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Has China's Pilot Policy of Farmland Management Right Mortgage Loan Promoted County Agricultural Economic Growth?

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Abstract: Farmland mortgages are expected to drive county agricultural economic growth (CAEG) as a crucial component of furthering the reform of the rural land system and the reform of the rural financial system against the new backdrop of the new era. This study gathers panel data from 2045 Chinese counties from 2011 to 2020 and uses the difference-in-differences method and the synthetic control method to systematically examine the effects of China's farmland management right mortgage loan (FMRML) pilot program on CAEG. The FMRML pilot program was implemented in 2016, and this research is presented as a quasi-natural experiment. The findings indicate that there is a "policy trap" and that CAEG has not been successfully promoted by the FMRML pilot program. The reason for this is because the pilot program has made county resource mismatch worse, making it unable to fully realize the promotional effect on CAEG, rather than significantly activating the three key drivers of agricultural economic growth: people, land, and money. The impact of the FMRML pilot policy on CAEG is not uniform, according to the results of the heterogeneity study, with a substantial "blocking" effect only in the central region and no significant influence in the western, northeastern, or eastern regions. The findings propose that in order to optimize agricultural mortgage policy and advance CAEG, China and other emerging nations can benefit greatly from the insights this study offers.

Keywords: farmland management right mortgage loan; county agricultural economic growth; resource mismatch

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1. Introduction

China's county economies, which are the fundamental economic units of the country's economy, have long played a significant role in advancing high-quality rural regeneration and urban–rural integrated development [1]. Agriculture and rural regions constitute a considerable section of the county's economic and social structure, and the majority of agricultural activities take place there due to the county's concentration of the agriculture industry, the department of rural areas, and the farmer group. As a result, China's efforts to advance agricultural modernization and forge a robust agricultural nation depend heavily on the growth of county agriculture. Land and finance, two types of scarce elements, formerly had an invisible "fence" in the institutional framework for growing and extending the county agriculture economy. This signified that it was challenging to effectively activate the land element and meet the farmers' financing needs. In addition to successfully activating the "blood-creation" function of dormant property rights in rural areas, the two can infuse financial life into CAEG if they are able to achieve organic articulation. The concept of "farmland finance", embodied by farmland mortgages, offers a fresh approach to resolving this issue and takes on the contemporary task of satisfying the CAEG's varied financial requirements. It actually accomplishes the transformation of rural land from a guarantee to an extension of the financial and property functions, boosts the rural land's

financial qualities, and turns the land into a "living asset" for farmers, thereby resolving the "difficult financing" issue brought on by the CAEG's lack of suitable collateral.

Farmland mortgages are an important part of the reform of rural land systems and an important part of rural financial deepening. In 2016, the *Interim Measures for Pilot Mortgage Loans for the Management Right of Contracted Rural Land*[1] were promulgated, and 232 counties (cities and districts) such as the Daxing District of Beijing were selected as "pilot counties for FMRML", which marked the pilot of farmland financial reform centered on farmland mortgages in China and provided a good quasi-natural experiment for this study. However, in practice, it is found that in many pilot areas, the business of the FMRML has been "coldly received", with fewer loans issued or high non-performing loan rates, and the effect of pilot work is not satisfactory, which is far from the policy objectives [2]. The question we are left to ponder is whether China's pilot policy of the FMRML can improve the local agricultural economic development level. Is it releasing policy dividends or slipping into a "policy trap", and what is the mechanism behind it? Thus, this article assesses the policy impact of China's FMRML pilot program on CAEG based on the distinctive reality of quickening the financialization of farmland and the national strategic backdrop of quickening the creation of agricultural power.

2. Literature Review

As the basic unit of China's agricultural economic development, county agricultural economy has attracted much attention from the academic and theoretical circles, and the related research results have made fruitful exploration on the connotation [3], evaluation system [4], and promotion strategy of CAEG [5]. In summary, in the new era and new journey to promote the high-quality development of county agricultural economy, we need to base on "agriculture, rural areas, and farmers" and grasp the three key issues of "people, land, and money". From the perspective of "land", we need to deepen the reform of rural land systems and revitalize the idle land in rural areas; from the perspective of "money", it is necessary to accelerate the innovation of rural finance and alleviate the problem of "difficult to lend" for farmers [6,7]. In order to solve the problems of "land" and "money" at the same time and achieve an organic connection between the two, farmland finance has emerged, which has had a positive impact on activating the attributes of farmland assets and breaking the bottleneck of agricultural financing [8], further attracting human capital to gather in rural areas to help solve the problem of "people". It also has an irreplaceable role in supporting the transfer of rural land, realizing large-scale agricultural operation and increasing farmers' income [9]. Farmland finance in Western developed countries started earliest, and the more representative ones are the "Land Mortgage Credit Association" model in Germany and the Federal Land Bank model in the United States [10,11]. Drawing on foreign experience, China's farmland finance is also in continuous exploration and has developed a variety of forms such as farmland mortgages, farmland banks, farmland trusts, and farmland securities [12], among which the development of farmland mortgages is the most mature. Therefore, most scholars focus their research on the impact effects of farmland finance on farmland mortgages.

Throughout the existing literature at home and abroad, many scholars have extensively discussed the policy effects of farmland mortgage loans, but the conclusions are not the same. Specifically, they can be summarized into the following two types of views: Some scholars believe that farmland mortgage loans can release "policy dividends". They generally believe that farmland mortgage loans can alleviate rural credit constraints by activating land capital [13], increase factor inputs such as labor and capital in agriculture [14], and improve large-scale production, agricultural technology level, and agricultural output [15,16], thereby increasing farmers' income and releasing "policy dividends" [17]. Another group of scholars believe that farmland mortgage loans may instead slip into the "policy trap". This is mainly because of the imperfect supporting system, the superposition of multiple risks such as credit risk and business risk, and the low willingness of financial institutions and farmers to participate [18]. For example, Tassel (2004) [19] found that in Bolivia and

Mexico, the asymmetry in the assessment of land value between financial institutions and farmers led to farmers not only being unenthusiastic about land property mortgage loans but even boycotting the land property as collateral for loans. Gu et al. (2019) [20], using questionnaire survey data on farmers in the pilot area of Donghai County, Jiangsu Province, China, in 2015, found that there existed a larger portion of farmers facing new transaction cost rationing, risk rationing, and complete quantity rationing, which made the credit rationing challenge not effectively solved. Further, based on the loan data of rural financial institutions covering 982 counties, Ma et al. (2023) [21] found that the FMRML did not significantly increase the rural financial supply at this stage by means of the policy shock of China's pilot policy of the FMRML in 2016. Hu et al. (2021) [22] also found that the effect of policy implementation was not satisfactory through a case study of the pilot demonstration area—Pengshan District, Meishan City, Sichuan Province. The six local banks involved in the business of the FMRML implemented very few projects and loans in the course of the business and did not play an obvious role in supporting local agricultural production. In addition, there may be regional differences in the impact effect of the FMRML due to factors such as differential policy trust, farmers' preferences for loan attributes, and different scales of land development space [23].

