

# Case Study of Enterprise Value Assessment

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**Abstract.** Along with the gradual advancement of the deepening reform of our country's socialist market economy and the further optimization of resource allocation, the restructuring, investment, acquisition and merger of enterprises are becoming increasingly frequent economic activities. The evaluation of the value of the target enterprise is one of the important links. This paper takes the small household appliance industry as the starting point, takes the small B Electric Appliance Co., Ltd. as an example, and uses the discounted free cash flow model in the income method to estimate its market value. It can reflect that this method is conducive to providing detailed and solid basis for value assessment relatively comprehensively from the aspects of enterprise profitability, profit quality, future profit sustainability, expected rate of return of the industry in which it is located, and time cost of funds, etc., and is widely used in the capital financial market and market information disclosure requirements.

**Keywords:** value assessment; discounted free cash flow model.

## 1. Introduction

Along with the gradual advancement of the deepening reform of our country's socialist market economy and the further optimization of resource allocation, the restructuring, investment, acquisition and merger of enterprises are becoming increasingly frequent economic activities. The evaluation of the value of the target enterprise is one of the important links. This paper takes the small household appliance industry as the starting point, takes the small B Electric Appliance Co., Ltd. as an example, and uses the discounted free cash flow model in the income method to estimate its market value. It can reflect that this method is conducive to providing detailed and solid basis for value assessment relatively comprehensively from the aspects of enterprise profitability, profit quality, future profit sustainability, expected rate of return of the industry in which it is located, and time cost of funds, etc., and is widely used in the capital financial market and market information disclosure requirements.

## 2. Selection of valuation method for B Electric

### 2.1. Analysis of business valuation methods

Enterprise value assessment can be divided into market method, cost method and income method, and income method can be divided into discounted free cash flow model, dividend discount model and economic value-added model. Among them, the theoretical basis of the cost method of accounting is the calculation of the replacement cost of enterprise assets and the assessment of the part that affects the impairment of enterprise value, and the difference between the two is the value of the enterprise. Although the data basis of the assessment is easy to obtain and more accurate, it ignores the synergistic effect between the various assets of the enterprise and ignores the intangible assets of the enterprise. The market approach is based on the value of the same or similar assets in a sound competitive market environment, using the same or similar enterprises as a reference. The free cash flow is based on the theory that the value of a business is equal to the sum of the present value of future cash flows and applies to businesses that can be compared to those that have a sustained profitability. The discounted dividend model uses a share price equal to the sum of the present value of future dividends and is applicable to firms with a more stable dividend payment policy. The Economic Value-Added model is based on the theory that the opening value of the owner's equity and the present value of the enterprise's future residual income from production constitute the sum of

the enterprise's value, which emphasizes the value that the enterprise is able to generate for its shareholders and is suitable for emerging enterprises and IT enterprises with large market development costs.

## 2.2. Applicability analysis of free cash flow in the valuation of small household appliance enterprises

In the small home appliance industry, there is a portion of intangible assets such as scientific and technological research and development, brand value, etc., which cannot be measured by the cost approach. The market approach requires a sound market environment, and the small home appliance industry is still in a state of market instability, so it is impossible to use the market approach to make an accurate assessment. Therefore, the income approach is used in the assessment of enterprise value for the small home appliance industry. In next chapter, the discounted free cash flow model is used to assess the enterprise value of B Electric.

## 2.3. Feasibility analysis of free cash flow in B Electric enterprise valuation

Since the 2023 annual report has not yet been disclosed, we analyze B Electric since the public financial statement data from 2015 to 2022, its net profit was 0.72, 1.47, 1.86, 2.6, 4.28, 283, 386 million yuan, respectively, and the year-on-year growth rate of net profit was -0.29%, 104.88%, 26.57%, 44.57%, 59.64%, 33.81%, 36.2%, and its operating income was 725, 10.54, 16.47, 20.41, 26.88, 36.60, 36.06, 4.118 billion yuan, with year-on-year growth rates of 45.50%, 56.17%, 23.96%, 31.70%, 36.16%, -1.46% for the total operating income, 14.20%. Except for 2021, which was affected by the New Crown epidemic, the net profit and sales revenue in other years have maintained a relatively stable growth, with predictable prerequisites.

