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Narrowing the Innovation Gap: Cross-Regional University Leadership Transfers and Research Performance in Western China

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Abstract: Under the strategic guidance of developing new quality productive forces consistent with local conditions, addressing regional imbalances in university innovation is critically important. Based on a unique dataset covering western “Double First-Class” universities and provincially key-supported “Double First-Class” universities from 2012 to 2024, this study employs a multiperiod difference-in-differences (DID) approach to evaluate the policy effectiveness of an east–west talent collaboration mechanism, namely, the cross-regional transfer of university-level administrators from eastern to western universities. The results show that such cross-regional transfers significantly increase the number of invention patents granted by western universities. This policy effect is more pronounced when transferred administrators have longer tenures, their originating universities possess stronger innovation foundations, and the innovation gap between eastern and western universities is relatively small. Mechanism analyses indicate that cross-regional transfers primarily enhance innovation in western universities through three key channels: improving the innovation environment, facilitating access to external resources, and expanding collaborative networks. Further analyses reveal that this policy not only increases the quantity of innovation output in western universities but also significantly improves innovation quality and promotes fundamental research. Overall, this study provides a new theoretical perspective and microlevel empirical evidence for understanding how east–west talent collaboration fosters regional coordinated innovation and supports the place-based development of new quality productive forces.

Keywords: East–West Talent Collaboration; Cross-Regional Transfers; University Innovation; New Quality Productive Forces

1. Introduction

As global technological competition intensifies and the new wave of the industrial revolution accelerates, the construction of national innovation systems has emerged as a critical engine for safeguarding strategic security and improving overall national competitiveness. According to the 2025 Global Innovation Index (GII), China's overall world ranking is among the top ten for the first time, with China attaining the first position among middle-income economies and demonstrating exceptional performance in terms of knowledge and technology outputs. Nonetheless, despite this upward trajectory in its aggregate rankings, China's performance in university-industry research innovation ranks only 19th globally, while its institutional environment ranks only 44th (World Intellectual Property Organization [WIPO], 2025). Against this backdrop, China's newly released 15th Five-Year Plan (2026–2030) emphasizes the imperative to “coordinate the development of a strong education system, a strong science and technology system, and a strong talent pool, thereby enhancing the overall efficacy of the national innovation system.” University innovation not only serves as the central nexus that integrates education,

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science and technology, and human capital development but also assumes a strategic vanguard role in spearheading the advancement of new quality productive forces and underpinning the construction of a modernized industrial system (Jiang et al., 2024; Leng & Zhang, 2024). Statistical evidence reveals a dramatic expansion in university innovation output: the number of invention patents granted to Chinese universities increased from 18,000 in 2012 to 176,200 in 2024, representing an average annual growth rate of 21.95%. Similarly, Chinese universities' share of the total national invention patent grants rose from 16.03% in 2012 to 19.13% in 2024¹.

At its core, innovation-driven development is fundamentally predicated upon talent. As the principal carriers of knowledge, highly qualified individuals are broadly acknowledged as the endogenous driving force underpinning innovation within higher education institutions (Rossoni et al., 2023). Nonetheless, the spatial distribution of talent across China exhibits pronounced “siphon” and “Matthew” effects. The eastern regions, because of their superior remuneration, more favorable working conditions, and more mature innovation ecosystems, perpetuate a unidirectional flow of talent from the west, which subjects western universities to the dual predicament of persistent human capital attrition and diminishing innovative momentum (Shi et al., 2024; Yu & Zuo, 2024). This disparity is strongly reflected in the patent data: between 2012 and 2024, the average annual number of granted invention patents at “Double First-Class” and key provincial universities in the eastern region reached 46,300, whereas the corresponding institutions in the western region recorded only 34,200—a discrepancy that unequivocally reveals a significant innovation gap between eastern and western universities². In response to these challenges, the central government of China has undertaken institutional innovations aimed at fostering inter-regional talent collaboration. Among the most prominent initiatives is the cross-regional transfer of university leadership from eastern to western institutions.

University leaders serve as the architects of institutional strategy and the stewards of organizational resource allocation; consequently, their managerial philosophies and policy orientations exert a decisive influence on institutional innovation trajectories (Yu et al., 2024). A survey of the extant literature on east–west talent collaboration, however, indicates a predominant emphasis on its macrolevel ramifications for regional economic development or public service provision (Gu et al., 2024), with comparatively scant attention devoted to its microlevel effects within higher education institutions as discrete innovation entities.

Theoretically, universities in western China confront three challenges in innovation development, namely, institutional inertia (Yang, 2025), resource scarcity (Schlegel et al., 2021), and insufficient collaborative networks (Li et al., 2023). As an externally introduced governance intervention, cross-regional leadership transfers operate beyond the mere aggregation of individual capabilities; they fundamentally represent the effective diffusion of high-level innovation resources and managerial paradigms to less-developed regions. Such transfers embody three mechanisms that encompass institutional transformation, reputational endorsement, and network reconfiguration. These mechanisms not only mobilize the innovation potential across universities by optimizing the institutional environment in western institutions but also facilitate access to external resources and expand collaborative networks, thereby systematically enhancing research performance. Accordingly, this study investigates whether and

1 This was compiled by the Science and Technology Development Center of the Ministry of Education, Compilation of Science and Technology Statistics of Higher Education Institutions, Science and Technology Development Center of the Ministry of Education, 2012–2024. https://hudong.moe.gov.cn/s78/A16/A16_tjdc/.

2 Because the Double First-Class list was officially announced in 2017, this study adopts universities designated under “Project 985,” “Project 211,” and provincial key universities as research samples for the pre-2017 period. For terminological consistency, the designation of Double First-Class universities is employed throughout as a general classifier.

through which channels cross-regional leadership transfers substantively improve innovation outcomes in western Chinese universities.

Moreover, considering the coordinated construction of a nation strong in education, science and technology, and talent, a singular focus on innovation output no longer suffices to capture the full spectrum of a university's innovation capabilities. On the one hand, basic research within universities constitutes the lifeblood of the entire scientific enterprise: it plays an indispensable role in increasing national innovation capacity, overcoming critical core technological challenges, and catalyzing industrial transformation (Jiang et al., 2025; Zhang et al., 2025). On the other hand, innovation quality represents the strategic cornerstone for achieving self-reliance and strength in science and technology and for surmounting “chokepoint” technological bottlenecks (Kang et al., 2025). Therefore, building on the validation of the baseline effect whereby cross-regional transfers increase innovation output in western universities, this study performs an exploratory analysis of their impact on basic research and innovation quality, with the objective of comprehensively delineating the intrinsic nexus between east–west talent collaboration and university innovation.

Accordingly, this study manually assembled a unique dataset documenting cross-regional transfers that span the period of 2012–2024 and merged it with corresponding patent records for western universities obtained from the China National Intellectual Property Administration (CNIPA) database. With this integrated dataset, we empirically examined whether east–west talent collaboration increases the innovation performance of western universities and identified the underlying mechanisms. Relative to the existing scholarship, the potential marginal contributions of this study are threefold. First, from a research perspective, this study is the first to incorporate the institutional practice of cross-regional transfers into a rigorous causal identification framework that systematically evaluates the impact of east–west talent collaboration on university innovation. In this way, it extends the boundaries of the research on talent mobility and university innovation while furnishing novel theoretical perspectives and empirical evidence for understanding the diverse pathways of talent-driven innovation within the Chinese institutional context. Second, with respect to the action mechanisms, this research constructs and empirically validates an integrated analytical framework that includes the innovation environment, external resources, and collaborative networks and thus provides a relatively comprehensive explanation of the pathway mechanisms through which cross-regional transfers improve university innovation and effectively unveils the black box of intervening processes. Third, in terms of research content, this study broadens the analytical scope beyond a sole emphasis on innovation quantity to encompass innovation quality enhancement and basic research strengthening, which therefore expands the scholarly understanding of the multifaceted effects of east–west talent collaboration and provides microlevel evidence from the university perspective to cultivate new quality productive forces.

2. Literature Review

To examine the impact of east–west talent collaboration on university innovation and its underlying transmission mechanisms, this work reviews two interrelated bodies of literature: the drivers of university innovation and the effects of cross-regional talent mobility between eastern and western China.

2.1 Drivers of University Innovation

The literature has primarily examined the drivers of university innovation along the three dimensions of resource endowments, institutional and environmental factors, and collaborative networks.

First, studies consider resource endowments. This strand of research posits that an adequate resource base constitutes a prerequisite for universities to engage in innovative activities. Sufficient investment in

science and technology funding (Rymarzak et al., 2022), coupled with a high-caliber research workforce (Liu & Tian, 2023), collectively forms a “fuel repository” for knowledge creation and transformation within universities.

