

The Crowding out Effect of China's Real Estate Price Rise on Processing Trade

Yan Xiao, Xinyi Yuan

Central South University of Forestry and Technology, Changsha, China

Email: yxy13786016063@163.com

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Abstract

In view of the central government's proposal that "The house is used for living, not for speculation", the rising market of China's real estate market has been flattened. However, the reflection on the impact of China's real estate investment on the real economy cannot be ignored. Through the econometric regression model, this paper analyzes the impact of China's real estate prices on processing trade by using random and double fixed effects. The results show that: there is a strong correlation between housing prices and processing trade; there is a significant inverted U-shaped relationship between house prices and processing trade, and the corresponding inflection point prices of the negative impact of house prices on processing trade are calculated; and the impact of house prices on processing trade in the east, the middle and the west is significant. The crowding out effect of housing prices on processing trade in the east is the most significant, followed by the west, and finally in the central region. Therefore, the central region has formed a good low-lying land effect of processing trade transfer. The high quality destination of processing trade should be the central region. A deep understanding of the impact of housing prices on processing trade and employment driven by processing trade is of great significance for maintaining and consolidating the traditional advantages of China's processing trade and promoting the development of the central and Western sub regions.

Keywords

Real Estate, Crowding out Effect, Wealth Effect, Inverted U-Shaped Distribution

1. Introduction

Since the reform of China's commercial housing system in 1998, the real estate

market has developed rapidly and its pillar position in the national economy has been consolidated. In order to maintain the sustainable and rapid development of China's economy, promoting the development of the real estate market has become an important economic strategy under the macroeconomic environment. From 1998 to 2015, the proportion of real estate market investment in the total investment has been as high as more than 20%, and the annual growth rate is more than 20%, so that the housing prices in China continue to climb to new heights. But at the same time, the wealth effect brought about by the rise of house prices tends to weaken, while the crowding out effect is strengthened.

Since the reform and opening up, processing trade has been maintaining a rapid growth rate, becoming an important part of China's foreign trade and playing an important role in promoting the process of China's reform and opening up. Under the background of the deepening of globalization, processing trade has gradually developed along with the process of China's reform and opening up. In the process of attracting foreign investment and undertaking international industrial transfer, processing trade has developed rapidly and continuously for more than 20 years. Under the severe impact of the financial crisis in 2008, the international market demand has shrunk significantly, foreign investment has slowed down, and the development speed of processing trade has been significantly reduced in recent years.

With the development of economic globalization, the international division of labor has gradually changed from the traditional inter industry division to the intra industry division, from the vertical division to the horizontal division of labor. Multinational companies have laid out the industrial chain in the global scope, which has led to the acceleration of international industrial transfer. After the reform and opening up, the Chinese government seized the historical opportunity of international industrial transfer, implemented the processing trade policy, successfully accepted the export-oriented foreign direct investment, organically combined the advantages of foreign capital, technology, management and China's labor force, land cost, infrastructure and other advantages, so that China quickly integrated into the global production network and became global oriented low cost manufacturing base.

It can be said that processing trade is the product of the development of international industrial division of labor. It is the result of seizing opportunities and undertaking transfer, which embodies the characteristics of international industrial level division of labor. From the beginning of undertaking the traditional manufacturing industry of Hong Kong in the way of "three processing and one compensation" in the late 1970s, to the assembly and processing of mechanical equipment, electrical assembly and other products in the mid-1980s, and then to a large number of high-tech electronic information manufacturing industries in Europe, the United States, Japan, South Korea and other countries and regions in the middle and late 1990s, China's processing trade has developed rapidly and the industrial level has been continuously improved.

The role of processing trade in promoting the development of national economy is mainly reflected in the following six aspects: first, it promotes the establishment of the status of a major trading country. Second, it solves the employment of a large number of migrant workers. Third, it has promoted the improvement of the overall level of the industry. Fourth, we have trained a large number of technical and managerial personnel and skilled workers. Fifth, the economic and trade relations between the mainland and Hong Kong, Macao and Taiwan have been strengthened. Sixth, the speed of technological catching up and technological innovation has been accelerated.

Over the past 30 years, processing trade has achieved high-speed and leapfrog development, and has played an important role in promoting the healthy development of the national economy. Under the favorable conditions of accelerating international industrial transfer, in the past 30 years, processing trade has made use of demographic dividend, played a comparative advantage, maintained an average annual growth rate of more than 20%, and expanded its scale by nearly 800 times, making a significant contribution to economic and social development. However, problems in the process of development have gradually accumulated and emerged, such as the low added value of processing and manufacturing links; the lack of mastering core technology and being controlled by others; the weak ability of independent innovation; the imbalance of regional development; the incompatibility of management mechanism and policy with the requirements of transformation and upgrading. In addition, the development of processing trade is also facing multiple pressures, such as the rapid rise of operating costs, the increasing pressure of environmental resources, and the increasingly fierce international competition. In developed areas such as the Pearl River Delta and the Yangtze River Delta, the constraints on land space, energy resources and environment are increasing, especially the rising labor cost, which weakens the international competitive advantage in the development of processing trade, and the extensive growth mode is difficult to sustain. Among all the rising costs, it is inevitable that the land cost will rise; measuring the impact of land cost on processing trade has become an urgent work of quantitative verification. The innovation of this paper lies in the fact that no scholars have studied the crowding-out effect of trade, especially the crowding out effect of processing trade. This study will fill the gap in this field.

