



温州肯恩大学
WENZHOU-KEAN UNIVERSITY

The impact of China's Loan Prime Rate reform on the real estate companies

In Partial Fulfillment of the Requirements
for the Bachelor of Science in Finance

by

LUO Ju

1098180

May, 2022

The impact of China's Loan Prime Rate reform on the real estate companies

October 6, 2021

Ju Luo ^{a,*}

^a *College of Business and Public Management, Wenzhou-Kean University, Wenzhou 325060, China.*

Abstract

The real estate market is an essential part of China's economy, and it occupies a vital position in the national economy. In 2019, the People's Bank of China announced that the Loan Prime Rate (LPR) was calculated according to the new formation mechanism. The emergence of LPR has had an essential impact on the real estate industry. This paper obtained the real estate company's stock price, trade date, index from August 1, 2019, to November 1, 2019, from CSMAR. Through the event study method, using the market model and mean adjusted model to analyze the impact of LPR on real estate companies and the real estate market. We found that the LPR policy reform was a good signal for real estate companies. By comparing two different markets, Shanghai Stock Exchange's response to the new policy is slightly shorter than that of the Shenzhen Stock Exchange, and market model and adjusted model also confirm this positive results. My paper's contribution to the literature fills in the gaps in the research on the impact of Loan Prime Rate reform on real estate companies by other scholars, and analyzed the A-share market of the Shanghai Stock Exchange and the Shenzhen Stock Exchange. Results revealed that the Shanghai Stock Exchange's response to the new policy is slightly shorter than that of the Shenzhen Stock Exchange.

* Corresponding author. Email address: 1098180@wku.edu.cn

JEL Classification: G28, R30, R38

Keywords: Loan Prime Rate, Real estate market, Real estate companies

1. Introduction

As one of the monetary policies that regulate and control economic stability, interest rates play an essential role in the regulation of the market in China's economy and society. Interest rates can directly affect the financial interests of the people. The state controls the funds flowing in the market by adjusting the interest rate policy; when the interest rate rises, the financing cost of the enterprise will increase, which means that its financial people expenses will also increase. The increase in costs leads to a decline in the company's profits, and at the same time, the company's market value will also decrease. In addition, the rise in interest rates also affects the attractiveness of financial products that use bonds as fixed income, which leads to more being willing to invest funds in the bond market, thereby affecting the stock market. On the other hand, when the interest rate drops, the company's financing cost decreases, the company's market value rises, and the decline in interest rates makes more investors willing to invest in the stock market, so the overall transaction volume across the market increases. Since establishing the Chinese stock market, China's capital market has been continuously growing through reforms. However, China's stock market still needs continuous improvement compared with Western countries. To make the interest rate fully play its role in the socialist market economy, the reform of interest rate marketization should be gradually carried out.

The issue of China's real estate market has always been a hot topic in society. Currently, China's domestic housing prices remain high, and frequent changes in credit policies are not conducive to the real estate market's stability. China has introduced many monetary policies to stabilize China's housing prices and stabilize the real estate stock market. Economists believe that the capital market and the real economy are closely linked and that only when the stock market is stabilized can the industry develop in a balanced manner. The long-term and healthy development

of the real estate industry requires relevant policies to maintain the smooth operation of the real estate stock market. And every time a new policy is introduced, it often triggers real estate stock prices changes. The LPR is based on the Medium-term Lending Facility rate (MLF) quotation plus a few basis points. This policy developed interest rate marketization, which affects the financial market, including the real estate market. And the emergence of LPR has an essential impact on the industry, and different cities have different degrees of influence. We found changes in LPR over the past few years. The LPR in September and October 2019 was 4.2%, the LPR from November 2019 to January 2020 was 4.15%, the LPR from February 2020 to March 2020 was 4.05%, and the LPR was adjusted from April 2020 to 3.85%, which has not changed so far.¹ And we know that LPR floats on the basis of MLF. According to mortgage data, most banks raised the benchmark interest rate for first home loans by 10%–20% and the benchmark interest rate for second home loans by 20%–30%. It is a comprehensive loan risk assessment conducted by the lending bank following the local housing credit policy requirements. Once the value is determined, it will be fixed throughout the contract period. Huber and Punzi (2020) state the transmission mechanism of monetary policy to the real estate market. Zhu (2020) said that personal housing loan interest rates are negatively correlated with housing prices, while real estate development loan interest rates positively correlate with housing prices.

At present, foreign authors' research on LPR mainly focuses on the reform of LPR as a transmission mechanism of China's monetary policy in terms of market interest rate reform and the asymmetric impact of LPR on China's real estate market. There is a lack of research on the impact of real estate company stocks. Pay attention to the adjustment of the People's Bank of China to LPR reform and the expected changes of real estate companies. We hypothesize that the LPR

¹ China's Escalating Property Curbs Point to Xi's New Priority. 2021. Bloomberg News.

reform was good news for real estate companies, and we should observe that the stocks of real estate companies will bring abnormal returns when the incident occurs. In addition, we will compare the stock yields of Shanghai A-share and Shenzhen A-share real estate companies.

To test our hypothesis, selecting the closing stock prices and stock index prices of 139 real estate companies from August 2019 to November 2019 on the trading day. We first derive the company's stock abnormal returns and use the market model of the event study method to obtain the cumulative abnormal returns figure. It can be observed that the stocks of 139 companies were affected by the event during the event window. After the day of the event, the cumulative abnormal returns showed an overall upward trend. Then we used the mean adjusted model in the event method to further reduce possible problems related to sample timing bias. Compared with the market model, the mean adjusted model results also support our hypothesis, and the results presented are more significant. It shows that after the event date, the abnormal increase in stock returns of real estate companies was higher than before. Furthermore, we compared the A-share company listed on the Shenzhen Stock Exchange (SZSE) and the A-share company listed on the Shanghai Stock Exchange (SSE). The results showed that the stocks of the companies in the two markets showed good influence. There are only minor differences between the two.

