

The Influencing Factors of Real Estate Investment Trust Yield under the Background of Internet Finance

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Abstract: Internet finance is an innovative financial service model formed under the background of Internet technology popularization. Based on Internet finance, the financial service mode can be rebuilt and the investment mode of many industries, including real estate, has been changed. More and more people are investing in real estate through trust funds. Real estate investment trusts (REITs) are becoming popular with investors. However, with the support of Internet finance, the factors affecting the return of real estate investment trust fund also become more and more. This paper mainly studies the influencing factors of REIT returns under the background of Internet finance, providing reference for improving the returns of trust funds and promoting the sustainable development of real estate investment. Considering the particularity of real estate investment trust on asset securitization and its as the universality of securities, real estate investment trust fund under the background of the Internet financial yield influence factors are divided into macroeconomic fundamentals, medium industry status and micro stock price fluctuations three levels, the analysis of the affecting factors are respectively.

Keywords: Internet finance, real estate investment trust yield, influencing factors

1. Introduction

Internet finance is an online financial transaction model based on Internet carrier derivatives. It is an organic combination of traditional finance and Internet information technology. It has both dominant characteristics of traditional finance and certain network risks. Therefore, in this financial model, the return rate of any investment activities including REITs will be affected.

Real Estate Investment Trusts (REITs) refer to a trust fund that collects funds by issuing shares or beneficiary certificates, entrusts specialized Investment institutions to conduct Real Estate Investment operation and management, and distributes comprehensive Investment income to investors in proportion. At present, REITs have developed into mature investment and financing tools in the real estate industry of many countries, among which the American REITs market occupies half of the global market. The charm of REITs lies in that they provide small and medium investors with the opportunity to invest in the lucrative real estate industry through the "pooling" of funds; Professional managers use the raised funds in the real estate portfolio, which disperses the real estate investment risks; The equity that investor place has can transfer, have better liquidity.

2. Factors influencing the returns of real estate investment trusts under Internet finance

Park, Mullineaux and Chew (1990) studied the relationship between REITs and expected inflation and found that inflation had a limited impact on the rate of return of REITs, which could only cause small fluctuations of REITs, but could still hedge part of the expected inflation risk. By establishing ARIMA model, Hartzell and Hoesli (1997) analyzed the return rates of REITs in seven countries across Europe, Asia and America, and found that the return rates of REITs in Japan and Switzerland were negatively correlated with inflation. The higher the inflation, The lower the return rate of REITs is, and the Geske -- Roll hypothesis of causality is also proved. However, Glascock, Lu and So (2002) established a vector error correction model (VEC) to analyze the factors affecting the rate of return of REITs and found that the negative effect of inflation on the rate of return of REITs is actually influenced by monetary policy. In the study of Simpson, Ramchander and Webb (2007), through the data of American REITs from 1991 to 2002, it was found that no matter whether the situation of American inflation had an obvious effect on the rate of return of American REITs in these years. Yields on REITs have been on the upswing. Hong and Lee (2013) fully explained the negative correlation

between REITs and inflation by using the concept of "inflation illusion". Meanwhile, they also found that in addition to the impact of inflation on the pricing of REITs, the factor of consumer sentiment can also explain the pricing of REITs.

In addition to studying the impact of inflation on the rate of return of REITs, scholars also studied the impact of macro indicators such as interest rate, monetary policy and securities index on REITs. Swanson and Bruce (1986) studied the relationship between interest rate and REITs and concluded that the yield of REITs would rise with the rise of interest rate, and that the yield of REITs was more affected by the interest rate spread from Treasury bonds than that of commercial bonds. Zane, John and Casey (2002) found that in the 1990s, REITs were more sensitive to credit risks, which had a certain impact on the decline of credit value of REITs in addition to changes in the investment group. Ewing, Bradley and James (2005) analyzed the influence of macroeconomic indicators on REITs and pointed out that there was a positive correlation between business cycle and the market performance of REITs, and the increase of corporate default risk and inflation risk would lead to the decline of the return rate of REITs. Chang, Chen and Leung (2011) divided monetary policy into predictable and unpredictable parts, analyzed the relationship between REITs and federal interest rate by establishing VAR model, and knew the effect of federal interest rate on REITs of a unit of variance through impulse response, the impact of the previous several periods is large, the impact of the later several periods converges to 0, and the impact degree of the return rate of REITs in the unpredictable period is much greater than that of REITs in the predictable period. Bley, Olson (2005) analyzed the monthly data from 1972 to 2001 and found that the correlation between STANDARD & Poor's 500 index and REITs index gradually weakened over time. Stefan Rong (2014) studied the Australian REAL estate investment trust (A-REITs) market by establishing an AR-GarC Stock model and found that the returns of A-REITs are highly correlated with the Australian stock market.

