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Do China's National Agricultural Science and Technology Parks Promote County Economic Development? An Empirical Examination Based on Multi-Period DID Methods

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Abstract: China's National Agricultural Science and Technology Parks (NASTPs) play a key role in improving the nation's agro-industrial structure and regional economic development; notably, NASTPs can demonstrate innovations in modern agricultural science and technology and, relatedly, incubate emerging modern agri-industries. However, after more than 20 years of development, scholars have not yet to confirm whether NASTPs contribute to local economies. This study sought to explore the impact of NASTPs on county economic development, to identify the mechanisms behind this impact, and to verify these effects using a multi-period double difference method based on panel data from 1743 counties in China collected between 2000 and 2019. The study found that the NASTPs significantly improved county economic development. The policy effects were mainly evident in western regions and counties with higher levels of financial resources. No spatial spillover effects were observed. The NASTPs drove county economic growth through three main channels: agglomeration, institutional environment, and innovation effects. These findings provide insights useful for designing policies related to the high-quality construction of agricultural sci-tech parks, the high-quality growth of county economies, and a reduction in regional economic development gaps.

Keywords: National Agricultural Science and Technology Parks; county economic development; multi-period DID

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1. Introduction

Agricultural science and technology parks are the products of the organic combination of agricultural parks and sci-tech parks, which originated in agricultural parks in developed countries (e.g., parks related to urban agriculture, demonstration agriculture, and holiday farms). Agricultural parks primarily provide agricultural products, leisure, and entertainment services for the public and technical training for farmers [1]. Meanwhile, sci-tech parks were first introduced in the 1950s. The growth of sci-tech parks significantly contributed to transformations in agricultural parks. Eventually, the two kinds of parks fused, resulting in three notable types of agricultural sci-tech parks: first, agricultural sci-tech parks with functions such as research and development (R&D), production, and demonstrations related to agricultural science and technology, which were introduced in developed countries, such as the United States and the Netherlands; second, agricultural sci-tech parks established to ensure food security, which were established in developed countries with scarce resources, such as Singapore and Israel; and third, agricultural sci-tech parks established to promote agricultural and rural development, which were established in developing countries, such as India, South Africa, and China [2,3].

Since the founding of the People's Republic of China, the focus of the nation's agricultural policy has shifted from 'industry-demanding agriculture' to 'industry-feeding agriculture'. China's reform and opening up in the late 1970s played an essential role in this transformation. Specifically, after 1978, science and technology were increasingly used to promote products. In this context, the entire country began actively exploring new agricultural, rural, and regional economic development models. To accelerate the process of agricultural modernisation and to promote regional economic development, the central government constructed National Agricultural Science and Technology Parks (NASTPs) [1]. The first batch of NASTPs was established in September 2001; since then, China has approved nine more batches of NASTPs (304 in total). After more than 20 years of development, the NASTPs have gradually become essential bases for regional agricultural science and technology innovation and growth poles for county economic development [4,5], while some problems inevitably exist. For example, the process by which NASTPs are developed often lacks scientific and technological talent, core technologies, clear leading industries, and cohesive product goals [6,7]. Given the problems and possibilities of NASTPs in China, it is important to determine the degree to which they actually facilitate growth and the mechanisms by which they achieve this. This study sought to offer some insights into this site of inquiry by considering the degree to which NASTPs contribute to the development of county economies, how they do so, and whether the economic impacts of NASTPs differ across regions in China. An accurate evaluation of the role of NASTPs in developing county economies is essential to determine best practices for the future high-quality development of national county economies and high-quality construction of agricultural sci-tech parks.

As the basic unit of national governance in China, counties play an essential role in macro- and microeconomic development. Notably, they are natural carriers of agricultural and rural modernisation and revitalisation strategies [8]. Of late, academic researchers have been increasingly interested in factors influencing county-level economic growth. Scholars generally believe that human capital, financial capital, technology, and institutional innovation play significant roles in the growth of county economies; this has led to the formation of theories such as 'official role theory', 'institutional role theory', and 'market role theory' [9–12]. As the core areas of NASTPs are mainly located in counties, scholars have been interested in how the development of NASTPs promotes upgrades in counties' agro-industrial structures and economies. Most studies have evaluated park performance in terms of industry-driven, economic contribution, and employment-driven development by establishing a development evaluation index system [5]. Some studies used empirical methods to confirm the association between agricultural sci-tech parks and regional economic development. For example, Zhu and Zhang [4] studied three agricultural sci-tech parks in Jiangsu Province using the objective assignment method; notably, they found that the parks positively influenced regional economic development in terms of labour force utilisation, infrastructure development, and income improvement. Overall, there has been less analysis of the regional economic benefits of agricultural sci-tech parks. There are two possible reasons for the lack of scholarship on this topic. First, the distribution of the core areas of the NASTPs is complex, which leads to more significant difficulties in sample selection: the core areas of parks are located within municipal districts, county-level cities, counties, autonomous counties, etc., and some parks have core areas located in multiple counties and districts. Second, as the primary function of the NASTPs is agricultural science and technology innovation, scholars have primarily focused on how parks influence the growth of primary industries [13], ignoring their role in the development of secondary and tertiary industries and regional economies.

Based on current studies on the regional economic effects of the development of agricultural sci-tech parks, there are still several areas that deserve in-depth exploration. First, existing literature primarily assesses the development of a typical park in a specific year by establishing an indicator system and does not analyse the net effect of NASTPs on regional economic growth; this makes the credibility of these results controversial. Second, due to limitations related to county data and research methods, few previous studies have empirically analysed agricultural sci-tech parks on a national scale, especially in terms of the economic effects and impact mechanisms of park development. Third, the economic effects of the development of NASTPs vary across regions based on their resources, but the available literature does not analyse regional differences. Regardless of whether NASTPs have promoted county economic growth, their mechanisms of action and regional heterogeneity must be tested further. Therefore, this study used Chinese county panel data and the multi-period double-difference method to investigate the county economic effects of the development of China's NASTPs. This study explored the impact mechanisms of park development in terms of the agglomeration effect, institutional environment effect, and innovation effect and analysed the policy effects in terms of regional and financial level heterogeneity and spillover effects. The findings of this study provide policy references for future high-quality development of agricultural sci-tech parks and county economies.

2. Policy Background and Theoretical Hypotheses

2.1. Policy Background

Stanford Science Park was the world's first sci-tech park, and its successful development has made sci-tech parks a critical way to promote the industrialisation of high technology in countries around the world [14]. Many countries have also experimented with using agricultural sci-tech parks to promote the modernisation of agriculture and rural development. In 1988, the Institute of Geography of the Chinese Academy of Sciences and the Nanjing Institute of Soil Research proposed building the Shandong Yucheng Science and Technology Agricultural Park and Henan Fengqiu Science and Technology Agricultural Park [15]. In the early 1990s, during the national 'development zone fever' and 'investment fever', agricultural sci-tech parks entered a stage of rapid development [1].

In 1994, Beijing established China's first modern agricultural sci-tech park, the China–Israel Demonstration Farm. In the same year, Shanghai established the Sunqiao Modern Agricultural Demonstration Park, which kicked off a nationwide boom in agricultural sci-tech parks [1]. Concurrently, the former State Science and Technology Commission, Development and Reform Commission, Ministry of Agriculture, and other central departments carried out a series of projects to support the construction of agricultural sci-tech parks in step with the trend of developing agriculture and rural areas. These support policies played a demonstrative and guiding role in the development of agricultural sci-tech parks [16].