## 3. Value assessment of B electrical enterprise

### 3.1. Fundamentals

Free cash flow based enterprise value assessment can be divided into perpetual growth model and two-stage growth model, based on the industry development trend and B Appliance's own operating conditions, this paper assumes that from 2023 onwards for the rapid growth of B Appliance, after 2027 for the stable growth of B Appliance stage, using the following two-stage free cash flow model:

$$P = \sum_{t=1}^5 \frac{FCFF_t}{(1+WACC)^t} + \frac{FCFF_6}{(WACC-g)(1+WACC)^5}$$

where P is the value of the firm,  $FCFF_t$  is the projected free cash flow in year t,  $FCFF_6$  is the free cash flow in year 6, WACC is the weighted average cost of capital; and g is the growth rate during the period of steady growth.

$$WACC = W_e * K_e + W_d * K_d * (1-T)$$

Where  $W_e$  is the share of equity capital,  $K_e$  is the cost of equity capital,  $W_d$  is the share of debt capital,  $K_d$  is the cost of debt capital and T is the tax rate.

### 3.2. WACC determination

#### 3.2.1 Forecast of cost of debt capital

The current interest rate on all central bank loans over five years is 4.9%, according to the finance network. So, we take the cost of debt at 4.9%.

#### 3.2.2 Cost of equity capital forecast

The cost of equity capital is calculated using the capital asset pricing model:

$$K_e = R_f + \beta * (R_m - R_f)$$

where  $R_f$  is the risk-free rate of return,  $\beta$  is the systematic risk factor, and  $R_m$  is the expected rate of return on the market portfolio.

The first step is to calculate the risk-free return rate. The risk-free return rate refers to the return rate of investors on using products with no investment risk. In fact, because government bonds are basically risk-free, the government debt interest rate is generally used to calculate the risk-free return rate. Because common stocks are long-term securities, the capital budget time is long, and the interest rate of long-term treasury bond fluctuates little, when costs are involved, the usual practice is to choose the interest rate of 10-year treasury bond as the risk-free yield. According to the risk-free yield of 2.69% of China's 10-year treasury bond released at the end of 2023.

The second step is to estimate the beta coefficient. B Electric Appliances was launched on August 23, 2019. By checking professional website, the average beta coefficient of B appliances is 1.06.

The third step is to estimate the expected rate of return of the market portfolio. The average annual return on equity of the CSI 300 index in the past ten years is 12.9%.

Through the calculation of the above formula, the cost of equity capital is 13.5126%.

### 3.2.3 WACC determination

B Appliances is listed from 2019, prior to that, B Appliances relies heavily on liabilities for its assets and after listing, its assets are generally sourced from the owners. From 2019 to 2023, the asset-liability ratio of B Electrical appliances is 34.26%, 46.56%, 42.80%, 51.43%, 49.2%. Therefore, when calculating the debt capital ratio, the average value from 2019 to 2023 is 44.85%, while the equity capital ratio is 55.15%. For B Appliances, although the parent company adopts 15%, most of its subsidiaries adopt a 25% tax rate, so using a 25% tax rate to calculate the final result, the final WACC is equal to 8.08%.

## 3.3. Free cash flow projections

Using the formula for free cash flow, calculate each component as a percentage of sales revenue.

### 3.3.1 Operating income

The growth rates of operating income from 2016 to 2023 are 45.50%, 56.17%, 23.96%, 31.70%, 36.16%, -1.46%, 14.18% and 14.42%, respectively. Since 2015, the cooperation between B Electric and Tmall has reached a scale of 500 million yuan, while continuously entering emerging e-commerce platforms and improving e-commerce channels. During the "double 11" period in 2016, the sales of B electrical appliances in the whole network exceeded 600,000 units, and the sales of the whole network increased by more than 50% year-on-year, resulting in a significant increase in sales revenue in 2016. Since then, the topic of B electrical appliances and brand effect have brought a large number of sales. In 2021, due to the recurrence of the novel coronavirus epidemic, coupled with the growing sales volume from 2016 to 2020, the base continues to expand, resulting in a decline in operating income in 2021. However, in 2022, due to the slowdown of the epidemic, the improvement of the overall economy and the continuous improvement of the company's technological innovation ability, Industrial design, independent research and development, scientific and technological innovation and other capabilities have been highly recognized by the state and all sectors of society, and business income has returned to positive growth. Therefore, the low operating income growth rate in 2021 is not excluded from the sales revenue forecast. Geometric mean value is commonly used to analyze the growth of financial data. Considering the negative growth of operating revenue in 2021, the growth rate of operating revenue is increased by 1 and then geometric average is performed during data processing. In this paper, the growth rate of operating income from 2020 to 2023 is added by one, then the geometric average is carried out, and the growth rate of operating income in the forecast period is obtained by minus one after the result is obtained. This article takes the growth rate of operating revenue from 2020 to 2023, adds one, and then performs geometric averaging to obtain the result. After subtracting one, the predicted growth rate of operating revenue for the forecast period is 15%.

