# Wuliangyr Group Valuation Report based on the Free Cash Flow of The Firm

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**Abstract.** With the prosperous development of emerging industries, traditional production like liquor is affected seriously. Wuliangye Group, as the top enterprise in the liquor industry, occupies a significant proportion of the market. Meanwhile, it is still looking for further development and to maintain its status in the market. Therefore, a method that can assess the value and forecast the company's advancement seems important for the investment. The research applies the free cash flow to the firm (FCFF) model to determine the intrinsic value of Wuliangye's A-share equity. A comparative analysis between this intrinsic valuation and prevailing market prices informs evidence-based investment strategies. Additionally, the FCFF outcomes elucidate the enterprise's operational efficiency in cash flow generation and its capacity for enduring value enhancement, thereby establishing a robust evaluative benchmark for stakeholders. In addition, to assess the firm's value precisely, the firm's financial data must be collected from the firm's financial statement, which the management had published.

**Keywords:** FCFF, intrinsic value, Cost of Capital, Wuliangye Group

## 1 Introduction

In the case of the advancement of emerging technology, many funds were invested in the technological industry, which caused conventional industries like liquor to suffer a great impact. Meanwhile, the transformation of consumerism resulted in a decreasing operating income of the liquor business. 'Wuliangye' is a famous liquor company in China that has a high status in the Chinese liquor industry. As for the corporation's stocks, shares have remained high from 2018 to now. According to the data revealed by 'Tonghuashun', the price of 'Wuliangye' reached RMB 144 [1]. However, compared to 2023, the total operating income decreased by 15.35 billion [1]. In terms of the regression of liquor industries, 'Wuliangye' is viewed as an overvalued stock. The dissertation intends to use the free cash flow method for the firm (hereafter FCFF) to calculate the intrinsic price of 'Wuliangye', which is listed in A- the share market. The comparison between the inherent value and the share price instructs individuals on their investment strategy. Furthermore, the outcome of FCFF can also indicate the company's real ability to generate cash and long-term value, which can provide a fair judgement to investors.

## 2    Methodology

### 2.1    Free Cash Flow of the Firm

FCFF is the discounted free cash flow model of an enterprise. It takes the free cash flow of an enterprise as the income standard, calculates the overall value of an enterprise by discounting, and then deducts the interest-paying debt to obtain the total equity value of shareholders on this basis [2]. It is a major method of obtaining a company's intrinsic value. (Equation (1))

$$FCFF = Adjusted\ EBIT * (1-t) - \\ [(Adjusted\ Net\ Capital\ Expenditure - Depreciation) + \Delta Non\ cash\ Working\ Capital] \tag{1}$$

### 2.2    Ingredients of the Formula of FCFF

To transform accounting profit into an indicator that reflects enterprises' actual cash creation ability, adjusting earnings before interest and tax(hereafter EBIT) is necessary to eliminate the influences of tax, merger and acquisition (hereafter M&A), and research and development (hereafter R&D). Moreover, financial charges resulting from external capital constitute tax-deductible expenses [3]. Therefore, adding ignored tax benefits (hereafter ITB) should be involved. (Equation (2), (3), (4))

$$Adjusted\ EBIT * (1-t) = \\ (EBIT + R\&D\ +\ M\&A - R\&D\ amortization\ –\ M\&A\ amortization) * (1-t) \\ +ITB \tag{2}$$

$$EBIT = Total\ profit\ + interest\ expense \tag{3}$$

$$Tax\ rate(t) = \frac{Tax\ expense}{total\ profit} \tag{4}$$

For ITB, the R&B process may reduce practical interest expense, so this part needs to be included in the adjusted EBIT.   (Equation (5), (6))

$$ITB = Increase\ in\ Operating\ Income\ * t \tag{5}$$

$$Increase\ in\ Operating\ Income = R\&D\ of\ 2024 - Amortization\ of\ R\&D \tag{6}$$

'EBIT', 'Tax rate', 'R&B' (research and development) and 'M&A' (merge and acquirement) can be obtained by browsing the income statement. R&D is pivotal for a firm's long-term growth, yet its immediate expensing as per accounting standards can result in stock return anomalies [4]; it is necessary to amortise it. As for the Amortization of R&B, the number of years of amortisation is 5, so the quantity of depreciation from the previous year to the current year is 0.2 times the amount in that year, thereby the amount of amortised R&B from the last 5 years to current. (Equation (7))

$$R\&B\ =\ 0.2 * (\sum_{i=2022}^{n=2018} R\&D_n) \tag{7}$$

The method of 'M&A' is the same as that of R&D.

