The Impact of a Weaker Yen Against the US Dollar on Japanese Real Estate

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Abstract. This study explores the impact of the widening interest rate differential between China and the United States on the Japanese real estate market during the Fed's rate hike cycle (March 2022 to August 2023). The study assumes that a weaker exchange rate will have an impact on the property market by affecting financing and investment activity. Through correlation analysis, this paper analyzes the relationship between exchange rate, loan interest rate, and real estate market indicators (including real estate price index, construction order volume, financing cost of real estate developers, etc.). The results show that there is a significant positive correlation between the depreciation of the yen against the US dollar and the real estate price index. The long-term loan interest rate is positively correlated with the exchange rate to some extent. The relationship between construction order volume and exchange rate is weak. There is a strong positive correlation between the financing cost of real estate and the exchange rate. These findings have implications for understanding how exchange rate fluctuations affect the real estate market and provide data reference for macroeconomic policymaking.

Keywords: Fed rate hike, Exchange rate of Yen, Real estate market, Financing cost, Construction order intake.

1. Introduction

In the global economy, currency exchange rate fluctuations can have a significant impact on many aspects of a country's economy, especially in advanced economies such as Japan. This study focuses on the impact of the depreciation of the yen against the US dollar on the Japanese real estate market in the context of the Fed rate hike.

As a key variable of the international financial market, the exchange rate directly affects investment decisions and market expectations. In recent years, with the US Federal Reserve's interest rate hike, the depreciation of the yen relative to the US dollar has attracted wide attention. The US Federal Reserve has repeatedly said that it will start to shrink its balance sheet after raising interest rates. Because of such expectations, the US dollar has strengthened, resulting in the depreciation of the yen [1]. The Japanese real estate market has also been affected by the depreciation of the yen. The healthy development of the Japanese real estate market is crucial to the stability of the domestic economy, so the sensitivity of exchange rate fluctuations to its investment and financing activities makes this market worth studying.

Initial research has uncovered how fluctuations in exchange rates influence the property market. Essentially, exchange rate movements directly impact a nation's currency value. A falling yen exchange rate signifies an increase in value, conversely, an ascending yen exchange rate indicates a decrease in value. The appreciation or depreciation of a country's currency will raise or lower the price of residents' financial assets, thus making residents invest more or less in the real estate market [2].

Additionally, research has examined how variations in exchange rates influence property values and their subsequent effect on the movement of global capital and decisions related to property investment. In a 1988 study, Miller et al. found that real estate prices in Hawaii increased with the appreciation of the yen against the US dollar between 1987 and 1988, and later calculated that the correlation coefficient between the exchange rate and house prices was 0.75 [3]. Later, some people also put forward some ways that exchange rate adjustment can affect real estate prices, such as the

expectation effect and wealth effect. The expected effect is that investors will invest more money in the real estate market where the host country currency is expected to appreciate. The wealth effect means that currency appreciation increases the purchasing power of the currency, and excess purchasing power enters the real estate sector [4-6]. At the same time, according to the analysis of the theoretical relationship between housing price and exchange rate (i.e., purchasing power parity theory, asset portfolio theory, and impossible triangle theory), some people believe that exchange rate and housing price cannot go hand in hand, and the rise of housing price is caused by the change of exchange rate environment leading to excess domestic liquidity [7, 8].

Through the analysis of historical data, this study aims to deeply explore how the change in the yen exchange rate affects the Japanese real estate market under the background of the Fed's interest rate hike and is expected to reveal the complex relationship between the exchange rate change and the real estate market.

2. Data Selection

The purpose of this study is to explore the specific dimensions of the impact of the depreciation of the Yen-USD exchange rate on the Japanese real estate market, including the real estate price index, the average contract interest rate of bank loans and discounts, the volume of construction orders, and the financing cost measured by the total liabilities and total equity of typical Japanese real estate developers. This study utilizes correlational analysis as its primary methodology, employing the calculation of correlation coefficients to measure the linear relationship's magnitude and orientation between two variables.