### 3.3.2 Operating costs

From 2015 to 2023, the operating cost accounted for 66.29%, 65.47%, 66.86%, 67.49%, 65.74%, 67.57%, 67.22%, 63.55%, 55.54%. Therefore, the average of 65.08% is taken as the percentage of operating costs to sales revenue during the forecast period.

### 3.3.3 Taxes and surcharges

From 2015 to 2023, the proportion of business taxes and surcharges is 0.76%, 0.77%, 0.70%, 0.73%, 0.56%, 0.63%, 0.46%, 0.66%, 0.58%, and the average of 0.65% is taken as the proportion.

### 3.3.4 Selling expenses, administrative expenses and research and development expenses

The percentage of total revenue from 2015 to 2023 is 19.85%, 21.85%, 19.98%, 19.86%, 20.93%, 18.25%, 22.57%, 24.81% and 21.68%, respectively. It is generally stable and, therefore, an average of 21.09% is taken as the cost for the forecast period.

### 3.3.5 Income tax expense

From 2015 to 2023, the income tax expenses accounted for 3.60%, 3.56%, 3.23%, 2.61%, 2.38%, 2.47%, 1.28%, 1.67%, 1.46%. The reason why the income tax from 2018 is lower than the previous period is that first of all, B Electric was approved by the Guangdong Provincial Department of Science and Technology on November 28, 2018, as a high-tech enterprise, valid for three years, and enjoyed the tax incentives of 15% corporate income tax levied from 2018 to 2020. At the same time, it will be recognized as a high-tech enterprise by the approval review on December 20, 2021, valid for three years, and enjoy the tax incentives of levying enterprise income tax at a 15% tax rate from 2021 to 2023. Secondly, the company's wholly owned subsidiaries meet the conditions of small micro-profit enterprises and implement preferential tax policies. Therefore, the average income tax expense ratio of 2.47% from 2015 to 2023 is chosen as the expense for the forecast period.

### 3.3.6 Depreciation and amortisation

From 2015 to 2023, depreciation and amortization accounts for 1.96%, 1.27%, 1.06%, 1.83%, 0.34%, 2.09%, 3.27%, 3.24%, 1.33%, respectively. Accordingly, the average of 1.82% of the four-year ratio from 2015 to 2023 is taken as the depreciation and amortization ratio for the forecast period.

### 3.3.7 Increase in working capital

Operating working capital = operating current assets - operating current liabilities, and then subtract the base period's working capital from the second period's working capital to get the increase in working capital.

From 2015 to 2023, operating current assets accounted for 28.80%, 27.19%, 30.36%, 33.51%, 44.58%, 47.61%, 41.80%, 70%, 50.57%. The average proportion of operating current assets from 2015 to 2023 is 41.6%. From 2015 to 2023, the proportion of operating current liabilities is 25.70%, 24.72%, 20.95%, 26.44%, 27.42%, 40.99%, 39.09%, 40.03%, 41.34%. The average ratio of operating current liabilities from 2015 to 2023, 31.85%, is taken as the ratio during the forecast period.

When calculating the increase of working capital in the forecast period, the operating current assets and operating current liabilities are calculated respectively, and the working capital is obtained by deducting the working capital of the second phase from the working capital of the base period.

