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The Land System and the Rise and Fall of China's Rural Industrialization: Based on the Perspective of Institutional Change of Rural Collective Construction Land

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Abstract: China's rural industrialization, which flourished in the 1980s, has suddenly declined since the mid-1990s. Based on the perspective of institutional change of rural collective construction land, this paper discusses the reasons behind the rise and fall of China's rural industrialization. Using the empirical tests of China's provincial panel data from 1987 to 1997, it is found that from the 1980s to the mid-1990s, the government relaxed the regulation of collective construction land and allowed its transfer, which was the institutional basis for the rapid rise of China's rural industrialization with township and village enterprises (TVEs) as the main form. Furthermore, this paper takes the government's policy of prohibiting the circulation of collective construction land from the mid-1990s as the breakthrough point, and uses the "Land Administration Law of China" promulgated in 1998 as a quasi-natural experiment to examine the causal relationship between restricting the circulation of collective construction land and the decline of TVEs. It is found that the restrictions on the circulation of collective construction land caused by the implementation of the law significantly hindered the development of TVEs. After the implementation of the Land Administration Law, in areas affected more by the law, the development scale of their TVEs shrunk even more. The analysis of this paper shows that deepening the reform of the system of property rights on agricultural land and ensuring farmers' rights of land circulation are important ways to revitalize the rural areas.

Keywords: rural industrialization; township and village enterprises; land system; collective construction land



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1. Introduction

Promoting rural industrialization, vigorously establishing and developing rural industrial enterprises are regarded as important ways to absorb agricultural surplus labor, increase farmers' income and promote rural economic development [1,2]. As the world's largest developing country, China has embarked on a rapid rural industrialization path since 1978. Rural industrialization with township and village enterprises (TVEs) as the mainstay has risen rapidly and has become the most dynamic part of China's economic reform at that time. In 1978 and 1996, the number of people employed in TVEs increased from 28 million to 135 million, with an average annual growth rate of 9%; the ratio of added value to GDP of TVEs increased from less than 6% in 1978 to 26% in 1996 [3]. However, unexpectedly, this rapid development of TVEs came to an abrupt end in the mid-1990s. From the mid-1990s, the development of TVEs began to slow down sharply, their profit margins and ability to absorb labor continually declined. By the end of the 1990s, TVEs almost completely declined, becoming a short-lived economic phenomenon. With the decline of TVEs, the rural economy was gradually declining, and the gap between urban

and rural areas was constantly widening. Then why did the once prosperous TVEs go into decline? What are the determinants behind its transition from prosperity to decline? This paper attempts to provide a logically consistent explanation for these issues from the perspective of institutional change of rural collective construction land.

Theoretically speaking, TVEs have obvious economic disadvantages. On the one hand, TVEs are mostly located in rural areas, with high transportation and information costs, and do not have the economies of scale for industrial production. On the other hand, the property rights of TVEs mostly belong to collective property rights, with the typical characteristics of “ambiguous property rights” [4]. In this case, existing literature mainly starts from the external environment faced by TVEs to explain their prosperity in practice. To sum up, first, from the perspective of economic structure, it is believed that the success of TVEs is closely related to the industrial structure dominated by heavy industry formed in China since 1949. Under this industrial structure, state-owned enterprises mainly produce heavy industrial products, while there is a serious shortage of light industrial products. It is through the production of light industrial products that TVEs fill the gap in the industrial structure and emerge [3]. The second is based on the theory of ambiguous property rights, explaining that the ambiguous property rights of the collective nature of TVEs can well adapt to the environment of imperfect market and imperfect legal system at the beginning of China’s reform and opening up, so as to achieve prosperity and development [4,5]. Third, from a cultural perspective, it is emphasized that the rapid development of early TVEs is a product of Chinese culture and the unique quality of cooperation and altruism of Chinese people [6]. In addition, there is another paper that emphasizes that local government behavior plays an important role in the development of TVEs in China. It is believed that local government support is an important reason for the prosperity of TVEs [7–9]. However, after the reform of the tax-sharing system in 1994, the enthusiasm of local governments to run enterprises declined, which led to the gradual decline of TVEs since 1994 [10,11].

The above paper discusses the external conditions for the prosperity of TVEs from the perspectives of political, economic and social environment, providing important clues for us to understand the mystery of the rise and fall of TVEs. However, these external environments are not enough to constitute all the conditions for the development of TVEs. Moreover, they mainly focus on exploring the reasons for the prosperity of TVEs, and lack of attention to why the TVEs declined after the mid-1990s. In fact, the first prerequisite for starting a business and establishing a factory is to have a piece of land. If there is no land system as a guarantee, the essential land resources cannot be obtained. Even if other political, economic and social conditions are in place, TVEs cannot emerge smoothly. In this sense, in order to fully analyze the rise and fall of TVEs, we need to deeply explore the land use system of TVEs.

Based on the above analysis, this paper attempts to explain the reasons behind the rise and fall of China’s TVEs from a perspective different from the existing literature, that is, the change of the rural collective construction land system. This paper holds that the rapid rise and development of TVEs in the 1980s benefited from the national policy during this period, which opens up farmers’ rights to use collective land for industry development, allowing rural collective construction land to directly enter the non-agricultural land market [12–14]. This land system arrangement greatly reduces the land cost of rural industrial investment, creates the most basic conditions for the rise of TVEs, and becomes a vital factor in promoting rural industrialization. However, since the mid-1990s, the state has imposed strict controls on the use of collective construction land, and no longer allowed collective construction land to enter the market directly [15,16]. In particular, the “Land Administration Law of China” (Land Administration Law) revised in 1998 clearly stipulates that “no right to the use of land owned by peasant collectives may be assigned, transferred or leased for non-agricultural construction”. This means that farmers can no longer rely on the property rights of their own land to develop non-agricultural industries as in the past, which has led to the decline of rural industrialization in the main form of TVEs.

Based on the actual data in China, drawing on the methods of existing literature to construct an empirical model [9,17,18], this paper conducts rigorous empirical tests of the above theoretical logic. First of all, with the background of the national deregulation of rural collective construction land from the 1980s to mid-1990s, we use China's provincial panel data from 1987 to 1997 to verify the impact of the circulation of collective construction land on the expansion of TVEs. It is found that the circulation of collective construction land significantly promoted the rise and expansion of TVEs. Then, we take the Land Administration Law as a quasi-natural experiment to examine the relationship between the change of the state's control policy on collective construction land; that is, the implementation of a strict policy of restricting the circulation of collective construction land and the decline of TVEs. It is found that prohibiting collective construction land from directly entering the market has a significant hindering effect on the development of TVEs. In areas affected more by the law, there is a greater reduction in the development of their TVEs.

Compared to the existing literature, the characteristics and contributions of this paper mainly lie in the following points. First, the literature on land system and TVEs' development has been expanded. Regarding the rural land system, the existing literature mainly focuses on the system of property rights on agricultural land, and discusses the impact of this system on labor transfer [19], farmer investment [20], and agricultural productivity [18]. There are also some papers that have paid attention to the rural collective construction land system, focusing on discussing the effect of the rural collective construction land system on land transfer [15,16,21], land use efficiency [22,23], and its impact on land spatial planning [24–26]. These studies enrich the discussion on rural land system. However, the research on the impact of the collective construction land system on the rise and fall of TVEs has received less attention, especially the lack of rigorous empirical research. This paper supplements the perspective of land system to the literature on the rise and fall of TVEs. Second, previous papers have mostly discussed the reasons for the prosperity of TVEs from the external environment they faced [10,11]. This paper starts with the rural collective construction land system, discusses the more fundamental reasons behind the rise and fall of TVEs, and provides a logically consistent explanation and rigorous empirical evidence for understanding the prosperity and decline of TVEs. Third, in terms of policy practice, the conclusion of this paper shows that giving farmers and rural areas legal rights to land development and allowing the transfer of collective construction land are important measures to promote rural industrialization. It provides policy inspiration for how to revitalize and promote rural development in many developing countries, including China, and has a certain reference value.

The following parts of this paper are arranged as follows: the second part puts forward theoretical hypotheses based on the analysis of the system; the third part is the empirical model setting and data explanation; the fourth part is the empirical tests of the circulation of rural collective construction land and the rise of TVEs; the fifth part is the empirical results and robustness tests of the control of collective construction land and the decline of TVEs; the sixth part is the discussion and conclusion.

2. Institutional Background and Theoretical Hypothesis

According to China's land use system, rural land is divided into agricultural land and collective construction land. The institutional changes of these two types of land have played an important role in China's rural economic development. Since 1978, China's rural areas have implemented the household responsibility system. Thus, there was a change from a system in which the land was collectively owned and managed by the collective during the people's commune period to a system in which the land is contracted to peasant families on the premise of maintaining the collective ownership system, and thus, preceding the reform of the rural land system. Influenced by the reform, Chinese farmers created two achievements on collective land. First, on agricultural land, the achievement of rapid agricultural production growth and farmers' income was created, by transforming the land from collective ownership and unified management to collective ownership and

contracted management by farmers [27]. Second, on rural collective construction land, farmers used collective construction land to establish TVEs, creating the achievement that rural industries occupy half of the China's industry [12,14]. However, unfortunately, the institutional arrangements in land behind these two achievements experiences different fates in the subsequent development process.

