

Impact of National Sports Industry Demonstration Bases on Regional Sports Development: Empirical Difference-in-Differences

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Article

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Abstract

As a local policy instrument for promoting high-quality development of China's sports industry, National Sports Industry demonstration bases play a significant role in regional development. This study treats their establishment as an exogenous shock, applies a multi-period difference-in-differences approach within a quasi-natural experiment and uses panel data from 208 Chinese cities (2015–2023) to examine effects on three dimensions: resident sports consumption, sports industry economic value and employment absorption capacity. Notably, demonstration bases have no significant effect on resident sports consumption or employment absorption; however, it significantly promotes the economic value of the sports industry and these findings are robust. Overall, demonstration bases drive regional sports economic development but do not improve employment or consumption level. Accordingly, this paper proposes three policy directions: upgrading evaluation mechanisms, strengthening employment transformation capacity and optimising product supply.

1 Introduction

The position of China's sports industry economy has continued to rise. In 2024, the total scale reached RMB 3.8421T, with an added value of RMB 1.6033T, accounting for 1.19% of gross domestic product (GDP; National Bureau of Statistics of China, 2025). As the industry expands, its development model is undergoing transformation. The rising share of the sports service sector indicates that the industry has shifted from mere scale expansion to one characterised by improved service supply and deepened industrial integration. Hence, the extensive development model based on factor input and project expansion has become unsustainable, making it necessary to explore new pathways aligned with current industry requirements.

As a major institutional innovation in building a modern sports industry, the National Sports Industry demonstration base has been tasked with promoting regional economic transformation and high-quality industry development. Since the establishment of the first demonstration base (i.e. the Shenzhen National Sports Industry Base) in April 2006, their economic contribution and social standing have improved significantly. According to China's first blue book on demonstration bases, among the 36 bases that year, 24 reported industry value added exceeding 1% of GDP and four exceeded 10%, becoming pillar industries in their regions (Li, 2019). Existing studies have examined demonstration bases concerning enterprise performance, regional growth, employment effects and spatial patterns (Wang et al., 2024; Guo et al., 2025; Lu & Wang, 2025; Li & Sun, 2021). However, current evidence does not adequately explain their impact on the economic effects of the sports industry. Prior research has largely focused on single outcome variables at the macro level, with limited attention to multi-dimensional analysis within a unified city-level framework. Systematic empirical evidence on the dynamic and lagged effects of staggered recognition policies also remains insufficient.

This study treats the establishment of demonstration bases as a staggered local policy shock, applies a multi-period difference-in-differences approach and uses panel data from 208 Chinese cities (2015–

2023) to evaluate policy effects across three dimensions: resident sports consumption, the economic value of the sports industry and employment absorption capacity. The study aims to inform policy optimisation and enhance the development effectiveness of demonstration bases.

The contributions of this study are threefold. First, while prior research has focused on enterprises, regional growth or aggregate employment, this study shifts analysis to the city level and refines outcome variables within the sports industry, improving identification of policy effects and reducing bias from macro-level proxies. Second, it integrates economic value, employment and consumption into a unified analytical framework, providing a more comprehensive assessment of policy impacts on the regional sports economy. Third, by exploiting the staggered recognition of demonstration bases and applying a multi-period difference-in-differences (DID) framework, the study better distinguishes pre-existing advantages from causal policy effects compared with static or average treatment approaches.

The Chinese context is particularly relevant. As a socialist system with strong policy-driven industrial development, China provides a clear setting for examining how government-led instruments shape regional industries. Its dual-track system in which government and market mechanisms operate in parallel also enhances the broader applicability of the findings. Similarly, China's ongoing economic transformation and evolving sports industry make it a useful case for regions at similar development stages.

2 Literature Review

2.1 Policy Background

Since China's reform and 'opening-up', the nation's economy has experienced rapid growth and the sports industry has entered a new phase of development; however, its overall scale remains limited, its vitality is insufficient and structural and institutional constraints persist. As a key platform for promoting sports industry development, demonstration bases refer to regions, institutions or projects recognised by the General Administration of Sport of China that possess a solid foundation, appropriate scale, distinctive development characteristics, strong competitiveness in key sectors and notable economic and social benefits (General Administration of Sport of China, 2023a). Since 2006, after nearly 2 decades of exploration, the evolution of demonstration bases can be divided into four stages:

1. Initial exploration (2006–2010). In April 2006, the General Administration of Sport of China approved the first demonstration base in Shenzhen, marking the beginning of policy implementation. Between 2006 and 2010, areas such as Wenjiang in Chengdu, Jinjiang in Fujian and Longtan Lake in Beijing were successively designated as 'National Sports Industry Bases' (General Administration of Sport of China, 2023b). During this period, development remained limited and scattered, with only six bases established over 5 years.
2. Rapid development (2011–2015). To strengthen planning and governance, the General Administration of Sport of China issued the 'Administrative Measures for National Sports Industry

Bases (for Trial Implementation)' in November 2011, formally defining the concept (Department of Sports Economy, 2015). In October 2014, the State Council promulgated the 'Several Opinions on Accelerating the Development of the Sports Industry and Promoting Sports Consumption (Document No. 46)', elevating the sports industry to a national strategic level and emphasising the development of competitive, market-oriented bases (State Council of the People's Republic of China, 2014). During this stage, eight additional demonstration bases were approved, further strengthening their scale and foundation.

3. Standardised development (2016–2020). During the '13th Five-Year Plan' period, national policy called for the construction of 50 county-level demonstration bases with substantial industrial scale and clear agglomeration effects (Policy and Regulation Department of the General Administration of Sport of China, 2016). In March 2016, the General Administration of Sport of China issued the 'Notice on Strengthening the Development of National Sports Industry Bases', clarifying the framework and expanding categories into demonstration bases, demonstration units and demonstration projects. This stage saw rapid expansion, with increasingly evident agglomeration, scale and spillover effects.
4. High-quality development (2021–present). In July 2023, revised 'Administrative Measures' introduced a 5-year validity period for demonstration base designation, after which reapplication is required. In the same year, 36 bases designated before 2017 were automatically revoked upon expiration, marking a shift towards dynamic management. To date, 86 demonstration bases have been recognised, including those whose qualifications expired in 2023. At the 2024 National Meeting on Sports Industry Base Work, officials reported that demonstration bases clustered 52,731 sports enterprises and absorbed 1.1443M employees in 2023, generating significant agglomeration and social effects (Wang, 2024). As an advanced form of industrial agglomeration, demonstration bases generate spillovers beyond the sports sector, with broad impacts on local economies and livelihoods.

2.2 National Demonstration Bases

Existing research has been conducted primarily by Chinese scholars and can be broadly classified into several categories:

- Impact of demonstration base establishment on local sports enterprises (Liu et al., 2025; Wang et al., 2024), economic development (Guo et al., 2025; Li et al., 2022; Yao & Liu, 2021) and employment (Lu & Wang, 2025; Xu & Lin, 2023);
- Spatiotemporal distribution and spatial evolution (Li et al., 2024; Tang & Zhang, 2023; Xiao et al., 2023); and
- Current conditions with proposed optimisation paths (Li & Sun, 2021; Xu & Huang, 2019; Zhao et al., 2019).