Clayton, Mackinnon (2003) found that since the underlying asset of REITs is real estate, REITs are more sensitive to the real estate market. Huang, Liano and Pan (2009) studied the data of REITs from 1990 to 2001 and found that the returns of REITs would reach a peak in the year of share repurchase, but would decline in the following years. Therefore, share repurchase announcements would have a positive impact on the returns of REITs. Lin, Rahman and Yung (2009) found that investor sentiment is positively correlated with the returns of REITs. When investor sentiment is high, they will actively participate in capital market investment, so the flow of funds will cause fluctuations of REITs. Sun, Titman and Twite (2013) studied the financial crisis period from 2007 to 2009 and found that REITs with high debt ratio and short debt duration fell more sharply than REITs with low debt ratio and long debt duration. Gyamfi -- Yeboah, Ling and Naranjo (2012) found that in addition to investor sentiment, the uncertainty of risks in the real estate market and the uncertainty of real estate companies would also significantly affect the returns of REITs. Alcock, Steiner (2016) "Found that in times of crisis, REITs with small scale, low turnover and high growth opportunities generally have lower systemic risk, so REITs with leverage are more risky than those without leverage.

2.1 Macroeconomic fundamentals of REITs

The level and status of macroeconomic development is an important factor affecting the price and income of REITs. Judging from the relationship between general securities and macro economy, the influence of macro economy on REITs tends to be extensive, profound and long-term, which may lead to significant changes in the returns of REITs. In order to reflect the impact of macroeconomic fundamentals on REITs returns, the following indicators are selected in this paper.

1) Level of economic development

The sustainable and stable development of social economy is an important factor affecting the return of negotiable securities. When the national or regional economic operation situation is good, the support assets of REITs will get more investment opportunities and operating income, its price will also rise steadily, and the corresponding income level of REITs will also increase. This paper chooses the GDP of a country or region as the measurement index.

2) Inflation level

Moderate inflation will promote the dividend distribution of REITs and increase the price of REITs, thus improving the income level of REITs. At the same time, REITs have a good ability to resist inflation. In order to avoid asset shrinkage, investors will increase their demand for REITs products and further improve the returns of REITs, while severe inflation will adversely affect the returns of REITs.

The GDP deflator is a more objective indicator of inflation in the economy as a whole than the CPI, which focuses on consumer goods. Therefore, the GDP deflator is used as a measure of inflation in this paper.

3) Monetary policy

Monetary policy has a direct impact on the prices of securities including REITs: when money is loose, a large amount of hot money floods into the securities market, and the prices of REITs rise; when money is tight, the money inflow into the securities market decreases, and the prices of REITs fall.

Monetary policy makers generally take short-term interest rate as their main operating tool, so this paper chooses interest rate level as the main indicator reflecting monetary policy.

2.2 Factors of medium industry status

The difference between REITs and ordinary securities such as stocks lies in that the direct income source of REITs is mainly the operating income of the property holding and the interest of the residential mortgage loan. The price change of REITs is more sensitive than the change of the earnings status of the industry. The earnings characteristics of the real estate industry will directly affect the price and earnings of REITs

The supporting assets behind REITs are various types of property, which mainly include writing property, residential property and retail property. The income level of the above three properties will have a direct impact on the dividend income of REITs, thus affecting the price and income level of REITs. Therefore, this paper chooses the rent-price index corresponding to various properties as a factor to measure the development of the real estate industry in which REITs are located.

1) Residential rental price index

For mortgage and hybrid REITs, the rent on the home is proportional to the corresponding loan rate. Therefore, rent-price index will have an impact on the returns of REITs.