It is not difficult to find through the above literature review that, firstly, the relevant research on the policy effect of farmland mortgage loans is relatively rich, but there are many controversies. The possible reason for this is that most of the existing research uses micro-survey data or case analysis, the sample representativeness is insufficient, and the macro-level evaluation based on large sample data is lacking. Secondly, the evaluation of the policy effect is mostly from the perspective of alleviating credit constraints, improving agricultural production conditions, and increasing farmers' income. However, there is little literature on the evaluation of the farmland mortgage loan policy from the perspective of the regional overall agricultural economy, that is, the study of the impact and mechanism of farmland mortgage loans on CAEG. Different from the existing literature, this paper makes new attempts in the following aspects: Firstly, considering that counties are the basic units for the implementation of the national economic development strategy, this paper adopts the panel data of 2045 counties in China from 2011 to 2020 and uses the difference-in-differences (DID) method and the synthetic control method (SCM) to examine the impact of the farmland mortgage loan policy on local agricultural economy. The amount of sample data can solve the endogenous problem of the model and greatly enhance the authenticity of the empirical results. Secondly, based on the quasi-natural experiment of China's FMRML pilot policy, this paper systematically examines its impact on CAEG, which can provide useful thinking for exploring the high-quality development path of county agricultural economy in China and other developing countries. Thirdly, this paper identifies the internal mechanism of the FMRML pilot policy affecting CAEG to the extent possible and explains why the policy has not driven local agricultural economic development from the perspectives of "people–land–money". On this basis, it puts forward problems that should be corrected in the subsequent implementation of the policy.

3. Institutional Background and Research Hypothesis

In China, for a long period of time after the reform and opening up, a "two-rights-division" farmland system was implemented, whereby the ownership of farmland was vested in the collective and farmers had the contract and management right of land (right to use). *The Guarantee Law of the People's Republic of China*[2] promulgated in 1995 and *the Property Law of the People's Republic of China*[3] promulgated in 2007 clearly stipulate that the right to use cultivated land belonging to the collective cannot be mortgaged. As a result, the capital attributes of rural land have not been activated due to China's farmland system and land ownership characteristics, and the development of farmland mortgages has long been a restricted area for financial innovation. This has also directly contributed to the problem of insufficient capital for the advancement of agricultural modernization [24]. The contract right and management right of land were separated with the formal introduction

of the "separation of three rights" reform of rural land, which led to the realization of "stabilizing the contract right of farmers and releasing the land management right on the basis of implementing the collective ownership of rural land". The institutional framework and legislative climate around farmland mortgages are maturing. To resolve this issue, the People's Bank of China, along with five other departments, jointly released the Interim Measures for Pilot Mortgage Loans for the Management Right of Contracted Rural Land in 2016. This document states unequivocally that "banking financial institutions are permitted to issue loans to eligible contractor farmers or agricultural business entities by using the management right of contracted land as collateral". Among these, home contracting grants farmers the right to manage their land, while legal circulation grants agricultural business companies this same ability. The act brought China's farmland mortgage policy reforms to a whole new level of strength, breadth, and depth. It made specific provisions on mortgage conditions, loan management, risk disposal, etc., and designated 232 counties (cities and districts), including Beijing's Daxing District, as the pilot counties for the FMRML. Additionally, it permitted pilot areas to postpone the implementation of pertinent legal provisions during the pilot period. All of these measures helped to promote the FMRML pilot work in a truly comprehensive manner.

The original intention of China's pilot policy of the FMRML was to effectively revitalize rural land resources and increase medium- and long-term and large-scale capital investment in agricultural production, and the ultimate goal is to promote farmers' income and agricultural economic growth. Neoclassical economic theory holds that economic growth is restricted by labor, technology, capital, and other factors of production. Based on this theory, in order to achieve the ultimate goal of agricultural economic growth, the expected path of the pilot policy is the activation of the three types of agricultural economic growth driving factors of "people–land–money". That is to say, through the main body cultivation effect, the scale effect of agricultural land management and the financial supply effect should promote CAEG. Specifically, the loan policy is inclined to the new agricultural business entities with moderate scale operation, aiming at accelerating the return of urban talents to rural areas, cultivating more new agricultural business entities, and activating the key factor of "people" in agricultural economic growth; the policy gives the mortgage attribute of farmland management rights and realizes the transformation of land elements from "assets" to "capital", aiming to promote rural land circulation and scale management and activate the key element of "land" in agricultural economic growth; the loan policy encourages financial institutions to issue medium- and long-term loans within the remaining use period of rural contracted land management rights, aiming to increase medium- and long-term credit investment in agricultural production and activate the key element of "money" in agricultural economic growth.

However, from the perspective of practical observation, at present, China's farmland mortgages and farmland finance based on this are still in their infancy, the institutional system is not perfect, the scale effect is not obvious enough, and the systemic risk is large. At this time, the pilot policy of the FMRML has not fully opened up the above three transmission paths, and the policy effect on CAEG is not obvious. Specifically, it is manifested in the lagging development of new agricultural business entities, the small scale of farmland management, and the insufficient supply of agricultural finance. A more important fact is that, due to China's imperfect farmland mortgage system, certain agricultural business entities have been cheating on policy subsidies, with loans flowing to "non-farming", making it extremely easy to form non-performing loans. It worsens the imbalance between urban and rural resources and the systemic risk associated with rural finance, which is detrimental to the growth of county agriculture.

The following issues have been identified:

1. From the perspective of the cultivation of new agricultural management entities, in reality, the farmland management rights of new agricultural management entities are obtained through land transfer, and there are unsustainable problems with property rights during the mortgage period, making it difficult to obtain farmland mortgage

loans. Taking farmers' professional cooperatives as an example, farmers invest in cooperatives through the discount of farmland management rights, and the two sides sign a land transfer agreement for a certain period of time, but the dividends are basically paid once a year. In fact, after paying the dividends, the management rights are really transferred to the cooperative side. For the management rights of the next few years, although the agreement has been signed, but because the dividends have not been paid, they can only be considered as creditor's rights, and this "management right" actually has no mortgage value. Therefore, in the case of one-year dividends, the new agricultural business entities to mortgage land management rights are actually a kind of empty transfer of management rights, without a substantial mortgage [25]. This is the same as tenant's mortgaging a landlord's home. As a result, they are frequently rejected by financial institutions as loan collateral, which limits the ability of new agricultural business entities to obtain funding. In order to establish new agricultural business organizations, it is challenging to draw talented individuals from urban areas to rural areas, and the CAEG is lacking in its core.

2. From the perspective of the scale of farmland management, the key difficulty in the implementation of farmland mortgage loans is that it is difficult to value and dispose of farmland management rights. These two difficulties determine that the effectiveness of farmland management rights as collateral is low, and it is difficult to promote farmland transfer and scale operation. Firstly, collateral valuation is an important part of loan issuance; the existing methods of farmland value assessment are mainly the income reduction method, market comparison method, cost approximation method, etc. These assessment methods are different, and there is a gap with reality. At present, there is no unified, scientific, reasonable, and standardized assessment standard for the value of farmland management right, which impedes the process of bank lending. Secondly, collateral disposal is another important reason that affects the issuance of loans. Collateral disposal mainly has three forms: transfer, change, and realization, which requires a more active collateral trading platform. However, farmland belongs to the thin market, with poor liquidity and realization. The development of China's farmland trading market lags behind, and the efficiency of disposal and realization is low, which seriously restricts the enthusiasm of financial institutions to participate in this business. For example, in pilot areas such as Xinyi City in Jiangsu Province, Wuhan City in Hubei Province, and Zaozhuang City in Shandong Province, defaults by borrowers and difficulties in disposing of mortgaged farmland have occurred [26].
3. Farmland mortgage loans were inadequate in many places during the pilot phase, and the quantity of loans did not reach the level necessary for regional agricultural economic growth, as seen from the standpoint of the agricultural financial supply level. As a result, it will be challenging for the program to fully reap its benefits in terms of agricultural economic growth. For instance, since the FMRML's establishment in Shaanxi Province's Nanzheng District, the quantity, size, and profit of the loans made have all been modest, and it has been challenging to create an impact on a big scale. This is due to two factors: First of all, the conditions necessary for the policy's implementation are not met. Mortgage financing of land management rights requires clear ownership, and during the pilot policy phase, land contract management rights certificates were not issued quickly. Farmers did not receive all of the land contract management rights certificates that they were due, and in some pilot areas, townships and village committees still lacked these certificates. This limited the transfer of contracted land in rural areas, hindered the realization of the right to mortgage financing, and hampered the pilot program's advancement. As of the end of September 2018, in 45 pilot areas of the FMRML, rural contracted land had been certified but land contract management rights certificates had not yet been issued[4]. Secondly, the effective supply of financial institutions is insufficient. An (2017) [27] also found, through research in four regions such as Tongxin County in Ningxia, that local governments provide some guidance on the interest rate for the FMRML,

which mostly fluctuates within 50% of the benchmark interest rate, that is, between 6% and 9.6%. However, this interest rate is not sufficient to cover the costs of financial institutions in carrying out this business, resulting in insufficient market incentives for financial institutions to carry out this business, and the "policy nature" of the FMRML is stronger than the "market nature".