In 2001, the State Council issued the Outline for the Development of Agricultural Science and Technology (2001–2010), making the construction of NASTPs an important initiative in the broader project of developing agricultural science and technology. Following central government arrangements, the Ministry of Science and Technology, in conjunction with the former Ministry of Agriculture, the Ministry of Water Resources, the State Forestry Administration, the Chinese Academy of Sciences, and the Agricultural Bank of China, formed the NASTP Management Office; formulated and released the Guidelines for Agricultural Sci-Tech Parks and the Management Measures for Agricultural Sci-Tech Parks (for trial implementation); and approved the first and second batches of NASTPs in 2001 and 2002, respectively. At the same time, several provinces started to construct pilot provincial agricultural sci-tech parks. In October 2001, the Ministry of Science and Technology issued the Supplementary Circular on Strengthening the Work of NASTPs, which further established construction guidelines, construction priorities, and management mechanisms for NASTPs [1]. Between the approval of the second batch of NASTPs in May 2002 and the third batch in December 2010, the central government stopped approving the construction of NASTPs. Instead, the government focused on improving the construction quality of existing parks, formulating evaluation standards, and accepting the park as the focus of park construction; this shift laid the foundation for the large-scale, multi-batch high-quality construction and development of NASTPs in the future.

Moreover, the central government also relaunched the application process for the third batch of NASTPs in December 2010. Central and local governments increasingly emphasised the construction of NASTPs to promote agricultural science and technology innovation. The Ministry of Science and Technology established a system for monitoring and comprehensively evaluating the parks. The first NASTP Innovation Capacity Evaluation Report was released in 2014 [1]. On 22 January 2018, the Ministry of Science and Technology issued the NASTP Development Plan (2018–2025), which proposed new requirements for the development of NASTPs. These included exploring mechanism innovation; enhancing innovation service capacity; developing high-tech industries; and promoting the integrated development of parks, towns, and villages. On 29 January 2018, the General Office of the State Council issued the Guiding Opinions on Enhancing the Implementation and Growth of Agricultural High-Tech Industrial Demonstration Zones, proposing that China will build several National Agricultural High-Tech Industrial Demonstration Zones with international influence by 2025, which points to future high-quality development of NASTPs. As of December 2021, nine batches of NASTPs have been approved for construction across the country—a total of 304 parks. The first eight batches have been accepted. The construction status of each batch is listed in Table 1.

Table 1. Construction and acceptance of NASTPs.

Batch	Number	Approval Time	Acceptance Number	Acceptance Time	Remarks
The first batch	21	Sep-01	38	Mar-10	Huishan Park and Jinggangshan Park were added in 2003.
The second batch	15	May-02		Mar-10	
The third batch	27	Dec-10	27	Oct-16	
The fourth batch	8	Apr-12	7	Oct-16	
The fifth batch	46	Oct-13	45	Nov-17	
The sixth batch	46	Mar-15	48	Nov-18	Increased acceptance of the former batches of two parks in Songyuan, Jilin and Shangrao, Jiangxi, China;
The seventh batch	82	Dec-15	77	Nov-19	five parks were not compliant; and three parks exited the management sequence.
The eighth batch	32	Dec-18	32	Dec-21	Ningxia Yinchuan was not up to standard, and Guangxi Guilin applied to exit the management sequence.
The ninth batch	25	Dec-20		Pending acceptance	
Total	294		269		

Note: The first total, 304, in Table 1 was derived from the number of parks approved up until December 2021, plus Hui Shan Park and Jinggang Mountain Park, which were added in 2003. The second total, 269, was derived from the 304 approved parks minus the 6 parks that did not meet the standards, the 4 parks that applied for withdrawal, and the 25 ninth-batch parks that were not accepted. These statistics are based on official data from the Ministry of Science and Technology of the People's Republic of China and referenced from Wu Sheng's Study on Government Collaboration Mechanisms in the Construction of NASTPs.

The construction of NASTPs is a major strategic decision made by the state. If an application is successful, the government may support the construction of NASTPs through initiatives such as policies, projects, and management training; notably, these benefits incentivise local governments to apply for NASTP status. In addition, the central government guides and encourages provincial governments to provide financial and policy support to parks.

In principle, the declaration of NASTP status should be dominated by the people's government at the prefectural and municipal levels and above. This study selected the county as its research object for two main reasons. First, NASTPs are primarily focused on agricultural science and technology innovation; accordingly, they are typically constructed in counties with relatively robust agricultural activities. Analyses conducted at the county level may best reflect the effect of the park on regional agricultural science and technology innovation and agro-industry structure upgrades. Second, due to the weak quality and instability of agriculture, most NASTPs are not very profitable, require government support, and may only minimally influence the city's economic development.

2.2. Theoretical Analysis

A review of the past 20 years of NASTP development reveals that they have mainly driven the county's economic development through the agglomeration effect, institutional environment effect, and innovation effect.

2.2.1. Agglomeration Effect

As noted above, when a local government successfully declares an NASTP, it can receive support from the central government for innovation platform creation, R&D, management training, and information services [1]. Provincial-, municipal-, and county-level governments jointly create a growth pole for regional economic development through preferential policies that support taxation, finance, land, and talent. Meanwhile, parks gather production factors, such as capital, talent, and technology for the region's development, mainly thanks to the government's preferential policies and the cultivation of high-tech agricultural science and technology industries. The concentration of production factors allows a park's core area to gradually grow into a regional economic growth pole. The diffusion effect radiates to surrounding rural areas, promoting the development of the entire regional economy [4]. The agglomeration effect of NASTPs mainly manifests in three aspects: first, the agglomeration of enterprises forms industrial clusters, which strengthen the division of labour and cooperation among enterprises, reduce their production and transaction costs, and promote the development of internal economies of scale; second, the geographical concentration of enterprises located in related industrial chains enhances the efficiency of public services and the utilisation rate of public facilities, forming external economies of scale in the region; and, third, the knowledge spillover effect, catch-up effect, and availability of innovation resources brought about by the concentration of related enterprises can enhance the competitiveness of agriculture and its related industries, create regional brands of products, and create better value for the development of the county economy [14].

2.2.2. Institutional Environmental Effect

Effective management models [17], market-oriented reforms [18], and improvements in the business environment [19] can effectively promote sustainable economic growth in China and enhance the market-oriented allocation of resources while promoting the agglomeration and innovation effects of parks. NASTPs have led to a more efficient regional management model, mainly in the following two aspects. First, NASTPs have management committees, which are generally attached to local science and technology administrative agencies. These committees possess organisational, coordination, and management capabilities; notably, they can promote the agglomeration and integration of resources and enhance their allocation efficiency [20]. Second, by introducing and nurturing new agricultural business subjects, such as leading agricultural enterprises, family farms, and agricultural cooperatives [21], NASTPs have improved the degree of social organisation and management in rural areas. The concentration of elements, enterprises, and industries in the parks has enhanced competition among enterprises, further stimulated their innovation and derivation, and enhanced the vitality of the market [14,22]. At the same time, the parks' development has created a suitable environment for innovation and entrepreneurship—which can support regional economic development—and extensively promoted regional market-oriented reforms. In addition, the development of NASTPs is supported by governments at all levels; to a certain extent, this has improved the business environment (e.g., local infrastructures, markets, and policies) [4].