Table 1. Explanation of indicators

Number	Index	Explanation
1	Real estate price index	It accurately mirrors fluctuations in property market prices and serves as a broad gauge for assessing the overall direction of the real estate sector. An increase in the price index signifies an upturn in property values, whereas a decrease points to a downturn.
2	Average contract interest rate on bank loans and discounts	The level of loan interest rate directly determines the purchasing power of buyers and the financing cost of real estate developers, thus affecting the demand and supply of real estate. For this analysis, we segmented the interest rates into three categories: the aggregate loan interest rate, the interest rate for short-term loans, and the interest rate for long-term loans.
3	Construction order intake	It is a forward-looking indicator to predict the future trend of the real estate market. The increase or decrease of the order volume is directly related to the vitality of the construction industry and the future supply of the real estate market. In this study, we selected the total construction order volume compared with the order volume of the same month last year.
4	Real estate financing costs	It is related to the feasibility and profitability of the real estate project. In this study, the data of total liabilities and total equity of four typical real estate companies in Japan are selected for analysis.

As shown in Table 1, the data required for the analysis are mainly from the Ministry of Land, Infrastructure and Transport, the Central Bank of Japan, and the public financial statements of major real estate companies. Specific data include the real estate price index (2010 base=100), average contract interest rate on bank loans and discounts, construction order volume, financing costs of real estate companies (Mitsui Fudosan, Sumitomo Fudosan, Mitsubishi Land, Daiwa House, and other companies public financial statements), yen exchange rate data.

By drawing the corresponding line chart and bar chart, and further analyzing the correlation coefficient matrix, this study will evaluate the correlation between the lower exchange rate of the yen against the US dollar and various indicators of the real estate market. A correlation coefficient nearing 1 or -1 signifies a strong positive or negative linear relationship between variables, respectively. In contrast, a coefficient approaching 0 suggests the absence of a significant linear correlation. These analysis results will provide data support for further exploration of the mechanism of exchange rate fluctuations in the Japanese real estate market.

3. Correlation Analysis Results

3.1. Yen Exchange Rate Data

As can be seen from Fig. 1: from the beginning of 2020 to the beginning of 2021, the exchange rate was relatively stable, with a slight downward trend, indicating that the Japanese economy was relatively stable during that period; And entering 2021, especially starting from 2022, possibly due to the Federal Reserve's interest rate hike (a stronger dollar tends to lead to a relatively weaker yen) and other factors, we can see a clear downward trend in the exchange rate.

It is in this context that the real estate market is likely to be affected, as changes in the exchange rate affect the financing costs of real estate. In this case, it may lead to a rise in borrowing costs for large real estate companies, which in turn affects real estate prices and market supply and demand. At the same time, for the Japanese real estate market, the depreciation of the yen may attract foreign investors, because they can exchange less foreign currency for more yen assets, which is likely to increase the demand of the real estate market.

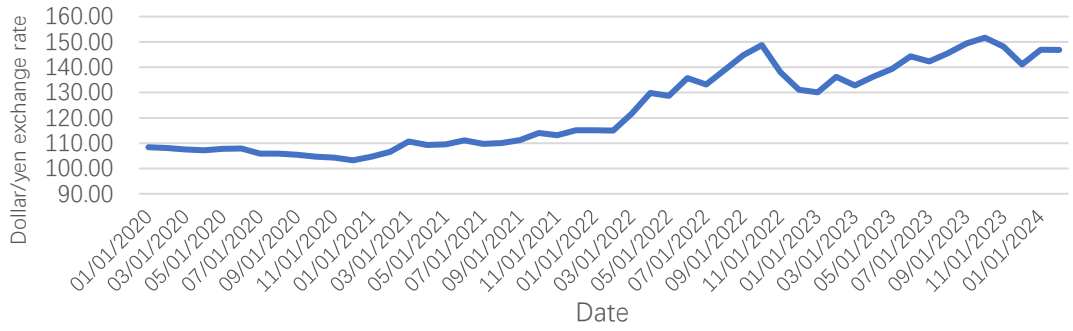


Figure 1. Exchange rate price

3.2. Japan Real Estate Price Index

From Fig. 2, it can be seen that from 2020 to the beginning of 2023, the real estate price index shows an overall upward trend, indicating that the price of the Japanese real estate market generally rises during this period. From the monthly data, the fluctuations of market prices have cyclical increases and decreases, with significant increases in the second half of 2020 and the first half of 2023.