### 3.3.8 Capital expenditure

From 2015 to 2023, the proportion of operating long-term assets is 7.87%, 13.41%, 13.30%, 17.81%, 20.04%, 20.32%, 27.72%, 28.41%, 29.78%. The operating long-term liabilities of the company from 2015 to 2021 are 0, and the operating long-term liabilities in 2022 and 2023 are mainly bonds payable of 457.1 million, which are mainly caused by the company's issuance of convertible corporate bonds with a share term from February 20, 2023, to August 11, 2028. Considering that this is an occasional event, and the recent two announcements show the tendency of the company to swap debt for equity, the operating long-term liabilities of Bear Electrical Appliances are still recorded as 0 during the forecast period.

In calculating the increase in capital expenditures for the forecast period, operating long-term assets are first calculated, operating long-term liabilities are subtracted, and depreciation and amortization are added to calculate capital expenditures.

### 3.3.9 Free cash flow projections

The free cash flow projections for 2024 to 2028 are shown in Table 3.1.

**Table 3.1** Free cash flow projections (in billions of dollars)

Year	2024	2025	2026	2027	2028
Operating revenue	54.19	62.32	71.66	82.41	94.78
Less: Operating costs	35.27	40.56	46.64	53.63	61.68
Less: Business taxes and surcharges	0.35	0.41	0.47	0.54	0.62
Less: Selling expenses, administrative expenses, research and development expenses	11.43	13.14	15.11	17.38	19.99
EBIT	7.14	8.21	9.45	10.86	12.49
Less: Income tax	1.34	1.54	1.77	2.04	2.34
Net operating profit after tax	5.80	6.67	7.68	8.83	10.15
Add: Depreciation and amortisation	0.99	1.13	1.30	1.50	1.72
Less: Net increase in working capital	1.27	1.62	2.06	2.63	3.36
Less: Capital expenditure	2.37	2.73	3.13	3.60	4.15
Free cash flow for the forecast period	3.15	3.47	3.78	4.09	4.37

## 4. Comparison of enterprise valuation results

The growth rate of the sustainable period is generally consistent with the national GDP growth rate, but in recent years, due to the recurrence of the epidemic, the economic growth rate is very uncertain. Therefore, when calculating the growth rate of the sustainability period, the geometric average growth rate from 2016 to 2023 was calculated, and the calculated result was 4.46%.

**Table 3.2** Present Value of Free Cash Flows of Bear Electrics, 2024 to 2028 (in billions of dollars)

Year	2024	2025	2026	2027	2028
Cash flow	3.15	3.47	3.78	4.09	4.37
Discount factor	1.08	1.17	1.26	1.36	1.47
Fair value	2.92	2.97	3.00	3.00	2.97
Sum of present values	14.84				

According to the formula, the total present value of the first stage of B Electrical equipment is about 1.484 billion yuan, and the enterprise free cash flow in 2029 and after the growth rate of 4.46%, the present value of the second stage, that is, the sustainable growth period, is 9.42 billion yuan, and the final enterprise value is 11.754 billion yuan. As of the end of 2023, the book value of its debt is 10.904 billion yuan, so its equity value is 8.254 billion yuan, and the number of shares in circulation is about 15,686,4386 shares. The calculated value per share is approximately 52.62 yuan. As of December 29, 2023, its closing price was 51.93 yuan. The estimated evaluation result in this article is close, but slightly lower than the evaluation result in this article. Therefore, we believe that the share price of B electrical appliances may be undervalued at the end of 2023, as of the announcement of the 2023 annual report of B Electrical Appliances, that is, in April 2024, the share price has fluctuated.

## 5. Summary

The conclusion is that compared with traditional methods, free cash flow method can more accurately reflect the intrinsic value of enterprises and can achieve the value-added assessment effect

within a reasonable range. It can provide useful information to managers and investors, help them improve business and investment decisions, and provide reference for the value assessment of other home appliance enterprises, and jointly promote the development of home appliance industry.

## References

- [1] John Burr Williams. Investment valuation theory[M],2010
- [2] Gupta S, Lehmann D R Stuart J A. Valuing Customers[J]. Social Science Electronic Publishing, 2004, 41(1):7-18.
- [3] Richard J. Sweeney. Equivalent valuations in cash flow and accounting models[J]. Review of Quantitative Finance and Accounting,2014,42(1): 29-49
- [4] Vigdis Boasson, Emil Boasson. Firm value, spatial knowledge flow, and innovation: evidence from patent citations[J]. China Finance Review International1, 2015.