

Analysis and suggestions on stock valuation and profit forecast of Kweichow Moutai Company based on historical data

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Abstract. The prediction of stock value and earnings can provide reliable empirical evidence for the future development of enterprises. This paper takes Moutai Company as the research object, uses historical data of the enterprise and combines various valuation models, regression models, neural networks, time series models and sensitivity analysis to carry out stock valuation and profit forecast. The results show that the stock value and profit of Moutai will continue to improve in the future, reflecting the good operating performance of Moutai Company. However, some risk factors may also exist, and changes in the external environment may bring uncertainties to Moutai's future development. Therefore, risk factors should be taken into full consideration while making an optimistic estimate of Moutai's operating performance. Finally, this paper puts forward some suggestions, hoping to be helpful to the development of Moutai and related enterprises.

Keywords: Moutai; Stock valuation; Profit; Historical data.

1. Introduction

As an important part of virtual economy, stock market is closely related to real economy and enterprise development (Guo et al., 2012)[1]. As a barometer of the economy, the stock market is of great significance to financial stability and economic development. Scientific prediction of stock value and earnings is very necessary to analyze the development of companies and the stability of financial markets. Against the background of China's high-quality economic development, various uncertain factors are also prevalent, bringing some challenges to the stability of the stock market and the development of enterprises. In this process, in-depth analysis of the stock and earnings of the enterprise is conducive to research and judge the future development trend of the enterprises.

Kweichow Moutai Co.,Ltd. (Hereinafter called Moutai)is mainly engaged in the production and sales of liquor series products, as well as the production and sales of beverages, food and packaging materials, the development of anti-counterfeiting technology. Its main business products include Moutai Wine and Wine of Series. It has created a step-by-step product development mode to enter the market in an all-round way, forming three series of over 70 specifications, thus occupying the Chinese liquor market.

Enterprise value is the sum of the value of the company's existing assets and its expected future value (Pu et al., 2021) [2]. The purpose of this paper is to predict the stock valuation and profitability of Moutai Company, so as to provide specific suggestions for the development of Moutai Company. As a typical liquor enterprise in China, Moutai Company occupies a special important position in the state-owned enterprises and liquor market. Taking Moutai Company as the research sample not only helps us to understand the operating situation of Moutai Company, but also provides reference for relevant enterprises.

The contribution of this paper mainly includes the following aspects. First, existing studies tend to judge stock valuation and financial market conditions from the macro level, lacking the necessary micro enterprise perspective. This paper takes the historical data of Moutai Company as an example to predict its stock valuation and earnings, which is a useful supplement to relevant research. Second, this paper comprehensively uses a variety of valuation models, neural networks, regression analysis and other methods to predict stock valuation and earnings, which can obtain relatively scientific and accurate empirical results, and provide a comprehensive reference frame for subsequent research.

Third, this study provides important enlightenment for the development of Moutai Company and related enterprises. This study found that Moutai's stock valuation and future earnings are good, but there are some risks.

2. Valuation Assumptions and Predictions

2.1 Theoretical analysis and research hypothesis

In the past five years, the increase trend of price among liquor brands is obvious. And we believe that Moutai will still be able to raise price because of its scarcity. Analyzing the supply side, although Moutai has been increasing production in recent years, it still maintains the principle of “strict production areas and limited capacity expansion”. While on the demand side, under the background of common prosperity, the disposable income of residents continues to increase. The demand for high-quality liquor will drive the development of Moutai.

However, there are two restrictive factors which includes the national control mechanism of liquor price and the launch of “iMoutai” app, so we predict that the increase rate of price will slow down in the future. The successive reform measures which launched policies has controlled speculation and the introduction of “iMoutai” app, an online direct selling channel, also curb the growth of price.

Based on the reasons given above, we believe that the decline of the growth rate of price has objective conditions.

Hypothesis 1: Moutai's growth rate of price may decline

Firstly, according to the data, the production capacity of Moutai has increased significantly in previous years. And because there is a large gap between supply and demand, we believe that the increasing capacity can be effectively converted into sales transaction volume.

