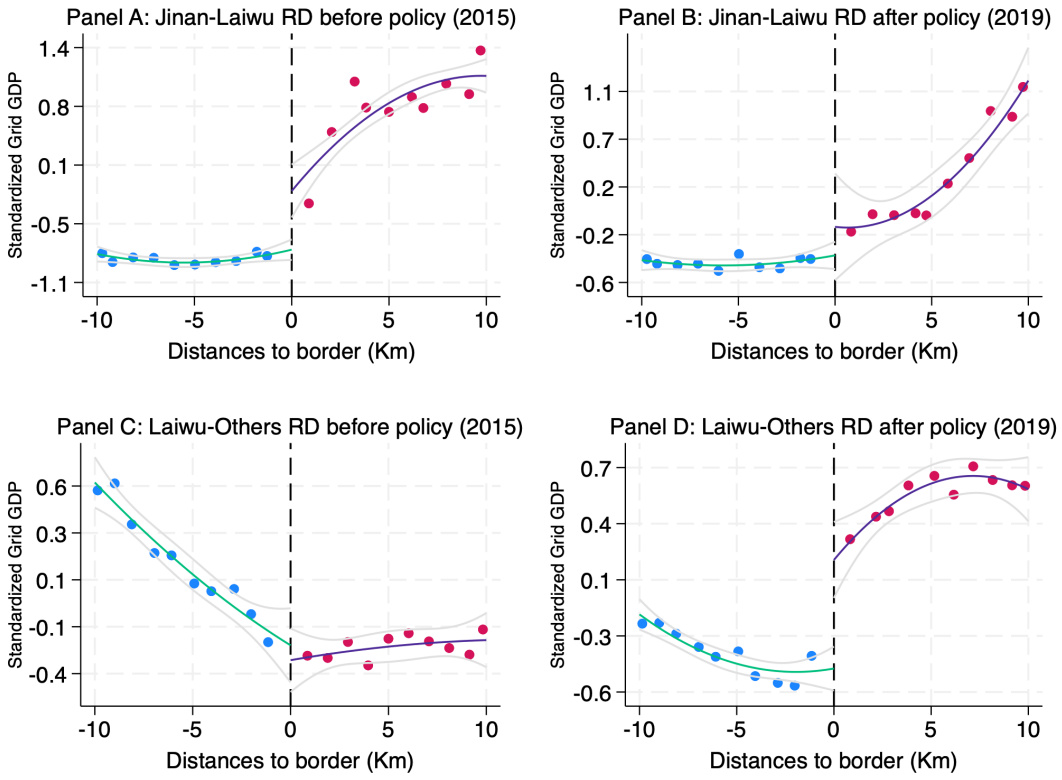
Note: The figure plots boundary profiles for observable covariates, including slope, soil type, and road density. Distance is measured in kilometers from the boundary; positive values denote grid cells inside the provincial capital and negative values denote grid cells in adjacent non-capital areas.

Figure 5: Administrative Change in Shandong: The Jinan–Laiwu Merger



Note: The figure illustrates the administrative reorganization associated with the 2018 Jinan–Laiwu merger. The former Jinan–Laiwu boundary became an internal district boundary after Laiwu was incorporated into Jinan.

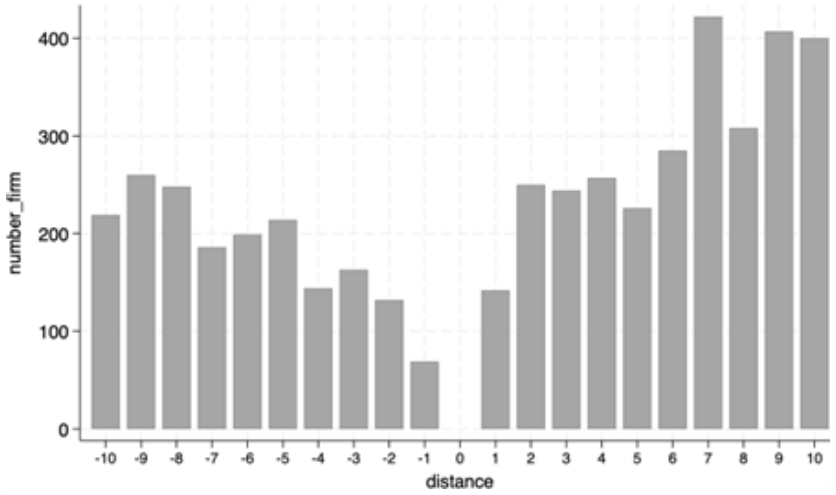
Figure 6: Boundary Discontinuities Before and After the Jinan–Laiwu Merger



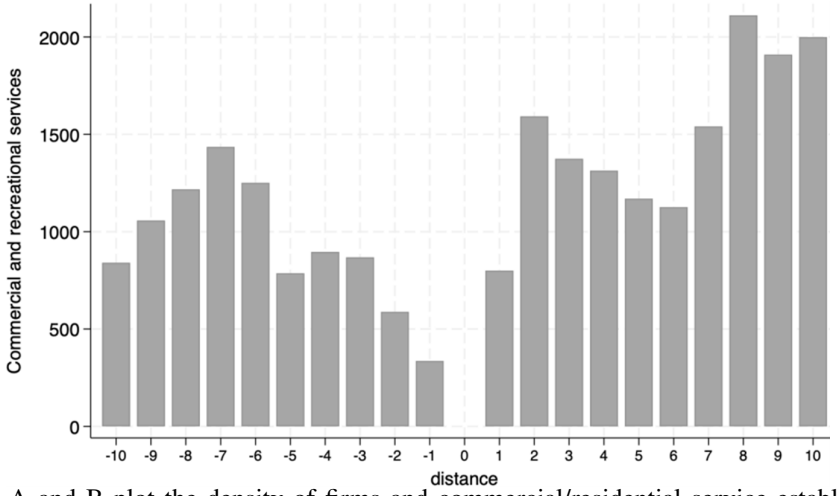
Note: Panels A and B plot gridded GDP around the former Jinan–Laiwu boundary before and after the merger. Panels C and D plot gridded GDP around Laiwu's boundaries with neighboring areas before and after incorporation into Jinan. Distance is measured in kilometers from the boundary; positive values denote grid cells on the central-city side indicated in each panel.

