

The Impact of Real Estate Investment on Profits in the Real Economy

-- Empirical Data from China's Industrial Level

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Abstract. In recent years, with the rapid development of the virtual economy, the real economy, which is the cornerstone of China's national economy, has seen the phenomenon of "turning from real to virtual". A large number of real enterprises deviate from their main business direction and invest funds in the high-risk, high-return real estate industry. Based on the panel data of 30 provinces, municipalities and autonomous regions in China from 2000 to 2020, this paper constructs a two-way fixed-effect model to discuss the relationship between real estate investment (*Rei*) and real economic profits (*Profit*). The study found that *Rei* has a significant negative effect on real economy profits, and this effect is regional heterogeneous: in the eastern and western regions, *Rei* significantly suppresses real economy profits, but in the central region, there is no obvious impact. This paper provides a new perspective for the research on *Rei* and the development of the real economy, reveals the impact of *Rei* on the profits of the real economy, and further provides policy suggestions for regulating the cross-industry investment of real enterprises and promoting the coordinated development of the two.

Keywords: Real Estate Investment; Real Economy Profits; High-quality Development; The Two-Way Fixed Effect Model.

1. Introduction and Literature Review

1.1 Research Background

The real economy is the foundation of China's economy and an important driving force for China's economic development. Besides, whether the real economy can develop with high quality is the key to whether the growing material needs of our people can be satisfied. In recent years, General Secretary Xi Jinping has repeatedly talked about the real economy, pointing out that the real economy is the foundation of a big country, and economic development cannot be separated from reality to virtuality. In the report of the 20th National Congress of the Communist Party of China, the general secretary further pointed out that "to build a modern industrial system, we insist on focusing on the real economy for economic development." Improving the operating profit of the real economy is an important measure to achieve high-quality development of the real economy. However, with the rapid development of the digital economy, in the post-epidemic era with a complex situation, the phenomenon of China's economy "turning from real to virtual" is obvious, and the development of the real economy is facing problems such as insufficient innovation ability [1], structural imbalance between supply and demand [2], rising operating costs [3], and difficulties in enterprise financing [4]. At the same time, China's real estate industry has developed rapidly in recent years, with a total *Rei* of 498.4 billion yuan in 2000 and a *Rei* of 141443 billion yuan in 2020, 28.38 times that of 2000. This has led to a large amount of enterprise capital flowing into the real estate industry, which is not only not conducive to the real estate industry to provide high-quality products, but also has a certain negative impact on the high-quality development of China's real economy, which is not conducive to the healthy and stable development of China's national economy. This paper links *Rei* with real economy profits, and discusses the impact of *Rei* on the business performance of the real economy.

1.2 Literature Review

The impact of overheating of the real estate industry on the development of the real economy has been a hot issue of domestic and foreign scholars in recent years, mainly focusing on the independent innovation and development of the real economy, financing issues of the real economy, and industrial structure. With the growing real estate industry in China, real estate price changes are increasingly closely linked to real economic fluctuations (Liu and Hu, 2018) [5]. In terms of independent innovation of entity enterprises, on the whole, the *Rei* behavior of enterprises has a significant negative effect on the technological innovation activities of enterprises, and this effect has obvious dynamic superposition characteristics and heterogeneity characteristics (Huang et al., 2021) [6]. Peng et al. (2022), based on non-financial companies listed on China's A-shares, found that the financialization of entity enterprises significantly inhibits the technological innovation input and innovation output activities of real enterprises, and the impact is lagging and sustainable, and has a significant heterogeneous effect in different regions and types of enterprises with different levels of financial level. Ren et al. (2020) [7] further studied their channel mechanism and concluded that the economic assessment and fiscal decentralization of local governments greatly promote enterprises to invest in real estate. At the same time, enterprise *Rei* will have a significant crowding out effect on the available resources of enterprises, which in turn will have a significant negative impact on enterprises' technological innovation output activities. In terms of real economy financing, Peng et al. (2018) [8] believe that the increase in the proportion of *Rei* has a significant negative impact on the inflow of financial resources into the real economy, which in turn reduces financial efficiency and is not conducive to the high-quality and sustainable development of China's real economy. Moreover, the impact is heterogeneous, mainly reflected in the western region, economically underdeveloped areas and areas with poor real estate sales. However, Fan and Zhang (2022) [9] believe that the view, overheating real estate is an important reason for the hollowing out of the real economy, is more one-sided, and the key to achieving high-quality development of the real economy is to improve the investment and financing environment and build a modern industrial system. They found that the market-oriented reform of real estate, with financial support, has significantly promoted the development of the real economy. In terms of industrial structure, overheating of the real estate industry may promote the optimization of industrial structure in the short term, but this promotion role crowds out the development space of the industrial industry, making the optimization of the industrial structure tend to be superficial and virtualized, which is not conducive to its optimization and upgrading (Sun et al., 2018) [10].

