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The impact of urban business environment on the agglomeration of high-skilled labor

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Abstract

In the era of technology-driven global economic transition, optimizing high-level labor agglomeration is crucial for economic growth as high-skilled workers prioritize urban business environments over housing prices and wages. Leveraging panel data from 280 Chinese cities spanning 2009-2021, this study delves into the impact of the urban business environment on high-skilled labor agglomeration. Specifically, the entropy weight method is employed to measure business environment indicators, and the location quotient is used to measure the level of high-skilled labor agglomeration. Employing two-way fixed effect, mediating effect, and threshold effect models, we find that improving the urban business environment significantly boosts high-skilled labor agglomeration, partially through enhanced urban innovation. However, the impact of the business environment on high-skilled labor agglomeration is constrained by the average wage level. If the average wage level is too low, the optimization of the urban business environment will impede the agglomeration of high-skilled labor. Our findings emphasize the importance of a favorable business environment and reasonable wage policies in attracting talent for sustainable economic development.

Keywords: High-skilled labor agglomeration, Urban business environment, Entropy weight method, Location quotient, Threshold effect, Mediating effect.
JEL Classification: R30.

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Contents

Contribution of this paper to the literature

This study innovatively explores how the urban business environment affects high-skilled labor agglomeration. By introducing the mediating mechanism of urban innovation and the threshold effect of wage levels, it reveals the internal relationship between the optimization of the business environment and talent spatial allocation, providing new perspectives for optimization of the business environment and the spatial allocation of talents, and formulating effective high-skilled labor attraction policies.

1. Introduction

Amid the technology-driven transformation that increasingly characterizes both domestic and global economies, intergovernmental competition has shifted beyond simplistic unidimensional contests. Cities are now motivated to comprehensively optimize their business environments, which encompass technological innovation ecosystems, market dynamics, legal frameworks, and financial infrastructures. Meanwhile, as technological progress displays an escalating skill bias, the skill premium for high-skilled labor has risen significantly. The agglomeration of high-skilled workers not only strengthens the technological innovation capacity of clustered regions but also fuels high-quality economic development (Wang, Xue, Chang, & Xie, 2020) thereby emerging as a crucial determinant for regional economic growth in the new economic paradigms (Kerr & Lincoln, 2010). Empirical evidence highlights that urban business environments play a pivotal role in regional economic development (Fan, Liu, & Wang, 2024). As technological competition intensifies to become the "main battlefield" of economic rivalry, the link between urban business environment enhancements and high-skilled labor agglomeration has grown increasingly interdependent. Investigating how the urban business environments impact high-skilled labor can empower governments to uncover new growth drivers in this evolving economic landscape. It holds significant importance for boosting urban innovation capabilities, identifying latent economic drivers, and promoting high-quality development.

To value the quality of business environments across diverse regions, the World Bank established a global evaluation framework by measuring the Distance of Doing Business index. Existing studies have investigated various factors, including deregulation (Djankov, McLiesh, & Ramalho, 2006) government policies and human capital (Wach, 2008) entrepreneurial activity (Klapper, Lewin, & Delgado, 2011) innovation ecosystems (Prajogo, 2016) and tax reduction policies (Lockwood & Rohlin, 2013). The literature consistently demonstrates that improving the business environment can significantly boost socio-economic development by stimulating regional economic activities and creating new growth opportunities. Notably, enhanced business environments are strongly associated with increased domestic private investment-a key economic driver, as domestic investments generally surpass foreign direct investments in most nations (World Bank, 2004). Moreover, variations in business environments influence corporate credit allocation patterns (Augier, Dovis, & Gasiorek, 2012).

The spatial distribution of population has long been a key focus in the field of geography. Prior research on the migration and distribution patterns of highly skilled labor reveals that their mobility is shaped not only by regional economic disparities but also by multifaceted factors such as wage levels, the quality of public service (Qian, 2010) and administrative policies (Liu & Shen, 2014). As societal values and lifestyle preferences evolve, the concept of quality of life has gained increasing prominence, elevating regional amenities to a critical determinant in the location choices of high-skilled workers (Davies, Greenwood, & Li, 2001; Glaeser & Gottlieb, 2006; Partridge, 2010).

Most existing literature predominantly analyzes the agglomeration effects of highly skilled labor from isolated dimensions, rarely examining the direct influence of urban business environments on their concentration. In the context of neo-classical migration theory, wage levels are posited as the core determinant of labor mobility (Haas & Osland, 2014) driving high-skilled labor to cluster in cities offering higher remuneration and rental opportunities. Such agglomeration substantially elevates local productivity (Zhang, 2023) especially in urban areas with a dense presence of foreign enterprises, where significant wage premiums are prevalent (Setzler & Tintelnot, 2021). From an infrastructure perspective, research demonstrates that enhanced transportation accessibility (e.g., high-speed rail networks) can significantly facilitate the mobility of high-skilled labor and expand market size, with spatially heterogeneous effects (Feng, Chen, Cheng, & Chang, 2023). Concerning policy and environmental factors, stringent environmental regulations have counterintuitively spurred high-skilled employment growth, while government counterintuitively spurred high-skilled employment growth (Choudhury, 2022; Wang et al., 2020). Additionally, although not directly centered on talent agglomeration, some studies reveal the fundamental role of business environments in shaping economic development quality and pace (Li, Tang, & Huang, 2023).

Existing research on business environments predominantly examines their effects on corporate location decisions, foreign direct investment, and firm innovation. Although some researchers have explored the influence of factors such as industrial agglomeration, housing prices, or pandemic conditions that affect high-skilled labor, these studies typically adopt a unidimensional approach, concentrating on a single determinant in isolation. Notably, the critical question of how urban business environments shape the agglomeration of high-skilled labor and the associated causal mechanisms remains under-researched. This gap highlights the need for a more comprehensive investigation into the intricate relationship between business environments and talent concentration, which could offer valuable insights for policymakers aiming to foster regional economic development through strategic talent attraction.

Therefore, we make the following key contributions. First, we integrate urban business environments and high-skilled labor agglomeration into a cohesive analytical framework, systematically exploring both the direct and indirect impacts of business environments on talent concentration. This approach uncovers the complex mechanisms underlying the relationship, providing a more comprehensive understanding compared to previous unidimensional analyses. Second, departing from the conventional use of provincial-level data, this research leverages prefecture-level city data to construct a comprehensive urban business environment index system. The system encompasses six dimensions: government efficiency, human resources, financial services, innovation climate, infrastructure, and market conditions. Additionally, we measure high-skilled labor agglomeration by aggregating

employment in finance, information technology, scientific research and technical services, and education sectors, offering a more precise and detailed representation of talent distribution. Third, this study innovatively incorporates urban innovation capacity as a mediating variable in the analysis of the influence of urban business environments on high-skilled labor agglomeration. Simultaneously, average wage levels are employed as a threshold variable to test for nonlinear effects, revealing how the impact of business environments may vary depending on wage conditions. Overall, we provide novel theoretical perspectives, offering substantial academic and practical implications for understanding the interplay between urban business environments and high-skilled labor dynamics.