2.2.3. Innovation Effect

Governments have supported the construction of NASTPs at all levels. For example, preferential policies have enabled the creation of new research institutes, enterprises, and subjects of innovation. Additionally, government support can help NASTPs gather innovative resources, such as land, talent, and technology; create a good innovation environment to stimulate regional economic development [16]; and improve labour productivity in the county. It is important to note that NASTPs' innovation activities are not limited to only traditional realms, such as scientific and technological innovation, but also cover areas such as institutional mechanism reform, modern industry cultivation, and business incubation [5]. More specifically, in terms of institutional mechanism reform, NASTPs have actively promoted reforms to the institutional mechanisms for science and technology innovation and collective property rights, land, and finance in the rural areas of different regions, which stimulates the development of various resources in the countryside. Meanwhile, NASTPs cultivate modern industry by focusing on dominant contemporary industries, continuously fostering and strengthening diverse business entities, and promoting the extension of agriculture to secondary and tertiary industries. Regarding business incubation, NASTPs often offer sound education and training systems for farmers, serve as incubators for innovation and entrepreneurship, and encourage enthusiasm for innovation and entrepreneurship [23,24].

Based on the above analysis, this study constructed a theoretical framework for the impact of the construction of NASTPs on counties' economic development, as shown in Figure 1.

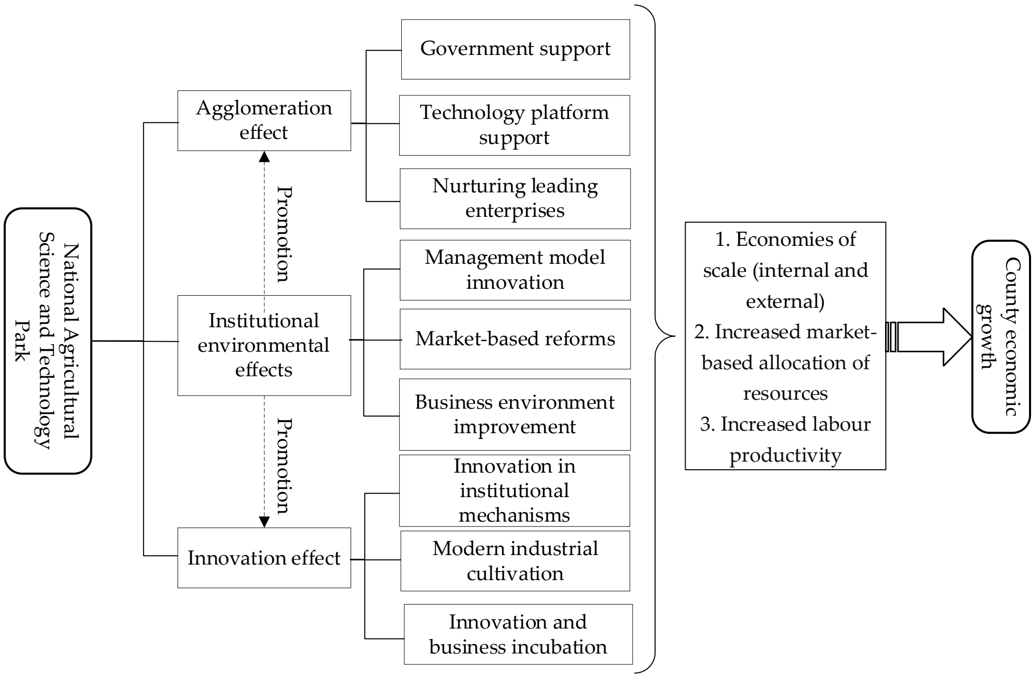

Figure 1. Theoretical analysis framework.

Based on the above analysis, this study proposed the following two hypotheses:

Hypothesis 1 (H1). *The construction of NASTPs can boost the growth of county economies.*

Hypothesis 2 (H2). *The construction of NASTPs can promote the development of county economies through three channels: the agglomeration effect, the institutional environment effect, and the innovation effect.*

3. Materials and Methods

3.1. Sample Selection and Data Source

3.1.1. Sample Selection

To examine the impact of the construction of the NASTPs on the economic growth of counties, this study collated panel data from 2000 to 2019 for 1743 counties in 26 provinces in China. The core areas of the NASTPs were located in 123 of these counties, which made up the experimental group. The remaining 1620 counties made up the control group.

In terms of sample selection for the experimental group, the principle of one park per county was followed, and samples from counties under the jurisdiction of municipalities with a relatively small share of agriculture and a more developed economy were excluded. As established in the Introduction, NASTPs have been under construction since September 2001, and the construction and acceptance of the first seven batches were completed in December 2019. A total of 247 NASTPs were built in the first seven batches, among which five parks—Xinjiang Agricultural Reclamation Science Academy Park, Hebei Baiyangdian Park, Yunnan Yimen Park, Yunnan Qujing Park, and Guangxi Qinzhou Park—failed the acceptance test. Three parks—Shanxi Taiyuan Park, Heilongjiang Harbin Park, and Shandong Dongying Park—were withdrawn from the management sequence of the NASTPs; the core areas of the former two are located in Xiaodian District and Nangang District, respectively, which were not within the scope of this study. The core area of Shandong Dongying Park is located in Guangrao County, which was established in April 2012. This park's withdrawal date was 30 October 2019; its establishment and development time were basically included in the study period. Based on this fact and the park's successful transformation into a National Agricultural High-Tech Industry Demonstration Zone in October 2015, which has vital development reference significance, the park was retained in the experimental group. Seven parks that failed the above acceptance and withdrew from the management sequence were excluded from the experimental group. Meanwhile, 22 parks had core areas located in four municipalities directly under the Central Government or the Tibet Autonomous Region, 75 parks had core areas located in only one municipal district, and 17 parks had core areas located in multiple counties and districts; these parks were excluded from the study. Additionally, three other parks were removed; namely, the Danzhou NASTP in Hainan, which is located in Danzhou City (a prefecture-level city) and is not part of the county-level administrative division study; the Xinjiang Corps Hu Yanghe NASTP, which is located in Hu Yanghe City, was established on 6 November 2019, and lacks statistical data; and Xinjiang Production and Construction Corps Wujiaqu NASTP, which is located in Wujiaqu City, was established on 19 January 2004, and also lacks some statistical data. Ultimately, the 123 counties in which the core areas of the remaining NASTPs were located formed the experimental group.

In selecting the overall sample, the study took into consideration the unique characteristics of municipalities directly under the central government in terms of the administrative system and internal management, and the severe lack of data in the Tibet Autonomous Region. Accordingly, county-level administrative districts in Beijing, Tianjin, Shanghai, Chongqing, and the Tibet Autonomous Region were eliminated. The study also drew on the common practice of using existing literature to eliminate municipal districts. Finally, county-level samples were selected based on the construction of NASTPs: first, the county-level samples of the five parks that did not pass the acceptance process were excluded; second, the county-level samples of the counties where the core areas of the parks were distributed across multiple counties and Danzhou, Hu Yanghe, and Wujiaqu were excluded; third, as the eighth batch of parks was constructed in December 2018 and the acceptance results were publicly announced on 17 December 2021, after the study period ended, these parks were excluded. Therefore, data were ultimately collected for 1743 counties.

3.1.2. Data Sources

This study used county-level economic and social data and data related to the construction of the NASTPs. Among these datasets, county-level economic and social data were mainly collected from China County Statistical Yearbooks for 2001 to 2020 and the China Regional Economic Statistical Yearbooks for 2001 to 2014, supplemented by data from the China Urban Statistical Yearbook, the China Ethnic Statistical Yearbook, and provincial and municipal statistical yearbooks. The 2000–2019 provincial consumer price indices and fixed asset investment price indices were obtained from the China Price Statistical Yearbook for

2020. Data related to the construction of NASTPs were obtained from the website of the Ministry of Science and Technology. This study supplemented some of the missing data using the interpolation method. To enhance the robustness of the study and avoid the influence of outliers, all variables were subjected to a 1% upper and lower tail reduction.