In terms of agricultural land, since the reform of the household responsibility system was implemented in 1978, the Chinese government has been actively promoting and improving the reform of the system of property rights on agricultural land. Through the evolution of a series of policies and regulations, the current law has given farmers the long-term unchangeable usufruct of agricultural land, and has provided farmers with a guaranteed right to transfer their agricultural land freely. Thus, an increasingly clear system of property rights on agricultural land is established [18,28–30].

In terms of rural collective construction land, from the Land Administration Law in 1986 to the revision of the new Land Administration Law in 1998, the national legislation on the use and circulation of rural collective construction land has gone from deregulation to overall tightening [13–15]. This institutional evolution of collective construction land has had a profound impact on the rise and fall of TVEs.

Since 1978, with the implementation of the household responsibility system, the state has begun to relax the control of collective construction land, cancel the policy of prohibiting the free circulation of collective construction land, and allow farmers to set up industrial enterprises on collective construction land [13,14,16]. The landmark event of this stage was the passing of the Land Administration Law in 1986. Article 2 of the law stipulates that “the right to use state-owned land and collectively owned land can be transferred in accordance with the law”. Article 36 of the law stipulates that “enterprises owned by the whole people or jointly owned by urban collectives and agricultural collective economic organizations, which need to use collectively owned land, can be requisitioned in accordance with the regulations on land requisition for national construction, and the agricultural collective economic organizations can also use the right of land use as a condition for joint operation in accordance with an agreement”. The loose institutional environment for collective construction land greatly promotes the circulation of collective construction land and creates conditions for farmers to set up TVEs on collective construction land.

In a broad sense, TVEs refer to rural industrial enterprises located within townships [2,11]. In terms of ownership, most TVEs are collectively owned. However, with the adjustment of policies, individual, private enterprises and foreign-owned, joint ventures, have also developed. Although these enterprises differ greatly in the nature of ownership, they have one thing in common, that is, they are all established in rural areas and built on rural collective construction land. In the use of land, collectively owned enterprises are set up by peasants using their own land without compensation. Rural individual enterprises are generally opened on their own homesteads, and the land is free of charge. There are also those with large operating scales and insufficient homesteads, so they turn to renting collective land for a fee. As for private enterprises and foreign-funded enterprises, some of their land sources are enterprises renting land with compensation from collectives, and some are the collectives who use the land use rights as shares to establish joint ventures between the village collective and external capital [12,16]. In short, no matter what kind of ownership nature of TVEs, their common feature is that the development of enterprises is inextricably linked to the use and circulation of rural collective construction land.

Theoretically speaking, as a vital factor of production, land is not only the space carrier for the establishment of industrial enterprises, but also the economic resource that the expansion of industrial enterprises must rely on and utilize. In this sense, the first prerequisite for the establishment of an industrial enterprise is land [12]. In China from the 1980s to the early 1990s, land was divided into two main bodies—rural collective land and urban state-owned land. Since the capital construction of the state-owned sector was completely controlled by the government at that time, the use of land had to be approved by the government first. Neither the urban collective sector nor private units owned land,

so it could not be easily expanded [13]. The only exception is rural collective land. As mentioned above, it is during the period from the 1980s to the early 1990s that the state opened up channels for farmers to use collective construction land for non-agricultural construction. Farmers are allowed to set up enterprises on the collective construction land, which not only creates conditions for the rise of TVEs in the rural areas, but also constitutes an important advantage of the development of TVEs [12,14,22,23]. Based on the above theoretical analysis, we propose theoretical Hypothesis 1.

Hypothesis 1 (H1). *The government loosened the control of rural collective construction land and allowed the free circulation of rural collective construction land, which was the institutional basis for the rapid rise of rural industrialization in China from the 1980s to the mid-1990s.*

It is worth noting that there is serious heterogeneity and imbalance in the development of TVEs among regions. TVEs in the suburbs of big cities, transportation centers and coastal areas with higher levels of rural infrastructure develop very rapidly, while those in inland and remote areas with high transportation costs and difficult transportation often develop relatively slowly or even no TVEs at all [3]. How can we understand the regional differences in the development of TVEs? The essential clue to answering this question is still the system of collective construction land for farmland. As mentioned above, one of the advantages of TVEs' development is the availability and low cost of its land. In theory, companies must pay rent to use land. TVEs, however, are either set up on their own land by rural collectives, which pay no rent to others or themselves [12], or by individuals, private or foreign enterprises, who pay very low rent to the collective. In this sense, land rent is actually converted into a part of the profits of TVEs [12].

Furthermore, in terms of the theory of differential rent, the economic value of land in areas with perfect transportation infrastructure construction, close proximity to big cities and low transportation cost is higher, and the corresponding differential rent is higher. Specifically for TVEs in the vicinity of transportation centers and urban suburbs, they can benefit more from the diffusion of capital, technology and information in the city, so their differential rent is naturally relatively higher. However, under the system for the use of rural collective construction land at that time, TVEs did not pay or paid a much lower price than their real differential rents, so the rent actually turned into the profit of TVEs [12]. In this way, the higher the level of transportation infrastructure, the higher the differential rent, and the higher the degree of collective construction land circulation. Therefore, the more likely that the differential rent is converted into the profits of TVEs, the more profitable it is to set up TVEs in these areas. Then, more TVEs gather in these areas with high level of transportation infrastructure. Based on the above theoretical analysis, we propose theoretical Hypothesis 2.

Hypothesis 2 (H2). *The differential rent in geographical location is an important factor leading to the unbalanced development of TVEs in various regions.*

The above explains the reasons for the rapid rise of TVEs in the 1980s and early 1990s. However, unexpectedly, from the mid-1990s, the development of TVEs began to slow down rapidly. In order to understand the decline of TVEs, it is also necessary to examine the rural collective land system. Since the mid-1990s, the policy of collective construction land has undergone important changes. The state has changed from allowing and encouraging farmers to set up enterprises on collective construction land to a policy of strictly restricting the use and circulation of collective construction land. In particular, the promulgation and implementation of the new Land Administration Law in 1998 became a turning point in the change of China's rural collective construction land system. Article 43 of the law stipulates that "all units and individuals that need land for construction purposes shall, in accordance with law, apply for the use of State-owned land". Article 63 of the law stipulates that "no right to the use of land owned by peasant collectives may be assigned, transferred or leased for non-agricultural construction". At the same time, this law also established that "the

state applies a system of control over the purposes of use of land". It is stipulated that the state should formulate an overall plan for land use, strictly restrict the conversion of agricultural land into construction land, and control the total amount of construction land.

Under these regulations, rural collective construction land cannot directly enter the market. The only legal way to convert agricultural land into non-agricultural construction land is to implement land acquisition. The local government expropriates land from farmers and transfers ownership from rural collectives to the state. After the land is expropriated, the local government transfers the land use rights to the land use units on behalf of the state [15,16]. This makes the local government monopolize the supply of construction land and become the only implementer of agricultural land conversion. Thus, the channel for rural collective construction land to directly enter the non-agricultural construction market is blocked, so that the rural collective construction land loses the function of market-oriented allocation, farmers and rural areas also lose the right to use and transfer collective construction land [13,14]. As the peasants are deprived of the right to use collective construction land for non-agricultural construction, the utilization space of rural collective construction land has been greatly reduced, and the entry threshold for farmers to develop non-agricultural industries on collective land has also been greatly improved. As a result, they lose the opportunity to use collective construction land to develop non-agricultural industries, and can no longer independently participate in rural industrialization with property rights on their own land as in the past [22]. In this way, the former land cost advantage of TVEs has disappeared, and the development of TVEs on collective land has fallen into decline. Based on the above theoretical analysis, we propose theoretical Hypothesis 3.

Hypothesis 3 (H3). *Prohibiting the rural collective construction land from directly entering the non-agricultural land market and restricting the circulation of rural collective construction land are important reasons for the decline of Chinese TVEs after the mid-1990s.*

3. Empirical Strategies and Variable Selection

In order to confirm the theoretical hypothesis of this paper, we draw on the econometric methods widely used in economic research [9,17,18], and construct an empirical model to test the above hypothesis. Compared with qualitative analysis, case study and survey research, an econometric method is used to establish an economic mathematical model on the basis of economic theory. Through the collection of actual data and the use of statistical software for empirical analysis, scientific and rigorous research conclusions can be obtained. Different from case studies, survey research and other methods, it pays more attention to the quantitative relationship between economic variables, and can explore the reasons behind economic phenomena by using actual data. This approach enables effective causal identification, handles endogeneity issues, and draws rigorous and reliable conclusions.