The rest of the paper is structured as follows: Chapter 2 presents a related literature review. Chapter 3 describes the methodology and data employed in the study. Chapter 4 presents the empirical results and discussions, and Chapter 5 concludes.

2. Theoretical Background and Hypotheses

This chapter first introduces key concepts related to business environments and high-skilled labor agglomeration. Building on this foundation, it examines how urban business environments affect this agglomeration and explores the underlying mechanisms.

2.1. Related Concepts

2.1.1. High-Skilled Labor Agglomeration

Educational attainment has long been the standard metric for defining talent (Skeldon, 2009). However, recent publications in Nature and PNAS have highlighted critical limitations of this approach: First, the broad categorization by educational credentials fails to account for intrinsic regional disparities in knowledge-skill cultivation (Angrist, Djankov, Goldberg, & Patrinos, 2021). Second, it excludes middle-aged and older workers who lack higher education but are essential to industries (Lutz et al., 2021). Florida (2002) earlier critiqued this approach as oversimplistic, proposing instead the "creative class" framework-workers in knowledge-intensive or creative occupations. Post-2000, occupation-based talent research has grown significantly (Florida, Mellander, & Stolarick, 2008; Rao & Dai, 2017). In China, higher education expansion has led to an oversupply of highly educated labor, which exceeds the demand from knowledge-intensive industries in some regions (Yeung, 2013). This mismatch inflates human capital stock estimates and results in underutilization, diminishing the value of educational credentials. Consequently, occupational classification may better identify talent in China. Nevertheless, domestic migration studies predominantly retain education-based definitions for distinguishing high-skilled from general-skilled labor (Gu & Shen, 2021; Shen & Liu, 2016).

From the perspective of agglomeration itself, it refers to the concentration of entities within a specific geographic area-a phenomenon that stands in contrast to dispersion. High-skilled labor agglomeration is unique due to worker agency: skilled workers relocate based on economic conditions, infrastructure, geographic factors, and other variables, forming clusters with spatial directionality. A defining feature of labor agglomeration is its tendency to concentrate in certain regions, exhibiting what we describe as spatial directionality. Theories in labor economics emphasize that high-skilled labor agglomeration is not an isolated phenomenon. On one hand, its drivers are multifaceted and complex; on the other, once formed, it generates a range of spillover effects. When measuring the extent of highly skilled labor agglomeration, it is essential to consider not only its spatial scope but also its scale, which reflects the abundance of skilled labor resources in each region.

Based on the above definitions and conceptual boundaries, this study considers "high-skilled labor" as high-quality workers with the following characteristics: possessing necessary theoretical knowledge and innovation capabilities, mastering modern equipment, performing complex or key operations in production beyond entry-level and intermediate-skilled workers. Specifically, this study defines high-skilled labor from the perspective of occupational types, using practitioners in the financial industry; information transmission, computer services, and software industry; scientific research, technical services, and geological exploration industry; and the education industry to represent high-skilled labor.

2.1.2. Urban Business Environment

The business environment, originally conceptualized as part of the Worldwide Governance Indicators, serves as a key metric for evaluating government governance capacity. Today, the World Bank's enterprise life cycle-based indicator system stands as the most authoritative international framework for assessing business environments. This system defines the business environment as the external conditions that enterprises encounter during their establishment, operation, and termination processes. This definition underscores the direct influence of the business environment on regional enterprise operations and economic development.

2.2. The Mechanism of Urban Business Environment on High-Skilled Labor Agglomeration

2.2.1. The Direct Effect

An efficient business environment not only enhances regional economic development but also provides various benefits for high-skilled labor, including competitive wages, welfare benefits, environmental quality, and healthcare standards. Consequently, it exerts a direct and substantial influence on the geographical agglomeration of high-skilled labor as an economic factor. This study examines the direct effects of the urban business environment on high-skilled labor agglomeration through two primary mechanisms: the agglomeration effects and the cost effects.

On one hand, improvements in the urban business environment generate significant agglomeration effects, where scale effects and spillover effects influence high-skilled labor concentration. Through the lens of economies of scale theory, our analysis reveals that urban business environment improvements facilitate technological knowledge spillovers and production scale economies. Cities with superior business environments provide high-skilled workers with more diverse job opportunities that match their skill sets. Moreover, business environment optimization creates spillover effects-as both high-skilled labor and firms cluster in regions with improved business environments, reduced geographical distance fosters closer connections among workers. Knowledge spillover

theory suggests this accelerates the flow of knowledge and technology among workers. Scale economy theory further indicates enhanced sharing of knowledge, information, and technology among high-skilled workers within these spaces, promoting the diffusion of new knowledge and technologies. For high-skilled labor, this matching, sharing, and learning process not only increases labor productivity and urban total factor productivity but also generates skill premiums. Additionally, in cities with better business environments, less-skilled workers often find it difficult to cope with the high living costs and to survive amid intense competition, resulting in an overall higher skill level compared to cities with poorer business environments.

On the other hand, the urban business environment also influences high-skilled labor through cost effects, a critical factor in their locational choices. These costs include not only living expenses but also job search opportunity costs. New economic geography theory demonstrates that densely populated regions with large markets tend to develop industrial clusters, which provide more employment opportunities while driving down commodity prices through competition. Lower employment and living costs, in turn, encourage the inflow and agglomeration of high-skilled labor, further reinforcing industrial clustering patterns. Over time, this dynamic leads to the formation of a "core-periphery" spatial structure in both industry and labor distribution-a phenomenon consistent with Krugman's theoretical framework.

Furthermore, according to the "push-pull" theory, improved regional public services enhance local welfare. Cities with better business environments typically offer superior public services, infrastructure, and quality of life, thereby creating stronger pull factors for high-skilled labor. The resulting agglomeration generates a talent clustering effect that attracts additional high-skilled workers. However, high-skilled labor also compares living costs against migration costs-when the former exceeds the latter or living costs surpass expectations, outmigration may occur. High-skilled workers weigh both positive and negative externalities before making optimal location decisions.

H_1: The improvement of the urban business environment positively promotes the agglomeration of high-skilled labor.

2.2.2. The Mediating Effect

The enhancement of urban innovation capacity increases a city's locational potential while generating significant positive externalities and spillover effects, thereby attracting greater inflows of high-skilled labor. Within China's government-led development context, urban innovation capacity is substantially influenced by the quality of the local business environment. This study selects urban innovation capacity as a mediating variable to examine the mechanism through which business environments affect high-skilled labor agglomeration from an innovation perspective.