Figure 7: Firms and Services around Beijing's Administrative Boundary

(a) Panel A. Firms

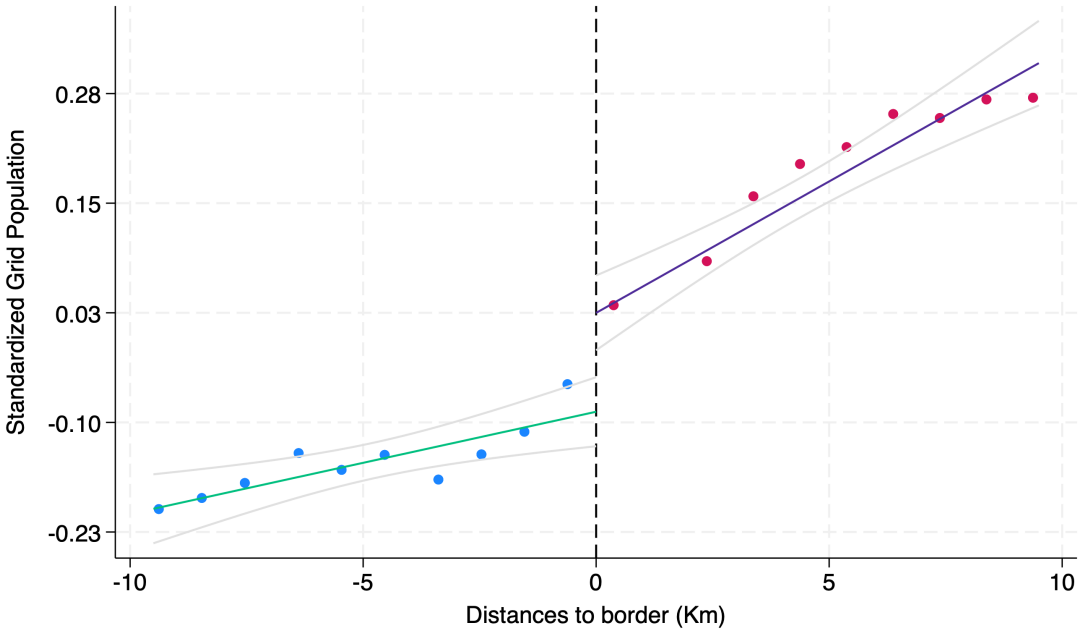


(b) Panel B. Commercial and Residential Services



Note: Panels A and B plot the density of firms and commercial/residential service establishments, respectively, within a 10 km buffer around Beijing's administrative boundary using December 2019 Amap point-of-interest data. Distance is measured in kilometers from the boundary; positive values denote locations inside Beijing and negative values denote adjacent areas outside Beijing.

Figure 8: Population Density around Beijing's Administrative Boundary



Note: The figure plots standardized grid-cell population within a 10 km buffer around Beijing's administrative boundary using 2019 data. Distance is measured in kilometers from the boundary; positive values denote grid cells inside Beijing and negative values denote adjacent areas outside Beijing.

Tables

Table 1: Components of the Provincial Marketization Index

Overall Marketization Index
1. Relationship between Government and Market 1a Proportion of Economic Resources Allocated by the Market 1b Reduction of Government Interference in Enterprises 1c Downsizing of Government
2. Development of the Non-State-Owned Economy 2a Share of Non-State-Owned Economy in Industrial Sales Revenue 2b Proportion of Non-State-Owned Economy in Total Social Fixed Asset Investment 2c Share of Non-State-Owned Economy in Urban Employment
3. Development Level of the Product Market 3a Degree to which Prices are Determined by the Market 3b Reduction of Local Protectionism in the Goods Market 3c Fair Market Competition Conditions
4. Degree of Development of Factor Markets 4a Marketization of the Financial Industry (4a1) Competition in the Financial Industry (4a2) Marketization of Credit Fund Allocation 4b Conditions of Human Resources Supply (4b2) Resident Population/Household Population 4c Marketability of Technological Achievements
5. Development of Market Intermediary Organizations and the Legal Institutional Environment 5a Development of Market Intermediary Organizations (5a1) Service Conditions of Market Intermediary Organizations such as Lawyers, Accountants, and Technical Services (5a2) Extent to Which Industry Associations Help Enterprises 5b Legal Environment for Maintaining the Market 5c Intellectual Property Protection

Note: This table lists the dimensions and underlying indicators of the provincial marketization index compiled by the Development Research Center of the State Council. The index summarizes government–market relations, the development of the non-state sector, product and factor markets, market intermediaries, and the legal-institutional environment.

Table 2: Summary Statistics for Main Variables

Variable	Obs.	Mean	SD	Min.	Max.	Median
Marketization Index	134	6.493	2.310	0.740	11.49	6.485
RD_Coef	135	0.162	0.282	-1.350	1.052	0.137
RD_Robust	135	0.113	0.235	-1.131	0.872	0.0889
GDP Growth rate	135	109.6	2.858	102.8	119.6	109.1
Individual Income Gini	135	0.428	0.0475	0.353	0.508	0.424
Regional Gini	106	0.232	0.0857	0	0.431	0.241
Eco_primacy	132	0.267	0.0957	0.0968	0.513	0.252
Pop_primacy	133	0.147	0.0733	0.0613	0.392	0.126
Misallocationk_center	125	1.031	0.265	0.404	1.759	1.014
Misallocationl_center	125	4.698	15.21	-0.790	94.99	1.060
Misallocationk_adjacent	115	1.000	0.295	-0.694	1.969	1.006
Misallocationl_adjacent	115	0.847	0.702	-2.730	1.939	1.013
Misallocationk_weight_adjacent	115	0.030	0.066	-0.006	0.454	0.003
Misallocationl_weight_adjacent	115	0.158	0.163	-0.392	0.619	0.141
Misallocationk_others	125	1.041	0.558	-1.585	2.729	1.056
Misallocationl_others	125	1.282	0.778	0.236	5.092	1.111
Misallocationk_weight_others	125	0.048	0.105	-0.011	0.595	0.005
Misallocationl_weight_others	125	0.303	0.244	-0.059	1.257	0.260

Note: This table reports summary statistics for the main variables used in the province-level analysis. RD_Coef and RD_Robust are estimated boundary discontinuities from the border-RDD; Marketization Index is the provincial marketization score; GDP Growth rate is annual provincial GDP growth; Eco_primacy, Regional Gini, and Individual Income Gini are defined in the text. Misallocation measures follow the construction described in Appendix D.

Table 3: Balance Tests for Geographic Covariates

Provincial Capital	Chengdu	Harbin	Hefei	Jinan
Road Density	0.071	-0.022	0.021	0.048
	(0.044)	(0.054)	(0.041)	(0.041)
Observations	9,618	7,485	10,334	15,113
Slope	0.046	-0.012	0.000	-0.012
	(0.031)	(0.028)	(0.055)	(0.028)
Observations	17,476	21,096	5,142	21,096
Soil Type	-0.076	-0.038	-0.038	0.012
	(0.035)	(0.030)	(0.038)	(0.035)
Observations	14,297	19,731	11,527	13,731

Note: This table reports boundary-discontinuity estimates for observable geographic covariates at selected provincial-capital boundaries. Positive values indicate higher covariate values on the provincial-capital side of the boundary. Slope is calculated from elevation raster data at a 1 km spatial resolution. Soil type is derived from the digitized 1 km $\times$ 1 km raster version of the Soil Map of the People's Republic of China, 1:1,000,000. Road density is constructed from the 2019 road network dataset and measured as the average road density within each 1 km $\times$ 1 km grid cell, covering expressways, national highways, provincial highways, county roads, township and village roads, and other road types. Standard errors are in parentheses. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels, respectively.