4. From the perspective of loan flow, some agricultural management organizations have experienced distortions in the flow and use of loans after they have been approved, exacerbating the mismatch of resources between urban and rural areas, which is not conducive to CAEG. The *Interim Measures for Pilot Mortgage Loans for the Management Right of Contracted Rural Land* stipulates that "the mortgage loans on the operating right of contracted land obtained by the borrowers shall be mainly used for legitimate purposes recognized by the lenders, such as agricultural production and operation". However, there is no supporting policy to establish the systemic compliance of its business, that is, it fails to clarify the relevant systemic rules and regulate the specific operational practices. Therefore, in reality, agricultural operators lack regulation and stability in land transfer operations. Because of their profit-driven nature, some agricultural operators, such as agribusinesses, have taken advantage of policy incentives to obtain loans at lower interest rates. Instead of using the money for agricultural purposes, they have invested it in fixed assets like energy, real estate, and iron and steel, as well as other cities and towns. This has led to a flow of loans to "non-agricultural and non-grain" industries. The concentration of labor, technology, and other variables in towns, coupled with the flow of finances to towns rather than the countryside, exacerbates the resource mismatch between urban and rural areas and impedes CAEG and urban–rural integration.

The above series of problems have led to the fact that although the pilot policy of the FMRML has the original intention of supporting agriculture, the level of agricultural economic development in the pilot areas may not have been fundamentally improved. To sum up, this paper puts forward the following hypothesis to be tested: in reality, the pilot policy of the FMRML in China has not significantly activated the three driving factors of agricultural economic growth of "people–land–money" but has aggravated the mismatch of county resources, which means that the pilot policy may not drive the rapid development of local agricultural economy as expected.

4. Empirical Strategy and Data Description

4.1. Empirical Strategy

In order to test the impact of China's FMRML policy on CAEG, this paper compiles panel data of 2045 counties in 31 provinces of China from 2011 to 2020, including 209 pilot counties of the FMRML, and constructs a bidirectional fixed-effects difference-in-differences model based on Ran et al. (2023) [28]. The specific model is as follows:

$$Y_{it} = \alpha_0 + \alpha_1 fed_{it} + \sum_{j=1} \alpha_j control_{ijt} + \eta_i + \delta_t + \varepsilon_{it} \quad (1)$$

In Equation (1), Y_{it} is the explained variable, including the logarithm of the actual value added of the primary industry and the actual per capita value added of the primary industry of county i in period t, which is used to measure the level of agricultural economic development. fed_{it} is the policy variable of farmland mortgages, specifically $fed_{it} = treat_i \times post_t$, *treat* denotes the dummy variable of being selected as a "pilot county of the FMRML" (the selected assignment is 1, the unselected assignment is 0), and *post* is the dummy variable of pilot time (the assigned value before the selection is 0, and the assigned value after the selection is 1). The estimated coefficient α_1 of fed is the focus of this paper; if the policy is effective, then α_1 is significantly positive. The control is a set of other control variables that affect the performance of county economic development; η_1 represents sample individual fixed effects, that is, endowment characteristics that do not change over time at the county level; δ_t represents time fixed effects, that is, controlling the

factors that change only over time; and ε_{it} indicates a residual term independent of time and region.

4.2. Indicator Selection

4.2.1. Explained Variables

The level of county agricultural economic development: This paper measures the level of county agricultural economic development by the value added of the primary industry (lnGDP1) and the per capita value added of the primary industry (lnPGDP1). Based on the GDP price index in 2010, the value added of the primary industry is deflated and the logarithm is taken, which is consistent with the practice of authoritative literature [29,30].

4.2.2. Core Explanatory Variables

The pilot policy of the FMRML (fed): In order to break the bottleneck of agricultural financing, in recent years, the Chinese government has taken farmland mortgages as a breakthrough and increased the pace of reform of farmland financialization [31]. Although many regions in China have conducted a lot of exploration and practice in rural land mortgage financing, the scope of influence was limited only to local areas, until the introduction of the FMRML pilot policy in 2016, when the scope of influence was expanded to the whole country. Therefore, this paper argues that the FMRML pilot policy can effectively represent the innovation progress of farmland mortgages in China and adopts the FMRML pilot policy with exogenous shocks as the core explanatory variable in the empirical test.

4.2.3. Control Variables

In order to accurately reveal the impact effect of the FMRML pilot policy on CAEG and obtain more robust estimation results, this paper refers to existing studies and combines the sample data characteristics of this paper to select the following six variables to control the interference of exogenous factors: (1) County industrial structure (str): the change and adjustment in local industrial structure is an important source of economic fluctuation, which will accordingly have an impact on its own agricultural economy, and the difference in industrial structure between different regions will also have different effects on agricultural economy. (2) County government intervention degree (gov): Fiscal support and financial support are important sources of funds for agricultural production. The FMRML pilot policy reflects the financial support of financial institutions. Therefore, the degree of government intervention is used here to reflect the government's fiscal support for county agricultural development. (3) County urban and rural economic characteristics (tow): County urban and rural economic characteristics are reflected in the proportion of the number of towns and townships under the jurisdiction. Chinese governments at all levels, generally based on the total population, economic conditions, infrastructure, and other aspects, establish the criteria for organic towns. The local "removal of townships and setting up of towns" will have an impact on their own agricultural economy, and the urban and rural economic differences between different regions will also have different effects on the agricultural economy. (4) County residents' savings level (dep): high savings generally means low consumption, including low agricultural productive consumption, which will have a certain impact on agricultural mechanization, scale, and even agricultural economic growth. (5) County education endowment conditions (edu): as the most important source of human capital, basic education is of great significance to the "intellectualization" construction of agricultural industry and the high-quality development of agricultural economy. (6) County informatization level (inf): At present, China vigorously promotes the development of agricultural informatization, that is, to drive agricultural modernization with informatization guidance and to promote the infiltration and integration of modern information technology into various fields of agriculture and rural areas. Therefore, the level of county informatization will have a certain impact on agricultural economic growth. The specific definitions are shown in Table 1.

Table 1. Control variables and their definitions.

Variable Name	Variable Symbol	Definition
County industrial structure	str	The proportion of the added value of the secondary industry in county GDP
County government intervention degree	gov	The ratio of general public budget expenditure to county GDP
County urban and rural economic characteristics	tow	The proportion of the number of towns in the total number of towns and townships
County residents' savings level	dep	The ratio of residents' savings deposit balance to county GDP
County education endowment condition	edu	The ratio of the number of students in ordinary middle schools to the total population of the county
County informatization level	inf	The ratio of the number of fixed telephone subscribers to the total population of the county

4.3. Data Sources and Statistical Characteristics

The data used in this paper include two parts: the data on the FMRML pilot policy and the data on county economic characteristics. Among them, the pilot policy data come from the website of the People's Bank of China; the data on county economic characteristics come from *China County Statistical Yearbook (2012–2021)*, and some counties with serious data deficiencies are excluded. The two parts of the data are matched to construct the county panel data, and finally, 2045 valid estimation samples are obtained. Table 2 shows the descriptive statistics of the variables.

