2018 Citi Financial Innovation Application Competition

REITs Valuation Model Report

Title ： Li Jin--A REITs platform for securitization of housing lease assets

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Abstract

This file is a report of REITs valuation model, belonging to the enterprise valuation part in the background operation of SPV terminal, which mainly realizes the valuation function of REITs to be issued by the enterprise.

The proportion of China's rental market is significantly lower than that of the international level, and there is still a large space for growth. The lack of matching financing supply largely slows down the development of the leasing market, and the issuance of leasing REITs can effectively improve such problems.REITs valuation is the key link of issuing and leasing REITs, and its accuracy, sensitivity and real-time performance are particularly important.Therefore, for this trading platform, it is necessary to choose an appropriate valuation scheme.

Based on the development of REITs in China, the first part summarizes the importance of REITs valuation.The second part starts from the three existing valuation methods, weighs the advantages and disadvantages, and selects the basic valuation scheme.The third part further improves the existing scheme, and describes the calculation formula, data processing and operation logic.The fourth part carries on the case analysis through the example, evaluates the scheme accuracy;The fifth part draws the corresponding conclusion.

Contents

1. Part One: Development Status Of Leasing REITs In China

1.1 Lease Market Potential Needs To Be Further Developed

According to the statistics at the present stage, the scale of China's real estate leasing market has reached 1 trillion yuan, and the leasing population has reached 190 million. Based on the reasonable prediction of the current growth rate, the market size may exceed 3 trillion yuan in the next decade.

By virtue of China's demographic advantage and population size, although China's real estate rental market is only one-third of that of the United States at the present stage, China's real estate rental market has great development potential and sufficient growth space in the future.

1.2 Domestic REITs Are Still In The Initial Stage Of Development

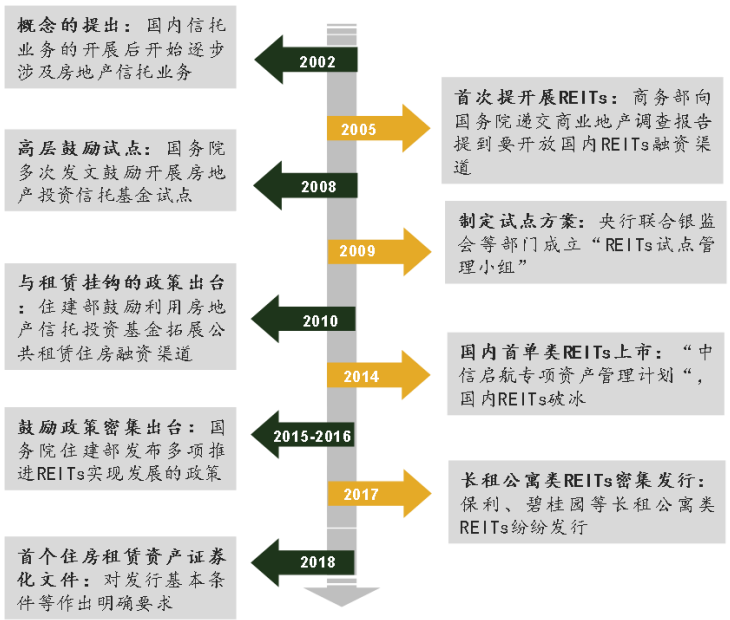

Figure 1-1 development history of domestic REITs

Data and pictures: China index academy

According to the data, by the end of 2017, the cumulative issuance scale of China's REITs products was 64.9 billion yuan, far from the huge market scale of the United

States, which was dominated by equity type, with a total of 30 products including mortgage type and hybrid type.

The issuance size and number of REITs products doubled in 2017, driven by high-level policies, but the market volume of domestic REITs is still small compared with mature financing tools such as corporate bonds.

From the perspective of asset type, it involves a variety of property types, including office building, shopping mall, store, hotel, bookstore, commercial complex and logistics real estate. From the perspective of distribution, it is mainly concentrated in the core area of first-tier cities.