Second, institutional and environmental factors are discussed. This body of work emphasizes that institutional arrangements and the broader environment are pivotal in stimulating and sustaining the innovative vitality of universities. Reforms to national-level science and technology governance systems (Hao & Zhang, 2023), industry–university–research collaboration policies (Kang et al., 2022), internal research evaluation frameworks (Jiang et al., 2024) and cultures of innovation incentivization (Zarea et al., 2025) can mitigate the uncertainty inherent in the innovation process and foster a supportive atmosphere that encourages exploration and tolerates failure.

Third, the literature examines collaborative networks. This line of inquiry contends that establishing extensive internal interdisciplinary collaboration and external industry–university–research networks represents a critical pathway for promoting cross-institutional knowledge integration and resource complementarity, thus increasing innovation performance (Xuan et al., 2025; N. Zhang et al., 2024).

Notably, however, these driving factors exhibit pronounced regional heterogeneity across China, which leads to an imbalanced landscape characterized by markedly higher innovation levels in eastern universities than in their western counterparts (Li et al., 2024). Among the constraints that confront western universities, the regional scarcity and unidirectional outflow of high-caliber innovative talent constitute some of the most critical developmental bottlenecks (Lin et al., 2025). To address such predicaments, scholarly attention has naturally gravitated towards cross-regional talent mobility as a viable pathway for promoting the coordinated development of university innovation capacity.

2.2 Effects of Cross-Regional Talent Mobility between Eastern and Western China

Research on the cross-regional talent mobility between the eastern and western regions can be further disaggregated into two distinct strands.

The first focuses on the impact of the spontaneous mobility of academic talent on university innovation. Studies within this tradition conceptualize high-level talent as the core productive force in scientific research and have confirmed that western universities, through the autonomous recruitment of distinguished academic personnel from the east—such as Yangtze River scholars and recipients of the National Science Fund for Distinguished Young Scholars—can effectively bolster their research capacity and innovation output (Hu et al., 2024; Liu et al., 2021). These findings compellingly validate the cross-regional value of talent as knowledge creators.

The second strand examines the macrolevel economic and social effects of east–west talent collaboration under formal institutional arrangements. A substantial body of literature has investigated how mechanisms such as reciprocal temporary postings of officials between the eastern and western regions and the inter-regional exchange of party and government leaders promote economic growth (Ding & Li, 2023; Liang, 2022) and increase the provision of public services (Kan & Yang, 2024; Zhao & Tan, 2020) in western areas. Concurrently, improvements in regional economic conditions and public service quality have created more favorable external conditions for western universities to attract high-level academic talent and stimulate latent research potential (Li & Wang, 2023).

Although both strands provide valuable reference points for the present study, a conspicuous lacuna remains: the innovation effects of cross-regional transfers—a distinctive and increasingly prevalent modality driven by national strategy in which administrators are reassigned to serve in university-level governance positions—have received scant scholarly attention. Unlike academic talent, which contributes to innovation through direct participation in knowledge creation, the core value of cross-

regional transfers resides in systemic governance interventions—including strategic formulation, resource reallocation, the reshaping of governance structures, the optimization of institutional environments, and the expansion of resource networks—which drive innovation indirectly but more fundamentally. The essential differences between these two modes in role orientation, functional scope, and operative pathways constitute a theoretical logic that is fundamentally distinct from that of existing research.

Accordingly, this study situates its inquiry within the institutional context of east–west talent collaboration and, for the first time, examines the innovation effects of cross-regional transfers at the university level. This endeavor not only bridges and extends the two research domains of talent mobility and university innovation at the theoretical level but also furnishes microlevel evidence to inform the optimization of national policy regarding east–west talent collaboration and the targeted improvement of innovation capacity in western universities.

3. Policy Background and Theoretical Analysis

3.1 Policy Background

Persistent development gaps have characterized China's eastern and western regions because of the combined effects of natural endowments, human capital disparities, and differential exposure to reform and opening-up policies. In response, China formally institutionalized an inter-regional partnership framework in 1996 whereby 13 eastern provinces and municipalities provided targeted assistance to 10 western provinces through financial transfers and human capital development programs. This initiative marked the official establishment of an organizational mechanism for east–west collaboration.

Upon entering the twenty-first century, the east–west partnership framework underwent further consolidation. In 2001, the State Council expanded the scope of targeted assistance to include Chongqing Municipality and the Tibet Autonomous Region, which brought the total number of recipient provinces to 12. Concurrently, the State Council explicitly encouraged reciprocal exchanges of scientific and technical personnel between the eastern and western regions through temporary assignments, thereby institutionalizing talent and intellectual support as a core component of inter-regional collaboration. This policy provided a foundational reference for subsequent initiatives that promote university-level talent partnerships. In the same year, the Ministry of Education established a structured pairing arrangement under which 13 eastern universities would provide targeted support to their 13 western counterparts through preferential policies, financial assistance, and talent collaboration; this formalized the institutional architecture for east–west university partnerships.

As the national agenda for coordinated regional development advanced, the policy objectives of east–west talent collaboration increased and exhibited notable functional expansion. In 2016, the central government issued directives that emphasized the strengthening of talent support by explicitly advocating for the bidirectional temporary assignment of senior university administrators between eastern and western institutions as a mechanism to improve the research management capacity and innovation performance of western universities. These directives were accompanied by supporting measures designed to ensure policy sustainability. This policy articulation indicated that innovation enhancement had become a central objective of east–west university talent collaboration. The 15th Five-Year Plan further underscores the imperative to strengthen talent partnerships, optimize talent structures, and promote coordinated regional talent development, reflecting the continuous refinement of the policy framework.

The foregoing policy evolution demonstrates that the objectives of east–west talent collaboration

have progressively expanded from poverty alleviation to the development of comprehensive governance capacity and innovation capability in universities, which furnishes a robust policy foundation for investigating the impact of cross-regional transfers on innovation in western universities.

3.2 Theoretical Analysis

3.2.1 Cross-Regional Transfers and Innovation among Western Universities

According to the knowledge-based view, the fundamental source of an organization's sustainable competitive advantage resides in its inimitable knowledge system (Grant, 1996). University innovation activities are highly contingent on embedded tacit knowledge—including research organizational paradigms, resource integration strategies, and innovation-oriented cultural climates (Yıldız et al., 2025)—and cross-regional transfers constitute a distinctive vehicle for transmitting such advanced tacit knowledge. Transferred administrators, who have been immersed in the more innovation-efficient systems of eastern universities, not only master explicit cutting-edge knowledge but also internalize sophisticated tacit knowledge. Consequently, when they assume positions within the decision-making core of western universities, they initiate a targeted, learning-by-doing process of knowledge migration, diffusion, and practical reapplication. Unlike sporadic academic exchanges, this sustained learning embedded within the organizational power center can fundamentally reshape the strategic orientation and resource allocation patterns of western universities, thereby renewing their knowledge base and innovation paradigms.

According to institutional theory, organizations that confront uncertainty seek legitimacy by emulating the pathways of their successful counterparts. Administrators from high-performing eastern universities themselves embody replicable institutional templates. Cross-regional transfers offer western universities—which occupy relatively disadvantaged positions in competitive landscapes—a highly attractive blueprint for emulation. Under dual pressures from superior governmental policy mandates and internal imperatives to pursue excellence, western universities systematically adopt and internalize the governance structures, evaluation systems, and operational processes introduced by newly appointed leaders, which drives institutional isomorphism. This process substantially reduces the trial-and-error costs associated with organizational transformation and accelerates convergence towards advanced innovation governance models.

Therefore, cross-regional transfers underpinned by national strategy effectuate a targeted implantation of the “genetic code” of high-performing innovation systems into relatively underdeveloped systems through the mobility of key governance actors. This provokes profound knowledge reconstruction and institutional change and thus effectively expands innovation capacity in western universities. Accordingly, the following hypothesis is proposed for empirical validation:

Hypothesis 1: Cross-regional transfers improve innovation capacity in western universities.

3.2.2 Mechanisms through which Cross-Regional Transfers Foster Innovation among Western Universities

Drawing on the salient challenges faced by western universities, this study constructs an integrative mechanistic framework that involves the institutional reform-driven optimization of the innovation environment, credibility endorsement-enabled acquisition of external resources, and network reconfiguration-induced expansion of collaborative networks" (as illustrated in Fig. 1).

