

Regional Disparity of Real Estate Investment in China: Characteristics and Empirical Study in the Context of Population Aging

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ABSTRACT

Using the method that measures regional disparity of economic growth, we calculated the SE, CVs and Theil series of regional real estate investment to analyze the regional disparity of real estate investment. We measured the regional disparity of real estate investment from 1999 to 2012 among China's economic regions, intra-economic regions and cities in the same province in the context of population aging. We also made empirical analysis on the relationship between real estate investment and GDP using the sample of 231 cities. The result reveals that the absolute difference of real estate investment is increased yearly and the relative difference is gradually reduced. The difference among economic regions or cities in the same province is increasing largely year by year, which is the main component of regional disparity. Due to the different level of regional economic development, the relationship between real estate investment and GDP is varying among cities.

Keywords: theil coefficient, economic growth, intra-economic regions, GDP

INTRODUCTION

There are significant regional differences in regional economic development in China. And the development characteristics vary from one city to another since 2000, the development of real estate industry also has distinct regional characteristics in the context of population aging, which is closely related to the development of regional economy (Ling 2006; Fan & Yang et al. 2006). The regional disparity characteristics of real estate in China are mainly the concentrated distribution of the supply-demand in the housing market. Since 2011, the volume of the real estate investment in 35 large and medium-sized cities has accounted for over 50% of that of all the country. The sales volume and saleable area of commercial housing always remain high. At the same time, the housing price differentiation among different cities has also become increasingly great. Taking the volume of the real estate investment for example, although the difference of investment volume in eastern, central and western region has gradually narrowed in recent years, the proportion of investment volume in central and western region have increased from 13.5% and 13.2% to 22% and 21.6% in 2012 respectively since 2000, while the proportion of investment volume in eastern region decreased from 73.3% in 2000 to 56.5% in 2012, which is still much higher than that in central and western region. In addition to great regional disparity, the differences inside the regions are also significant, and the investment volume concentrates mainly on the following provinces: Liaoning, Jiangsu, Zhejiang, Guangdong, Shandong located in eastern region; Anhui, Henan, Hubei, Hunan located in central region; Sichuan; Guangxi, Yunnan, Shanxi located in western region.

At the same time, by the analysis of statistical data of cities in each province, we can get that the investment volume focuses mainly on the developed cities, such as Shijiazhuang and Tangshan in Hebei Province, Taiyuan and Datong in Shanxi Province, Shenyang and Dalian in Liaoning Province, Changchun in Jilin Province, Harbin in Heilongjiang Province, Qingdao and Jinan in Shandong Province, Nanjing, Wuxi and Suzhou in Jiangsu province, Hefei and Wuhu in Anhui province, Hangzhou, Ningbo and Wenzhou in Zhejiang Province, Fuzhou and

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Contribution of this paper to the literature

- This paper investigates the regional disparity of real estate investment among 231 cities in China by using the standard deviation, variable coefficient and theil coefficient.
- By various indicators and the empirical analysis, it can be seen that the overall difference of real estate development investment in China is gradually decreasing. The absolute difference of real estate investment in each province is expanding year by year, while the relative difference presents a downward trend year by year.
- We can obtain the result that the regional differences in intra-groups are the main influence factors of real estate investment. And the real estate investment in the eastern cities spreads from the core cities to the surrounding cities. The result reflects a signature characteristic of real estate market in China, which is called Regional Differentiation.

Xiamen in Fujian Province, Kaifeng and Luoyang in Henan Province, Wuhan in Hubei Province, Changsha in Hunan Province, Guangzhou and Shenzhen in Guangdong Province, Nanning, Guilin and Liuzhou in Guangxi Province, Xi'an in Shanxi Province, Lanzhou in Gansu Province, Yinchuan in Ningxia Province, etc. And the low investment volume concentrates on less-developed cities in each province. Not merely the investment volume, the sales volume and saleable area, construction starts and housing price also show an extremely concentrated distribution (Hsu, 2016). The regional economic development characteristics and its interaction with the real estate market lead to the regional differences in real estate market of China. The implementation of the real estate market regulatory policy should not only take the current situation of real estate market development into account, but also consider the regional disparity of the real estate market, especially the interaction mechanism of real estate market among cities, in order to make differential regulatory policies (Wang, 2016).

In this paper, by the calculation of variable coefficient, Theil coefficient and concentration coefficient of regional real estate market investment in China, we took the real estate investment analysis as an example, compared with the existing analysis results, reflected the evolution rule of regional real estate market investment difference in the context of population aging. At the same time, we examined the regional differentiation of real estate investment and economic development through analyzing the relationship between the regional real estate investment and GDP.

LITERATURE REVIEW

From the perspective of market investment, regional disparity of housing prices, and the relationship between real estate investment and regional economic, scholars have carried on many analysis and empirical researches on regional difference of real estate market in China based on the existing economic division (Liu, 2016). By analyzing the data of 30 provinces during 1999-2003, Wei & Li (2005) found that there are great differences in the real estate demand function in all over the provinces and cities. Tan & Chen (2006) put forward to the curve method and coefficient method of real estate investment disparity, carrying on actual measurement and analysis of real estate investment difference briefly from 2001 to 2003 in China. Ling & Liu (2006) thought that different macro-control policy should be adopted due to great regional difference of real estate in the east. Liang & Gao (2007), on the basis of regional difference, carried on the research about the housing price fluctuation in China based on the traditional region division (eastern, central and western region). Fan et al. (2007) thought the factors that affect the real estate regional disparity are regional economy, policy and market environment etc., thus the housing market should be regulated, controlled based on local market conditions. They also carried on the Granger causality test between the housing market and macro-economy, and studied the regional investment elasticity by building the three relevant fixed-effect models, which indicated that the special region disparity in the housing market is closely linked to the regional economy development, and both influenced each other and restrict each other. By the empirical study of real estate demand elasticity in 35 large and medium cities in China, Gao & Wang (2008) found that there was a significant regional disparity in real estate demand elasticity. Kong et al. (2009) argued that as the macroeconomic fundamental changes, such as the economic development, household consumption etc., the housing market showed a significant regional difference, and the relationship between it and regional economy was varying with time. Hu et al. (2010) studied the macro-control effect on urban real estate market, and thought that the macro-policy was relatively effective in urban real estate market; however, the city differences led to bigger different effectiveness. Chen & Wang (2012) draw a conclusion that the influence of house prices on adjoining regions is greater than that on non-adjoining regions; moreover, the mutual influence of house prices on regions with similar economic characteristics was smaller than that on regions with dissimilar economic characteristics. Tian & Wang (2012) argued that the housing prices of provinces in China possessed significant spatial correlation, the high value concentrated on the developed eastern coastal regions, while the low value concentrated on the relatively poor western regions.