Based on panel data for listed sports industry firms from 2000 to 2022, Liu et al. (2025) found that demonstration bases significantly improve total factor productivity. Similarly, Wang et al. (2024) reported

positive effects on enterprise innovation.

Regarding economic outcomes, some studies found that demonstration bases promote growth with notable regional heterogeneity. Li et al. (2024) identified a significant inhibitory effect in eastern cities but no significant effect in western regions, with impacts exhibiting a lag of approximately 3 years and increasing marginal effects over time. Xu and Lin (2023) argued that demonstration bases expand the economic scale of host cities while optimising industrial structure. In terms of employment, Lu and Wang (2025) found differentiated spillover effects across sectors such as education, wholesale and retail and accommodation and catering, supporting the mechanism of inter-industry employment linkages.

With respect to spatial characteristics, Tang and Zhang (2023) identified a pattern of eastern concentration and western dispersion at the provincial level, and a ‘dense east–sparse west’ pattern at the municipal level. Xiao et al. (2023) showed increasing spatial agglomeration over time, driven jointly by economic development, technological innovation environments, tourism resource endowments and government support, with significant spatial heterogeneity. In addition, case-based evidence (Fu, 2019) suggested that national strategic promotion and policy support are key drivers of demonstration base development.

These studies have substantially advanced understanding of the mechanisms underlying demonstration base policies; however, several limitations remain. First, prior research predominantly focused on enterprises or provincial-level outcomes, with limited city-level analysis using consistent statistical standards. Many studies relied on listed firm data or composite macro-indicators, which may not accurately capture direct policy effects on the regional sports economy. Second, given the multi-dimensional nature of the sports industry, existing work typically examined a single outcome dimension, with few studies jointly analysing consumption, economic value and employment within a unified framework. Third, although quantitative methods have been increasingly used, evidence on dynamic and lagged effects under staggered policy implementation remains insufficient.

To address these gaps, this study treats demonstration base establishment as an exogenous policy shock and employs a multi-period DID approach within a quasi-natural experiment to evaluate impacts on residents’ sports consumption, and further identifies effects on sports industry economic growth and employment.

2.3 Theoretical Mechanisms

Insufficient consumer demand has long constrained China’s economic growth and the transformation of its development model. Expanding consumer demand, especially resident consumption, has therefore become a priority for enhancing endogenous growth stability and promoting high-quality development. As a new driver of consumption, sports consumption was identified in the ‘2024 Report on the Work of the Government’ as a key growth point (Shi et al., 2024). International evidence suggests that sports consumption grows rapidly when per capita income exceeds USD 6,500; in 2025, China’s per capita

income was approximately USD 6,300 (National Bureau of Statistics of China, 2026), indicating that China is entering a rapid growth phase of sports consumption.

Due to its high degree of integration, the sports industry stimulates related sectors such as tourism, culture, construction, technology and health. Large-scale sporting events are often combined with cultural performances, tourism and urban leisure consumption, while mass fitness activities are embedded in daily life, generating significant multiplier and agglomeration effects. Schumpeter (1934) argued that economic change is driven primarily by producers introducing new products that shape consumer demand, while Drucker (1985) emphasised that high-quality supply activates latent demand by creating new uses and markets. From a supply-side perspective, demonstration bases can promote sports consumption by advancing supply-side structural reform, including diversifying consumption formats, expanding consumption space, improving policy support and increasing the variety and quality of sports products. Based on this reasoning, this study proposes:

Hypothesis 1

The establishment of National Sports Industry demonstration bases has a significant positive effect on resident sports consumption level.

Local industrial policies play a central role in guiding enterprise behaviour, regulating markets, and allocating factors, and are key instruments for promoting regional growth and industrial upgrading. Demonstration bases represent a form of place-based industrial policy. Prior studies suggest that such policies improve regional performance by reducing transaction costs, strengthening specialisation and fostering innovation environments conducive to knowledge spillovers (Gao & Yuan, 2022). In the sports industry, policy support, emerging technologies and platform effects attract activities such as manufacturing, event operations, venue services and training, generating agglomeration of firms, capital and services. National policy has emphasised expanding sports product supply, and industry development increasingly depends on platform-based supply capacity. A core function of demonstration bases is to build integrated supply platforms, which enhance the quality and density of supply through resource aggregation, improved public services and upgraded infrastructure. As local supply capacity strengthens, consumption scenarios expand, increasing economic returns.

The sports industry's cross-sectoral integration further amplifies these effects through pathways such as 'sports + tourism', 'sports + technology', and 'sports + health', transforming sports demand into broader cultural and lifestyle consumption. demonstration bases also concentrate market actors and projects spatially. Following designation, local governments allocate land, fiscal resources and investment incentives across sports sub-sectors, attracting firms and expanding operations. This increases enterprise density and generates demand for labour, forming the first employment mechanism. A second mechanism arises from spillovers to related industries—such as culture, tourism and manufacturing—which expand production and absorb labour due to their flexible employment structures. Based on this analysis, this study proposes the following hypotheses:

Hypothesis 2

National Sports Industry demonstration bases have a significant positive effect on the economic value of the sports industry.

Hypothesis 3

National Sports Industry demonstration bases have a significant positive effect on the sports industry employment absorption level.

3 Research Design

3.1 Sample and Model

This study treats the establishment of a National Sports Industry demonstration base as an exogenous shock. Differences in approval timing across bases create favourable quasi-natural experimental conditions for applying a multi-period DID approach. For sample selection, demonstration bases approved after 2015 exhibit more stable timing and greater frequency. Accordingly, 2015 was set as the starting point for treatment timing. The year in which a city was first recognised as a demonstration base is defined as its policy onset year; once recognised, the city enters the treatment group in that year and remains treated thereafter, while cities never recognised serve as the control group.

The sample consisted of panel data for 208 cities from 2015 to 2023, yielding 1,872 city-year observations, of which 44 were demonstration base cities. Because missingness differs across dependent and control variables, the estimation samples vary across models. Specifically, for the full-sample model with resident sports consumption as the dependent variable, 204 cities and 1,836 observations remained after including controls. For partial-sample models using sports industry development and employment absorption as dependent variables, data availability yielded 1,139 observations, forming an unbalanced panel. Although sample sizes differed, the identification strategy, model specification and core explanatory variables remained consistent, allowing policy effects to be examined across outcome dimensions within a unified framework.

The research model is specified as follows:

$$Y_{it}^m = \alpha + \beta \text{Base}_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

1

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Here, i denotes the city and t denotes the year; Y_{it}^m is the dependent variable measuring the level of urban sports economic development; Base_{it} is the core explanatory variable, indicating whether city i in year t is treated by the demonstration base policy; X_{it} denotes control variables; μ_i represents city fixed effects, controlling for time-invariant heterogeneity; λ_t represents year fixed effects, capturing

common shocks such as macroeconomic fluctuations and institutional changes; and ϵ_{it} is the random disturbance term. In addition, m denotes different outcome dimensions.

When $m = 1$, Y_{it}^1 represents residents' sports consumption level.

When $m = 2$, Y_{it}^2 represents the economic value of the sports industry.