In addition, in the trial operation phase of “iMoutai”, the market response is quite positive. We analyze that this is mainly due to lower prices and more convenient sales channels for consumers. Therefore, we predict that the sales volume of Moutai, especially in the category of high-end Moutai will achieve a faster growth.

Hypothesis 2: Moutai's sales are likely to grow even faster.

Firstly, the operating cost is controllable. Its manufacturing cost has been relatively low because Moutai has an advanced production process. In addition, its strong market position brings a strong bargaining advantage in purchasing raw materials, reducing the materials cost.

In terms of expenses, due to its mature management experience, Moutai has a low level of administration expense. Besides, due to its great condition of cashflow, it has a low level of debt burden and financial expenses. Although based on the expansion and integration of online channels, the selling expense may increase faster, in general, the expense rate of Moutai is low.

Hypothesis 3: Moutai's costs and expenses will be more manageable

Considering the influence of the online direct channel, we believe that it will leave more profit margins. Because Moutai will not need to distribute its profit to other dealers and retails in the intermediate process while reduce the price of online direct sales for consumers.

Hypothesis 4: More Profit Margins may be Left.

2.2 Valuation Predictions

Based on the four assumptions above, we make a forecast of the Income Statement and Balance sheet of Moutai in 2022 to 2026.

Table 1. The forecast of income statement

Fiscal Year Ended (¥100 m)	Method	2022E	2023E	2024E	2025E	2026E
Total revenue		1,374.11	1,546.18	1,725.09	1,928.27	2,148.79
Operating proceeds		1,341.75	1,513.82	1,692.73	1,895.91	2,116.43
Revenue from main business		1,340.35	1,512.23	1,690.96	1,893.96	2,114.29
Sales of Moutai Wine	Based on	1,174.39	1,309.92	1,452.03	1,600.71	1,755.97
Sales of Wine of Series		165.96	202.32	238.94	293.25	358.33

	Assump tion 1 and 2					
Revenue from other business	% Total	1.40	1.59	1.77	1.95	2.14
Interest income	Revenu e	32.36	32.36	32.36	32.36	32.36
Total operating cost		379.22	409.97	440.72	471.46	502.21
Operating costs		97.28	105.00	112.71	120.43	128.15
Cost of main business	Based	90.99	93.20	95.40	97.60	99.81
Costs of Moutai Wine	on	57.96	60.10	62.25	64.40	66.54
Costs of Wine of Series	Assump tion 2	33.04	33.09	33.15	33.21	33.26
Cost of other business	% Total	6.29	11.80	17.31	22.82	28.34
Fees and commission expenses	Revenu e	0.00	0.00	0.00	0.00	0.00
Taxes and surcharges	Based	171.66	188.06	204.46	220.86	237.25
Selling expenses	on	26.68	26.16	25.64	25.11	24.59
General and administrative expenses	on	89.76	98.68	107.60	116.53	125.45
R&D expenses	Assump tion 3	0.74	0.86	0.97	1.09	1.20
Financial expenses	% Total	(18.85)	(30.86)	(45.38)	(62.41)	(81.95)
Other operating profits/losses	Revenu e	11.96	22.09	34.72	49.87	67.52
Operating Profit		994.88	1,136.21	1,284.37	1,456.81	1,646.58
Non-recurring gains and losses	consiste nt	(2.00)	(2.00)	(2.00)	(2.00)	(2.00)
Profit/(loss) before tax		992.88	1,134.21	1,282.37	1,454.81	1,644.58
Income tax expense	*25%	248.22	283.55	320.59	363.70	411.15
Net profit after tax		744.66	850.66	961.78	1,091.11	1,233.44
Net profit attributable to non- controlling interests	% Net profit	42.26	48.68	55.31	63.00	71.42
Net profit attributable to owners of the parent		702.40	801.98	906.47	1,028.10	1,162.02