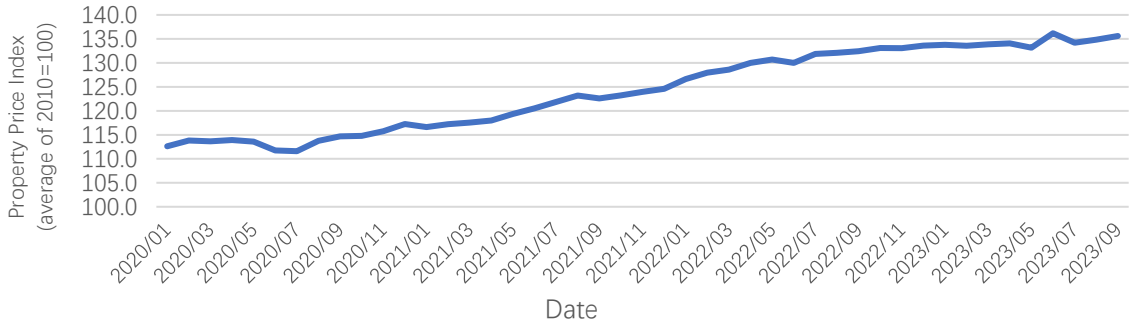


Figure 2. Residential Property

Table 2. Exchange rate and real estate price index correlation coefficient matrix

	Exchange rate price	Property Price Index (average of 2010=100)
Exchange rate price	1	
Property Price Index (average of 2010=100)	0.921707	1

Through the analysis and construction of the correlation coefficient matrix in this study (Table 2), we observe that the correlation coefficient between the yen's depreciation against the US dollar and the real estate price index stands at 0.92. This denotes a substantially strong positive correlation between these two variables. This correlation suggests that as the yen weakens against the dollar, the Japanese real estate price index typically increases, indicating that a decrease in the exchange rate may lead to an upsurge in real estate prices.

3.3. Japanese Lending Rate Data

Three broken lines can be seen in Fig. 3, representing the average contractual interest rates for gross and discounted loans, short-term and discounted loans, and long-term loans, respectively.

The average contract interest rate of gross loans and discounts showed relatively stable and little fluctuation throughout the period; Short-term loan and discount interest rates fluctuated greatly and rose significantly in the third quarter of 2023; Rates on long-term loans showed a modest upward trend, peaking in September 2023.

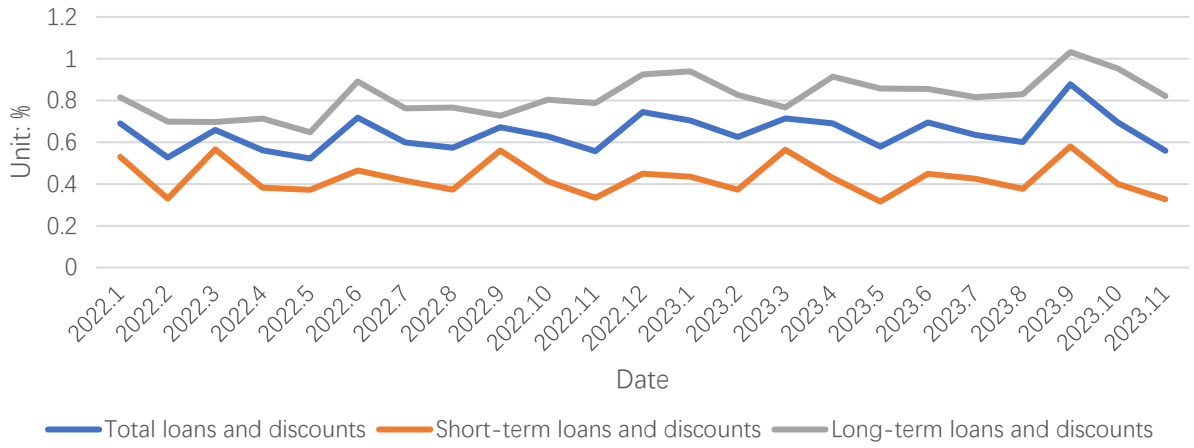


Figure 3. Average Contract Interest Rates on Loans and Discounts

Table 3. Matrix of correlation coefficients between exchange rate and average contract interest rate of bank loans and discounts