The contribution of my paper to the literature is to fill a significant gap in the research on the impact of interest rate reform on real estate companies by other scholars. Through the design and discovery of the market model and the mean adjustment model in the event study method, and to expand the theory's generality to increase the literature. The previous literature focused more on the impact of interest rate reform on housing prices and ignored its effects on the stock returns of listed companies, so my article filled this gap. My thesis added the impact of the LPR policy reform on the stock returns of real estate companies and analyzed and compared the A-share market of

the Shanghai Stock Exchange and the Shenzhen Stock Exchange. And the analysis of the results of different trading markets shows that the release of the new policy is good news for the Shenzhen Stock Exchange and the Shanghai Stock Exchange real estate companies. Still, the Shanghai Stock Exchange's response to the new policy is slightly shorter than that of the Shenzhen Stock Exchange.

The rest of this paper is as follows. In Section 2, I reviewed the literature related to my research topic and put forward hypotheses. Section 3 describes the data and the research methods used. Section 4 presents the results of the research. Conclusions are drawn in Section 5.

2. Literature Review

The LPR reform is an essential part of my country's current monetary policy reform, and it is advancing the process of interest rate marketization. The impact of LPR on real estate exists and can be analyzed from the changes in interest rates and real estate market expectations. We review the relevant theories and empirical evidence in the following chapters to investigate the short-term and long-term effects of LPR on the real estate market and the impact in different areas.

2.1 The impact of policy adjustments on the real estate market

Aiet-Sahalia et al. (2012) found that monetary policy is an essential factor affecting the financial sector. Gallo et al. (2016) also used data to construct policy indicators and found that the total revenue can reflect the policy. Chen (2012) also used 45 years of relevant data from the United States to construct a non-parametric estimation model. As a result, he found that his monetary policy and housing prices not only have a significant correlation but also show cyclical fluctuations. According to Granziera and Kozicki (2015), they believed that housing price changes can be effectively predicted under rational expectations and that housing price fluctuations are related to policies. At the same time, Notapietro and Siviero (2015) used the DSGE model to

analyze that the choice of optimal policy needs to be consistent with house price fluctuations. Moreover, Chen et al. (2017) proposed that the effects of monetary policy shocks on asset prices are asymmetric. Singh and Nadkarni (2020) proved that loan interest rates have a significant impact on housing prices. In addition, Wong et al. (2003) and Chen (2018) mainly studied the effect of interest rates on housing prices from the perspective of expectations, and Zhang (2020) concluded that housing prices and interest rates show a moderately high correlation. However, Shi et al. (2014) studied the impact of New Zealand's central bank policy and retail mortgage interest rates on real house prices from 1999 to 2009. They found that real interest rates are significantly positively correlated with actual house prices. In another study on monetary policy on the real estate market, Zhang and Pan (2020) emphasized the asymmetric impact of the real estate market on monetary policy and output. Ding et al. (2020) and Brito (2016) also showed that the asymmetric relationship between China's economic policy and the real estate market is crucial. Jiang (2021) shows that Chinese policymakers' real estate regulation policies cannot restrain the real estate market, but LPR does not mean that the real estate market should be relaxed. Zhang and Hu (2011) state that it will become an essential reference for macro-control after the LPR reform, and LPR can reflect the supply and demand of funds. Additionally, Tang and Tao (2021) provide an essential reference for the financial sector to implement macro-control, help make the prudent monetary policy more flexible and appropriate, and better meet the needs of the real economy. Aoki et al. (2003) stated that Real estate developers, borrowers, and lenders in the mortgage market could carefully consider the long-term risks they face or need to bear, effectively avoiding short-term real estate market participants. And Wei et al. (2014) analyzed that eastern coastal cities are more sensitive to monetary policy changes than western non-coastal cities. Based on these foundations, Maand (2020) referred to the trends and trends of LPR to clarify the dynamic

variability of LPR. Furthermore, Zhang and Hu (2021) analyzed the LPR reform to promote the process of interest rate marketization and smooth the interest rate transmission mechanism. They pointed out the positive impact of LPR on the real estate market from interest rates.

Based on the above literature, every adjustment of interest rates will have a certain impact on the real estate market, and monetary policy has an important effect on real estate prices. There is an asymmetrical interaction between my country's monetary policy and the stock market.

2.1. Effects on different market

According to the similar structure and regulatory environment of the Shanghai and Shenzhen stock markets, in these two trading markets, the risk premium overtime is very significant and asymmetric (Zhang & Huang, 2001). Yan et al. (2011) believed that the pace of housing price changes in different cities was different, and their response to monetary policy was also different. A new study on LPR, Lim et al. (2021) found through the DSGE model that LPR policies are more specifically aimed at housing and capital asset markets. In addition, Lim et al. (2020) believe that LPR, the mortgage market has an impact, and its impact is different in different cities. In the short term, second-tier cities have shown a more evident and complex situation in terms of the actual realization or the magnitude of changes in the level of mortgage interest rates in second-tier cities than in first-tier cities. According to Wang (2020) and Liu (2017), they also pointed out that because the market environment has not undergone fundamental changes and the transmission channel of monetary policy interest rates has yet to be further formed. It has little effect on short-term fluctuations in the level of China's mortgage interest rates. Furthermore, Wu and Bian (2018) and Yu and Zhang (2019), in first-tier cities, interest rate hikes have a more significant negative impact on housing prices.

It can be concluded from the above literature that LPR, as a monetary policy tool, has an asymmetric indirect impact on the real estate market. Ding et al. (2017) analyzed that increasing macro-prudential policies tailored to local conditions is appropriate. And Suratman (2019) and Si (2015) further analyze that the People's Bank of China's LPR reform reduces interest rates further to support its slowing economy. The real estate industry needs to make detailed plans for the monetary policy adjustments brought about by LPR to minimize the impact of policy adjustments. The interest rate marketization embodied in the LPR reform has had a favorable impact on the real estate market. This is specifically reflected in the fact that LPR is good news for real estate companies, and LPR can control the rise of housing prices in first-tier cities to a certain extent.

LPR can reflect transaction information in the credit market on time. LPR quotes refer to the Medium-term Lending Facility (MLF), which can reflect the trend of monetary policy. Monetary policy's transmission mechanism and effect are inconsistent in different financial markets and institutions (Wang, 2020). It can be seen from previous studies that the introduction of the new policy is likely to be a positive signal to the real estate industry. Still, the emergence of LPR is relatively short, and the research literature is limited. Therefore, the effect of the policy is not apparent, and it may bring benefits or disadvantages. Although many scholars have studied the impact of changes in interest rate policies on the real estate market, most take the major reform of mortgage interest rates as their research perspective. They lack the analysis of the LPR impact on the stock prices of real estate companies, and for companies listed on different exchange market. This paper hopes to fill the gap in the existing literature.