Regarding the impact of *Rei*, domestic scholars mainly establish fixed-effect panel models, dynamic panel models, error correction models, etc. based on the panel data at the national level, and study the effect results, impact mechanisms, crowding out effects and so on. On the whole, Chen (2017) [11] believes that the short-term impact of real estate on China's economy is significantly different from the long-term impact and the effect is opposite. The rapid development of the real estate industry will promote China's national economic growth in the short term, but the promotion effect is small and the impact time is short; In the long haul, the increase in the proportion of *Rei* has significantly inhibited China's economic development for a long time (Wang, 2019) [12]. Based on the panel threshold model, Wu and Lu (2020) [13] believe that the impact of *Rei* scale on economic development is related to different degrees of land price and housing price change, and this effect shows significant nonlinear characteristics. Du and Chen (2020) [14] believe that *Rei* has a significant impact on regional innovation activities, while the impact mechanism and impact results of different regions are heterogeneous, and local government behavior plays an important role in this process. In terms of price indices, inflation in *Rei* boosted the CPI. First of all, the rise in land prices has promoted the price of commercial housing, and at the same time, real estate construction requires a large number of production factors, including labor, technology, etc., which has greatly promoted the development of related industries (Lu, 2020) [15]. However, little literature has paid attention to the impact of *Rei* on real economy profits.

Compared with the existing research, the innovation of this study lies in: First, unlike most scholars who focus on the relationship between the real estate industry and the development of the real economy, this paper conducts in-depth research on the *Rei* and the business performance of real economy, providing empirical evidence for the study of the impact of *Rei* on the real economy. Second, based on the industrial experience data at the provincial level in China from 2000 to 2020, this paper finds that *Rei* significantly inhibits the profit growth of the real economy, and provides empirical evidence for regulating the *Rei* behavior of real estate enterprises and promoting the coordinated development of *Rei* and the real economy from an empirical perspective.

2. Models, Variables and Data

2.1 Econometric Models

In order to study the impact of *Rei* on the profits of the real economy, this paper selects a two-way fixed effect model, introduces the fixed effect of time and region, and constructs the model as follows:

$$Profit_{it} = \beta_0 + \beta_1 Rei_{it} + \beta_2 Pollution_{it} + \beta_3 Highway_{it} + \beta_4 Popu_{it} + \beta_5 Patent_{it} + \beta_6 Sencond_{it} + \beta_7 Urbanization_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

In this case, the time fixing effect controls the difference between 2000 and 2020 with the changes in the domestic economic environment. Regional fixed effects control for differences between provinces and existing factors. i is the value of different provinces, and t represents different years. Among them, real economic profit (*Profit*) is used as the explained variable, and real estate investment (*Rei*) is used as the core explanatory variable. Add environmental regulation (*Pollution*), infrastructure (*Highway*), population (*Popu*), patent (*Patent*), industrial structure (*second*) and urbanization (*Urbanization*) as control variables that affect the profits of the real economy. ε_{it} is a random perturbation term.