Table 2. Descriptive statistics of variables.

Variable Name	Obs	Mean	S.D.	Min	Max
lnGDP1	20,450	11.9825	1.0518	7.3856	14.3104
lnPGDP1	20,450	8.4178	0.6753	3.0339	12.5353
fed	20,450	0.0511	0.2202	0.0000	1.0000
str	20,450	0.4187	0.1609	0.0131	0.9773
gov	20,450	0.3252	0.3502	0.0049	16.7352
tow	20,450	0.6335	0.2569	0.0000	1.0000
dep	20,450	0.7716	0.4115	0.0128	7.3447
edu	20,450	0.0499	0.0579	0.0002	3.0950
inf	20,450	0.1108	0.1056	0.0001	4.1245

5. Analysis of Empirical Results

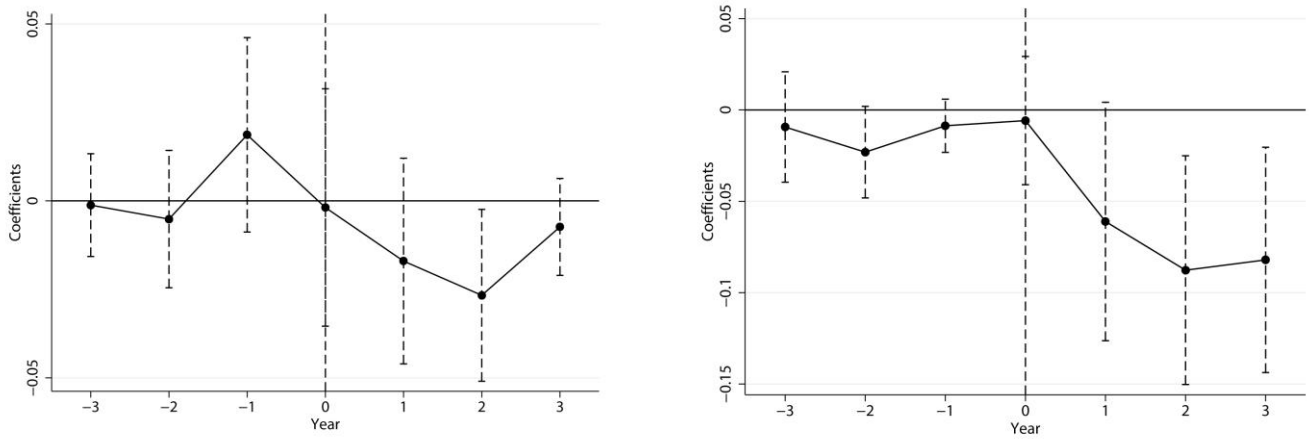
5.1. Parallel Trend Test

The fundamental tenet of the difference-in-differences model states that the treatment group and the control group must maintain an approximately balanced time trend prior to the policy shock. That is to say, before the introduction of the FMRML pilot policy, the level of economic development among all samples meets the assumption of a parallel trend, while after the introduction of this policy, there are significant differences in economic development trends among the samples whether they are selected as pilot counties or not. Hence, to test for a parallel trend, this paper refers to the practice of Boler et al. (2015) [32] and constructs the following estimation model:

$$Y_{it} = \alpha_0 + \alpha_1 fed_{it}^{-3} + \cdots + \alpha_7 fed_{it}^{3} + \sum_{j=1} \alpha_j control_{ijt} + \eta_i + \delta_t + \varepsilon_{it} \quad (2)$$

In Equation (2), fed_{it}^{0} denotes the year when county i was selected as a pilot county for the FMRML, fed_{it}^{-c} is the cth year before county i was selected as a pilot county (c = 1, 2, 3), fed_{it}^{j} is the jth year after county i was selected as a pilot county (j = 1, 2, 3), and the rest of the variables are the same as in Equation (1). The estimation results are shown in Figure 1 (where the horizontal axis denotes the periods before and after the pilot policy,

and the vertical axis is the corresponding estimated coefficients and confidence intervals). It can be seen that before the impact of the pilot policy, there was no significant difference in the value added of the primary industry and the per capita value added of the primary industry between the pilot counties and the non-pilot counties, satisfying the parallel trend assumption. After the impact of the FMRML pilot policy, the per capita value added of the primary industry in the pilot counties is much lower than that in the non-pilot counties, and there is no discernible difference in the value added of the primary industry between the pilot counties and the non-pilot counties. This suggests that there has not been much of a promotion of CAEG by the FMRML pilot strategy.



(**a**) (**b**)

Figure 1. Parallel trend test results. (**a**) The explained variable is lnGDP1; (**b**) the explained variable is lnPGDP1.

5.2. Baseline Estimates

5.2.1. Results of the Baseline Estimation: Has China's Pilot Policy of FMRML Promoted CAEG

The baseline estimation of this paper adopts a bidirectional fixed-effects model to correct for the heterogeneity caused by county economic features and time factors, and the specific estimation results are shown in Table 3. Taking lnGDP1 as the explained variable, the estimated coefficient of the FMRML pilot policy is −0.0082 without other control variables in column (1), but it is not significant, which indicates that the introduction of the FMRML policy has not promoted the growth of the value added of the primary industry in the region, and there is a "policy trap". The estimated coefficient is slightly reduced after adding control variables in column (2), but it is still not significant, indicating that the "policy trap" does exist. Taking lnPGDP1 as the explained variable, the estimated coefficients of the FMRML pilot policy are negative at the 1% significance level in columns (3) and (4), which designates that the pilot policy has also not promoted the growth of the per capita value added of the primary industry in the region. The results of the benchmark regression suggest that China's pilot policy of the FMRML has not been effective in stimulating CAEG and that there is a "policy trap".

The regression results of the control variables show that informatization plays a prominent role as a new means and new kinetic energy to promote CAEG. Basic education plays an obvious role as a "soft support" of agricultural economic growth, while an excessive savings rate has a negative impact on CAEG, and excessive industrialization will cause certain erosion and suppression of agriculture. From the experience of county-level governments, as more and more governments do not rationally allocate public resources, the promotion effect of government intervention on CAEG is becoming less and less obvious. From the perspective of the development of county urban and rural economy, at present, China is actively promoting the construction of new urbanization, which can bring the "city" and

"village" closer, promote the two-way flow of various elements, and then promote the vigorous development of county agricultural economy and realize the win–win situation of urbanization and agricultural growth.

Table 3. Impact of the FMRML pilot policy on CAEG: baseline estimates.

	County Agricultural Economic Development Level: lnGDP1		**County Agricultural Economic Development Level: lnPGDP1**	
	(1)	**(2)**	**(3)**	**(4)**
fed	−0.0082	−0.0041	−0.0463 ***	−0.0340 ***
	(−1.21)	(−0.32)	(−3.01)	(−2.72)
str		−0.2426 ***		−0.2137 ***
		(−16.29)		(−7.58)
gov		−0.0302 ***		0.0062
		(−4.27)		(0.46)
tow		0.1215 ***		0.0725 ***
		(9.42)		(2.97)
dep		−0.1361 ***		−0.1371 ***
		(−23.23)		(−12.37)
edu		0.0560 ***		3.6062 ***
		(2.81)		(95.57)
inf		0.2054 ***		0.3223 ***
		(12.59)		(10.44)
Constant	11.6929 ***	11.7896 ***	8.1339 ***	7.9674 ***
	(3594.91)	(974.51)	(1104.88)	(348.09)
County fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
R^2	0.5452	0.5706	0.1829	0.4609
N	20,450	20,450	20,450	20,450

Note: *** indicates significant at the 1% level, respectively, with t-statistics in parentheses.