2. Literature Review

2.1. Research on the Crowding out Effect of Foreign Real Estate

Carroll et al. (2006) based on the theory of life cycle persistent income hypothesis, believe that the rise of house price will promote residents' consumption, showing obvious wealth effect; Mehra (2001) analyzed the cointegration relationship between housing wealth, income and consumption, and found that housing wealth effect not only has wealth effect on consumption, but also can help predict future consumption capacity in the short term; Iacoviello (2012)

takes the United States as the research background, and thinks that the wealth effect of housing is very obvious in the long run. Mills (1987) analyzed the data of the United States from 1920 to 1980's and found that real estate investment lowered the overall return rate of investment, and real estate investment exceeding a certain reasonable level would restrict economic growth. Rong et al. (2016) found that the rise of domestic house prices led to a higher profit margin of real estate investment, which induced other non real estate enterprises to start investing in real estate, which inhibited the innovation motivation of manufacturing enterprises. Moreover, the inhibition effect was more severe in the regions with higher house prices. Harris & Arku (2006) believes that real estate investment generally has crowding out effect on the consumption of American families. The study found that rising house prices will lead to the increasing burden of American families, and only a small number of families will have wealth effect, leading to some consumption growth; while for most families, they will choose to save their housing income instead of spending it.

2.2. Research on Crowding out Effect of Real Estate in China

In the past, the research on the extrusion effect of real estate investment mainly focuses on the following three aspects: one is the extrusion effect on the real economy manufacturing industry; the other is the crowding out effect on the consumption of residents; the third is the extrusion effect on other fixed assets investment.

Due to the particularity of China's real estate market, the cognitive process of domestic scholars on the impact of real estate price on consumption, other fixed assets investment and manufacturing industry mainly experienced three stages: from the initial view of wealth effect to no significant impact, and then to crowding out effect, finally found that the real estate price of the impact of the interval division, the real estate price of The rise has a dual effect, that is, the joint effect of wealth effect and substitution effect. In the process of China's urbanization, real estate has been developing and growing. Since 2000, the proportion of real estate development investment in fixed assets investment of the whole society has been more than 15%. From the perspective of contribution to economic growth, the results show that the contribution of real estate development investment to economic growth has fluctuated from 2000 to 2013, but it has basically maintained above 10% for many years (Economic Daily, 2019).

Therefore, during this period, there are a large number of articles on the wealth effect of real estate development on the national economy.

2.2.1. Positive and Negative Wealth Effect of Housing Price Rise

Huang Jing and Tu meizeng (2009) and other scholars believe that the rise of China's real estate prices can increase residents' wealth, and thus enhance residents' consumption; Huang Zhilong (2018) proposed that from the policy point of view, the real estate market had played an important role in stimulating con-

consumption and stimulating domestic demand; while [Zhang Cuntao \(2007\)](#) constructed an error correction model based on China's data from 1987 to 2007 to explore the rise of real estate prices. The results show that the rise of house prices does not have a positive effect on the growth of national wealth. However, with the further rise of house prices, a large number of funds have been transferred from the real economy to the real estate industry, which leads to the serious phenomenon that the economy is out of reality and becomes virtual. And as of the end of 2018, the total scale of household debt in China has reached 430,000 (including the balance of personal house purchase loan is 25.75 trillion, accounting for 60%), accounting for about 90% of the disposable income. Household debt produces continuous loan repayment expenditure, which affects the current consumption expenditure of residents in other fields, and even brings about the decline of quality of life for residents with low income ([Bi, 2019](#)). People began to notice that real estate development not only has a positive wealth effect, but also has a negative crowding out effect.

2.2.2. Crowding out Effect of Real Estate Investment Growth on Manufacturing Industry

[Wu Haimin \(2012\)](#), based on the panel data of private industries in 12 provinces and cities in coastal areas of China from 2001 to 2010, found that the proportion of the total output value of private industry in the total industrial output value decreased by 0.322% for every 1% rise in house price, which led to the "hollowing out" of private industry; [Rong Zhao and Wang Wenchun \(2014\)](#) collected the data manually from the analysis. According to the data of non real estate listed companies in 35 large and medium-sized cities in China from 2001 to 2008, it is found that more than half of the non real estate listed companies have real estate business, and the faster the house price rises, the higher the possibility of local enterprises to enter the real estate market; [Luo Zhi and Zhang Chuan-chuan \(2015\)](#) according to 2002-2007 in China. According to the panel data of 157 cities, for each unit of real estate investment, the manufacturing sector will reduce investment by 0.002 units, so the increase of real estate investment has squeezed out the investment of manufacturing sector; [Shi Huiling \(2018\)](#) proposed that, in terms of consumption, the rise of house prices is under budget. Bundle effect, wealth redistribution effect and its substitution effect can crowd out residents' consumption.