3.1. Empirical Strategies

3.1.1. Empirical Model Setting of Collective Construction Land Circulation and the Rise of TVEs

A core purpose of this paper is to examine how the Chinese government's deregulation of rural collective construction land and the circulation of collective construction land affected the rise of TVEs from the 1980s to the mid-1990s. In order to explore this question and verify the theoretical Hypothesis 1, we draw on the existing literature [9] to construct the following econometric model:

$$TVE_{it} = \alpha_0 + \alpha_1 land_{it} + \gamma X_{it} + u_i + \delta_t + \varepsilon_{it} \quad (1)$$

where the subscripts i and t represent the province and time, respectively. The explained variable TVE_{it} is the development scale of TVEs in i province in year t , and we construct two sets of variables to measure. The first group is the ratio of the number of employees in TVEs to the number of rural employees in each province ($tveemployeeer$), which reflects the

share of TVEs in the process of rural labor allocation caused by rural industrialization, and is used to describe the relative scale of the employment of TVEs. The second group is the logarithm of the number of employees in TVEs in each province (*Intveemployee*), which is used to describe the overall scale of the employment of TVEs in each province. In order to test the robustness of the results, we also select other indicators that reflect the development scale of TVEs, and conduct robustness tests from multiple perspectives. Including the logarithm of the total output value of TVEs (*Intveoutput*), and the number of TVEs after standardization of the total number of rural employees in each region, that is, the logarithm of the number of TVEs per 10,000 rural employees (*Intvenumber*).

land_{it} is the core explanatory variable of this paper, representing the transfer degree of rural collective construction land under the background of land deregulation. Due to the limitation of data, we cannot obtain the data that can directly measure the circulation of rural collective construction land. Fortunately, since the state relaxed control over collective construction land during the period from the 1980s to the early 1990s, allowing farmers to set up industrial enterprises on collective construction land. As a result, the transformation of cultivated land into rural collective infrastructure land has occurred in various regions, and these data have been counted in the “China Agricultural Statistical Report” over the years. Therefore, we use the area of rural collective infrastructure in the reduced cultivated land area (*land*) to measure the transfer degree of rural collective construction land. The larger the value, the more rural collective construction land directly enters the non-agricultural land market. In order to test the robustness of the results, we also select the proportion of rural collective infrastructure area in the reduced cultivated land area (*rland*) as a proxy for the degree of rural collective construction land circulation. α_1 is the parameter to be estimated that is most concerned by empirical analysis. It measures the relationship between the degree of rural collective construction land circulation and the development of regional TVEs. According to our hypothesis, α_1 is expected to be significantly positive.

X_{it} is a set of control variables. According to the existing literature [9], this paper introduces the following variables as control variables. (1) The level of economic development (*lnpgdp*), expressed by the logarithm of the per capita GDP of each province; (2) Agricultural productivity (*lnpagr*), expressed by the natural logarithm of the total agricultural output value per labor in each region; (3) The degree of government intervention (*Gov*), measured by the proportion of local fiscal expenditure in GDP; (4) The degree of economic openness (*open*), expressed by the ratio of the total import and export volume of each province to GDP; (5) The level of agricultural mechanization (*power*), expressed by the total power of agricultural machinery per labor in each region; (6) The proportion of the output value of the primary industry (*indus*), expressed by the proportion of the output value of the primary industry to GDP; (7) The urban-rural income gap (*inequal*), measured by the ratio of the per capita disposable income of urban residents to the per capita net income of rural residents; (8) Rural population employment ratio (*ruralr*), expressed by the ratio of rural employees to the total employed population. α_0 is a constant term, ε_{it} represents the random error term, u_i represents the region fixed effect and δ_t represents the time fixed effect.

Furthermore, in order to test the influence of differential rent heterogeneity in geographic space on the unbalanced development of TVEs in various regions, and to verify theoretical Hypothesis 2, we construct model (2) as follows:

$$TVE_{it} = \beta_0 + \beta_1 land_{it} + \beta_2 infra_{it} + \beta_3 land_{it} \times infra_{it} + \gamma X_{it} + u_i + \delta_t + \varepsilon_{it} \quad (2)$$

Due to the limitation of data, we cannot directly obtain the data of differential rent. However, according to the previous analysis and the theory of differential rent [12], we can describe the differential rent indirectly from the perspective of the difference in the level of transportation infrastructure in various regions. Based on this, in model (2), we choose the ratio of highway mileage to population of each region to measure the level of transport infrastructure (*infra_{it}*). The coefficient of interaction term β_3 is the parameter to be estimated in this paper. According to the previous theoretical inference, we expect

β_3 to be significantly positive. That is to say, the higher the level of infrastructure and the higher the differential rent, the greater the stimulating effect of the transfer of collective construction land on the development of TVEs. The symbols and meanings of other variables in model (2) are the same as in the econometric model (1).

3.1.2. The Empirical Model Setting of Collective Construction Land Control and the Decline of TVEs

Another core purpose of this paper is to examine the impact of collective construction land regulation on the decline of TVEs. In order to explore this issue and verify theoretical Hypothesis 3, this paper uses the Land Administration Law promulgated in 1998 as a quasi-natural experiment to examine the relationship between the state's strict policy of restricting the circulation of collective construction land and the decline of TVEs. The promulgation and implementation of the new Land Administration Law in 1998 marked a turning point in the change of China's rural collective construction land system. It stipulates that the right to use the land collectively owned by farmers shall not be assigned, transferred or leased for non-agricultural construction. Since then, the direct access of rural collective construction land to the non-agricultural construction market has been basically closed, and farmers have lost the right to use collective construction land to develop non-agricultural industries [22].

It is worth noting that the impact of the revision of the Land Administration Law as an exogenous shock on the development of TVEs in various regions of China has differences in both time and space. First, in terms of time, after the revision and implementation of the Land Administration Law in 1998, the development of TVEs in various regions has slowed down rapidly, and there are certain differences between the development of TVEs before and after the implementation of the law. Second, in the spatial dimension, before the implementation of the Land Administration Law, different regions had different historical endowment conditions for the development of TVEs, resulting in different impacts of the implementation of the law on the development of TVEs in different regions. Specifically, from the perspective of the history of the development of TVEs, their predecessors were commune and brigade enterprises in the period of the people's communes. This type of commune and brigade enterprise is the general name for various collectively owned enterprises operated by the Chinese rural people's communes and their subordinate production brigades. It has been renamed TVEs since 1983 [3]. Thus, the proportion of the number of commune and brigade enterprises in each region in the country can reflect the historical endowment conditions for the development of TVEs in that region. The higher the proportion of commune and brigade enterprises in a region in the whole country, the better the historical conditions and traditions for the development of TVEs in that region. Meanwhile, areas with better historical endowment conditions for the development of TVEs are more dependent on collective construction land. When the collective construction land policy changes, their development can be more impacted. As a result, in the empirical strategy, the degree of difference in the historical endowment conditions for the development of TVEs in different regions can be regarded as the intensity of the exogenous impact of the implementation of the Land Administration Law.

Based on the above analysis, this paper draws on the practice of Nunn and Qian [17], adopting the intensity differences-in-differences (DID) model. We introduce the interaction term between the historical endowment conditions for the development of TVEs and the dummy variable for the implementation of the Land Administration Law in 1998, to examine the impact of collective construction land regulation on the development of TVEs. In this setting, it is assumed that areas with a high proportion of commune and brigade enterprises in China are the treatment group, and areas with a low proportion of commune and brigade enterprises in the country are the control group. Then, we construct the following DID model:

$$TVE_{it} = \theta_0 + \theta_1 Density_i \times Post_t + \gamma X_{it} + u_i + \delta_t + \varepsilon_{it} \quad (3)$$

where i and t , respectively, represent the province and time, and the explained variable TVE is a measure of the development scale of TVEs.

$Density$ is the historical endowment condition variable for the development of TVEs. We choose the proportion of the number of commune and brigade enterprises in each region to the total number of commune and brigade enterprises of China in 1980, as a measure to reflect the historical endowment conditions for the development of TVEs in each region. In order to test the robustness of the results, the proportion of commune and brigade enterprises in each region in 1981 ($Density1981$) and in 1982 ($Density1982$) are also selected as alternative indicators of the historical endowment conditions for the development of TVEs in each region.

$Post$ represents the time dummy variable before and after the implementation of the 1998 Land Administration Law, with a value of 0 before 1998 and a value of 1 after 1998. The main explanatory variable is the interaction term $Density \times Post$ between the proportion of commune and brigade enterprises and the dummy variable for the implementation of the Land Administration Law. What we are interested in is the coefficient θ_1 of this interaction term, which reflects the difference in the development of TVEs in different regions with different proportions of commune and brigade enterprises after the implementation of the law. If θ_1 is significantly negative, it means Hypothesis 3 holds. That is, after the implementation of the Land Administration Law in 1998, as the government implemented a strict control policy on collective construction land and prohibited the circulation of collective construction land, in those areas with higher historical endowment conditions for the development of TVEs the development scale of TVEs was reduced more significantly.