2.2.2.1. Impact of Urban Business Environment on Urban Innovation Capacity

A city's innovation capacity is significantly shaped by its business environment, particularly government efficiency, innovation climate, financial services, and market conditions. Existing studies demonstrate that governance quality directly affects innovation outcomes: decentralizing administrative authority expands local governments' discretionary power, creating rent-seeking opportunities through bureaucratic hurdles in approval processes (Gu & Shen, 2012). Regional innovation disparities often stem from differences in corporate innovation activities, which are influenced by local governance environments, including administrative services, regulatory interventions, and legal protections. Cities with poor governance environments suffer from cumbersome approval procedures and low efficiency, which substantially reduce corporate innovation efficiency and impose additional policy burdens that hinder R&D activities. Optimizing the business environment reduces administrative interference in corporate behavior, enhances innovation efficiency, and consequently elevates regional innovation capacity.

Moreover, the innovation climate-a core component of the business environment-encompasses funding support and knowledge infrastructure. A favorable business environment not only provides conducive conditions for innovation but also enhances regional innovation performance. Financial services within the business environment further play a decisive role: Given the capital-intensive and long-cycle nature of R&D, firms heavily rely on external financing, making regional disparities in financial market conditions a critical determinant of firms' access to funding. Thus, business environment-induced financing constraints influence regional innovation levels by shaping corporate R&D activities (Chen, Hai, & Wu, 2015).

2.2.2.2. Impact of Urban Innovation Capacity on High-Skilled Labor Agglomeration

New economic geography theory suggests that high-skilled labor exhibits a pronounced tendency to agglomerate in cities with advanced innovation capacity, where innovation policies and ecosystems enhance attractiveness. This process operates through two key mechanisms: First, the integration of innovation factors with market and physical capital drives substantial productivity gains, which in turn attract inflows of high-skilled labor. Elevated urban innovation capacity strengthens locational advantages, directly facilitates high-skilled labor agglomeration. Second, urban innovation generates positive externalities and spillover effects, particularly in industrial clusters. As regional innovation capacity increases, it elevates factor returns (e.g., wages, capital yields), thereby attracting high-skilled labor in conjunction with complementary capital and resources. This convergence strengthens the region's locational competitiveness, while the ensuing agglomeration of these factors produces scale effects. Ultimately, this creates a self-reinforcing cycle that perpetually enhances the region's appeal to high-skilled workers.

H_2: The optimization of the urban business environment can attract the agglomeration of high-skilled labor by enhancing urban innovation capacity.

2.2.3. Threshold Effect

Neoclassical migration theory establishes labor return rates as a fundamental determinant of migration decisions. Complementing this perspective, push-pull theory reveals that workers conduct cost-benefit analyses when considering relocation, where average wage levels serve as the primary indicator of expected benefits. This

study selects the average wage level as the threshold variable to analyze the nonlinear relationship between urban business environments and high-skilled labor agglomeration, based on two underlying mechanisms. First, while business environment optimization typically raises living costs, when such increases substantially outpace wage growth, high-skilled labor demonstrates a stronger propensity to migrate toward regions combining higher wages with lower living expenses. Second, improved business environments may incentivize firms to adopt low-cost production models favoring lower-skilled workers. These dynamic pushes high-skilled labor to relocate to urban centers with better career development prospects. Consequently, in regions below certain wage thresholds, even significant business environment improvements may fail to offset other constraining factors, ultimately inhibiting rather than promoting high-skilled labor agglomeration. These dual dynamics confirm the existence of distinct threshold effects in the relationship between urban business environments and high-skilled labor concentration based on average wage levels.

H_3: The process by which urban business environment optimization promotes high-skilled labor agglomeration is constrained by average wage levels.

3. Methodology and Data

3.1. Methodology

3.1.1. Location Quotient (LQ)

Following the methodology of Sun and Zhang (2020) we measure high-skilled labor agglomeration using the location quotient (LQ). The LQ, derived from industrial and regional economics, compares the proportion of a specific sector's output in a regional economy to its proportion in the national economy (In Equation 1).

$$LQ_{ij} = \frac{X_{ij}/\sum_{i=1}^{m} X_{ij}}{\sum_{j=1}^{n} X_{ij}/\sum_{i=1}^{m}\sum_{j=1}^{n} X_{ij}} \quad (1)$$

Where i represents industry categories $(i = 1,2,\dots,m)$, j denotes regions $(j = 1,2,\dots,n)$. X may carry different meanings. Here, X specifically represents the number of employed persons in four high-skilled sectors: (1) finance; (2) information transmission, computer services, and software; (3) scientific research, technical services, and geological prospecting; (4) education. We use this measure to quantify high-skilled labor agglomeration.

3.1.2. Entropy Weight Method

To establish an evaluation index for urban business environments, the first step is to determine the weights of each indicator. Existing multi-factor comprehensive evaluation weighting methods mainly fall into three categories: subjective weighting, objective weighting, and integrated subjective-objective weighting methods. Given that subjective weighting methods tend to be overly arbitrary, and considering that existing literature suggests urban business environment indicator systems should strive for maximum objectivity and fairness, this study adopts the entropy method from objective weighting approaches to determine the weights of secondary indicators in the urban business environment evaluation system. This ensures the indicator weights remain free from subjective bias. Assume there are n samples and m evaluation indicators, the sample observation matrix is shown in Equation 2.

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nm} \end{bmatrix} \quad (2)$$

For a given indicator x_{ij}, its weight increases with greater dispersion of values; if an indicator's values show no variation (i.e., complete uniformity), it becomes statistically irrelevant to the system and receives zero weight.

The calculation steps of the entropy weight method are as follows.

(1) The urban business environment data require standardization before analysis. Since the indicators in the evaluation system differ in both units of measurement and magnitude, standardization is necessary to enable cross-indicator comparison. Moreover, distinct standardization methods must be applied to positive and negative indicators based on their directional relationship with business environment quality. For indicators that are positively correlated with business environment development levels (positive indicators), the standardization is calculated: $x_{ij}^{*} = \frac{x_{ij} - \min\{x_{ij}\}}{max\{x_{ij}\} - \min\{x_{ij}\}}$. For indicators that are negatively correlated with business environment development levels (negative indicators), the standardization is calculated: $x_{ij}^{*} = \frac{\max\{x_{ij}\} - x_{ij}}{max\{x_{ij}\} - \min\{x_{ij}\}}$.

(2) Calculate the proportion of the j-th indicator value for the i-th prefecture-level city: $w_{ij} = \frac{x_{ij}^{*}}{\sum_{i=1}^{n} x_{ij}^{*}}$.

