

Research on Enterprise Value Evaluation Based on EVA Model

-- Taking Jidian as an Example

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Abstract: Different from the traditional value evaluation system, EVA considers the impact of equity capital cost on enterprise value. This paper uses the EVA value evaluation model to process and analyze the financial data of Jidian Corporation from 2017 to 2021, and finds that the market value of Jidian Corporation has a small difference with EVA value. The research of this paper has certain enlightenment significance for the production and operation of power industry enterprises.

Keywords: Power industry, EVA, Value assessment.

1. Introduction

In the process of enterprise value evaluation, the traditional enterprise value evaluation models mainly include cash flow discount model, dividend discount model and relative value model. Most of these methods ignore the impact of equity cost on enterprise value, and only rely on the impact of debt cost on enterprise value. In the production and operation process of an enterprise, the cost of equity capital is higher than the cost of debt capital. Economic added value adds the cost of equity capital and the cost of debt capital to the consideration of enterprise value. It is the difference between the after tax net profit and the total capital cost of the enterprise. It can reflect the ability of managers to effectively use the capital cost to create value and reflect the internal value of the enterprise.

China has long been dominated by thermal power generation. In the past two years, with the proposal of "carbon peaking" and "carbon neutralization", clean energy has gradually entered the public's vision. Due to the demand for energy transformation and the continuous improvement of the voice of clean energy, the power supply mode of clean energy generation such as wind energy and geothermal energy will be improved. Jidian has positioned its future development strategy to establish the whole industrial chain of hydrogen energy industry, with the proportion of clean energy exceeding 90%. In recent years, the stock price and market value of Jidian have fluctuated greatly, and when the enterprise is in good operating condition, its stock market value is in a downward trend. In this paper, the EVA model is used to test the financial statements of Jidian Electric Co., Ltd. and it is found that the EVA model is close to the market value, which indicates that the market value can reflect its intrinsic value.

2. Theoretical Overview of EVA Value Evaluation Model

EVA is the economic added value. EVA brings equity capital and debt capital into the consideration of enterprise value. It is the difference between after tax net operating profit and total capital cost, which reflects the efficiency of capital use and the ability to create profits. EVA valuation model is

divided into three categories based on the growth rate: sustainable growth model, two-stage growth model and three-stage growth model. This paper uses two-stage growth model. The basic formula is:

$$EVA = NOPAT - TC \times WACC \quad (1)$$

(1) where NOPAT is the net operating profit after tax, TC is the total capital, and WACC is the weighted average cost of capital.

$$WACC = \frac{E}{E+D} \times Ke + \frac{D}{E+D} \times Kd \times (1 - T) \quad (2)$$

Weighted average cost of capital:

Where e is the equity capital, D is the debt capital, Ke is the cost of equity capital, KD is the cost of debt capital, and t is the income tax rate.

$$Ke = Rf + \beta \times (Rm - Rf) \quad (3)$$

The cost of equity capital Ke is determined by using the capital asset pricing model:

RF is the risk-free rate of return and this paper uses the interest rate of national debt as the risk-free rate of return, β Represents market risk, RM is the expected return rate of investors, RM RF is the return rate of risk premium investment, and GDP is taken as the return rate of risk premium in this paper.

Enterprise value = total capital on the benchmark date + present value at the stage of rapid growth + present value at the stage of stable growth

$$V = T_0 + \sum_{t=1}^n \frac{EVA_t}{(1+WACC)^t} + \frac{EVA_{n+1}}{(WACC-g)(1+WACC)^n} \quad (4)$$

G represents the EVA growth rate after the enterprise enters the stable growth period.

3. Enterprise Value Evaluation of Jidian Based on EVA Model

3.1. Company profile

In September 2002, Jidian was listed on Shenzhen stock exchange with stock code 000875. Mainly engaged in the development, investment, construction, production, sales and other services of power resources. The strategic objective of the company is to realize the good application of biomass energy and electric energy substitution by 2025, and initially build the whole industrial chain of hydrogen energy industry, with an installed capacity of more than 20 million kilowatts and a proportion of clean energy of more than 90%. In recent years, relying on the development opportunities of the national new energy policy, the company has continuously increased R & D investment, enhanced its competitiveness and achieved better development.