Table 2. The forecast of balance sheet

Fiscal Year Ended	Method	2022E	2023E	2024E	2025E	2026E
Asset						
Current asset						
Cash and cash equivalents	% operating cost	644.68	696.95	925.51	990.08	1,054.64
Inventories	% operating cost	351.65	380.16	408.68	437.19	465.70
Accounts receivable	% total revenue	-	-	-	-	-
Prepayments	% total revenue	2.68	3.03	3.39	3.79	4.23
Other current assets	% total revenue	1,610.10	1,816.59	2,031.28	2,275.09	2,539.72
Total		2,609.11	2,896.73	3,368.85	3,706.15	4,064.30
Non-current asset						
Fixed assets	BASE	186.16	199.33	214.26	231.20	250.29
Intangible asset	BASE	76.17	91.93	109.39	128.79	150.28
Other non-current asset	% total revenue	174.43	196.80	270.84	303.35	338.63
Total		436.76	488.05	594.48	663.33	739.20
Total asset		3,045.87	3,384.78	3,963.33	4,369.48	4,803.50
Liability&Equity						
Current liability						
Deposits and balances from banks and other financial institutions	% change	326.46	489.69	685.57	959.79	1,343.71
Accounts payable	% operating cost	60.68	65.60	70.51	84.86	90.40
Unearned revenue	average	-	-	-	-	-
Contract liabilities	consistent	130.00	130.00	130.00	130.00	130.00
Taxes payable	% alcohol sales	156.15	176.18	197.00	220.65	246.32
Interest payable	consistent	-	-	-	-	-

Other payables	% operating cost	45.17	48.83	52.49	56.15	59.81
Other current liabilities	consistent	16.00	16.00	16.00	16.00	16.00
Total		734.45	926.29	1,151.57	1,467.45	1,886.24
Non-current liability						
Lease liabilities	consistent	1.00	1.00	1.00	1.00	1.00
Long-term Payable	consistent	-	-	-	-	-
Deferred tax liabilities	consistent	-	-	-	-	-
Total		1.00	1.00	1.00	1.00	1.00
Total Liability		735.45	927.29	1,152.57	1,468.45	1,887.24
Equity						
Paid-in capital	consistent	12.56	12.56	12.56	12.56	12.56
Capital reserve	consistent	13.75	13.75	13.75	13.75	13.75
Surplus reserve	BASE	311.83	396.06	464.72	577.13	669.16
Retained Earnings	BASE	1,915.53	2,244.32	2,633.42	3,029.93	3,513.10
Other comprehensive income	consistent	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
General risk reserve	% net profit	12.97	14.95	16.99	19.36	21.94
Non-controlling interests	BASE	89.25	106.60	126.32	148.78	174.24
Total Equity		2,355.79	2,788.14	3,267.67	3,801.40	4,404.65
Total liability and equity		3,091.24	3,715.43	4,420.23	5,269.86	6,291.89

3. Valuation Methods and Results

3.1 PE Valuation

3.1.1 Valuation Notes

PE valuation predicts the reasonable value of the enterprise through the ratio between the market value and net profit. Its calculation formula is $PE = \frac{P}{E}$, where P is the share price per share and E is the net profit per share.

3.1.2 Valuation Prerequisites

The PE valuation method is largely affected by the net profit, so it is suitable for enterprises with a relatively stable profit. Moutai has a stable performance of long-term operating, which is suitable for the PE valuation method.

3.1.3 Valuation Result

3.1.3.1 Based on the Industry Average Index

Table 3. PE valuation-based on the industry index

Indicators	2022E	2023E	2024E	2025E	2026E
Net profit attributable to owners of the parent(¥100m)	702.40	801.98	906.47	1,028.10	1,162.02
Industry average PE	48.22	48.22	48.22	48.22	48.22
Market value(¥100m)	33,868.0	38,669.4	43,707.6	49,572.5	56,029.7
	3	6	7	6	3
Share price (¥)	2,696.07	3,078.29	3,479.36	3,946.24	4,460.26
Increase from current price	49.29%	70.45%	92.66%	118.51%	146.97%
Company	Stock Code		Market value(¥100m)		PE
WuLiangYe YiBin Co.,Ltd.	000858		6,594.85		38.01
ShanXi XingHuaCun Fen Wine Factory C0.,Ltd.	600809		3,241.84		70.09
Luzhou Laojiao Co.,Ltd	000568		3068.32		49.81
Jiangsu King's Luck Brewery Joint-Stock Co.,Ltd.	603369		550.22		34.96
Industry average			3363.81		48.22

As for the selection of industry comparisons, we comprehensively consider the factors of market positioning, business scale, and profit stability of the main business, and finally determine the four companies in the liquor industry.