2) Rental price Index for writing/retail properties

For equity and hybrid REITs, the operating income of writing and retail properties constitutes the main cash inflow, so the rent-price index of writing and retail properties is used for analysis.

2.3 Micro security price fluctuation factors

In the stock market, the same plate securities in a specific period will show obvious characteristics of rising and falling together. REITs are mostly traded in the stock market in the form of securities such as stocks, so their short-term prices are vulnerable to the fluctuations of the market, especially those of stocks in related sectors. The sectors that are closely related to REITs include the financial sector and the real estate sector. The selected indicators are as follows.

1) Overall index

Reflect the overall trend of the market on the impact of REITs securities prices and earnings.

2) Index of financial stocks

Reflects the impact of stock price changes of banks and non-bank financial institutions on the prices and returns of REITs securities.

3) Property stock index

Reflects the influence of the stock price changes of real estate development and operation enterprises on the price and income of REITs securities.

3. Model Construction

3.1 The VAR model

In 1980, Sims proposed the Vector Autoregressive Model. VAR model adopts the form of multi-equation simultaneous, which is not based on economic theory. In each equation of the model, the endogenous variables perform regression on the lag values of all the endogenous variables of the

model, so as to estimate the dynamic relations of all the endogenous variables. The VAR model with N variables and a lag period of K is expressed as follows:

$$Y_t = \mu + \sum_{k=1}^K \pi_k Y_{t-k} + \pi_t$$

Where, Y_t is the column vector of order $N \times 1$ time series, μ is the column vector of order $N \times 1$ constant term, π is the parameter matrix of order $N \times 1$, and $\pi_t \sim \text{IID}(0, \varphi)$ is the column vector of order $N \times 1$ random error. Each element is non-autocorrelation, but there may be correlation between these elements, namely, the random error terms corresponding to different equations.

VAR model is widely used to study the interaction between different variables, among which impulse response function analysis and variance decomposition analysis can be used to explain the interaction between multiple economic variables.

3.2 Impulse response function and variance decomposition

In practical application, the VAR model is a kind of theoretical model, it need not make any apriority constraints on variables, so on the analysis of the VAR model, tend not to analysis the change of one variable to another variable's influence how, but was a shock to the system analysis model of dynamic effect, this kind of analysis method called the impulse response function (IRF and variance decomposition (VD)

Impulse response function describes the impact of a standard deviation shock on the random error term of an endogenous variable on the current and future values of all endogenous variables. Variance decomposition is also commonly used as the evaluation of VAR model, which uses the relative variance contribution rate (RVC) to measure the contribution degree of each structural shock to the endogenous variable, and further evaluate the importance of different structural shocks.

When using the above two methods, firstly, the vector must be stationary, and all the eigenvalues of the characteristic equation of VAR model must be in the unit circle. At the same time, all variables that affect each other should be added into the VAR model. If other variables that affect each other are ignored, the constructed VAR model will be worthless.

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4. Empirical analysis

4.1 Variable selection and data processing

In this paper, Hong Kong REITs are selected as the research object, and the quarterly data of relevant indicators in Hong Kong from December 2005 to March 2014 are selected for empirical analysis. First, determine the rate of return of REITs. This paper takes Hong Kong REITs as the overall research object, uses Hang Seng REITs index as the original data, and calculates the quarterly return rate formula as follows: $ROR_t = \frac{P_t - P_{t-1}}{P_{t-1}}$

Where ROR_t is the return rate of REITs in quarter T, P_t is the Hang Seng REITs index in quarter T, and P_{t-1} is the constant REITs index in quarter T-1. Using this method, the rate of return of the whole REITs market can be determined quickly and reasonably. Secondly, determine the index system of income influencing factors. According to the above analysis, at the macro level, GDP, GDP deflator and composite interest rate are selected as indicators. At the intermediate level, rent price indices of residential, office and retail properties are selected as indicators. At the micro level, Hong Kong Hang Seng Index, Hang Seng Financial Index and Hang Seng Property index as indicators. Table 1 shows the index system of influencing factors of REITs income.