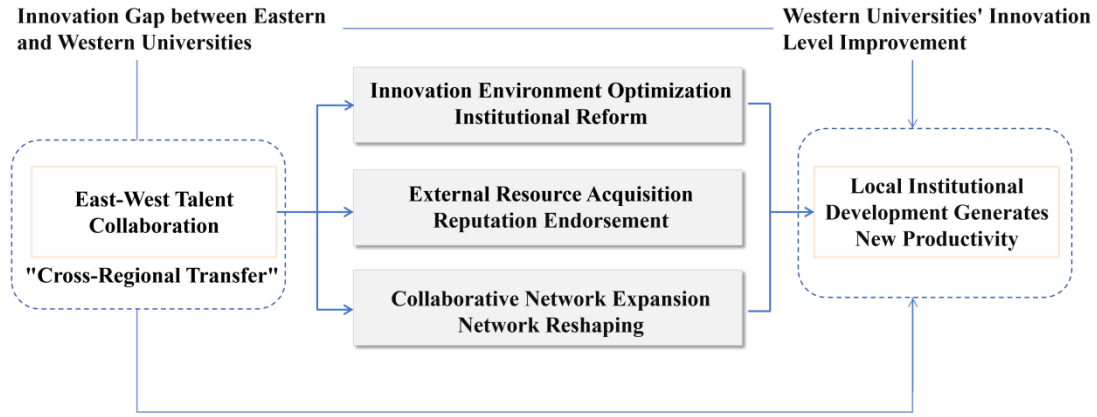


Fig. 1. Theoretical Framework of Cross-Regional Transfers.

(1) Optimization of the Innovation Environment

According to innovation systems theory, a favorable innovation environment constitutes a critical pathway for stimulating internal innovative vitality, increasing resource allocation efficiency, and serving as a foundational condition for sustained innovation capacity enhancement (Duan & Yang, 2025). Relative to their eastern counterparts, western universities exhibit path dependence and institutional lag in innovation incentive systems and research management mechanisms, which considerably weaken their internal innovation environments and thus constrain overall innovation capacity improvement (Qi & Sang, 2023).

Against this backdrop, cross-regional transfers possess the ability to identify latent deficiencies within existing institutional frameworks and the willingness and capability to propel institutional reform. They transplant advanced management practices, research organizational paradigms, and frontier innovation concepts accumulated in eastern universities to western institutions. By leveraging the formal authority and resource allocation power vested in their positions, they initiate and spearhead a campaign of “creative destruction” that targets outdated institutional arrangements in western universities. For instance, by tailoring reforms to local resource endowments and regional characteristics, transferred administrators directly reshape internal incentive structures and research organizational models through revisions to core institutional documents such as the Measures for the Management of Scientific and Technological Achievement Transformation and Revenue Distribution, thereby fundamentally activating the innovative motivation of internal personnel (Xu et al., 2023). More critically, cross-regional transfers are typically accompanied by strong promotion incentives and performance orientations, which endow transferred administrators with pronounced reform motivation within limited tenures. This compels them to actively advance the optimization of the innovation environment and generate a “leading goose effect” within the organization. Through personal demonstration, mobilization, and pressure transmission, they galvanize the overall innovative willingness of western universities, continuously influence the innovative enthusiasm of organizational members and therefore cultivate an organizational cultural climate that encourages and embraces innovation, which forms an endogenous impetus to optimize the internal innovation environment (Wang & Li, 2025). Accordingly, the present study proposes the following hypothesis:

Hypothesis 2: Cross-regional transfers enhance innovation capacity in western universities by optimizing the innovation environment.

(2) Acquisition of External Resources

According to the resource-based view, adequate resources constitute not only a critical determinant for universities to achieve sustained innovation and maintain competitive advantage but also a

fundamental guarantee for conducting high-quality innovation activities (Barney, 1991). However, western universities currently face pervasive challenges of weak resource endowments and insufficient research funding that fail to meet their escalating innovation demands (Schlegel et al., 2021). This predicament constrains the development of innovation capacity in western universities and exacerbates inter-regional imbalances in university innovation development.

Unmistakably, the act of cross-regional transfer itself transmits an effective signal to external resource holders that the recipient western university has obtained governmental endorsement. This endorsement furnishes resource suppliers with a crucial implicit quality certification and risk mitigation, which significantly increases their confidence in resource provision (Wang & Xu, 2024). On the one hand, transferred administrators can more accurately and efficiently convey to superior authorities the precise demands of western universities for research funding and policy support, reducing the information asymmetry between universities and the government (Huang et al., 2023). On the other hand, transferred administrators can secure invaluable reputational guarantees for western universities in fierce resource competition by leveraging substantially greater fiscal support, policy preferences, and major project opportunities than were previously accessible. Accordingly, the present study proposes the following hypothesis:

Hypothesis 3: Cross-regional transfers increase the innovation capacity in western universities through the acquisition of external resources.

(3) Expansion of Collaborative Networks

According to social network theory, as innovation activities increasingly exhibit network characteristics, the interorganizational collaboration among diverse innovation actors through collaborative networks has become a vital conduit for knowledge flows, technology sharing, and resource complementarity. For universities, expanding the breadth and depth of collaborative networks has emerged as a critical determinant of innovation capacity enrichment (Borgatti et al., 2009). However, western universities confront practical challenges in innovation collaboration—including low efficiency and redundant R&D—which severely constrain growth in their overall innovation capacity.

In addressing this predicament, the core function of cross-regional transfers lies in structurally reconfiguring the pre-existing innovation collaboration networks of western universities. Transferred administrators serve not only as collaboration intermediaries but also as strategic actors that can identify and fill structural holes within networks. By introducing the diverse social capital that they have personally accumulated—spanning both eastern and western regions and encompassing both the academic and administrative dimensions—transferred administrators effectively bridge western universities with previously unconnected elite academic teams, key governmental departments, and leading industry enterprises that rapidly expands the breadth of their collaborative networks (Xu et al., 2025). More importantly, this deliberate network reconfiguration introduces new collaborative partners and improves the structural position of western universities within networks, which confers informational and control advantages. This enables western universities to more efficiently search for, identify, and integrate heterogeneous external knowledge, transcend pre-existing information cocoons, and thus propel the renewal and deepening of their knowledge bases—on which more stable, higher-quality long-term collaborative relationships can be constructed (Li et al., 2025; K. Zhou et al., 2025). Accordingly, the present study proposes the following hypothesis:

Hypothesis 4: Cross-regional transfers enhance innovation capacity in western universities by expanding collaborative networks.

4. Theoretical Analysis

4.1 Model Specification

Building on the foregoing theoretical analysis and to rigorously test the impact of cross-regional transfers on innovation capacity in western universities while identifying their dynamic effects, this study adopts a multi-period difference-in-differences (DID) model following the methodological approach of Yue and Liu (2025) that captures the pre- and post-implementation effects of east–west talent collaboration policies. The regression equation is specified as follows:

$$Innovation_{jt} = \alpha_0 + \alpha_1 (Treat_j \times Post_t) + \alpha_2 X_{jt} + \mu_j + \lambda_t + \varepsilon_{jt} \quad (1)$$

In Equation (1), subscript j denotes universities, and t denotes years, with temporal demarcation determined by the timing of treatment receipt. $Innovation_{jt}$ represents the innovation capacity of western university j in year t . $Treat_j$ is a dummy variable that indicates whether western university j belongs to the treatment group. $Post_t$ is a dummy variable that identifies whether year t falls within the post-treatment period. The estimated coefficient α_1 of the core explanatory variable $Treat_j \times Post_t$ constitutes the focal parameter of interest in this study, and it captures the differential change in innovation capacity between the treatment and control groups of western universities following treatment. X_{jt} conveys the set of control variables. μ_j and λ_t represent university fixed effects and year fixed effects, respectively, which control for time-invariant university-specific characteristics and macroeconomic temporal trends. ε_{jt} is the robust standard error.

4.2 Variable Selection

4.2.1 Dependent Variable

Innovation capacity of western universities (*Innovation*). To measure the innovation capacity of western universities, this research follows Wang Yonggui and Li Xia (Wang & Li, 2023) and employs the number of invention patents granted to universities as a proxy for innovation capacity. Relative to invention patent applications, granted invention patents indicate that the patent has acquired legal force and that its innovative value has been validated through official examination; this more authentically reflects the maturity of the innovation outputs and their practical application potential.

4.2.2 Core Explanatory Variable

Cross-regional transfers (*Treat*×*Post*). The core explanatory variable in this study is the interaction term $Treat \times Post$. $Treat$ is a dummy variable that equals 1 if a western Double First-Class university or a provincially prioritized Double First-Class cultivation university has experienced a cross-regional transfer and 0 otherwise. $Post$ is likewise a dummy variable that equals 1 for the current year and all subsequent years in which a cross-regional transfer exists at the aforementioned western universities and 0 otherwise.