When $m = 3$, Y_{it}^3 represents the employment absorption level of the sports industry.

3.2 Variable Design

The establishment of a National Sports Industry demonstration base is the treatment variable. Given variation in approval timing across demonstration bases, this study employed a multi-period DID framework; cities without a demonstration base were assigned to the control group, with their dummy variable coded as 0 throughout.

Because statistics on the sports industry remain incomplete and value-added data at the provincial and city levels were unavailable, this study drew upon the 'National Bureau of Statistics' Industrial Classification for National Economic Activities' and prior studies (Xu et al., 2025; Yao & Liu, 2017) to construct proxy variables. Specifically, per capita household expenditure on education, culture and entertainment, value added in culture, sports and entertainment and employment in sports and entertainment were used to measure resident sports consumption, the economic value of the sports industry and its employment absorption capacity, respectively.

This approach is supported by two considerations. First, international statistical practice commonly integrates sports with entertainment, leisure, health and physical activity (Yi, 2025) and as part of the tertiary sector, sports policy evaluation should account for broader spillover effects. Second, the sports industry is highly integrated with cultural and entertainment sectors (Zhang & Wang, 2012); thus, the performance of the culture, sports and entertainment sector reasonably reflects sports industry development. Because these data were compiled within a unified statistical framework, they effectively capture overall industry trends (Zeng & Huang, 2022).

To control for differences in economic and social development across cities, and following prior studies (Caragliu & Del Bo, 2019; Feng et al., 2019; Gao & Yuan, 2022), this study included gross regional product and per capita gross regional product to measure economic development; the share of tertiary industry value added to capture industrial structure; per capita urban road area to reflect infrastructure; local general budget expenditure to measure government size; resident population to represent population scale; and urbanisation rate to indicate urbanisation, as shown in Table 1.

Data on demonstration bases were obtained from official lists published annually by the General Administration of Sport of China. City-level economic and social data were drawn from the 'China City Statistical Yearbook', the China Economic Information Network (www.cei.cn) and prefecture-level statistical yearbooks. After accounting for missing data and administrative adjustments, 208 prefecture-

level and above cities are retained. Missing values are addressed using interpolation and three-year average growth rates.

Table 1
Main Variables and Descriptions

Variable Type	Variable Definition	Symbol	Type
Dependent Variable	Residents'Sports Consumption Level	Y_{it}^1	Continuous Variable
Dependent Variable	Economic Value of the Sports Industry	Y_{it}^2	Continuous Variable
Dependent Variable	Employment Absorption Level of the Sports Industry	Y_{it}^3	Continuous Variable
Explanatory Variable	National Sports Industry Demonstration Bases	<i>Base</i>	Dummy Variable
Control Variable	Gross Regional Product	<i>GRP</i>	Continuous Variable
Control Variable	Share of Value Added of the Tertiary Industry in GDP	<i>TertiaryShare</i>	Continuous Variable
Control Variable	Gross Regional Product per capita	<i>PCGRP</i>	Continuous Variable
Control Variable	Urban Road Area per capita	<i>URAPC</i>	Continuous Variable
Control Variable	Local General Public Budget Expenditure	<i>LGPBE</i>	Continuous Variable
Control Variable	Permanent Resident Population	<i>PRP</i>	Continuous Variable
Control Variable	Urbanization rate	<i>UR</i>	Continuous Variable

4 Research Results

Table 2 reports the benchmark regression results for the effect of National Sports Industry demonstration base establishment on resident sports consumption. Without controlling for city fixed effects, the coefficient for the core explanatory variable, Base, is significantly positive (0.0495128), indicating higher sports consumption in demonstration base cities than in non-base cities. However, after introducing city fixed effects, the coefficient declines substantially and becomes insignificant in Models (1) and (3). This suggests that the initial significance reflects pre-existing differences between

cities rather than the net policy effect of base establishment. After further controlling for city and year fixed effects, city-level covariates and clustering standard errors at the city level, the coefficient remains insignificant, indicating no statistically significant relationship between demonstration base establishment and resident sports consumption.

Table 2
DID Regression Results: Benchmark Regression Results for Residents' Sports Consumption Level

Variable	model(1)	model(2)	model(3)
Base	-0.0018155	0.0495128***	0.0067378
SE	0.0157879	0.017292	0.0254962
Gross Regional Product		0.1048287	-0.1135092
Share of Value Added of the Tertiary Industry in GDP		0.0007956***	0.0077842***
Gross Regional Product per capita		0.1019718***	0.2460731**
Urban Road Area per capita		0.0154046	-0.0194773
Local General Public Budget Expenditure		0.0226298	0.1029155*
Permanent Resident Population		0.1031244	0.0528707
Urbanization rate		0.0007333***	0.0035411
Control Variables	NO	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
City Fixed Effects	Yes	NO	Yes
Clustered Standard Errors at the City Level	Yes	NO	Yes
Observations	1,827	1816	1,816
Number of Cities	204	204	204
R ²	0.7302	0.7133	0.7502
Note: The dependent variable is residents' sports consumption level. The standard errors in columns (1) and (3) are clustered at the city level; unless otherwise noted, the same applies below. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.			

4.1 Parallel Trend Test

Considering that DID regression results can only reflect the average effect of policy implementation on the outcome variables of Demonstration Bases in the treatment and control groups, and cannot

accurately capture the effects of the pilot policy in different years, this study follows the approach of Callaway and Sant'Anna (2021). An event-study test is conducted using event time to estimate the dynamic effects of the pilot policy across different years, and annual policy intervention effect plots are drawn accordingly. As shown in Fig. 1, the average pre-treatment effect is not statistically significant ($p > 0.05$), indicating that, overall, there is no significant systematic difference in trends between the treatment and control groups before policy implementation. A further examination of the dynamic coefficients in each pre-treatment period shows that most lead coefficients do not reach statistical significance; taken together, these findings indicate that the treatment and control groups constructed in this study satisfy the basic requirements of the difference-in-differences model.

4.2 Placebo Test

To rule out the possibility that the estimation results are affected by unobservable factors, this study conducts a spatial placebo test. Specifically, from the untreated cities, this study randomly selects the same number of cities as in the actual treatment group to form a fictitious treatment group, assuming that these cities were subject to the policy intervention of "Demonstration Bases," while the remaining cities serve as the control group. This random sampling procedure ensures that the intervention variable constructed in this study has no effect on the outcome variables. Figure 2 reports the results of the placebo test based on 500 random samples; as shown in the figure, the mean of the estimated coefficient β of the intervention variable across all random samples is close to zero and follows a normal distribution, and the p-values of the vast majority of the estimated coefficients are greater than 0.1, indicating that most regression coefficients are not statistically significant. The vertical dashed line (the true estimated value) is clearly shifted away from the distribution, which further verifies the robustness of the research findings.