	Exchange rate price	Total loans and discounts	Short-term loans and discounts	Long-term loans
Exchange rate price	1			
Total loans and discounts	0.214035	1		
Short-term loans and discounts	-0.09077	0.763206	1	
Long-term loans	0.457181	0.738823	0.155163	1

By plotting the correlation coefficient matrix between the exchange rate and the average contract interest rate of bank loans and discounts (Table 3), this study concludes that the correlation coefficient between total loans and the exchange rate is 0.21, indicating that there is a slightly positive correlation. The correlation coefficient between short-term loans and the exchange rate is -0.09, indicating a slight negative relationship. However, the correlation coefficient between long-term loans and the exchange rate is 0.46, showing a moderate degree of positive relationship. This suggests that changes in the

exchange rate may have a more pronounced impact on the interest rate of long-term loans, but have little impact on total and short-term loans.

3.4. Japanese Construction Orders Data

As can be seen from Fig. 4 and Fig. 5, from the beginning to the middle of 2022, the growth rate of engineering orders fluctuated significantly in some months, while the exchange rate also rose significantly during this period.

From mid to late 2022 to early 2023, the year-on-year growth rate of construction order volume showed an overall downward trend, while the exchange rate continued to rise. This may be due to the rising cost of construction materials as the yen continues to depreciate, leading to a decrease in the number of new orders undertaken by the construction industry.

In the second half of 2023, it is generally lower than in the early stages of 2022. This change is most likely related to the decline in the yen/dollar exchange rate, and may also be related to other macroeconomic factors, such as the heat of the housing market.

In general, exchange rate fluctuations do have a certain impact on construction orders, but it is not a simple one-to-one relationship, but a complex process, which includes the comprehensive effect of market supply and demand, policy environment, and other economic factors.

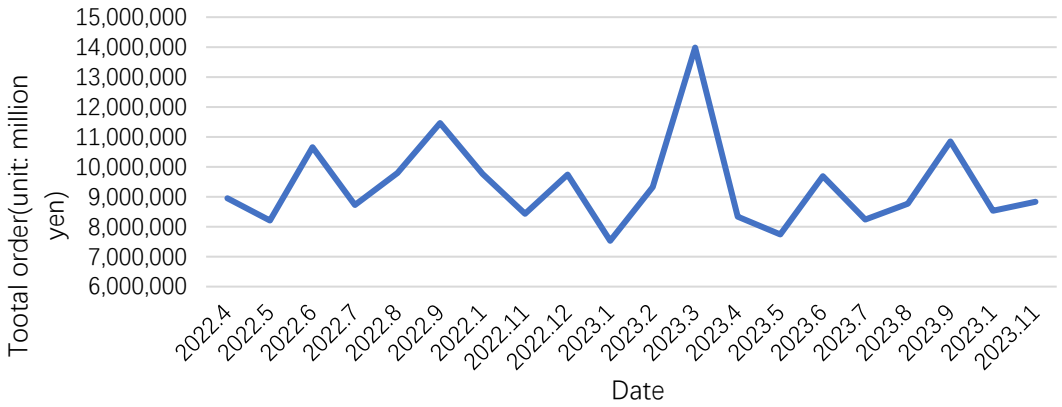


Figure 4. Dynamic statistics of construction project contracting

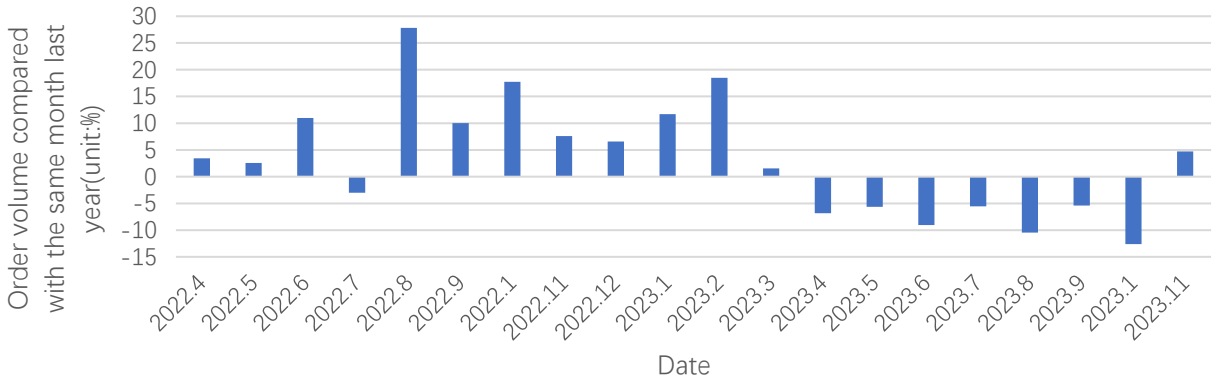


Figure 5. Dynamic statistics of construction project contracting

Table 4. Correlation coefficient matrix between exchange rate and construction orders