3. Data and Methodology

3.1. Data

The data used in this study are derived from China Stock Market and Accounting Research Database (CSMAR).

We obtained the operating data of listed real estate companies from August 2019 to October 2019 from CSMAR. CSMAR data reports real estate listed companies' code, the stock closed price, real estate share returns, and real estate market return. The samples are taken every trade date. In addition, we also obtained real estate price-earnings ratio data from CSMAR. The data reported by CSMAR includes exchanges (Shanghai Stock Exchange and Shenzhen Stock Exchange), real estate pricing-earning ratio. We extract each month's stock abnormal return.

In addition, when selecting sample data, because the event study method is used, it is necessary to consider whether there are other significant events occurring during the estimation window period and the event period. Since our research period is from July, 2019 to September, 2019, because this period avoided the news that the Ministry of Housing and Urban-rural Development mentioned at the press conference on September 26, 2019, about encouraging the development of shared property housing in cities with higher housing prices, it may be a negative effect on real estate stocks. The estimated window period is [-30, -16], the event window is [-15, 15], and the post-event window is [16, 30].

3.2. Methodology

3.2.1. Event study method

The event study method was used to analyze 139 real estate companies listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange.² Study whether the stock price will fluctuate when an event occurs in the market. It can be concluded whether there is a correlation between the event and the fluctuation of the stock price. It can be a positive correlation or a negative correlation, and there is no correlation. The event study method was initiated by Ball and Fama in 1969.³ Its principle is to analyze the changes in stock returns of the research object before and after the event according to the research purpose, and then use this method to explain the impact of the event on stock prices and returns.

The steps of the event study method: determine the research event and event date; select the research sample; calculate the normal return rate of the sample's stock; calculate the abnormal return rate of the store; check the sample statistics; and finally analyze the results.

3.2.2. Event and event window selection

Determine the event day, and divide the research time into an estimation window period, an event window period, and an after-event window period according to the event day. The estimation window period is used to estimate the normal rate of return of the research target stock, mainly to analyze the impact of the event on the stock price in the short term. Due to the subjective nature of the event window period determination, it is necessary to avoid selecting a time period that is

² Event study is an empirical analysis that examines the impact of major events or events on the value of securities (such as company stocks).

³ Hayes, A. 2020. Event Study. Investopedia. From: <https://www.investopedia.com/terms/e/eventstudy.asp>.

too short or too long. If it is too short, the study of the event cannot be fully investigated. If the event window is too long, other events may occur during the event period to affect the results of the study, resulting in inaccurate research results. The event window period selected by the paper is 20 days before and after August 17, 2019, with a total of 63 trading days as the event window period.

3.2.3. Market model and Mean adjusted model

When analyzing the impact of the LPR policy on the real estate stock market after the issuance of the LPR policy, it is analyzed by using event study and the abnormal return rate of the market model.⁴ Using regression is assumed that the parameter values α_i and β_i estimated by the market model remain unchanged during the event period, then we can obtain the abnormal return rate and the cumulative abnormal return rate during the event period.

According to the event study method, the normal rate of return model selected in this paper is the market model, and perform the following least-squares OLS regression for each stock:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

where R_{it} is the return rate of stock in the event period in t period, R_{mt} is the celestial circulation index (market rate of return) in the event period t , α_i and β_i are the parameter values estimated by the market model.

Market model:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (2)$$

Mean adjusted model:

⁴ The abnormal rate of return refers to the rate of return that exceeds the normal (or expected) rate of return. It is equal to the rate of return on a certain day minus the difference between the normal (expected) rate of return required by investors (or the market) on that day.

$$\bar{R}_i = \frac{1}{139} \sum_{t_1}^{t_2} R_i \quad (3)$$

$$AR_{it} = R_{it} - \bar{R}_i \quad (4)$$

where \bar{R}_i is the stock i average return at event window.

Then, calculate the abnormal rate of return and add up the average abnormal rate of return (AAR):

$$AAR_{it} = \frac{1}{N} \sum_i^N AR_{it} \quad (5)$$

where AR_{it} calculates the abnormal rate of return of the stock i on the t day. In order to study the impact of the event on the overall security pricing, it is also necessary to calculate the average abnormal rate of return AAR_{it} . Generally, the average abnormal return rate is to average the abnormal return rates of all companies at a certain point in time; t is a certain time in the event window period, and N is the number of companies. Cumulative abnormal rate of return is the sum of the average abnormal rate of return of a company i from t_1 to t_2 in a certain period of time. The calculation is as follows:

$$CAR_{i(t_1, t_2)} = \sum_{t=t_1}^{t_2} AR_{it} \quad (6)$$

where CAR_{it} is the cumulative abnormal return of the stock, n is the number of the samples.

Then, the sample cumulative average abnormal return rate ($CAAR_{i(t_1, t_2)}$):

$$CAAR_{i(t_1, t_2)} = \frac{1}{N} \sum_{t=t_1}^{t_2} AAR_{it} \quad (7)$$

where $CAAR_{i(t_1, t_2)}$ represents the cumulative average abnormal return, CAR_{it} is the cumulative abnormal return of the stock in the event period in t period.

t -test and p -value can show us the relationship between the LPR and the real estate company's stock return. When the value of t obtained by the t -test is greater than a certain selected value, if we find that the value of p is less than 10%, we can reject the null hypothesis at this time,

thinking that the mortgage interest rate linked to the LPR policy has an impact on the stock returns of real estate companies. On the contrary, when the value of t is less than a certain selected value, and the value of p is greater than 10%, the null hypothesis is accepted, and it is believed that the LPR policy has no effect on the stock income of real estate companies.