3.2. Research Methods

The construction of the NASTPs can be viewed as a quasi-natural experiment. Because different counties have different construction times, this study used the multi-period double-difference method to test whether the NASTPs promoted the development of county economies. The specific settings of the model were as follows.

$$Y_{it} = \beta_0 + \beta_1 did_{it} + \alpha X_{it} + \gamma_t + \mu_i + \varepsilon_{it} \tag{1}$$

where Y_{it} is the explained variable. This study selected the real GDP logarithm and per capita real GDP logarithm to measure the growth of the county economy. The subscripts i and t represent the ith county and the tth year, respectively. did_{it} is a dummy variable for the establishment of NASTPs, and its expression is $did_{it} = treat_i * post_t$. Within this formula, $treat_i$ is a dummy variable for the experimental group; if county i is affected by the policy, then $treat_i = 1$, otherwise $treat_i = 0$. $post_t$ is a dummy variable for the experimental stages; $post_t = 0$ before the implementation of the policy, and $post_t = 1$ in the year the policy was implemented and in the years following the policy's implementation. Overall, did_{it} is equal to 1 in the year in which County i establishes a NASTP and after and 0 otherwise. X_{it} represents the set of control variables that affect the development of the county economy. γ_t represents the time fixed effect, μ_i represents the individual fixed effect of each county, and ε_{it} represents the random interference term. The estimated value of coefficient β_1 of did_{it} reflects the net impact of NASTPs on county economic growth, which was the focus of this study.

To further explore the mechanism by which the construction of NASTPs affects the development of the county economy, this study used Baron and Kenny's intermediary effect for testing [25]. The specific model was set as follows:

$$M_{it} = \varphi_0 + \varphi_1 did_{it} + \alpha X_{it} + \gamma_t + \mu_i + \sigma_{it} \tag{2}$$

$$Y_{it} = \theta_0 + \theta_1 did_{it} + \theta_2 M_{it} + \alpha X_{it} + \gamma_t + \mu_i + \xi_{it} \tag{3}$$

In Models (2) and (3), M_{it} is the intermediary variable, β_1 is the total effect of the construction of NASTPs on the development of the county economy, θ_1 is the direct effect, and the calculation method of the intermediary effect is $\varphi_1\theta_2 = \beta_1 - \theta_1$. The meanings of the other variables are consistent with those in Model (1) and are thus not repeated here. To distinguish the residual terms of Models (2) and (3), they are denoted by σ_{it} and ξ_{it}, respectively.

In recent years, Baron and Kenny's stepwise approach to the intermediary effect has been constantly criticised and questioned. Therefore, this study drew on a new method for the intermediary effect test proposed by Wen and Ye [26]. The specific steps are as follows. First, test β_1 in Model (1)—if it is significant, make an argument according to the intermediary effect; if it is not significant, make an argument according to the masking effect theory. A follow-up inspection should be conducted to determine whether it is significant. Second, test φ_1 and θ_2 in Model (2)—if both are significant, the indirect effect is significant and the test should proceed to the fourth step (described below); if at least one is not significant, then the test should proceed to the third step (described below). Specifically, the third step involves using the bootstrap method to test hypothesis H_0:$\varphi_1\theta_2 = 0$—if it is significant, the indirect effect is significant, and the test should proceed to the fourth step; otherwise, the indirect effect is not significant, and the test should end. The fourth step involves testing θ_1 in Model (3)—if it is not significant, there is a direct benefit and only an intermediary effect; if it is significant, the direct effect is significant, and the test should proceed to the fifth step. The fifth step involves comparing the symbols of $\varphi_1\theta_2$ and θ_1—if the symbols are the same, there is a partial mediation effect; if they are different, there is a masking effect.

To further study whether the construction of the NASTP has spillover effects on the neighbouring counties (control counties that share a common border with the experimental counties) around the experimental group, this study set the dummy variable, $near_i$, to 1 if i county neighboured the county in which the core area of the NASTP was constructed and 0 otherwise. $didn_{it}$ is the interaction term of the spillover effect, which was set as $didn_{it} = near_i * post_t$. The other variables are consistent with the meaning in Model (1). The specific model is as follows.

$$Y_{it} = \omega_0 + \omega_1 didn_{it} + \alpha X_{it} + \gamma_t + \mu_i + \varepsilon_{it} \tag{4}$$

The experimental group comprises the counties neighbouring the county in which the core area of the NASTP is located, and the control group comprises the counties remaining after removing the neighbouring counties in the original experimental group. In Model (4), if ω_1 is significantly positive, it indicates that the effect of the policy has a positive spillover effect on neighbouring counties.

3.3. Variable Selection

3.3.1. Explained Variables

To measure the growth level of county economies, the logarithm of real GDP and the logarithm of real GDP per capita of each county were used as explanatory variables in this study, in line with standard practice in the existing literature. The real GDP of each county was obtained by dividing the nominal GDP of each county by the consumer price index of the province to which it belonged in the base year of 2000. The real GDP per capita of each county was obtained by dividing the real GDP of each county by the entire household registration population at the end of the year.

3.3.2. Core Explanatory Variables

The core explanatory variable of this study was the dummy variable, $did_{it}(did_{it} = treat_i * post_t)$, for the establishment of the NASTPs.

3.3.3. Control Variables

This study selected a series of control variables to control for the impact of other factors on county economic growth. Capital is the most important factor affecting China's economic growth [27]. This study drew on the practice of Zhou et al. [28] and selected the ratio of fixed asset investment to the registered household population to measure the impact of county capital on economic growth, where fixed asset investment is deflated using the fixed asset investment index of each province and converted into comparable prices using 2000 as the base period. It is also notable that the quantity and quality of the labour force considerably affect economic growth [29]. This study drew on Fan et al. [30] to measure the impact of county labour resources on economic growth by using the logarithm of the size of the household registration population. Because of the lack of statistics on the average years of schooling of the county labour force, this study drew on Huang et al. and Zhou et al. and used the ratio of the number of students enrolled in public secondary schools to the registered household population to reflect the quality of the labour force [28,31]. As differences in industrial structure fundamentally affect differences in economic development, this study used the ratio of the output value of the secondary industry to GDP to reflect the change in industrial structure [31–33]; a good financial situation can ensure that the county government provides public goods and social services in a timely and effective manner and creates a good external environment for the development of the county economy [12]. Therefore, this study used the ratio of local general budget revenue and general budget expenditure to calculate financial freedom, which measures the role of financial conditions on economic development. Meanwhile, the construction of public infrastructure also has a solid driving effect on China's economic growth [34]. Thus, this study drew on Huang et al. [31] and used the ratio of the number of fixed telephone subscribers to the number of household members as an indicator of the level of development of communication infrastructure. Additionally, agriculture is the foundation of the county economy [35], and the level of agricultural modernisation is an essential reflection of the development of agricultural and rural economies [36]. Therefore, this study also drew on Bao's approach [37] and used the total power of agricultural machinery to measure the degree of development of agricultural modernisation. Differences in the size of a county's administrative area have a more significant impact on its factor endowment structure, which conversely affects the level of development of the county's economy [38]. Therefore, this study used the administrative area as a control variable to portray differences in the factor endowment structure of counties.