The existing literatures about the regional disparity of real estate market in China are mostly based on the existing economic region division, eastern, central and western region, and 30 provinces or 30 large and medium-sized cities act as the research samples, ignoring other second-tier cities and third-tier or fourth-tier cities, thus past discussions lack the analysis of cities. The further discussion about regional disparity of real estate investment in different cities and the internal relation among each part is poorly investigated. This paper uses the variable coefficient, Theil coefficient and concentration coefficient to study the regional differences in real estate investment in China from provinces and cities respectively, and analyzes the relationship between real estate investment and regional economic development from cities in the context of population aging.

METHODS

This paper uses the standard deviation, variable coefficient (Donald, 1964) and theil coefficient (Zellner & Theil 1962; Zanden et al. 2014) to analyze the regional disparity of real estate investment in China. Theil coefficient refers to the measuring method of China's regional economy difference by He & Liang (2004).

The Standard Deviation and Variable Coefficient

$$S_t = \sqrt{\sum_j (Y_j - \bar{Y})^2 / n}, CV_t = \frac{S_t}{\bar{Y}} \tag{1}$$

where Y is the volume of real estate investment in region j, while \bar{Y} is the mean value of real estate investment.

Theil Coefficient

The Theil coefficient has the following advantages: it can decompose the regional differences with many layers according to industrial structure or regional structure; it uses economics scale as weights; if the average income and population scale in all regions change at the same rate, the Theil coefficient remains unchanged; the Theil coefficient is not affected by the number of space unit, and it can compare the economic differences in different regions (He&Liang, 2004).

The Theil coefficient reflecting regional differences of real estate investment in provinces

The Theil coefficient (T_p) reflecting regional difference of real estate investment in provinces can be defined as follows:

$$T_p = \sum_i \sum_j \left(\frac{Y_{ij}}{Y}\right) \ln\left(\frac{Y_{ij}/Y}{N_{ij}/N}\right) \tag{2}$$

Here, Y_{ij} is the completed investment in real estate in province j of economic zone Y_{ij} ; Y is the completed investment in real estate throughout the country; N_{ij} represents the population in province j of region i, and N is the total population in China.

If T_{pi} is defined as the province difference of region i, then T_{pi} can be defined as follows:

$$T_{pi} = \sum_j \left(\frac{Y_{ij}}{Y_i}\right) \ln\left(\frac{Y_{ij}/Y_i}{N_{ij}/N_i}\right) \tag{3}$$

Here, Y_i and N_i are the investment volume and population respectively of real estate development in economic belt i.

If T_{br} is defined as the regional difference, it can lead to

$$T_{br} = \sum_i \left(\frac{Y_i}{Y}\right) \ln\left(\frac{Y_i/Y}{N_i/N}\right) \tag{4}$$

Through the analysis, the province investment difference in real estate in China can be decomposed into the sum of differences of intra-economic zone (T_{wr}) and differences of inter-economic zone (T_{br}), namely

$$\begin{aligned} T_p &= \sum_i \sum_j \left(\frac{Y_{ij}}{Y}\right) \ln\left(\frac{Y_{ij}/Y}{N_{ij}/N}\right) = \sum_i \left(\frac{Y_i}{Y}\right) T_{pi} + T_{br} \\ &= T_{wr} + T_{br} \end{aligned} \tag{5}$$

The Theil coefficient reflecting regional difference of real estate investment in regions

When analyzing the regional difference of real estate investment in regions, the regions are the administrative cities, excluding the regional administrative regions.

The Theil coefficient (T_c) reflecting regional difference of real estate investment in regions can be defined as follows:

$$T_c = \sum_i \sum_j \sum_k \left(\frac{y_{ijk}}{Y}\right) \ln\left(\frac{y_{ijk}/Y}{n_{ijk}/N}\right) \tag{6}$$

Here, y_{ijk} and n_{ijk} are the completed investment and population in real estate development in city k in province j of economic zone i ; the others are described as Formula 2.

The investment differences in real estate development among cities of economic zone i (T_{ci}) can be defined as follows:

$$T_{ci} = \sum_j \sum_k \left(\frac{y_{ijk}}{Y_i}\right) \ln\left(\frac{y_{ijk}/Y_i}{n_{ijk}/N_i}\right) \tag{7}$$

Here, T_c can be decomposed into:

$$\begin{aligned} T_c &= \sum_i \left(\frac{Y_i}{Y}\right) T_{ci} + \sum_i \left(\frac{Y_i}{Y}\right) \ln\left(\frac{Y_i/Y}{N_i/N}\right) \\ &= \sum_i \left(\frac{Y_i}{Y}\right) T_{ci} + T_{br} \end{aligned} \tag{8}$$