5.2.2. Mining the Causes: Why China's Pilot Policy of FMRML Has Failed to Promote CAEG

Basic regression analyses show that the implementation of the FMRML pilot policy has not had the expected positive effect on the local agricultural economic development. Therefore, what are the factors that have led to the failure of this innovative rural financial activity to release the policy dividend? The hypothesis part of the previous research conjectures that the failure to significantly activate the "people–land–money" three major driving factors of agricultural economic growth and the aggravation of county resource mismatch are the key factors that induced the adverse effects after the implementation of the pilot policy. In order to verify the above conjecture, this paper constructs a mediating effect model to analyze whether the FMRML pilot policy promotes the cultivation of new agricultural business entities, the large-scale operation of farmland, the increase in agricultural financial supply, and the rational allocation of resources. In this way, we can identify the mechanism of the impact of the FMRML pilot policy on the local agricultural economic development. The model is constructed as Equations (3) and (4):

$$median_{it} = \beta_0 + \beta_1 fed_{it} + \sum_{j=1} \beta_j control_{ijt} + \eta_i + \delta_t + \varepsilon_{it} \quad (3)$$

$$Y_{it} = \gamma_0 + \gamma_1 fed_{it} + \gamma_2 median_{it} + \sum_{j=1} \alpha_j control_{ijt} + \eta_i + \delta_t + \varepsilon_{it} \quad (4)$$

where $median_{it}$ denotes the mechanism variables of county i in period t, including the cultivation of new agricultural management entities (rceo), large-scale operation of farmland (land), the level of agricultural financial supply (loan), and the degree of resource mismatch (mis), and the other variables are defined in the same way as in Equation (1). Specifically, considering that farmers' professional cooperatives are the main components of new agricultural business entities, this paper uses the number of registered farmers' professional

cooperatives in counties to measure the cultivation of new agricultural business entities; the average crop planting area per household is used to measure the large-scale operation of farmland; and the total amount of agricultural loans of financial institutions is used to measure the level of agricultural financial supply. Considering that the mismatch of resources between urban and rural areas is mostly reflected in the "siphon effect" of urban areas on rural areas, that is, resources do not stay in rural areas but flow to urban areas, the logarithm of urban fixed asset investment is used to measure the degree of county resource mismatch.

With lnGDP1 as the explained variable, the estimation results are shown in Table 4. In columns (2), (4), (6), and (8), the cultivation of new agricultural management entities, large-scale operation of farmland, agricultural financial supply, and county resource mismatch are included in the estimation equation of county agricultural economic development. It can be seen that the estimation coefficients of the first three on CAEG are significantly positive, and the estimation coefficients of resource mismatch on CAEG are significantly negative. In addition, the estimation coefficient of the FMRML pilot policy on CAEG is still negative, but the absolute value of the coefficient decreases from 0.0041 in the benchmark regression to 0.0017, 0.0022, 0.0014, and 0.0027. This shows that the cultivation of new agricultural management entities, the large-scale operation of farmland, agricultural finance supply, and county resource mismatch are closely related to county agricultural economic development and play an intermediary role in the path of the FMRML pilot policy affecting CAEG. The results of columns (1), (3), (5), and (7) show that when the cultivation of new agricultural business entities, large-scale operation of farmland, agricultural financial supply, and county resource mismatch are used as explanatory variables, after controlling the time fixed effect and the county fixed effect, the impact of the FMRML pilot policy on the first three indicators is either not obvious or significantly negative, with a positive impact on the latter indicator. This indicates that farmland mortgage loans worsen county resource mismatch rather than encouraging the development of new agricultural management entities, large-scale farmland operations, or agricultural financial supply. This makes it easier to see why the pilot policy's implementation has not produced the expected outcomes.

Table 4. Mechanism test: how FMRML pilot policy affects CAEG.

Variable	Mechanism 1: Cultivation of New Agricultural Business Entities		Mechanism 2: Large-Scale Operation of Farmland		Mechanism 3: Agricultural Financial Supply		Mechanism 4: County Resource Mismatch	
	(1) rceo	(2) lnGDP1	(3) land	(4) lnGDP1	(5) loan	(6) lnGDP1	(7) mis	(8) lnGDP1
fed	−0.1235 ***	−0.0017	0.0313	−0.0022	−0.0278 **	−0.0014	0.0343 *	−0.0027
	(−3.26)	(−0.26)	(0.74)	(−0.34)	(−2.17)	(−0.22)	(1.83)	(−0.41)
rceo/land/loan/mis		0.0030 **		0.0039 ***		0.0249 ***		−0.0167 ***
		(2.31)		(3.39)		(6.53)		(6.43)
str	0.3604 ***	−0.2437 ***	0.2774 ***	−0.2437 ***	0.4545 ***	−0.2539 ***	0.6772 ***	−0.2539 ***
	(4.21)	(−16.35)	(2.90)	(−16.36)	(15.79)	(−16.95)	(16.00)	(−16.94)
gov	0.0107	−0.0302 ***	−0.0368	−0.0301 ***	0.2999 ***	−0.0377 ***	0.1047 ***	−0.0320 ***
	(0.26)	(−4.28)	(−0.81)	(−4.25)	(21.95)	(−5.27)	(5.21)	(−4.52)
tow	−0.0439	0.1216 ***	0.1059	0.1211 ***	−0.0647 ***	0.1231 ***	−0.2441 ***	0.1256 ***
	(−0.59)	(9.43)	(1.28)	(9.39)	(−2.59)	(9.55)	(−6.66)	(9.73)
dep	−0.0677 **	−0.1359 ***	−0.0723 *	−0.1359 ***	−0.1570 ***	−0.1322 ***	−0.5615 ***	−0.1268 ***
	(−2.01)	(−23.20)	(−1.92)	(−23.19)	(−13.87)	(−22.47)	(−33.72)	(−21.02)
edu	−0.0432	0.0561 ***	0.0354	0.0558 ***	0.1330 ***	0.0526 ***	−0.0945 *	0.0575 ***
	(−0.38)	(2.81)	(0.28)	(2.80)	(3.45)	(2.64)	(−1.67)	(2.89)
inf	0.1534	0.2050 ***	−0.0877	0.2058 ***	0.2888 ***	0.1982 ***	0.3318 ***	0.1999 ***
	(1.64)	(12.56)	(−0.84)	(12.61)	(9.16)	(12.13)	(7.15)	(12.24)
Constant	1.1801 ***	11.7861 ***	0.8871 ***	11.7862 ***	8.0635 ***	11.5888 ***	13.0138 ***	11.5727 ***
	(16.99)	(966.77)	(11.41)	(971.07)	(344.92)	(350.89)	(378.60)	(322.91)
County fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.1112	0.5708	0.0026	0.5709	0.6460	0.1112	0.5708	0.0026
N	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450

Note: ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively, with t-statistics in parentheses.

5.3. Robustness Tests

5.3.1. Considering Sample Selection Bias

Despite being an exogenous decision, China's FMRML pilot policy is likely to have a natural endogeneity between the policy and the county agricultural economy; that is, a county's likelihood of being chosen as a pilot county increases with its level of agricultural economic development. In order to address the endogeneity problem caused by the possible selectivity bias of the policy's pilot districts and to further improve the credibility of the conclusions, this paper employs the propensity score matching (PSM) method proposed by Rosenbaum et al. (1983) [33] to conduct robustness analyses of the FMRML policy's effects. The specific method is as follows: use the control variables in Equation (1) as covariates to construct a Logit regression model to estimate the propensity score, then use the one-to-one nearest neighbor matching method to match, and finally, use the matched samples to conduct a DID regression. The estimation results are shown in the PSM-DID section of Table 5. The results show that the estimated coefficients of the FMRML pilot policy on the value added of the primary industry and the per capita value added of the primary industry are both significantly negative, which is consistent with the results of the benchmark regression.