2.2.3. Threshold Effect and Inverted U-Shaped Change Trend of House Price Rise

With the development of real estate market, more and more researchers find that real estate has positive and negative effects on manufacturing industry and consumption. With the development of real estate market, positive and negative effects are constantly sawing, which will form threshold effect. On the whole, the impact of real estate on manufacturing and consumption presents an inverted

U-shaped trend. Based on China's quarterly data from 2010 to 2018, Zhao Jiping (2020) used Gregory Hansen nonlinear structural mutation method to study the spillover effect of house price rise on urban residents' consumption in China. The study found that there was a nonlinear spillover effect between housing price rise and residents' consumption during 2010-2018, and house price rise occurred in 2010. From the first quarter of 2007 to the second quarter of 2017, the positive promoting effect on the consumption of urban residents in China is stronger than the crowding out effect. After the second quarter of 2017, the crowding out effect of housing price rise on urban residents is significantly stronger than the wealth effect; Wu Chaoming (2019) explained that from the inflection point of positive and negative effects, the inflection point of the impact of real estate investment on consumption demand has arrived before and after de stocking in 2016; the report issued by the Chinese Academy of Social Sciences in 2019 is based on the data from 2010 to 2010. Based on the data of China's household tracking survey in 2016 and the data of 285 cities in China from 2003 to 2015, this paper estimates the positive pull effect and negative crowding out effect of real estate on economic growth by comprehensive use of econometric regression and other methods. The critical ratio of house price to income is 9.0 in 2008, which is at the inflection point of positive effect exceeding negative effect. Based on the panel data of 31 provinces in China from 1999 to 2011, Li Chang et al. (2013) empirically tested the dynamic impact of real estate investment on manufacturing industry by using parametric method and nonparametric point by point regression method. The results show that, nationwide, real estate investment promotes the development of manufacturing industry, but the promotion effect is "inverted U" and tends to "critical value". Li Chunfeng et al. (2018) combined with the dual attributes of housing and the corresponding dual effect graph trend, theoretical analysis found that the impact of house price on China's residents' consumption has obvious threshold effect; Zeng Shihong et al. (2019) verified the threshold effect of real estate price on Service consumption with the help of threshold regression model, and tested the existence of a threshold value of 1881.6 yuan in real estate price/Square meters.

Cheng Bo (2018) proposed that driven by high profits, banks and other financial institutions and social capital significantly incline to the real estate industry in terms of financing and investment willingness, resulting in a relatively low investment in the manufacturing industry, especially in the high-tech industry, forming the crowding out effect of the real estate industry on the manufacturing industry. Based on the provincial panel data of the Yangtze River Delta from 2001 to 2016, Yang Li (2018) used the fixed effect mixed coefficient model, cointegration test and Granger causality test to test the impact of the development of the real estate financial market on the manufacturing industry. The results show that as a financial center, the scale advantage of the real estate financial market promotes the development of the manufacturing industry, while the real estate

financial markets in Jiangsu and Zhejiang are underdeveloped. There is crowding out effect on the fragile manufacturing industry. Based on the panel data of 31 provincial administrative regions in China from 2001 to 2015, [Zheng Dongya et al. \(2019\)](#) found that from the national level, the rise of house prices squeezed out the investment of the real economy. [Wu Chaoming \(2019\)](#) found that the crowding out effect of real estate on manufacturing industry is mainly reflected in the following four aspects: First, the real estate boom will push up factor prices and production costs, and reduce the profit space of manufacturing industry. For example, in May 2019, the average floor price of land and the sales price of residential commercial housing in 100 large and medium-sized cities were 4.8 times and 2.6 times of that at the end of 2008, far exceeding the CPI and PPI growth in the same period; Second, the real estate market occupied a large amount of credit resources and the real estate industry was crowding out the manufacturing industry in financing. Such as 2008 Since, the proportion of personal housing loans and real estate loans in the five major state-owned banks has been increasing, while the proportion of manufacturing loans has been decreasing year by year, with the former increasing from 20.5% to 36.0%, and the latter from 18.6% to 11.0%; Third, the myth that house prices only rise but not fall tends to breed speculation, which makes a large amount of funds out of the real economy; Fourth, manufacturing industry is the main battlefield of technological innovation. The extrusion of real estate from manufacturing industry will hinder the technological innovation of manufacturing industry, and form a negative effect on manufacturing industry, especially high-tech manufacturing industry, which is not conducive to the transformation of new and old kinetic energy. To sum up, first of all, there is no research on the impact of house price on processing trade; secondly, even the threshold value of house price obtained by calculation is seriously divorced from the reality of real house price; this study will make up for the deficiency of research in these two aspects.

3. Model Setting, Variable Selection and Data Description

With the development of export comprehensive free trade zone, the pilot free trade zone is becoming more and more popular. The historical function of export processing zone is gradually withdrawing. As we known, in the process of reform and opening up, the processing trade zones established in various regions of China will gradually withdraw from the stage of history. On April 27, 2000, the State Council officially approved the establishment of export processing zones. In order to facilitate the operation, the state has set up export processing zones in the established development zones and selected a number of regions for pilot projects. The first batch of 15 export processing zones approved for pilot projects are Dalian export processing zone in Liaoning Province, export processing zone in Tianjin city, Tianzhu Export Processing Zone in Beijing, Yantai Export Processing Zone in Shandong Province, Weihai export processing

zone in Shandong Province, Kunshan Export Processing Zone in Jiangsu Province and Jiangsu Province The export processing zone of state industrial park, Shanghai Songjiang Export Processing Zone, Zhejiang Hangzhou export processing zone, Fujian Xiamen export processing zone, Guangdong Shenzhen Export plus zone, Guangdong Guangzhou Export Processing Zone, Hubei Wuhan export processing zone, Sichuan Chengdu Export Processing Zone, Jilin Hunchun export processing zone. With the increasing number of export processing zones, almost all provinces have set up their own export processing zones. With the continuous advancement of China's reform, the historical task of export processing zones is gradually ending, which makes these large exporters in history increasingly face substantial transformation, and the reform of setting up comprehensive bonded demonstration zone is advancing day by day. Based on the accurate statistical data under the strict management system of processing trade zone, this paper studies the relationship between processing trade and house price.