T_{ij} is defined as the investment difference in province j of economic zone i ,

$$T_{ij} = \sum_k \left(\frac{y_{ijk}}{Y_{ij}}\right) \ln\left(\frac{y_{ijk}/Y_{ij}}{n_{ijk}/N_{ij}}\right) \tag{9}$$

So the investment differences in real estate development among cities of an economic zone (T_{ci}) can be decomposed further into:

$$\begin{aligned} T_{ci} &= \sum_j \left(\frac{Y_{ij}}{Y_i}\right) T_{ij} + \sum_j \left(\frac{Y_{ij}}{Y_i}\right) \ln\left(\frac{Y_{ij}/Y_j}{N_{ij}/N_i}\right) \\ &= \sum_j \left(\frac{Y_{ij}}{Y_i}\right) T_{ij} + T_{pi} \end{aligned} \tag{10}$$

$$\begin{aligned} T_c &= \sum_i \left(\frac{Y_i}{Y}\right) T_{ci} + \sum_i \left(\frac{Y_i}{Y}\right) \ln\left(\frac{Y_i/Y}{N_i/N}\right) \\ &= \sum_i \left(\frac{Y_i}{Y}\right) \left[\sum_j \left(\frac{Y_{ij}}{Y_j}\right) T_{ij} + T_{pi} \right] + T_{br} \\ &= \sum_i \sum_j \left(\frac{Y_{ij}}{Y}\right) T_{ij} + \sum_i \left(\frac{Y_i}{Y}\right) T_{pi} + T_{br} \\ &= T_{wp} + T_{bp} + T_{br} \end{aligned} \tag{11}$$

DATA

This paper adopts the data of volume of real estate investment and population in each province and city in China from 1999 to 2012 to investigate the regional disparity characteristics of real estate investment. The GDP and population in each province and city are from *China statistical yearbook*, *Chinese regional economy statistical yearbook*, *Chinese real estate statistics yearbook* and the statistical yearbooks related to the year of each province and city.

Because of data problems, the real estate investment in Tibet is nor taken into account, and the eastern regions in this paper include Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Guangdong, Shandong, Hainan; the central regions include Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan; the western regions include Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Sinkiang. When calculating the regional difference of real estate investment in cities, combining Beijing, Tianjin with Hebei as one city, and combining respectively Shanghai, Hainan, Chongqing with Jiangsu, Guangdong, and Sichuan as cities.

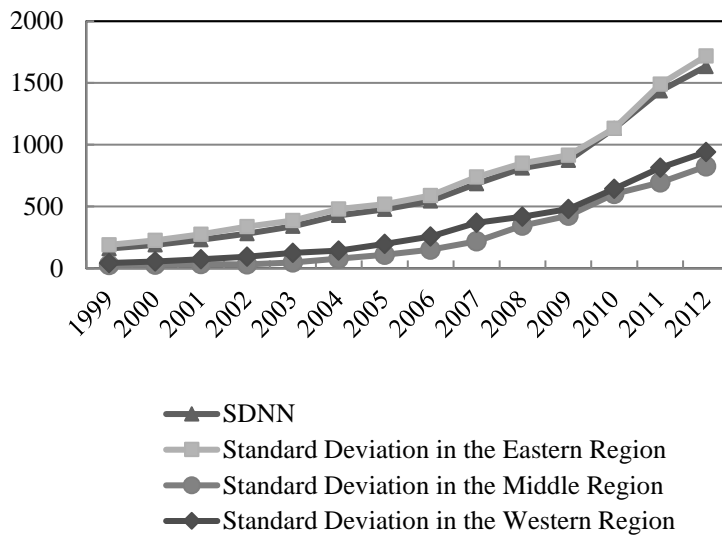


Figure 1. Absolute Differences of Chinese Real Estate Investment

RESULTS & DISCUSSIONS

Analysis of Standard Deviation and Variable Coefficient

This paper uses the standard deviation that reflects the absolute differences as well as the coefficient of variation (CV) that reflects the relative difference to describe the change for regional differences of real estate investment in China. As shown in Figure 1, during 1999-2012, the absolute difference of the overall change for Chinese real estate investment is expanding, which the overall standard deviation (SDNN) increased from 160.15 in 1999 to 1633.90 in 2012 with an AAGR of 19.6%. From the perspective of different regions, the eastern regions increased from 190.24 in 1999 to 1718.58 in 2012 with an average annual growth rate (AAGR) of 18.4%; the central regions increased from 27.33 in 1999 to 826.04 in 2012 with an AAGR of 30.0%; the western regions increased from 43.09 in 1999 to 941.18 in 2012 with an AAGR of 26.8%. As shown in Figure 2, during 1999-2012, except the central region, the overall real estate investment in China and the relative difference between the eastern region and the western region declined yearly; and the relative differences in central region showed a trend of expansion yearly after 2002, but the rise is smaller. These changes illustrate that with the rapid development of the real estate market from 1999, the investment levels of real estate development in various regions have been enhanced significantly, but there are still investment differences in real estate investment in each province. Guangdong possessed the highest volume of real estate investment up to 57.5 billion RMB in 1999, except Qinghai, Qinghai possessed the lowest volume of real estate investment with 1.1 billion RMB. In 2012, Jiangsu possessed the highest volume with 435.5 billion RMB, while Qinghai possessed the lowest with 19 billion RMB.