From the perspective of earnings, the expected earnings of domestic issued REITs products are basically between 4% and 7%. Compared with the stable earnings in the international mature market, there is still much room for improvement in the future.

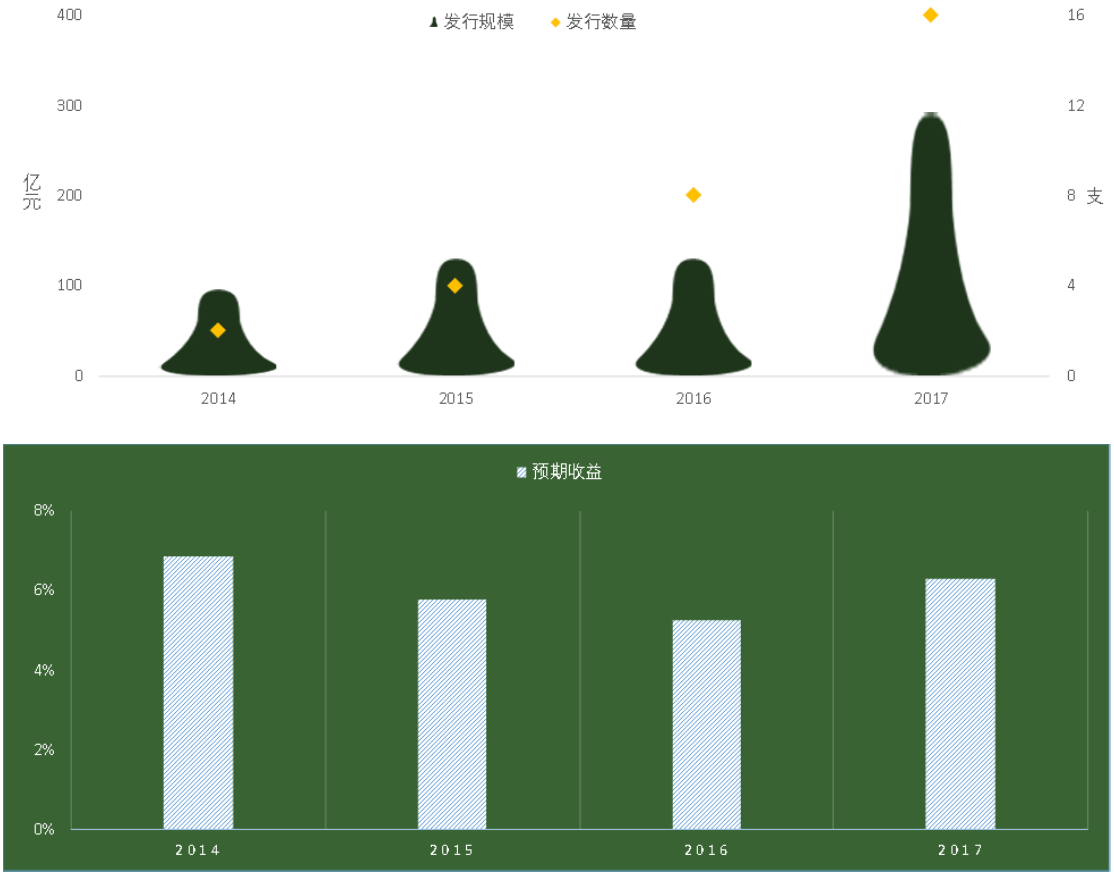

Figure 1-2 the issuance scale, quantity and rate of return of Chinese REITs in 2014-2017

Data and picture source: wind, China index research institute comprehensive collation

The development process of REITs in China is slow. On the one hand, the lack of domestic legislation and the absence of tax system are the fundamental reasons for restricting the development of REITs.

The absence of relevant laws makes the domestic REITs have no unified standards in the aspects of issuing subject, organizational structure, management mode, investment operation, investor type and protection, which makes the issuance more difficult.