3.3.4. Intermediate Variable

The previous theoretical analysis suggests that there are three possible transmission mechanisms for the impact of NASTPs on county economic development: the agglomeration effect, the institutional environment effect, and the innovation effect. Based on this and combined with the analysis of existing literature, this study introduced three mediating variables: the level of economic agglomeration, institutional environment development, and labour productivity in the secondary industry. The agglomeration effect brought about by constructing the NASTP was chosen to express the level of economic agglomeration. Its indicator value is measured by the ratio of the sum of the value added by the secondary and tertiary industries to the area of the administrative region, following Huang et al. [31]. The intermediary variable of the level of institutional environment development draws on Bao's approach [37]. Specifically, it calculates the indicator value by subtracting the ratio of the local fiscal general budget revenue to the regional GDP from 1. The higher the score, the higher the degree of market-oriented regional resource allocation. In terms of long-term economic trends, technological progress always increases labour productivity [39,40]; accordingly, this study selected the labour productivity of the secondary industry to reflect the innovation effect of the NASTPs. Table 2 presents the descriptive statistics for the main variables.

Table 2. Calculation methods and descriptive statistics of main variables.

Variable Meaning	Computing Method	Mean	Standard Deviation	Min	Max
Real GDP	Countywide actual GDP logarithm (original unit: CNY 10,000)	12.865	1.209	9.723	15.540
Real GDP per capita	The logarithm of the per capita real GDP of the county (original unit: CNY 10,000)	9.509	0.987	7.371	11.860
NASTP	Virtual variable (0, 1)	0.023	0.149	0.000	1.000
Investment level of fixed assets	Fixed assets investment/registered population, logarithm (original unit: CNY/person)	8.522	1.489	4.557	11.290
Number of labourers	Number of registered individuals (original unit: person)	3.574	0.830	1.109	5.072
Labour quality	Number of students in ordinary middle schools/registered population	0.054	0.017	0.016	0.099
Industrial structure	Added value of secondary industry/nominal GDP	0.399	0.157	0.086	0.781
Financial freedom	Local general budget revenue/general budget expenditure	0.332	0.222	0.028	1.013
Infrastructure communication level	Number of fixed telephone users/registered population	0.126	0.091	0.013	0.496
Agricultural mechanisation level	Total power of agricultural machinery at county level, logarithmic (original unit: 10,000 kilowatts)	3.076	1.071	0.000	5.204
Administrative area	Administrative area, logarithm (original unit: km^2)	7.729	0.888	5.768	10.560
Economic agglomeration level	Sum of added value of the secondary and tertiary industries/administrative area (unit: CNY 100 million/km^2)	0.058	0.107	0.000	0.684
Development level of institutional environment	1—General budgetary expenditure/nominal GDP	0.764	0.217	−0.311	0.962
Labour productivity of the secondary industry	Output value of the secondary industry/number of employees in the secondary industry, add 1 to take the logarithm (original unit: CNY 10,000/person)	2.223	0.919	0.368	4.743

4. Results

4.1. Benchmark Regression Results

According to Model (1), this study evaluated the impact of NASTPs on county economic development. The regression results are shown in Table 3.

Table 3. Benchmark regression results.

	Real GDP		Real GDP per Capita	
	(1)	(2)	(3)	(4)
Construction of NASTP		0.038 *		0.045 **
		(0.020)		(0.020)
Investment level of fixed assets	0.051 ***	0.051 ***	0.051 ***	0.051 ***
	(0.004)	(0.004)	(0.004)	(0.004)
Number of labourers	0.594 ***	0.593 ***	−0.371 ***	−0.371 ***
	(0.091)	(0.091)	(0.083)	(0.083)
Labour quality	−0.038	−0.037	0.329	0.330
	(0.287)	(0.287)	(0.257)	(0.256)
Industrial structure	1.370 ***	1.372 ***	1.371 ***	1.373 ***
	(0.052)	(0.052)	(0.047)	(0.047)
Financial freedom	0.447 ***	0.446 ***	0.432 ***	0.432 ***
	(0.028)	(0.028)	(0.026)	(0.026)
Communication infrastructure level	0.207 ***	0.208 ***	0.269 ***	0.271 ***
	(0.054)	(0.054)	(0.052)	(0.052)
Agricultural mechanisation level	0.081 ***	0.082 ***	0.080 ***	0.080 ***
	(0.014)	(0.014)	(0.013)	(0.013)
Administrative area	−0.075	−0.075	−0.074 *	−0.073 *
	(0.048)	(0.048)	(0.041)	(0.041)
Constant term	9.091 ***	9.088 ***	8.935 ***	8.932 ***
	(0.528)	(0.528)	(0.470)	(0.470)
County fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Number of samples	34,860	34,860	34,860	34,860
R^2	0.8550	0.8554	0.7698	0.7706

Note: ***, **, and * show significance levels of 1%, 5%, and 10%, respectively; the brackets are robust standard errors.

In Table 3, columns 1 and 3 report the results of the regression between the control variables, such as the fixed asset investment level, labour force quantity, labour force quality, industrial structure, financial freedom, communication infrastructure level, agricultural mechanisation level, administrative area, and the explained variables of real GDP and per capita real GDP under the control of time fixed effects and individual fixed effects. Columns 2 and 4 present the results of the regression based on columns 1 and 3 by adding the interaction term of the NASTPs as explanatory variables. From the regression analysis, the overall goodness of fit of columns 2 and 4 is significantly improved compared with that of columns 1 and 3 when the NASTP construction variables are added, indicating that the NASTP is a more important variable affecting county economic growth. Notably, the goodness of fit of the regression results was higher and the model interpretation effect was better. Meanwhile, the regression analysis results also reveal that the construction of the NASTPs plays a significant role in promoting the development of county economies; specifically, compared with non-pilot areas, the construction of the NASTPs significantly promoted the growth of real GDP and real GDP per capita in pilot areas—in county areas, it improved real GDP and real GDP per capita by 3.8% and 4.5%, respectively. From 2000 to 2019, the average actual GDP of all sample counties was CNY 7.705 billion, and the average per capita actual GDP was CNY 22,326.74. Therefore, the construction of NASTPs can contribute CNY 293 million and CNY 1004.70 to the actual GDP and per capita actual GDP of counties in which the core areas are located, respectively.

4.2. Robustness Check

4.2.1. Parallel Trend Test

The first premise of using the multi-period double-difference method is that the experimental and control groups must have a parallel trend before the policy occurs. This study used existing research methods [41,42] to study the dynamic economic effects of policy implementation through an event analysis method. The model settings were as follows:

$$Y_{it} = \eta_0 + \sum_{s=-8}^{0} \eta_s DID_s + \alpha X_{it} + \gamma_t + \mu_i + \varepsilon_{it} \tag{5}$$

In Model (5), η_S is the estimation coefficient, which measures the difference in policy effects between the experimental group and the treatment group on the time trend. $s = 0$ indicates the year the NASTP was built; when $s > 0$, the date is s years since the park was constructed, and when $s < 0$, the date is s years before the park was constructed. η_0 is a constant term, and the other variables are consistent with those in Model (1). Figures 2 and 3 show the estimation results for Model (5); notably, the regression coefficients of the two to eight years before the construction of the NASTP are not significant, suggesting that there is no significant difference in the development trend of the real GDP and the real GDP per capita of the experimental and control groups before NASTP construction. The assumption of parallel trends was satisfied.