Table 4: Boundary Discontinuities: Provincial Capitals vs. Matched Non-Capital Cities

	Provincial Capitals	Matched Non-Capital Cities	Difference
Boundary Discontinuity	0.2583***	-0.0531	0.3114***
	(0.0554)	(0.0704)	(0.0896)

Note: This table compares estimated boundary discontinuities for provincial capitals and matched non-capital cities within the same province. The third column reports the difference between the two estimates. Provincial capitals without a suitable within-province match are excluded. Standard errors are in parentheses. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table 5: OLS Estimates: Marketization and Provincial-Capital Boundary Discon- tinuities

	(1)	(2)	(3)	(4)	(5)	(6)
Marketization	-0.040***	-0.044***	-0.045***	-0.062***	-0.074***	-0.069***
	(0.014)	(0.002)	(0.004)	(0.006)	(0.012)	(0.012)
Second Industry Share		0.919***	1.936***	1.907***	2.747***	2.207***
		(0.218)	(0.045)	(0.069)	(0.423)	(0.328)
Third Industry Share		1.032***	1.480***	1.365***	1.591***	1.270***
		(0.042)	(0.091)	(0.091)	(0.017)	(0.039)
Urbanization			0.373***	0.255***	0.245***	0.246***
			(0.019)	(0.024)	(0.011)	(0.011)
Log Per_GDP			-0.353***	-0.290***	-0.441***	-0.354***
			(0.047)	(0.050)	(0.017)	(0.002)
Human Capital			12.333***	13.932***	16.919***	8.547**
			(3.900)	(3.288)	(4.791)	(3.325)
Density				-0.353***	-0.387***	-0.236***
				(0.089)	(0.098)	(0.072)
Agglomeration				30.463***	34.549***	51.572***
				(2.506)	(4.686)	(7.666)
Industrial Degree					-0.728**	-0.720**
					(0.286)	(0.285)
Infrastructure					0.179**	0.100
					(0.090)	(0.076)
Information					-0.481*	-0.684**
					(0.272)	(0.307)
Openness						0.758***
						(0.133)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	135	135	135	135	135	135
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	0.162	0.162	0.162	0.162	0.162	0.162
SD dep. var.	0.282	0.282	0.282	0.282	0.282	0.282

Note: The dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary, standardized by province-year. Marketization is the provincial marketization index. Controls are added sequentially and include the industry shares, urbanization, log GDP per capita, human capital, population density, agglomeration, industrialization, infrastructure, information, and openness. All specifications include province and year fixed effects. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table 6: IV Estimates: Marketization and Provincial-Capital Boundary Discontinuities

	OLS	RF	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)
Marketization	-0.069***		-0.128***	-0.203***	-0.212***
	(0.012)		(0.046)	(0.052)	(0.050)
			First Stage		
LogFirm × $\text{Marketization}_{\text{nation}}$		-0.015***	0.072***	0.070***	0.070***
		(0.003)	(0.016)	(0.017)	(0.017)
Second Industry Share	2.207***	1.837***	1.809***	2.638***	2.107***
	(0.328)	(0.345)	(0.296)	(0.353)	(0.364)
Third Industry Share	1.270***	1.098***	1.244***	1.434***	1.111***
	(0.039)	(0.343)	(0.389)	(0.396)	(0.399)
Urbanization	0.246***	0.178	0.338***	0.357***	0.369***
	(0.011)	(0.123)	(0.107)	(0.112)	(0.111)
Log Per_GDP	-0.354***	-0.410***	-0.230***	-0.356***	-0.264***
	(0.002)	(0.071)	(0.060)	(0.066)	(0.064)
Human Capital	8.547**	8.009	17.957***	25.566***	18.377***
	(3.325)	(4.985)	(5.602)	(6.056)	(6.128)
Density	-0.236***	-0.427**	-0.487***	-0.607***	-0.484***
	(0.072)	(0.179)	(0.163)	(0.165)	(0.169)
Agglomeration	51.572***	58.922***	35.543***	45.725***	63.183***
	(7.666)	(6.146)	(5.912)	(6.126)	(6.375)
Industrial Degree	-0.720**	-0.692***		-0.719***	-0.711***
	(0.285)	(0.209)		(0.204)	(0.204)
Infrastructure	0.100	0.094*		0.258***	0.191***
	(0.076)	(0.055)		(0.056)	(0.056)
Information	-0.684**	-1.398***		-1.018**	-1.267***
	(0.307)	(0.389)		(0.438)	(0.434)
Openness	0.758***	0.791***			0.728***
	(0.133)	(0.105)			(0.093)
Year FE	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES
Observations	135	135	135	135	135
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
CD Wald F	NA	NA	20.0	14.9	14.8
KP Wald F	NA	NA	18.4	11.3	11.4

Note: The dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary, standardized by province-year. Columns (3)–(5) instrument provincial marketization using the interaction of Republican-period private-firm exposure and national marketization. RF denotes the reduced form. Controls are added sequentially as in Table 5. All specifications include province and year fixed effects. Values in parentheses are bootstrap standard errors. CD and KP Wald F statistics report weak-instrument diagnostics. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table 7: Provincial-Capital Boundary Discontinuities and Capital Misallocation

	Capital Misallocation	Adjacent Average	Adjacent Weighted Avg.	Other Cities Average	Other Cities Weighted Avg.
	(1)	(2)	(3)	(4)	(5)
Boundary Discontinuity	0.034*	-0.100***	-0.010**	-0.032	0.002
	(0.018)	(0.020)	(0.004)	(0.025)	(0.010)
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES
Observations	125	115	115	125	125
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	1.031	1.000	0.030	1.041	0.048
SD dep. var.	0.265	0.295	0.066	0.558	0.105

Note: The dependent variables are capital-misallocation measures for the provincial capital, adjacent non-capital cities, and other non-adjacent cities within the same province. The key regressor is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary, obtained from the border-RDD with a quadratic function of distance. Controls are the province-level covariates used in Table 5. All specifications include province and year fixed effects. Sample sizes vary because city-level factor data are missing for some provinces, mainly Tibet, Qinghai, Xinjiang, and Guangxi. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table 8: Provincial-Capital Boundary Discontinuities and Labor Misallocation

	Labor Misallocation	Adjacent Average	Adjacent Weighted Avg.	Other Cities Average	Other Cities Weighted Avg.
	(1)	(2)	(3)	(4)	(5)
Boundary Discontinuity	0.185	0.034	0.001	-0.168	-0.125***
	(0.582)	(0.040)	(0.008)	(0.108)	(0.022)
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES
Observations	125	115	115	125	125
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	4.698	0.847	0.158	1.282	0.303
SD dep. var.	15.21	0.702	0.163	0.778	0.244

Note: The dependent variables are labor-misallocation measures for the provincial capital, adjacent non-capital cities, and other non-adjacent cities within the same province. The key regressor is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary, obtained from the border-RDD with a quadratic function of distance. Controls are the province-level covariates used in Table 5. All specifications include province and year fixed effects. Sample sizes vary because city-level factor data are missing for some provinces, mainly Tibet, Qinghai, Xinjiang, and Guangxi. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table 9: Provincial-Capital Boundary Discontinuities and Provincial Growth

	(1)	(2)	(3)	(4)	(5)	(6)
Boundary Discontinuity	-0.008***	-0.009***	-0.009***	-0.008***	-0.006***	-0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Second Industry Share		0.111***	0.115***	0.119***	0.041***	0.035***
		(0.003)	(0.005)	(0.005)	(0.006)	(0.006)
Third Industry Share			0.037***	0.039***	0.027***	0.025***
			(0.004)	(0.004)	(0.004)	(0.004)
Urbanization			-0.016***	-0.007***	-0.010***	-0.010***
			(0.001)	(0.001)	(0.001)	(0.001)
Log Per_GDP			-0.001	-0.003***	0.012***	0.013***
			(0.001)	(0.001)	(0.001)	(0.001)
Human Capital			0.225***	-0.048	-0.291***	-0.613***
			(0.031)	(0.031)	(0.029)	(0.033)
Pop_Density				-0.009***	-0.004***	0.002**
				(0.001)	(0.001)	(0.001)
Agglomeration				-1.006***	-1.318***	-0.464***
				(0.065)	(0.067)	(0.109)
Industrial Degree					0.077***	0.073***
					(0.002)	(0.002)
Infrastructure					-0.014***	-0.016***
					(0.000)	(0.000)
Information					0.042***	0.034***
					(0.002)	(0.003)
Openness						0.033***
						(0.002)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	135	135	135	135	135	135
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	1.096	1.096	1.096	1.096	1.096	1.096
SD dep. var.	0.029	0.029	0.029	0.029	0.029	0.029