	Exchange rate price	Total order	Order volume compared with the same month last year
Exchange rate price	1		
Total order	0.064192	1	
Order volume compared with the same month last year	-0.25503	0.184915	1

This study also draws the correlation coefficient matrix between exchange rate and construction orders (Table. 4), but there is no correlation. The correlation coefficient between the order volume compared to the same month last year and the exchange rate is -0.26, indicating a certain negative relationship, possibly reflecting a certain negative impact of the decline in the exchange rate on the growth of the construction order volume.

3.5. Japanese Typical Real Estate Financing Cost-Related Data

(1) Mitsui Fudosan Co., Ltd. (8801.T): As one of Japan's largest real estate companies, Mitsui Fudosan has investments in residential, office, and commercial facilities and is the market leader.

(2) Sumitomo Realty & Development Co., Ltd. (8830.T): Known for its large-scale development of residential and commercial properties, Sumitomo Realty occupies an important position in Japan's real estate industry.

(3) Mitsubishi Estate Co., Ltd. (8802.T): Mitsubishi Estate is another major real estate company in Japan, covering real estate development, property management, and other businesses, and its projects are all over the world.

(4) Daiwa House Industry Co., Ltd. (1925.T): Daiwa House Industry focuses on residential construction and is one of the dominant players in the prefabricated housing market in Japan.

The above four companies are selected as research objects in this study because they are representative of the Japanese real estate market, and their financial conditions, etc., can reflect the health of the entire Japanese industry. By examining the relationship between the financing costs of these firms and the exchange rate, we can better understand the overall impact of exchange rate movements on the Japanese real estate market.

It can be seen from Fig. 6 and Fig. 7 that the total liabilities and equity of these companies gradually increased during this period, with the total liabilities increasing more sharply and the total equity increasing more moderately. It is initially speculated that the depreciated yen may affect the borrowing costs of these companies. In the case of the depreciated yen, if the company holds foreign currency liabilities, the repayment costs will increase, which may affect the company's financial position and investment ability. On the contrary, a depreciating yen may attract more foreign investors to the Japanese real estate market because they can exchange less foreign currency for more yen assets, thus raising the value of their investment in Japanese real estate.