(3) The information entropy e_j of the j-th indicator is computed as follows: $e_j = -\frac{1}{ln(n)}\sum_{i=1}^{n} w_{ij} * ln(w_{ij})$, $0 \le e_j \le 1$.

(4) The corresponding redundancy degree d_j is computed as: $d_j = 1 - e_j$.

(5) The corresponding weight w_j is computed as: $w_j = \frac{d_j}{\sum_{j=1}^{m} d_j}$.

(6) Calculate the total urban business environment score of each city: $s_j = \sum_{i=1}^{m} w_j * x_{ij}^{*}$.

3.1.3. Two-Way Fixed Effect Model

To test H1, we employ a two-way fixed effects model to examine the impact of urban business environments on high-skilled labor agglomeration. The econometric model is specified in Equation 3.

$$Skilled_{it} = \beta_0 + \beta_1 BE_{it} + \boldsymbol{x}_{it}\boldsymbol{\alpha} + \mu_t + \lambda_i + \varepsilon_{it} \quad (3)$$

Where $Skilled_{it}$ represents the agglomeration level of high-skilled labor in city i during year t, BE denotes the urban business environment, $\boldsymbol{x}_{it}$ denotes the vector of control variables, μ_t and λ_i captures city and time fixed effects, respectively, and ε_{it} is the random error term.

3.1.4. Mediating Effect Model

To examine the mechanism through which urban business environments affect high-skilled labor agglomeration, we follow Jiang's identification method for mechanism variables (Jiang, 2022). Using the number of patent applications per 100 people to measure urban innovation capacity, we analyze its mediating role through the following model specification (Equation 4).

$$Inno_{it} = \rho_0 + \rho_1 BE_{it} + \boldsymbol{x}_{it}\boldsymbol{\alpha} + \mu_t + \lambda_i + \varepsilon_{it} \quad (4)$$

Where $Inno_{it}$ represents the urban innovation level, and ρ_1 quantifies the impact strength of the urban business environment on innovation capacity. All other variables retain their definitions from the baseline regression model.

3.1.5. Threshold Effect Model

To examine the threshold effects of urban business environments on high-skilled labor agglomeration, we conduct a regression analysis using a threshold effects model. Following Hansen (1999) panel threshold regression framework, the baseline specification is given by Equation 5.

$$y_{it} = u_i + \beta_1' x_{it} I(q_{it} \le \gamma) + \beta_2' x_{it} I(q_{it} > \gamma) + e_{it} \quad (5)$$

Where q represents the threshold variable, γ is the unknown threshold. The e_{it} is the i.i.d. error term, and $I(\cdot)$ is an indicative function. It takes the value of 1 when the conditions within the parentheses are met; otherwise, it equals 0. Equation 5 is equivalent to Equation 6.

$$y_{it} = \begin{cases} u_i + \beta_1' x_{it} + e_{it}, q_{it} \le \gamma, \\ u_i + \beta_2' x_{it} + e_{it}, q_{it} > \gamma. \end{cases} \quad (6)$$

Therefore, we specify the threshold effect model as shown in Equation 7.

$$Skilled_{it} = \alpha_0 + \alpha_1 BE_{it} \times I(wage_{it} \le \gamma) + \alpha_2 BE_{it} \times I(wage_{it} > \gamma) + \boldsymbol{x}_{it}\boldsymbol{\alpha} + \mu_i + \lambda_i + \varepsilon_{it} \quad (7)$$

where $wage$ denotes the threshold variable (average wage level).

3.2. Data

We examine the period 2009–2021 and use 280 prefecture-level cities across China as the primary research units. The analysis employs city-level panel data derived from the China Statistical Yearbook, the China City Statistical Yearbook, the Local statistical yearbooks of each prefecture-level city, and the National Bureau of Statistics official website, et al.

3.2.1. Dependent Variable: The High-Skilled Labor Agglomeration

Building upon the LQ metric, we measure high-skilled labor agglomeration ($Skilled$) using employment data from four key sectors: (1) finance; (2) information transmission, computer services, and software; (3) scientific research, technical services, and geological prospecting; (4) education.

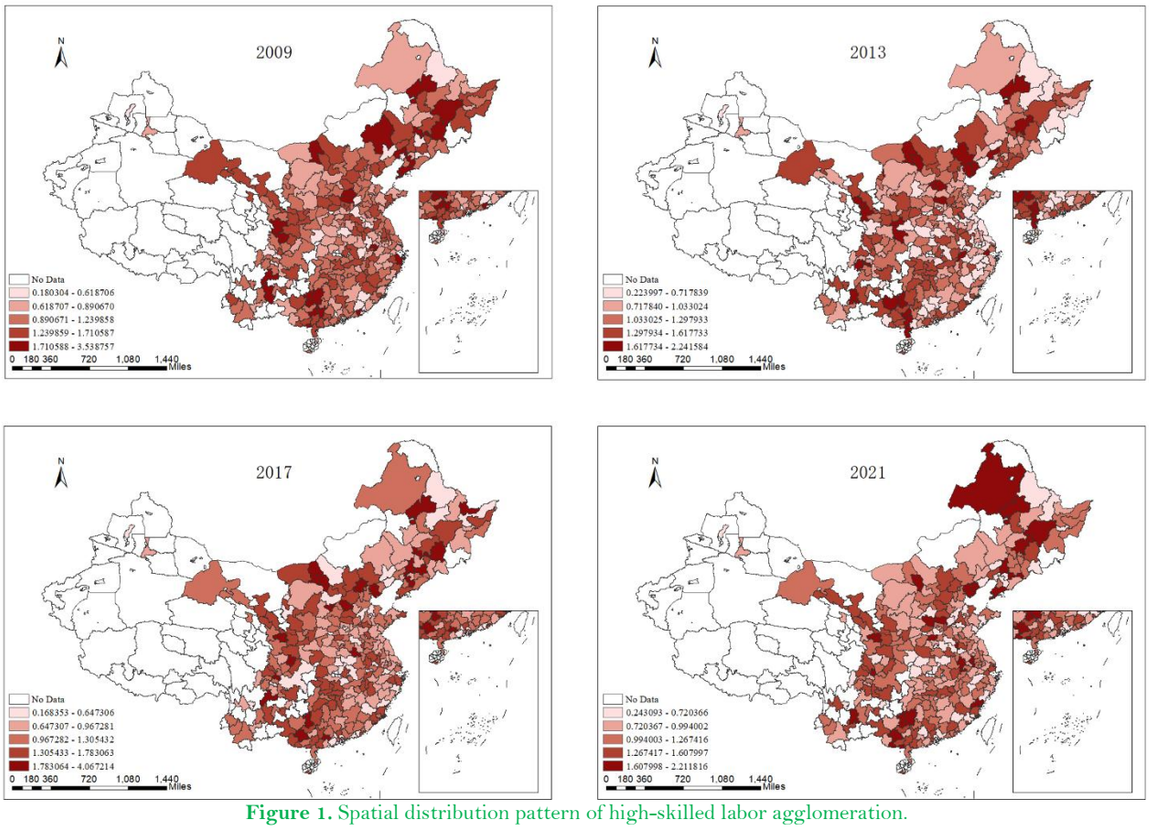

Figure 1. Spatial distribution pattern of high-skilled labor agglomeration.