3.2. Reasons for choosing Jidian

Since 2017, the net profit and after tax net operating profit of Jidian have always maintained an increasing trend. Correspondingly, the share price of Jidian has been in a downward trend from 2017 until 2020, and has a rapid growth in 2021. Obviously, the market value represented by the stock price is quite different from the economic situation reflected in the enterprise's financial statements. Therefore, this paper calculates the enterprise value based on the economic added value to test whether the market value can reflect the internal value of the enterprise.

3.3. Enterprise value in the base period

After tax net operating profit refers to the business profit of the enterprise minus interest expense and income tax, plus research and development expenses, depreciation and amortization, and deducting some non routine operating expenses, and finally the value of goodwill, deferred tax and various impairment expenses.

Table 1. Calculation amount of NOPAT of Jidian from 2017 to 2021 unit:10000 yuan

project	2017	2018	2019	2020	2021
Net profit	-29464.35	25179.49	40192.84	79900.41	78533.15
Financial expenses	75592.72	114978.91	130722.34	132730.58	168468.40
interest expenses	0.00	112438.96	129387.44	130288.83	165564.72
Income tax expense	2944.69	7082.31	10734.64	18079.67	19014.18
total	49073.06	259679.68	311037.26	360999.49	431580.45
Income tax rate	0.00	0.00	0.00	0.00	0.00
Minority interest	4489.03	13718.64	25427.81	32092.48	33495.26
R & D expenses	0.00	0.00	97.51	1893.05	5712.48
Deferred Tax Liability	0.00	4730.40	12963.93	11805.64	16720.79
Non operating expenses	581.59	1246.65	761.86	717.32	46.05
Interest expense	0.00	0.00	0.00	0.00	0.00
Income from changes in fair value	0.00	0.00	0.00	0.00	0.00
deferred tax assets	2852.96	4095.27	3980.57	3818.97	7473.91
Non operating income	3581.60	6166.72	15622.83	10226.62	7040.79
Non operating income * (1-T)	3044.36	5241.71	13279.41	8692.62	5984.67
Net operating profit after tax	48246.36	270038.39	333028.39	394996.38	474096.44

Total invested capital = short-term loans + long-term loans + bonds payable + total owner's equity + R & D expenses +

deferred income tax liabilities - deferred income tax assets - financial assets - Construction in progress.

Table 2. Calculation amount of total invested capital unit: 10000 yuan

project	2017	2018	2019	2020	2021
Short term borrowings	691331	719730	815740.6	954859.7	1053772
Long term loan	930912.6	1179972	1632544	2262458	2631034
Bonds payable	0	0	0	0	0
Total owner's equity	847166.7	1034420	1067103	1129724	1428022
total	2469410	2934122	3515388	4347042	5112828
Add: deferred income tax liabilities	0	4730.4	12963.93	11805.64	16720.79
Add: R & D expenses	0	0	97.51	1893.05	5712.48
Less: deferred income tax assets	2852.96	4095.27	3980.57	3818.97	7473.91
Less: net amount of construction in progress	463770.1	248090.1	363447.9	863657.2	590660.9
Total capital	2002787	2686667	3161021	3493264	4537126

Cost of equity capital. In practice, the annual growth rate of China's GDP is usually taken as the market risk premium, so this paper selects the growth rate of China's GDP from 2017 to 2021 as the market risk premium, and selects the interest rate of five-year treasury bonds from 2017 to 2021 to

reflect the risk-free yield, β Take the beta value of the sub market year for the stock risk coefficient to measure the volatility of the investment object relative to the market, which can be queried in the CSMAR database.