$Adjusted\ Net\ Capital\ Expenditure$
$$= Capital\ Expenditure + Increase\ in\ Operating\ Income$$
$$- Depreciation$$

Capital Expenditure is a cash outlay for acquiring, upgrading, or maintaining long-term assets such as plant, equipment, and technology. Net capital expenditure can be obtained by adding an increase in operating income, as mentioned above, and reducing depreciation. (Equation (7))

$$\Delta Non\ cash\ Working\ Capital =$$
$$\Delta(Non\ cash\ Current\ Assets - Non-cash\ Current\ Liabilities) \tag{8}$$

Non-cash working capital refers to changes in non-cash current assets and current liabilities. According to the definition of FCFF, eliminating it from EBIT to acquire FCFF is reasonable. (Equation (8))

## 2.3   Calculation of Growth Estimate (hereafter g)

$$g = Retained\ \frac{Earnings}{NI} * ROE = Retention\ Ratio * ROE \tag{9}$$
$$= (1 - Payout\ ratio) * ROE$$

$$ROE = \frac{NI}{Equity} \tag{10}$$

$$Payout\ ratio = \frac{Distribution\ of\ shareholder\ profit}{net\ profit} \tag{11}$$

'g' is the dividend growth rate that relies on internal retained earnings return rather than external financing. Such a parameter is used to assess the growth of FCFF. (Equation (9) to (11))

## 2.4   The calculation of WACC

**Cost of Equity.** The Cost of equity (hereafter $K_e$) represents the return rate shareholders require; the CAMP model is still widely applied in practice, for example, to estimate discount rates for capital budgeting decisions or evaluate portfolio managers' performance. To calculate WACC, β in the CAPM model is necessary [5]. Therefore, according to the CAPM model, it can be obtained by the formula below. (Equation (12))

$$E(r) = r_f + \beta * r_{premium} \tag{12}$$

$r_{premium}$ is assessed by US Equity risk premium. In addition, to consider the competed risk premium, the total country risk premium (hereafter Total $r_{premium-country}$) is added; in the following analysis, Chinese CRP can represent it.

$\beta$ represents the market systemic risk coefficient acquired by the regression process. The leveraged beta reflects the systemic risk of a company when its capital structure

includes debt, while the unleveraged beta represents the pure business risk when there is no debt.

To obtain leverage β, the β and D/E ratio of the top 5 leading enterprises with the same operation must be acquired. Then, calculate the average β and average D/E ratio and unlevered β by the formula below. (Equation (13) to (15))

$$COE = r_f + Total\ CRP + leverage\ \beta * r_{premium\ of\ USA} \tag{13}$$

$$Unlevered\ bet = (Average\ beta\ across\ publicly\ traded\ firms)/\left(\left(1 + (1 - t)\left(Average \frac{D}{E}\ ratio\ across\ firms\right)\right)\right) \tag{14}$$

$$Levered\ \beta = Unlevered\ \beta \times \left(1 + (1 - tax\ rate)\left(\frac{Debt}{Equity}\right)\right) \tag{15}$$

**Cost of Debt.** The cost of debt (hereafter COD) represents the expense the company has to afford to borrow funds. Risk-free rate, Chinese CRP, and company default spread (hereafter CDS) can be used to calculate it. The method used to obtain CDS is called 'Estimating Synthetic Ratings'. After calculating the interest coverage ratio(hereafter ICR), checking the sheet provided by Damodaran and illustrating the relation between ICR and CDS can confirm the CDS. (Equation (16), (17))

$$COD = r_f + Chinese\ CRP + CDS \tag{16}$$

$$ICR = Adjusted \frac{EBIT}{Interest} Expenses \tag{17}$$

ICR estimates the proportion of EBIT that is occupied in interest expenses.