The market value and the price-earnings ratio indicators are as follows:

According to the results, the expected stock price will be 2,696.1 yuan in 2022 and 3,078.3 yuan in 2023. Compared with the current price, the increase will be 49.3% and 70.5%, respectively.

3.1.3.2 Based on the Historical Average Index

Through calculation, the expected stock price in 2022 will be 2,274.5 yuan and 2,596.9 yuan in 2023, which will increase 25.9% and 43.8% compared with the current price.

Table 4. PE valuation-based on the historical average index

Indicators	2017	2018	2019	2020	2021
PB(¥100m)	10.39	7.24	11.86	16.91	14.77
Indicators	2022E	2023E	2024E	2025E	2026E
Net profit attributable to owners of the parent (¥100m)	702.40	801.98	906.47	1,028.10	1,162.02
Company average PE of 2016-2021	40.678	40.678	40.678	40.678	40.678
Market value(¥100m)	28,572	32,622	36,873	41,821.	47,268
Share price(¥)	2,274.50	2,596.96	2,935.31	3,329.19	3,762.84
Increase from current price(April 15th)	25.94%	43.80%	62.53%	84.34%	108.35%

3.2 PB Valuation

3.2.1 Valuation Notes

PB valuation method predicts the reasonable value of the enterprise by the ratio of the its market value and net asset book value. The calculation formula is $PB = \frac{P}{B}$, where P is the stock price per share, and B is the book value of net assets per share.

3.2.2 Valuation Result

3.2.2.1 Based on the Industry Average Index

The same as PE valuation, we choose four companies as the comparison target, with an average market value of 331.9 billion yuan and an average PB of 9.83.

Table 5. PB valuation-based on the industry average index

Company	Stock Code	Market value(¥100m)	PB(MRQ)		
WuLiangYe YiBin Co.,Ltd.	000858	6,293.25	5.73		
ShanXi XingHuaCun Fen Wine FACTORY CO.,Ltd.	600809	3,318.71	17.52		
Luzhou Laojiao Co.,Ltd	000568	3,101.13	10.02		
Jiangsu King's Luck Brewery Joint-Stock Co.,Ltd.	603369	563.02	6.06		
Industry average PB		3,319.03	9.83		
Indicators	2022E	2023E	2024E	2025E	2026E
Net Assets (¥100m)	2,357.71	2,790.20	3,269.91	3,803.87	4,407.38
Industry average PB	9.97	9.97	9.97	9.97	9.97
Market value (¥100m)	23,494.9	27,804.8	32,585.2	37,906.18	43,920.22
	6	4	0		
Corresponding share price (¥)	1,870.32	2,213.41	2,593.95	3,017.53	3,496.28
Increase from current price (April 15)	3.56%	22.56%	43.63%	67.08%	93.59%

Through calculation, the expected market value is 2349.4 billion yuan in 2022 and 2780.5 billion yuan in 2023. The corresponding stock price will be 1870.3 yuan and 2213.4 yuan respectively, with an increase of 2.1% and 20.8% compared with the current price.

3.2.2.2 Based on the Historical Average Index

Through calculation, the expected stock price will be 2,296.2 yuan in 2022 and 2,717.4 yuan in 2023, which will increase of 25.9% and 43.8% compared with the current price. It can be seen that with the economic development and the stability of liquor industry, Moutai company's profits are improving.

Table 6. PB valuation-based on the historical average index

Indicators	2022E	2023E	2024E	2025E	2026E
Net Assets (¥100m)	2,357.71	2,790.20	3,269.91	3,803.87	4,407.38
Company average PB in 2016-2021	12.23	12.23	12.23	12.23	12.23
Market value (¥100m)	28,844.23	34,135.36	40,004.11	46,536.55	53,919.85
Corresponding share price (¥)	2,296.15	2,717.36	3,184.54	3,704.56	4,292.31
Increase from current price (April 15)	27.14%	50.46%	76.33%	105.13%	137.67%

3.3 DCF Valuation

3.3.1 Valuation Notes

The DCF valuation method is based on the corporate cycle theory which believes that the development of enterprises will undergo start-up, growth, maturity, and recession. And we assume that Moutai is at growth period with a significantly higher growth rate than the average growth rate of macro-economy; then will enter the mature period in 2027, maintaining a sustainable growth in synchronization with the speed of socioeconomic development.