Table 3 reports the benchmark regression results for the effect of the establishment of National Sports Industry Demonstration Bases on the economic value of the sports industry. Overall, the regression coefficients are positive in all models and significant at the 1% level. When city fixed effects are not included, the regression coefficient of the core explanatory variable is 0.45381; after further adding control variables and city fixed effects, the regression coefficient declines slightly but remains significantly positive. This indicates that, after controlling for unobservable city-specific heterogeneity and common time shocks, the establishment of Demonstration Bases still significantly enhances the economic value of the sports industry. With regard to the control variables, the Share of Value Added of the Tertiary Industry in GDP is significantly positive in both Model (2) and Model (3), indicating that cities with a higher share of the service sector tend to have a higher economic value of the sports industry, making it a key factor affecting the development of the sports economy.

Table 4 reports the benchmark regression results for the effect of the establishment of National Sports Industry Demonstration Bases on the employment absorption level of the sports industry. The results show that Base is significantly positive in Model (2), but after the introduction of city fixed effects, the coefficient declines and is no longer significant in Models (1) and (3), indicating that the earlier

significance mainly stems from pre-existing differences between Demonstration Base cities and non-base cities, rather than from the net employment effect generated by the establishment of the bases themselves. Finally, after controlling for city fixed effects, year fixed effects, and city-level control variables, and clustering standard errors at the city level, the regression coefficient of Demonstration Base establishment on the number of employees in culture, sports, and entertainment becomes negative and insignificant, indicating that the establishment of the bases has not yet generated an employment-promoting effect.

Table 3
Benchmark Regression Results for the Economic Value of the Sports Industry

Variable	model(1)	model(2)	model(3)
Base	0.217251***	0.45381***	0.2173781***
SE	0.0423658	0.052522	0.0811864
Gross Regional Product		1.159339***	0.6918886
Share of Value Added of the Tertiary Industry in GDP		0.027772***	0.0250708***
Gross Regional Product per capita		0.0349316	0.1057127
Urban Road Area per capita		-0.0523675	-0.0473606
Local General Public Budget Expenditure		-0.5102308***	0.1802011
Permanent Resident Population		0.1051047	-0.0621199
Urbanization rate		-0.0067534***	0.0042147
Control Variable	NO	YES	YES
Year Fixed Effect	YES	YES	YES
City Fixed Effects	YES	NO	YES
Clustered Standard Errors at the City Level	YES	NO	YES
Observations	1,197	1195	1,195
Number of Cities	149	149	149
R ²	0.5190	0.7370	0.5723

Table 4
Benchmark Regression Results for the Employment Absorption Level of the Sports Industry

Variable	model(1)	model(2)	model(3)
Base	0.0024944	0.0804317**	-0.0176998
SE	0.0337786	0.0377634	0.0437448
Gross Regional Product		0.2432635***	1.020645*
Share of Value Added of the Tertiary Industry in GDP		0.0019591***	-0.0044343
Gross Regional Product per capita		0.2379614*	-0.5739495
Urban Road Area per capita		0.0366957***	0.0412789
Local General Public Budget Expenditure		0.0569552***	-0.0516718
Permanent Resident Population		0.2397488	-0.2981585
Urbanization rate		0.0017457***	-0.0079721
Control Variable	NO	YES	YES
Year Fixed Effect	YES	YES	YES
City Fixed Effects	YES	NO	YES
Clustered Standard Errors at the City Level	YES	NO	YES
Observations	1,192	1,192	1,192
Number of Cities	149	149	149
R ²	0.0030	0.8002	0.0780

4.3 Parallel Trends Test

As shown in Fig. 3, the average pre-treatment effect fails the significance test ($p > 0.05$), indicating that, overall, there is no significant systematic difference in trends between the treatment group and the control group before policy implementation. A further examination of the dynamic coefficients in each pre-treatment period shows that most lead coefficients do not reach statistical significance; Fig. 4 yields the same conclusion and is therefore not discussed in further detail; taken together, these findings indicate that the treatment and control groups constructed in this study satisfy the parallel trends assumption.

4.4 Placebo Test

As shown in Fig. 5, in order to avoid the influence of unobservable omitted variables on the baseline regression results, this study randomly selects from the untreated cities the same number of cities as in the actual treatment group to serve as a fictitious treatment group, repeats the above estimation procedure 500 times, obtains 500 regression coefficients and p-values, and plots them. As shown in the figure, across all random samples, the mean of the estimated coefficient β of the intervention variable is close to zero and follows a normal distribution, and the p-values of the vast majority of the estimated coefficients are greater than 0.1, indicating that most regression coefficients are not statistically significant. Figure 6 yields the same conclusion and is therefore not discussed in further detail, which further verifies the robustness of the research findings.

5 Discussion and Conclusion

Against the backdrop of building China into a leading sporting nation and promoting high-quality sports industry development, the effects of demonstration base establishment have become an important research focus. This study contributes to the literature by examining policy impacts across multiple dimensions of the sports economy rather than relying on a single macro-level indicator, thereby enabling a more comprehensive evaluation of policy effects.

Using panel data for 208 cities from 2015 to 2023 and a multi-period DID framework, this study evaluated the effects of demonstration bases on resident sports consumption, the economic value of the sports industry and employment absorption. The results show that base establishment does not significantly increase resident sports consumption, but does promote the economic value of the sports industry, while having no significant effect on employment absorption. That is, policy effects are primarily reflected in economic gains within the sports industry rather than in employment expansion or increased household sports consumption and these findings are robust.

Place-based policies target specific geographic areas, provide preferential treatment and allocate resources to designated regions. They are a key instrument through which governments promote economic development in lagging areas via structured programmes (Kline, 2010). National Sports Industry demonstration bases are a form of place-based policy. As large-scale demand for sports consumption emerges in China and the sports industry evolves towards a pillar sector, demonstration bases are positioned to play a critical role. This study examined their effects on residents' sports consumption, the economic value of the sports industry and employment.

This study found that place-based policies concentrate dispersed factors such as capital, land and information, reduce transaction costs and promote factor mobility and agglomeration (Amiti, 2005), thereby creating local 'growth poles'. Second, they improve resource allocation efficiency: as sports enterprises, event resources and venue facilities cluster locally, information exchange, collaboration and resource sharing intensify, enhancing supply–demand matching and shortening value chains. This improves service responsiveness and project conversion efficiency. Consequently, demonstration bases directly promote the economic development of the sports industry, supporting Hypothesis 2.

However, employment effects are indirect. Employment demand arises from output expansion rather than the policy shock itself. Contrary to some prior findings, this study shows that demonstration bases do not necessarily increase employment (Lu & Wang, 2025). Labour demand depends on whether output growth is labour-intensive or driven by efficiency gains. In China, the sports industry is undergoing structural transformation towards service-oriented and high-value-added activities, which rely less on labour input. Regression results further support this: the share of value added of the tertiary industry in GDP has a significantly positive effect on sports industry economic value. In addition, digital technologies reduce labour dependence, weakening the link between industry growth and employment expansion. Accordingly, no robust employment-promoting effect is observed.

The sports industry is characterised by cross-sectoral integration and the coexistence of experiential and tangible consumption (Yoshida, 2017). While demonstration bases expand supply and output, translation into employment growth depends on production structures and translation into consumption depends on consumer preferences and willingness (Ludvigson, 2004). Two contextual factors further explain the insignificant consumption effect. First, pandemic-related restrictions constrained sports services and events, limiting supply and suppressing consumption. Second, a challenging international economic environment and weak domestic demand reduced household consumption willingness.