4. Results and Discussions

4.1. Main Results

First, use Stata software to perform statistical analysis on the CAAR of 139 companies' stocks. In the t -test of CAAR, the corresponding results are shown in Table 1. The results of the data in this table found that the CAAR changed significantly in the 15 days of the LPR event. During the period of [-15, -12], the company's CAAR was continuously significantly greater than zero, and there was no significant difference between the CAAR and zero on the 9th day before the event. Significant changes occurred in [-9, 4] after the event. The CAAR on the first, second, and fourth days was significantly greater than zero at the 5% level, and the CAAR on the third day was significantly greater than zero at the 10% level. It shows that the stock price of real estate companies has a rising trend before and after the occurrence of LPR interest rates. Table 1 shows the calculated value and significance index of the cumulative average abnormal return 15 days before and after the release of the LPR policy reform. Before the incident [-15, -12], the cumulative average abnormal rate of return showed a negative value and a downward trend, and then there was an upward trend, indicating that there may be information leakage during this period. In addition, there may be situations where investors have made pre-judgment behaviors without fully understanding the content of the information, resulting in a short-term decline in the rate of return. But overall, LPR has had a positive impact on the real estate market. It can be seen that the [-9, 4]

CAAR value changed from negative to positive before the policy was released, which shows that the LPR reform is good news for the real estate market, and it continues to be positive after the policy is released, and most of them are at 1%. Significant at the significance level. Since the LPR reform, investors in the market have judged the information, believing that interest rate liberalization will increase the demand for housing purchases, which will improve the performance of real estate companies to a certain extent. The reason is that LPR will not cause a significant drop in mortgage interest rates in the short term. In the long run, there may be a downward trend in interest rates. With the current high-quality operation of my country's economic development and relatively stable prices, investors still hold a positive attitude towards the real estate market. Comparing Table 2, using the mean adjusted model to test AAR and CAAR again, we also get the calculated value and significance index of the cumulative average excess return 15 days before and after the event.

It can be clearly seen from Figure 1 that the cumulative average abnormal return are generally positive. The cumulative average abnormal return has turned from negative to positive and continues to rise, indicating that the reform of LPR has promoted the increase in the stock yield of real estate companies, which has more advantages than disadvantages for the real estate industry. Investor sentiment also believes that in a certain period of time, the development momentum of the real estate industry is still strong, and they are optimistic about its stocks. This figure compares the trend of cumulative average abnormal returns in the event window from August 2, 2019 to September 2, 2019 between the market model and the mean adjustment model [-15,15]. In the market model, the [-15, 1] cumulative average abnormal return rate is generally negative, and the upward trend is obvious at [1, 15], and both are positive. In the mean adjustment model, CAAR dropped sharply in the early stage of the event [-1,0], and was always negative, and

only became positive after 15 days. In addition, in the market model, in the three trading days before the event, the cumulative average abnormal return changed from a downward trend to an upward trend, and continued to rise, indicating that the LPR reform promoted the increase in the actual stock return.

4.2. Additional Results

From Table 3, this paper classifies all real estate companies in the sample according to the different trading markets. Among the 139 sample companies, there are 71 A-share companies in Shanghai Stock Exchange and 568 A-share companies in Shenzhen Stock Exchange. The CAAR of Shenzhen A-share company's stock was highly significant at the 1% level during the event window. It can be seen that the LPR policy has a significant impact on Shenzhen A-shares and is good news for investors. Comparing the cumulative excess return rate of Shanghai A-shares during the event window period, we found that the significance is also higher at the 5% level. The impact of the Shanghai Stock Exchange real estate company's return rate can be positive. The LPR policy passes the 5% to 1% level of a significance test, and it has a positive correlation with the cumulative excess return. This shows that the LPR policy reform is good news for the Shanghai A-share real estate market during the event window period. Through comparative analysis, we found that the LPR policy reform is good news for both trading markets, but the impact of the policy on the Shenzhen Stock Exchange is more significant than that of the Shanghai Stock Exchange. Through comparative analysis, we found that the LPR policy reform is good news for both trading markets, and the impact of the policy reform on the Shenzhen Stock Exchange is slightly different from that of the Shanghai Stock Exchange. However, from the data results, we found that the impact of the LPR policy on the Shanghai Stock Exchange gradually decreased 7 days after the incident.

To make the results in this section more reliable and to test the robustness, we set up different event window periods and tested for two different models. These data include 139 firms, including Shanghai Stock Exchange A-share companies and Shenzhen Stock Exchange A-share companies. According to the results of the CAAR test, it is highly significant at the 1% level, indicating that the LPR policy has a positive and significant impact on the abnormal returns of real estate companies. This point is consistent with the previous results, showing that the overall empirical analysis in this section is relatively robust, and the results obtained have a certain degree of reliability.

5. Conclusions

Using the event study method, my paper first explores the cumulative average excess return rate of 139 sample companies and observes whether the release of the LPR reform policy pair is good for the real estate stock market. There are two main findings in my paper. The first finding is that the LPR policy reform has positively impacted the whole real estate companies. In the event study method, CAAR presents a trend of integrity during the event window period. It can be seen that the policy has a positive effect on the selected sample companies as a whole and has a significant impact. By dividing the window period of the event into different windows for stability testing, the results also show that LPR is beneficial to the company's stock. The second conclusion is that the LPR policy reform is positive for real estate companies in Shanghai and Shenzhen, but there are also differences between the two regions. From the CAAR analysis, we know that the policy has a more substantial impact on companies listed in Shenzhen than companies listed on the Shanghai Stock Exchange. The analysis reason may be the reason for the regional economy. Companies listed in Shenzhen are mainly located in the economically developed Pearl River Delta

region, where most residential projects are. Most of the real estate companies in this region have comprehensive solid strengths.

Through the event window period, the AAR and CAAR before and after the policy is issued are compared and analyzed in detail. We deduce the excess return of the company's stock, and use the market model of the event research method to get the cumulative excess return map. It can be observed that during the event window, the stocks of 139 companies were affected by the event. After the day of the incident, the cumulative excess return showed an overall upward trend. Then we use the mean adjustment model in the event event method to further reduce possible problems related to sample timing deviation. Compared with the market model, the average adjusted model results also support our hypothesis, and the results presented are more significant. It can be seen that after the incident, the abnormal increase in stock returns of real estate companies was higher than before. In addition, we also compared A-share companies listed on the Shenzhen Stock Exchange (SZSE) and A-share companies listed on the Shanghai Stock Exchange (SSE). The results show that company stocks in both markets have shown good influence. There are only subtle differences between the two. A comparative analysis of the cumulative average abnormal return before and after the release of the LPR policy is carried out by setting the event window period. Through analysis, we concluded that the policy reform of LPR is beneficial to real estate companies.