X_{it} is a series of control variables, consistent with the econometric model (1), including the level of economic development ($lnpgdp$), agricultural productivity ($lnpagr$), the degree of government intervention (gov), the degree of economic openness ($open$), the level of agricultural mechanization ($power$), the proportion of the output value of the primary industry ($indus$), the urban-rural income gap ($inequal$) and the employment ratio of rural population ($ruralr$). θ_0 is a constant term, ε_{it} represents the random error term, u_i represents the regional fixed effect and δ_t represents the time fixed effect.

3.2. Variable Descriptions and Data Sources

In order to test the rise and fall of TVEs, the sample selected in this paper is divided into two time periods. First, we use panel data of 28 inland provinces, autonomous regions and municipalities in China from 1987 to 1997 (due to changes in the administrative divisions of Chongqing and Hainan, the key data of some years in Tibet are missing, so the data of these three regions are not taken into account) to examine the impact of rural collective construction land transfer on the rise of TVEs in the context of opening up the collective construction land market. Next, we use panel data of 28 inland provinces, autonomous regions, and municipalities in China from 1987 to 2008 to further examine the impact of rural collective construction land regulation on the decline of TVEs.

In terms of data sources, the data on the number of employees in TVEs, the output value of TVEs, the number of units in TVEs and the number of commune and brigade enterprises are all from the “China Agriculture Yearbook” over the years. The data on the area of rural collective infrastructure and the proportion of rural collective infrastructure in the reduced cultivated land area in the current year are all from the “China Agricultural Statistical Report” over the years. The data of other variables come from the “China Compendium Statistics 1948–2008”, “China Agricultural Statistical Report” over the years, “China Statistical Yearbook” and the CEInet Statistical Database. Table 1 is an illustration and descriptive statistics of the abovementioned main variables.

Table 1. Variable description and descriptive statistics.

| Variables | Definition of Variables | Observations | Mean | SD | Min | Max |
|----------------------|---|--------------|--------|--------|--------|--------|
| <i>tveemployeeer</i> | proportion of employees in TVEs in the number of employees in rural areas | 616 | 29.194 | 15.795 | 3.927 | 72.159 |
| <i>Intveemployee</i> | logarithm of the number of employees in TVEs | 616 | 14.815 | 1.075 | 11.288 | 16.690 |
| <i>Intveoutput</i> | logarithm of the total output value of TVEs | 616 | 16.217 | 1.838 | 10.667 | 20.152 |
| <i>Intvnumber</i> | logarithm of the number of TVEs per 10,000 rural employees | 616 | 5.916 | 0.773 | 2.595 | 7.274 |
| <i>land</i> | area of rural collective infrastructure | 308 | 3.180 | 3.896 | 0.060 | 23.250 |
| <i>rland</i> | proportion of rural collective infrastructure in the reduced cultivated land area | 308 | 10.46 | 9.901 | 0.399 | 50 |
| <i>infra</i> | area road mileage regional population | 308 | 11.163 | 6.575 | 2.146 | 38.743 |
| <i>Density</i> | proportion of the number of commune and brigade enterprises in the total number of commune and brigade enterprises in China | 616 | 3.571 | 3.245 | 0.232 | 13.162 |
| <i>Density1981</i> | proportion of commune and brigade enterprises in 1981 | 616 | 3.577 | 3.302 | 0.224 | 13.752 |
| <i>Density1982</i> | proportion of commune and brigade enterprises in 1982 | 616 | 3.571 | 3.495 | 0.242 | 16.046 |
| <i>lnpgdp</i> | logarithm of GDP per capita | 616 | 8.57 | 1.034 | 6.303 | 11.111 |
| <i>lnpagr</i> | natural logarithm of gross agricultural output per labor | 616 | 8.733 | 0.932 | 6.670 | 10.947 |
| <i>gov</i> | government fiscal expenditure/gross regional product | 616 | 13.596 | 5.495 | 4.920 | 35.700 |
| <i>open</i> | total imports and exports/gross regional product | 616 | 0.293 | 0.437 | 0.027 | 3.041 |
| <i>power</i> | total power of agricultural machinery per labor | 616 | 1.874 | 1.498 | 0.207 | 7.859 |
| <i>indus</i> | primary industry output value/gross regional product | 616 | 19.388 | 9.464 | 0.816 | 41.373 |
| <i>inequal</i> | urban-rural income gap | 616 | 2.612 | 0.721 | 1 | 4.759 |
| <i>ruralr</i> | employment ratio of rural population | 616 | 65.788 | 16.314 | 18.952 | 88.071 |

4. The Empirical Analysis on the Transfer of Rural Collective Construction Land and the Rise of TVEs: 1987–1997

4.1. Benchmark Regression Results

Based on the econometric model set in Equation (1), Table 2 reports the benchmark regression results of the influence of rural collective construction land transfer on the rise of TVEs in China. Among them, the first three columns are the regression results of the proportion of employees in TVEs (*tveemployeeer*) as the explained variable. Column (1) examines the fixed effects (FE) estimation results of the relationship between the circulation of collective construction land and the development scale of TVEs without introducing any control variables. From the regression results, it can be seen that the coefficient of the core explanatory variable *land* (area of rural collective infrastructure) that measures the transfer degree of collective construction land is significantly positive at the 1% level, which preliminarily verifies the theoretical Hypothesis 1 of this paper. To mitigate the estimation bias caused by the omission of important variables, columns (2) and (3) report the estimation results of fixed effects (FE) and random effects (RE), adding all control variables. The results show that with the addition of control variables, the influence coefficient of collective construction land transfer on the development scale of TVEs is still highly significant and positive, and the fitting degree of the model is improved. This shows that opening the rural collective construction land market and allowing the free circulation of rural collective construction land is indeed an important factor in promoting the rapid expansion of TVEs.

The last three columns use the logarithm of the number of employees in TVEs (*Intveemployee*) as the regression results of the explained variable. The results show that the influence coefficient of *land* is still highly positive. This indicates that under the institutional environment of allowing rural collective construction land to directly enter the non-agricultural land market, the larger the area of rural collective infrastructure in a region (that is, the larger the transfer scale of collective construction land), the more significantly it promotes the growth of the number of employees in TVEs in that region. These results support the theoretical Hypothesis 1 of this paper. It shows that from the 1980s to the mid-1990s, the state abolished the policy of prohibiting the transfer of collective construction land during

the period of the people's communes, and turned to allowing and encouraging farmers to use collective construction land for non-agricultural construction, which was an important reason for the rapid rise of TVEs during this period. A Hausman test shows that the FE model is more efficient, so in the empirical analysis that follows, we will use the FE model for estimation unless otherwise specified.

Table 2. The transfer of rural collective construction land and the rise of TVEs (1987–1997): benchmark regression.

| Dependent Variables | <i>Tveemployee</i> | | | <i>Lntveemployee</i> | | |
|------------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | FE | FE | RE | FE | FE | RE |
| <i>land</i> | 0.453 *** (0.129) | 0.343 *** (0.122) | 0.306 *** (0.113) | 0.015 *** (0.005) | 0.011 * (0.006) | 0.014 *** (0.005) |
| <i>lnpgdp</i> | | 0.952 (6.692) | 3.554 (3.980) | | 0.091 (0.234) | 0.247 (0.288) |
| <i>lnpagr</i> | | 5.232 (3.975) | 3.058 (3.053) | | 0.175 (0.160) | 0.129 (0.221) |
| <i>gov</i> | | −0.453 (0.342) | −0.824 *** (0.189) | | −0.009 (0.012) | −0.031 *** (0.010) |
| <i>open</i> | | 5.773 *** (1.462) | 5.664 *** (1.069) | | 0.195 *** (0.061) | 0.112 (0.110) |
| <i>power</i> | | 1.857 (1.534) | 2.418 *** (0.692) | | −0.031 (0.056) | −0.092 (0.057) |
| <i>indus</i> | | 0.045 (0.217) | −0.334 ** (0.146) | | −0.005 (0.009) | −0.009 (0.009) |
| <i>inequal</i> | | 3.793 ** (1.829) | 0.737 (1.577) | | 0.181 ** (0.084) | 0.114 (0.096) |
| <i>ruralr</i> | | −0.561 * (0.306) | −0.118 (0.097) | | −0.010 (0.009) | 0.015 *** (0.006) |
| Constant | 24.715 *** (0.840) | 13.628 (47.688) | 4.043 (20.783) | 14.523 *** (0.035) | 13.257 *** (1.308) | 11.510 *** (1.119) |
| Province fixed effects | YES | YES | YES | YES | YES | YES |
| Year fixed effects | YES | YES | YES | YES | YES | YES |
| Observations | 308 | 308 | 308 | 308 | 308 | 308 |
| R-squared | 0.100 | 0.223 | 0.177 | 0.153 | 0.238 | 0.179 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

Among the control variables, we take the FE model in column (2) as the baseline model. It can be found that the influence coefficient of the degree of economic openness (*open*) is significantly positive, indicating that the sudden emergence of TVEs in the 1980s benefited from the reform and opening-up policy implemented during this period. The coefficient of the urban-rural income gap (*inequal*) is also significantly positive, indicating that the existence of the urban-rural income gap constitutes a driving force for rural development, and plays a role in promoting the development of TVEs to a certain extent. The coefficient of the employment ratio of rural population (*ruralr*) is significantly negative, which shows that the large number of rural labor force is not an advantage for the development of TVEs, but has a dragging effect on the expansion of the scale of TVEs. It also shows that the main reason for the rapid rise of TVEs is the advantage of low land cost rather than low labor cost. The coefficients of the level of economic development (*lnpgdp*), agricultural productivity (*lnpagr*), the degree of government intervention (*gov*), the level of agricultural mechanization (*power*) and the proportion of the output value of the primary industry (*indus*) are not significant, indicating that these factors have little effect on the rapid rise of TVEs.