4.2.3 Control Variables

To objectively estimate the impact of cross-regional transfers on innovation capacity in western universities and to minimize the endogeneity concerns that arise from omitted variable bias to the greatest extent possible, this study controls for university-level and city-level variables that may influence innovation capacity by drawing on the literature. University-level variables include whether university-level administrators have been temporarily posted to eastern universities (*West_coop*), the number of full-time faculty members (*Professor*), the number of full-time faculty members who hold doctoral degrees (*Doc_professor*), and the number of enrolled doctoral students (*Doc_stu*). City-level variables include the development level of the city in which the western university is located (*Economics*) and its development capacity (*Growth*).

4.3 Data Description

4.3.1 Data Sources

The data employed in this study were sourced as follows. The data on cross-regional transfers were derived from curriculum vitae and biographical information of current and former university-level leaders published on the official websites of western universities and cover the period from 2012 to 2024. Given that the Double First-Class university list was officially promulgated in 2017, this study selected Double First-Class universities and provincially prioritized Double First-Class cultivation universities as the research sample for 2017 and subsequent years. For prior years, the sample comprised universities formerly designated under the 985 Project and the 211 Project, and key provincial universities in western regions, thereby ensuring temporal comparability and sample consistency. The patent-related data for western universities were obtained from the China National Intellectual Property Administration (CNIPA) patent database. The data for the control and mechanism variables were sourced from university information disclosure websites, departmental budget disclosure statements published by university finance departments, the China City Statistical Yearbook, and provincial statistical yearbooks.

4.3.2 Data Processing

The data processing procedure comprised four steps. First, based on official documents promulgated by the national government and provincial authorities regarding the former 985 Project, the 211 Project, the new round of Double First-Class discipline construction initiative, and key provincial universities, this study identified western universities formerly designated under these projects and initiative, key universities, and provincially prioritized Double First-Class cultivation universities to establish the scope of the foundational sample. Second, by referencing the aforementioned university list, this study collected and organized the curriculum vitae and personal homepages of current and former university-level leaders published on official university websites and systematically documented the career trajectories of university-level administrators. On this basis, personnel who were transferred from eastern to western universities to assume university-level administrative positions between 2012 and 2024 were identified, and the university-level cross-regional transfer variable was accordingly constructed. Third, western Double First-Class universities and provincially prioritized Double First-Class cultivation universities were matched to the CNIPA patent database, university information disclosure websites, departmental budget disclosure statements from finance departments, and provincial statistical yearbooks to construct a microlevel database that encompassed the number of granted patents and relevant university-level and regional-level variables. Finally, samples with severe data deficiencies were excluded. For partial missing values, linear interpolation was employed for estimation and imputation³. Concurrently, to mitigate the distorting effects of outliers and scale disparities on the regression results, continuous non-ratio variables were winsorized bilaterally at the 1% and 99% levels and subsequently normalized using min-max scaling. Following these procedures, a panel dataset comprising 1,482 observations from 114 universities across 12 provinces (autonomous regions and municipalities) that spanned 2012 to 2024 was obtained. The detailed variable definitions and descriptive statistics are presented in Table 1.

Table 1

Descriptive statistics of the variables.

Variable type	Name	Definition	Observations	Mean	Standard deviation
Dependent variable	Number of invention patents (<i>Innovation</i>)	Number of invention patents granted by universities	1482	0.096	0.183

³ The variables estimated and imputed using interpolation primarily included mechanism variables and control variables.

Explanatory variable	Cross-regional transfer (<i>Treat</i> × <i>Post</i>)	Whether the university has cross-regional transfer	1482	0.198	0.398
Control variable	Western cadre posting (<i>West_coop</i>)	Whether the university has provincial-level cadres posted in western universities	1482	0.039	0.194
	Number of full professors (<i>Professor</i>)	Number of full professors at the university	1482	0.341	0.180
	Number of full professors with doctorates (<i>Doc_professor</i>)	Number of full professors with doctorates at the university	1482	0.250	0.191
	Number of doctoral students (<i>Doc_stu</i>)	Number of doctoral students at the university	1482	0.098	0.154
	City development level (<i>Economics</i>)	Per capita GDP	1482	0.178	0.212
	City development capacity (<i>Growth</i>)	Year-on-year growth rate of per capita GDP	1482	0.073	0.049

5. Empirical Results and Analysis

5.1 Baseline Regression

Table 2 presents the impact of cross-regional transfers on innovation capacity among western universities. Column (1), which excludes all control variables, reveals that the coefficient on cross-regional transfers (*Treat* × *Post*) is significantly positive at the 5% level. Columns (2) and (3) sequentially incorporate university-level and city-level control variables, respectively; the coefficient remains significantly positive with a stable magnitude, indicating the robustness of the baseline regression results.

Taking Column (3) as an illustrative example, the coefficient on cross-regional transfers is 0.021 and significant at the 5% level. This finding indicates that after controlling for university and city characteristics and time-invariant individual effects and year effects, cross-regional transfers increase the innovation capacity of treatment group western universities by an average of 0.021 standard deviations. Relative to the sample mean (0.096), this represents an increase of approximately 21.86% (0.021/0.096), which demonstrates not only statistical significance but also substantial economic significance. These results provide strong support for Hypothesis 1, confirming that cross-regional transfers have a significant positive effect on innovation capacity in western universities.

Table 2

Baseline Regression Results.

Variables	Innovation		
	(1)	(2)	(3)
<i>Treat</i> × <i>Post</i>	0.019** (0.009)	0.023** (0.009)	0.021** (0.009)
University-Level Controls	No	Yes	Yes
City-Level Controls	No	No	Yes
Individual Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Constant	0.092*** (0.003)	0.050*** (0.015)	0.051*** (0.017)
Observation	1482	1482	1482
R ²	0.824	0.833	0.834

Note: Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The same applies to the tables below.

5.2 Parallel trends test

In analyzing the impact of cross-regional transfers on innovation capacity in western universities, the parallel trends assumption constitutes a critical prerequisite. This assumption requires that prior to the event shock—namely, the occurrence of cross-regional transfers—the control and treatment groups of western universities exhibit relatively stable and statistically indistinguishable trends in innovation capacity development. To further enhance the credibility and robustness of the baseline regression results, this research employs an event study approach to examine whether the impact of cross-regional transfers

on innovation capacity in western universities satisfies the parallel trends assumption while simultaneously investigating the dynamic effects following the implementation of east–west talent collaboration. Specifically, this study presents dynamic effect regression results for three periods before and after the event shock. To avoid multicollinearity, the period immediately preceding the event is selected as the reference period for the parallel trends test, with particular attention devoted to the dynamic evolution of the key coefficients before and after the transfer. The model is specified as follows:

$$Innovation_{jst} = \alpha_0 + \alpha_x \sum_{k=-3+}^{k=3+} Treat_{js} \times Post_{ts} + \alpha_2 X_{jst} + \mu_j + \lambda_t + \varepsilon_{jst} \quad (2)$$

As illustrated in Fig. 2, prior to the cross-regional transfers, all of the estimated coefficients on the core explanatory variable are statistically insignificant and approximately zero, indicating that the treatment and control groups of western universities exhibit broadly similar trends in innovation capacity prior to the event, thereby satisfying the parallel trends assumption. With respect to the dynamic policy effects, in the year of cross-regional transfer, the estimated coefficient is positive but insignificant, suggesting that east–west talent collaboration has not yet generated a significant effect on innovation capacity in western universities. Following the transfer, the estimated coefficient becomes significantly positive and exhibits sustained growth. Overall, the promotional effect of cross-regional transfers on innovation capacity among western universities demonstrates a pattern of continuous strengthening.

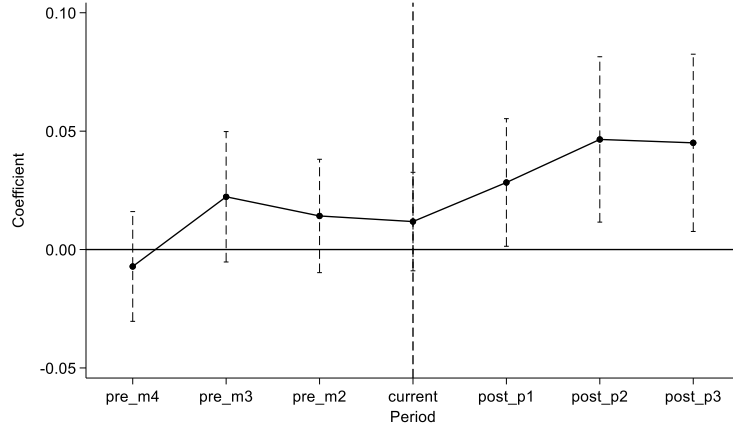


Fig. 2. Pre-Trend Test.