My paper's contribution to literature mainly focuses on the impact of the LPR reform on multiple listed companies. The previous literature focused more on the impact of interest rate adjustments on housing prices. My paper added the impact of LPR policy reforms on the stock returns of real estate companies, and analyzed and compared the A-share markets of the Shanghai Stock Exchange and the Shenzhen Stock Exchange. The differences in each market are small, but

they are all affected by the LPR policy. This paper makes recommendations for investors. Although the current LPR reform is a favorable signal for the real estate industry, investors should maintain a rational analysis and invest cautiously under controlled policies. The paper shows that the impact of interest rate policy adjustments on the stock market is positively correlated, and there is an impact on both the Shanghai Stock Exchange and the Shenzhen Stock Exchange. It reveals that any policy adjustment may affect the stock market. However, it is undeniable that stock price fluctuations are also affected by many factors, such as the company's own internal factors. The limitation of this paper is that it does not take into account other factors that affect stock price fluctuations, company size, etc. It is not enough to choose the event research method to observe the abnormal returns of stocks.

References

- Ait Sahalia, Y., Andritzky, J., Jobst, A., Nowak, S., Tamirisa, N., 2012. Market response to policy initiatives during the global financial crisis. *Journal of International Economics*. 162–177.
- Aoki, K., Proudman, J., Vlieghe, G., 2003. House prices, consumption, and monetary policy: a financial accelerator approach. *Journal of financial intermediation*. 414–435.
- Brito, P., Marini, G., Piergallini, A., 2016. House prices and monetary policy. Studied in nonlinear dynamics and econometrics. 251–277.
- Chen, X., Kontonikes, A., Montagnoli, A., 2012. Asset price, credit and the business cycle. *J. Economices Letters*. 117, 857–860.
- Carvalho, M. D., Junior, A. T., 2015. A dinâmica territorial do capital e seus efeitos para o mundo do trabalho. *Terra Livre*. 2, 31.
- Chen, K.J., Ren, J., Zha, T., 2018. The nexus of monetary policy and shadow banking in China. *American economic review*. 3891–3936.
- Gallo, L.A., Hann, R.N., Li, C.C., 2016. Aggregate earnings surprises, monetary policy, and stock returns. *Journal of Accounting and Economics*. 62, 103–120.
- Ding, H. Y., Liang, G. Y., Qi, T., Ying, J. Z., 2020. Tail causalities between monetary supply and real estate prices in China. *Economic and Political Studies-Eps 2020*, 82–95.
- Granziera, E., Kozicki, S., 2015. House price dynamics: Fundamentals and expectations. *Journal of Economic Dynamics and Control*. 60, 152–165.
- Huber, F., Punzi, M.T. 2020. International housing markets, unconventional monetary policy, and the zero-lower bound. *Macroeconomic dynamics*. 774–806.
- Jiang, J.H., 2021. Can real estate regulatory policies constrain real estate risks to banks. Evidence from China. *Journal of Chinese Economic and Business Studies*. 35–53.
- Lim, K. Y., Liu, C., Zhang, S., 2021. Optimal central banking policies: envisioning the post-digital yuan economy with loan prime rate-setting.
- Ma, J., He, X., 2020. China's Interest Rate Liberalization. In *The Handbook of China's Financial System*, 87–102. Princeton University Press.
- Noparietro, A., Siviero, S., 2015. Optimal Monetary policy rules and house prices: the role of financial frictions.
- Singh, B., Nadkarni, A. R., 2020. Role of credit and monetary policy in determining asset prices: Evidence from emerging market economies. *Journal of Economics and Finance*. 51.
- Shi, S., Jou, J.B., Tripe, D., 2014. Can interest rates really control house prices. Effectiveness and implications for macroprudential policy. *Journal of Banking and Finance*. 47, 15–28.
- Tang, G., Tao, G., 2021. The Globalization Strategy and Problems of Industrial and Commercial Bank of China. *International Journal of Education and Technology*. 248.
- Wong, T. Y. J., Hui, C. M. E., Seabrooke, W., 2003. The impact of interest rates upon housing prices: An empirical study of Hong Kong's market. *Property Management*.
- Wei, Y.G., Lam, P. T. I., Chiang, Y.H., Leung, B.Y.P., 2014. The effects of monetary policy on real estate investment in China: a regional perspective. *International Journal of Strategic Property Management*. 368–379.
- Liu, K., 2017. China's interest rate pass-through to commercial banks before and after interest rate liberalisation. *Economic Affairs*. 37, 279–287.
- Wu, L.L., Bian, Y., 2018. Housing, consumption and monetary policy: how different are the first-, second- and third-tier cities in China. *Applied Economics Letters*. 107–1111.

- Yin, X. C., Su, C. W., Tao, R., 2020. Has monetary policy caused housing prices to rise or fall in China. *Singapore Economic Review*. 1601–1618.
- Yu, S., Zhang, L.N., 2019. The Impact of Monetary Policy and Housing-Purchase Restrictions on Housing Prices in China. *International economic*. 33, 286–309.
- Yan, Y., Wang, Y.T., Zhu, X.W., 2011. Heterogeneous Responses of Chinese Cities' Housing Prices to Monetary Policies. 791–796.
- Yan, X., Hu, X., 2021. Characteristics, Challenges and Development Trends of China's Financial Operation. *Statistical analysis on key economic areas of China*. 221–241.
- Zhu, S., 2020. The impact of bank loan interest rates on housing prices under the reform of the LPR mechanism. *Guangxi Quality Supervision Guide*. 10, 146–147.
- Zhang, X.Y., Pan, F.H., 2021. Asymmetric effects of monetary policy and output shocks on the real estate market in China. *Economic Modelling*.
- Zhang, C., Hu, H., 2021. Viewing the Progress of China's Interest Rate Marketization from the Reform of Loan Prime Rate Formation Mechanism. In *2021 2nd Asia-Pacific Conference on Image Processing. Electronics and Computers*. 1115–1118.