3.1. Results of Initial Data Analysis

Before regression analysis, we selected data of China 34 municipalities, provincial capitals and important cities (Beijing, Tianjin, Hebei Province, Shanxi Province, Inner Mongolia Autonomous Region, Shenyang City of Liaoning Province and Dalian City, Jilin Province, Heilongjiang Province, Shanghai, Jiangsu Province, Zhejiang Province, Anhui Province, Fuzhou City and Xiamen city of Fujian Province, Jiangxi Province, Qingdao city and Jinan City of Shandong Province, Henan Province, Hubei Province, Hunan Province, Guangzhou and Shenzhen city of Guangdong Province, Guangxi Zhuang Autonomous Region, Hainan Province, Chongqing City, Sichuan Province, Guizhou Province, Yunnan Province, Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Hui Autonomous Region and Xinjiang Uygur Autonomous Region). Using the import volume, export volume and total import and export volume of processing trade in these regions, this paper makes a scatter plot test on the housing prices of the cities where the provincial capitals and processing trade zones are located. The data comes from China Real Estate database in EPS database.

The scatter diagram shows that with the increase of the average price of logarithmic commercial housing sales, the fitting degree of logarithmic import, logarithmic export and logarithmic total import and export are evenly and symmetrically distributed on both sides of the corresponding straight line, and the goodness of fit is very significant. Therefore, it is expected to select the appropriate function model to fit the data points (Figures 1-3).

3.2. Model Setting

According to the research objectives, we set up the following basic econometric models:

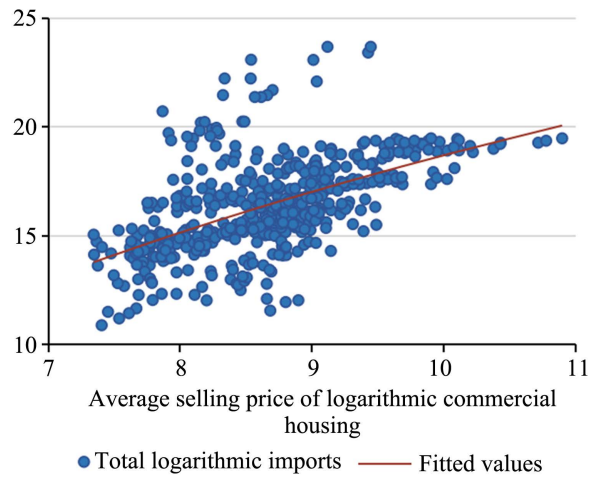


Figure 1. Scatter chart of the relationship between average selling price of commercial housing and import.

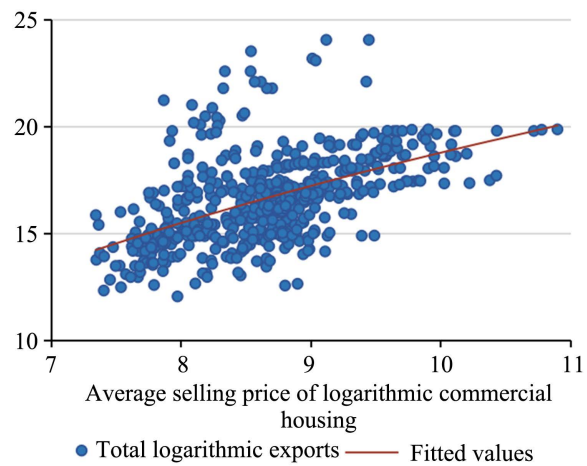


Figure 2. Scatter chart of the relationship between average selling price of commercial housing and export.

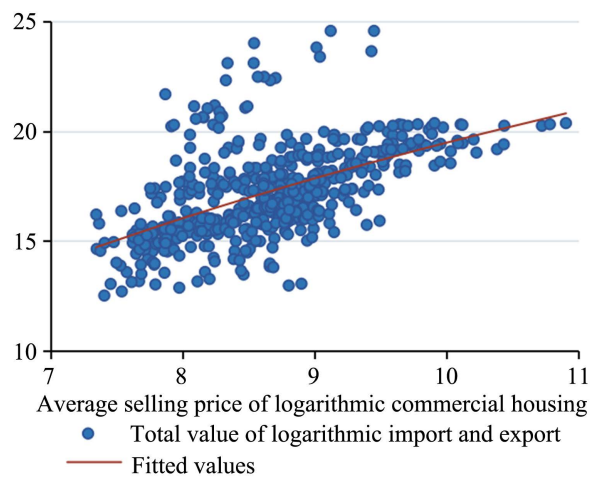


Figure 3. Scatter chart of the relationship between average selling price of commercial housing and total import and export.