Finally, the effectiveness of place-based policies varies across contexts (Austin et al., 2018; Zheng, 2021). In some cases, such policies primarily transfer gains to local landowners rather than residents (Kline & Moretti, 2014), limiting broader welfare improvements. This helps explain the lack of a significant effect on residents' sports consumption (Hypothesis 1).

Based on the above analysis, several policy implications can be proposed. First, leveraging the growth poles formed by demonstration bases to accelerate sports industry development is a feasible strategy for regional innovation policy in China. Local governments should recognise the socioeconomic value of demonstration bases and integrate them into broader development planning. Policy optimisation should move beyond expanding the number of bases or investment scale and instead focus on whether bases generate stable and sustained economic effects. Future designation and evaluation should incorporate indicators such as employment absorption and consumption stimulation, while improving feedback mechanisms for designation, withdrawal and routine assessment. Demonstration bases should be treated as institutional platforms for promoting local sports industries and broader economic development.

Second, greater emphasis should be placed on employment conversion capacity. Policy design should extend beyond industrial expansion to improving employment quality and scale by increasing the share of business formats with strong labour absorption, such as sporting goods manufacturing, event operations and sports training. At the same time, stronger linkages among base development, vocational training, skill certification and higher education institutions are needed to form an integrated system involving industry, academia and government, thereby ensuring a stable supply of high-quality labour for sustained innovation.

Third, demonstration base policy should optimise product supply in a resident-centred manner. Sports products and services must align with residents' preferences, consumption capacity and habits to fit everyday consumption scenarios. Given the rapid development of digital technologies, data-driven approaches should be used to optimise resource allocation, innovate consumption scenarios and enhance user experience. Moreover, because the sports industry is inherently cross-sectoral, policy implementation should be coordinated with related sectors such as tourism, culture and commerce. It should also be aligned with local employment, consumption-promotion, cultural-tourism integration and public service policies to maximise overall effectiveness.

6 Limitations and Future Prospects

This study still has the following limitations: first, it mainly evaluates the policy effects of Demonstration Bases from three outcome dimensions, namely the economy, employment, and residents' consumption. However, it has not yet further identified through which specific variables this causal chain is realized, and future research may introduce mediating variables to explore this issue further on the basis of the present study. Second, the research sample of this study is drawn from China, and China's policy interventions have distinctly localized characteristics. Therefore, these conclusions may not be fully generalizable to other countries in the world. However, the issues revealed in this study are of general relevance and deserve attention, especially from countries or regions at similar stages of development. Future research may incorporate more samples or compare the policy effects across countries or regions with different institutional settings

Declarations

Ethical Approval

This article does not contain any studies with human participants performed by any of the authors.

Informed Consent

Not applicable.

References

1. **Amiti, M. (2005).** Location of vertically linked industries: Agglomeration versus comparative advantage. *European Economic Review*, 49(4), 809–832.
2. **Austin, B. A., Glaeser, E. L., & Summers, L. H. (2018).** *Jobs for the heartland: Place-based policies in 21st century America* (NBER Working Paper No. 24548). National Bureau of Economic Research.
3. **Callaway, B., & Sant'Anna, P. H. C. (2021).** Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2), 200–230.

4. **Caragliu, A., & Del Bo, C. F. (2019).** Smart innovative cities: The impact of smart city policies on urban innovation. *Technological Forecasting and Social Change*, 142, 373–383.
<https://doi.org/10.1016/j.techfore.2018.07.022>
5. **Department of Sports Economy. (2015, March 11).** Notice on issuing the measures for the administration of national sports industry bases (trial) [In Chinese].
<https://www.sport.gov.cn/gdnps/content.jsp?id=567384>
6. **Drucker, P. F. (1985).** *Innovation and entrepreneurship*. Harper & Row.
7. **Feng, Y. C., Wang, X. H., Du, W. C., Wu, H. Y., & Wang, J. T. (2019).** Effects of environmental regulation and FDI on urban innovation in China: A spatial Durbin econometric analysis. *Journal of Cleaner Production*, 235, 210–224. <https://doi.org/10.1016/j.jclepro.2019.06.184>
8. **Fu, Q. (2019).** Experience and inspiration from the construction of national sports industry demonstration base: Based on field trips of Zhangjiagang and Xujiahui. *Sports Culture Guide*, (3), 70–75.
9. **Gao, K., & Yuan, Y. (2022).** Government intervention, spillover effect and urban innovation performance: Empirical evidence from national innovative city pilot policy in China. *Technology in Society*, 70, 102035. <https://doi.org/10.1016/j.techsoc.2022.102035>
10. **General Administration of Sport of China. (2023a, July 17).** Guanyu yinfa "Guojia tiyu chanye jidi guanli banfa" de tongzhi [Notice on issuing the Measures for the administration of national sports industry bases]. <https://www.sport.gov.cn/jjs/n5039/c25805492/content.html>
11. **General Administration of Sport of China. (2023b, July 26).** Guojia Tiyu Zongju gonggao: Daoqi zidong chexiao zige de Guojia tiyu chanye jidi mingdan (2023) [Announcement of the General Administration of Sport of China: List of national sports industry bases whose qualifications were automatically revoked upon expiration (2023)]. <https://www.sport.gov.cn/gdnps/content.jsp?id=25829517>
12. **Guo, E. K., Wang, Z. H., Li, J., & Zhang, Z. Y. (2025).** Influences and mechanism of high-quality development of national sports industry demonstration bases on regional new quality productive forces. *Journal of Wuhan Sports University*, 59(5), 53–62.
<https://doi.org/10.15930/j.cnki.wtxb.2025.05.009>
13. **Kline, P. (2010).** Place-based policies, heterogeneity, and agglomeration. *American Economic Review*, 100(2), 383–387.
14. **Kline, P., & Moretti, E. (2014).** People, places, and public policy: Some simple welfare economics of local economic development programs. *Annual Review of Economics*, 6(1), 629–662.
15. **Li, G., & Sun, Q. (2021).** Study on the symbiosis between sporting goods manufacturing and sports services: Take the National Sports Industry Demonstration Base in Southern Jiangsu as an example. *Journal of Beijing Sport University*, 44(8), 42–53. <https://doi.org/10.19582/j.cnki.11-3785/g8.2021.08.005>
16. **Li, G. B., Zhou, D. P., & Xiao, N. L. (2024).** The coupling coordination between the agglomeration of provincial national sports industry bases and the development of sports industry. *Journal of*