To more intuitively analyze the spatial distribution characteristics of high-skilled labor agglomeration, we generated visualizations of the agglomeration patterns for 2009, 2013, 2017, and 2021 using ArcGIS software, as shown in Figure 1. It reveals two significant spatial-temporal characteristics.

The observed trends reveal a notable convergence in high-skilled labor agglomeration patterns, characterized by decreasing maximum values and increasing minimum values across regions. This convergence indicates a gradual reduction in spatial polarization (depolarization effect), suggesting a more balanced geographical distribution of skilled human capital. Simultaneously, persistent regional disparities remain evident, with

significantly larger agglomeration gaps between the economically advanced eastern coastal regions (East China and South China) and the northeastern provinces, compared to relatively smaller differentials observed between the northwestern and southwestern interior regions.

3.2.2. Independent Variable: Urban Business Environment

We constructed a comprehensive evaluation system for assessing urban business environments across six key dimensions, establishing both primary and secondary indicators with carefully determined weights to develop China's business environment evaluation framework at the prefecture-level city scale. In developing this analytical approach, we first classified the nature of all indicators, specifically identifying industrial wastewater emissions as a negative indicator while designating all others as positive indicators. The weighting scheme for these evaluation metrics was then systematically derived through application of the entropy method, an objective technique that calculates weights based on the information content and variability within each indicator. This methodology enabled us to construct a robust quantitative assessment system, with the complete structure and corresponding weights of our business environment indicators presented in detail in Table 1. The analytical process included normalization of all indicators and incorporated rigorous validation procedures to ensure methodological reliability.

Table 1. The urban business environment indicator system.

Primary indicator	Secondary indicator	Indicator attributes	Weight
Government efficiency (19.84%)	General budgetary expenditure	+	3.37%
	Government service efficiency	+	16.47%
Human resources (9.73%)	Average wage	+	0.57%
	Faculty count in higher education	+	5.39%
	Year-end institutional employment	+	3.77%
Financial services (18.01%)	Financial sector employment	+	3.94%
	Year-end deposit balance of financial institutions	+	5.81%
	Pension insurance enrollees	+	3.73%
	Unemployment insurance participants	+	4.53%
Innovation environment (13.74%)	Science and technology expenditure	+	7.91%
	Number of regular higher education institutions	+	5.82%
	Urban innovation capacity	+	0.01%
Infrastructure (15.37%)	Water supply capacity	+	4.71%
	Power supply capacity	+	3.51%
	Practicing physicians	+	2.19%
	Postal and telecom services volume	+	4.62%
	Industrial wastewater discharge	-	0.34%
Market environment (23.31%)	GDP per capita	+	1.07%
	Industrial output of foreign-funded enterprises	+	9.09%
	Total import and export value	+	9.98%
	Above-scale industrial enterprises	+	3.17%

The weight distribution analysis in Table 1 reveals that among the primary indicators, Market Environment carries the highest weight at 23.31%, followed by Government Efficiency (19.84%), Financial Services (18.01%), Infrastructure (15.37%), Innovation Environment (13.74%), and Human Resources (9.73%). Collectively, Market Environment, Government Efficiency, and Financial Services account for 61.16% of the total weighting, indicating these dimensions exhibit substantial inter-city variation and constitute the most significant components of the business environment assessment. Conversely, the relatively low weight assigned to Human Resources (9.73%) suggests minimal disparity in this factor across prefecture-level cities, reflecting its limited discriminatory power in differentiating regional business environments.

An analysis of the secondary indicators reveals that Government service efficiency carries the highest weight at 16.47%, followed by Total import and export value at 9.98%. In contrast, Industrial wastewater discharge and Urban innovation capacity indicators show minimal weighting below 1% (0.34% and 0.01%, respectively). This distribution pattern reflects significant structural characteristics of China's urban development landscape. The substantial weight assigned to Government service efficiency and external trade indicators stems from the pronounced developmental disparities between tier-1/new tier-1 cities and other urban centers. These privileged cities benefit from distinct policy advantages and advanced high-tech industrial bases, creating marked inter-city variations.

Conversely, the negligible weights of environmental and innovation capacity indicators suggest these factors exhibit limited differentiation across prefecture-level cities, consequently exerting marginal influence on overall business environment assessments.

3.2.3. Control Variables

To mitigate estimation bias caused by omitted variables, this study incorporates additional control variables that may influence high-skilled labor agglomeration alongside the core explanatory variable of urban business environment in the regression models.

3.2.3.1. Foreign Direct Investment (FDI)

The scale of actual utilized foreign capital reflects a region's investment attractiveness and economic vitality. Robust Foreign Direct Investment inflows stimulate local economic dynamism through capital infusion and technology spillovers, subsequently influencing the agglomeration patterns of high-skilled labor. This aligns with the "investment-led development" paradigm observed in China's special economic zones.

3.2.3.2. Industrial Structure Advancement (Indus)

This metric captures the transition toward technology-intensive and high-value-added production sectors. The progression of industrial sophistication enhances regional competitiveness through productivity gains and innovation capacity building, creating magnet effects for talent migration. Our measurement follows the OECD's sectoral upgrading framework, adapted to China's development context.

3.2.3.3. Market Vitality (IGP)

Represented by fixed-asset investment intensity, this indicator proxies regional economic robustness and growth potential.

The construction and operation of capital-intensive projects generate skilled employment opportunities and supporting service ecosystems, thereby attracting human capital inflows. This relationship demonstrates the "investment-employment multiplier" effect.

3.2.3.4. Per Capita SO_2 Emissions (SO_2)

As an environmental quality proxy, this control variable accounts for skilled workers' locational preferences regarding living conditions. Elevated emissions correlate with negative externalities that deter talent retention, particularly among environmentally conscious professionals. The inverse relationship echoes the "green migration" phenomenon observed in developed economies.

3.2.4. Threshold Variables

This study uses the city's average wage level (Wage) as the threshold variable to examine the differential effects of urban business environment on high-skilled labor agglomeration when the average wage is above versus below the threshold value. The variable selection and measurement methods employed in this study are summarized in Table 2.

Table 2. Variable selection and measurement.