Table 3. Calculation of cost of equity capital

year	2017	2018	2019	2020	2021
GDP growth rate (city)	6.95%	6.75%	5.95%	2.35%	8.10%
Interest rate of five-year treasury bonds (NIL)	4.17%	4.27%	4.27%	3.97%	3.97%
β coefficient	0.90787	0.76313	0.9209	0.8516	0.45676
Cost of equity capital (KE)	6.69%	6.16%	5.82%	2.59%	5.86%

Table 4. Calculation of debt capital cost

project	2017	2018	2019	2020	2021
Short term borrowings (10000 yuan)	691331	719730	815740.6	954859.7	1053772
Long term loan (ten thousand yuan)	930912.6	1179972	1632544	2262458	2631034
Bonds payable	0	0	0	0	0
Short term loan interest rate (%)	4.35%	4.35%	4.35%	4.35%	4.35%
Long term loan interest rate (%)	4.90%	4.90%	4.90%	4.90%	4.90%
Total interest (ten thousand yuan)	75687.61	89126.88	115479.4	152396.8	174759.7
Cost of debt capital before tax (%)	4.67%	4.69%	4.72%	4.74%	4.74%
Income tax rate (%)	15%	15%	15%	15%	15%
After tax debt capital cost (%)	3.97%	3.99%	4.01%	4.03%	4.03%

The weighted average capital cost is the average capital cost of the enterprise calculated according to the enterprise financing structure and financing cost. The calculation results

of the weighted average capital cost of Jidian are shown in the table below.

Table 5. Calculation of weighted average capital of Jidian

project	2017	2018	2019	2020	2021
Equity capital (10000 yuan)	847166.73	1034419.72	1067102.95	1129724.12	1428021.83
Debt capital (ten thousand yuan)	1622243.55	1899701.84	2448284.97	3217317.6	3684805.77
Total capital (10000 yuan)	2469410.28	2934121.56	3515387.92	4347041.72	5112827.6
Proportion of equity capital (%)	34.31%	35.25%	30.36%	25.99%	27.93%
Proportion of debt capital (%)	65.69%	64.75%	69.64%	74.01%	72.07%
Cost of equity capital (%)	6.69%	6.16%	5.82%	2.59%	5.86%
Debt capital cost (%)	3.97%	3.99%	4.01%	4.03%	4.03%
WACC(%)	4.90%	4.75%	4.56%	3.65%	4.54%

Historical EVA calculation. The historical EVA data from 2017 to 2021 is calculated according to the full text data.

Table 6. historical EVA calculation table of Jidian

project	2017	2018	2019	2020	2021
NOPAT (ten thousand yuan)	48246.36	270038.39	333028.39	394996.38	474096.44
TC (ten thousand yuan)	2002787.27	2686666.6	3161020.86	3493264.21	4537126.08
WACC(%)	4.90%	4.75%	4.56%	3.65%	4.54%
EVA(%)	-49924.01	142299.17	188948.44	267383.95	268062.69

From the historical EVA growth, from 2017 to 2021, the economic added value of Jidian shares increased from a negative value in 2017 to 2.6 billion in 2021, from a rapid increase in 2017 to 2018 to a stable growth in 2021. It can be reflected here that Jidian Power Co., Ltd. is in a period of rapid growth during this period, and its business condition has been greatly improved.

3.4. EVA forecast in growth period

Combined with the operation of Jidian and the calculation results of EVA mentioned above. From the external perspective represented by the industry environment and national policies, and from the internal operating conditions

of the company, the future EVA of Jidian is calculated.

3.4.1. External angle analysis

(1) Industry environment: in recent years, China's power industry has developed rapidly. From the national market, China's power generation from 2015 to 2021 is on the rise. According to the statistics of China Electric Power Enterprise Federation, the national full caliber power generation in 2021 was 8.38 trillion kwh, an increase of 9.8% year on year.

At the same time, although the current power industry focuses on developing clean energy, from the perspective of China's power consumption structure, thermal power generation is still the main power supply mode. By 2021, 69%

of the power generation will come from thermal power generation. Compared with 71.13% of thermal power generation in 2016, the proportion of thermal power generation has significantly decreased.