Figure 1: The trend of CAAR at window period

The figure reports trend of cumulative average abnormal return during the event window from August 2, 2019, to September 2, 2019. And it shows that the cumulative average abnormal return rate is generally positive, and the CAAR has been negative in the early stage of the event. For the five trading days before the event occurred, the cumulative average abnormal return rate turned from negative to positive and continued to rise, which shows that the LPR reform has promoted the increase in the stock yield of real estate companies. It can be seen that the benefits of LPR reform outweigh the disadvantages of the real estate industry. It can be seen that the advantages of LPR reform outweigh the disadvantages. From the CAAR trend in the figure, CAAR fluctuates during the event window estimation period. There are negative numbers in [3, 5]. In [9,15], the value of CAAR has been showing a clear upward trend. In addition, CAAR line became more stable after 30 days of the event.

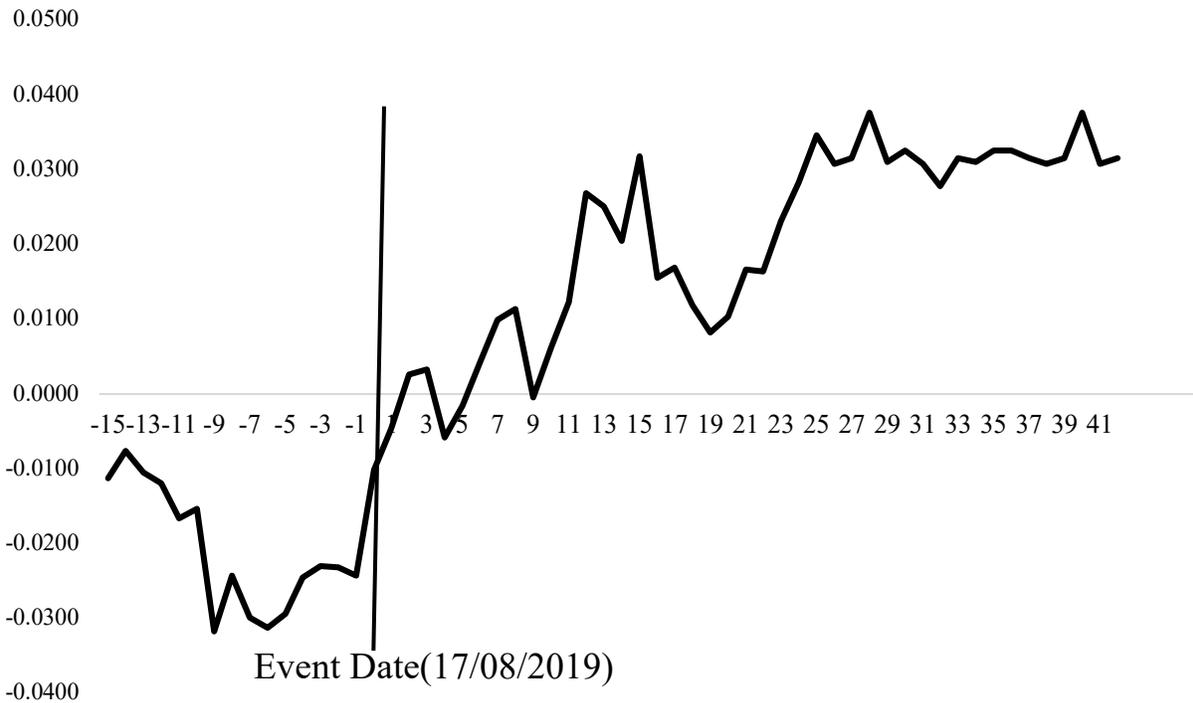


Figure 2: CAAR comparison of the two models

The figure reports trend of cumulative average abnormal return during the event window from August 2, 2019, to September 2, 2019 [-15,15]. In the market model, it showed that the cumulative average abnormal return rate is generally negative, and the CAAR has been negative in the early stage of the event [-13,14] in mean adjusted model. Additionally, in market model, for the three trading days before the event occurred, the cumulative average abnormal return rate turned from downward trend to upward, and continued to rise, which shows that the LPR reform has promoted the increase in the stock yield of real estate companies. It can be seen that the benefits of LPR reform outweigh the disadvantages of the real estate industry.