As a result of the imperfect tax system, REITs need to pay various taxes in the process of establishment, survival and termination, which not only increases the cost of the issuer, but also affects the income of investors, which is not conducive to the large-scale development of REITs.

On the other hand, the rent level of domestic office, hotel and other properties is relatively low. At the same time, the real estate market is still in the period of the new house market, and the income brought by leasing business and direct sale of houses is not comparable, which determines the low awareness and enthusiasm of major social bodies in the development of leasing.This is a deviation from the stability and high yield of REITs.

1.3 Real REITs May No Longer Be Far Off

With the acceleration of the rent-purchase and co-ownership system, the development prospect of long-term rented apartments, which have been plagued by profitability, has become increasingly clear and clear.

Merchants, poly, xu hui, country garden brand enterprise, the approval of rental housing type securitised products again in the industry, financial institutions, the rating agencies such as the social from all walks of life to see the opportunity, although the marketization of REITs from the real meaning of the product also has the very big space, but with the rapid advance of rental housing policy, legislation and taxation problems of solving REITs have been will be just around the corner.

2. Part Two:The Importance Of REITs Valuation

(1) To measure the comprehensive value of the underlying assets of enterprises based on real estate

Leasing REITs is based on the value of the assets leased by enterprises, through the dual-spv structure, to issue public offering funds to investors and take the value of the real estate leased and the expected cash flow as the repayment guarantee. Therefore, the value of the REITs can be fully measured on the comprehensive value of the leased assets while valuing the REITs.

(2) Determine the classification and dividend structure of public offering funds

Through the valuation of REITs, the expected earnings and risks of the public offering fund issued by the company's leased assets can be determined, which is helpful to determine the classification and dividend structure of the public offering fund.

(3) Facilitate the overall management of SPV operation

Whether for financial institutions undertaking SPV1 or as the trading platform of SPV2, the valuation of REITs is convenient for controlling the capital flow, operation capacity and risk status of enterprises, providing convenience for the future public offering of funds, and laying a foundation for the management and operation of SPV terminal after issuance.

(4) Dual audit to reduce platform trading risks

This trading platform has a rigorous auditing process when enterprises enter. When evaluating REITs, it can audit the enterprises again and reduce transaction risks.

3. Part Three: Overview Of Traditional Valuation Models

The methods of REITs valuation include: discount of operating cash flow, net assets method and P/FFO multiplier method.

3.1 Discount Method Of Operating Cash Flow

The discount method of operating cash flow evolved from the discount method of cash flow.This valuation method is to build a certain hypothesis and financial model for the operating cash flow generated by the property, discount and add up the cash flow of the subsequent period of the property, and predict the estimated amount of the final value at the end of the period.

The formula is as follows:

$$V = \sum_{i=1}^{n} \frac{FFO_i}{(1+r)^i}$$

$$WACC \equiv KD \times \frac{TD}{V} + KE \times \frac{E}{V} \times (1 - T_C)$$

Net income = all income (including capital gains) - operating expenses - depreciation - amortization - interest expenses - general management expenses

FFO= net income - capital gains in real estate sales + depreciation charges

Where FFO_i is the operating cash flow in year I;r is the discount rate, usually WACC;KD is the cost of debt capital;KE is the cost of equity capital;V is the total cost;TD is total debt capital;E is the total amount of equity capital, T_C is the tax rate, the general corporate income tax rate.

This method is very reasonable in theory, and the research results also show that the correlation coefficient between the price index and the rent index of American equity REITs has reached 0.72 in the past 20 years.For a REITs company with financial regulations, it is not difficult to make FFO prediction, because the prediction results are based on the existing financial data of the company and have high credibility.Discounting FFO in this way, however, exaggerates the value to some extent, because investors do not receive all future FFO in advance as implied by this method. Investors receive only cash dividends from REITs, and the remaining FFO is retained to promote future growth.As the real debt interest rate is usually lower than the yield rate,

REITs can easily "buy" FFO growth by increasing the debt ratio, especially the low-cost variable interest rate debt, thus making REITs overvalued.