Finally, data processing. TRAMO/SEATS method is used to make seasonal adjustment to the quarterly data of GDP and the quarterly price index of various property in Hong Kong. At the same time, in order to weaken the heteroscedasticity of model variables, GDP, meso and micro indicators were added into the model logarithmic, while GDP deflator and composite interest rate were directly added into the model. The descriptive statistical results of each variable after processing are shown in Table 2.

Table 1: Table of factors affecting REITs earnings

classification	The variable name	Indicator Object	Specific data selection	The data source
Macro-index	GDP	economic development level	Hong Kong's quarterly GDP	Census and statistics department
	GDPDE	inflation level	Quarterly GDP deflator for Hong Kong	Census and statistics department
	I	monetary policy	Quarterly composite interest rate in Hong Kong	Hong Kong Monetary Authority
Medium indicators	HRI	income from residential property	Quarterly price index of private domestic rents in Hong Kong	Hong Kong Rating and Valuation Department
	ORI	office property income	Quarterly price index of private office rents in Hong Kong	Hong Kong Rating and Valuation Department
	RRI	retail property income	Quarterly price Index of private retail rental in Hong Kong	Hong Kong Rating and Valuation Department
Micro index	HSIND	The overall price level of the market	Hang Seng Index	Wind information
	HSFIN	The level of financial stock prices	Hong Kong's Hang Seng Financial Index	Wind information
	HSPRO	property share price level	Hong Kong Hang Seng Property Index	Wind information

Table 2: Descriptive statistical table for each variable

variable name	sample size	mean value	maximum	minimum	standard deviation
GDP	34	8.424	8.580	8.271	0.079
GDPDE	34	1.048	1.135	0.991	0.042
I	34	1.073	3.340	0.110	1.183
HRI	34	4.789	5.057	4.503	0.186
ORI	34	5.054	5.345	4.711	0.190
RRI	34	4.836	5.136	4.633	0.164
HSIND	34	9.915	10.233	9.516	0.166
HSFIN	34	8.048	8.340	7.644	0.155
HSPRO	34	10.144	10.547	9.739	0.197
ROR	34	0.008	0.169	-0.312	0.109

4.2 Lag order determination and stability test of VAR model

In order to avoid the phenomenon of pseudo regression, ADF unit root test was conducted on the above variables first, and the test results showed that the above variables were all stable within 95% confidence interval, so the corresponding VAR model could be directly established.

Subsequently, variables were added into the VAR model in sequence from macro to micro, and the lag order was determined to be 4 after comprehensive consideration of AIC information criterion, SC information criterion and LR statistics.

Finally, the stability of the established VAR model is tested to ensure the convergence of the

impulse response function.

It can be seen from VAR model stability test unit circle that the modules of AR roots corresponding to VAR model are all less than 1 and located in the unit circle, which indicates that the CONSTRUCTED VAR model is stable.

5. Conclusions

It is of great theoretical and practical significance to study the factors influencing the returns of REITs in the context of Internet finance. The operation and transaction form of REITs are special, and the factors affecting its earnings are diverse and complex, so it is necessary to distinguish and study them. At the same time, REITs products have high liquidity, stable market value and high cash rate of return, which are very important financial investment products. Research on the factors influencing their returns can help provide a basis for institutional investment decisions and asset valuation. In this paper, by analyzing the particularity and universality of real estate investment trust fund, set up the index system of factors that affect their profits, use of the Hong Kong market quarterly data, using VAR model, variance decomposition and impulse response function method, studied the influence factors of different types of REITs yield and characteristics, the influence of the following conclusions.

First, the real estate investment trust fund income influence factors is complex, macroeconomic fundamentals, medium industry development status, and the micro plate stock movements will affect the benefits of REITs, including inflation, the related property rental price index, industry stock price index has more obvious influence on the benefits of REITs.

Second, there is no decisive factor in the return of REITs, and the impact of each factor on the change of return shows the characteristic of focusing on the average, and the change of the return of REITs is mostly the comprehensive result of the joint action of each factor.

Third, the impact of macroeconomic variables on the returns of REITs is profound and unidirectional, while the short-term price of REITs is less affected by the fluctuation of the market, and has the characteristics of volatility.