The calculation formula is as follows:

$$P_0 = \frac{FCF_1}{(1+R)} + \frac{FCF_2}{(1+R)^2} + \frac{FCF_3}{(1+R)^3} + \frac{FCF_4}{(1+R)^4} + \frac{FCF_5}{(1+R)^5} + \frac{P_5}{(1+R)^5}$$

$$P_5 = \frac{FCF_5 \times (1+g_2)}{(R-g_2)}$$

3.3.1. Estimation of Valuation Indicators

3.3.1.1 Estimation of R

We first calculate Moutai's future weight average cost of capital (WACC) to predict its discount rate R. The formula is as follows:

$$WACC = (\text{proportion of equity}) \times R_e + (\text{proportion of debt}) \times R_d$$

a. According to the data, the debt capital cost (R_d) will be 2.25%.

b. We use the Capital Asset Pricing Model (CAPM) to calculate the cost of equity capital. And the formula is $R_e = R_f + \beta \times (R_m - R_f)$

Table 7. DCF valuation-equity capital cost

R_f	risk- free interest rate	2.82%	10-year national bond yield
β	expected market risk coefficient	0.85	weighted average of Moutai's monthly return rate in the last ten years and the market monthly return rate
R_m	market risk	8.34%	geometric average of the CSI 300 Index

Through calculation, we predict that the equity capital cost(R_e) will be 7.512%.

c. According to the calculation above, the WACC of Moutai will be 7.51%

Table 8. DCF valuation-weighted average cost of capital

		Value(billion)	Proportion		Cost of capital	Result
Equity	Ordinary Shares	2248.97	99.93%	K_e	7.51%	7.5045%
	Preferred Stock	0	0%			
Debt	Short-term debt	1.64	0.07%	K_d	2.25%	0.0016%
	Long-term debt	0	0%			
total		2250.61	100%			7.5061%

3.3.1.2 Estimation of g

With the increase of GDP and per capita disposable income, consumers have gradually appeared in the concept of "drinking less and drinking better", so we think it is appropriate to set sustainable growth rate g_2 to 5%.

3.3.2 Calculating FCFF

According to the formula, we obtain the figure of the free cash flow of Moutai.

FCFF=Earnings Before Interest and Tax- Taxation+ Depreciation and Amortization-Changes in Working Capital-Capital expenditure

And the formula of t of each detailed item is as follows:

a. EBIT=Net profit+ Interest expenses+ Income tax payments

b. Capital expenditure=Cash paid for the purchase of fixed assets, intangible assets, and other long-term assets in the cash flow statement

c. Working Capital= (Notes receivable + Accounts receivable + Prepayments + Other receivables excluding interest receivable + Inventories and other current assets) - (Notes payable and Accounts payable + Advance payment +Employee pay payable + Taxes payable + Other payables excluding interest payable and dividends payable and other current liabilities).

Table 9. The forecast of free cash flow

Fiscal Year Ended	2022E	2023E	2024E	2025E	2026E
Operating proceeds					
Revenue from main business	1,205.92	1,344.84	1,489.78	1,640.75	1,797.76
Sales of Moutai Wine	1,067.62	1,190.83	1,320.02	1,455.19	1,596.33
Sales of wine of other series	138.3	154	169.76	185.57	201.43
Revenue from other business	1.4	1.59	1.77	1.95	2.14
Total Revenue	1,207.32	1,346.43	1,491.55	1,642.70	1,799.90
Operating Cost	97.28	105	112.71	120.43	128.15
Selling/Admin/R&D Expenses	117.18	125.69	134.21	142.73	151.24
Total Expenditure	214.46	230.69	246.92	263.16	279.39
EBITDA	992.87	1,115.74	1,244.63	1,379.55	1,520.51
Depreciation & Amortisation	13.31	14.31	15.32	16.33	17.33
EBIT	979.56	1,101.43	1,229.31	1,363.22	1,503.18
Tax	199.35	214.44	229.53	244.62	259.71
NOPAT	780.21	886.98	999.78	1,118.60	1,243.46
Adjust non-cash items					
Depreciation & Amortisation	14.27	15.92	17.63	19.42	21.28
Capital Expenditure	39.42	44.33	49.47	54.86	60.49
Changes in <i>NWC</i>	122.39	43.51	18.28	(43.15)	(125.20)
FCF	632.67	815.06	949.66	1,126.31	1,329.45