3.2 Net Asset Value Method

The net asset value method is based on the rental income of all properties, and the company's total rental income is capitalized with a certain discount rate, and the selected capitalization rate is generally the rental yield of the real transaction of the property.

The formula is as follows:

NAV=NOI present value + land value + / - company net liability - adjustment

Among them, the adjustment items include: changes in market expectations, industrial policies, interest rate, exchange rate changes, GDP, house price to income ratio, per capita living area and other factors that may affect housing price, which may have an impact on NAV valuation. These are the adjustment factors that need to be considered in the specific valuation process.

The value of REITs calculated by NAV model reflects the book value of REITs, and reflects the volatility of capital market, market risk, corporate governance and investor expectation through specific adjustments, which can help investors avoid the over-valued REITs in the trading of REITs market, thus avoiding the wrong choice of investors.

But a NAV REITs are often very difficult to achieve, because the company does not generally class property value of the company's property, also won't hire outside of the appraiser to valuations, even based on the results publicly, intermediary company appraiser is unlikely to get all the index of NAV valuation need, part will lead to the use of this model is less;

Moreover, the NAV valuation model is more used in the liquidation process of REITs companies. For sustainable REITs companies, the NAV valuation model is not very

applicable.

3.3 P/FFO Multiplier Method

The P/FFO multiplier valuation model is similar to the PE multiplier model in general enterprise value assessment. The multiplier valuation model is used frequently in mature western markets, especially when investment Banks value enterprises.

When using the P/AFFO multiplier method for valuation, we take REITs as a whole market into consideration, and we choose lower or higher multiples in combination with the market situation.

The formula is as follows:

$$V = FFO \times \frac{P}{FFO} \text{multiplier}$$

This method is less subjective than net asset value in calculating the ratio of stock price to working capital and so on.

But since the size of the P/PFO multiplier affecting REITs is variable, it is difficult to select comparable targets. For example, some companies count income from asset sales as working capital, while others do not.Lease termination fees and other non-recurrent income also distort working capital data for a certain period. Therefore, the inaccurate working capital data reported by some companies may lead to the loss of significance in comparison of price and adjusted working capital multiples.Differences in REITs debt ratios also lead to differences in P/FFO multipliers. REITs stocks with higher debt levels will definitely trade with lower P/FFO and P/AFFO multipliers to match higher risks.In addition, the capitalization rate shall be included into the influencing factors. A REITs property with a lower capitalization rate will be traded at a higher P/FFO or P/AFFO ratio than a property with a higher capitalization rate within the same property division.At the same time, strong, low-risk blue-chip REITs should trade at a higher P/FFO ratio than depressed REITs because risk is an important factor in determining a reasonable valuation of any investment product.

4. Part Four: Model Selection And Improvement

4.1 Model SelectionIn

In the foregoing overview of the traditional model, we respectively mentioned the advantages and disadvantages of the three types of models. After comparison, it is too difficult for the net asset value method to obtain the NAV of the enterprise, which will increase the calculation cost of the trading platform.However, in the P/FFO multiplier method, the factors affecting the multiplier are various and difficult to be determined.Although the discount method of operating cash flow also has problems, it can reduce the overvaluation bias of the valuation by improving the method. Therefore, this trading platform chooses the discount method of operating cash flow.

4.2 Model Improvement

In addition to the problems mentioned in 3.1, operating cash flow discount method applied to the lease REITs valuations there are some other problems, for example, the value of commercial real estate will slowly decrease over time, the holder to maintain asset value, usually on the hoisting structure reset from time to time to invest, so simply to add depreciation to net income, will affect the exact value of FFO. Therefore, this trading platform uses the concept of "AFFO, Adjusted Funds From Operation" proposed by Green Street Advisors.