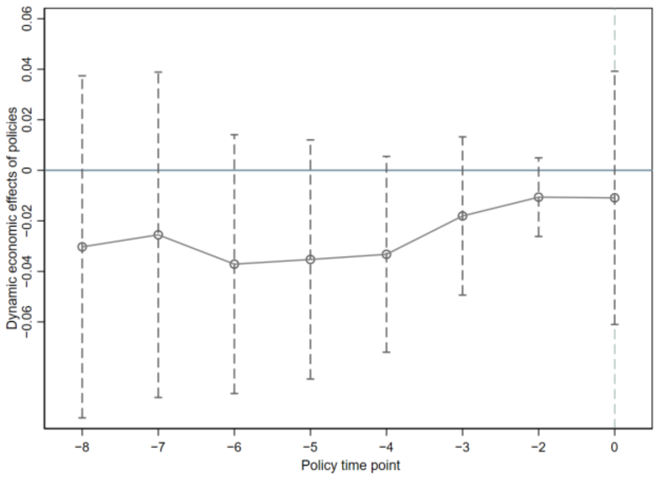

Figure 2. Parallel trend test for real GDP.

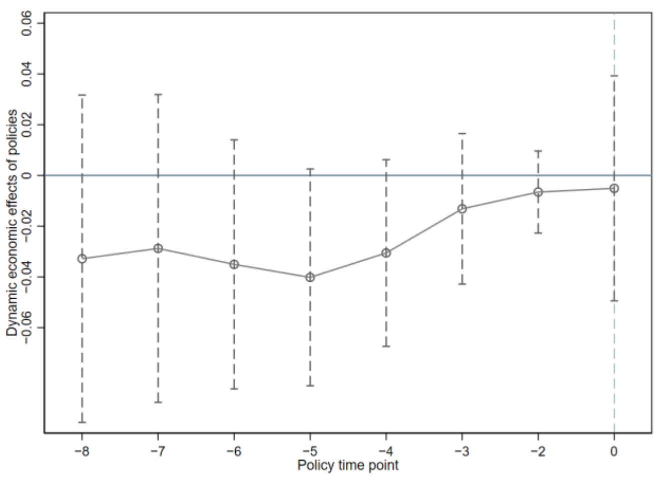

Figure 3. Parallel trend test for per capita real GDP.

4.2.2. Placebo Test

To further verify that omitted variables do not interfere with the growth effect of the construction of NASTPs on the county-level economy, the practice of La Ferrara et al. [43] was used as a reference. The placebo test was conducted by randomly setting construction counties in the core area of the NASTPs. In this study, 123 counties were randomly selected from the 1743 county samples each time as the 'pseudo treatment group'; the remaining samples were the control group. This study repeated 500 random samplings and 500 regressions. The probability density distribution of the estimated coefficient of the NASTPs on county economic growth effect is shown in Figure 4. Specifically, the estimated coefficients based on random sample regression are distributed around 0, completely independent of the benchmark regression coefficient (0.038); 48 random experiments have p-values less than 0.1, accounting for 9.6% of all experiments; 26 experiments have p-values less than 0.058 (the actual experimental p-value), accounting for 5.2% of all experiments; and most experiments have p-values more significant than 0.1, indicating that NASTP promotion of county economic growth is not a random event. In summary, the role of NASTPs in developing county economies is relatively stable and is unlikely to be affected by missing variables.

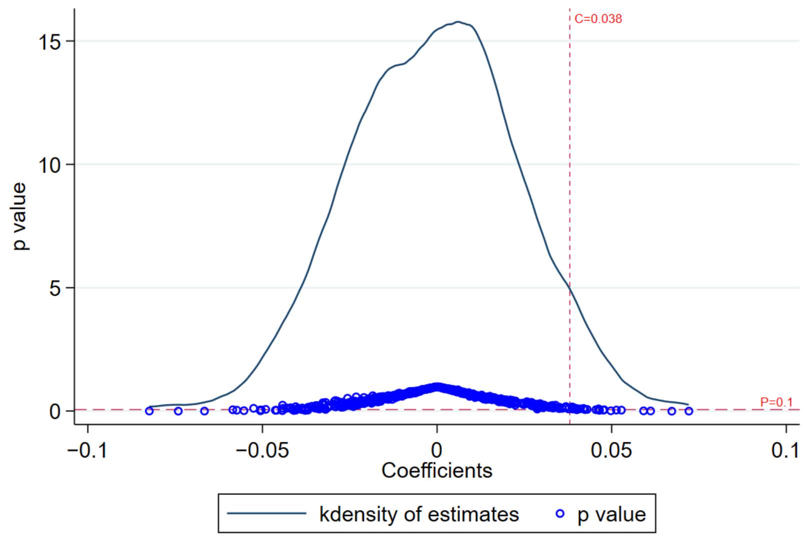

Figure 4. Placebo test results.

4.2.3. Sample Selection

To reduce the error of regression results caused by the problem of sample self-selection, this study used the research method of Huang et al. [44] to further test the impact of the construction of the NASTPs on county economic development through the propensity score matching multiple difference method (PSM-DID). The specific process is as follows. First, all control variables, such as fixed asset investment level, labour quantity, labour quality, and industrial structure, are selected as covariates. Second, the logit model is used to calculate the tendency score of each county to build a NASTP. Third, the nearest neighbour matching method is used to select one-to-one matching samples from the counties of the control group as the counties of the experimental group. Fourth, balance and standard support tests are carried out for the matching results, and the observations not in the standard support domain are deleted. Finally, the matched samples are regressed again. The results of the balance and standard support domain tests for propensity score matching are shown in Figures 5 and 6. As Figure 5 shows, the standardisation deviation of most variables before matching is relatively large; meanwhile, the standardisation deviation of all variables significantly decreases after sample matching, indicating that there is no systematic difference between the experimental group and the control group, meeting the requirements of the random experiment. In Figure 6, the graph of the kernel density function before and after the propensity score matching shows that the kurtosis and skewness of the control group and the experimental group before matching deviate considerably. The kernel density functions of the control group and the experimental group after matching almost overlap, showing a very high matching degree, and the samples met the common support hypothesis.

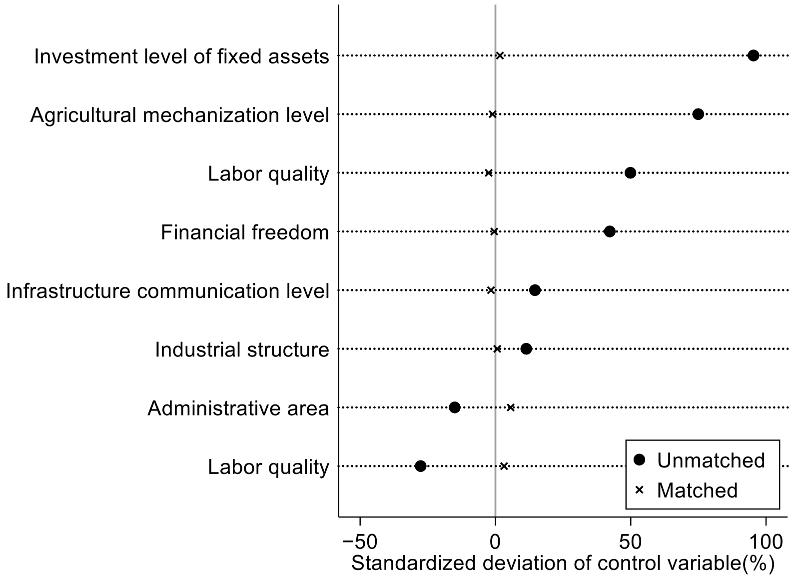

Figure 5. Balance inspection chart.