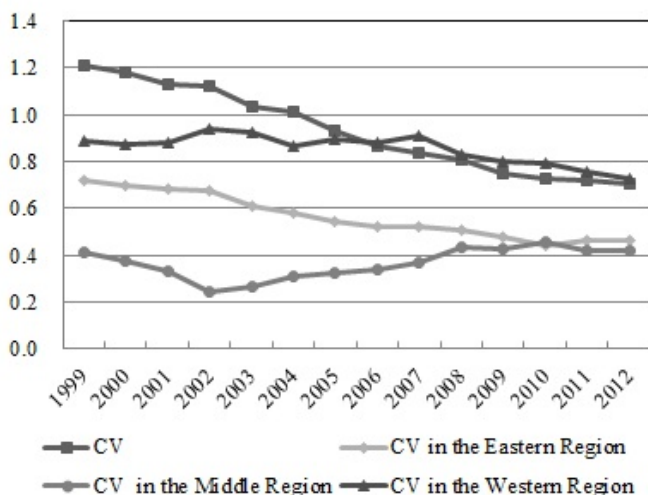


Figure 2. Coefficient of Variation (CV) of Chinese Real Estate Investment

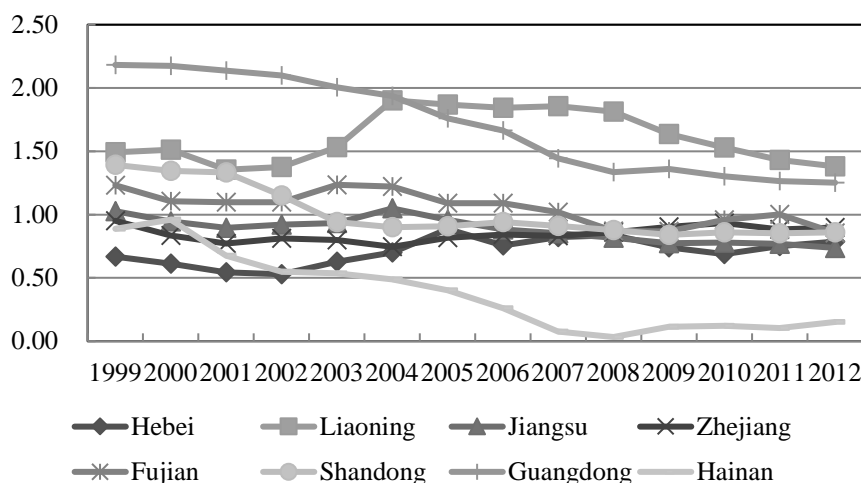


Figure 3. Coefficient of Variation (CV) of Real Estate Investment in Provinces of Eastern Region

At the same time, this paper analyzes the absolute difference and relative difference of real estate development investment in each province. But it fails to show the result completely for the lack of space. The standard deviation shows the absolute difference of real estate investment in each province are expanding yearly, and Hebei, Shanxi, Inner Mongolia, Anhui, Hunan, Guizhou are the provinces with higher AAGR (more than 30%), among which the highest one is Hunan Province with an AAGR (34.4%).

Figure 3, Figure 4 and Figure 5 show the changing trend of relative difference of real estate investment in each province of different region. From the figure, it can be seen that except some particular provinces, the relative difference of real estate investment in each province presents a decline trend yearly, and the provinces with significant decreasing trend are Guangdong, Shandong, Hainan, Jiangsu, Fujian, Henan, Guangxi, Gansu and so on, while Liaoning, Zhejiang, Shanxi, Anhui, Sichuan, Guizhou and the decline trends in some other provinces are not obvious, moreover, the relative difference in Hebei, Jiangxi, Hunan, Inner Mongolia, Shanxi, Ningxia and some other provinces show a trend of expansion.

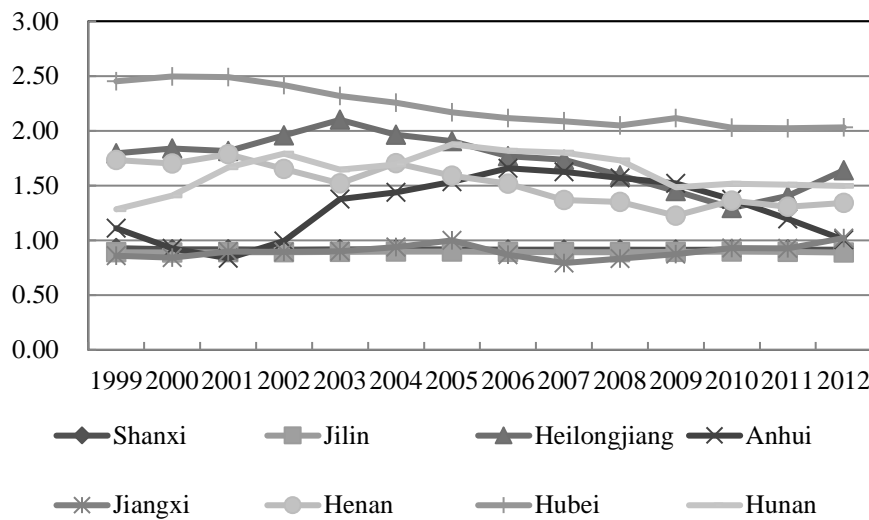


Figure 4. Coefficient of Variation (CV) of Real Estate Investment in Provinces of Middle Region

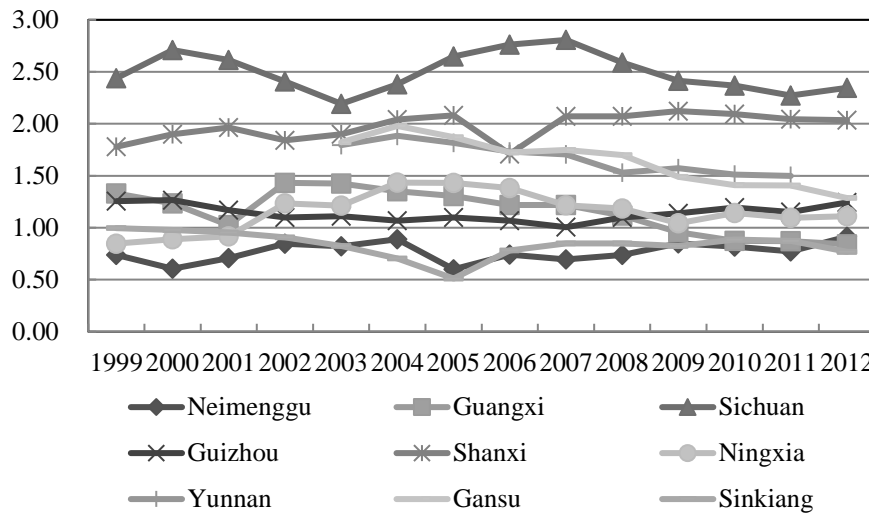


Figure 5. Coefficient of Variation (CV) of Real Estate Investment in Provinces of Western Region