$$\text{LnY_im}_{it} = \alpha_0 + \alpha_1 \text{LnHP}_{it} + \alpha_2 \text{LnHP}_{it}^2 + \lambda_1 X_{it} + \eta_t + \gamma_i + \varepsilon_{it} \quad (1)$$

$$\text{LnY_ex}_{it} = \alpha_0 + \alpha_1 \text{LnHP}_{it} + \alpha_2 \text{LnHP}_{it}^2 + \lambda_1 X_{it} + \eta_t + \gamma_i + \varepsilon_{it} \quad (2)$$

$$\text{LnY}_{it} = \alpha_0 + \alpha_1 \text{LnHP}_{it} + \alpha_2 \text{LnHP}_{it}^2 + \lambda_1 X_{it} + \eta_t + \gamma_i + \varepsilon_{it} \quad (3)$$

Among them, LnHP_{it} refers to the average price of commercial housing sales in the city in, LnY_im_{it} represents the city's logarithmic total import amount in year, LnY_ex_{it} represents the city's logarithmic total export amount in year, LnY_{it} represents the city's logarithmic total import and export amount in year; X is the control variable, specifically including the total wage of on-the-job employees (LnWage), the average wage of employees (LnSalary), and the loan balance of financial institutions at the end of the year (LnLoan), GDP (LnGDP), the total industrial output value of foreign-invested enterprises (LnIves), the completed amount of real estate development investment (LnState) and the proportion of the import value of the region's opening-up level in the GDP (Open_im), Proportion of exports to GDP (Open_ex). In addition, this paper also adds time fixed effect and individual fixed effect; finally, ε_{it} is interference item.

3.3. Variable Selection and Data Description

Data sample period: 2003-2018;

Explained variables: since the import and export process of processing trade zone is under the direct supervision of the customs, the accuracy, integrity and timeliness of the data are better, so the official data published by the processing trade zone are selected; the data sources are EPS macroeconomic statistical database and regional trade database.

Explanatory variables: according to the influence of land, capital and labor on production cost, the paper preliminarily selects the indexes of sales price of commercial housing, total wages of on-the-job employees, average wages of employees, loan balance of financial institutions at the end of the year, GDP, total industrial output value of foreign-invested enterprises, completion of real estate development investment and openness index as import/regional GDP Exports/regional GDP. The data sources are EPS macroeconomic statistical database and regional trade database, and the urban housing price data is from the housing world statistical database. The selection of explanatory variables is based on the preliminary regression of various types of data, through validation and deletion of some significant factors retained. With the deepening of the research, the variables with significant collinearity are eliminated in the later stage to make the results more convincing (for example, the total amount of on-the-job employees and the average wage of employees; the import/regional GDP and export/regional GDP in the openness index).

Both the time series and the panel data need to do a smooth unit root test, taking the logarithm can generally make the series stationary. In order to get smooth data, natural logarithm is usually used to get the time series without changing the nature and correlation of the time series, avoiding false regression

and eliminating heteroscedasticity. The stationarity test is an indispensable step in the research, because the time series analysis method is only suitable for the stationarity data.

Control variables: in view of the relative fixity of the region, individuals and time are taken as two control variables. The descriptive statistics of the main variables are shown in **Table 1**.

4. Empirical Test and Result Analysis

4.1. Variable Stationarity Test

First of all, in order to prevent the occurrence of pseudo regression phenomenon, this paper first carries out unit root test on variables. In this paper, LLC test, IPS test and Fisher ADF three unit root test methods are used to analyze the stationarity of panel data. The first-order difference value of each variable is significant at the level of 5%. It can be judged that all variables show consistent first-order integrity (**Table 2**).

4.1.1. Baseline Regression Results

After testing the stationarity of the data, this paper first uses the fixed effect model to regress the data. **Table 3** shows the basic regression results of the impact of real estate prices on the total import and export volume of each city.

Table 1. Descriptive statistics of variables.

Variable Name	Variable Interpretation	Sample Size	Mean	Standard Deviation	Minimum	Maximum
LnY _{im_{it}}	Total logarithmic imports (10,000 yuan)	544	16.379	2.087	10.897	23.688
LnY _{ex_{it}}	Total logarithmic exports (10,000 yuan)	544	16.628	2.041	12.056	24.062
LnY _{it}	Total value of logarithmic import and export (10,000 yuan)	544	17.252	2.028	12.545	24.586
LnHP _{it}	Average selling price of logarithmic commercial housing (yuan/m ²)	544	8.664	0.640	7.344	10.899
lnWage	Total wages of logarithmic employees (10,000 yuan)	544	15.286	1.113	12.616	18.566
LnSalary	The average wage of employees	544	10.605	0.570	9.408	11.917
LnLoan	At the end of the logarithmic year, the balance of various loans of financial institutions (10,000 yuan)	544	17.774	1.067	15.131	20.373
LnGDP	Logarithmic GDP (10,000 yuan)	544	17.292	1.046	14.186	19.605
LnInvest	Total industrial output value of foreign-invested enterprises (10,000 yuan)	544	15.364	1.848	9.749	19.057
LnState	Logarithmic real estate development investment completed (10,000 yuan)	544	15.398	1.165	12.149	17.565
Open _{im}	Import/regional GDP (%)	544	4.418	23.339	0.008	283.770
Open _{ex}	Exports/regional GDP (%)	544	6.412	35.547	0.022	437.917

Table 2. Test results of unit root of variables.