- Shandong Sport University*, 40(3), 40–50. <https://doi.org/10.14104/j.cnki.1006-2076.2024.03.005>
17. **Li, H., Zhang, Y., & Wang, C. (2022).** Can the construction of national sports industry demonstration bases promote urban economic growth? Based on the perspective of policy effect evaluation. *Journal of Chengdu Sport University*, 48(3), 128–133. <https://doi.org/10.15942/j.jcsu.2022.03.020>
 18. **Li, Y. (Ed.). (2019).** *Development report of national pilot base of sport industry (2017–2018)* [in Chinese]. Social Sciences Academic Press.
 19. **Liu, S., Wu, Z., Wu, Y., & Wang, Y. (2025).** Research on entrepreneurial effect of national sports consumption pilot city policy: Empirical analysis based on DID method. *Sports & Science*, 46(3), 12–22.
 20. **Ludvigson, S. C. (2004).** Consumer confidence and consumer spending. *Journal of Economic Perspectives*, 18(2), 29–50. <https://doi.org/10.1257/0895330041371222>
 21. **Lu, X. R., & Wang, Z. H. (2025).** Employment effect of national sports industry demonstration base: Based on the dual test of industry spillover and spatial spillover. *Journal of Shandong Sport University*, 41(4), 104–115. <https://doi.org/10.14104/j.cnki.1006-2076.2025.04.011>
 22. **National Bureau of Statistics of China. (2025, December 31).** Announcement on the total scale and value added of the national sports industry in 2024. https://www.gov.cn/lianbo/202512/content_7053480.htm
 23. **National Bureau of Statistics of China. (2026, January 19).** Income and consumption expenditure of residents in 2025. https://www.gov.cn/lianbo/202601/content_7055181.htm
 24. **Policy and Regulation Department of the General Administration of Sport of China. (2016, May 5).** Tiyu fazhan "Shisanwu" guihua [Sports development 13th Five-Year Plan]. <https://www.sport.gov.cn/n315/n330/c723032/content.html>
 25. **Schumpeter, J. A. (1934).** *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (R. Opie, Trans.). Harvard University Press.
 26. **Shi, Y., Chen, Y., & Xu, J. (2024).** Action logic and key driving forces for improving sports consumption vitality: Based on the analysis of 40 sports consumption pilot cities. *China Sport Science*, 44(10), 3–12. <https://doi.org/10.16469/j.css.2024KX030>
 27. **State Council of the People's Republic of China. (2014, October 20).** Several opinions of the State Council on accelerating the development of the sports industry and promoting sports consumption. https://www.gov.cn/zhengce/content/2014-10/20/content_9152.htm
 28. **Tang, J. C., & Zhang, Y. H. (2023).** Space-time distribution characteristics and influencing factors of national sports industry base based on spatial analysis. *Journal of Shandong Sport University*, 39(5), 107–118. <https://doi.org/10.14104/j.cnki.1006-2076.2023.05.012>
 29. **Wang, H. (2024, June 18).** Guojia tiyu changye jidi youxu tuijin kuorong zengxiao [National sports industry bases are advancing orderly in scale expansion and quality improvement]. *China Sports Daily*. <https://www.sport.gov.cn/n20001280/n20745751/c27837546/content.html>
 30. **Wang, J. X., Mou, L. L., Zhao, X. W., & Xie, S. J. (2024).** A study on the impact of the establishment of national sports industry demonstration bases on the innovation of sports enterprises: An

- empirical analysis based on multi-period DID. *China Sport Science and Technology*, 60(8), 76–87.
<https://doi.org/10.16470/j.csst.2024082>
31. **Xiao, N. L., Zhou, D. P., & Zhao, B. B. (2023).** Spatial pattern evolution and its influencing factors of national sports industry base in China. *Journal of Shandong Sport University*, 39(2), 12–21.
<https://doi.org/10.14104/j.cnki.1006-2076.2023.02.002>
 32. **Xu, H. Y., Zhong, M. B., Zhong, N., Ren, J. B., & Gao, G. X. (2025).** The innovation-driven mechanism of digital economy empowering the improvement of sports industry resilience: An empirical study based on provincial panel data in China. *China Sport Science and Technology*, 61(9), 73–83.
<https://doi.org/10.16470/j.csst.2025070>
 33. **Xu, K., & Huang, H. (2019).** The development trend, experience and development proposals of the sports industry in the Yangtze River Delta. *China Sport Science and Technology*, 55(7), 45–55.
<https://doi.org/10.16470/j.csst.2019043>
 34. **Xu, M., & Lin, X. (2023).** The impact of national sports industry demonstration base establishment on labor force employment in territorial cities: An empirical analysis based on multi-period DID. *Journal of Fujian Normal University (Natural Science Edition)*, 39(4), 127–138.
<https://doi.org/10.12046/j.issn.1000-5277.2023.04.014>
 35. **Yao, S., & Liu, B. (2021).** Relationship between sports industry agglomeration and regional economic growth: Theoretical logic, hot issues and trend review. *Journal of Guangzhou Sport University*, 41(5), 1–6. <https://doi.org/10.13830/j.cnki.cn44-1129/g8.2021.05.001>
 36. **Yao, S. B., & Liu, Y. (2017).** An empirical analysis of the impact of sports industry agglomeration on regional economic growth: Based on static and dynamic panel data model. *China Sport Science*, 37(11), 21–29. <https://doi.org/10.16469/j.css.201711003>
 37. **Yi, J. (2025).** The exploration process and refinement path of sport studies. *Journal of Physical Education*, 32(5), 1–15. <https://doi.org/10.16237/j.cnki.cn44-1404/g8.2025.05.019>
 38. **Yoshida, M. (2017).** Consumer experience quality: A review and extension of the sport management literature. *Sport Management Review*, 20(5), 427–442.
 39. **Zeng, X., & Huang, H. (2022).** Sports industry agglomeration and total factor productivity: Based on the perspective of sports industry in Yangtze River Delta [In Chinese]. *China Sport Science and Technology*, 58(7), 83–91.
 40. **Zhang, J., & Wang, J. (2012).** On convergence development of sport industry and culture industry. *Journal of Shanghai University of Sport*, 36(5), 41–44, 76.
<https://doi.org/10.16099/j.cnki.jsus.2012.05.011>
 41. **Zhao, B., Song, Y., Shi, L., & Qi, Z. (2019).** Promotion strategy of core competitiveness of sports industry base in China: Taking Liaoning sports industry base as an example. *Journal of Shenyang Sport University*, 38(4), 70–77.
 42. **Zheng, L. (2021).** Job creation or job relocation? Identifying the impact of China's special economic zones on local employment and industrial agglomeration. *China Economic Review*, 69, 101651.