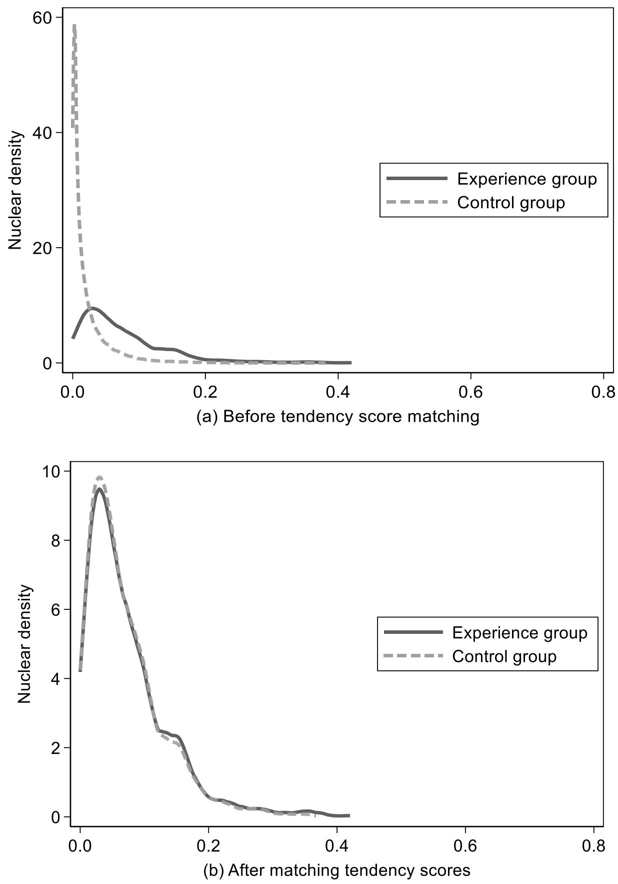

Figure 6. Kernel density function before and after propensity score matching.

The matched sample data were regressed using the DID method. The results are presented in Table 4. The core explanatory variables are significant at the 10% and 5% levels, and the estimation coefficient is positive, indicating that the construction of NASTPs plays a positive role in promoting the development of county economies. This also proves that the results of the previous estimation are robust.

Table 4. PSM-DID stability test results.

	Real GDP	GDP per Capita
Interactive items of pilot policies	0.039 * (0.020)	0.046 ** (0.020)
Control variable	Yes	Yes
County fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
R^2	0.8554	0.7711
Sample size	34,819	34,819

Note: ** and * show significance levels of 5% and 10%, respectively; the brackets are robust standard errors.

4.2.4. Impact Mechanism Test

The above analysis verifies that the construction of NASTPs can significantly promote the development of the county economy. However, what mechanism does park construction use to promote the growth of the county economy? To answer this question, this study constructed an intermediary effect model by introducing three intermediary variables; namely the level of economic agglomeration, the level of institutional environment development, and the labour productivity of secondary industry. On this basis, the study explored the mechanism of the impact of NASTPs on the development of the county-level economy in light of the above theoretical analysis.

This study drew on the new test method of the intermediary effect proposed by Wen and Ye [26]. The regression test of Model (1) was performed in the previous article, and the results showed that the contribution of the NASTPs to county level economic growth is significantly positive at the 5% level. Next, we tested Model (2); the test results are listed in Table 5, column 3. It can be seen that the construction of NASTPs has significantly improved the agglomerated county economy and that this impact is positive and significant at the 1% statistical level, with an effect of 2.6%. In addition, the impact of park construction on the county institutional environment is positive and significant at the 1% level, with an effect of 3.2%. Park construction has no significant impact on the labour productivity of secondary industry.

Table 5. Test results for the intermediary effect based on the agglomeration effect, institutional environment, and innovation effect.

	β_1	θ_1	φ_1	θ_2	$\varphi_1\theta_2$	Bootstrap: 95% Confidence Interval	Conclusion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Economic agglomeration level	0.038 * (0.020)	0.025 (0.020)	0.026 *** (0.008)	0.524 *** (0.063)	0.013624	(0.070, 0.138)	Complete mediation effect
Development level of institutional environment	0.038 * (0.020)	0.012 (0.019)	0.032 *** (0.008)	0.811 *** (0.042)	0.025952	(0.134, 0.199)	Complete mediation effect
Labour productivity of the secondary industry	0.038 * (0.020)	0.034 * (0.018)	0.032 (0.065)	0.114 *** (0.007)	0.003648	(0.108, 0.168)	Partial mediation effect

Note: *** and * show significance levels of 1% and 10%, respectively; the brackets are robust standard errors.

To further test the influence of the intermediary variables on county economic growth, the estimated results of Model (3) are shown in columns 2 and 4 of Table 5. The results show that, in the intermediary effect test of county economic growth, the coefficient θ_2 for the economic agglomeration level and the institutional environment development level was significantly positive, while the coefficient θ_1 of the pilot policy interaction item was not significant, indicating that the construction of NASTPs mainly affects county economic growth through these two variables. Regarding the variable labour productivity of secondary industry, the coefficient φ_1 of the policy interaction term was not significant in Model (2). In the regression test of Model (3), the coefficient θ_2 of the intermediate variable was significantly positive, the bootstrap test was significant, the coefficient θ_1 of the policy interaction term was positive at 0.034, and $\varphi_1\theta_2$ was the same as θ_1, indicating that the variable labour productivity of secondary industry has some intermediary effects in the process by which NASTPs promote county economic growth—the economic growth effect of the park is 9.6%. In summary, the construction of the NASTP has promoted county economic agglomeration, improved the institutional environment, and promoted innovation, thus stimulating the development of county economies. Hypothesis 2 was verified.

4.2.5. Heterogeneity Test

Regional Heterogeneity

China is a vast territory. There are significant differences in resource endowments, location conditions, and economic and social development levels among the eastern, middle, and western regions; correspondingly, the development models and levels of NASTPs in different regions are also very different. To further analyse the regional heterogeneity of the impact of the construction of the NASTPs on the development of the county economy, this study divides all samples into the east, middle, and west for regression tests according to the classification criteria of the National Bureau of Statistics. The regression results are presented in Table 6, columns 1, 2, and 3. It can be seen that the construction of NASTPs has a positive effect on county-level economic growth in the western region but not in the eastern and central regions. This shows that NASTP construction plays a positive role in boosting county economic growth across the country, especially in the western region, which has scarce resources and a low level of economic and social development.

Table 6. Heterogeneity test.

Variable	Eastern Region	Central Region	Western Region	High Financial Region	Low Financial Region
	(1)	(2)	(3)	(4)	(5)
Interactive items of pilot policies	0.017	−0.002	0.106 ***	0.061 **	0.02
	(0.032)	(0.031)	(0.036)	(0.027)	(0.029)
Control variable	Yes	Yes	Yes	Yes	Yes
County fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
R^2	0.8463	0.8099	0.8325	0.8548	0.8534
Number of counties in the experimental group	42	35	46	62	61
Sample size	9080	11,320	14,460	33,640	33,660

Note: *** and ** show significance levels of 1% and 5%, respectively; the brackets are robust standard errors.

Factor endowment and location characteristics play essential roles in the development of high-tech industries [45]. The same economic policy will have different effects under different initial factor endowments [46]. As high-tech agricultural industry carriers, NASTPs are no exception. According to the law of diminishing marginal effect in economics, NASTPs located in the eastern and middle regions are more effective than those in western regions in terms of resource elements, policy preferences, infrastructure support, etc. Therefore, the policy preferences and financial support provided for park construction can produce a more significant marginal effect in the relatively underdeveloped western regions and play a vital driving role in local economies. Therefore, the construction of an NASTP can promote the economic growth of the county in which it is located and, if it is reasonably located, reduce differences in economic development across regions.