5.3 Robustness checks

The baseline regression results indicate that cross-regional transfers increase the innovation capacity of western universities. To ensure the robustness of the conclusions, the following subsections conduct robustness checks across multiple dimensions—including stacked DID, placebo tests, propensity score matching, alternative dependent variables, interacted fixed effects, the exclusion of contemporaneous policies, and instrumental variables.

5.3.1 Stacked DID

To mitigate estimation bias, this study follows Chen et al. (2024) and employs a stacked DID approach, which treats multiperiod events as an integrated whole for analysis. This approach partially overcomes the estimation bias that arises from repeated events and enables a more accurate identification of the impact of cross-regional transfers on innovation capacity in western universities. The fundamental procedure of stacked DID involves identifying “clean” control groups—those never treated—for the treatment groups that share the same treatment timing; then, a dataset is constructed for each cohort, and all of the datasets are subsequently stacked for a regression. The stacked DID results, which are presented in Fig. 3, are broadly consistent with the parallel trends test in the baseline regression, which confirms

the robustness of the main findings.

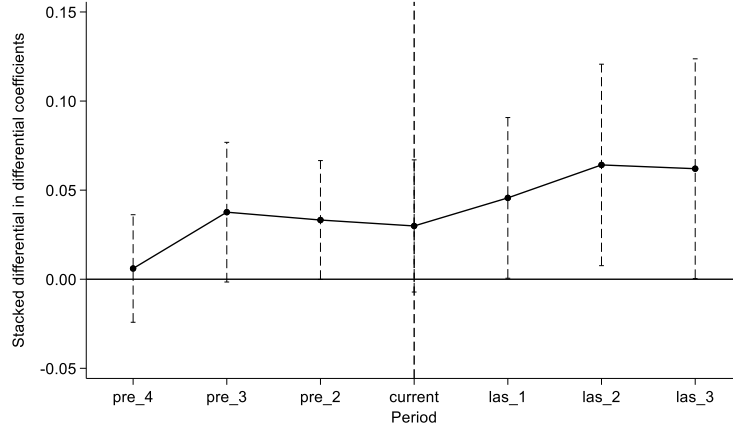


Fig. 3. Stacked DID.

5.3.2 Placebo Test

To further rule out the influence of other unobservable factors on innovation development in western universities and ensure that the findings are driven by cross-regional transfers rather than random factors, a placebo test is conducted. The specific procedure is as follows. Western universities experiencing cross-regional transfers are randomly selected, and a fictitious timing is assigned to each to generate a randomized experiment that includes both transferred universities and timing. Model (1) is then re-estimated through 1,000 random sampling regressions, which yields the kernel density distributions of the estimated coefficients and p values presented in Fig. 4. The results reveal that the kernel density of the estimated coefficients from the sampling regressions approximates a normal distribution centered at zero, with the vast majority of the p values exceeding the 10% significance threshold. Moreover, the overwhelming majority of the estimated coefficients fall short of the baseline regression coefficient of 0.021 (which is indicated by the solid black vertical line on the right), rendering the baseline estimate an absolute outlier. These findings collectively demonstrate that the conclusion regarding the promotional effect of cross-regional transfers on innovation development in western universities is not driven by random factors, that the baseline regression estimates are not biased by potential stochastic influences, and that the conclusions pass the placebo test.

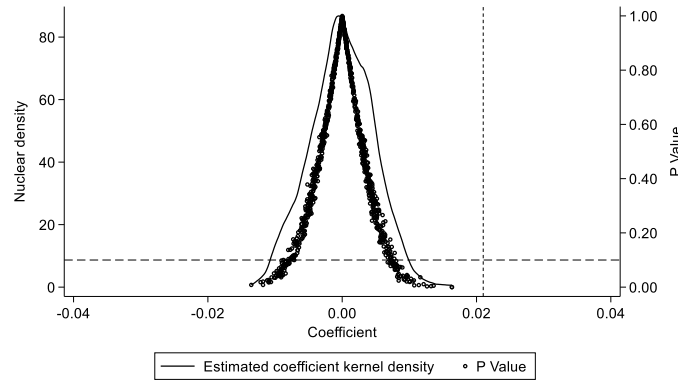


Fig. 4. Placebo Test.

5.3.3 PSM-DID Test

Considering that cross-regional transfers may not be randomly assigned and that sample selection bias may exist, this paper adopts propensity score matching (PSM) combined with DID (PSM-DID) to more precisely evaluate the impact of cross-regional transfers on innovation capacity in western universities,

following Qi et al. (2024) and Ma and Xiang (2025). Columns (1), (2), and (3) of Table 3 present the results of the PSM-DID regression using nearest-neighbor matching ($k=2$), caliper matching (default radius 0.01), and kernel matching, respectively. The results demonstrate that regardless of the matching method employed, the significance and directional effect of cross-regional transfers remain largely consistent with the baseline regression results, thereby confirming the validity of the preceding conclusions.

5.3.4 Alternative Dependent Variable

To further validate the reliability of the findings, this research follows Qu et al. (2025) and replaces the dependent variable with the total granted patents⁴. The results, which are presented in Column (4) of Table 3, indicate that the positive effect of cross-regional transfers on innovation capacity in western universities remains significant at the 1% level after the dependent variable is replaced, which is consistent with the main regression results and supports the baseline findings.

5.3.5 Augmented City-Year Interactive Fixed Effects

Considering that time-varying unobservable factors at the city level—such as innovation support—may confound the estimated effect of cross-regional transfers on innovation capacity in western Double First-Class universities and provincially prioritized Double First-Class cultivation universities, this study follows Tang and Shi (2025) and Zhu and Xia (2025) by introducing more stringent city-year interactive fixed effects into the baseline model (1). The results, which are shown in Column (5) of Table 3, demonstrate that the estimated coefficients exhibit no changes in sign or significance, corroborating the reliability of the preceding conclusions.

5.3.6 Exclusion of Contemporaneous Policies

To reduce the interference from other policies during the study period, this research further excludes relevant policies that may influence university innovation capacity. Three innovation policies are manually collected for testing: China's broadband policy, which controls for the effect of information infrastructure diffusion on lowering innovation cost thresholds; the “Intelligent Construction” pilot policy, which controls for the influence of technology empowerment and innovation scenario provision; and National Independent Innovation Demonstration Zones, which control for the effects of regional R&D resource agglomeration and industrialization. Following Ye and Zhang (2022) and Feng et al. (2024), this study constructs dummy variables that indicate whether a university's location is affected by the aforementioned major innovation policies, incorporates these variables into regression model (1) as controls, and re-estimates the baseline model. As shown in Column (6) of Table 3, the coefficient of the core explanatory variable $Treat \times Post$ remains significantly positive at the 1% level, with a magnitude that closely approximates the baseline regression result. This finding provides compelling evidence that the identified promotional effect of cross-regional transfers on innovation in western universities is not driven by contemporaneous shocks, and the conclusions are highly robust.

Table 3

Robustness checks.

Variables	Innovation					
	(1) PSM-DID (Nearest- Neighbor Matching)	(2) PSM-DID (Caliper Matching)	(3) PSM-DID (Kernel Matching)	(4) Replacing Dependent Variable	(5) Interactive Fixed Effects	(6) Excluding Other Policy Interference
$Treat \times Post$	0.027** (0.014)	0.020** (0.009)	0.021** (0.009)	0.014*** (0.005)	0.021** (0.009)	0.022** (0.009)
University-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
City-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes

4 The total granted patents comprise invention patents, utility model patents, and design patents.

Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Interactive Fixed Effects	No	No	No	No	Yes	No
Observations	616	1482	1482	1482	1482	1482
R ²	0.877	0.834	0.838	0.816	0.837	0.838

5.3.7 Instrumental Variable Approach

This research further introduces an instrumental variable approach to mitigate potential endogeneity bias and provide supplementary robustness checks for the baseline regression results. Following Hu et al. (2025) and J. Zhou et al. (2025), in this study, instrumental variables are constructed using the cross-regional transfer rate and geographic distance. Specifically, the cross-regional transfer rate is defined as the proportion of eastern Double First-Class universities and provincially prioritized Double First-Class cultivation universities from which scholars were transferred to western universities to assume university-level administrative positions from 2012–2024. Geographic distance is measured as the highway mileage between the eastern scholar's original university (benchmarked to 2012) and the western university to which they were transferred; the inverse of this distance serves as the spatial weight. The regression model is re-estimated using two-stage least squares (2SLS).