THEIL COEFFICIENT ANALYSIS

This paper analyses the real estate investment difference in different regions by multi-layer decomposition of Theil coefficient, and use this coefficient to analyze the contribution level of intra-groups' and inter-groups' differences to the regional real estate investment, which are mainly divided into the Theil coefficient of real estate investment difference in provinces and cities in regions.

Figure 6 and Figure 7 are the Theil coefficient and its decomposition of real estate investment in provinces during 1999-2012, and the figures show that the Theil coefficient of Chinese real estate investment showed a decline trend since 1999, the overall Theil coefficient decreased from 0.36 in 1999 to 0.085 in 2012. It can be seen that the inter-groups' difference decreased obviously from 0.264 in 1999 to 0.047 in 2012, and the difference within groups decreased from 0.1 in 1999 to 0.038 in 2012. At the same time, the contribution level of intra-groups' differences rose from 27.4% in 1999 to 45.2% in 2012. It can be seen from the above analysis that the real estate investment difference in China has been gradually decreasing since 1999, and gradually transformed from the inter-groups' difference into the intra-groups' difference, which reflects that the overall difference of real estate development investment in China is gradually decreasing, but the difference within regions is gradually expanding.

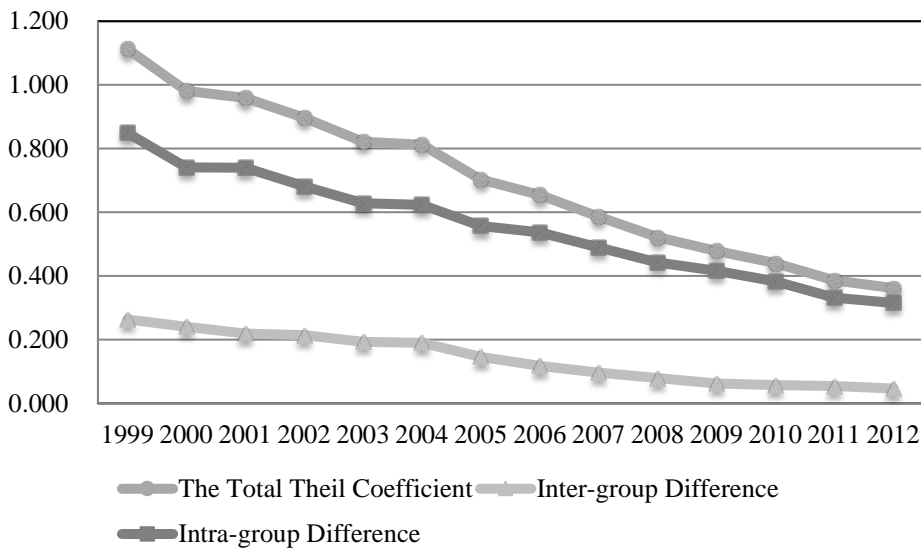


Figure 6. The Theil Coefficient of Real Estate Investment in Provinces

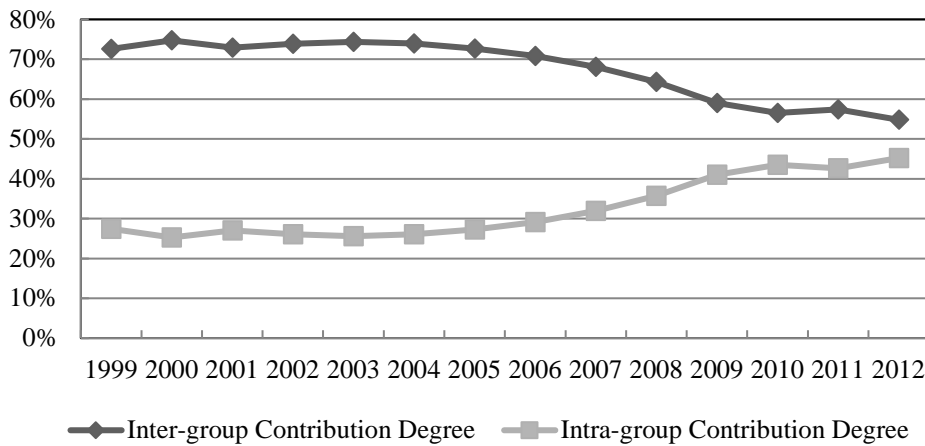


Figure 7. The Decomposition of Theil Coefficient of Real Estate Investment in Provinces

Figure 8 shows the Theil coefficient of real estate investment in the eastern, central and western regions. It can be seen that the differences in eastern, central and western regions have been decreasing year by year since 1999, but the difference among provinces in eastern region is still higher than that in the central and western region; after 2002, the real estate investment difference in provinces of western region was obviously higher than that in the central region, but after 2008, the difference became reduced. From the trend of difference change, the change trend of the eastern region and central region is relatively similar, and the changing trend of western region shows an opposite tendency with that in the eastern and central region during 2002 to 2008.