Variable type	Symbol	Variable	Calculation
Dependent variable	$Skilled$	High-skilled labor agglomeration	Location quotient of highly skilled labor
Independent variable	BE	Urban business environment	Urban business environment index
Control variable	fdi	Foreign direct investment	Actual utilized FDI/ GDP
	$indus$	Industrial structure advancement	Tertiary/ Secondary industry output
	igp	Market vitality	Total fixed asset investment/ GDP
	SO_2	Per capita SO_2 emissions	SO_2 emissions/ Resident population
	$wage$	Regional average wage level	Average wage

4. Results and Discussion

Before conducting the empirical analysis, fundamental statistical tests must be performed (as shown in Table 3), including multicollinearity and Hausman tests. Initially, the Variance Inflation Factor (VIF) was employed to diagnose multicollinearity among the variables. The results demonstrated that all VIF values remained below the critical threshold of 10, signifying the absence of severe multicollinearity problems. Subsequently, the Hausman test was conducted to determine whether to use fixed effects or random effects models. Since the null hypothesis was rejected, the fixed effects model was selected for empirical research.

Table 3. The fundamental statistical tests.

Variable	VIF	1/VIF
Urban business environment	1.17	0.858
Foreign direct investment	1.14	0.878
Industrial structure advancement	1.09	0.915
Market vitality	1.07	0.932
Per capita SO_2 emissions	1.06	0.939
Mean VIF	1.11	—
Hausman test	**FE**	**RE**
	chi2(5) = 18.1	
	Prob > chi2 = 0.0029	

4.1. Baseline Regression Results

The baseline regression model is constructed according to Equation 3. We use a fixed effects model to examine the impact of urban business environment on the agglomeration of high-skilled labor, adding control variables one by one in the regression. A two-way fixed effects model with both city and time fixed effects is adopted to minimize the interference of unobservable factors on the estimation results. The empirical findings are presented in Table 4.

As illustrated in Table 4, column (1), which omits control variables, reports a statistically significant coefficient of 0.151 for the impact of the urban business environment on high-skilled labor agglomeration. In columns (2)-(5), control variables are systematically introduced through stepwise regression, with the final specification showing a remarkably stable coefficient of 0.152. The consistent statistical significance and coefficient stability across specifications strongly validate the robustness of our findings, indicating that high-skilled workers are strongly attracted to regions with favorable business environments. The gradual improvement in model fit, as evidenced by the increasing R-squared values from columns (1)-(5), suggests enhanced explanatory power with each additional control variable. The results confirm that high-quality business environments facilitate high-skilled labor agglomeration through two primary mechanisms. First, agglomeration effects trigger substantial knowledge and

technology spillovers, creating self-reinforcing cycles of increasing returns to scale and positive externalities that amplify the concentration of skilled workers. Second, cost-reduction effects materialize through streamlined administrative processes and efficient government services, which not only significantly lower financial and non-financial costs for high-skilled labor but also enhance their quality of life. Furthermore, improved business environments drive regional industrial upgrading and technological innovation, expanding employment opportunities and optimizing working conditions for skilled professionals. This dual mechanism-combining agglomeration economies with transaction cost reduction-establishes a virtuous cycle that sustains and intensifies the spatial concentration of human capital in business-friendly regions.

Table 4. Baseline regression results.

Variable	(1)	(2)	(3)	(4)	(5)
	Skilled	***Skilled***	***Skilled***	***Skilled***	***Skilled***
BE	0.151***	0.158***	0.157***	0.151***	0.152***
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
fdi		1.480***	1.535***	1.684***	1.642***
		(0.549)	(0.549)	(0.557)	(0.559)
indus			0.066***	0.059**	0.057**
			(0.025)	(0.026)	(0.026)
igp				0.009	0.010*
				(0.006)	(0.006)
SO_2					0.476
					(0.530)
Observations	3640	3640	3640	3640	3640
yearfix	YES	YES	YES	YES	YES
idfix	YES	YES	YES	YES	YES
R-squared	0.388	0.389	0.390	0.391	0.391

Note: Robust standard errors are in parentheses; *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

The empirical results demonstrate that the urban business environment exerts a statistically significant positive influence on high-skilled labor agglomeration at the 1% significance level, irrespective of the inclusion of control variables, thereby validating H1. This indicates that improvements in the urban business environment can significantly promote high-skilled labor agglomeration. An advanced business environment translates into better public services provided by city governments, along with improved markets, innovation, and financial ecosystems. These conditions offer high-skilled workers enhanced job prospects and living standards, thereby facilitating their professional and personal lives. The coefficient of fdi is significantly positive at the 1% level, showing that an expansion of foreign investment can significantly promote high-skilled labor agglomeration when other variables are held constant. An expansion of foreign investment helps improve urban industrialization levels, increase tax revenue, create jobs, and improve the balance of payments, indicating that the city has high potential for openness and a good investment environment, providing more job options for high-skilled labor while also increasing their income levels. The coefficient for indus is positive and significant at the 1%-5% level, showing that the advancement of industrial structure can substantially drive high-skilled labor agglomeration when other variables are held constant. Advancing industrial structure can improve urban production efficiency, promote the development of high-tech enterprises, create more high-skilled jobs, and increase demand for high-skilled labor. Moreover, an advanced urban industrial structure elevates residents' living standards, reduces energy consumption and dependence, and to some extent, improves the urban living environment. The positive coefficient of igp reveals that an increase in total fixed asset investment can promote high-skilled labor agglomeration when other variables are held constant. Increasing fixed asset investment not only optimizes the urban investment structure but also expands production capacity and residents' living space. Increased fixed asset investment in scientific research provides good hardware and software conditions for high-skilled labor agglomeration. Notably, the impact of (SO_2) on high-skilled labor agglomeration is insignificant, indicating that environmental factors either play a minor role or are of lower priority in the agglomeration decisions of high-skilled labor, and thus do not serve as a decisive determinant.

4.2. Analysis of Mediating Effect

The regression results in Table 5 test the process proposed in H2, which examines how urban business environments promote high-skilled labor agglomeration by influencing urban innovation levels.

Table 5. Mediating effect results.

Variable	(1)	(2)
	Inno	***Inno***
BE	1.191***	1.177***
	(0.066)	(0.066)
fdi		-0.720
		(0.718)
idus		0.069**
		(0.033)
igp		0.007
		(0.007)
SO_2		-0.487
		(0.680)
Observations	3,640	3,640
yearfix	Yes	Yes
idifx	Yes	Yes
R-squared	0.793	0.793

Note: **, and *** indicate significant at the 5%, and 1% levels, respectively.