A valid instrumental variable must satisfy both the relevance and exogeneity conditions. In terms of relevance, the cross-regional transfer rate, as a macrolevel intensity indicator, directly reflects the overall personnel mobility trend from east to west during a given period. Shorter geographic distances expand the convenience and frequency of inter-regional talent mobility Y. Yang et al. (2024), which increase the likelihood of cross-regional transfers by eastern scholars. With respect to exogeneity, variation in the cross-regional transfer rate originates primarily from differences in the macropolicy intensity faced by different treatment cohorts across years; the model effectively absorbs nationwide common shocks by controlling for year fixed effects. Geographic distance, as a historically determined exogenous geographic variable, influences innovation through substantially attenuated economic channels after city economic characteristics were controlled.

The regression results are presented in Table 4. Columns (1) and (3) demonstrate that the instrumental variables are positively correlated with cross-regional transfers and are significant at the 1% level, preliminarily validating the relevance of the instrumental variables. The Kleibergen–Paap Wald F statistic exceeds the Stock-Yogo critical value (16.38), which corresponds to 10% bias; thus, the weak instrument hypothesis is rejected. The p values of the Kleibergen–Paap LM test are all 0.000, significantly rejecting the null hypothesis of the under-identification of instrumental variables at the 1% level; this demonstrates the validity of the selected instrumental variables. Columns (2) and (4) reveal that the estimated coefficients on innovation are significantly positive, which further validates the robustness of the conclusions.

Table 4

Regression Results of the Instrumental Variable Estimation.

Variables	Cross-Regional Transfer Rate		High-Speed Railway Mileage	
	(1) <i>Treat × Post</i>	(2) <i>Innovation</i>	(3) <i>Treat × Post</i>	(4) <i>Innovation</i>
<i>Iv</i>	1.340*** (0.137)		0.801*** (0.025)	
<i>Treat × Post</i>		0.059** (0.028)		0.031*** (0.011)
University-Level Controls	Yes	Yes	Yes	Yes
City-Level Controls	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Kleibergen–Paap rk Wald F Statistic	11289.92		1014.276	
Kleibergen–Paap rk LM Statistic	538.292***		350.603***	
Observations	1482	1482	1482	1482

5.4 Heterogeneity Analysis

"Optimizing collaborative relationships and deepening paired collaboration" constitutes the developmental direction of East–West talent collaboration. Determining the most optimal collaborative relationships and better leveraging the innovation-enhancing effect of cross-regional transfers on western universities represent the focal points of a heterogeneity analysis. This work explores policy effect heterogeneity across the temporal, qualitative, and spatial dimensions.

5.4.1 Temporal Dimension: Tenure Length

First, this study considers whether eastern scholars serve in long-term positions. With respect to cross-regional transfers, longer tenure in university-level administrative positions confers a greater voice and influence within the university and facilitates the internal implementation and translation of innovation concepts and policy proposals into concrete actions, which impacts the efficacy of innovation environment optimization in western universities. Accordingly, in this research, the variable tenure length (*Tenure*) is assigned a value of 1 to the long-tenure sample group (cross-regional transfers serving for three years or more) and 0 to the short-tenure sample group. The tenure length variable is interacted with the core explanatory variable, and the interaction term is incorporated into Model (1) for re-estimation. As shown in Column (1) of Table 5, the estimated coefficient of the interaction term is positive and significant at the 1% level, indicating that long-tenured eastern scholars have a stronger innovation-promoting effect.

5.4.2 Qualitative Dimension: Innovation Foundation of the Original Eastern University

The innovation foundation of the eastern scholar's original university substantially influences the innovation resources and collaborative intensity that they can mobilize post-transfer, thereby influencing the policy effectiveness of east–west governance talent collaboration. Accordingly, in this study, the variable innovation foundation (*Basis*) is constructed. Based on the mean number of granted invention patents at eastern universities, the sample groups that exceed the mean are assigned a value of 1, while those below the mean are assigned 0. The innovation foundation variable is interacted with the core explanatory variable, and the interaction term is substituted into Model (1) for re-estimation. As shown in Column (2) of Table 5, the estimated coefficient on the interaction term is positive, which indicates that a more solid innovation foundation at eastern universities corresponds to a relatively stronger innovation capacity improvement effect of east–west governance talent collaboration.

5.4.3 Spatial Dimension: Innovation Development Gap between the Original Eastern and Current Western Universities

The matching quality constitutes not only a fundamental principle of talent collaboration but also an important basis for promoting innovation cooperation. For western universities, smaller innovation development gaps with eastern universities facilitate the formation of more effective support relationships in terms of knowledge structures and research capabilities. Western universities can absorb, emulate, and transform external innovation resources and advanced technologies at lower costs to rapidly increase their innovation capacity. Accordingly, the variable innovation development gap (*Development*) is constructed in this paper. First, the number of invention patents granted at the eastern scholar's original eastern university is matched with that of the western university to which they were transferred; this yields the absolute value of the innovation capacity gap through differencing. On the basis of the mean innovation capacity gap, sample groups below the mean are designated the proximate development sample group (and assigned a value of 1), while the remainder constitute the disparate development sample group (and assigned 0). The innovation development gap variable is then interacted with the core explanatory variable, and the interaction term is substituted into Model (1) for re-estimation. As shown in Column (3) of Table 5, the estimated coefficient is significantly positive, which suggests that smaller

innovation development gaps between eastern and western universities amplify the effectiveness of East–West talent collaboration. Consequently, cross-regional transfers should prioritize western universities with proximate innovation development levels.

The foregoing analysis across the temporal, qualitative, and spatial dimensions identifies the boundary conditions under which policy effects operate. Additionally, this work examines the heterogeneous effects of transferred administrators' personal characteristics (whether they hold primary positions [*Primary*] and whether their disciplinary background is in science and engineering [*Scientific*]). The corresponding regression results imply that the estimated coefficients of these variables are statistically insignificant. Although sample size limitations cannot be entirely ruled out, these findings have important theoretical value. They offer negative evidence that the policy effect of cross-regional transfers derives primarily from the generic governance capital, authority, and networks embodied in their institutional identity as university-level governance actors, and they relatively transcend specific administrative hierarchies or individual academic backgrounds. This further reinforces the core argument of this study: the value core of such talent collaboration lies in the implantation of “governance genes” rather than the simple aggregation of individual traits.

Table 5
Regression Results of the Heterogeneity Analysis.

Variables	<i>Innovation</i>				
	(1) Tenure Length	(2) Innovation Foundation	(3) Innovation Gap	(4) Position Level (Principal)	(5) Disciplinary Background (STEM)
<i>Treat × Post × Tenure</i>	0.033*** (0.010)				
<i>Treat × Post × Basis</i>		0.045*** (0.017)			
<i>Treat × Post × Development</i>			0.020** (0.010)		
<i>Treat × Post × Primary</i>				0.010 (0.013)	
<i>Treat × Post × Scientific</i>					0.002 (0.015)
University-Level Controls	Yes	Yes	Yes	Yes	Yes
City-Level Controls	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Constant	0.043*** (0.016)	0.056*** (0.017)	0.051*** (0.017)	0.051*** (0.017)	0.051*** (0.017)
Observations	1482	1482	1482	1482	1482
R ²	0.839	0.837	0.834	0.834	0.834

Note: The main effect of the cross-regional transfer variable is absorbed by individual fixed effects and is therefore not reported.

6. Mechanism Analysis

The preceding sections demonstrate the positive impact of cross-regional transfers on innovation capacity development in western Double First-Class universities and provincially prioritized Double First-Class cultivation universities. By building on this foundation and integrating the foregoing theoretical analysis, this section further examines the specific mechanisms underlying the innovation effects of cross-regional transfers across three dimensions: the optimization of the innovation environment, acquisition of external resources, and expansion of collaborative networks.

6.1 Optimization of the Innovation Environment

With respect to innovation environment optimization, this study adopts a dual-dimensional approach that consists of “soft attention” and “hard reform.” First, at the conceptual guidance level, following Z. Yang et al. (2024), this research analyzes the innovation-related keywords mentioned in the university

development plans, annual work plans, and key work arrangements published by western universities. Specifically, the disclosure frequency of characteristic keywords such as “innovation,” “innovation optimization,” “technological innovation,” and “independent innovation” in university development plans, annual work plans, and key work arrangements is tallied. The total word count is normalized to derive the innovation environment attention variable (*Concern*), which reflects the degree of attention that each western university devotes to innovation environment optimization; higher values indicate a greater emphasis on innovation environment optimization by western universities. This study subsequently employs a two-step approach for mechanism testing in which a regression is conducted with innovation environment attention as the dependent variable. The corresponding estimation results are reported in Column (1) of Table 6. The results show that the coefficient of innovation environment attention is significantly positive, indicating that following cross-regional transfers, the emphasis on innovation in top-level design at western universities increases significantly, which demonstrates the newly appointed leaders' intention to reshape the organizational innovation climate.