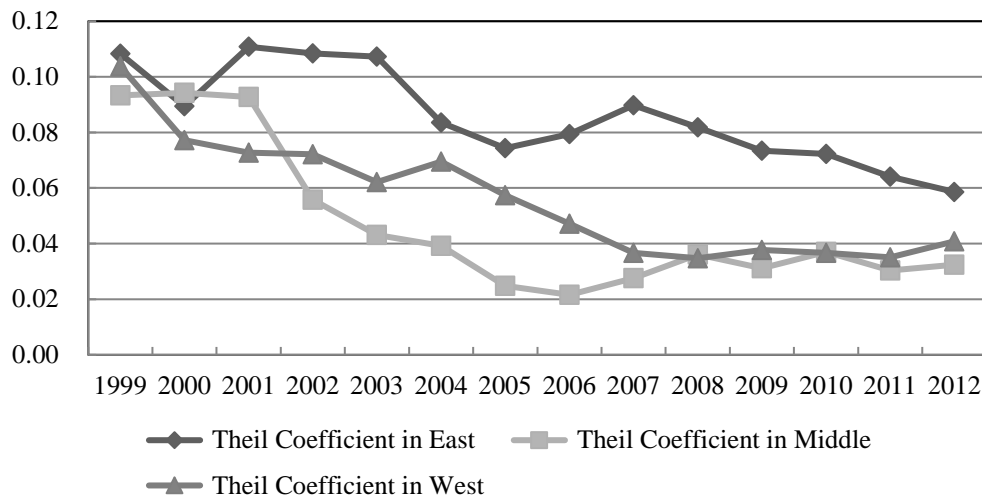


Figure 8. The Theil Coefficient of Real Estate Investment in Eastern, Middle and Western Regions

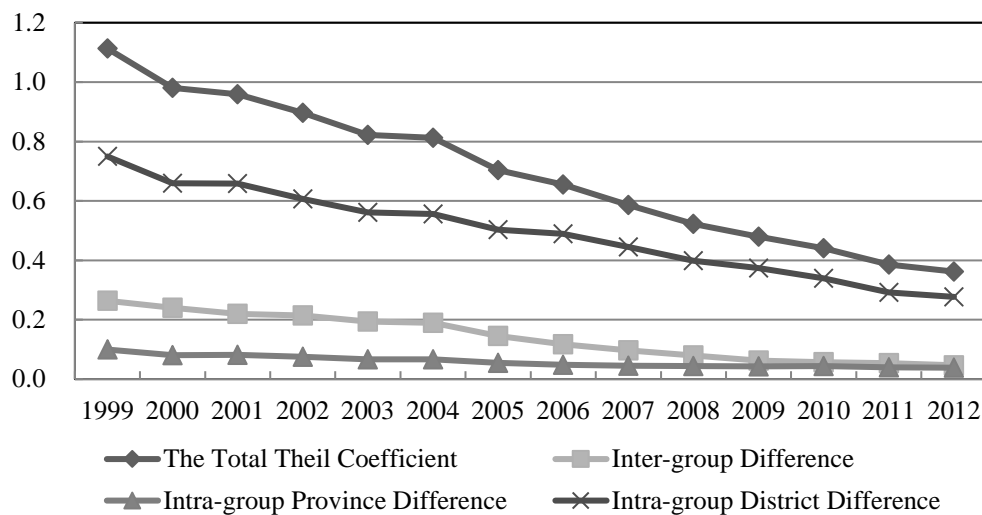


Figure 9. The Theil Coefficient of Real Estate Investment in Regions of China

Figure 9 and Figure 10 are the Theil coefficient and its decomposition of real estate investment in regions (cities) during 1999-2012, and the figures show that the real estate investment difference also showed a decline trend, and the overall Theil coefficient decreased from 1.11 in 1999 to 0.36 in 2012, especially the Theil coefficient within groups from 0.75 to 0.28 in 2012. The differences in provinces and regions within groups shrink a little. Through the decomposition of Theil coefficient, it can be seen that the contribution level of inter-groups' differences from 23.7% in 1999 to 12.9% in 2012. And both the province's differences in intra-group and regional differences in inter-groups were increase, in which the contribution degree of regional differences in inter-groups rose from 67.4% in 1999 to 76.5% in 2012. The regional differences in intra-groups are the main influence factors of real estate investment.

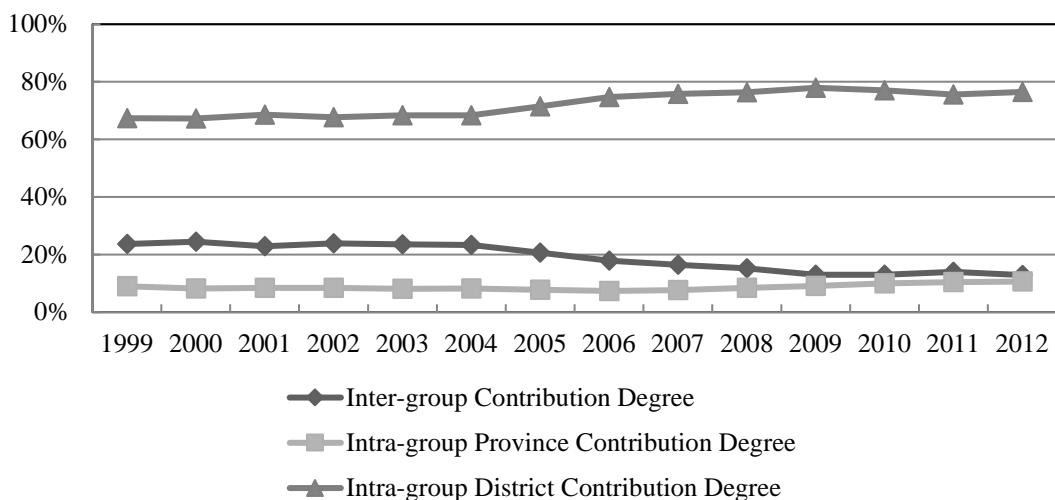


Figure 10. The Decomposition of Theil Coefficient of Real Estate Investment in Regions of China