Note: The dependent variable is annual provincial GDP growth. The key regressor is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary, obtained from the border-RDD with a quadratic function of distance. Controls are added sequentially and include the province-level covariates used in Table 5. All specifications include province and year fixed effects. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table 10: Provincial-Capital Boundary Discontinuities, Primacy, and Inequality

	Eco_primacy	Regional Gini	Individual Gini
	(1)	(2)	(3)
Boundary Discontinuity	0.027***	0.018**	0.044***
	(0.005)	(0.007)	(0.008)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Province FE	YES	YES	YES
Observations	135	133	135
First-stage obs.	1,556,526	1,530,716	1,556,526
Mean dep. var.	0.267	0.232	0.428
SD dep. var.	0.096	0.086	0.047

Note: This table reports regressions of provincial-capital primacy and within-province inequality on the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary. Column (1) uses provincial-capital primacy, measured as the capital city's share of provincial GDP. Columns (2) and (3) use the regional Gini coefficient and individual income Gini coefficient, respectively. Controls are the province-level covariates used in Table 5. All specifications include province and year fixed effects. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Appendix to "The Political–Economy Origins of Economic Geography"

Appendix A. Summary Statistics

Table A.1 reports summary statistics for the province-year controls used in the empirical analysis. Urbanization is the urban share of the provincial population. *Log Per_GDP* is the natural logarithm of provincial GDP per capita, and *Human Capital* captures the average human-capital level in the province. *Agglomeration* measures employment density, defined as provincial employment divided by provincial land area. The remaining controls describe industrial structure, population density, industrialization, transportation infrastructure, information intensity, and openness to trade.

Table A.1: Summary Statistics for Province-Year Controls

Variable	Obs.	Mean	SD	Min.	Max.	Median
Second Industry Share	135	0.443	0.0786	0.198	0.579	0.448
Third Industry Share	135	0.421	0.0694	0.286	0.590	0.402
Urbanization	135	0.474	0.133	0.167	0.752	0.487
Log Per_GDP	135	10.01	0.901	7.887	11.72	10.18
Human_Capital	135	0.0139	0.00700	0.00210	0.0286	0.0150
Density	135	8.160	0.892	5.553	9.433	8.348
Agglomeration	135	0.0146	0.0119	0.000100	0.0446	0.0111
Industrial Degree	135	0.335	0.0953	0.0691	0.535	0.345
Infrastructure	135	11.46	0.752	9.227	12.73	11.56
Information	135	0.0758	0.0449	0.0187	0.236	0.0628
Openness	135	0.207	0.252	0.0127	1.554	0.114

Note: The table reports province-year summary statistics for the controls used in the marketization and welfare regressions. Industrial shares, urbanization, industrial degree, information intensity, and openness are measured as ratios. Infrastructure is the logarithm of highway mileage.

Table A.2: Descriptive Statistics of Provincial Indicators, 2000–2005

Province-Year	GDP Mean	GDP SD	Distance Mean	Distance SD	Obs.	Capital Misalloc.	Labor Misalloc.	RD	Rdrobust
2000_Anhui	480.24	1280.91	-0.61	4.90	12805	1.16	0.64	0.42	0.34
2000_Fujian	286.61	471.35	0.22	5.91	7177	0.96	0.86	0.47	0.35
2000_Gansu	172.30	918.65	-0.25	6.05	12890	1.02	1.85	0.61	0.49
2000_Guangdong	7524.14	17908.59	-0.82	5.88	10596	0.96	9.04	0.36	0.20
2000_Guangxi	101.36	165.85	-0.40	5.87	17044	1.06	1.02	0.54	0.46
2000_Guizhou	184.70	277.38	-0.74	5.81	9675	1.30	1.05	0.19	0.15
2000_Hainan	145.94	222.16	0.39	6.19	3933	0.96	1.85	0.17	0.11
2000_Hebei	366.86	253.98	-0.39	5.96	8238	0.99	0.96	0.15	0.11
2000_Heilongjiang	85.16	168.17	0.65	6.09	20657	1.44	0.99	0.05	0.04
2000_Henan	661.07	542.40	-0.60	5.92	8698	1.24	0.86	0.11	0.12
2000_Hubei	683.17	533.64	-0.64	6.00	11337	1.16	1.40	0.17	0.21
2000_Hunan	407.51	1487.64	-0.36	5.94	13631	1.28	0.78	0.14	0.04
2000_Jiangsu	665.14	892.41	0.78	6.05	4346	1.29	1.70	0.02	-0.03
2000_Jiangxi	187.93	411.04	-0.77	5.83	8657	0.85	0.23	0.12	0.05
2000_Jilin	260.10	489.94	-0.33	5.97	16909	0.98	0.80	0.29	0.23
2000_Liaoning	468.93	1373.77	-0.55	5.93	13165	1.25	0.86	-0.05	-0.12
2000_Neimenggu	54.23	586.30	-0.42	6.04	12731	1.27	65.09	0.23	0.18
2000_Qinghai	82.45	381.69	-0.68	6.00	9195			0.04	0.03
2000_Shandong	554.49	642.95	-0.76	5.83	11127	0.90	0.85	0.10	0.02
2000_Shanxi	188.14	494.81	-0.88	5.88	9203	1.04	1.11	0.14	0.07
2000_Sichuan	470.87	649.02	-0.57	5.94	12617	1.38	0.79	0.44	0.40
2000_Sshanxi	428.35	941.99	-0.53	6.01	11833	0.89	0.95	0.18	0.18
2000_Tibet	5.55	32.70	1.90	5.71	11492			0.13	0.14
2000_Xinjiang	66.20	149.78	-0.69	5.94	17161	0.40	1.31	0.05	0.00
2000_Yunnan	176.18	419.17	0.75	6.06	19111	1.13	1.54	0.36	0.29
2000_Zhejiang	618.10	531.65	0.77	6.07	12645	1.08	1.86	0.02	-0.01
2000_Ningxia	65.56	68.04	0.46	6.12	6497	1.00	-0.49	0.09	0.04
2005_Anhui	765.62	2042.81	-0.61	4.90	12805	1.01	0.56	0.17	0.15
2005_Fujian	426.04	556.18	-0.21	5.92	7184	1.33	0.85	-0.04	-0.06
2005_Gansu	308.56	812.25	-0.25	6.05	12888	0.83	1.14	0.17	0.17
2005_Guangdong	4991.61	6233.05	-0.64	5.94	9696	1.05	18.90	0.03	-0.03
2005_Guangxi	430.33	314.74	-0.40	5.87	17044	1.63	1.32	0.73	0.60
2005_Guizhou	301.74	402.75	-0.74	5.81	9675	1.23	1.12	0.99	0.85
2005_Hainan	453.49	852.44	-0.97	5.92	3196	0.90	2.50	0.51	0.24
2005_Hebei	595.08	363.48	-0.40	5.96	8232	0.99	0.99	0.91	0.72
2005_Heilongjiang	231.45	481.25	-0.07	6.00	18454	1.71	1.08	-0.01	0.00
2005_Henan	2859.97	2304.17	-0.60	5.92	8698	1.25	0.86	0.09	0.04
2005_Hubei	717.89	630.65	-0.64	6.00	11337	1.03	1.37	0.09	0.08
2005_Hunan	730.77	1304.48	-0.36	5.94	13626	1.37	0.80	0.15	0.09
2005_Jiangsu	1209.78	714.13	0.03	5.90	3861	1.07	1.61	0.27	0.19
2005_Jiangxi	498.78	666.45	-0.77	5.83	8657	0.96	0.59	-0.31	-0.26
2005_Jilin	514.38	665.28	-0.33	5.97	16909	1.05	1.24	-0.99	-0.83
2005_Liaoning	500.05	676.67	-0.55	5.93	13161	1.52	0.84	-1.35	-1.13
2005_Neimenggu	185.17	296.21	-0.42	6.04	12730	1.07	63.75	0.22	0.17
2005_Qinghai	215.53	1008.14	-0.68	6.00	9195			0.22	0.19
2005_Shandong	2388.03	1658.02	-0.76	5.83	11128	0.70	0.89	-0.22	-0.21
2005_Shanxi	373.67	1008.96	-0.88	5.88	9203	1.01	0.99	0.08	0.07
2005_Sichuan	770.81	1265.58	-0.57	5.94	12617	1.28	0.85	0.06	0.06
2005_Sshanxi	604.08	1267.83	-0.53	6.01	11833	1.14	1.00	-0.06	0.02
2005_Tibet	4.32	12.00	0.99	5.71	14318			0.01	0.05
2005_Xinjiang	128.33	282.48	-0.69	5.94	17161	0.46	1.17	0.22	0.11
2005_Yunnan	217.74	353.67	-0.27	5.92	16282	0.98	1.04	0.32	0.17
2005_Zhejiang	1616.29	1877.19	-0.22	5.95	10807	0.91	1.55	0.41	0.24
2005_Ningxia	118.83	104.39	-0.32	6.03	5743	1.18	-0.53	0.26	0.13