2.2 Variable Description

2.2.1 Explained Variables and Core Explanatory Variables

The explained variable in this paper is the profit of the real economy, which is measured by the total profit of industrial enterprises above the provincial level in China. The core explanatory variable is *Rei*, and the proportion of *Rei* in GDP completed this year is selected as the measurement index.

2.2.2 Control Variables

In addition to the above core variables, there are other factors that can also affect real economy profits. Referring to the previous literature, the control variables are selected as follows: the proportion of investment in industrial pollution control projects to GDP this year, which is used to measure environmental regulation (*Pollution*); The logarithm of the road mileage, as a measure of infrastructure (*Highway*); The logarithm of the total population of the country, which measures the impact of demographic factors (*Popu*); The number of domestic patent applications accepted and authorized as the measurement index of China's technical factors (*Patent*); The proportion of added value of the secondary industry is used to measure China's industrial structure (*Second*); The urbanization rate represents China's urbanization level (*Urbanization*).

2.3 Data

This paper selects panel data from 30 provinces (autonomous regions and municipalities directly under the central government) in China from 2000 to 2020, based on the availability of data, excluding Tibet, Hong Kong, Macao and Taiwan. The data comes from EPS database: China Macroeconomic Database, China Environment Database, China Science and Technology Database, China Real Estate Database. Table 1 shows the descriptive statistics of the sample data.

Table 1. Variable description statistics

Variable	Observations	Mean	Standard Deviation	Minimum	maximum
Profit	630	0.140	0.184	-0.053	1.057
Rei	630	0.109	0.060	0.015	0.460
Pollution	630	0.004	0.004	0.000	0.029
Highway	630	117550.1	77133.68	4325	394371
Popu	630	4444.032	2721.255	516.5	12624
Patent	630	8.844	17.672	0.019	167.693
Second	630	0.451	0.083	0.158	0.615
Urbanization	630	0.519	0.153	0.233	0.896

3. Analysis of Empirical Results

3.1 Full Sample Analysis

Table 2. Full-sample regression

	Profit(1)	Profit(2)	Profit(3)	Profit(4)
Rei	-0.344*** (-2.93)	-0.366*** (-3.09)	-0.197** (-2.35)	-0.356*** (-4.12)
Pollution		2.162 (1.25)	-0.786 (-0.66)	0.078 (0.07)
Highway		0.030 (1.11)	0.077*** (3.86)	0.036* (1.73)
Popu			-0.025 (-0.45)	0.036 (0.65)
Patent			0.006*** (24.00)	0.006*** (24.06)
Second				0.086 (1.08)
Urbanization				0.606*** (4.72)
Constants	0.032* (1.69)	-0.295 (-1.06)	-0.576 (-1.01)	-0.925* (-1.66)
Year Fixed Effect	control	control	control	control
Provincial Fixed Effect	control	control	control	control
R2	0.4667	0.4694	0.7476	0.7608
Observations	630	630	630	630

Note: T values in parentheses; *, **, *** indicate that the significance level is 10%, 5%, and 1%, respectively.

This article adopts the idea of stepwise progressive regression. First, all data from various provinces are regressed without taking into account the control variables, only *Rei* and real economy profits. Secondly, gradually increasing the control variables, it was found that the results were always significantly negative, indicating that *Rei* has a significant negative effect on the profits of the real economy. Table 2 shows the results of the impact of *Rei* on profits of the real economy.

Although in the short term, the expansion of *Rei* can drive economic growth, but in the long run, due to the characteristics of high-risk rate and high rate of return of *Rei*, a large amount of money flows into the real estate industry. Entity enterprises invest their own investment funds and R&D innovation funds across industries, take *Rei* as an important profit channel, and gradually deviate from self-operated business, which inhibits the innovation activities of entity enterprises and is not conducive to their own business stability and profit improvement.

3.2 Sub-regional Analysis

Due to the different levels of real economy development and the development status of the real estate industry between different regions in China, the impact effect of *Rei* on the profits of the real economy may also have regional heterogeneity.