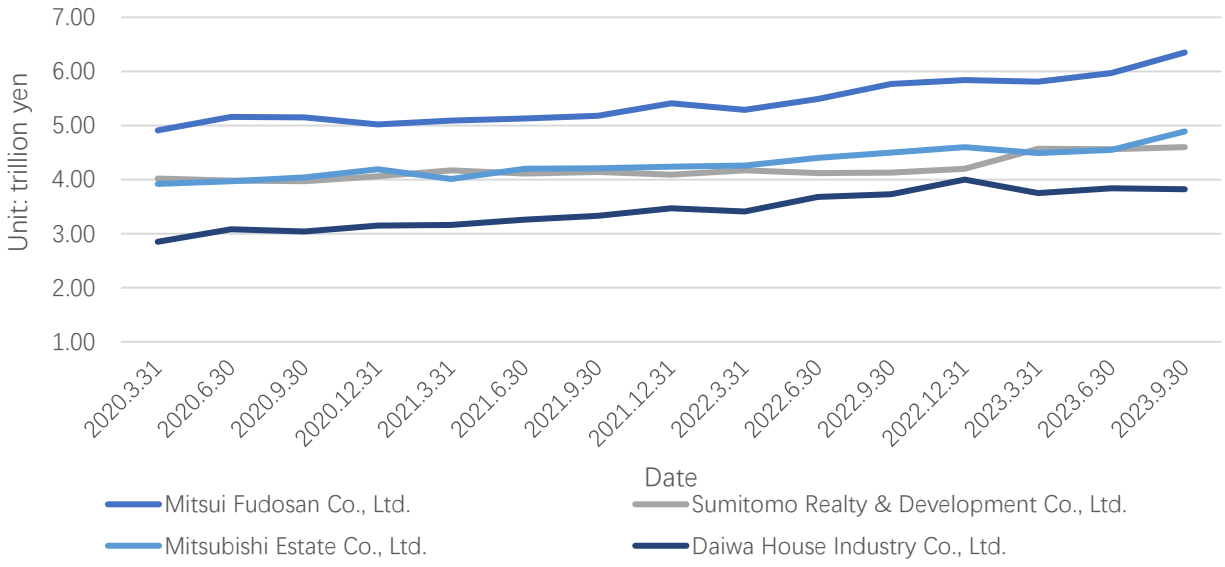


Figure 6. Total equity

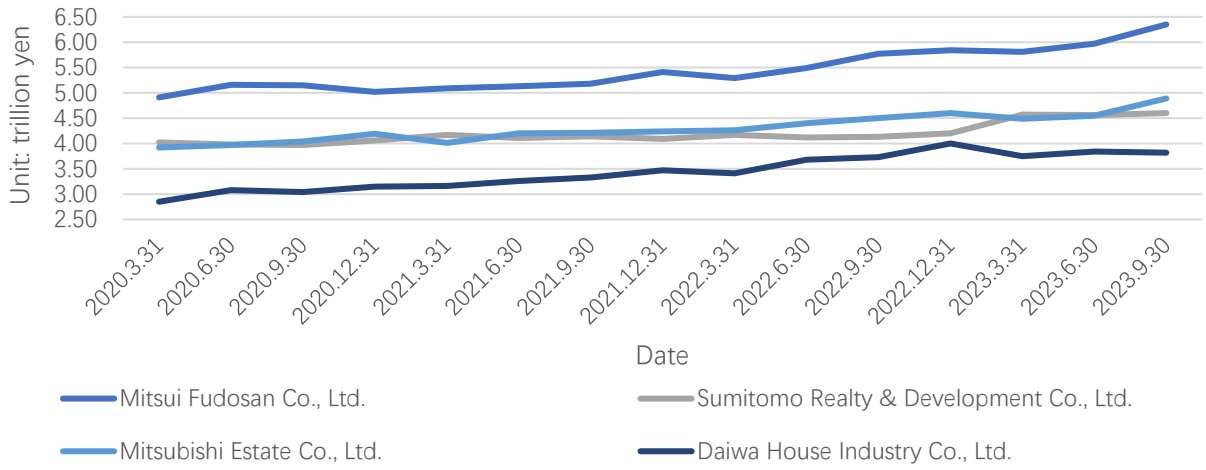


Figure 7. Total liability

Table 5. Correlation calculation of total liability

	Exchange rate price	Mitsui Fudosan Co., Ltd.	Sumitomo Realty & Development Co., Ltd.	Mitsubishi Estate Co., Ltd.	Daiwa House Industry Co., Ltd.
Exchange rate price	1				
Mitsui Fudosan Co., Ltd.	0.952155	1			
Sumitomo Realty & Development Co., Ltd.	0.742731	0.821704	1		
Mitsubishi Estate Co., Ltd.	0.928552	0.952409	0.781036	1	
Daiwa House Industry Co., Ltd.	0.930768	0.902323	0.701016	0.923023	1

Table 6. Correlation calculation of total equity

	Exchange rate price	Mitsui Fudosan Co., Ltd.	Sumitomo Realty & Development Co., Ltd.	Mitsubishi Estate Co., Ltd.	Daiwa House Industry Co., Ltd.
Exchange rate price	1				
Mitsui Fudosan Co., Ltd.	0.923954	1			
Sumitomo Realty & Development Co., Ltd.	0.904029	0.978735	1		
Mitsubishi Estate Co., Ltd.	0.963672	0.974599	0.956398	1	
Daiwa House Industry Co., Ltd.	0.940046	0.981642	0.981293	0.97411	1