Variable Name	Horizontal series value			First order difference value		
	LLC	IPS	ADF	LLC	IPS	ADF
lnHP	-6.5068*** (0.000)	-5.986*** (0.000)	-1.4979 (0.9329)	-7.1033*** (0.000)	-10.4645*** (0.000)	10.1137*** (0.000)
lnHP ²	-6.272*** (0.000)	-5.742*** (0.000)	-2.7329 (0.9969)	-7.201*** (0.000)	-10.3704*** (0.000)	10.2579*** (0.000)
lnWage	-5.207*** (0.000)	-3.068*** (-0.001)	2.9829*** (0.0014)	-6.2581*** (0.000)	-10.0178*** (0.000)	3.0945** (0.0010)
lnSalary	-4.5656*** (0.000)	-2.6940*** (0.000)	1.3746* (0.0846)	-18.2876*** (0.000)	-10.5005*** (0.000)	9.6878*** (0.000)
lnLoan	-3.9126*** (0.000)	-6.0609*** (0.000)	-5.1483 (1.0000)	-8.1877*** (0.000)	-12.6893*** (0.000)	32.2515*** (0.000)
lnGDP	-10.509*** (0.000)	0.761 (-0.777)	12.2113*** (0.000)	-12.6407*** (0.000)	-8.3142*** (0.000)	6.1401*** (0.000)
lnInvest	-11.6589*** (0.000)	-5.2596*** (0.000)	10.3127 (0.000)	-10.9483*** (0.000)	-10.9098*** (0.000)	15.2156*** (0.000)
lnState	-4.3442*** (0.000)	-0.6893 (0.2453)	2.5234*** (0.000)	-7.2283*** (0.000)	-8.3680*** (0.000)	7.5245*** (0.000)
Open_im	-8.522*** (0.000)	-10.984*** (0.000)	8.5334*** (0.000)	-12.584*** (0.000)	-13.7916*** (0.000)	29.8143*** (0.000)
Open_ex	-8.509*** (0.000)	-10.966*** (0.000)	8.5505*** (0.000)	-12.5581*** (0.000)	-13.7867*** (0.000)	29.7533*** (0.000)

Note: *, **, ***, respectively, are significant at 10%, 5% and 1% levels.

Table 3. Benchmark regression results.

VARIABLES	(1)	(2)	(3)
	Total logarithmic imports	Total logarithmic exports	Logarithmic total import and export
	LnY_im	LnY_ex	LnY
lnHP	1.783*** (0.647)	2.063*** (0.650)	2.099*** (0.547)
lnHP ²	-0.112*** (0.035)	-0.121*** (0.035)	-0.126*** (0.029)
lnWage	0.400*** (0.113)	0.706*** (0.113)	0.578*** (0.095)

Continued

InSalary	0.429** (0.206)	0.015 (0.207)	0.248 (0.175)
InLoan	-0.033 (0.095)	0.178* (0.095)	0.052 (0.080)
InGDP	-0.042 (0.143)	0.437*** (0.144)	0.237* (0.121)
InInvest	0.110*** (0.037)	0.071* (0.037)	0.064** (0.031)
InState	0.016 (0.053)	0.101* (0.053)	0.047 (0.044)
Open_im	0.002 (0.002)	-0.001 (0.002)	-0.000 (0.001)
Open_ex	-0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Constant	-2.419 (3.284)	-15.963*** (3.298)	-9.584*** (2.776)
Year fixed effect	Y	Y	Y
Individual fixation effect	Y	Y	Y
Observations	544	544	544
R-squared	0.957	0.958	0.970
Number of id	34	34	34

Note: *, **, ***, respectively, are significant at 10%, 5% and 1% levels.

Columns (1) (2) (3) show the impact of real estate prices on total imports, exports and total imports and exports respectively. The results of column (1) (2) show that the sign of the first and second term estimation coefficients of real estate price are positive and negative respectively, and they are significant at the level of 1%. This regression result conforms to the hypothesis proposed in this paper, indicating that there is an inverted U-shaped relationship between real estate price and commodity import and export. In other words, with the rising of real estate prices, commodity imports and exports show a trend of first rising and then declining.

The possible reasons are as follows: 1) in the early stage of real estate price rise, due to the strong industrial relevance of the real estate industry, it will drive the demand of upstream cement, machinery, steel, wood and other industries, and will also drive the derivative demand of electrical appliances, furniture and other means of living, which can promote the rapid development of regional ur-

ban economy and accelerate the demand for imported products in cities; and With the rise of urban land price, local governments can obtain extra budgetary revenue through land transfer, actively encourage export by adjusting factor prices and factor flow allocation, and promote local enterprises' export. At this stage, the real estate price has a positive role in promoting import and export. 2) When the housing price rises rapidly and reaches a peak, it will form a significant "crowding out" effect on the consumption and micro production sectors. First, the rapid expansion of real estate and the formation of the real estate bubble will create a significant crowding out effect on the internal investment of enterprises, especially the long-term investments. Enterprises will invest limited funds into the real estate sector with short-term profits, and the input of their main businesses will be inhibited; secondly, the important source of enterprise production capital, bank loans, and real estate prices. As a result, bank loans are more likely to invest with limited credit funds to the real estate sector with higher short-term profits, thus forming a "crowding out effect" on the manufacturing sector. Finally, the rise of real estate prices will cause households to invest their savings in the real estate sector, distorting residents' consumption, which will further promote the rapid development of high investment industries such as real estate related cement and building materials, which is not conducive to the development of the export enterprise sector. Finally, the rapid rise of real estate prices inhibits the demand for intermediate goods import, and reduces the export, which has an inhibitory effect on urban import and export.