Note: This table reports descriptive statistics for provincial indicators in 2000 and 2005. GDP Mean is mean gridded GDP in the provincial-capital boundary sample, and GDP SD is the corresponding standard deviation. Distance Mean and Distance SD summarize grid-cell distance to the provincial-capital boundary. Obs. reports the number of grid cells in each province-year sample. Capital Misalloc. and Labor Misalloc. denote province-year measures of capital and labor allocation efficiency. RD and Rdrobust report the estimated provincial-capital boundary discontinuities from the parametric and nonparametric border-RDD specifications, respectively. Blank entries indicate unavailable misallocation indicators.

Table A.3: Descriptive Statistics of Provincial Indicators, 2010–2015

Province-Year	GDP Mean	GDP SD	Distance Mean	Distance SD	Obs.	Capital Misalloc.	Labor Misalloc.	RD	Rdrobust
2010_Anhui	1260.98	2044.91	-0.61	4.90	12805	1.19	0.78	0.20	0.17
2010_Fujian	843.53	1297.96	-0.22	5.91	7177	1.31	0.85	0.08	0.10
2010_Gansu	403.37	916.32	-0.25	6.05	12888	0.62	1.06	-0.14	-0.08
2010_Guangdong	6421.58	6455.68	-0.64	5.94	9700	0.93	19.60	-0.18	-0.09
2010_Guangxi	443.18	653.46	-0.40	5.87	17044	1.05	1.33	-0.03	0.01
2010_Guizhou	531.16	662.96	-0.74	5.81	9675	1.22	1.16	0.06	0.07
2010_Hainan	1041.06	2149.75	-0.99	5.94	3206	0.74	2.93	-0.02	-0.09
2010_Hebei	1110.03	728.12	-0.39	5.96	8238	0.93	0.89	0.05	-0.02
2010_Heilongjiang	491.05	1284.61	-0.06	6.00	18449	1.76	0.99	0.05	-0.01
2010_Henan	2867.17	2298.26	-0.60	5.92	8698	1.10	0.91	0.05	-0.03
2010_Hubei	635.95	411.47	-0.64	6.00	11337	1.00	1.27	0.19	0.11
2010_Hunan	1281.44	1433.55	-0.36	5.94	13626	1.34	0.89	1.05	0.87
2010_Jiangsu	3136.15	1876.76	0.01	5.93	3874	0.91	1.83	0.69	0.54
2010_Jiangxi	806.56	544.20	-0.76	5.83	8635	0.92	0.75	0.58	0.46
2010_Jilin	761.55	546.74	-0.33	5.97	16909	1.02	0.97	0.29	0.09
2010_Liaoning	1357.56	1622.22	-0.55	5.93	13161	1.56	0.94	0.45	0.30
2010_Neimenggu	442.83	609.76	-0.42	6.04	12730	0.90	75.98	0.04	0.06
2010_Qinghai	383.73	1582.41	-0.68	6.00	9195			0.00	0.01
2010_Shandong	2338.59	1644.78	-0.76	5.83	11128	0.69	1.07	0.05	0.04
2010_Shanxi	758.91	1850.77	-0.88	5.88	9203	0.90	1.10	-0.03	0.00
2010_Sichuan	1280.87	2098.15	-0.57	5.94	12617	1.18	0.98	0.27	0.26
2010_Sshanxi	1339.26	2167.15	-0.53	6.01	11833	1.08	1.02	0.03	0.12
2010_Tibet	21.67	43.53	0.26	5.86	18979			0.16	0.09
2010_Xinjiang	285.46	614.34	-0.69	5.94	17161	0.49	1.09	-0.08	-0.08
2010_Yunnan	546.28	913.22	-0.26	5.93	16315	0.96	1.07	-0.05	-0.03
2010_Zhejiang	3232.10	3583.84	-0.21	5.94	10818	0.89	2.10	0.04	0.03
2010_Ningxia	389.26	266.97	-0.32	6.03	5748	1.29	-0.57	0.10	0.08
2015_Anhui	1367.23	1531.86	-0.46	5.97	11527	1.09	0.83	-0.11	-0.07
2015_Fujian	1814.78	2084.22	-0.20	5.91	7168	1.27	0.98	0.14	0.11
2015_Gansu	825.47	2309.02	-0.25	6.05	12888	0.53	1.00	0.00	-0.04
2015_Guangdong	18081.01	51775.85	-0.63	5.95	9634	0.86	14.66	0.31	0.25
2015_Guangxi	762.10	1100.22	-0.40	5.87	17044	1.04	1.31	-0.01	-0.04
2015_Guizhou	1752.86	6216.50	-0.74	5.81	9675	1.14	1.23	0.26	0.15
2015_Hainan	1931.24	2676.43	-1.00	5.91	3202	0.68	2.78	0.16	0.10
2015_Hebei	1874.38	1317.20	-0.39	5.95	8229	0.89	0.83	0.39	0.43
2015_Heilongjiang	558.11	1441.88	-0.07	6.00	18451	1.71	0.99	0.80	0.80
2015_Henan	5116.64	7428.73	-0.60	5.92	8698	1.07	1.05	0.36	0.26
2015_Hubei	2840.52	2839.02	-0.64	6.00	11337	0.83	1.14	0.30	0.21
2015_Hunan	3753.49	7979.06	-0.36	5.94	13626	1.13	0.90	0.23	0.16
2015_Jiangsu	6042.56	4775.09	0.04	5.92	3867	0.89	1.51	0.26	0.18
2015_Jiangxi	1267.53	711.02	-0.77	5.83	8657	0.90	0.86	0.21	0.09
2015_Jilin	1177.67	1851.38	-0.33	5.97	16909	1.04	1.07	0.61	0.46
2015_Liaoning	1866.14	2153.81	-0.55	5.93	13159	1.50	1.06	0.65	0.48
2015_Neimenggu	834.08	1413.19	-0.42	6.04	12727	0.80	82.85	0.57	0.44
2015_Qinghai	817.89	4441.71	-0.68	6.00	9195			0.06	0.05
2015_Shandong	3538.56	3002.09	-0.76	5.83	11128	0.62	0.88	0.13	0.15
2015_Shanxi	1750.85	6873.68	-0.88	5.88	9203	0.74	1.20	0.00	-0.02
2015_Sichuan	2677.99	3398.11	-0.57	5.94	12617	1.04	1.58	-0.12	-0.11
2015_Sshanxi	2630.63	7612.67	-0.53	6.01	11833	0.96	1.03	-0.16	-0.17
2015_Tibet	14.36	47.15	0.15	5.84	19333			-0.01	0.00
2015_Xinjiang	652.13	3746.49	-0.69	5.94	17161	0.65	1.03	-0.01	0.01
2015_Yunnan	770.53	1113.99	-0.27	5.92	16296	0.91	1.06	0.08	0.05
2015_Zhejiang	5052.58	6427.15	-0.23	5.97	10680	0.87	2.00	0.18	0.13
2015_Ningxia	918.69	803.72	-0.29	6.04	5754	1.28	-0.79	0.19	0.15