(2) National policy: the electric power industry is an important part of China's economic development. In recent years, with the global climate anomaly, energy conservation and environmental protection have gained a great voice in the world. China has proposed the goal of developing green energy and carbon neutralization, gradually reducing the proportion of traditional coal in the power supply, increasing the proportion of clean energy in the power consumption structure, and giving certain policy support to the entire electric power industry. With the adjustment and upgrading of China's industrial structure, the demand for electric power will increase. At the same time, as the "14th five year plan" proposes to deepen the supply side structural reform and develop low-carbon power for the power industry, it is required to improve the use efficiency of energy, gradually reduce the proportion of coal-fired power, and increase the proportion of clean energy in China's power supply structure.

Since 2017, the operating revenue and net profit of Jidian have increased rapidly. In addition, with the progress of technology and the increasingly positive acceptance of clean energy, the proportion of traditional thermal power in the overall power supply structure has decreased in recent years, and the total amount still shows an upward trend, which is mainly due to the increasing demand for power in China. Combined with the policy support for clean energy and the improvement of the operating conditions of Jidian, this paper predicts that the operating income of Jidian will have a rapid growth.

3.4.2. Internal angle analysis

(1) Analysis of the company's operation: according to the analysis of the financial statements of Jidian Electric Co., Ltd., the company's net profit increased significantly from -294.6435 million yuan to 785.3314 million yuan from 2017 to 2021, with a leap forward improvement. From the analysis of various financial indicators of the company, we can see that the overall operation of the company is developing well. The net assets per share increased from 0.6439 yuan in 2017 to 1.2319 yuan, the total operating income increased from 5.102 billion yuan in 2017 to 13.18 billion yuan, and the non net profit increased from -337.1 million yuan in 2017 to 360.5 million yuan in 2021. On the whole, the company's operating conditions are in an upward period.

(2) Analysis of development capacity: from 2017 to 2021, the total operating income of Jidian Power Co., Ltd. showed a rapid upward trend, with an increase of nearly 1.3 times in five years. The net profit of Jidian Power Co., Ltd. from 2017 to 2021 is in a rapid upward trend. Except for 2021, the attributable net profit from 2017 to 2020 has increased significantly.

(3) Analysis of operating capacity: the total asset turnover days of Jidian Co., Ltd. decreased from 2302 days in 2017 to 1678 days; Inventory turnover days increased from 7.335 days in 2017 to 12.16 days in 2021; The inventory turnover rate showed a rapid upward trend from 2017 to 2019, increasing from 49.08 times to 68.85 times. From 2019 to 2021, the turnover rate slowed down to 29.59 times, which was mainly due to the rapid increase of the inventory of Jidian from 102.5 million yuan in 2017 to 411.2 million yuan in 2021. The turnover rate of accounts receivable decreased

from 3.043 times in 2017 to 1.688 times in 2021, reflecting that although the profitability of Jidian has been enhanced in recent years, its collection capacity is not strong. Although the cash flow generated by the operating activities of Jidian has shown an upward trend, its growth rate is slightly slower than that of operating income and net profit.

(4) Analysis of cash flow statement: from 2017 to 2021, the cash inflow from operating activities of Jidian Electric Co., Ltd. increased from 4.708 billion yuan to 12.97 billion yuan. Although the net increase in cash and cash equivalents increased from -1.176 billion yuan to 417.8 million yuan, it was insufficient compared with the cash inflow from operating activities. This was mainly due to the fact that the amount of cash flow from investment activities of Jidian Electric Co., Ltd. was always in a loss and increased year by year. The cash outflow from its investment activities is mainly the net outflow caused by the cash paid for the purchase and construction of fixed assets, intangible assets and other long-term assets. In combination with the company's development strategy of initially completing the whole industrial chain of hydrogen energy industry by 2025 and forming an open and shared smart energy ecosystem by 2035, and the cash outflow direction of investment activities in the financial statements is mainly to purchase relevant clean energy power stations, which shows that Jidian shares is adopting an expansionary development strategy at this stage. Therefore, in the long term, the investment at this stage will promote the rapid growth of Jidian shares in the future.