The relationship between the rise of real estate prices and the city's import and export trade shows an inverted U-shaped relationship. From **Table 2** (1) (2) (3), we can see that the relationship between the real estate price and the city's total import, export and total import and export can be expressed by the following one variable quadratic equation:

$$\text{LnY}_{im_{it}} = -2.419 + 1.783\text{LnHP}_{it} - 0.112\text{LnHP}_{it}^2 \quad (4)$$

$$\text{LnY}_{ex_{it}} = -15.963 + 2.063\text{LnHP}_{it} - 0.121\text{LnHP}_{it}^2 \quad (5)$$

$$\text{LnY}_{it} = -9.584 + 2.099\text{LnHP}_{it} - 0.126\text{LnHP}_{it}^2 \quad (6)$$

According to Formulas (4), (5) and (6), the relationship between the real estate price and the city's import, export and total import and export is drawn. It can be seen from the following figure: (1) the relationship between the real estate price and the city's import, export and total import and export is "inverted U-shaped", with the peaks of 7.96, 8.52 and 8.33 respectively, and the corresponding peak house prices are 2864.07 yuan/m², 5014.05 yuan/m² and 4146.42 yuan/m², respectively (**Figure 4**).

4.1.2. Regression Results of Logarithmic Import and Export Volume by Direct Use of House Price

Sometimes very simple things, instead, we complicate them. For the relationship

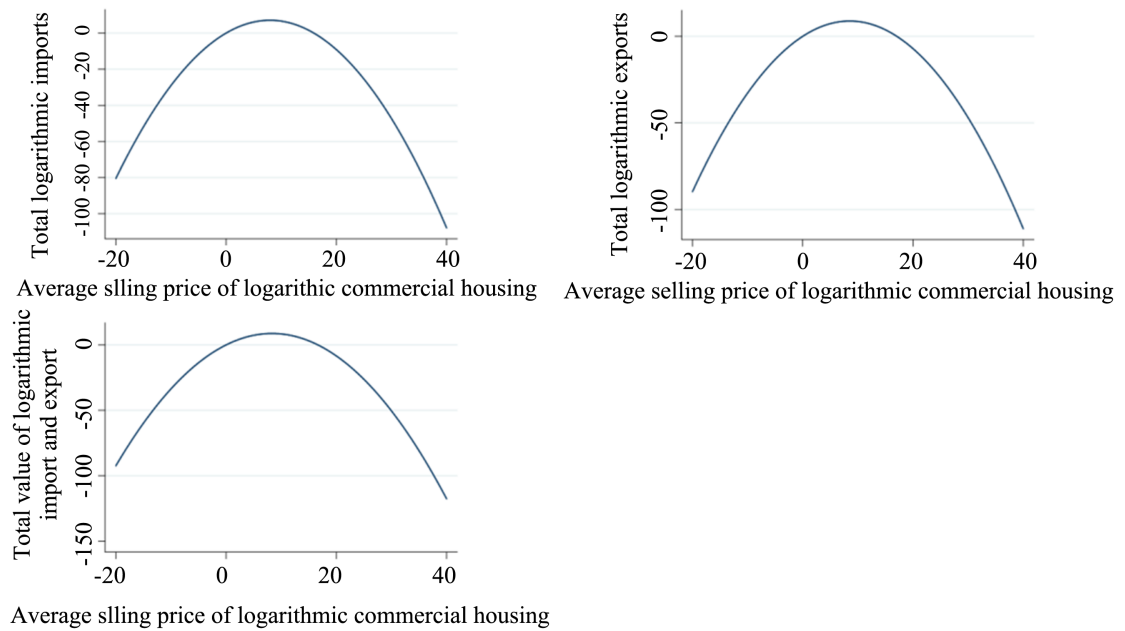


Figure 4. Relationship curve between city real estate price and logarithm import, export and total import and export.

between house prices and processing trade, we review the fixed effects and individual fixed effects for a year, and find that there is a significant correlation between house prices and the import and export of processing trade, and the results of various indicators are relatively ideal (**Table 4**).

4.1.3. Regression Results after Excluding Collinearity

Considering the significant collinearity among GDP, total wages and average wages of employees, the total wages and average wages of employees are deleted, and the results show that the significance of the results is greatly improved.

In the above regression results, the indicators of openness (imports/regional GDP, exports/regional GDP) of a city and region are not significant, so we separate them out, and the results have little impact on the overall results. This phenomenon may be that with the continuous promotion of reform and opening up, the degree of openness of the provincial capital cities and the major developed cities in various regions has gradually increased, and the obstacles and obstacles in the system have gradually decreased. The exchange and learning of opening experience has made the difference in the degree of openness between these cities increasingly reduced (**Table 5**).

4.1.4. Heterogeneity Analysis

In this paper, the data are divided into eastern region, central region and western region by sample regression, and then the differential influence of real estate price on total import, total export and total import and export under different regions is examined. **Table 6** shows the impact of real estate prices on the total imports of different regions. The impact of housing price on the import of eastern

Table 4. Regression results of house price and import and export under double fixed conditions.