Figures

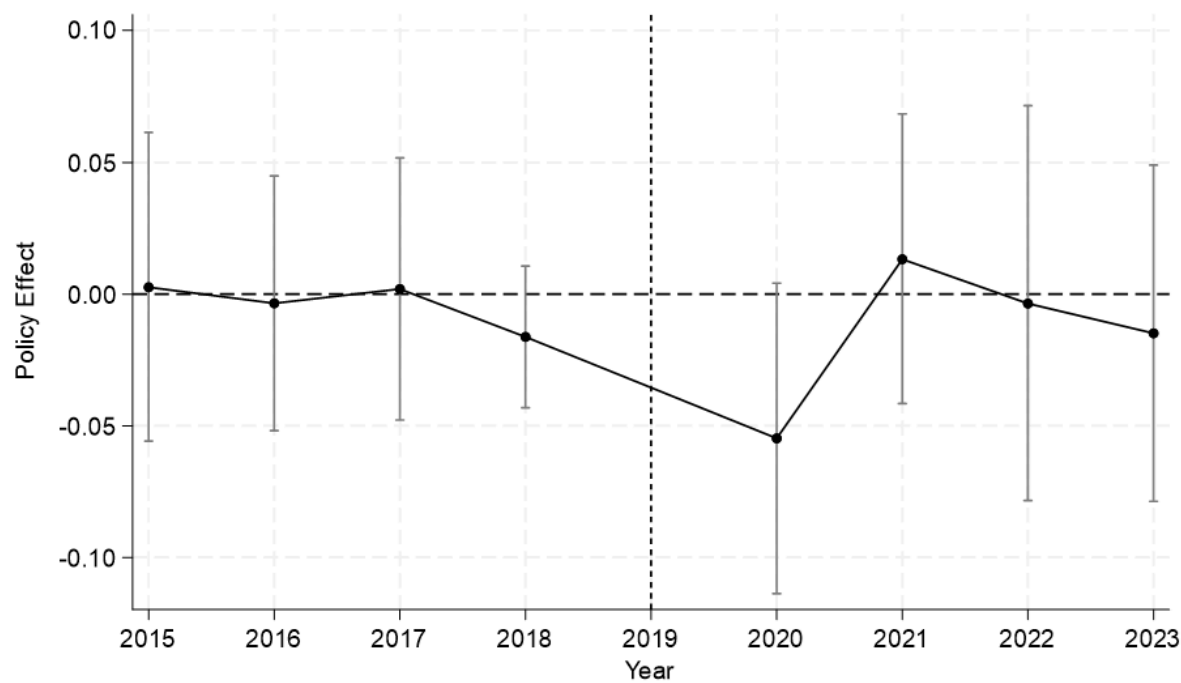


Figure 1

Parallel Trends Test (Residents' Sports Consumption Level)

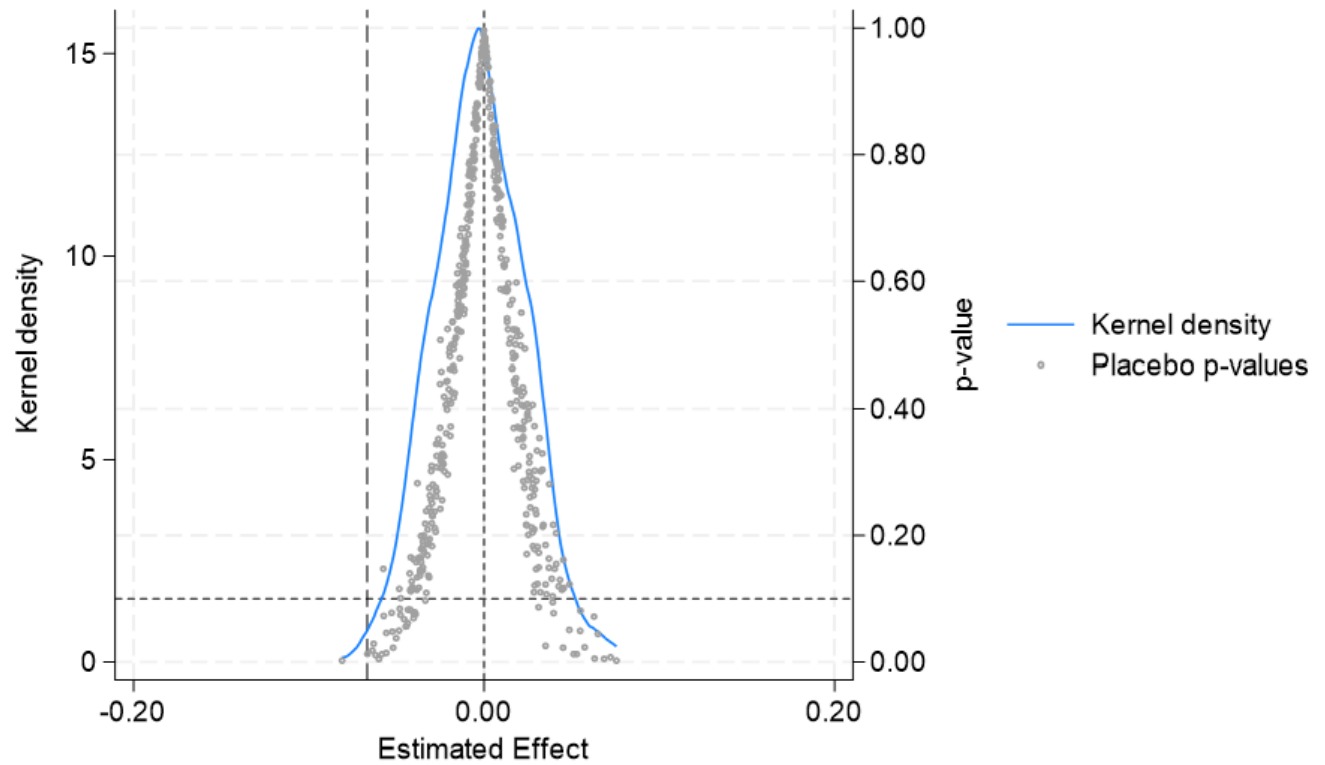


Figure 2

Placebo Test—Residents' Sports Consumption Level

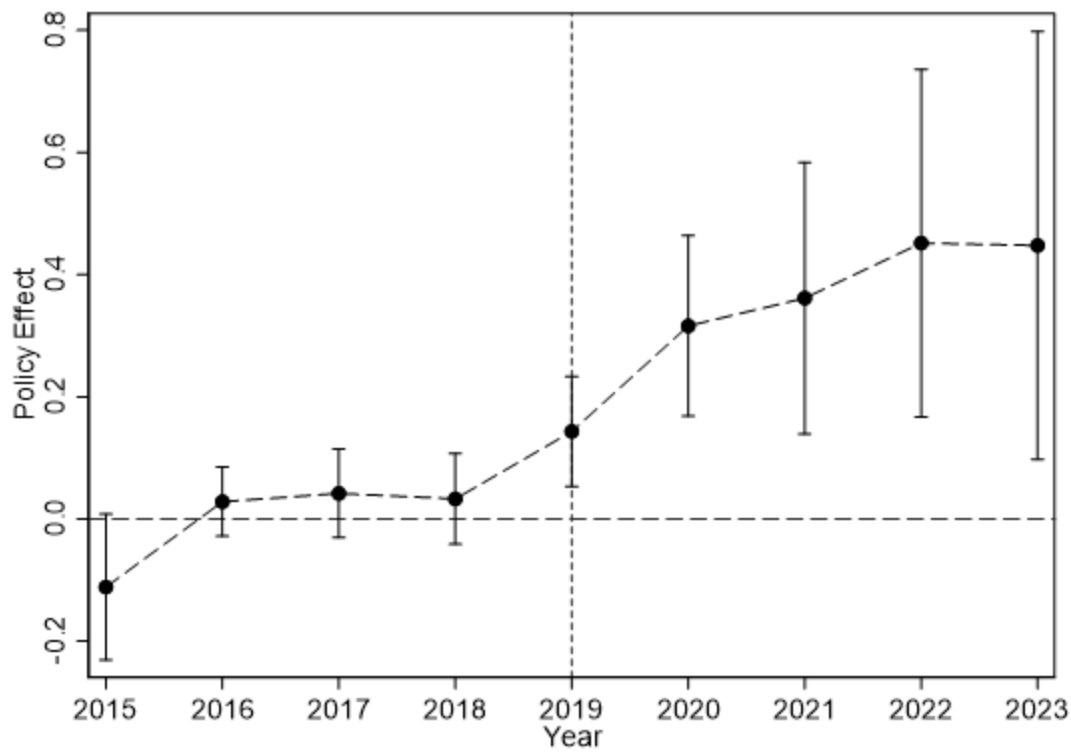


Figure 3

Parallel Trends Test (Economic Value of the Sports Industry)