As presented in Table 5, the ordinary least squares (OLS) regression results demonstrate that the coefficient of the urban business environment's impact on the urban innovation level is 1.177, statistically significant at the 1% level. This finding underscores a substantial positive effect of business environment optimization on the enhancement of innovation capacity. An optimal urban business environment provides three key advantages for innovation: robust financial market conditions, streamlined government services, and advanced economic development. Collectively, these elements reduce innovation costs, shorten R&D cycles, and optimize talent-driven innovation ecosystems, thereby accelerating urban innovation.

Previous research has firmly established a positive correlation between urban innovation and talent agglomeration, whereby innovation capacity serves as a potent attractor for high-skilled talent. An elevated urban innovation level not only strengthens locational advantages but also generates significant positive externalities and spillover effects, rendering cities more appealing to high-skilled labor. In the context of China's government-led development paradigm, urban innovation capacity is substantially influenced by the local business environment. These converging findings collectively validate that urban business environments affect high-skilled labor agglomeration by way of their impact on urban innovation levels.

4.3. Analysis of Threshold Effect

Furthermore, we sequentially test for both double-threshold and single-threshold effects. The regression results in Table 6 demonstrate that the average wage level exhibits a statistically significant single-threshold effect at the 1% significance level, with the threshold estimate being 25850.96.

Table 6. Threshold effect test results for average wage level.

Variable	Threshold type	Estimate	P-value	1% critical value	5% critical value	10% critical value
Average wage	Single	25850.96	0.000	13.286	10.532	8.860
	Double	76230.00	0.170	17.433	12.356	9.784

The results presented in Table 7 reveal that the influence of the urban business environment on high-skilled labor agglomeration exhibits a pronounced threshold effect concerning average wage levels, with the estimated threshold value of 25850.96. Empirical evidence shows that when regional average wages are below this threshold, the business environment has a significantly negative effect on high-skilled labor agglomeration at the 1% level. Conversely, once wages exceed this threshold, the relationship turns significantly positive. This finding reinforces the notion that income levels are a primary determinant in the location decisions of high-skilled workers. Thus, although enhancements to the business environment can stimulate economic development in low-wage regions, their allure for high-skilled labor is insufficient to overcome structural constraints such as wage stagnation and limited high-skilled job opportunities. This explains the observed negative net effect on skilled labor agglomeration in these areas. The findings underscore the necessity of implementing coordinated policy initiatives that simultaneously tackle wage levels, drive industrial upgrading, and create skill-appropriate jobs to fully realize the agglomeration benefits of business environment improvements in developing regions. Therefore, although business environment improvements can promote economic development in low-wage regions, their attractiveness to high-skilled labor remains insufficient to overcome structural constraints such as wage stagnation and limited high-skilled job opportunities. Such an approach is crucial for fully harnessing the agglomeration benefits stemming from business environment improvements in developing regions. In summary, the analysis confirms H3.

Table 7. Threshold effect results.

Variable	Coefficient
BE (*Wage*≤25850.96)	-0.775***
	(0.129)
BE (*Wage*>25850.96)	0.157***
	(0.068)
Control	Yes
Fixed effect	Yes

Note: *** indicate significant at the 10% levels, respectively.

4.4. Robustness Test

4.4.1. Re-Specify the Dependent Variable

This study conducts robustness checks by replacing the core dependent variable. The agglomeration level of high-skilled labor was measured using employment data from four sectors (finance; information transmission, computer services, and software; scientific research, technical services, and geological exploration; and education). We re-measure based solely on employment in the education sector. As shown in column (1) of Table 8, the corresponding results demonstrate that the explanatory variable, the urban business environment, continues to exhibit a statistically significant positive effect on high-skilled labor agglomeration at the 1% significance level. The consistent sign of the coefficient across different specifications provides strong empirical support for the findings of the baseline regression.

4.4.2. Exclusion of Special Samples

Owing to their distinctive socioeconomic positions, the four first-tier cities-Beijing, Shanghai, Guangzhou, and Shenzhen-enjoy the advantages of preferential talent policies and boast advanced economic development, sophisticated infrastructure, and robust innovation ecosystems. These factors collectively render them highly attractive to high-skilled labor, potentially introducing bias into our analysis. To mitigate this potential bias, we re-estimate our model while excluding these exceptional observations. As shown in column (2) of Table 8, the business environment variable continues to exert a statistically significant positive influence on skilled labor agglomeration at the 1% significance level. This outcome reinforces the robustness of our core findings, indicating that our conclusions are not overly influenced by the unique characteristics of these major cities.

4.4.3. Robustness of the Mediating Effect

We applied the special sample exclusion method outlined in Section 4.2.2 to test the mediation effect model, and the results are presented in Column (3) of Table 8.

The analysis demonstrates that after variable substitution, the estimated coefficient is 1.164, and the positive impact of the urban business environment on urban innovation level remains statistically significant. This finding suggests that the business environment continues to have a substantial positive influence on urban innovation levels across 276 cities, excluding Beijing, Shanghai, Guangzhou, and Shenzhen. Notably, the observed coefficient is smaller than that obtained from the full sample estimation. This discrepancy can be attributed to the unique policy advantages and advanced innovation foundations of these four first-tier cities. Under the combined influence of national policy support and leading innovation infrastructure, business environment optimization generates a more pronounced enhancement effect on urban innovation levels in these metropolitan areas.

Table 8. Robustness test results.

Variable	(1)	(2)	(3)
	Skilled	***Skilled***	***Inno***
BE	0.277***	0.119**	1.164***
	(0.073)	(0.056)	(0.063)
fdi	1.650**	1.585***	-0.544
	(0.790)	(0.559)	(0.626)
indus	0.055	0.051**	0.039
	(0.037)	(0.026)	(0.029)
igp	0.012	0.009	0.003
	(0.008)	(0.006)	(0.007)
SO_2	0.850	0.565	-0.290
	(0.749)	(0.531)	(0.595)
Observations	3,640	3,588	3,588
yearfix	YES	YES	YES
idfix	YES	YES	YES
R-squared	0.366	0.391	0.802

Note: Robust standard errors are in parentheses; **, and *** indicate significant at the 5%, and 1% levels, respectively.

4.5. Heterogeneity Analysis

4.5.1. Regional Features

This study covers 280 Chinese cities spanning 30 provincial-level administrative units (excluding Tibet), exhibiting substantial geographical, historical, cultural, and economic heterogeneity. Such variations in endowment structures and development potential may systematically influence the spatial distribution of high-skilled labor. The empirical results addressing these geographical factors are systematically reported in columns (1)-(3) of Table 9.

Table 9. Heterogeneity effect results.