Second, at the substantive incentive level, this study manually collects institutional documents such as the Measures for the Management of Scientific and Technological Achievement Transformation and Revenue Distribution publicly released by sample universities. If a university promulgates or revises reform schemes aimed at increasing researchers' shares of achievement transformation revenues or clarifying property rights attribution and reward procedures during the tenure of cross-regional transfers, then the value of 1 is assigned; otherwise, it is 0. A dummy variable innovation incentive system (*Incentive_reform*) is constructed, and mechanism testing is conducted using a two-step approach. Column (2) of Table 6 reports the regression results. The coefficient of $Treat \times Post$ is significantly positive at the 1% level. This finding confirms that cross-regional transfers propel deep incentive system reforms and fundamentally stimulates researchers' endogenous motivation by optimizing the distribution mechanism of innovation benefits. By optimizing the innovation environment, conceptual guidance and substantive incentives increase the internal driving force for innovation capacity, thereby effectively promoting innovation capacity enhancement in western universities. Hypothesis 2 is therefore partially validated.

6.2 Acquisition of External Resources

Among the diverse types of external resources available for acquisition, funding—because of its immediate availability and high liquidity—is regarded as the core indicator for measuring resource acquisition effectiveness. Therefore, this paper establishes funding as the primary measurement dimension for external resource acquisition by western universities. More specifically, funding sources for western universities can be broadly categorized into two types. The first comprises public fiscal support provided by central and local governments through fiscal transfer payments, which is typically reflected in universities' fiscal appropriation revenues. The second consists of competitive research funding received, which is obtained annually by universities. The acquisition of such funding is highly contingent on the quality of project applications and the institution's research reputation and more sensitively identifies the resource increase caused by cross-regional transfers by improving universities' research capacity. This funding is ultimately recorded in research enterprise income in universities' publicly disclosed budget statements.

Accordingly, fiscal appropriation revenue (*Revenue*) and research enterprise income (*Technology*) are selected as two indicators that represent the external resource acquisition by western universities. Mechanism testing is conducted using the two-step approach based on the baseline regression model (1).

Columns (3) and (4) of Table 6 report the regression estimation results, and the regression coefficients are significantly positive. This result suggests that cross-regional transfers not only assist western universities in securing more stable governmental fiscal support but also significantly improve their capacity to capture competitive research funding in the “battlefield” of competition. The latter is particularly critical, as it corroborates that by improving the quality of universities' project applications, cross-regional transfers bring valuable incremental resources that provide direct “innovation fuel” for innovation activities. These findings validate the theoretical logic that cross-regional transfers promote external resource acquisition, which advances innovation capacity in western universities and supports Hypothesis 2.

6.3 Expansion of Collaborative Networks

Following X. Zhang et al. (2024), collaborative networks are constructed using patent data from western universities. Concurrently, drawing on Xu et al. (2024), two indicators—innovation nodes (*Tech point*) and innovation edges (*Tech edge*)—are constructed to represent the breadth and depth of collaborative networks at western universities. Furthermore, innovation nodes and innovation edges are introduced into regression model (1) and this mechanism is identified through a two-step approach. The regression results in Columns (5) and (6) of Table 6 demonstrate that the regression coefficients remain significantly positive. These conclusions indicate that cross-regional transfers introduce the profound academic networks accumulated in eastern regions into western universities. Through network reconfiguration, they not only present new collaborative institutions to universities but also facilitate more frequent and deeper collaborative R&D. This optimization of network structure propels inter-institutional knowledge and resource sharing, which encourages innovation capacity in western universities. Thus, Hypothesis 2 is further validated.

This section confirms that cross-regional transfers improve innovation capacity in western universities through the three operational channels of the optimization of the innovation environment, acquisition of external resources, and expansion of collaborative networks. However, a more profound question arises: What constitutes the essential distinction between these mechanisms and the operational pathways of academic talent mobility documented in the literature? This study contends that the fundamental distinction resides in the “governance actor” identity of the action subject, which renders their operational modality more systematic, characterized by leverage effects, and endowed with an endorsement of legitimacy.

First, with regard to innovation environment optimization, cross-regional transfers have an institutional transformation function. Unlike academic talent, such as that of Changjiang Scholars who primarily establish exemplars through personal participation in R&D, the core authority of governance actors rests in institutional design and resource allocation. By revising fundamental innovation incentive systems such as the Measures for the Management of Scientific and Technological Achievement Transformation and Revenue Distribution, their influence encompasses the entire organization rather than individual laboratories. This “hard reform” propelled by administrative authority more fundamentally reshapes the institutional environment for university innovation than the technological demonstration created by academic talent. The breadth and depth of its influence are incomparable to those of the latter.

Second, concerning external resource acquisition, cross-regional transfers generate a potent “certification effect,” which constitutes their distinctive advantage. The recruitment of an eminent scientist by a western university primarily transmits a signal of the university's research potential in a

specific disciplinary domain. In contrast, the transfer of a university-level leader from a high-performing eastern university to a western university—as an organizational behavior—conveys a far more powerful signal to external stakeholders: the university has been incorporated into national strategic planning, its governance capacity has been endorsed by superior authorities, and it is positioned on an active reform trajectory. This legitimacy endorsement derived from organizational identity substantially bolsters the confidence of resource suppliers, thus conferring distinctive advantages in securing fiscal appropriations and competitive research funding that academic talent does not possess.

Finally, with respect to collaborative network expansion, governance actors fill structural holes rather than merely augment collaborative nodes. The personal networks of academic talent are typically concentrated within their specific disciplinary domains, whereas the social capital possessed by university-level administrators is interdisciplinary, inter-institutional, and even cross-sectoral. They not only introduce new collaborative partners but also, because of their positional authority, serve as “network bridges” that connect previously unrelated innovation groups across different departments within the university and between the university and external entities. This capacity to reconfigure the overall network structure enables western universities to access more diverse and heterogeneous knowledge combinations, with effects far exceeding the “node” effect of merely increasing the quantity of collaborations.

Table 6
Regression Results of Mechanism Testing.

Variables	Innovation Environment Optimization		External Resource Acquisition		Collaborative Network Expansion	
	(1) <i>Concern</i>	(2) <i>Incentive_reform</i>	(3) <i>Revenue</i>	(4) <i>Technology</i>	(5) <i>Tech_point</i>	(6) <i>Tech_edge</i>
<i>Treat × Post</i>	0.052*** (0.009)	0.303*** (0.031)	0.027*** (0.008)	0.016** (0.007)	0.019** (0.010)	0.023** (0.010)
University-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
City-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.345*** (0.022)	0.079** (0.039)	0.278*** (0.014)	0.089*** (0.010)	0.184*** (0.017)	0.118*** (0.018)
Observations	1482	1482	1482	1482	1482	1482
R ²	0.767	0.758	0.836	0.910	0.751	0.705

Accordingly, the mechanism analysis in this study reveals that the efficacy of “governance talent” mobility does not originate from their personal research productivity but instead from the institutional authority, legitimacy signals, and network hub positions conferred by their positions. This clearly distinguishes their operational pathways from those of academic talent mobility and furthers the understanding of the functional positioning of different categories of talent within innovation systems.

7. Extended Analysis

The preceding research findings confirm that cross-regional transfers significantly increase the quantity of granted invention patents at western universities. However, within the contemporary context of the coordinated construction of an education powerhouse and a science and technology powerhouse, focusing solely on innovation quantity is insufficient for comprehensively evaluating the overall efficacy of the policy. As the foundational core of the national innovation system, universities' breakthroughs in fundamental research and the improvement of innovation quality have profoundly far-reaching strategic significance for the nation's achievement of scientific and technological self-reliance and the development of new quality productive forces. Accordingly, building on the core analysis, this section further investigates the potential impact of cross-regional transfers on the innovation structure and

innovation quality of western universities, aiming to more comprehensively assess the profound value of this governance talent collaboration policy.