Heterogeneity of Government Financial Resources

The government tends to lead NASTP construction in China. Specifically, the central, provincial, and local governments have historically cooperated to promote the prosperity and development of the parks. In particular, the local government has played a significant role as an initiator and leader in park construction [1]. In locations with weak and unstable agricultural systems, NASTPs strongly depend on local financial support to promote agricultural science and technology innovation, and agricultural industry transformation and upgrades. Accordingly, this study divided 123 county samples into high and low financial levels based on the median per capita financial income of the sample counties in the experimental group. In Table 6, columns 4 and 5 present the regression results. These results show that NASTP construction significantly impacts the economic development of counties with higher government financial resources. In comparison, it does not significantly impact counties with lower financial resources. This may be because, at the beginning of the construction of an NASTP, the local government issues a series of preferential policies, including policies related to tax, land, and talent introduction, most of which initiate special park projects to provide sufficient financial support for the development of the park. Therefore, counties with high financial resources can provide sufficient financial support to develop NASTPs. Heavily funded NASTPs can more significantly drive county economies.

4.2.6. Spillover Effect Test

The regression results of the policy spillover effects of the construction of NASTPs are shown in Table 7. It can be seen that the spillover effects of park construction across the whole country and the eastern and central regions are not significant. By contrast, the spillover effect interaction term in the western region is significantly positive at the 5% level. This shows that, overall, the spatial spillover effect of the construction of NASTPs is not apparent. However, parks in the western region produced a more obvious positive spatial spillover effect, promoting the economic development of neighbouring counties. The main reasons may be that, at present, most NASTPs are dominated by unclear leading industries and lack scientific and technological innovation capacity, leading to the development of similar products with low added value. This can stimulate local industries and farmer employment but not enough to positively impact economic development in surrounding counties.

Table 7. Spillover effect test.

	Whole Country	Eastern Region	Central Region	Western Region
	(1)	(2)	(3)	(4)
Spill effect interaction term	0.009 (0.012)	−0.002 (0.019)	−0.018 (0.019)	0.053 ** (0.021)
Control variable	Yes	Yes	Yes	Yes
County fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
R^2	0.8534	0.8433	0.8106	0.8289
Sample size	32,400	8240	10,620	13,540

Note: ** show significance levels of 5%; the brackets are robust standard errors.

5. Discussion

5.1. Integration with Previous Studies

Currently, research on the development effect of agricultural sci-tech parks mainly focuses on industrial agglomeration; science and technology demonstration and promotion; and regional economic, social, and ecological effects. Most scholars have measured the development effects of typical agricultural sci-tech parks by constructing an evaluation index system. Studies on the constraints of agricultural sci-tech parks have shown that a shortage of talents and funds, imperfect operation and management mechanisms, and small-scale operations restrict the development of high-tech agricultural industries and the transformation of scientific and technological innovation achievements in parks, thus hindering their role in promoting agricultural and rural development [4,16].

Overall, most current studies on the regional economic driving effects of agricultural sci-tech parks assess performance by constructing evaluation indicators. An analysis of their impact mechanisms is usually theory-based and lacks empirical support. There is little literature on the impact of agricultural sci-tech parks on the regional economy as a policy shock. This study contributes to existing literature on the topic in three ways. First, this study used panel data from 2000 to 2019 for 1743 counties across China. It situated the NASTP construction policy as a quasi-natural experiment, studying its impact on county-level economic growth. A large sample size was used to make the results robust, and a multi-period double-difference method was used to overcome the estimation biases of previous studies and to enhance the reliability of the regression results. Second, this study deeply explored the mechanism of the role of NASTPs in promoting county economic growth from the perspectives of the agglomeration effect, the institutional environment effect, and the innovation effect and conducted empirical tests. Third, this study further enriches relevant research by analysing the economic growth effects of NASTPs in terms of regional and financial heterogeneity and testing for spillover effects.

5.2. Research Limitations and Future Research Directions

This study explored the economic effects of developing China's NASTPs at the county level. Although this study used an objective and rigorous analysis method, there are still limitations.

First, due to the time lag in updating county statistical yearbooks, only the first seven batches of the NASTPs were selected as the subjects of this study; more research should be conducted on the eighth and ninth batches.

Second, in analysing the impact mechanism, the study selected the labour productivity of the secondary industry and analysed the overall productivity of the counties. Future research should expand the selection of impact mechanism indicators for parks.

Third, the construction of NASTPs has impacted local economic and social development. Limited by the availability of county data, this study only examined the impact on the quantitative growth of county economies. Future research should deeply explore this effect from multiple perspectives, such as population movement, production efficiency, and industrial structure transformation.

Fourth, this study examined the economic effects of the construction of NASTPs at a national level. It focused on the positive impacts brought about by the development of the parks. However, due to the limitations of the double difference method, only the overall development effects were analysed. The developmental defects of the parks within specific counties cannot be well analysed, and future research needs to explore more appropriate analysis methods.

Fifth, due to data availability (e.g., data on capital investment in NASTPs are not available), the current multi-period DID used binary variables for NASTP policy, which cannot reflect the different policy implementation efforts in different regions. In the future, more comprehensive data need to be obtained through multiple channels, and more appropriate methods should be selected to study the dynamic effects of NASTP development.

Last, it is important to note that many factors affect county economic development, and this study may have problems with omitted variables and self-selection due to unobserved variables. Future optimisation of the double difference model and the selected variables will be required on an ongoing basis.

6. Conclusions and Policy Implications

6.1. Conclusions

NASTPs are important national initiatives for promoting agricultural sci-tech innovation and regional economic development in China. After more than 20 years of development, NASTPs have become the foundation of high-tech agricultural industries in counties, making the accurate evaluation of the impact of parks on the economic development of counties a matter of great concern. This study used panel data from 2000 to 2019 for 1743 counties across China and the multi-period double-difference method to conduct a systematic analysis test. The results showed that constructing NASTPs has significantly increased counties' real GDP and GDP per capita. However, regional heterogeneity was observed, with the economic driving effect of NASTPs showing a pattern of 'diminishing marginal effects.' This result suggests that if the government can rationalise the layout of the NASTPs, it can reduce the economic development gap between regions while driving economic growth at the county level. At the same time, there is heterogeneity in the economic growth effects of parks in terms of government financial resources, with NASTPs in counties with high financial resources being able to play a more significant role in driving economic growth. In addition, this study also finds that NASTPs mainly promote county economic growth through the agglomeration, institutional environment, and innovation effects.

6.2. Policy Suggestions

Currently, China's economy is demonstrating high-quality progress, and counties are the focus of development. However, the development of county economies is threatened by weak industrial bases, lagging infrastructure and public services, and aging populations. As the country's 'testing grounds' for agricultural science and technology innovation, NASTPs can help solve these issues facing county economic development. On one hand, all levels of government should encourage the rational layout and construction of agricultural sci-tech parks and gradually explore and promote the construction of NASTPs. Notably, the construction of NASTPs can rapidly improve economic development in areas with relatively low levels of economic development, which can narrow gaps between regions. In addition, to promote the construction of NASTPs, the government should take a complete survey of the differences in development across regions and increase policy support for funding and projects in less-developed areas with relatively low levels of economic development and less access to financing.

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