Note: This table reports descriptive statistics for provincial indicators in 2010 and 2015. GDP Mean is mean gridded GDP in the provincial-capital boundary sample, and GDP SD is the corresponding standard deviation. Distance Mean and Distance SD summarize grid-cell distance to the provincial-capital boundary. Obs. reports the number of grid cells in each province-year sample. Capital Misalloc. and Labor Misalloc. denote province-year measures of capital and labor allocation efficiency. RD and Rdrobust report the estimated provincial-capital boundary discontinuities from the parametric and nonparametric border-RDD specifications, respectively. Blank entries indicate unavailable misallocation indicators.

Table A.4: Descriptive Statistics of Provincial Indicators, 2019

Province-Year	GDP Mean	GDP SD	Distance Mean	Distance SD	Obs.	Capital Misalloc.	Labor Misalloc.	RD	Rdrobust
2019_Anhui	2476.56	3420.02	-0.46	5.97	11527	0.97	0.92	0.15	0.12
2019_Fujian	2703.15	2408.25	-0.22	5.92	7147	1.18	1.13	0.11	0.08
2019_Gansu	1005.49	2918.18	-0.25	6.05	12890	0.55	1.06	0.19	0.09
2019_Guangdong	22058.48	62070.70	-0.63	5.94	9695	0.78	16.73	0.22	0.13
2019_Guangxi	977.42	1089.94	-0.40	5.87	17044	1.09	1.53	0.15	0.08
2019_Guizhou	2137.88	7170.29	-0.74	5.81	9675	1.10	1.21	0.09	0.05
2019_Hainan	3231.14	3634.21	-0.98	5.93	3198	0.71	2.74	0.10	0.10
2019_Hebei	1806.68	1170.69	-0.41	5.96	8227	0.87	0.99	0.15	0.13
2019_Heilongjiang	605.01	1884.95	-0.06	6.00	18455	1.74	0.95	0.27	0.17
2019_Henan	7291.22	10170.27	-0.60	5.92	8698	1.06	1.17	0.31	0.20
2019_Hubei	5890.58	10330.47	-0.64	6.00	11337	0.72	1.14	0.11	0.05
2019_Hunan	5839.88	10221.62	-0.36	5.94	13631	1.02	0.92	0.15	0.09
2019_Jiangsu	10269.88	10624.31	0.03	5.91	3865	0.81	1.63	0.11	0.00
2019_Jiangxi	1642.31	1100.98	-0.77	5.83	8657	0.90	0.92	0.08	0.00
2019_Jilin	1409.79	5393.92	-0.33	5.97	16909	1.07	1.08	0.12	0.02
2019_Liaoning	1586.16	5531.64	-0.55	5.93	13161	1.40	1.06	0.05	-0.11
2019_Neimenggu	701.78	1446.82	-0.42	6.04	12731	0.87	94.99	-0.07	-0.11
2019_Qinghai	1254.67	7910.98	-0.68	6.00	9195			0.00	-0.01
2019_Shandong	3944.95	4860.17	-0.60	5.86	13731	0.65	1.09	0.12	0.00
2019_Shanxi	2816.17	11585.43	-0.88	5.88	9203	0.72	1.11	0.10	0.04
2019_Sichuan	3218.31	3653.99	-0.30	6.12	13926	1.00	1.67	0.27	0.08
2019_Sshanxi	3693.87	11503.64	-0.46	6.06	12086	0.87	1.05	0.40	0.22
2019_Tibet	72.84	398.53	-0.12	5.84	20572			0.35	0.33
2019_Xinjiang	1049.42	4606.47	-0.69	5.94	17161	0.72	1.06	0.08	0.04
2019_Yunnan	1416.47	2144.81	-0.27	5.92	16286	0.80	1.12	0.21	0.22
2019_Zhejiang	7831.73	11634.55	-0.22	5.94	10820	0.82	2.19	0.00	-0.01
2019_Ningxia	1236.96	1169.83	-0.30	6.04	5742	1.31	-0.65	0.21	0.15

Note: This table reports descriptive statistics for provincial indicators in 2019. GDP Mean is mean gridded GDP in the provincial-capital boundary sample, and GDP SD is the corresponding standard deviation. Distance Mean and Distance SD summarize grid-cell distance to the provincial-capital boundary. Obs. reports the number of grid cells in each province-year sample. Capital Misalloc. and Labor Misalloc. denote province-year measures of capital and labor allocation efficiency. RD and Rdrobust report the estimated provincial-capital boundary discontinuities from the parametric and nonparametric border-RDD specifications, respectively. Blank entries indicate unavailable misallocation indicators.

Appendix B. POI and Population Data

The mechanism exercises use December 2019 Amap (Gaode) point-of-interest data and 2019 gridded population data. The POI data classify establishments into firm, business-service, and residential-service categories, and the population data measure grid-level population density around the administrative boundary. These data are used for the descriptive mechanism evidence reported in Figures 7 and 8.