The calculation formula is:

Net income = all income (including capital gains) - operating expenses - depreciation - amortization - interest expenses - general management expenses

FFO= net income - capital gains in real estate sales + depreciation charges

AFFO=FFO- normal and recurring capital expenditures - tenant improvements and amortization of rental commissions - depreciation of rents (method of life averaging)

5. Part Five: Revised Valuation Model

5.1 Valuation Formula

$$V = \sum_{i=1}^{n} \frac{AFFO_i}{(1+r)^i}$$

$$WACC \equiv KD \times \frac{TD}{V} + KE \times \frac{E}{V} \times (1 - T_C)$$

Net income = all income (including capital gains) - operating expenses - depreciation - amortization - interest expenses - general management expenses

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AFFO=FFO- normal and recurring capital expenditures - tenant improvements and amortization of rental commissions - depreciation of rents (method of life averaging)

Where AFFOi is the operating cash flow in year I;R is the discount rate, usually WACC;KD is the cost of debt capital;KE is the cost of equity capital;V is the total cost;TD is total debt capital;E is the total amount of equity capital, T_C is the tax rate, the general corporate income tax rate.5.2 data processing

5.2 Data Processing

5.2.1 KD Treatment

KD is the cost of debt capital, calculated according to the following three methods (in the order listed) :

(1) **Yield to maturity method**: if a company has long-term bonds listed, the pre-tax capital cost of the debt is calculated using the yield to maturity.

(2) **Comparative corporate law**: look for a comparable enterprise with tradable bonds as a reference, and the yield to maturity of the long-term bonds of the comparable enterprise as the capital cost of the pre-tax debt of the enterprise.

(3) **Risk adjustment method**: pre-tax debt cost = market return rate of government

bonds + credit risk compensation rate of enterprises

5.2.2 KE Treatment

KE is the cost of equity capital. Capital asset pricing method (CAPM) is generally adopted. Its calculation formula is as follows:

$$KE = RF + beta\ (RM - RF)$$

Among them, RF is the risk-free return rate, usually taking the 10-year Treasury annual interest rate;Is the market risk coefficient of the listed company stock;RM is the weighted average rate of return of the listed company's stock, which is determined by referring to the average rate of return of all industries of the listed company.

5.2.3 TD, E, V Treatment

TD is the total amount of debt capital, referring to the sum of short-term loans and long-term loans of enterprises.

E is the total amount of bond capital, referring to the sum of paid-in capital and capital reserve of the enterprise.

V is the total capital, referring to the sum of TD and E.

5.2.4 Processing Of AFFO Related Indicators

Net income = all income (including capital gains) - operating expenses - depreciation - amortization - interest expenses - general management expenses.

FFO= net income - capital gains in real estate sales + depreciation charges.

AFFO=FFO- normal and recurring capital expenditures - tenant improvements and amortization of rental commissions - depreciation of rent (life mean method) + adjustment (gain or loss on prepaid debt)

5.3 Operating Logic

5.3.1 Inquire Relevant Data

According to the financial statements of the enterprise, find the value of "short-term borrowing", "long-term borrowing", "paid-in capital", "capital reserve" and other

relevant accounting items;In the Wind database, the value of enterprise Beta, FFO and other relevant indicators, and the yield of long-term bonds of enterprises (if not, the yield of their comparable long-term bonds) are searched.Inquire the interest rate of 10-year Treasury bonds and the average yield of all listed companies in the Wind database.

5.3.2 Calculate Relevant Indicators

Based on the data already queried, the following calculations are performed:

TD= short-term borrowing + long-term borrowing

E= paid-in capital + capital reserve

V = E + TD

KE = RF + beta (RM – RF)

AFFO=FFO- normal and recurring capital expenditures - tenant improvements and amortization of rental commissions - depreciation of rent (life mean method) + adjustment (gain or loss on prepaid debt)

5.3.3 Determine The Discount Rate

According to the $V = \sum_{i=1}^{n} \frac{AFFO_i}{(1+r)^i}$ determine the discount rate.

5.3.4 Determine The Valuation

The valuation is determined according to WACC congruent $WACC \equiv KD \times \frac{TD}{V} + KE \times \frac{E}{V} \times (1 - T_C)$.