4.2. Robustness Tests

In order to test the robustness of the estimated results, we mainly discuss the aspects detailed in the following subsections.

4.2.1. Replace the Measurement Indicator of the Explanatory Variable

We use the proportion of rural collective infrastructure in the reduced cultivated land area (*rland*) to replace the area of rural collective infrastructure (*land*) for regression. The results are shown in columns (1) and (2) of Table 3. It can be seen that the coefficient of *rland* is still significantly positive, indicating that the circulation of collective construction land has a promoting effect on the expansion of TVEs, and the result is robust to a certain extent.

Table 3. Robustness tests: replace explanatory and explained variables.

| Dependent Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|------------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|-----------------------|
| | <i>Tveemployee</i> | <i>Lntveemployee</i> | <i>Lntveoutput</i> | <i>Lntvenumber</i> | <i>Lntveoutput</i> | <i>Lntvenumber</i> |
| <i>rland</i> | 0.177 *** (0.050) | 0.007 *** (0.002) | | | 0.005 * (0.003) | 0.015 *** (0.005) |
| <i>land</i> | | | 0.024 * (0.013) | 0.014 * (0.007) | | |
| <i>lnpgdp</i> | 0.652 (6.942) | 0.068 (0.247) | 0.403 (0.582) | 0.346 (0.419) | 0.439 (0.579) | 0.275 (0.460) |
| <i>lnpagr</i> | 5.768 (4.145) | 0.196 (0.169) | 0.606 (0.420) | 0.209 (0.298) | 0.624 (0.422) | 0.251 (0.314) |
| <i>gov</i> | −0.494 (0.376) | −0.010 (0.013) | 0.010 (0.024) | −0.006 (0.030) | 0.006 (0.027) | −0.007 (0.030) |
| <i>open</i> | 5.371 *** (1.261) | 0.183 *** (0.057) | 0.278 (0.297) | 0.441 (0.317) | 0.248 (0.312) | 0.427 (0.277) |
| <i>power</i> | 1.268 (1.353) | −0.054 (0.050) | −0.112 (0.074) | 0.019 (0.190) | −0.133 * (0.073) | −0.025 (0.165) |
| <i>indus</i> | −0.035 (0.218) | −0.008 (0.009) | −0.012 (0.018) | 0.021 (0.019) | −0.014 (0.018) | 0.015 (0.019) |
| <i>inequal</i> | 3.537 * (1.748) | 0.166 * (0.082) | −0.067 (0.114) | 0.687 *** (0.162) | −0.055 (0.101) | 0.646 *** (0.158) |
| <i>ruralr</i> | −0.648 ** (0.302) | −0.014 (0.008) | −0.005 (0.015) | −0.043 ** (0.016) | −0.008 (0.015) | −0.049 *** (0.017) |
| Constant | 21.128 (48.362) | 13.609 *** (1.349) | 6.909 *** (2.284) | 3.278 (2.316) | 6.930 *** (2.249) | 4.105 (2.521) |
| Province fixed effects | YES | YES | YES | YES | YES | YES |
| Year fixed effects | YES | YES | YES | YES | YES | YES |
| Observations | 308 | 308 | 308 | 308 | 308 | 308 |
| R-squared | 0.233 | 0.258 | 0.934 | 0.214 | 0.931 | 0.238 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

4.2.2. Replace the Measurement Indicators of the Development Scale of TVEs

Considering that the development scale of TVEs is a multidimensional indicator, in addition to using the proportion of employees in TVEs and the number of employees in TVEs, we also replace the measurement indicators of the development scale of TVEs from the total output value of TVEs (*lntveoutput*) and the number of TVEs per 10,000 rural employees (*lntvenumber*). The regression results are shown in columns (3) and (4) of Table 3. It can be seen that the coefficient of the area of rural collective infrastructure (*land*) is still significantly positive. Furthermore, columns (5) and (6) of Table 3 report the estimation results of replacing explanatory and explained variables simultaneously. It can be seen that the results are still consistent with the benchmark regression. These results indicate that the empirical conclusions of this paper do not depend on the specific form of variables, and the replacement of core variable indicators do not have a fundamental impact on the robustness of the estimated results.

4.2.3. Instrumental Variables (IV) Estimation

Considering the endogenous problem of collective construction land transfer, we adopt IV to solve the endogenous problem in the benchmark regression. We select the interaction term of the proportion of leased arable land in arable land in rural areas in 1930 and the

area of rural collective infrastructure at the national level ($tenancy1930 \times zland$), and the interaction term between the proportion of tenant farmers in the total number of farmers in 1930 and the area of rural collective infrastructure at the national level ($tenant1930 \times zland$) as instrumental variables. The reasons for choosing these two instrumental variables are as follows. The proportion of leased arable land in arable land and the proportion of tenant farmers in the total number of farmers in 1930 represents the development degree of the land tenancy market in history. The higher the proportion, the more developed the land tenancy market. The historical land tenancy market in each region has path dependence and historical continuity [31], which can affect the current degree of land circulation. Thus, it is highly correlated with the current level of rural land transfer and satisfies the correlation conditions of instrumental variables. After controlling the regional economic variables and region and time fixed effects, the development of the land tenancy market in 1930 is not directly related to the development scale of TVEs today, which satisfies the exogenous condition of instrumental variables. However, the development degree of the land tenancy market in 1930 cannot be directly used as an instrumental variable for the transfer of rural collective construction land. Because the latter are panel data, the former are only cross-sectional data. In this regard, we select the proportion of leased arable land in arable land and the proportion of tenant farmers in the total number of farmers in 1930, multiplied by the area of rural collective infrastructure at the national level, as instrumental variables for the circulation of collective construction land. The data on the proportion of leased arable land in arable land and the proportion of tenant farmers in the total number of farmers in 1930 in each region are from “History of the Land System in China” by Zhao and Chen [32].

Table 4 shows the estimated results using the fixed effects two-stage least squares (2SLS) model of instrumental variables. Among them, columns (1)–(3) are the regression results of instrumental variable based on the interaction term $tenancy1930 \times zland$. Column (1) is the first-stage regression result. It can be seen that $tenancy1930 \times zland$ has a significant positive correlation with $land$, and the F-statistic of the test of weak instruments is greater than 10, which means that the instrumental variable is effective, and there is no need to worry about the existence of weak instruments. Columns (2) and (3) are listed as the second-stage regression results. It can be seen from the regression results that the coefficients of $land$ are all highly significantly positive, and the regression coefficients are larger than the corresponding values in the FE model. These results show that the use of IV significantly improves the estimation results, thus further supporting the theoretical Hypothesis 1 of this paper.

Columns (4)–(6) of Table 4 further report the estimation results of instrumental variable based on the interaction term $tenant1930 \times zland$. Column (4) is the first-stage regression result, and columns (5) and (6) are listed as the second-stage regression results. It can be seen from Table 4 that the regression results of instrumental variable are still significantly positive, which once again confirms the research conclusion of this paper. That is, allowing the free circulation of rural collective construction land indeed promotes the development of TVEs. Such results show that after solving the endogeneity problem, the conclusion of this paper still holds and is robust.

4.3. Land System, Differential Rent and Regional Heterogeneity of TVEs' Development

There are wide differences in transportation infrastructure across provinces in China, resulting in huge differences in differential rent for rural land across regions. According to theoretical Hypothesis 2, the promotion effect of the circulation of collective construction land on the development scale of TVEs may be affected by the differential rent caused by the geographical difference of land, thus showing certain heterogeneity. In order to verify this hypothesis, this paper is based on the econometric model set in Equation (2), and takes the ratio of the area road mileage to the regional population as a proxy variable for the level of transportation infrastructure (*infra*). By introducing the interaction term between the area of rural collective infrastructure and the level of transportation infrastructure ($land \times infra$)

as the core explanatory variable for regression, the results are shown in Table 5. Column (1) takes proportion of employees in TVEs (*tveemployeeer*) as the estimated result of the explained variable. It can be seen from the results that the coefficient of *land* is significantly positive, and the coefficient of *land* × *infra* is also significantly positive, indicating that the level of transportation infrastructure strengthens the relationship between the transfer of collective construction land and the development of TVEs. That is to say, the higher the level of rural transportation infrastructure and the higher the land differential rent, the stronger the promotion effect of the transfer of collective construction land on the scale expansion of TVEs.