Table 3. Sub-sample regression

	Eastern Profit (1)	Central Profit (2)	Western Profit (3)
<i>Rei</i>	-0.488*** (-3.42)	0.397 (1.58)	-0.215*** (-3.05)
Pollution	-1.016 (-0.32)	1.129 (0.46)	0.816 (1.60)
Highway	0.160*** (3.75)	0.263*** (5.08)	-0.020** (-1.97)
Popu	-0.327** (-2.23)	0.268 (1.61)	-0.126*** (-3.04)
Patent	0.006*** (14.45)	0.001 (0.62)	0.010*** (16.13)
Second	0.316 (1.37)	0.390*** (4.40)	0.368*** (6.40)
Urbanization	0.187 (0.70)	0.155 (0.65)	0.067 (0.50)
Constants	0.816 (0.56)	-5.353*** (-3.34)	1.025*** (2.90)
Year Fixed Effect	control	control	control
Provincial Fixed Effect	control	control	control
R2	0.8417	0.8295	0.8785
Observations	231	168	231

Note: T values in parentheses; *, **, *** indicate that the significance level is 10%, 5%, and 1%, respectively.

Table 3 shows the regression results for the eastern, central, and western regions with control variables and year fixed effects and province fixed effects. The empirical results show that there are regional differences in the impact of *Rei* on real economy profits: in the eastern and western regions, the growth of *Rei* significantly inhibits the growth of *Profit*, and the inhibitory effect on the eastern region is more obvious, while the central region is not significant. This shows that *Rei* has a significant negative effect on the profits of the real economy in the eastern and western regions, but has no obvious impact on the central region. This result may be due to the fact that the real estate industry

in the eastern region is more developed, with more *Rei* behavior and higher housing prices; The real economy in the western region is relatively fragile and vulnerable to the influence of the immature real estate industry.

3.3 Robustness Test

In order to improve the accuracy of the empirical results, the robustness of the bidirectional fixed-effect model is tested by the following three methods. Table 4 is a robustness test of the impact of *Rei* on profits in the real economy.

3.3.1 Robustness Test I.: Replace the Sample

In order to ensure that the results of the empirical analysis are not affected by specific regions, this paper excludes the sample data of Beijing, Tianjin, Shanghai and Chongqing, and then performs regression again. Table 4, column 1 shows the robustness regression results after sample replacement. The results show that after changing the sample, *Rei* still shows a significant inhibitory effect on the profit of the real economy at the level of 1%.

3.3.2 Robustness Test II.: Hysteresis Effects

Considering the lag in the impact of *Rei* on the profits of the real economy, this paper replaces the explanatory variables in the current period with the lag of the explanatory variables, and performs regression analysis again to test the robustness of the model. Table 4, Column 2 shows the robustness regression results of the lagging effect, and it is found that the impact of *Rei* on the profits of the real economy with a lag of the first period still shows obvious negative effects, which is consistent with the results of the whole-sample regression.

3.3.3 Robustness Test III.: IV-2SLS Instrumental Variable Method

Table 4. Robustness test

	Replace the sample	Hysteresis Effects	IV-2SLS instrumental variable method
Rei	-0.436*** (-4.45)	-0.283*** (-3.25)	-0.373*** (-5.65)
Pollution	-0.501 (-0.40)	-0.522 (-0.45)	-0.310 (-0.30)
Highway	0.038 (1.59)	0.046** (2.20)	0.034 (1.50)
Popu	0.093 (1.17)	0.028 (0.47)	0.046 (1.11)
Patent	0.006*** (21.56)	0.007*** (23.52)	0.006*** (12.04)
Second	0.063 (0.69)	0.109 (1.35)	0.088 (1.17)
Urbanization	0.906*** (5.53)	0.523*** (3.90)	0.641*** (4.82)
Constants	-1.485** (-2.04)	-0.934 (-1.61)	-1.171*** (-2.95)
Year Fixed Effect	control	control	control
Provincial Fixed Effect	control	control	control
R2	0.7702	0.7593	0.8877
Observations	546	600	600

Note: T values in parentheses; *, **, *** indicate that the significance level is 10%, 5%, and 1%, respectively.