To sum up, based on the development trend of clean energy industry, the national policy support and the analysis of its own business situation, it can be predicted that the company's development will be in an upward trend from 2022 to 2026.

3.4.3. Estimated future EVA

Based on the previous analysis of Jidian and the analysis of national macro policies and industrial development environment, this paper predicts that the period from 2022 to 2026 will be a high-speed growth period of Jidian, and from 2027, Jidian will enter a stable growth period.

According to the trend of China's treasury bond interest rate, the benchmark interest rate will continue the downward trend of the previous year in the future. At the same time, the future development of enterprises and industries tends to be stable, and the growth rate of the sustainable growth stage of the industry will be slightly lower than the benchmark interest rate.

Therefore, this paper assumes that the growth rate of the steady growth stage of Jidian is 2.5%, and the weighted average cost of capital in 2022 and later is set as 4.38% of the average value of the weighted average cost of capital in 2018-2021. Since the government's work goal is to reach the carbon peak by 2030, this paper assumes that 2022-2026 will be the high-speed growth stage of the company. Since the EVA value of Jidian shares in 2017 will be negative, which will have a great impact on the results, this paper excludes it. The compound growth rate of EVA of the company in 2018-2021 is 23.50%. Combined with the annual expansion of power demand and the continuous enhancement of clean energy demand, this paper assumes that Jidian shares will still be in the high-speed growth period from 2022 to 2026. However, EVA growth will slow down to 20.5%, 19.5%, 18.5%, 17.5% and 16.5%

Therefore, this paper will adopt a two-stage growth model to predict the EVA of Jidian in recent years.

Table 7. Calculation of EVA in high-speed growth period

particular year	EVA growth rate (%)	EVA (ten thousand yuan)	Present value discount coefficient	EVA discount value
2022	20.50%	323015.55	0.9581	309470.97
2023	19.50%	386003.58	0.9179	354310.75
2024	18.50%	457414.24	0.8794	402252.89
2025	17.50%	537461.73	0.8425	452828.27
2026	16.50%	626142.92	0.8072	505424.11
total		2330038.01		2024287.00

Future EVA forecast of Jidian Co., Ltd. Based on the above assumptions, the value of Jidian shares is calculated as follows: enterprise value = invested capital + enterprise value in high-speed growth period + enterprise value in stable growth period. Enterprise value of Jidian Co., Ltd. = 4537126.08 + 2024287.00 + (- 4363702.663) = 21977104200 yuan. It can be seen that according to the economic added value, the enterprise value of Jidian Co., Ltd. on December 31, 2021 is 21.977 billion yuan. According to the closing price of Jidian shares on that day of 9.09 yuan, the total number of shares on that day was 2790208200. According to the closing price and the total number of shares on that day, the market value of Jidian shares on that day can be calculated to be 25.363 billion yuan. Higher than the enterprise value calculated by EVA model. The error rate of the result is 13.35%, and the difference between the enterprise value calculated by EVA and the market value of the day remains within 20%, indicating that the error is small and the result is relatively accurate. It shows that the enterprise value evaluation is relatively accurate. This paper believes that the market value reflects the internal value of the enterprise.

4. Conclusion

4.1 the market value of Jidian shares can reflect the internal value of the enterprise, but there are certain errors. According to the calculation results of the EVA value of Jidian, except 2017, the EVA value of Jidian in 2018-2021 is positive and rising, which indicates that it has created value for the company in its business activities.

4.2 the business strategy of Jidian needs to be further improved. The volatility of the market price of Jidian shares reflects that investors have great differences in the future expectations of Jidian shares. Contrary to the stock price, the EVA growth rate of Jidian shares shows a trend of rising first and then gradually decreasing, which indicates that the enterprise has indeed made rapid development under the influence of national policies, which corresponds to the annual increase of EVA net value. The calculation results of comprehensive stock price and enterprise EVA show that the economic benefits generated by the business activities of Jidian are less than the market expectation, and Jidian needs to further improve its business strategy and achieve better benefits.

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