Variable	(1)	(2)	(3)	(4)	(5)
	Eastern region	**Central region**	**Western region**	**High-density**	**Low-density**
	Skilled	***Skilled***	***Skilled***	***Skilled***	***Skilled***
BE	0.158**	0.223	0.160	0.122*	0.784***
	(0.072)	(0.194)	(0.144)	(0.065)	(0.273)
fdi	0.563	2.548**	4.089**	1.443**	2.012**
	(0.668)	(1.200)	(1.872)	(0.709)	(0.958)
indus	0.097**	0.078	0.012	0.133***	0.051
	(0.044)	(0.048)	(0.044)	(0.047)	(0.032)
igp	0.019	0.002	0.015**	0.013	0.007
	(0.016)	(0.015)	(0.007)	(0.014)	(0.006)
SO_2	0.809	1.082	-0.288	1.161*	-0.577
	(1.013)	(0.821)	(0.944)	(0.676)	(0.629)
Constant	0.889***	0.932***	1.092***	0.852***	1.054***
	(0.070)	(0.072)	(0.075)	(0.068)	(0.049)
Observations	1,300	1,300	1,040	1,990	1,650
yearfix	YES	YES	YES	YES	YES
idfix	YES	YES	YES	YES	YES
R-squared	0.021	0.025	0.027	0.017	0.014

Note: Robust standard errors are in parentheses; *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

The estimation results reveal significant regional heterogeneity in the effects of urban business environment quality on high-skilled labor agglomeration. The coefficient for eastern regions is 0.158 and statistically significant at the 5% level, indicating a positive and significant agglomeration effect. By contrast, central and western regions show statistically insignificant coefficients. These findings are consistent with the observed migration patterns of high-skilled labor, wherein high-skilled labor exhibits a pronounced preference for eastern regions over central and western areas. This divergence suggests that business environment enhancements exert spatially uneven impacts on skilled labor agglomeration. For the west and central regions to enhance their attractiveness to high-skilled labor, policymakers should consider adopting successful practices from the eastern areas while capitalizing on local advantages. Complementary measures such as targeted talent policies should be implemented to strengthen the impact of business environment improvements in these regions. Collectively, these results underscore the necessity of tailored, place-based strategies for optimizing skilled labor distribution.

4.5.2. Population Density Features

Considering that regional amenities have become an increasingly important determinant of high-skilled labor location choices, the impact of urban business environments on talent agglomeration may differ between high- and low-population-density cities. To test this, we stratify the 280 prefecture-level cities into two subgroups based on whether their population density exceeds or falls below the sample average to examine potential differential effects. The regression results are presented in columns (4) and (5) of Table 9.

The estimation results reveal distinct effects across population density groups. For high-density areas, the business environment coefficient is 0.122 and significant at the 10% level, while for low-density areas, the coefficient reaches 0.784 with 1% significance. Although both estimates are statistically significant, the impact is notably stronger in low-density regions. These findings suggest that urban business environment improvements generate substantially stronger agglomeration effects for high-skilled labor in low-density areas relative to high-density cities. In high-density settings, the intensified competition among skilled workers, coupled with elevated living costs and potential resource misallocation, could dampen the marginal benefits of business environment enhancements. Conversely, low-density regions likely benefit from greater marginal returns to institutional enhancements, as they face fewer congestion effects and competitive pressures. This pattern highlights the diminishing marginal returns of business environment improvements as population concentration increases. From a policy perspective, the results emphasize the need for density-dependent strategies: Low-density cities should focus on business environment reforms as a primary tool for talent attraction. While high-density cities may require complementary measures targeting housing affordability and public service provision to fully realize agglomeration benefits.

5. Conclusions and Recommendations

5.1. Conclusion

The empirical analysis validates the hypothesis that urban business environments positively impact high-skilled labor agglomeration and uncovers significant heterogeneity across regions and in terms of population density. From the perspective of agglomeration effects, optimizing urban business environments effectively accelerates the concentration of high-skilled labor, triggering notable knowledge and technology spillover effects while generating substantial scale economies and persistent positive externalities. From a cost perspective, cities with advanced business environments substantially reduce the living costs and institutional frictions faced by high-skilled labor through well-developed infrastructure and public services, thereby alleviating the talent displacement phenomenon. Heterogeneity analysis further reveals that improvements in the business environment of eastern cities significantly enhance high-skilled labor agglomeration. Notably, both high- and low-density cities exhibit positive responses, with more pronounced effects observed in low-density urban areas.

The study also empirically confirms the underlying mechanism through which urban business environments influence high-skilled labor agglomeration. Specifically, business environment optimization attracts skilled labor by boosting urban innovation capacity. A city's innovation level, which is largely determined by its business environment, creates stronger locational advantages, more substantial positive externalities, and greater spillover effects, collectively driving high-skilled labor towards more innovative urban areas.

Threshold effect tests indicate that the promotion of high-skilled labor agglomeration by business environment optimization is subject to the constraint of average wage levels. In regions with lower wage thresholds, although environmental improvements can stimulate economic development, their appeal to high-skilled labor remains insufficient to offset the limitations posed by salary levels and development opportunities, ultimately resulting in an inhibitory effect on skilled labor concentration rather than a promotional one.

5.2. Recommendations

The agglomeration of high-skilled labor holds significant implications for urban productivity levels and industrial structure upgrading. To better attract high-skilled talent, governments should implement targeted strategies to enhance regional competitiveness. The following policy recommendations are proposed based on the study's findings.

First, given the significant positive impact of urban business environments on high-skilled talent agglomeration, efforts should center on optimizing government service efficiency and diversifying industrial development. By fostering a broader range of industries, more employment opportunities and career advancement prospects can be created. Simultaneously, infrastructure investment should be intensified, particularly through the development of efficient public transportation networks to reduce commuting costs. Moreover, optimizing the allocation of medical resources and improving ecological environment governance, including constructing modern medical facilities and enhancing air and water quality, will holistically upgrade the work-life convenience and residential comfort for high-skilled professionals.

Second, the empirical findings indicate that urban innovation capacity serves as a crucial mediator in how business environments attract high-skilled talent. Governments should enhance policy support for innovation, prioritize building an innovation-friendly ecosystem, and focus on attracting innovative talents while creating matching high-quality employment opportunities. Additionally, promoting collaborative R&D among prefecture-level cities and market entities, maximizing the utilization of available innovation resources, and encouraging regional industrial innovation are essential for boosting overall innovation capabilities. Furthermore, promoting synergistic innovation among upstream and downstream enterprises can help construct a comprehensive, cross-industry innovation landscape.

Finally, threshold regression analysis reveals that the influence of urban business environment on high-skilled labor agglomeration is significantly constrained by average wage levels, with more potent effects observed in high-wage regions. To address this regional disparity, targeted policy interventions should focus on increasing capital investment and implementing differentiated talent policies in less-developed areas. These measures can enhance the attractiveness of these regions to high-skilled professionals, stimulate local economic growth, and narrow interregional wage gaps.

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