Table 5. Robustness tests: considering sample selection bias.

Variable	PSM-DID	
	lnGDP1	**lnPGDP1**
fed	−0.0016	−0.0325 ***
	(0.01)	(0.01)
str	−0.4136 ***	−0.3601 ***
	(0.02)	(0.03)
gov	−0.0647 ***	0.0413 **
	(0.01)	(0.02)
tow	0.1327 ***	0.0851 ***
	(0.01)	(0.02)
dep	−0.1696 ***	−0.1806 ***
	(0.01)	(0.01)
edu	0.0534 ***	3.6006 ***
	(0.02)	(0.04)
inf	0.2138 ***	0.3289 ***
	(0.02)	(0.03)
Constant	11.8953 ***	8.0443 ***
	(0.01)	(0.03)
County fixed effect	YES	YES
Time fixed effect	YES	YES
R^2	0.5783	0.4631
N	20,395	20,395

Note: *** and ** indicate significant at the 1% and 5% levels, respectively, with t-statistics in parentheses.

5.3.2. Excluding the Effects of Other Policies

In order to identify more precisely the effect of the FMRML pilot policy on CAEG, it is necessary to exclude the interference of other policies on CAEG as much as possible. The FMRML pilot policy was launched in 2016, and this paper examines a number of additional measures that the Chinese government put in place at the same time to help and promote agriculture: First off, the Chinese government carried out the largest project to reduce poverty in human history between 2015 and 2020. All of the nation's impoverished counties were removed from the poverty list, which also solved the issue of absolute poverty in China. Since 34 of the 832 former national-level poor counties were not included in the initial sample, 798 counties were actually eliminated, making all former national-level poor counties irrelevant in this work. Secondly, in February 2016, December 2016, and October 2017, the National Development and Reform Commission and relevant departments se-

lected 341 pilot counties (cities and districts) in three batches to carry out the pilot work of supporting migrant workers and others to return home to start businesses, which has become an important way to stimulate CAEG. This paper excludes the impact of the above policy by eliminating all the pilot counties for returning-home entrepreneurship. Thirdly, the farmers' housing property rights mortgage pilot and the FMRML pilot are collectively referred to as the "two rights" mortgage pilot program, which was piloted at the same time and is designed to implement the usufructuary right of rural land and to give farmers more property rights. There are fifty-nine pilot counties of "farmers' housing property rights mortgage", of which four counties are not in the sample, and fifty-five counties are actually eliminated. Table 6 reports the estimated results of the robustness test. It is easy to see that the FMRML pilot policy still does not significantly promote CAEG after excluding the policies of poverty alleviation, returning-home entrepreneurship, and the farmers' housing property rights mortgage, further proving the robustness of the benchmark regression conclusion.

Table 6. Robustness tests: excluding the effects of other policies.

Variable	Exclusion of Former National Poor Counties	Exclusion of Pilot Counties for Returning-Home Entrepreneurship	Exclusion of Pilot Counties for Farmers' Housing Property Rights Mortgage
	lnGDP1	lnGDP1	lnGDP1
fed	−0.0031	−0.0106	−0.0060
	(−0.41)	(−1.36)	(−0.88)
str	−0.1923 ***	−0.2294 ***	−0.2336 ***
	(−10.75)	(−14.51)	(−15.54)
gov	−0.1304 ***	−0.0293 ***	−0.0309 ***
	(−4.62)	(−4.02)	(−4.35)
tow	0.0344 **	0.1183 ***	0.1218 ***
	(2.09)	(8.33)	(9.26)
dep	−0.0830 ***	−0.1314 ***	−0.1362 ***
	(−10.60)	(−21.00)	(−23.03)
edu	0.0471 *	0.0515 **	0.0481 **
	(1.93)	(2.44)	(2.38)
inf	0.1408 ***	0.2681 ***	0.2014 ***
	(7.77)	(13.75)	(12.15)
Constant	12.1872 ***	11.7263 ***	11.7752 ***
	(738.81)	(903.87)	(961.97)
County fixed effect	YES	YES	YES
Time fixed effect	YES	YES	YES
R^2	0.4982	0.5624	0.5701
N	12,470	17,380	19,900

Note: ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively, with t-statistics in parentheses.

5.4. Heterogeneity Analysis

Due to the vast territory of China, there are great differences in natural conditions and resource endowments among different regions, and there are obvious gradient characteristics in the development of county agriculture in China, which may lead to the heterogeneity of the impact of the FMRML pilot policy on CAEG. Specifically, the financial ecological environment, agricultural factor endowment, and rural land system reform process in different regions of China are not the same, and the agricultural economic development has unbalanced characteristics, which may affect the implementation effect of the FMRML pilot policy. Therefore, this provides a good perspective for further examining the boundary conditions of the FMRML pilot policy affecting CAEG. According to the classification criteria of the National Bureau of Statistics of China[5], this paper divides the overall sample into four sub-samples (including 511 counties in the east, 495 counties in the center, 889 counties

in the west, and 150 counties in the northeast) according to the provinces (autonomous regions and municipalities directly under the central government) to which they belong. The estimated results are shown in Table 7, which shows that the estimated coefficients of the FMRML pilot policy on CAEG are non-consistent, significantly negative in the central region and negative but non-significant in the western, northeastern, and eastern regions. This suggests that for the four major geographic regions, although none of the policies led to local agricultural economic growth, there were differences in the degree of impact, with a significant "blocking" effect only in the central region.

Table 7. Impact of FMRML pilot policy on CAEG: regional heterogeneity.

Variable	Eastern Region lnGDP1	Central Region lnGDP1	Western Region lnGDP1	Northeastern Region lnGDP1
fed	−0.0118	−0.0192 *	0.0137	0.0140
	(−1.01)	(−1.76)	(1.09)	(0.59)
str	−0.2995 ***	−0.0405 **	−0.4229 ***	−0.1989 ***
	(−7.39)	(−2.01)	(−18.43)	(−3.02)
gov	−0.1275 **	0.0664	−0.0282 ***	−0.1206
	(−2.15)	(1.54)	(−4.02)	(−1.64)
tow	0.0718 **	0.0376	0.1175 ***	0.0853
	(2.40)	(1.36)	(7.43)	(1.05)
dep	−0.1303 ***	−0.0839 ***	−0.2474 ***	−0.0781 ***
	(−8.73)	(−6.05)	(−23.70)	(−3.67)
edu	0.0078	0.1198 ***	0.0290	−0.1553
	(0.28)	(3.55)	(0.79)	(−0.57)
inf	0.1269 ***	0.0465	0.1314 ***	0.1215
	(5.41)	(1.49)	(4.33)	(1.18)
Constant	12.4272 ***	11.8563 ***	11.4450 ***	12.3715 ***
	(385.00)	(555.62)	(696.77)	(181.01)
County fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
R^2	0.4431	0.5937	0.6903	0.4525
N	5110	4950	8890	1500

Note: ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively, with t-statistics in parentheses.