3.3.3 Valuation Result

Then we use the corresponding discount rate *R* to discount the annual FCFF, and then sum up to calculate the enterprise value of Moutai.

Table 10. DCF valuation result

	2022E	2023E	2024E	2025E	2026E	Sustainable stage
FCF	632.67	815.06	949.66	1,126.31	1,329.45	
% change	10.63%	28.83%	16.51%	18.60%	18.04%	
WACC	7.5100%	7.5100%	7.5100%	7.5100%	7.5100%	7.5100%
Discounted value	588.48	705.17	764.22	843.07	925.61	38,720.67
Total enterprise value						42,547.21
Total number of equities						1,256,197,800
Stock Price						3,386.98

We calculate that the expected market value is 42,54.7 billion yuan with the corresponding stock price is 3,387.0 yuan, which has an increase of 87.54% from the current price.

3.4 Dividend Discount Valuation

3.4.1Valuation Notes

Dividend Discount Model evaluates the fair value of the company's shares by discounting the sum of the company's future dividends based on the expected dividend per share and discount factor. The formula is: $P = \frac{D}{r-g}$, where P is stock price, D is expected dividend per share, R is the cost of capital, and G refers to the dividend growth rate.

3.4.2 Valuation Prerequisites

DDM is only applicable to companies that pay dividends stably. According to the statement of Moutai, the dividend distribution policy of Moutai is stable and the amount of dividends is high, it is suitable for prediction.

3.4.3 Valuation Result

We set the DDM model as three stages, of which 2022-2026 is the company's high-speed growth period, and the indicators of each period refer to the above valuation assumptions. 2027-2036 is the company's stable growth period. Considering that Guizhou Moutai, as an industry leading company, has a relatively stable operation, and Baijiu consumption is less affected by the macro environment, it is conservatively estimated that the company's stable growth period will still have a growth rate of more than 10%, and it will be a stable growth period after 2037, The growth rate is set at 5%.

Through dividend distribution, it is estimated that the reasonable value of the company is 2593.941 billion yuan and the corresponding share price is 2064.91 yuan.

Table 11. DDM valuation result

Fiscal Year Ended	2022E	2023E	2024E	2025E	2026E	2027E-2036E	2037 E-
The dividend per share(¥)	29.08	33.20	37.52	42.56	48.10	83.17	52.91
Total equity(¥100 m)	12.56	12.56	12.56	12.56	12.56	125.62	
Net profit attribute to the shareholders of the company(¥100 m)	702.40	801.98	906.47	1,028.10	1,162.02	20,091.03	
Dividend payout ratio	52.00%	52.00%	52.00%	52.00%	52.00%	52.00%	
Share out bonus	365.25	417.03	471.36	534.61	604.25	10447.34	664.68
Dividend discount	339.73	360.80	379.32	400.17	420.70	5,064.27	26,481.11
The value of the company(¥100 m)				33,718.45			
Share price of the Company (¥)				2,684.16			

4. Sensitivity Analysis

4.1 Sensitivity analysis method

Sensitivity analysis is one of the common methods used in the absolute valuation method to analyze the uncertainty of the valuation results. Sensitivity analysis is used to estimate the impact that we use the absolute valuation method on the final valuation of Moutai when various factors change.

We selected from multiple uncertainty factor. More critically, we chose two pairs of uncertain factors which were the forecast of the sustainable growth rate and the cost of capital, predicted sales revenue of Guizhou Moutai liquor and predicted sales revenue of other Moutai liquor. Through the sensitivity test of the value of Guizhou Moutai company, we could find out the sensitivity factors that have an important influence on the valuation results.