6. Part Six: Case Analysis

6.1 Take Metro Shares As An Example.

6.1.1 Relevant Data Query Results

The results based on the financial report query are as follows:

Table 6-1 financial report of new city stock

Short-term borrowing	Long-term borrowing	Paid-in capital	Capital reserve
750000000.00	10580707200.00	2258484200.00	2619753118.00

The results based on Wind query are as follows:

Table 6-2 Wind database query data

Beta	Rf	RM	Yield to maturity1
1.9672	3.51%	11.08%	4.80%

Table 6-3 AFFO query data

Year	AFFO	Year	AFFO
2018	134281000	2028	239449000
2019	156221500	2029	246835600
2020	163096700	2030	254120200
2021	177692600	2031	261617200
2022	187874000	2032	269332400
2023	197017500	2033	277272000
2024	206082900	2034	285381500
2025	215450100	2035	302315500
2026	222937300	2036	302315500
2027	231774500		

6.1.2 Index Calculation Results

Based on the above data, the index calculation results are as follows:

Table 6-4 calculation results of new town holding index

TD	E	V	KE
11330707200	4878237318	16208944518	18.40%

6.1.3 Calculation Results Of Discount Rate

The calculated result based on the formula is: WACC=7.509%

6.1.4 Valuation V

Calculation results based on the valuation formula: V=2079216695In 2017, xincheng

holdings issued the REITs with a scale of 2.1 billion yuan, which is basically consistent with the valuation results, indicating that this valuation model is relatively accurate.

6.2 Take Suning Yunshang As An Example.

6.2.1 Relevant Data Query Results

The results based on the financial report query are as follows:

Table 6-5 suning commerce report data

Short-term borrowing	long-term borrowing	paid-in capital	capital reserve
9999000000.00	2880000000.00	9310000000.00	36430000000.00

Table 6-6 Wind database query data

Beta	Rf	RM	Yield to maturity
1.4233	3.51%	11.08%	5.95%

Table 6-7 AFFO query data

Year	AFFO	Year	AFFO
2018	254382032	2027	263945404
2019	254382032	2028	263945404
2020	254382032	2029	263945404
2021	293534564	2030	338684804
2022	293534564	2031	338684804
2023	312481956	2032	338684804
2024	267133156	2033	338684804
2025	266949529	2034	338684804
2026	263945404	2035	338684804

6.2.2 Index Calculation Results

Based on the above data, the index calculation results are as follows:

Table 6-8 calculation results of suning yunshang index

TD	E	V	KE
12879000000	45740000000	58619000000	14.28%

6.2.3 Calculation Results Of Discount Rate

Calculation results based on the formula: WACC=9.667%

6.2.4 Valuation V

Calculation results based on valuation formula: V=2366599862

The scale of class A REITs issued by suning yunshang in late 2014 was 2.085 billion yuan. Within the range of valuation results, it is clear that this valuation model is relatively accurate.

The rate of return of the priority fund in the platform is determined by the comprehensive Treasury bond rate and the rate of return of the priority of other similar funds. The return of the average fund is all the residual income after the dividend of the priority fund.The price of the priority funds and common funds in the platform will be assessed by professional evaluation institutions, and the final price will be determined by referring to the evaluation results of professional institutions.

7. Part Seven: Summary

The result is close to the real value of the enterprise and shows that the modified discounted cash flow method can effectively value the REITs.This method starts from the three basic valuation methods, carries on the pros and cons weighing, chooses the operating cash flow discount method as the basic method, and uses the overseas revision plan of AFFO for reference, revises the FFO in this method, makes it closer to the reality.On the one hand, the revised valuation scheme avoids subjective factors affecting the accuracy of the valuation. On the other hand, it computes the data obtained by enterprises when they enter the market and the data already in the Wind database, realizing double auditing while saving the transaction cost of the platform. Generally

speaking, although the original valuation plan has some deficiencies, it has been corrected, which is the optimal choice in the existing valuation method and more suitable for this trading platform.