**WACC.**

The firm's cost of capital (hereafter WACC) is usually calculated using the so-called weighted average cost of capital with the following expression [6]. It also indicates the minimal return rate required by shareholders. Large organisations' capital cost is significant in determining corporate finance and investment decisions [7]. Like the formula below, the firm's capital cost is usually calculated using the so-called weighted average cost of capital with the following expression. (Equation (18))

$$WACC = \frac{D}{D+E} \times COD \times (1 - t) + \frac{E}{D+E} \times COE \tag{18}$$

'D' in the formula is the market value of the corporation's debt, which is calculated by using interest expense, COD and Average maturity of debt(hereafter AMD), and 'E' is the market value of equity, which is calculated by multiplying the total number of shares by the share price Meanwhile, the corporation's tax rate is 't' in the formula. In the case of the characteristic of interest, which is reducing tax (tax shield), the amount of COD in WACC is after. (Equation (19))

$$Market\ Value\ of\ Debt$$
$$= Interest\ Expense \times \frac{\left[1 - \frac{1}{(1+COD)^{AMD}}\right]}{COD} + \frac{Book\ Value\ of\ Debt}{(1+COD)^{AMD}} \tag{19}$$

## 2.5    Intrinsic Value

FCFF is based on an enterprise's historical cash flow and calculates the enterprise's current market value by discounting. Therefore, the intrinsic value of a business can be calculated using the formula below. 'Growth rate', which has been mentioned, can be used to forecast subsequent FCFFs in the formula. As for the discount rate, WACC represents it. FCFF after 6 years is discounted as a growing perpetuity model. The formula is presented in Equation (20).

$$PV = \frac{\sum_{i=1}^{n=6} FCFF_n}{(1+WACC)^n} + FCFF_6 \times \frac{1+g}{WACC-g} \times (1+WACC)^6 \tag{20}$$

# 3    Analysis and Discussion

## 3.1    Enterprise Profile

Sichuan Yibin Wuliangye Group Co., LTD (hereafter Wuliangye Group) is an extremely large state-owned enterprise that produces liquor as its core industry. Its core product—Wuliangye—is a typical representative of Chinese liquor and a national brand with a long history and cultural heritage. It has often won the 'National Famous Wine' title and was the first batch of the protected list of the Sino-European Geographical Indication Agreement.

The major business of Wuliangye Group includes alcoholic beverages and related auxiliary products.

**The calculation of a risk-free rate.** The sustainability and impact of public debt have been the subject of several studies because of countries' high and growing debt and its effects on the real economy [8]. Getting a risk-free rate is necessary. According to the data from world government bonds.com [9], the 5-year country default spread between China and the United States was 0.6491% and 0.3012%, respectively, on November 29. Chinese government's 10-year treasury bond yield is 2.039%. The result of the risk-free rate is 1.6911%, which is obtained from the formula above.

**The calculation of US ERP.** According to the data of 'Tonghaushun' [1], the Standard & Poor 500 index was 6032.38 on November 29, 2024, and the operating earnings from 2005 to 2024 have been illustrated below. (Table 1) The expected growth of operating earnings is 8.67%. American risk-free rate on that day was 4.178% [9].

**Table 1.** the Standard & Poor 500 index

| year | Earning | g | year | Earning | g |
|------|---------|-----|------|---------|---|
| 2024 | 234.02 | 0.095 | 2013 | 107.3 | 0.108242099 |
| 2023 | 213.53 | 0.084 | 2012 | 96.82 | 0.003940274 |
| 2022 | 196.95 | -0.054 | 2011 | 96.44 | 0.151247463 |
| 2021 | 208.21 | 0.70 | 2010 | 83.77 | 0.47 |
| 2020 | 122.37 | -0.22 | 2009 | 56.86 | 0.14 |
| 2019 | 157.12 | 0.036 | 2008 | 49.51 | -0.40 |
| 2018 | 151.6 | 0.21 | 2007 | 82.54 | -0.059 |
| 2017 | 124.51 | 0.17 | 2006 | 87.72 | 0.14 |
| 2016 | 106.26 | 0.057 | 2005 | 76.45 | 0.12 |
| 2015 | 100.45 | -0.11 | | | average: 0.867 |
| 2014 | 113.01 | 0.053 | | | |

After that, the dividend & buyback can be predicted to increase by 8.67%. After 5 years, the perpetual growth rate will be the US risk-free rate at 4.178%.