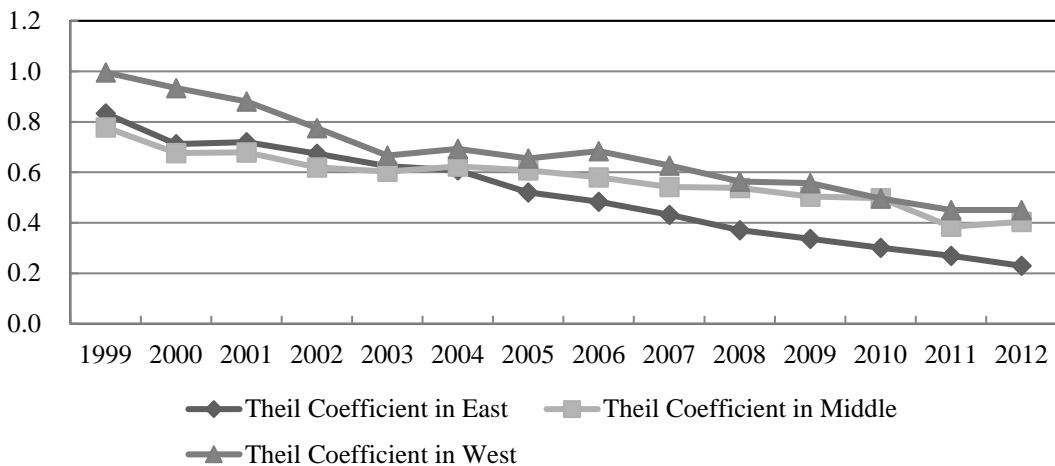


Figure 11. Theil Coefficient of Real Estate Investment in Eastern, Middle and Western Regions

Figure 11 is the changing trend of Theil coefficient of real estate investment in eastern, central and western regions. In the Figure 11, the Theil coefficient of real estate investment in eastern, central and western regions shows a downward trend year by year. Since 2004, the real estate investment difference in western and central regions is higher than that in the eastern region, and the reason is that the high overall economic development leads to the early real estate market formation, and the degree of housing market difference within each province is far less than that in the central and western regions. Compared to the eastern provinces, the real estate development investment concentrates more in the central and western provinces, while concentration in the eastern provinces is decreasing year by year; the real estate market of cities with a relatively low-level economy also develops rapidly, moreover, the Theil coefficient differences between the central and western cities and the eastern cities expands, which reflects, from a certain extent, that the real estate investment in the eastern cities spreads from the core cities to the surrounding cities.

RELATIONSHIP BETWEEN REGIONAL REAL ESTATE INVESTMENT AND ECONOMIC GROWTH

In order to better explain the relationship between regional difference characteristics of real estate investment and regional economic development, this paper uses panel co-integration test and panel Granger based on error correction model, selects the panel data of real estate investment and GDP of 231 cities during 2000-2012, analyzes the relationship between the real estate investment in different regions and economic development. For the lack of space, it fails to show the modeling process, instead, it presents the results of model and empirical analysis. This article carries out modeling analysis of the relationship between the real estate investment and GDP by the variable coefficient panel data model.

Table 1. The Contribution of Real Estate Investment to GDP

The range of β	The number of cities	The name of cities
0.25-0.35	6	Hegang, Huanggang, Yongzhou, Zhoukou, Baoding
0.35-0.45	31	Daqing, Panjin, Shanyao, Songyuan, Shiya, Anshan, Shijiazhuang, Yueyang, Wenzhou, Binzhou, Jinzhou, Langfang, Xuchang, Dezhou
0.45-0.55	62	Putian, Weifang, Jinan, Huangshi, Datong, Changchun, Kaifeng, Changzhou, Bangpu, Fuzhou, Qinhuangdao, Guilin
0.55-0.65	59	Yantai, Zhenjiang, Kunming, Qingdao, Ziben, Tangshan, Yingkou, Luoyang, Dongguan, Hefei, Zhuhai, Nanjing, Chengdu, Nanning, Taiyuan, Nantong, Xuzhou, Lanzhou, Weihai, Beijing, Dongying
0.65-0.75	37	Ningbo, Changsha, Dalian, Zhongshan, Wuhan, Chongqing, Haerbin,
Above 0.75	36	Baotou, Foshan, Hangzhou, Huizhou, Xining, Yanan, Yichun, Yancheng, Yinchuan, Tianjin, Shanghai, Shenzhen, Suzhou, Guangzhou

The model in this paper is $\ln(GDP_{it}) = \alpha_i + \beta_i \ln(RINV_{it}) + u_{it}$, here, $RINV$ represents the volume of real estate investment in each city. **Table 1** classifies the results simply according to the value of the coefficient β , in order to reflect the contribution of real estate investment in different regions to the regional economic development. Due to too many city samples, this paper only lists the representative cities. It can be seen from the table that the housing market can be classified according to the unit contribution of real estate investment to GDP, and its distribution is different. The regression coefficient of each city is mainly in the range from 0.45 to 0.65, and because of the different intercept term, it also reflects the influence of individual factors varying from region to region.

Because the speed of economic development in eastern region is significantly higher than that in western and central regions, and there are differences in the development of regional housing market, thus there are rigid demands of real estate investment in the eastern region, and the sufficient funds and frequent housing transactions promote the market maturity and prosperity. However, the real estate investment is weak in the relatively poor central and western regions, and the real estate market formatted late and develops relatively slowly. The difference in economy, market development and regional factors lead to the inconformity between development level and speed of Chinese housing market investment, and the total investment gap is increasing yearly, forming a pattern with widening absolute difference and narrowing relative differences yearly. And the housing market in central region developed relatively slowly during 2003-2008, so the variation of its mean value was small and the variable coefficient described an increase trend. The strategy of Central China Emerging' promotes the housing market in central region greatly. After 2009, the volume of real estate investment in every area shows a significant increase with higher mean value than before. And the variable coefficient in western region is significantly higher than eastern and central regions, which means the real estate investment in western region develops more quickly in recent years, while the eastern region shows a stable real estate investment because of the relatively mature market.