The possible reasons why the implementation of the farmland mortgage policy in the western region has not significantly inhibited local economic growth are as follows: On the one hand, the weak financial ecological environment and the western region's delaying land system reform, including land confirmation and transfer, make it harder to effectively implement the agricultural mortgage policy. However, the lack of information has become the primary barrier preventing farmers in the western region from employing the FMRML, owing to the region's poor development foundation and backward conditions. In addition, farmers have a lower awareness level of mortgage financing, a weaker willingness to apply for loans, and a lower level of participation, which also makes the implementation of the farmland mortgage policy less effective, and the western region has not fallen into the "policy trap". The main reason why the implementation of the farmland mortgage policy in the northeast has not significantly inhibited CAEG may be that the massive exodus of young adults from the northeast has increased the hollowing out and aging of villages, and the demand for loans is much smaller than in other regions, making it difficult to extend the pilot policy locally. The reason why the estimated coefficient of farmland mortgages to county economic performance is the smallest in the eastern region may lie in the fact that the eastern region itself has a higher level of economic development and is relatively less affected by the policy, given the significant role of economic endowment and the market environment. For the central region, in addition to Shanxi, five provinces (Henan, Hubei, Hunan, Anhui, and Jiangxi) are China's traditional agricultural provinces, so farmers' loan demand and willingness are strong. At the same time, the financial environment of

the major agricultural provinces in central China is relatively good, some land transfer experience has been accumulated, and remarkable results have been achieved. These have laid a good foundation for the promotion of the policy in the local area, and the stronger "blocking" effect in the central region is easier to understand.

6. Further Discussion

As the 209 pilot counties in the experimental group in this paper are not evenly distributed in the eastern and western regions, and the heterogeneity analysis in the previous section indicates that the policy effects differ across geographic regions, while the DID obtains the average treatment effect, it is not possible to know the performance of the policy's effects in specific districts and counties. In order to further test the policy effect of the FMRML in different districts and counties, this paper draws on the practices of Bulte et al. (2018) [34] and analyzes individual experimental groups in four regional samples of the eastern, central, western, and northeastern regions, using the synthetic control method. The specific operation is as follows: other non-pilot counties within the sample set in the provinces where the four experimental groups are located are selected as the control group, the synthetic control method is used to assign certain weights to the samples in the control group to fit a synthetic group that is similar to the experimental group before the policy treatment, and then the policy evaluation is carried out.

According to the above methods, this paper selects the four counties of Jiangsu Donghai, Henan Anyang, Ningxia Tongxin, and Heilongjiang Lanxi as the experimental group. These four counties all started the practical exploration of farmland mortgages at an early stage and have strong typicality and representativeness. Specifically, Donghai County, a traditional agricultural county with a solid foundation of agricultural production, as the first batch of pilot areas for rural property rights and rural financial reform in Jiangsu Province, has been relying on the county-level comprehensive rural property rights exchange platform to carry out the FMRML pilot project since 2010. Anyang County in Henan Province took the lead in the province's practice of the FMRML. Anyang Shangdu Rural Commercial Bank and Anyang County Sub-branch of Postal Savings Bank were established as the pilot banks, and six townships such as Honghetun Township were identified as pilot areas. In 2015, Anyang Shangdu Rural Commercial Bank issued the first mortgaged loan for the FMRML in the province's agricultural credit system. Tongxin County, located in the Ningxia Hui Autonomous Region, has a high proportion of farmers engaged in pure agricultural production. In 2003, it began to explore the farmland mortgage financing business to alleviate the shortage of funds for cattle and sheep farmers. At present, almost all townships in Tongxin County are carrying out farmland mortgages, forming the "Tongxin Model", which is a more mature model of the FMRML in China. Lanxi County in Heilongjiang Province is located in the vast northeastern plains; the vast majority of the land can be realized in concentrated and continuous operation. As a key county of national poverty alleviation and development work, Lanxi County began to explore and practice farmland mortgages in 2014, which is related to poverty alleviation work. At present, a set of development mechanisms, management models, and supporting policies have been formed.

The trend lines of the actual and synthetic values of the FMRML in the four counties of Jiangsu Donghai, Henan Anyang, Ningxia Tongxin, and Heilongjiang Lanxi from 2011 to 2020 were obtained by the synthetic control method (Figure 2a–d). Among them, the position of the vertical dashed line indicates the year when the FMRML policy began to be implemented, the solid line indicates the actual value of lnGDP1, and the dashed line indicates the synthetic value of lnGDP1. When the actual value is greater than its synthetic value, the pilot policy of the FMRML has brought a positive policy effect to county agricultural economic development, and vice versa, it has brought a negative policy effect. By comparing the paths of the solid line and the dashed line, it is found that on the left side of the vertical line (before the implementation of the FMRML policy), the trend of change between the actual value and the synthetic value is basically the same, and the

difference in the value is not large in Jiangsu Donghai, Henan Anyang, Ningxia Tongxin, and Heilongjiang Lanxi. On the right side of the vertical line (after the implementation of the FMRML policy), the two gradually deviate. Precisely, the actual agricultural economic growth path of Henan Anyang is lower than that of the synthetic group, that is, the pilot policy of the FMRML significantly inhibits CAEG; the actual agricultural economic growth paths of Ningxia Tongxin, Heilongjiang Lanxi, and Henan Anyang are sometimes higher and sometimes lower than the synthetic group paths, suggesting that the policy effect is more unstable. Overall, when all other variables are held constant, the policy significantly slows the growth of primary industry value added in the experimental group as compared to the control group. However, the impact of the policy varies across counties in various geographic regions, supporting the validity of the earlier benchmark estimation and heterogeneity analysis findings.