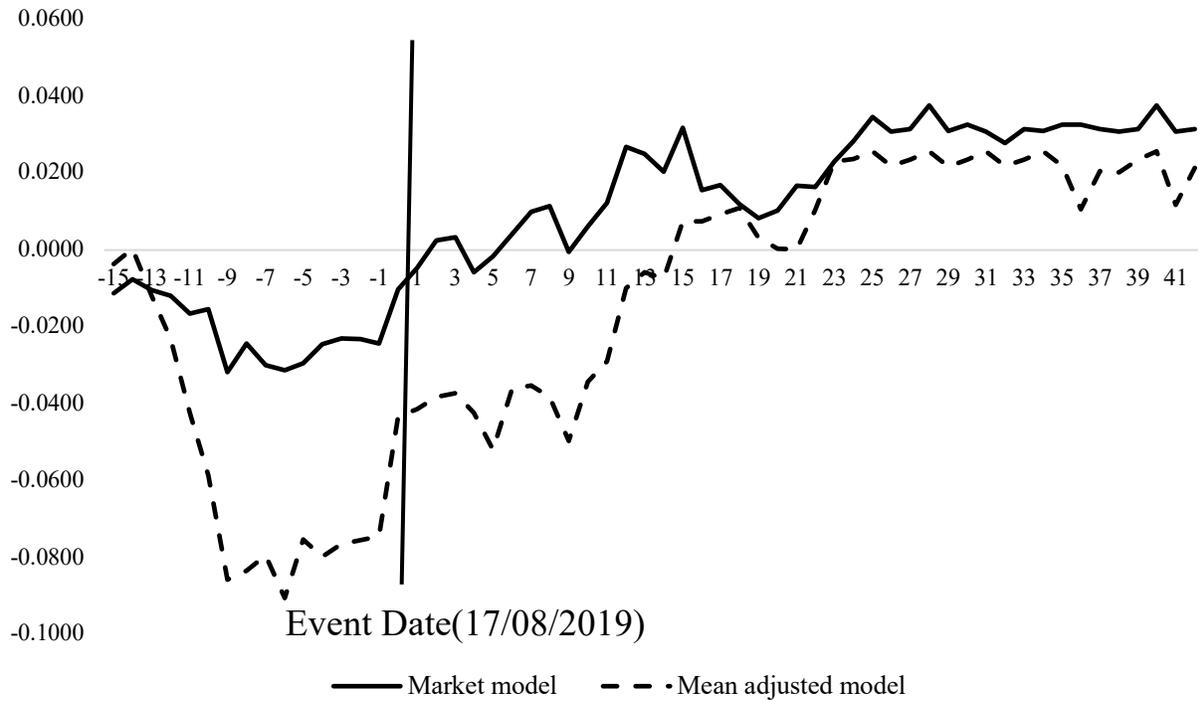


Table 1 Descriptive Statistics

This table shows the descriptive statistics used in the event research method. We selected the stock data of 139 companies. Among them, "stock price, Index, Return Market, Index, Return Market" represent 71 Shanghai Stock Exchange A shares data and 69 Shenzhen Stock Exchange A shares data. The number of sample observations are 2646 and 3192 respectively. The variance of close stock price at the trade date in Shanghai A-share market is much lower than it in Shenzhen.

Variables	obs.	Minimum	Maximum	Mean	Std. Dev.	Variance	Skewness
Stock price _{shanghai}	2,646	1.210	27.640	6.366	4.253	18.091	2.398
Index _{shanghai}	2,646	3,814.528	4,002.813	3,904.700	43.129	1,860.100	0.332
InReturn _{shanghai}	2,646	-0.101	0.102	-0.001	0.021	0.000	0.596
<i>Marketreturn_{shanghai}</i>	2,646	-0.018	0.020	-0.000	0.007	0.000	-0.120
Stock price _{shenzhen}	3,192	0.370	91.680	7.975	9.572	91.620	5.286
Index _{shenzhen}	3,192	3,814.530	4,041.800	3,905.249	43.340	1,878.389	0.338
Return _{shenzhen}	3,192	-0.110	0.100	-0.002	0.022	0.000	0.415
<i>Marketreturn_{shenzhen}</i>	3,192	-0.020	0.020	-0.000	0.007	0.000	-0.115

Table 2: Market model of AAR and CAAR

The table shows the average abnormal return during the event window from July 27, 2019, to September 7, 2019. And it shows that the average abnormal return rate is generally positive, and the AAR has been negative in the early stage of the event. However, In the time before the incident [-15, -1], there were four fluctuations of AAR's rise and fall, and there may be a leak of information. Later, on the day the LPR reform was released, AAR rose significantly. Almost all the values are less than 1% and "***," only date3 p-value is 0.0202, and its significance is 5% and " ***". The results of the data found that the CAAR changed significantly in the twenty days of the LPR event. During the period of [-15, -12], the company's CAAR was continuously significantly greater than zero, and there was no significant difference between the CAAR and zero on the 9th day before the event. It is greater than zero at the 1% level from the sixth day to the second day and is significantly greater than zero at the 5% level on the first day. Significant changes occurred in [-9, 4] after the event. The CAAR on the first, second, and fourth days was significantly greater than zero at the 5% level, and the CAAR on the third day was significantly greater than zero at the 10% level. It shows that the stock price of real estate companies has a rising trend before and after the occurrence of LPR interest rates. For the following values, "****" represents the p less than 1%, "****" represents the p less than 5%, and "****" represents the p less than 10%.

Date	AAR		CAAR	
	AAR	t value	CAAR	t value
-15	-0.0017	-1.5058	-0.0113**	-2.4836
-14	0.0037 **	2.3494	-0.0076	-1.6131
-13	-0.0029*	-1.8838	-0.0105**	-2.0652
-12	-0.0014	-0.8768	-0.0119**	-2.1202
-11	-0.0047 ****	-3.1917	-0.0166****	-2.8145
-10	0.0013	0.8511	-0.0153**	-2.5096
-9	-0.0164****	-9.0617	-0.0317****	-4.8202
-8	0.0075 ****	4.5779	-0.0243****	-3.6705
-7	-0.0057****	-4.0129	-0.0299****	-4.4475
-6	-0.0013	-0.9979	-0.0313****	-4.4161
-5	0.0019	1.3885	-0.0294****	-4.0926
-4	0.0049****	2.8760	-0.0245****	-3.2786
-3	0.0015	0.9404	-0.0230****	-3.0166
-2	-0.0002	-0.1130	-0.0232****	-2.9384
-1	-0.0011	-0.8312	-0.0243****	-2.9514
0	0.0141****	7.5194	-0.0102	-1.2201

1	0.0055***	3.5206	-0.0047	-0.5329
2	0.0072***	4.0412	0.0026**	-2.2939
3	0.0007	0.4483	0.0033**	-2.3604
4	-0.0092***	-6.3200	-0.0059	-0.6507
5	0.0043**	2.3493	-0.0016	-0.1714
6	0.0058***	4.1029	0.0042*	1.4395
7	0.0058***	3.6540	0.0099	0.9912
8	0.0015	0.8493	0.0114	1.0806
9	-0.0118***	-5.5258	-0.0004	-0.0397
10	0.0066***	5.1313	0.0062	0.5577
11	0.0062***	3.4257	0.0123	1.0422
12	0.0145***	6.6431	0.0268**	2.2388
13	-0.0018	-1.1298	0.0250**	2.0931
14	-0.0046***	-3.7517	0.0205*	1.6943
15	0.0113***	7.3244	0.0318**	2.5351

Table 3: Mean Adjusted model of AAR and CAAR

It can be seen from the table of the mean adjustment model that both AAR and CAAR showed significant significance during the event period. Among them, it is especially significant before the date of the event, which may cause information leakage. In [-9, -1], it reaches 1% significantly. There is no significant change in the event period [4, 11]. However, we also see that CAAR only has an overall upward trend. Compared with the market model, the results of the mean adjustment model are not as significant. However, from the overall results, the CAAR value of the mean adjustment model is rising. Even if it does not show significance of 10% or 5%, we can observe that its value is increasing and the cumulative return on stocks increases. "****" represents the p less than 1%, "***" represents the p less than 5%, and "**" represents the p less than 10%.