As shown in Table 5 and Table 6, this paper draws the correlation coefficient matrix between the exchange rate and total liabilities and total equity of four Japanese real estate companies, namely Mitsui Real Estate, Sumitomo Real Estate, Mitsubishi Estate, and Daiwa Housing, and draws the following conclusions: The correlation coefficients between the total liabilities of Mitsui Realty, Sumitomo Realty, Mitsubishi Estate, and Daiwa Housing and the exchange rate are about 0.95, 0.74, 0.93, and 0.93, respectively, indicating a very strong positive correlation between the exchange rate and the total liabilities of these real estate developers. In terms of total equity, the correlation between these companies and the exchange rate is also very strong, which is 0.92, 0.90, 0.96, and 0.94 respectively, which further proves the important impact of exchange rate fluctuations on the financial status of real estate developers, and also shows that exchange rate fluctuations have a strong positive correlation with the financing cost of real estate developers.

The analysis demonstrates that fluctuations in the exchange rate exert a profound influence on Japan's real estate sector and its stakeholders, particularly impacting property values and the borrowing expenses of property firms. Typically, a depreciation in the exchange rate leads to a rise in both property prices and the cost of financing, thereby impacting the vitality of the real estate market as well as the financial health of property developers.

4. Discussion

This paper finds clear correlation indicators through correlation analysis, which show the impact of exchange rate and interest rate movements on the Japanese real estate market. There is a strong positive correlation between the real estate price index and the exchange rate (the correlation coefficient is about 0.92), indicating that prices in the Japanese real estate market usually increase when the yen exchange rate declines against the US dollar. It may be that currency depreciation makes imports more costly and more attractive to foreign capital, making both domestic and foreign investors in Japan more inclined to invest in real estate as a means of value preservation, thus driving up house prices [9].

The correlation between bank loan interest rate and exchange rate is weak, but the positive correlation between long-term loans and exchange rate (correlation coefficient is about 0.46) indicates that exchange rate changes still have a certain impact on long-term loan cost. In the long run, this increase in costs will eventually be passed on to the final price of the property, further pushing up house prices.

The weak correlation between the construction order volume and the exchange rate implies that the direct impact of exchange rate changes on the construction industry may be relatively limited, and is more due to the influence of other factors, such as government policies and market demand, rather than the single exchange rate factor.

There is a strong positive correlation between the real estate financing cost and the exchange rate, which further confirms the significant impact of exchange rate changes on the real estate financing environment. In particular, the depreciation of the yen increases the financial burden of real estate developers holding foreign currency debt, affecting their ability to finance and the feasibility of their projects.

Based on the above analysis, the exchange rate can be considered an important indicator to study the real estate industry. For policymakers, timely macroeconomic policy adjustment and market intervention may help mitigate the negative impact of exchange rate fluctuations on the real estate market [10]. For investors, understanding the impact mechanism of exchange rate fluctuations on the real estate market can better formulate investment strategies and grasp investment opportunities. At the same time, real estate developers should consider diversified financing strategies and reduce foreign currency debt risks to improve the robustness and profitability of projects.

5. Conclusion

This paper explores the impact of the Fed's interest rate hike on the Japanese real estate market as the yen weakens against the US dollar. By analyzing the correlation between the real estate price index, average contract interest rate of bank loans and discounts, construction order volume, and real estate financing cost, this paper reveals the strong link between exchange rate movements and real estate market dynamics in Japan.

The real estate price index shows a strong positive correlation with the yen exchange rate; There is a certain degree of positive correlation between long-term loan interest rate and exchange rate; Construction order volume is weakly correlated with the exchange rate; Strong positive correlation between real estate financing cost and exchange rate.

Policymakers should consider the impact of exchange rate fluctuations, timely adjust the real estate market and macroeconomic policies, and formulate reasonable economic and financial policies to

stabilize market expectations. Investors should pay attention to the exchange rate trend, rationally plan investment strategies, and not ignore exchange rate risks. Real estate developers should diversify their financing strategies and reduce their reliance on foreign currency loans to reduce exchange rate risk.

Although this study provides valuable insights into understanding the impact of exchange rates on the real estate market, there are data limitations and failure to fully consider the impact of external factors such as changes in the global economy, etc. Future research can explore the impact of exchange rate changes on the rental market and consumers' purchasing power, as well as the prediction and analysis of the long-term impact of exchange rate trends and macroeconomic policy adjustments on the real estate market, to provide more comprehensive guidance for relevant policy-making and market participants.

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