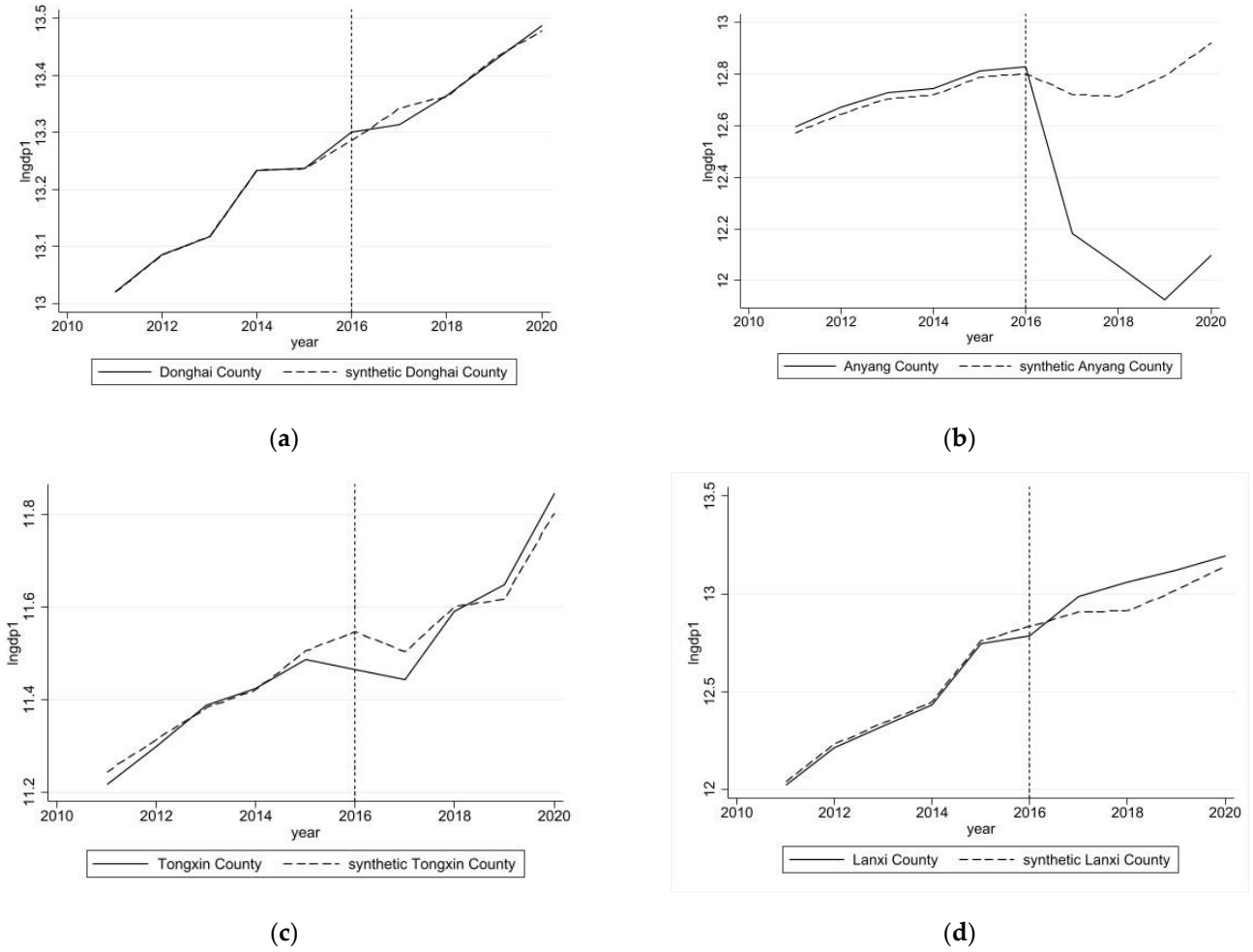


Figure 2. Comparison of economic growth (lnGDP1) paths for target and synthetic counties. (**a**) Eastern region representative: Donghai, Jiangsu Province; (**b**) central region representative: Anyang, Henan Province; (**c**) western region representative: Tongxin, Ningxia; (**d**) northeastern region representative: Lanxi, Heilongjiang Province.

7. Conclusions and Policy Recommendations

7.1. Conclusions

Farmland mortgages are anticipated to develop the moderate-scale operation of agriculture, encourage farmers to increase their income, and drive the growth of the county agricultural economy. This is because the new era and journey require more perfect financial services, thanks to the inspiration of the "De Soto effect" [35]. It is crucial to research how China's FMRML pilot policy affects CAEG in order to assess farmland mortgage poli-

cies and improve county agriculture policy systems. Based on the institutional background and development reality of farmland finance and agricultural power, this paper uses the quasi-natural experiment of the most far-reaching pilot policy of the FMRML in the field of farmland and conducts an empirical study on the panel data of 2045 counties in China from 2011 to 2020. This study finds that the pilot policy of the FMRML has not effectively promoted CAEG, and there is a "policy trap". After the robustness tests considering the sample selection bias and excluding the influence of other policies, the above conclusion is still valid. Additional mechanism identification results show that the pilot policy does not significantly activate the "people–land–money" three major driving factors of agricultural economic growth but exacerbates county resource mismatch, which together constrain the effect of farmland financialization and ultimately make it difficult to show the role of the FMRML pilot policy in promoting CAEG. From the perspective of regional heterogeneity, there is a non-consistency in the impact of the FMRML pilot policy on CAEG, with only the central region having a significant "blocking" effect, while the western, northeastern, and eastern regions are not significant.

7.2. Policy Recommendations

The empirical analysis presented in this paper suggests that, in order to effectively implement the farmland mortgage policy, we should begin with reforming the supporting system, continue to enhance the farmland mortgage loan system and its implementation techniques, encourage the development of new farmland mortgage loan products and services, and standardize and direct the growth of rural land financialization. Furthermore, it is imperative to facilitate the three channels of transmission of "people–land–money", encourage the prudent distribution of county resources, and ultimately overcome the policy trap in order to fully realize the "policy dividend" and advance CAEG. To be more precise, we ought to begin with the following three factors:

1. Enhancing the enabling policies that give farming mortgages the bare minimum of assistance. First off, while the registration and issuance of certificates for rural contracted land has essentially been finished nationwide as of right now, there are still lingering issues in certain places, such as the inability to issue certificates, the holding back of land from certification, and false information regarding certified rights. In the future, it will be crucial to advance the settlement of outstanding issues, protect the certified rights from the previous period, enhance the national land contracting information application platform's upgrading, and effectively manage the policy relationship between the confirmation of farmland rights and the extension of the second round of land contracting upon its expiration. Second, in order to encourage consistent evaluation norms, methods and procedures for determining the value of farmland management rights should be implemented nationally. In addition, local governments ought to investigate the use of independent assessment organizations, the development of a pool of experts in assessment, and financial institutions' self-evaluation in order to enhance the legitimacy and professionalism of farmland value assessments. Thirdly, in order to increase farmland's tradability, it is imperative that farmland transfer platforms be established as quickly as possible. To this end, all regions of the nation should expedite the creation of online and offline platforms for farmland property rights trading information, offering services like activity venues and filing registration for local farmland property rights transfers.
2. Increasing the willingness of borrowers and financial institutions to engage and following the path of development that is focused on the market. The government should progressively step down its engagement and establish a farming mortgage environment that is focused on the market. Financial institutions must reasonably and independently determine the collateral rate, interest rate, and actual loan amount of the FMRML, taking into account the borrower's credit status, borrowing demand and repayment ability, the value of the contracted land management right, and the method of transfer, among other factors. In order to successfully address the demand

for financial services from farmers and diverse agricultural business subjects, financial institutions must continue to support the innovation of farmland financial products and services in accordance with local conditions. In order to incentivize returning business owners and regular farmers to establish new agricultural business entities, they should also concentrate on prospective demand groups for entrepreneurs with an interest in agriculture and offer loan funds in support of innovative business models like multi-industry integration entrepreneurship based on the agricultural industry. Farmers must take on the role of village cadres in information transmission in order to increase the transparency of agricultural mortgage policy and lessen the issue of credit rationing brought on by knowledge asymmetry. To guarantee that the land management rights acquired by the new agricultural business entities are effective during the mortgage period of the following few years, it is necessary to advise the land transfer parties to sign long-term contracts and pay one-time dividends for the next few years.

3. A united front is formed by multi-party coordination to guarantee that farmland mortgage benefits the CAEG. State and local governments should define certain operational procedures, build business system compliance, explain pertinent system regulations, and adopt supporting policies concurrently with the implementation of farmland mortgage policy. Taking a cue from the "Xintian model", lending should be tightly restricted to financing agricultural output, comprehensive agricultural growth, agricultural product processing, and other economic development associated with agriculture. Financial institutions should make use of digital loan supervisory tools and financial information technology, monitor various borrower data types in real time, and dynamically assess the likelihood of their performance risks. To build a strong firewall against financial risks, the Chengdu "NongDaiTong" platform, for instance, uses big data as the foundation for modeling to monitor the borrower's business situation, living conditions, and behavioral changes. It also tracks changes in the borrower's willingness and ability to repay. To truly understand the positive relationship between the farmland mortgage policy and the county's industrial projects, farmers and other agricultural business subjects must utilize the policy for farmland mortgages in a reasonable manner. They also need to keep the funds in the county and for the county in order to realize the positive relationship between farmland mortgages and the county's economic growth and achieve win–win development.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

1 Original information from https://www.gov.cn/gongbao/content/2016/content_5086363.htm, accessed on 30 April 2024.

2 Original information from http://www.npc.gov.cn/npc/c1773/c1848/c21114/c30514/c30517/201905/t20190521_263175.html, accessed on 6 June 2024.

3 Original information from https://www.gov.cn/flfg/2007-03/19/content_554452.htm, accessed on 6 June 2024.

4 Original information from http://www.npc.gov.cn/zgrdw/npc/xinwen/2018-12/23/content_2067610.htm, accessed on 30 April 2024.

5 The eastern region includes the 10 provinces (cities) of Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan; the central region includes Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan provinces; the western

region includes the 12 provinces (autonomous regions and municipalities) of Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang, and the northeast region includes Liaoning, Jilin, and Heilongjiang. Original information from https://www.stats.gov.cn/hd/cjwtjd/202302/t20230207_1902279.html, accessed on 6 June 2024.

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