Date	AAR		CAAR	
	AAR	t value	CAAR	t value
-15	-0.0042****	-3.6747	-0.0113**	2.4836
-14	0.0042****	2.814	-0.0076	1.6131
-13	-0.0123****	-7.7542	-0.0105**	2.0652
-12	-0.0113****	-8.1299	-0.0119**	2.1202
-11	-0.0192****	-14.3538	-0.0166****	2.8145
-10	-0.0162****	-9.6291	-0.0153**	2.5096
-9	-0.0273****	-15.1983	-0.0317****	4.8202
-8	0.0025	1.5142	-0.0243****	3.6705
-7	0.0038**	2.5903	-0.0299****	4.4475
-6	-0.0110****	-8.0271	-0.0313****	4.4161
-5	0.0152****	10.3417	-0.0294****	4.0926
-4	-0.0044**	-2.3967	-0.0245****	3.2786
-3	0.0032*	1.8771	-0.0230****	3.0166
-2	0.0011	0.6997	-0.0232****	2.9384
-1	0.001	0.7213	-0.0243****	2.9514
0	0.0310****	15.7144	-0.0102	1.2201
1	0.0021	1.1795	-0.0047	0.5329
2	0.003	1.5265	0.0026**	2.2939
3	0.0011	0.6165	0.0033**	2.3604
4	-0.0052****	-3.2186	-0.0059	0.6507
5	-0.0096****	-6.1239	-0.0016	0.1714
6	0.0159****	10.7747	0.0042*	1.4395
7	0.0006	0.4186	0.0099	0.9912
8	-0.0029*	-1.7642	0.0114	1.0806
9	-0.0115****	-5.2516	-0.0004	0.0397

10	0.0154***	10.6658	0.0062	0.5577
11	0.0054***	3.1977	0.0123	1.0422
12	0.0191***	8.4406	0.0268**	2.2388
13	0.0040**	2.4265	0.0250**	2.0931
14	-0.0015	-1.2059	0.0205*	1.6943
15	0.0148***	9.303	0.0318**	2.5351

Table 4: CAAR for two markets

The results of the data in this table found that the CAAR changed significantly in the twenty days of the LPR event. There are less significant difference of the stock return between the Shenzhen and Shanghai. During the period of [-14, -12], the company's CAAR was continuously significantly greater than zero, and there was no significant difference between the CAAR and zero on the 8th day before the event. It is greater than zero at the 1% level from the sixth day to the second day and is significantly greater than zero at the 5% level on the first day. Significant changes occurred in [2, 7] after the event. For Shanghai A-share, the CAAR on the first, second, and third days was significantly greater than zero at the 5% level, and the CAAR on the fourth day was significantly greater than zero at the 10% level. It shows that the stock price of real estate companies has a rising trend before and after the occurrence of LPR interest rates. For the following values, "****" represents the p less than 1%, "***" represents the p less than 5%, and "**" represents the p less than 10%.

Date	Shenzhen A-share		Shanghai A-share	
	CAAR	t value	CAAR	t value
-15	-0.0012	-0.7947	0.0039	0.9068
-14	-0.0072****	-4.7658	-0.0033	-0.7098
-13	-0.0127****	-6.6138	-0.016	-3.3507
-12	0.0039**	2.5854	-0.0122	-2.8506
-11	0.0022	1.5478	-0.01	-2.3465
-10	0.0050****	3.0167	-0.005	-1.0748
-9	0.0160****	10.0963	0.0111	2.3408
-8	-0.0006	-0.5992	0.0105	2.2358
-7	-0.0027**	-2.1678	0.0077	1.5813
-6	0.0081****	4.6194	0.0158****	3.0215
-5	-0.0003	-0.1584	0.0156****	2.6769
-4	0.0014	0.8619	0.0169****	2.6569
-3	-0.0050****	-3.9151	0.0119*	1.9159
-2	-0.0037**	-2.4081	0.0082	1.2726
-1	0.0021	1.358	0.0104	1.4821
0	0.0063****	4.7184	0.0167**	2.3066
1	-0.0003	-0.2052	0.0164**	2.1706
2	0.0067****	4.5492	0.0231**	2.7738
3	0.0052****	3.6399	0.0283**	3.1478
4	0.0063****	2.7714	0.0346*	3.5601
5	-0.0052**	-2.35	0.0294****	2.9656
6	-0.0086****	-3.5834	0.0208**	2.1031
7	-0.0089****	-3.8076	0.0119	1.1527

8	-0.0005	-0.2951	0.0114	1.0585
9	-0.0072***	-4.5326	0.0042	0.3787
10	-0.0013	-0.9064	0.0029	0.2554
11	-0.0045***	-3.6128	-0.0017	-0.1413
12	0.0038**	2.449	0.0021	0.1776
13	0.0024*	1.9064	0.0045	0.3849
14	-0.0087***	-5.8933	-0.0042	-0.3555
15	0.0043**	2.5952	0.0001	0.0058

Table 5: The CAAR at various event windows in two models

The results of this table show the test of CAAR at different event windows in market model and mean adjusted model. According to the results of CAAR tests, it is highly significant at the level of 1% for all of the event window for two models except the window [-10,0]. Therefore, whole table can indicate that the LPR policy has a positive and significant impact on the abnormal return of real estate companies. This point is consistent with the previous empirical results, which can indicate that the overall empirical analysis in this section is relatively robust, and the results obtained have a certain degree of reliability. For the following values, "****" represents the p less than 1%, "***" represents the p less than 5%, and "**" represents the p less than 10%.

Event window	Market Model		Mean Adjusted Model	
	CAAR	t value	CAAR	t value
[-21]	0.0135****	9.078	0.0131***	8.2832
[-21, 0]	-0.0359***	-4.216	-0.0434***	-3.6579
[-15, 0]	-0.0384***	-5.2402	-0.0438***	-4.6957
[-10, 0]	0.0026	0.48	-0.0011	-0.1563
[-5, 0]	0.0492***	11.3741	0.0471***	9.5965
[0, 0]	0.0313***	16.2589	0.0310***	15.7144
[0, 5]	0.0246***	5.481	0.0225***	5.1049
[0, 10]	0.0439***	5.8717	0.0401***	5.8545
[0, 15]	0.0872***	8.3384	0.0818***	8.7944
[0, 21]	0.0871***	7.1034	0.0796***	6.8799