Table 4. The transfer of rural collective construction land and the rise of TVEs: IV estimation.

| Dependent Variables | First Stage | | | Second Stage | | |
|-----------------------------------|----------------------|----------------------|-----------------------|----------------------|-----------------------|-----------------------|
| | <i>Land</i> | <i>Tveemployeeer</i> | <i>Lntveemployeee</i> | <i>Land</i> | <i>Tveemployeeer</i> | <i>Lntveemployeee</i> |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>land</i> | | 1.384 ** (0.697) | 0.045 * (0.027) | | 1.206 *** (0.437) | 0.034 * (0.018) |
| <i>tenancy1930</i> × <i>zland</i> | 5.534 *** (2.092) | | | | | |
| <i>tenant1930</i> × <i>zland</i> | | | | 7.104 *** (1.739) | | |
| <i>lnpgdp</i> | 2.553 (1.768) | −2.419 (5.266) | −0.021 (0.196) | 1.958 (1.787) | −1.839 (4.953) | 0.014 (0.184) |
| <i>lnpagr</i> | −0.318 (1.233) | 5.113 * (3.058) | 0.171 (0.128) | −0.043 (1.218) | 5.134 * (2.951) | 0.172 (0.123) |
| <i>gov</i> | −0.225 ** (0.096) | −0.234 (0.273) | −0.001 (0.012) | −0.159 * (0.091) | −0.271 (0.248) | −0.004 (0.011) |
| <i>open</i> | −1.703 * (0.908) | 7.166 ** (3.519) | 0.241 *** (0.090) | −1.732 * (0.885) | 6.927 ** (3.375) | 0.226 *** (0.081) |
| <i>power</i> | −0.123 (0.298) | 2.176 (1.738) | −0.021 (0.051) | 0.017 (0.293) | 2.121 (1.710) | −0.024 (0.049) |
| <i>indus</i> | 0.042 (0.083) | 0.075 (0.172) | −0.004 (0.007) | 0.036 (0.081) | 0.070 (0.166) | −0.004 (0.007) |
| <i>inequal</i> | 0.916 * (0.511) | 2.351 (1.730) | 0.133 (0.082) | 0.470 (0.513) | 2.599 (1.627) | 0.148 * (0.077) |
| <i>ruralr</i> | −0.059 (0.122) | −0.489 ** (0.200) | −0.008 (0.007) | −0.068 (0.122) | −0.501 *** (0.194) | −0.009 (0.007) |
| Province fixed effects | YES | YES | YES | YES | YES | YES |
| Year fixed effects | YES | YES | YES | YES | YES | YES |
| Observations | 308 | 308 | 308 | 308 | 308 | 308 |
| R-squared | 0.172 | 0.033 | 0.079 | 0.193 | 0.047 | 0.163 |
| F statistic | 18.622 | | | 15.827 | | |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

For the purpose of ensuring the robustness of the results, columns (2)–(4) of Table 5 respectively report the estimated results of the explained variables with the logarithm of the number of employees in TVEs (*lntveemployeee*), the logarithm of the total output value of TVEs (*lntveoutput*) and the number of TVEs per 10,000 rural employees (*lntvenumber*). The results show that the coefficient of *land* and the coefficient of the interaction term *land* × *infra* are still significantly positive, indicating that the conclusion of this paper is robust. It further confirms that the difference in differential rent due to different levels of rural infrastructure is an important reason for the unbalanced development of TVEs in various regions. Combined with the results in Table 5, Hypothesis 2 is verified.

Table 5. Differential rent and regional heterogeneity of TVEs' development.

| Dependent Variables | <i>Tveemployeeer</i> | <i>Lntveemployeee</i> | <i>Lntveoutput</i> | <i>Lntvenumber</i> |
|------------------------|----------------------|-----------------------|-----------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| <i>land</i> | 0.349 *** (0.088) | 0.011 *** (0.004) | 0.021 *** (0.006) | 0.017 ** (0.006) |
| <i>infra</i> | 1.335 ** (0.602) | 0.053 ** (0.022) | 0.124 ** (0.049) | −0.010 (0.058) |
| <i>land × infra</i> | 0.024 ** (0.009) | 0.001 *** (0.000) | 0.003 *** (0.001) | 0.002 ** (0.001) |
| <i>lnpgdp</i> | −5.182 (6.061) | −0.075 (0.282) | −0.470 (0.490) | 0.719 (0.553) |
| <i>lnpagr</i> | 3.140 (4.039) | 0.090 (0.178) | 0.439 (0.402) | 0.087 (0.363) |
| <i>gov</i> | −0.191 (0.315) | 0.003 (0.010) | 0.016 (0.026) | 0.039 (0.026) |
| <i>open</i> | 5.690 *** (1.912) | 0.181 ** (0.068) | 0.363 (0.215) | 0.242 (0.312) |
| <i>power</i> | 2.438 (1.717) | −0.004 (0.059) | −0.104 (0.077) | 0.099 (0.196) |
| <i>indus</i> | −0.034 (0.208) | −0.009 (0.008) | −0.018 (0.016) | 0.019 (0.016) |
| <i>inequal</i> | −1.851 (1.713) | −0.041 (0.075) | −0.328 *** (0.101) | 0.182 (0.169) |
| <i>ruralr</i> | −0.402 (0.290) | −0.002 (0.008) | −0.004 (0.015) | −0.023 (0.015) |
| Constant | 52.892 (44.741) | 14.181 *** (1.689) | 13.569 *** (2.675) | 0.328 (3.154) |
| Province fixed effects | YES | YES | YES | YES |
| Year fixed effects | YES | YES | YES | YES |
| Observations | 308 | 308 | 308 | 308 |
| R-squared | 0.470 | 0.493 | 0.947 | 0.494 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$.

5. The Regulation of Collective Construction Land and the Decline of TVEs: Empirical Results and Robustness Tests

In the above, we verified the effect of the transfer of collective construction land on the scale expansion of TVEs under the background of national deregulation of rural collective construction land system from the 1980s to mid-1990s with China's provincial panel data from 1987 to 1997. Next, we will use the Land Administration Law of 1998 as a quasi-natural experiment to examine the impact of the shift to a policy of strictly controlling collective construction land on the decline of TVEs. It is further verified that the change of collective construction land system is an important reason for the rise and fall of China's TVEs.

5.1. The Regulation of Collective Construction Land and the Decline of TVEs: Benchmark Regression Results

Table 6 reports the regression results based on the econometric model set in Equation (3). Columns (1) and (2) are estimated results of FE and RE with the proportion of employees in TVEs (*tveemployeeer*) as the explained variable. The results shows that the estimated coefficient of the interaction term between the proportion of commune and brigade enterprises (*Density*) and the dummy variable for the implementation of the Land Administration Law (*Post*) is significantly negative. It means depriving farmers and rural areas of the right to land development, restricting the circulation of collective construction land, which has a significant inhibitory effect on the development of TVEs. After the implementation of the new Land Administration Law, the employment scale of TVEs in those provinces with better historical endowment conditions for the development of TVEs shrunk more than that in provinces with poorer historical endowment conditions for the development of TVEs. To ensure the robustness of the results, columns (3) and (4) of Table 6

report the estimated results of FE and RE with the number of employees in TVEs (*Intveemployee*) as explained variables. The results show that the coefficient of *Density* \times *Post*, the interaction item concerned in this paper, is still significantly negative. It further supports the theoretical judgment of this paper, and shows that prohibiting collective construction land from directly entering the market and depriving farmers and rural areas of the right to land development greatly hinders the development of TVEs.

Table 6. The empirical results of the regulation of collective construction land and the decline of TVEs.

| Dependent Variables | <i>Tveemployee</i> | | <i>Intveemployee</i> | | <i>Intvenumber</i> | |
|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | FE | RE | FE | RE | FE | RE |
| <i>Density</i> \times <i>Post</i> | −1.117 *** (0.349) | −0.631 ** (0.279) | −0.033 ** (0.015) | −0.012 * (0.007) | −0.072 *** (0.020) | −0.033 * (0.018) |
| <i>lnpgdp</i> | −4.092 (5.081) | 0.358 (4.120) | −0.210 (0.183) | −0.177 (0.128) | 0.310 (0.286) | −0.130 (0.326) |
| <i>lnpagr</i> | 7.179 *** (1.909) | 3.119 * (1.886) | 0.102 (0.077) | 0.041 (0.075) | 0.312 ** (0.138) | 0.192 (0.136) |
| <i>gov</i> | −0.319 (0.265) | −0.597 *** (0.230) | −0.009 (0.011) | −0.030 *** (0.006) | 0.006 (0.015) | −0.008 (0.016) |
| <i>open</i> | 7.357 *** (1.216) | 6.978 *** (1.541) | 0.231 *** (0.058) | 0.197 *** (0.058) | 0.304 *** (0.106) | 0.177 (0.132) |
| <i>power</i> | 1.871 ** (0.788) | 1.123 ** (0.543) | 0.022 (0.035) | −0.033 (0.022) | 0.049 (0.079) | 0.008 (0.064) |
| <i>indus</i> | −0.040 (0.155) | −0.103 (0.129) | −0.015 ** (0.007) | −0.014 *** (0.005) | 0.012 (0.010) | 0.022 ** (0.010) |
| <i>inequal</i> | 0.417 (1.241) | 0.411 (1.233) | 0.056 (0.059) | 0.049 (0.038) | 0.144 (0.100) | 0.172 (0.116) |
| <i>ruralr</i> | −0.867 *** (0.126) | −0.518 *** (0.103) | −0.014 ** (0.005) | −0.001 (0.003) | −0.044 *** (0.009) | −0.028 *** (0.008) |
| Constant | 60.117 (37.277) | 42.598 (33.021) | 16.540 *** (1.130) | 16.312 *** (0.992) | 3.672 * (1.934) | 6.489 *** (2.490) |
| Province fixed effects | YES | YES | YES | YES | YES | YES |
| Year fixed effects | YES | YES | YES | YES | YES | YES |
| Observations | 616 | 616 | 616 | 616 | 616 | 616 |
| R-squared | 0.496 | 0.466 | 0.555 | 0.514 | 0.673 | 0.651 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