**Table 2.** Estimate earnings

| | last 12 month | 2025 | 2026 | 2027 | 2028 | 2029 | SUM |
|---|---|------|------|------|------|------|-----|
| Earning (million) | 234.0 | 254.3 | 276.4 | 300.3 | 326.4 | 354.7 | 4986.6 |
| cash payout ratio (%) | 89.09 | 89.09 | 89.09 | 89.09 | 89.09 | 89.09 | |
| cash | 208.5 | 226.6 | 246.2 | 267.6 | 290.8 | 315.9 | |
| PV | | 208.7 | 208.9 | 209.1 | 209.4 | 209.6 | 6032.4 |

The expected value of operating earnings in the next 5 years is calculated, and the expected cash for each year is calculated according to the cash payout ratio of 89.09% and then discounted. (Table 2) Finally, the IDR is 8.556450% by using the planning solution function. US ERP was 4.38% though IDR minus the US risk-free rate.

## 3.2 Adjustment of Cash Flow

**Adjustment of Operation lease.** In 2024, 'Wuliangye' used the new accounting standards and treated the Lease as a debt rather than an operating expense, so there is no need to adjust the Lease.

**Adjustment of R&D.**

**Table 3.** R&D of the firm

| year | R&D (million) | | | Unamortised | Amortised |
|------|---------------|---|---|-------------|-----------|
| currently | 251 | 1 | | 251 | 64.4 |
| -1 | 322 | 0.8 | | 257 | 47.2 |
| -2 | 236 | 0.6 | | 141.6 | 35.4 |

| -3 | 177 | 0.4 | 70.8 | 26.2 |
|---|---|---|---|---|
| -4 | 131 | 0.2 | 26.2 | 25.2 |
| -5 | 126 | 0 | 0 | 16.8 |
| SUM | 746.6 | Amortisation of R&D | 198.4 | |
| Increase of operation income of R&D | 52.6 | Value of research asset | | 744.6 |

In terms of R&D, according to the enterprise's financial statement in the past 4 years [10], the total amount of practical amortised expenses is ¥198.4 million. (Table 3) The sum of R&D expenses in the first three quarters of 2024 and the fourth quarter of 2023 is the forecast value of 2024 R&D expenses. The value of the research asset is 746.6 million¥, and the Increase in Operating Income is 52.6 million ¥.

**Adjustment of M&A.** According to the company's annual financial statement [10], Wuliangye Group did not have M&A during the study period. Therefore, it is concluded that there was no need to adjust the M&A of Wuliangye Group.

### 3.3  Calculation of adjusted FCFF

**Utilisation of Tax rate.** The corporate income tax rate is regulated at 25%.

*Calculation of adjusted EBIT.*

**Table 4.** Financial data of the firm

| Unit: ¥ million | total profit | interest expense | EBIT |
|---|---|---|---|
| The third quarter of 2024 | 34484 | 24305.1 | 34508.30 |
| in 2023 | 42004 | 11618.3 | 42015.61 |
| The third quarter of 2023 | 31684 | 8265.6 | 31692.26 |
| 2024 after adjustment | 44804 | 27657.8 | 44831.65 |
| Amortization in 2024 (R&D) | 19.84 | Increase in operation income | 52.6 |
| Increase in operation income of M&A | 5.26 | Ignore tax benefit | 13.15 |
| Adjust EBIT | 44849.19 | | |

Putting all the data into the formula which was mentioned above can get adjusted EBIT is RMB 44,849.19 million. (Table 4)