Appendix C. Robustness Checks

Table C.1: OLS Estimates: Marketization and Provincial-Capital Boundary Discontinuities (Non-Parametric Estimation)

	(1)	(2)	(3)	(4)	(5)	(6)
Marketization	-0.034**	-0.037**	-0.042**	-0.056***	-0.066***	-0.062***
	(0.016)	(0.016)	(0.017)	(0.017)	(0.018)	(0.018)
Second Industry Share		0.795**	1.654***	1.613***	2.374***	1.857***
		(0.360)	(0.404)	(0.417)	(0.505)	(0.519)
Third Industry Share		0.860**	1.207***	1.102**	1.302***	0.996**
		(0.429)	(0.444)	(0.447)	(0.439)	(0.444)
Urbanization			0.284**	0.173	0.168	0.170
			(0.125)	(0.125)	(0.135)	(0.135)
Log Per_GDP			-0.302***	-0.247***	-0.382***	-0.298***
			(0.061)	(0.060)	(0.072)	(0.072)
Human Capital			15.966***	17.794***	20.386***	12.373***
			(3.602)	(4.310)	(4.472)	(4.249)
Density				-0.270*	-0.305**	-0.161
				(0.146)	(0.153)	(0.156)
Agglomeration				26.388***	30.017***	46.309***
				(5.764)	(6.182)	(7.644)
Industrial Degree					-0.662**	-0.654**
					(0.262)	(0.262)
Infrastructure					0.154***	0.079
					(0.055)	(0.054)
Information					-0.331	-0.525
					(0.395)	(0.394)
Openness						0.725***
						(0.122)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	135	135	135	135	135	135
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	0.113	0.113	0.113	0.113	0.113	0.113
SD dep. var.	0.235	0.235	0.235	0.235	0.235	0.235

Note: The dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary, obtained from the non-parametric first-stage border-RDD and standardized within province-year. Controls are added sequentially and include the province-level covariates listed in Table A.1. All specifications include province and year fixed effects. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table C.2: Marketization and Provincial-Capital Boundary Discontinuities: Alternative Bandwidths and Functional Forms

	Quadratic		Linear			
	(2) B.W.=6	(3) B.W.=8	(4) B.W.=4	(5) B.W.=6	(6) B.W.=8	(7) B.W.=10
Marketization	-0.053**	-0.065***	-0.063***	-0.072***	-0.074***	-0.074***
	(0.024)	(0.019)	(0.015)	(0.012)	(0.010)	(0.009)
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	135	135	135	135	135	135
First-stage obs.	994,866	1,280,055	697,774	994,866	1,280,055	1,556,526
Mean dep. var.	0.067	0.122	0.139	0.192	0.216	0.225
SD dep. var.	0.196	0.258	0.258	0.286	0.294	0.296

Note: The dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary. Columns vary the first-stage bandwidth and distance-control function used to estimate the boundary discontinuity. The 4 km specification is reported only for the linear first stage because the sample close to the boundary is too small for a stable quadratic specification. All columns include province-level controls, province fixed effects, and year fixed effects. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Alternative Measures of Marketization

Table C.3: Marketization and Provincial-Capital Boundary Discontinuities: Reduced Government Intervention

	Dependent variable: boundary discontinuity					
	(1)	(2)	(3)	(4)	(5)	(6)
Marketization (Reduced government intervention)	-0.015***	-0.014***	-0.015***	-0.013***	-0.015***	-0.015***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Second Industry Share		0.780***	1.880***	1.950***	2.561***	2.561***
		(0.237)	(0.297)	(0.303)	(0.349)	(0.349)
Third Industry Share		0.944***	1.466***	1.490***	1.595***	1.595***
		(0.334)	(0.345)	(0.346)	(0.335)	(0.335)
Urbanization			0.420***	0.260**	0.264**	0.264**
			(0.110)	(0.110)	(0.118)	(0.118)
Log Per_GDP			-0.377***	-0.344***	-0.473***	-0.473***
			(0.062)	(0.063)	(0.066)	(0.066)
Human Capital			6.812*	7.978*	10.109**	10.109**
			(3.899)	(4.343)	(4.358)	(4.358)
Density				-0.193	-0.212	-0.212
				(0.155)	(0.163)	(0.163)
Agglomeration				23.430***	26.682***	26.682***
				(4.375)	(4.413)	(4.413)
Industrial Degree					-0.588***	-0.588***
					(0.190)	(0.190)
Infrastructure					0.161***	0.161***
					(0.052)	(0.052)
Information					-0.444	-0.444
					(0.404)	(0.404)
Openness						-0.025***
						(0.004)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	135	135	135	135	135	135
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	0.162	0.162	0.162	0.162	0.162	0.162
SD dep. var.	0.282	0.282	0.282	0.282	0.282	0.282

Note: The dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary. The marketization measure is the reduction in government intervention in firms. The first step estimates the boundary discontinuity using grid cells within 10 km of the boundary and a quadratic function of distance; the second step regresses the estimated discontinuity on marketization and controls. Controls are added sequentially. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table C.4: Marketization and Provincial-Capital Boundary Discontinuities: Non-State Investment Share

	Dependent variable: boundary discontinuity					
	(1)	(2)	(3)	(4)	(5)	(6)
Marketization (Non-state investment share)	-0.019***	-0.016***	-0.021***	-0.025***	-0.029***	-0.030***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)
Second Industry Share		0.671***	1.681***	1.787***	2.579***	2.179***
		(0.248)	(0.313)	(0.314)	(0.349)	(0.356)
Third Industry Share		0.767**	1.200***	1.222***	1.265***	1.065***
		(0.345)	(0.362)	(0.362)	(0.350)	(0.351)
Urbanization			0.340***	0.194*	0.234**	0.217*
			(0.107)	(0.106)	(0.116)	(0.116)
Log Per_GDP			-0.351***	-0.312***	-0.460***	-0.386***
			(0.063)	(0.064)	(0.067)	(0.066)
Human Capital			16.409***	16.675***	20.312***	11.861***
			(3.941)	(4.267)	(4.284)	(4.145)
Density				-0.378**	-0.478***	-0.316*
				(0.161)	(0.170)	(0.174)
Agglomeration				28.662***	32.977***	50.533***
				(4.430)	(4.515)	(5.100)
Industrial Degree					-0.858***	-0.895***
					(0.188)	(0.187)
Infrastructure					0.149***	0.080
					(0.052)	(0.051)
Information					-0.042	-0.204
					(0.394)	(0.395)
Openness						0.776***
						(0.093)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	135	135	135	135	135	135
First-stage obs.	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526	1,556,526
Mean dep. var.	0.162	0.162	0.162	0.162	0.162	0.162
SD dep. var.	0.282	0.282	0.282	0.282	0.282	0.282

Note: The dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary. The marketization measure is the share of non-state fixed-asset investment. The first step estimates the boundary discontinuity using grid cells within 10 km of the boundary and a quadratic function of distance; the second step regresses the estimated discontinuity on marketization and controls. Controls are added sequentially. Values in parentheses are bootstrap standard errors from the two-step estimation. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Instrumental-Variable Robustness Checks

Table C.5: Alternative Bartik IV Estimates

	IV2		IV3		IV4	
	(1) First Stage	(2) Second Stage	(3) First Stage	(4) Second Stage	(5) First Stage	(6) Second Stage
Marketization		-0.146***		-0.182***		-0.184***
		(0.040)		(0.045)		(0.046)
Firm_capita × Log_nonstate_profit	0.059***					
	(0.010)					
LogFirm × Log_nonstate_profit_ex			0.416***			
			(0.096)			
Firm_capita × $\text{Marketization}_{\text{nation}}$					0.040***	
					(0.009)	
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
KP LM statistic	14.2		13.2		12.8	
CD Wald F	17.8		15.6		11.9	
KP Wald F	24.7		14.3		15.3	
Observations	134	134	134	134	134	134
First-stage obs.	None	1,556,526	None	1,556,526	None	1,556,526