Columns (5) and (6) of Table 6 report the estimated results of FE and RE with the number of TVEs per 10,000 rural employees (*Intvenumber*) as explained variables. The results show that the coefficient of *Density* \times *Post* is significantly negative. This actually verifies the influence mechanism between collective construction land control and the decline of TVEs. It shows that restricting the circulation of rural collective construction land has greatly increased the entry threshold for farmers to develop non-agricultural industries on collective land, thereby inhibiting the establishment of new TVEs and hindering the increase in the number of TVEs. The variable (*Intvenumber*) will also be used to test the influence mechanism in the subsequent analysis of this paper.

5.2. The Regulation of Collective Construction Land and the Decline of TVEs: Robustness Tests

To further test the robustness of the above results, we conduct robustness tests in light of the following aspects.

5.2.1. Replace the Measurement Indicator of Historical Endowment for the Development of TVEs

In the main empirical test of this paper, we used the index in 1980 to measure the historical endowment conditions of TVEs. In this part, we use other indicators to measure

the historical endowment conditions of the development of TVEs to test the robustness of the main conclusions of this paper. The regression results are shown in Table 7. First, we use the proportion of commune and brigade enterprises in 1981 (*Density1981*) to replace *Density1980* into the model to re-test. The results of columns (1), (3) and (5) of Table 7 show that the coefficient of the interaction item *Density1981* \times *Post* concerned in this paper is still significantly negative. That is, after the implementation of the new Land Administration Law, in those areas where the proportion of commune and brigade enterprises was higher in 1981, the development scale of TVEs was reduced to a greater extent. To further test the robustness, we use the proportion of commune and brigade enterprises in 1982 (*Density1982*) as a measure of the historical endowment conditions for the development of TVEs, and the results do not change substantially. The mean of the proportion of commune and brigade enterprises from 1980 to 1982 is also used as a proxy index for estimation, and the results are still consistent (not reported due to space limitations). It shows that the conclusions of this paper are not sensitive to the use of different definitions to measure the historical endowment conditions for the development of TVEs.

Table 7. Robustness tests: replace the indicator of historical endowment conditions for the development of TVEs.

| Dependent Variables | <i>Tveemployee</i> | | <i>Lntveemployee</i> | | <i>Lntvnumber</i> | |
|---|--------------------------|--------------------------|-----------------------|-----------------------|--------------------------|--------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Density1981</i> \times <i>Post</i> | −1.073 *** (0.339) | | −0.032 ** (0.015) | | −0.069 *** (0.019) | |
| <i>Density1982</i> \times <i>Post</i> | | −1.004 *** (0.300) | | −0.030 ** (0.013) | | −0.061 *** (0.020) |
| <i>Constant</i> | 59.399 (37.856) | 60.165 (37.045) | 16.531 *** (1.132) | 16.544 *** (1.107) | 3.634 * (1.967) | 3.602 * (1.933) |
| <i>Control variables</i> | YES | YES | YES | YES | YES | YES |
| <i>Province fixed effects</i> | YES | YES | YES | YES | YES | YES |
| <i>Year fixed effects</i> | YES | YES | YES | YES | YES | YES |
| <i>Observations</i> | 616 | 616 | 616 | 616 | 616 | 616 |
| <i>R-squared</i> | 0.494 | 0.494 | 0.555 | 0.554 | 0.672 | 0.669 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$ (3) Limited by space, the regression results of the control variables are not reported, and the control variables are the same as those in Table 2.

5.2.2. Parallel Trends Assumption Test and Time-Trend Dynamic Analysis

An important condition for using the difference in differences technique is that the parallel trends assumption between the treatment and control groups is required. For this paper, it is necessary to ensure that areas with different historical endowment conditions for the development of TVEs have the same development trend before the implementation of the new Land Administration Law. In order to test the parallel trend hypothesis, we add the interaction terms between dummy variables and the historical endowment conditions for the development of TVEs in the first year, as well as two years and three years before the implementation of the 1998 Land Administration Law in the initial regression equation, and conduct a placebo-controlled trial. Among them, *year1995*, *year1996* and *year1997* are the year dummy variables for the three years, two years and one year before the implementation of the new Land Administration Law. The first three columns of Table 8 report the estimated results of the parallel trends assumption test. It can be seen from the results that the coefficients of the newly added interaction items in each column are not significant except for the *Density* \times *year1995* in column (2), which is significant at the 10% level, while the coefficient of the interaction item *Density* \times *Post* is still significantly negative. To a certain extent, it shows that the development trend of TVEs before the implementation of the Land Administration Law in 1998 does not have systematic differences between different regions, which satisfies the parallel trends assumption.

Table 8. Parallel trends assumption test and time-trend dynamic analysis.

| Dependent Variable | Parallel Trends Assumption Test | | | Time-Trend Dynamic Analysis | | |
|----------------------------------|---------------------------------|-----------------------|-----------------------|-----------------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | <i>Tveemployeeer</i> | <i>Lntveemployeee</i> | <i>Lntvnumber</i> | <i>Tveemployeeer</i> | <i>Lntveemployeee</i> | <i>Lntvnumber</i> |
| <i>Density</i> × <i>Post</i> | −1.154 ** (0.421) | −0.030 * (0.017) | −0.072 *** (0.023) | | | |
| <i>Density</i> × <i>year1995</i> | 0.511 (0.412) | 0.029 * (0.015) | 0.039 (0.038) | | | |
| <i>Density</i> × <i>year1996</i> | −0.199 (0.457) | −0.002 (0.018) | −0.017 (0.029) | −0.270 (0.418) | −0.007 (0.017) | −0.022 (0.028) |
| <i>Density</i> × <i>year1997</i> | −0.501 (0.356) | −0.003 (0.014) | −0.016 (0.046) | −0.572 (0.346) | −0.008 (0.015) | −0.022 (0.046) |
| <i>Density</i> × <i>year1998</i> | | | | −1.069 ** (0.497) | −0.036 * (0.019) | −0.080 *** (0.028) |
| <i>Density</i> × <i>year1999</i> | | | | −1.075 ** (0.486) | −0.031 (0.020) | −0.070 ** (0.026) |
| <i>Density</i> × <i>year2000</i> | | | | −1.298 ** (0.504) | −0.036 * (0.020) | −0.084 *** (0.028) |
| <i>Density</i> × <i>year2001</i> | | | | −1.837 *** (0.556) | −0.044 ** (0.018) | −0.097 *** (0.026) |
| <i>Density</i> × <i>year2002</i> | | | | −1.172 *** (0.373) | −0.033 * (0.017) | −0.073 *** (0.023) |
| <i>Constant</i> | 60.093 (37.703) | 16.623 *** (1.137) | 3.716 * (1.907) | 59.461 (38.291) | 16.506 *** (1.151) | 3.555 * (1.944) |
| <i>Control variables</i> | YES | YES | YES | YES | YES | YES |
| <i>Province fixed effects</i> | YES | YES | YES | YES | YES | YES |
| <i>Year fixed effects</i> | YES | YES | YES | YES | YES | YES |
| <i>Observations</i> | 616 | 616 | 616 | 616 | 616 | 616 |
| <i>R-squared</i> | 0.501 | 0.560 | 0.675 | 0.503 | 0.556 | 0.674 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$ (3) Limited by space, the regression results of the control variables are not reported, and the control variables are the same as those in Table 2.

While satisfying the parallel trends assumption, it is also necessary to analyze the dynamic effects of land regulation policies to prove that the policy effects occurred at or after the implementation of the new Land Administration Law. Otherwise, there may be other factors that inhibit the development of TVEs. Therefore, we construct the following model to test dynamic effects:

$$TVE_{it} = \theta_0 + \sum_{s=1996}^{2002} \theta_s \text{Density}_i \times \text{year}_t^s + \gamma X_{it} + u_i + \delta_t + \varepsilon_{it} \tag{4}$$

where year_t^s is a year dummy variable and s is taken from 1996 to 2002, that is, two years before and four years after the transformation of the economic development pattern; here, we use 1995 as the base period, so s does not contain 1995. Moreover, t is the year; $\text{year}_t^s = 1$ if $t = s$, 0 if otherwise.