*Calculation of adjusted net capital expenditure.*

**Table 5.** Adjusted net capital expenditure

| unit:¥ million | PP&E | Depreciation |
|---|---|---|
| January-June 2023 | 1,345.04 million | -45.14 million |
| 2023 | 2,957.23 million | 89.63 million |
| January-June 2024 | 1,087.31 million | 127.29 million |
| Adjusted in 2024 | 2,699.50 million | 262.07 million |

| Adjusted PP&E from 2023 to 2024 | -257.73 million |
| --- | --- |
| Accumulated depreciation at the beginning | Accumulated depreciation at the end |
| 9197.32 million | 9152.17 million |
| 9197.32 million | 9286.95 million |
| 9286.95 million | 9414.24 million |

PP&E in the graph is property plant and equipment, putting the data into the formula that mentioned above can get adjusted net capital expenditure is RMB 4.34 million. (Table 5)

*Calculation of delta Net Working Capital.* Non-cash current assets are approximately equal to inventory plus accounts receivable, and non-cash current liabilities are approximately equal to accounts payable. Therefore, according to the data from the enterprise's financial statement [10], the change in the amount of inventory is RMB 19296.91million, the change in the number of accounts receivable is RMB 33.31million, and the change in the number of accounts payable is RMB11165.75 million. Putting all the data into the formula which was mentioned above can get change of NWC is RMB 816,447.1 million.

*Summary of Free Cash Flow of the Firm.* Putting all the ingredients that have been calculated into the formula which was mentioned above can get free cash flow is RMB 25,939.63 million.

## Calculation of Cost of Debt, Cost of Equity and WACC.

*Calculation of Cost of Debt.* According to the half-year financial statement of Wuliangye Group [10], the main business income of Wuliangye in China (income from liquor products) accounted for 93.02% of the total revenue. It is known that in 2021, Wuliangye's annual foreign sales revenue is RMB 409 million, accounting for only 0.66% of the total revenue (did not disclosed in the past three years). It can be inferred that Wuliangye's operating income in foreign countries accounts for a relatively small proportion of the total, and the percentage in overseas countries is unknown. Furthermore, Wuliangye Group does not directly export liquor products, but they are sold by the company to Wuliangye Group Import and Export Co., LTD for export sales. So, we assume that Wuliangye's country risk (Operation CRP) is constant with China's CRP, which was 0.86%.[11]. In conclusion, total CRP was regarded as Chinese CRP at 0.86%. Regarding the adequacy of secondary market data without a specific credit rating, Estimating Synthetic Rating—estimated using accounting and market-based information—adds substantially to agency ratings in explaining CDS spreads and predicting rating changes. [12]. Therefore, the relation between ICR and credit level, which Damodaran Online gives, is used to get CDS. Firstly, the ICR is 1607.11, which can be calculated using the formula above, and the necessary data has been calculated.

**Table 6.** Interest coverage ratio

| If the interest coverage ratio is | | | |
|---|---|---|---|
| greater than | ≤ to | Rating is | Spread is |
| 12.5 | 100000 | Aaa/AAA | 0.59% |

According to Table 6, the credit rate of the company was AAA, and the correlated CDS was 0.35%. Therefore, the Risk-free rate, US ERP and levered β have been calculated above. COD can be gotten is 2.9011%.

*The market value of debt.* The interest expense and COD have already been calculated in the previous calculation, which is RMB 27.65 million. According to the company's financial statement [10], the book value of debt was 38520604620 ¥. AMD can also be calculated at 0.803472644. Putting all the ingredients into the formula can get the market value of debt is RMB 37,667 million.

*Market value of equity.* According to the data of 'Tonghuashun', the price of shares of Wuliangye group was 146.77 ¥, and the number of capital stock was 3881608005. Thereby, the market value of equity is RMB 56.97 million.

*Calculation of β.* When calculating beta, Wuliangye is listed on the Shenzhen Stock Exchange, and the A-share market was chosen to return to calculate beta. First, the excess return of the Shenzhen component index was regarded as the independent variable X, and the logarithmic return of Wuliangye stock was the dependent variable Y.