4.2 Selection of sensitivity analysis factors

4.2.1 Sustainable growth rate and WACC

In the DCF valuation of Guizhou Moutai, we adopted the two-stage model. The sustainable growth rate during the sustainable period was obtained by our time-series fitting method based on historical data, so we lacked of consideration for the company's development strategy and external environment impact. During the determination of WACC, we cited some external data with values from Yahoo Finance. WACC tends to be a certain deviation from the actual corporate return on capital.

4.2.2 Predicted sales revenue of Moutai Wine and Wine of Other Series

In the revenue forecast of Guizhou Moutai, we forecast the income into the revenue of Moutai wine, wine of other series and other revenue respectively. And according to historical data, other revenue tends to be no more than one percent of the total revenue. Predicted sales revenue of Guizhou Moutai liquor and other Moutai liquor were the basis of the absolute valuation of the company's value. Therefore, they were important factors for our consideration of sensitivity analysis.

4.3 Results of the sensitivity analysis

For the same range of change, Guizhou Moutai's valuation is more sensitive to sustainable growth rate, with a sensitivity coefficient of about 2.32, while WACC has a sensitivity coefficient of -2.29.

Table 12. Sensitivity analysis-R and *g*

Company value (¥ 100 m)		Sustainable growth rate							
WACC		3.50%	4.00%	4.50%	5.00%	5.50%	6.00%	6.50%	
	5.51%	21.58%	59.39%	134.64%	357.45%				
	6.01%	-0.88%	21.97%	59.97%	135.57%	359.44%			
	6.51%	-15.93%	-0.59%	22.37%	60.54%	136.51%	361.43%		
	7.01%	-26.72%	-15.70%	-0.30%	22.77%	61.13%	137.45%	363.42%	
	7.51%	-34.86%	-26.55%	-15.48%	0.00%	23.18%	61.71%	138.39%	
	8.01%	-41.21%	-34.72%	-26.37%	-15.25%	0.30%	23.59%	62.30%	
	8.51%	-46.33%	-41.10%	-34.58%	-26.19%	-15.02%	0.60%	24.00%	
	9.01%	-50.53%	-46.24%	-40.99%	-34.43%	-26.01%	-14.78%	0.91%	
	9.51%	-54.06%	-50.46%	-46.14%	-40.87%	-34.29%	-25.82%	-14.55%	

The forecast sales revenue of other Moutai liquor had a limited impact on the valuation of Moutai, and its sensitivity coefficient reached about 0.65. The forecast sales revenue of Moutai liquor was a sensitive factor for the valuation of Moutai. Its sensitivity coefficient reached about 5.11, therefore, if the external environment is not conducive to the sales of Moutai liquor, the investment in Moutai may face greater risks.

Table 13. Sensitivity analysis-forecast sales revenue

Company value (¥ 100 m)		The range of change in forecast sales revenue for Guizhou Moutai liquor							
The range of change in forecast Sales Revenue for other Moutai liquor		-3.00%	-2.00%	-1.00%	0.00%	1.00%	2.00%	3.00%	
	-3.00%	-16.10%	-11.51%	-6.76%	-1.83%	3.28%	8.57%	14.05%	
	-2.00%	-15.52%	-10.93%	-6.17%	-1.24%	3.87%	9.16%	14.63%	
	-1.00%	-14.91%	-10.32%	-5.56%	-0.63%	4.48%	9.77%	15.24%	
	0.00%	-14.28%	-9.69%	-4.93%	0.00%	5.11%	10.40%	15.87%	
	1.00%	-13.62%	-9.03%	-4.28%	0.65%	5.76%	11.05%	16.53%	
	2.00%	-12.95%	-8.36%	-3.60%	1.33%	6.44%	11.73%	17.20%	
	3.00%	-12.24%	-7.66%	-2.90%	2.03%	7.14%	12.43%	17.90%	

4.4 Scenario analysis instructions

Combined with the sensitivity analysis, we made a scenario analysis in different situations.