The last three columns of Table 8 report the results of the tests for dynamic effects. It can be seen from the results that the interaction term is not significant in 1996 and 1997, indicating that before the implementation of the new Land Administration Law, the development scale of TVEs in different regions showed no significant difference, which is consistent with the conclusion of the parallel trends tests. However, the regression coefficients of core explanatory variables are significantly negative in the year and the years after the implementation of the Land Administration Law, indicating that the aforementioned benchmark regression results appear when and after the implementation of the new Land Administration Law. The results of the dynamic effects tests clearly reveal that under the background of the implementation of the Land Administration Law in 1998, there is a time-series causal link between the restriction of the circulation of collective construction land and the decline of TVEs.

5.2.3. Eliminate the Interference of other Factors

Existing literature has shown that China's urbanization and marketization are both important reasons for the loss of advantages of TVEs and their decline (Kung and Lin, 2007; Zheng et al., 2017). To eliminate the interference of these factors and test whether the collective construction land regulation really affects the decline of TVEs in various regions, we introduce the interaction term between the urbanization level and the time dummy variable of 1998, and the interaction term between the marketization degree and the time dummy variable of 1998 on the basis of Equation (3). The level of urbanization is expressed by "the proportion of urban population in the total population of the region" (*urban*), and the degree of marketization is expressed by "the proportion of employment in urban state-owned enterprises in the total employment in urban areas" (*SOEs*). Data sources are "China Compendium Statistics 1948–2008" and "China Statistical Yearbook" over the years. Table 9 reports the regression results with the abovementioned variables introduced. Columns (1) and (2) show the regression results of the proportion of employees in TVEs (*tveemployee*) as the explained variable after successively adding the interaction item of the urbanization level and the time dummy variable of 1998 (*urban* × *post*), and the interaction term between the marketization degree and the time dummy variable of 1998 (*SOEr* × *post*). It can be seen from the results that after adding the interaction term, the coefficient of the core explanatory variable *Density* × *Post* is still significantly negative, while the coefficients of the interaction terms *urban* × *post* and *SOEr* × *post* are not significant. This shows that the results of the benchmark regression in this paper cannot be explained by urbanization and marketization. Moreover, the implementation of the Land Administration Law to prohibit the transfer of collective construction land is an important reason for the decline of TVEs. To further test the robustness, columns (3)–(6) of Table 9 report the estimation results using the number of employees in TVEs (*Intveemployee*) and the number of TVEs per 10,000 rural employees (*Intvenumber*) as explained variables. The results are basically consistent with columns (1) and (2), which further indicates that the empirical results of this paper are robust.

Table 9. Robustness tests: eliminating the interference of other factors.

| Dependent Variable | <i>Tveemployee</i> | | <i>Intveemployee</i> | | <i>Intvenumber</i> | |
|------------------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Density</i> × <i>Post</i> | −1.036 *** (0.366) | −1.049 ** (0.440) | −0.034 ** (0.016) | −0.029 (0.017) | −0.062 *** (0.022) | −0.059 ** (0.023) |
| <i>urban</i> × <i>post</i> | 4.993 (6.258) | 4.732 (7.179) | −0.081 (0.236) | 0.015 (0.280) | 0.628 * (0.345) | 0.678 * (0.377) |
| <i>SOEr</i> × <i>post</i> | | −0.881 (8.038) | | 0.325 (0.284) | | 0.169 (0.379) |
| Constant | 72.921 * (37.596) | 72.461 * (37.354) | 16.331 *** (1.276) | 16.500 *** (1.276) | 5.282 ** (1.991) | 5.371 ** (2.075) |
| Control variables | YES | YES | YES | YES | YES | YES |
| Province fixed effects | YES | YES | YES | YES | YES | YES |
| Year fixed effects | YES | YES | YES | YES | YES | YES |
| Observations | 616 | 616 | 616 | 616 | 616 | 616 |
| R-squared | 0.498 | 0.498 | 0.555 | 0.558 | 0.676 | 0.676 |

Notes: (1) Robust standard errors are in parentheses; (2) *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$ (3) Limited by space, the regression results of the control variables are not reported, and the control variables are the same as those in Table 2.

6. Discussion and Conclusions

Rural industrialization with TVEs as the main form once rose rapidly in China in the 1980s, became the main force of China's rural economy and an important part of the national economy, but this development momentum suddenly fell into trouble from the mid-1990s. Why did China's rural industrialization rise rapidly from the 1980s to the mid-1990s, but then suddenly declined after the mid-1990s? This paper explains the problem

from the perspective of China's rural collective construction land system. Compared with qualitative analysis, case study and survey research, this paper uses econometric method to establish an economic mathematical model on the basis of economic theory. Moreover, by collecting relevant data for model estimation, the quantitative relationship between economic variables is obtained. In addition, this paper uses an econometric model to effectively overcome the endogeneity problem, identify the reasons behind the economic phenomenon and draw relatively rigorous and robust conclusions.

Based on China's provincial panel data from 1987 to 1997, we empirically test the effect of the circulation of collective construction land on the scale expansion of TVEs under the background of China's loose collective construction land policy from the 1980s to mid-1990s. It is found that allowing the circulation of collective construction land and giving farmers the right to use collective construction land to engage in non-agricultural construction constitutes the institutional basis for the rapid rise of China's rural industrialization, and significantly promotes the development of TVEs. However, after entering the mid-1990s, the state has changed the relatively loose policy of collective construction land, and turned to a policy of strictly restricting the circulation of collective construction land. In particular, the Land Administration Law promulgated in 1998 explicitly prohibits the direct entry of collective construction land into the non-agricultural land market, and became a turning point in the change of China's rural collective construction land system. In this context, we further take the law as a quasi-natural experiment to examine the relationship between the government's strict policy of restricting the circulation of collective construction land and the decline of TVEs based on China's provincial panel data from 1987 to 2008. It is found that the prohibition of direct access to the market for collective construction land has a significant impediment to the development of TVEs. That is, in areas affected more by the Land Administration Law of 1998, the development scale of their TVEs shrunk even more.

This paper enriches the existing literature in two aspects. First, in the research of rural land system, the existing literature mainly focuses on the characteristics of rural land property rights, and focuses on analyzing the impact of land property right system on labor migration decisions, farmers' production enthusiasm and land use efficiency [15,16,18,26], while relatively little attention has been paid to the relationship between land system and rural industrialization. This paper links the rural collective construction land system with the rise and fall of TVEs, and expands the research dimension of the system. Second, in the research of TVEs, the existing literature mainly discusses the reasons for the rapid prosperity of TVEs from the external development environment they faced, such as industrial structure, cultural tradition, government intervention, etc. [6,10,11]. However, these studies mainly explore the reasons for the prosperity of TVEs, but cannot explain why TVEs declined after the mid-1990s. This paper analyzes the transition process of China's rural collective construction land system from allowing transfer to prohibiting transfer, and links it with the rise and fall of TVEs, providing a complete explanation of the logic chain for understanding the rise and fall of TVEs.

The analysis of this paper provides policy implications for developing countries on how to promote rural economic development and revitalize the rural areas. According to the conclusion of this paper, allowing the circulation of collective construction land and giving farmers the right to use collective construction land to engage in non-agricultural construction is an important way to promote the development of TVEs, while in reality, many developing countries have implemented strict control policies on collective construction land for a long time, prohibiting rural collective construction land from directly entering the non-agricultural construction market. Moreover, the conversion of agricultural land into non-agricultural construction land must be realized through the implementation of government land acquisition, that is, the supply of construction land is monopolized by the government. Farmers are deprived of the right to use collective construction land to engage in non-agricultural construction. On the one hand, farmers' development opportunities in rural areas are hindered, which aggravates the shrinking of non-agricultural economic activities in rural areas, resulting in the decline of rural areas and the widening

of urban–rural income gap. On the other hand, due to the closure of the channel for rural collective construction land to legally enter the non-agricultural construction market, the utilization of a large number of collective construction land has become disorderly, which reduces the utilization efficiency of collective construction land.

Therefore, for many developing countries, in order to revitalize rural areas and activate the vitality of the rural non-agricultural economy, an important means is to further deepen the reform of the rural collective construction system. That is to say, it is necessary to break various restrictions on the circulation of collective land and allow rural collective construction land to directly enter the non-agricultural construction market. Moreover, it is also essential to give farmers the complete rights of land transfer, so that they can become the main body of land transfer and enjoy the opportunity to use collective construction land to develop non-agricultural industries. In this way, the vitality of rural collective land will be fully released, and the efficiency of land resource utilization will be improved. Then, it will stimulate the enthusiasm of farmers to participate in rural industrialization independently, and promote rural revitalization and rural non-agricultural economic development.

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