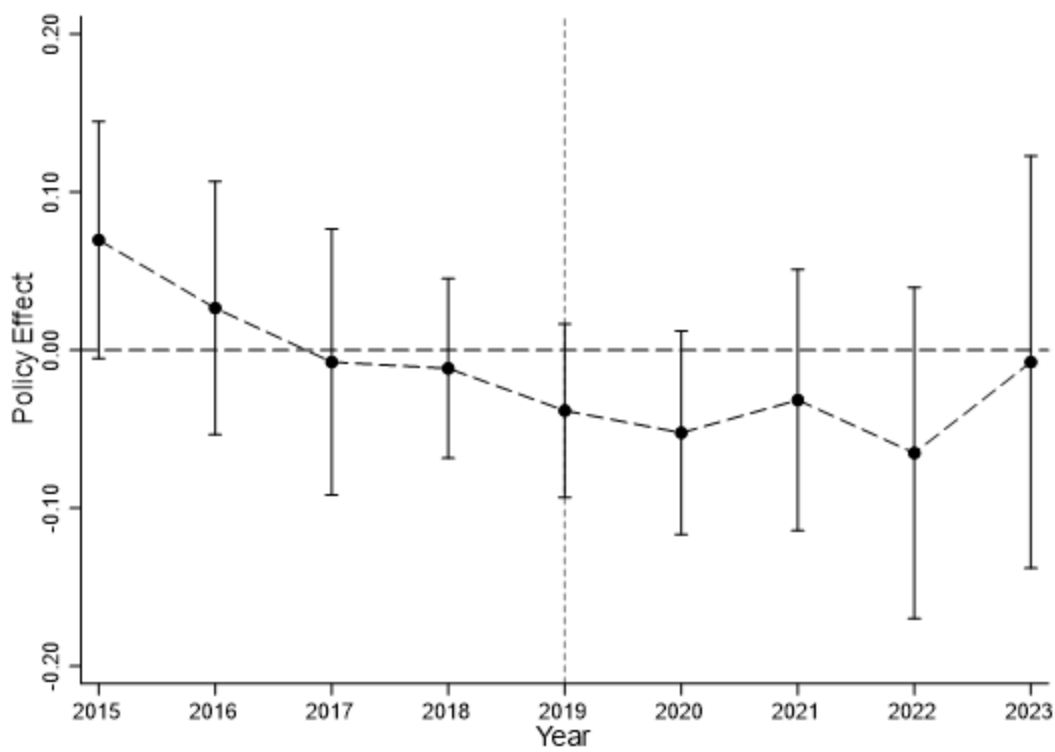


Figure 4

Parallel Trends Test (Employment Absorption Level of the Sports Industry)

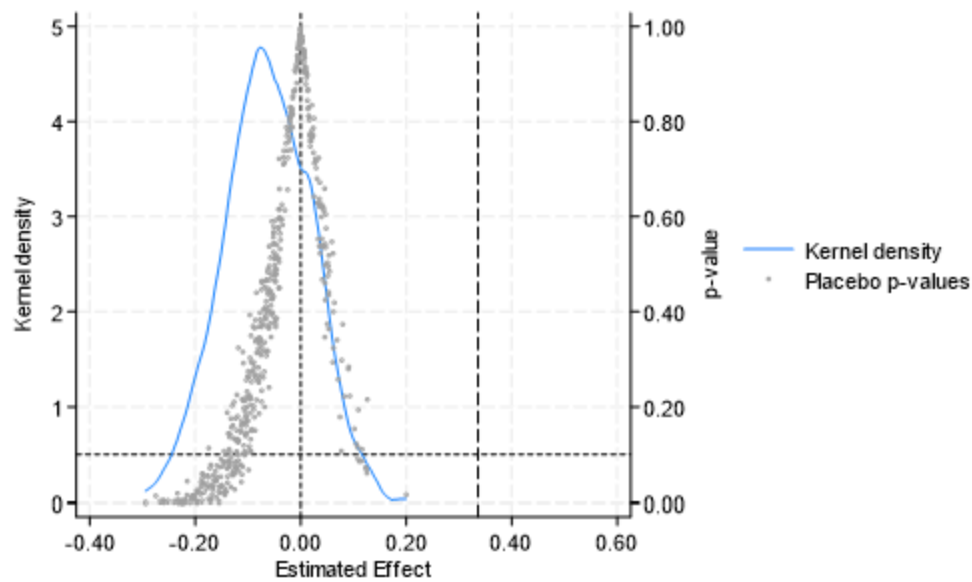


Figure 5

Placebo Test (Economic Value of the Sports Industry)

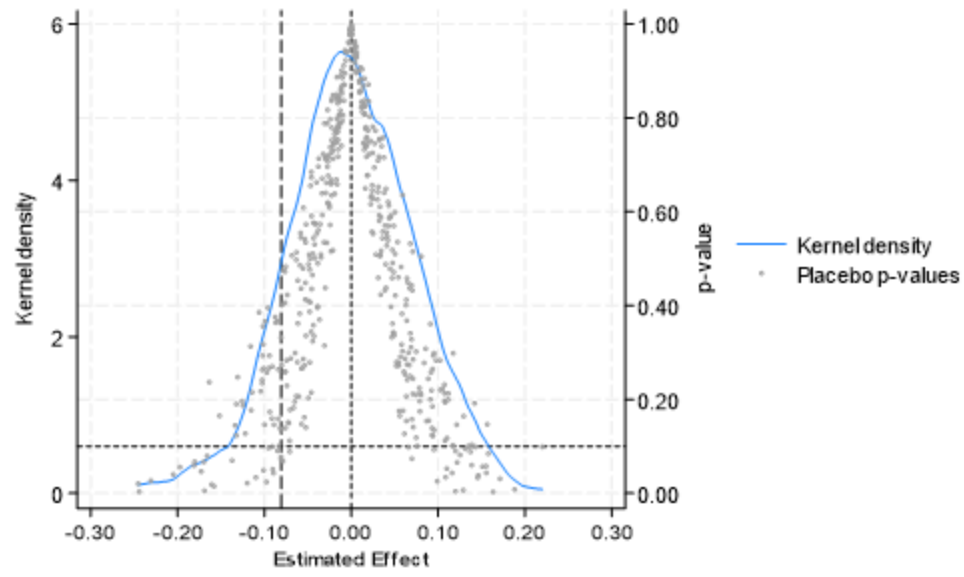


Figure 6

Placebo Test (Employment Absorption Level of the Sports Industry)