Following Diao (2025) and Yang et al. (2025), this work employs the number of high-level academic publications⁵ and the citation count of invention patents published by western universities to measure their fundamental research orientation and innovation quality, respectively. This is because as the primary vehicle for fundamental research outputs, academic publications represent the principal form through which researchers disseminate their findings to the public; their quantity identifies the fundamental research output of university research activities. The patent citation count, which is defined as the total number of times that a patent is cited in subsequent patents or non-patent literature, serves as a discriminating indicator, as only patents with greater originality or stronger applicability are cited more frequently. Compared with patent applications and grants, the patent citation count more authentically reflects the innovation quality of technologies. Based on model (1), the aforementioned variables are substituted as dependent variables for re-estimation. The results, presented in Columns (1) and (2) of Table 7, demonstrate that the coefficients on the core explanatory variable are significantly positive, which indicates that cross-regional transfers significantly increase fundamental research capacity and high-quality innovation at western universities.

Table 7

Regression Results of the Extended Analysis.

Variables	<i>Innovation</i>	
	(1) Fundamental Research	(2) Innovation Quality
Treat × Post	0.049*** (0.008)	0.089*** (0.012)
University-Level Controls	Yes	Yes
City-Level Controls	Yes	Yes
Individual Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Constant	0.022 (0.016)	0.038* (0.021)
Observations	1482	1482
R ²	0.911	0.729

These research findings have important theoretical depth and policy implications. First, the promotional effect of cross-regional transfers on fundamental research compellingly corroborates the theoretical depth of the “knowledge reconfiguration” mechanism articulated previously. This result suggests that cross-regional transfers not only transfer application-level technical knowledge but also more importantly, introduce research paradigms and academic value systems that emphasize long-term strategic planning and encourage original exploration in western universities. This deep-level renewal of knowledge systems can guide the transformation of research activities at western universities from “follower-type” research to “leader-type” exploration, fundamentally consolidating innovation capacity at its source.

Second, the expansion of innovation quality by cross-regional transfers vividly demonstrates the successful practice of institutional transformation. Newly appointed leaders, by optimizing research resource allocation and performance evaluation systems, successfully redirect universities' innovation incentives from pursuing quantity to emphasizing value and impact. This institutional guidance prompts researchers to devote greater attention to the technological frontier and market application potential of research outputs, which systematically elevates the quality of innovation outputs.

Therefore, this extended analysis reveals that the policy efficacy of cross-regional transfers does not

5 High-level academic publications include the Chinese Social Sciences Citation Index (CSSCI/Nanjing University Core), the Science Citation Index (SCI), and the Social Sciences Citation Index (SSCI).

constitute a simple expansion of the innovation scale but rather achieves synergistic progress in both the quality and quantity of the innovation system. These findings, from the dimensions of innovation-driven sources and quality, provide microlevel empirical evidence from the frontlines of higher education for the national strategy of “East–West governance talent collaboration serving the development of new quality productive forces”.

8. Conclusion and Policy Implications

Promoting east–west governance talent collaboration constitutes a critical imperative for achieving synergistic innovation development in universities and advancing the development of new quality productive forces. This study focuses on cross-regional transfers—a distinctive form of governance talent collaboration with Chinese characteristics—and treats the implementation of cross-regional transfers during 2012–2024 as a quasi-natural experiment. By constructing a unique microlevel dataset and employing a multiperiod DID approach, this research systematically examines the impact of east–west governance talent collaboration on innovation in western universities and its underlying mechanisms. The principal research conclusions follow.

First, cross-regional transfers significantly increase innovation capacity in western universities. This conclusion remains robust after a series of rigorous robustness checks, including parallel trends tests, placebo tests, PSM-DID, and instrumental variable methods. The findings demonstrate that east–west governance talent collaboration offers an effective policy instrument for promoting balanced regional innovation development.

Second, a mechanism analysis suggests that cross-regional transfers do not enhance western universities through substitutive direct R&D but rather systematically empower them through the exercise of governance authority. Specifically, cross-regional transfers optimize the internal innovation environment through institutional reform, leverage governmental endorsement to secure critical external resources for western universities, and reconfigure networks to expand their innovation collaborative networks. These three pathways collectively illuminate the microlevel mechanism through which governance talent drives innovation.

Third, a heterogeneity analysis indicates that significant differences in policy effects exist across different groups. A longer tenure in cross-regional transfers enables a more profound promotion of institutional change; a stronger innovation foundation at the original eastern university implies richer innovation knowledge; and a smaller innovation gap between eastern and western universities corresponds to greater capacity for knowledge transfer and absorption. These results provide important evidence for the precise matching of governance talent.

Fourth, an extended analysis further demonstrates that cross-regional transfers not only increase the quantity of innovation outputs at universities but also optimize the innovation structure, which significantly promotes fundamental research capacity and innovation quality. This result suggests that the policy effect achieves a transition from quantity to quality and provides a pathway for intensive development induced through governance optimization.

Accordingly, the evidence presented in this study demonstrates that cross-regional transfers, through the mobility of key governance actors, effectuate the targeted implementation of the “genetic code” of high-performing innovation systems and offer profound knowledge reconfiguration and institutional transformation in western universities. In this way, cross-regional transfers supply new insights and evidence for addressing the challenge of regional innovation imbalance.

Based on the conclusions of this research—particularly the deep-level logic revealed by the

heterogeneity analysis and mechanism testing—this research proposes the following targeted policy implications:

First, the transformation of the collaboration model from “scale coverage” to “precision empowerment” and the establishment of precise matching and incentive mechanisms should be promoted. A “gradient matching” strategy should be implemented by establishing a precise talent matching database and evaluation system. In the selection process, priority support should be accorded to collaborative combinations in which the potential innovation difference falls within a moderate range and eastern scholars can contribute high-quality “knowledge genes” to maximize efficiency. Simultaneously, a long-term orientation should be reinforced by establishing incentive mechanisms that encourage long-term tenure, incorporating the achievement of cross-term strategic objectives into performance evaluations, ensuring sufficient time for implementing systematic reforms, and avoiding “short-termism.”

Second, a policy support system that emphasizes the three key mechanisms, which removes obstacles and provides implementation levers for transferred administrators, should be constructed. First, “innovation environment optimization should be encouraged. Within their authorized scope, transferred administrators should be supported in prioritizing the “hard reforms” of core incentive systems such as the reform of research achievement transformation revenue distribution and granting them authority to pilot flexible research organizational models, thereby translating textual “attention” into substantive optimization of the environment. Second, platforms for external resource acquisition should be established. The central government may take the initiative to establish a dedicated “East–West University Collaborative Innovation” fund structured as a competitive project, with transferred administrators serving as the lead applicants. This not only offers critical resources but also reinforces these administrators’ legitimacy and authority within universities. Third, connections for collaborative network expansion should be facilitated. The role of transferred administrators as a network bridge should be fully leveraged, with education authorities regularly organizing dedicated “East–West University Innovation Alliance” matching events and providing priority support for joint laboratories or R&D centers with substantive collaborative content facilitated by transferred administrators. In this way, individual social capital can be consolidated into inter-organizational institutionalized collaboration.

Third, performance evaluation mechanisms grounded in innovation quality should be improved to guide the deepening of east–west collaboration. The existing evaluation approach, which places a disproportionate emphasis on the quantity of patents and publications, should be reformed. In assessing collaboration effectiveness, the weighting of indicators such as fundamental research contributions and innovation quality should be substantially elevated to guide both parties to shift their collaborative focus from a growth in quantity to value creation. Concurrently, east–west collaborating universities should be encouraged to jointly address challenges surrounding major national strategic needs, with the capacity to generate landmark achievements of significant impact designated as one of the core evaluation criteria, which would genuinely serve the development of new quality productive forces.

From an international perspective, the findings of this study offer valuable insights for other developing countries confronting uneven distributions of innovation resources. In addressing regional development imbalances, policymakers should transcend conventional approaches centered on financial transfers and infrastructure assistance and instead explore the establishment and implementation of sustainable cross-regional collaboration mechanisms. Through the institutionalized mobility of senior administrative and academic talent across regions, the pivotal role of key personnel in institutional restructuring and network formation can be leveraged to fundamentally unlock the endogenous innovation potential of lagging regions.

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Author contributions

Y.Z.: conceptualization, writing—original draft preparation, funding acquisition, writing—reviewing and editing. P.Z.: writing—reviewing and editing, supervision, project administration. H.X.: writing—original draft preparation, supervision, project administration. Y.G.: writing—original draft preparation, writing—reviewing and editing, methodology, formal analysis, validation, software, data curation, visualization.

Competing interests

The authors declare no competing interests.

Data availability

All data supporting the findings of this article are available in the Dataverse repository.

<https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/UOIKWB>