VARIABLES	(1)	(2)	(3)
	Total logarithmic imports	Total logarithmic exports	Logarithmic total import and export
	LnYim	LnYex	LnY
lnHP	2.409*** (0.542)	3.110*** (0.609)	2.774*** (0.492)
lnHP ²	-0.144*** (0.028)	-0.169*** (0.032)	-0.157*** (0.026)
Constant	6.349*** (2.651)	2.419 (2.979)	5.074*** (2.409)
Year fixed effect	Y	Y	Y
Individual fixation effect	Y	Y	Y
Observations	544	544	544
Adjusted R-squared	0.982	0.978	0.985
Number of id	34	34	34

Note: *, **, ***, respectively, are significant at 10%, 5% and 1% levels.

Table 5. Regression analysis of simplified double fixed model.

VARIABLES	(1)	(2)	(3)
	Total logarithmic imports	Total logarithmic exports	Logarithmic total import and export
	LnYim	LnYex	LnY
lnHP	2.096*** (0.545)	2.089*** (0.561)	2.093*** (0.469)
lnHP ²	-0.126*** (0.028)	-0.113*** (0.029)	-0.120*** (0.024)
LGDP	0.344*** (0.106)	1.122*** (0.109)	0.749*** (0.091)
Constant	1.833 (2.969)	-12.312*** (3.057)	-4.755* (2.555)
Year fixed effect	Y	Y	Y
Individual fixation effect	Y	Y	Y
Observations	544	544	544
Adjusted R-squared	0.9843	0.9826	0.9878
Number of id	34	34	34

Note: *, **, ***, respectively, are significant at 10%, 5% and 1% levels.

Table 6. Crowding out effect of real estate prices on total imports in different regions.

	(1)	(2)	(3)
	Eastern Region	Central region	Western Region
	Total logarithmic imports	Total logarithmic imports	Total logarithmic imports
VARIABLES	LnY_im	LnY_im	LnY-im
lnHP	2.608*** (0.574)	5.991 (3.925)	-8.688** (4.150)
lnHP^2	-0.144*** (0.0311)	-0.344 (0.229)	0.511** (0.252)
Constant	2.122 (3.948)	-18.39 (21.65)	37.95** (18.30)
Control variable	Y	Y	Y
Year fixed effect	Y	Y	Y
Individual fixation effect	Y	Y	Y
Observations	240	128	176
R-squared	0.988	0.977	0.929
Number of id	15	8	11

Note: *, **, ***, respectively, are significant at 10%, 5% and 1% levels.

Table 7. Crowding out effect of real estate prices on total exports of different regions.

	Eastern Region	Central region	Western Region
	Logarithmic total exports	logarithmic total exports	logarithmic total exports
VARIABLES	LnY_ex	LnY_ex	LnY_ex
lnHP	0.522 (0.422)	2.714 (5.442)	-4.485 (3.420)
lnHP^2	-0.0243 (0.0229)	-0.159 (0.319)	0.275 (0.207)
Constant	10.71*** (2.903)	-16.00 (22.12)	10.44 (15.08)
control variable	Y	Y	Y
Year fixed effect	Y	Y	Y
Individual fixation effect	Y	Y	Y
Observations	240	128	176
R-squared	0.993	0.961	0.951
Number of id	15	8	11

Note: *, **, ***, respectively, are significant at 10%, 5% and 1% levels.

Table 8. Crowding out effect of real estate prices on total import and export in different regions.

VARIABLES	Eastern Region	Central region	Western Region
	Logarithmic total exports	logarithmic total exports	logarithmic total exports
LnY	LnY	LnY	LnY
lnHP	1.733*** (0.421)	5.094 (2.947)	-5.943* (3.173)
lnHP ²	-0.0942*** (0.0228)	-0.287 (0.161)	0.355* (0.192)
Constant	6.298** (2.897)	-19.34 (17.80)	22.92 (13.99)
control variable	Y	Y	Y
Year fixed effect	Y	Y	Y
Individual fixation effect	Y	Y	Y
Observations	240	128	176
R-squared	0.993	0.981	0.958
Number of id	15	8	11

region is the most obvious, followed by the impact of central region, the impact on the central region is relatively insignificant. According to **Table 7**, the effect of housing price on the export of processing trade is generally not significant. Therefore, from the export of processing trade, the crowding out effect of house price is not significant. **Table 8** illustrates the crowding out effect of housing prices on the import and export of processing trade in the eastern region is more significant, followed by the western region, and then the central region. This also shows that the provinces in the central region are more attractive to processing trade, and the cost of house price can still be absorbed by the cost of processing trade. Therefore, it is also the first choice for the transfer of processing trade in China, that is, the transitional regional provinces located in the central region.

5. Conclusion and Suggestion

In view of the above research and analysis, we found that house prices and processing trade showed strong correlation; there was a significant inverted U-shaped relationship between house prices and processing trade, and calculated the corresponding turning point of housing prices on processing trade; there were significant differences in the impact of housing prices on processing trade in the east, the west, and the last. The central region, therefore, has formed a good low-lying effect of processing trade transfer, so the western region hopes to undertake the gradient transfer of processing trade, and should strictly control

the rise of house prices. It is of great significance to deeply understand the negative impact of house price on foreign trade real economy, so as to avoid greater house price increase. It is of great significance to maintain and consolidate the traditional advantages of China's processing trade and promote the development of the central and western sub regions. The academic community should establish a quantitative index system based on multi-dimensional measurement, and strictly monitor the impact of prices, house prices and wages on the real economy, so as to build a good research foundation for the macro and micro regulation of China's economic policies, and make the micro feedback of financial services to the real economy more sensitive, so as to flexibly adjust policies to serve the healthy development of China's economy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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