According to the CAPM model formula, in this example, linear regression between Y and X was performed to obtain the unadjusted original Beta of Wuliangye, and the β can be get as 1.63518.

Wuliangye (000858) belongs to the brewing, new retail sector. The main business structure of Wuliangye was alcohol (93.80%), plastic products (3.83%), and printing (0.18%) [10]. The liquor business was ranked second in the entire industry. In the case of the 100 % contribution of the liquor business to the operating income of Wuliangye, only the operating leverage of the company's alcohol industry was adjusted. At the same time, other enterprises similar to their business on the main board were selected to adjust the operating leverage.

Kweichow Moutai, Wuliangye, Luzhou Laojiao, and Shanxi Fenjiu are the five top brewing industry companies. Yanghe Group was selected to calculate their beta and D/E ratios. The top 5 liquor companies' data of β, debt, equity, D/E ratio, and market value were all collected; average beta and average D/E ratio were calculated through the weighted average of the market value, and then using the formula above can get the unlevered beta of the industry which is 1.13 and the levered beta is 1.19

*Calculation of Cost of Equity.* The risk-free rate, US ERP and levered β have been calculated above and will be illustrated below. Putting the data in the formula can get COE is 7.77%.

*Calculation of g and final value.*

**Table 7.** Net income and dividend

| unit:￥ million | The third season of 2023 | 2023 | The third season of 2024 |
|---|---|---|---|
| NI | 23833.98 | 31520.77 | 25941.11 |
| dividend | 14827.36 | 15894.24 | 19232.91 |

Adjusting equity by R&D, the book value of equity was RMB 146813070700.33 [10], then adding value research of asset can get adjusted equity. Finally, g can be gotten. g=9.013%. (Table 7)

**Calculation of Value.** To calculate Wuliangye's intrinsic value, we first forecast FCFF from 2024 (t=0) to 2030 (t=6) according to the growth rate g calculated above, calculate the discounted present value to 2024 one by one according to the discount rate r=WACC, and finally calculate the PV of Wuliangye in 2024 by adding up. (Table 8)

**Table 8.** FCFF and Present value of FCFF

| unit:￥ million | | | |
|---|---|---|---|
| year | FCFF | PV | Growth rate |
| 2024 | 25939.63 million | | 9.01% |
| 2025 | 28277.57 million | 26519.34 million | |
| 2026 | 30826.23 million | 27112 million | WACC |
| 2027 | 33604.59 million | 27717.91 million | 0.0663 |
| 2028 | 36633.38 million | 28337.35 million | |
| 2029 | 39935.14 million | 28970.65 million | |
| 2030 | 43534.50 million | 29618.09 million | |

Based on the valuation model, the estimated intrinsic value of Wuliangye in 2024 is RMB 1091515.46 million. After deducting the adjusted Total liabilities of RMB 7667.55 million, the total available shareholders' Equity was RMB 1053847.91 million. Based on the company's total share capital, each share's estimated value is RMB 281.20.

# 4    Discussion

As of the valuation date of this report (November 29, 2024), Wuliangye's share price was 146.77 yuan/share and showed an overall upward trend in the past few months. Combined with the valuation results and market performance analysis. A high stock price will result in a high firm value and enhance market confidence in the company's current performance and prospects. [13] Theoretically, Wuliangye's stock price can further rise in the next month.

# 5    Conclusion

The essay calculated the intrinsic value of Wuliangye Group by FCFF, and the outcome was RMB 1091515.46 million. Furthermore, each share's estimated value was RMB

281.2, lower than the market value. It is reasonable to predict that the firm's stock price may rise. Theoretically, investing in the company may obtain revenue in the future. In terms of the method, the drawbacks still exist. In the first place, the entire calculation process is based on a company's cash flow; therefore, the outcome may be affected by the extreme inflow or outflow of cash. In addition, the method ignores other company values, such as the brand's value. In conclusion, FCFF is only a reference value of financial investment but can not be a solo indicator.

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