In order to overcome the endogenous problem in econometric models, this paper selects the lagging period of *Rei* as the instrumental variable, which is related to the core explanatory variable: the real economy profit of the current year, but not with other random error terms of the year. The results are shown in Table 4, Column 3. The results show that the impact of *Rei* on the profit of the real economy is significant at the level of 1%, and the direction of the estimated coefficient is consistent with the results of the full-sample analysis, which proves that the model is robust and effective.

Through the above three robustness methods, it can be obtained that *Rei* significantly inhibits the growth of real economy profits, and the result is robust.

4. Conclusion and Recommendations

Most of the existing research on *Rei* and real economy at home and abroad discusses the impact of overheating *Rei* on the development of real estate economy and the innovation output activities of real enterprises, but does not fully discuss the relationship between *Rei* and the operating performance of real enterprises. In view of this, based on the panel data of 30 provinces and cities in China at the industrial level from 2000 to 2020, this paper constructs a two-way fixed effect model, tests the impact of *Rei* on *Profit*, examines the relationship between the two and the heterogeneity differences, and concludes as follows: First, on the whole, *Rei* has a significant inhibitory effect on real economy profits, and the negative impact exists significantly under the superposition of various control variables. This conclusion is still significantly true under the substitution of samples, lag effect and instrumental variable method, indicating that the results are robust. From the results of regression, it can be concluded that the *Rei* behavior of real estate enterprises is not conducive to improving their own business performance, and the development of *Rei* and the real economy has not achieved dialectical unity and coordinated development. Second, from a regional perspective, the impact of *Rei* on the profits of the real economy is heterogeneous. The negative inhibitory effect of *Rei* on *Profit* is reflected in the eastern and western regions, while in the central region, the impact of *Rei* on *Profit* is not significant.

Combined with the research results of this paper, the following policy enlightenment is obtained: First, promoting the coordinated and unified development of *Rei* and the real economy. Under the premise of recognizing the dialectical unity relationship between *Rei* and the real economy, through the government's macro-control and supervision, we will promote the coordinated development and the mutual promotion of the two, and achieve a win-win situation. Through the real estate industry to drive the high-quality development of China's real economy, realize the promotion effect of *Rei* on China's real economy, minimize the crowding out effect, and promote the efficient and innovative development of the real economy. At the same time, restricting the excessive investment of real estate enterprises in the real estate industry to avoid lowering the threshold of the real estate industry, continuing to rise in housing prices, and the emergence of real estate bubbles. Second, formulating targeted and diversified policies to intervene in *Rei* by real estate enterprises. According to the regional characteristics and economic development status of different regions, different policies are formulated to promote the coordinated development of *Rei* and the real economy in various regions. *Rei* has a great inhibitory effect on the real economy in the east and west, so the control of *Rei* in the eastern region should be strengthened, and the phenomenon of rapid rise in housing prices should be curbed through government macro-control, and should insist "housing is not speculation". For the western region, the development of emerging industries and pillar industries should be encouraged and supported, so as to promote the high-quality development of the local real economy and promote the stable development of the real estate industry. Third, deepening market-oriented reforms, improving the investment and financing environment, and optimizing the investment and financing structure. The government should vigorously support the development and innovation activities of industrial enterprises, and provide incentives to enterprises by giving policy support such as tax incentives and innovation subsidies. At the same time, urging real enterprises to use funds rationally

and use them more in production and operation or innovation input and output activities, so as to promote more investment funds to flow to industry, avoid the hollowing out of industrial industries, and promote the transformation and optimization of investment and financing structure. Fourth, establishing and improving relevant cross-industry investment policies, and relevant departments should strengthen supervision. From the perspective of development, the government should adhere to the sustainable development of the real economy and correct the phenomenon of turning the real economy into reality. At the same time, it is necessary to continuously establish and improve cross-industry investment policies, increase the supervision and governance of enterprises' *Rei* behavior, avoid unreasonable transfer of real economic funds into the real estate industry, and include them in the performance assessment of local governments.

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