Note: The second-stage dependent variable is the estimated gridded-GDP boundary discontinuity at the provincial-capital boundary. The table reports Bartik-style IV estimates using alternative instrument constructions. The baseline IV interacts the logarithm of historical private firms in a province with the contemporaneous national marketization index. IV2 interacts per capita historical private firms with the logarithm of contemporaneous national non-state enterprise profits. IV3 interacts the logarithm of historical private firms with the contemporaneous national share of non-state enterprise profits, excluding the target province. IV4 interacts per capita historical private firms with the contemporaneous national marketization index. The boundary discontinuity is first estimated using the baseline quadratic distance specification. The reported first-stage and second-stage columns correspond to the IV estimation. All columns include province-level controls, province fixed effects, and year fixed effects. Values in parentheses are bootstrap standard errors. "None" indicates that the grid-level first-stage boundary-discontinuity sample is not applicable to the IV first-stage column. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Table C.6: IV Exogeneity Diagnostics

	(1) market_nation	(2) lognonstate_p	(3) out1s_nonsoeprofit
Lagged Second Industry Share	6.420	1.597	0.309
	(5.823)	(4.293)	(0.599)
Lagged Third Industry Share	7.460	5.187	0.678
	(8.290)	(6.278)	(0.807)
Lagged Urbanization	-0.284	-0.120	-0.045
	(1.671)	(1.347)	(0.188)
Lagged Log Per_GDP	-1.102	-0.930	-0.122
	(1.311)	(0.939)	(0.117)
Lagged Human Capital	26.035	10.239	-1.744
	(110.277)	(82.589)	(11.145)
Lagged Density	0.451	2.502	0.169
	(4.142)	(3.501)	(0.417)
Lagged Agglomeration	75.412	19.114	4.889
	(138.903)	(118.459)	(14.593)
Lagged Industrial Degree	1.733	3.176	0.400
	(4.414)	(3.647)	(0.468)
Lagged Infrastructure	0.321	0.441	0.103
	(0.923)	(0.705)	(0.083)
Lagged Information	0.531	-1.208	0.050
	(5.191)	(4.301)	(0.516)
Lagged Openness	-0.615	-0.035	-0.038
	(1.748)	(1.244)	(0.179)
Observations	108	108	108

Note: The table reports exogeneity diagnostics for the shift components used in the Bartik-style instruments. Column (1) uses the contemporaneous national marketization index as the dependent variable. Column (2) uses the log of contemporaneous non-state enterprise profits. Column (3) uses the contemporaneous share of non-state enterprise profits in total profits, excluding the target city. Regressors are lagged province-level observables. Values in parentheses are standard errors. $*$, $**$, and $***$ denote significance at the 10, 5, and 1 percent levels.

Appendix D. Misallocation Index Construction

The resource-misallocation indices include the capital misallocation index ($Kmis$) and the labor misallocation index ($Lmis$). The construction follows Hsieh and Klenow (2009). Data on capital, labor, and wages come from the China City Statistical Yearbook. Let γ_{Ki} and γ_{Li} denote the relative price-distortion coefficients for capital and labor, respectively. The calculation proceeds as follows.

Assume a constant-returns-to-scale Cobb–Douglas production function:

$$Y_{it} = AK_{it}^{\beta_{Ki}} L_{it}^{1-\beta_{Ki}}. \tag{A.1}$$

Taking logs and rearranging gives:

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \ln A + \beta_{Ki} \ln\left(\frac{K_{it}}{L_{it}}\right) + \varepsilon_{it}. \tag{A.2}$$

Here, Y_{it} is real GDP of region i in year t; L_{it} is annual average employment; and K_{it} is the fixed-capital stock, computed using the perpetual-inventory method:

$$K_{it} = \frac{I_{it}}{P_{it}} + (1 - \delta_t) K_{i,t-1}. \tag{A.3}$$

In this expression, I_{it} is total fixed-asset investment in city i in year t, P_{it} is the corresponding fixed-asset investment price index, and δ_t is the depreciation rate. Following the constant-returns-to-scale setup, the depreciation rate is set to 0.6%. For the first-period capital stock, we use:

$$K_{it} = \frac{I_{it}}{P_{it}}. \tag{A.4}$$

Because cities within the same province differ in economic and technological conditions, their initial capital productivity may also differ. In estimation, city fixed effects and city-specific slope terms are included to account for such heterogeneity; the interaction coefficients provide the city-specific capital output elasticity β_{Ki}. Given β_{Ki}, constant returns imply:

$$\beta_{Li} = 1 - \beta_{Ki}. \tag{A.5}$$

Using the estimated capital and labor output elasticities, the relative factor-price distortion coefficients are computed as:

$$\gamma_{Ki} = \frac{K_i/K}{s_i \beta_{Ki}/\beta_K}, \tag{A.6}$$

$$\gamma_{Li} = \frac{L_i/L}{s_i \beta_{Li}/\beta_L}. \tag{A.7}$$

Here, s_i is region i's output share in the province, $\beta_K = \sum_i^N s_i \beta_{Ki}$, K_i/K is region i's actual share of total capital, and $s_i\beta_{Ki}/\beta_K$ is the theoretical share of capital allocated to region i under the efficient allocation. The ratio γ_{Ki} therefore captures the deviation between actual and efficient capital use. If $\gamma_{Ki} > 1$, region i receives more capital than under the efficient allocation, indicating over-allocation; if $\gamma_{Ki} < 1$, the region is under-allocated capital.

The capital and labor misallocation indices are then calculated as:

$$\tau_{Ki} = \frac{1}{\gamma_{Ki}} - 1, \qquad \tau_{Li} = \frac{1}{\gamma_{Li}} - 1. \tag{A.8}$$

Following this procedure, we calculate city-level capital and labor misallocation indices for 2003–2016. A positive index indicates under-allocation, while a negative index indicates over-allocation. A larger absolute value implies more severe resource misallocation. Following the related Chinese literature, the empirical analysis uses the absolute value of the misallocation index.

Appendix E. Gini Coefficient Construction

To compute the regional economic Gini coefficient, we use city-level GDP and population data from the China City Statistical Yearbook. First, we compute population-weighted differences in per capita GDP. Specifically, for regions i and j, the weighted difference is $|Y_i - Y_j| \times (P_i \times P_j)$, where Y_i and Y_j are real per capita GDP in regions i and j, and P_i and P_j are their populations.

Next, summing over all pairs gives the total weighted difference:

$$S = \sum_{i=1}^{n} \sum_{j=1}^{n} |Y_i - Y_j| \times (P_i \times P_j). \tag{A.9}$$

The regional Gini coefficient is then:

$$G = \frac{S}{2\mu P_{total}^2}, \tag{A.10}$$

where S is the sum of weighted pairwise differences, μ is the population-weighted average per capita GDP,

$$\mu = \frac{\sum_{i=1}^{n} Y_i P_i}{P_{total}},$$

and total population is:

$$P_{total} = \sum_{i=1}^{n} P_i.$$

For the individual income Gini coefficient, we use grouped household income data published by the National Bureau of Statistics and calculate the Gini coefficient from the corresponding fitted Lorenz curve.