Table 14. Sensitivity analysis-forecast sales revenue

Scenario		The range of change in forecast sales revenue for Moutai liquor	The range of change in forecast sales revenue for other Moutai liquor	Company value	Percentage change
Sales scenario	Best	3.00%	3.00%	50165.26315	17.90%
	Normal	0.00%	0.00%	42547.2058	0.00%
	Worst	-3.00%	-3.00%	35696.19521	-16.10%
Other scenarios		WACC	Sustainable growth rate	Company value	Percentage change
	Worst	7.01%	6.00%	101027.4019	137.45%
	Normal	7.51%	5.00%	42547.2058	0.00%
	Best	8.01%	4.00%	27775.80956	-34.72%

4.5 Break-even analysis

Then we make the break-even analysis to identify the bottom line of Moutai's profitability and make a risk warning for Moutai's investment.

Table 15. Break-even analysis

Variable-forecast or assumption	Expected value	Critical value	Percentage change
Sales growth rate	13.69%	-48.38%	-453.27%
Revenue	100.00%	45.40%	-54.60%
Cost of good sold	8.06%	34.95%	333.71%
Gross profit margin	91.94%	65.05%	-29.24%
All expense	17.76%	70.74%	298.26%
Tax rate	25.00%	104.00%	316.00%
Net working capital	112.64%	165.08%	46.55%

As the table above, the items that have the greatest impact on Moutai's business risk are gross profit margin, net working capital and revenue. However, Moutai has maintained a gross profit margin of over 90% for a long time, with minimal historical variation. Besides, it has a strong debt servicing capacity and a low leverage ratio, which allows it to manage Net working capital effectively. In summary, although several risk items are obtained through Break-even analysis, they do not pose much threat to Moutai's actual operations.

5. Conclusion and implications

5.1 Conclusion

The study used historical data and DDM model to predict moutai's stock valuation and earnings. The results show that in the future, the stock valuation of Moutai Company will show a trend of steady growth, and the stock price and earnings will continue to improve. Although Maotai's own strength can effectively manage its net working capital, changes in the external environment may also bring some risks.

5.2 Implications

In recent years, Moutai company has grasped the investment opportunities, continuously explored the domestic and foreign markets, and continuously improved its business performance. The performance is also fully reflected in Moutai's stock valuation and earnings. Moutai's business performance will continue to improve in the future. On this basis, investment in Moutai has important strategic significance. At present, some Internet companies such as Alibaba are strengthening cooperation with Moutai, such as gaining more official distribution rights and even lower factory prices. This will help attract high-end consumers and stabilize and expand its user pool. However, we still don't recommend this option.

Firstly, it is difficult to implement. At present, except for the holding company, all the other shareholders hold less than 5% of shares. It is difficult for Alibaba to acquire enough shares to influence the distribution channels of Moutai. Moreover, according to the cost-benefit principle, due to the high stock price of Moutai and the certain repeatability between the previous layout of Wuliangye and this investment, the consideration paid may take a long period to recover. Therefore, our suggestion is to invest in Moutai in the form of financial assets. Based on its good prospects, the market value of Moutai will become higher in the next five years, with a continuous growth trend of its stock price, so this option is quite valuable based on financial returns.

Although some stock data and earnings suggest that Maotai companies may perform well economically, external risks cannot be ignored. Moutai Group should improve its internal risk control mechanism and enhance its ability to resist risks. The COVID-19 outbreak and various market risks make it impossible for companies to completely avoid some risk factors. It is necessary to pay full attention to the uncertainty brought by risk factors to achieve sustainable development.

5.3 Limitations

Firstly, the prerequisite of DCF model, which is under the absolute rationality and sufficient market, is differ from the actual market environment. Therefore, the results predicted by this model can only reflect the future value of Moutai to a certain extent. Secondly, in terms of valuation assumptions, we mainly focus on the external environment, including on new industry trends, new sales channel, pre-sales of new products, etc. However, it is difficult for us to speculate about the change of its internal governance ability. According to the financial report of 2021, the Chairman and Senior Management of Moutai has changed which may cause improvement or decline of its performance in the next five years, so our valuation assumptions may have certain deviation.

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