References

- [1] Ye, Q., & Ma, B. (2017). *Internet Finance*. In *Internet+ and Electronic Business in China: Innovation and Applications*. Emerald Publishing Limited.
- [2] Brown, D. T., & Riddiough, T. J. (2003). *Financing choice and liability structure of real estate investment trusts*. *Real Estate Economics*, 31(3), 313-346.
- [3] Campbell, R. D., Ghosh, C., & Sirmans, C. F. (2001). *The information content of method of payment in mergers: Evidence from real estate investment trusts (REITs)*. *Real Estate Economics*, 29(3), 361-387.
- [4] Wang, W. *The Development of Financial Innovations and The Impacts on Traditional Banking Services in China*.
- [5] Kruger, M. (2017). *Transformation from property loan stocks to real estate investment trusts and the resulting influence on international diversification (Doctoral dissertation, University of Pretoria)*.
- [6] Sivaramakrishnan, S., Srivastava, M., & Rastogi, A. (2017). *Attitudinal factors, financial literacy, and stock market participation*. *International journal of bank marketing*.
- [7] Juma, M. I. (2014). *The effect of macro-economic variables on growth in real estate investment in Kenya (Doctoral dissertation, University of Nairobi)*.
- [8] Lee, K. H. (2017). *Determinants of Returns on Malaysian Real Estate Investment Trusts (MREITs) (Doctoral dissertation, UTAR)*.
- [9] Zhu, C. C., & Yang, W. (2019). *Analysis of Internet Financial Planning Based on the Development in China and America*. In *Green Finance for Sustainable Global Growth (pp. 147-172)*. IGI Global.
- [10] Funk, A. S. (2019). *From Informal Finance to Internet Finance in China*. In *Crowdfunding in China (pp. 95-147)*. Springer, Cham.
- [11] Prakasa, Y. *Islamic Real Estate Investment Trust as an Investment Asset for Waqf Management in Indonesia: Regulatory Framework and Shariah-Compliance*.
- [12] Krewson-Kelly, S., & Thomas, R. B. (2016). *The intelligent REIT investor: how to build wealth with real estate investment trusts*. John Wiley & Sons.
- [13] Hartzell, J. C., Sun, L., & Titman, S. (2006). *The effect of corporate governance on investment: evidence from real estate investment trusts*. *Real Estate Economics*, 34(3), 343-376.

- [14] Hartzell, J. C., Sun, L., & Titman, S. (2006). *The effect of corporate governance on investment: evidence from real estate investment trusts*. *Real Estate Economics*, 34(3), 343-376.
- [15] Kruger, M. (2017). *Transformation from property loan stocks to real estate investment trusts and the resulting influence on international diversification* (Doctoral dissertation, University of Pretoria).
- [16] Collier, N. S., Collier, C. A., & Halperin, D. A. (2007). *Construction funding: the process of real estate development, appraisal, and finance*. John Wiley & Sons.
- [17] FAI, C. N. *FEASIBILITY STUDY: THE IMPLEMENTATION OF REAL ESTATE INVESTMENT TRUST (REIT) IN HONG KONG* (Doctoral dissertation, The Chinese University of Hong Kong).
- [18] Soon, W. C. K., Hussin, M. Y. M., Muhammad, F., & Wahab, N. A. (2020). *Macroeconomic shocks and leverage effect on Malaysian Islamic real estate investment trust stock return*. *J. Crit. Rev.* 7(6), 607-617.
- [19] Chiang, K. C., Lee, M. L., & Wisen, C. H. (2005). *On the time-series properties of real estate investment trust betas*. *Real Estate Economics*, 33(2), 381-396.
- [20] Binti Mohamad, N. E. A., & Bin Zolkifli, I. A. (2014). *The determinant factors of real estate investment trust (REIT)'s performance: Evidence from Asian REITs*. *Indonesian Capital Market Review*.
- [21] Mohamad, N. E. A. B. (2015). *The performance of shariah real estate investment trust and conventional real estate investment trust in Malaysia*. *Indonesian Capital Market Review*, 1-11.
- [22] Soon, W. C. K. (2021). *The Mirror of Malaysia Real Estate Investment Trust Stock Return in the Short-Run Dynamics*. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, 12(3), 547-562.