By comparing the changing trend of the proportion of cities' real estate investment in each province, it can be found that real estate investment proportion in cities is changing yearly in regions with significant decline trend, such as Guangdong, Shandong, Fujian Province, and the proportion in their main cities shows a decline trend, for example, except Guangzhou, Shenzhen in Guangdong province, the proportion of the real estate investment Foshan, Huizhou, Dongguan and some other places is increasing yearly in recent years; the proportion of the real estate investment of Jinan and Qingdao in Shandong province dropped from 60% in 1999 to 35% in 2012, while that of Yantai, Weifang, Weihai and that of some other places is increasing yearly, breaking the regional concentration pattern. The proportion of the real estate investment of some other cities, such as Quanzhou and Zhangzhou in Fujian Province, Anyang, Xinxiang and Xinyang in Henan Province, Suzhou and Changzhou in Jiangsu Province shows an increasing trend, and the regional proportion of real estate investment in the above provinces is changing with the development of regional economy. The proportion of real estate investment in cities in Liaoning, Zhejiang, Shanxi, Anhui and some other provinces is stable. However, for those provinces with expanding relative differences, such as Hebei, Jiangxi, Hunan, Shanxi, Ningxia, the real estate investment increasingly concentrates, and the real estate development investment has always been focused on the following cities, such as Shijiazhuang, Tangshan and Baoding in Hebei Province, Taiyuan, Datong and Yangquan in Shanxi Province, Changsha and Zhuzhou in Hunan Province, Nanchang and Ganzhou in Jiangxi province, and the degree of concentration is increasing.

By the Theil Coefficient, we can obtain the result that the regional differences in intra-groups are the main influence factors of real estate investment. And the real estate investment in the eastern cities spreads from the core cities to the surrounding cities. The result reflects a signature characteristic of real estate market in China, which is called Regional Differentiation. The cities in eastern region developed much better than those in central and western region. And the concentration of economic development leads to the concentration of real estate market. The distribution of population, industry and social resource, such as high-quality schools, hospitals and public administrative agency showed a trend of convergence among cities in eastern region, which draw more and more

population that leads to the distribution characteristic of supply, demand and investment in real estate market. More and More supply and demand are driven into the cities that have an advantage of resources. That is the reason that the regional differences in intra-groups are the main influence factors of real estate investment. Moreover, the development of regional economic collaboration and industry chain in eastern region is much better than central region and western region, which increase the linkage effect of real estate market among cities. That is the reason that the real estate investment in the eastern cities spreads from the core cities to the surrounding cities, which is called Diffusion Effect.

As the key industry of national economy in China, real estate market contributes a lot to the regional economic growth, which can be found in [Table 1](#). And the effect on economic growth that real estate market had showed the signature regional differentiation. Owing to the difference of industry structure among cities, the more diversified the industry structure is, the weaker the effect is. The economic growth of some cities has a strongly dependent on the real estate market owing to industry structure deficiency, especially the 3-tier and 4-tier cities. With the decrease of economic growth rate, this issue became increasingly outstanding, which may trigger the economic risk.

CONCLUSION

This paper uses the standard deviation, variable coefficient and Theil coefficient to analyze the regional difference characteristics of real estate investment in China. This paper selects the panel data of real estate investment and GDP of 231 cities during 2000-2012 to analyze the relationship between the real estate investment and economic development in different regions. By various indicators and the empirical analysis, it can be seen that during 1999-2012, except the central region, the overall difference of real estate investment in China, the relative difference in the eastern region and the western region declined yearly; and the relative differences in central region show a trend of expansion year by year after 2002, but the rise is smaller. The absolute difference of real estate investment in each province is expanding year by year, while the relative difference presents a downward trend year by year. Due to different regional economic development, the real estate investment in some provinces spreads from the core cities to the surrounding cities, at the same time, the real estate investment still concentrates on cities of some province and the concentration is increasing. By calculating the Theil coefficient of real estate investment disparity, it can be seen that the real estate investment difference in China has been gradually decreasing since 1999, and gradually transformed from the difference among groups to the difference within groups, which reflects that the overall difference of real estate investment in China is gradually decreasing, but the difference within regions is gradually expanding. Through the Theil coefficient of real estate investment difference in regions, it can be seen that the contribution level of inter-groups' differences decreased. But both the province's differences intra-groups and regional differences inter-groups were increasing, in which the contribution degree of the province's differences intra-groups rose from 67.4% in 1999 to 76.5% in 2012. The province's differences are the main influence factors of real estate investment.

This paper takes the real estate investment as an example, by means of various indicators of regional economic development difference, combined with the statistical method, in order to describe the difference characteristics and development trend of regional housing market in China and provide the basis for regional housing market regulation. At the same time, through other indicators, such as commercial housing sales price, sales volume, saleable area, construction starts and so on, the regional difference characteristics of the housing market in China can also be discussed. The real data and the performance of regional housing market illustrate that the existing regulatory policies do not achieve the target, and it cannot have the regulation effect on some regions, thus the different regulation in the housing market is increasingly urgent, and it is quite worth discussing how to classify reasonably the housing market in China to make effective regional housing market regulation policy.

RECOMMENDATION

Through analyzing the relationship between real estate investment in cities and GDP by using the panel data model, it can be found that due to the differences in regional economic development and industrial structure, the role of the real estate investment on economic growth is different, thus the role and status of real estate investment in the regional economic development should also be focused by macro-control.

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