

Valuing Coca-Cola Using Discounted Cash Flow Analysis

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Abstract. Coca-Cola experienced a constant revenue decline from 2013 to 2018 due to the structural change of the company, and then COVID-19 impacted the world economy. However, in such an era filled with uncertainties, the market cap of Coca-Cola has barely fallen yet had a constant increase yearly. Thus, this paper uses DCF analysis to investigate the 'intrinsic' value of Coca-Cola and hence evaluate the rationality of the current market value of Coca-Cola. The future free cash flow is forecasted based on the historical free cash flows of Coca-Cola, and reasonable assumptions are made to discount the sum of the future free cash flow and give an answer of valuation. By conducting the analysis, the rationality of the current market value of Coca-Cola is justified, and it is realized that there is further potential for Coca-Cola to grow in the future by considering a wider range of financial metrics. It is suggested that Coca-Cola's stock is a good choice for long-term investment.

Keywords: Firm Valuation, DCF Analysis, Coca-Cola

1. Introduction

1.1 Research Background

Coca-Cola is the largest non-alcoholic beverage company around the world, and its products are sold to the whole globe. Coca-Cola has constantly been growing in the past years, and Berkshire Hathaway has owned Coca-Cola's stock since 1988 without selling or planning to sell the stock until now. The stock of Coca-Cola has always been reckoned as a good long-term investment.

However, the revenue of Coca-Cola hit its peak in 2012, and then it started to decline year by year until 2018. During this period, Coca-Cola was in a transition phase to rebrand most of its bottling factories to escape from the capital-intensive, low profitability industry of bottling and toward concentrated production as the demand for carbonated beverages constantly fell, particularly in developed regions [1]. Such structural change caused the revenue to fall from \$48 billion in 2012 to \$34 billion in 2018 [2]. But the market cap of Coca-Cola was still growing steadily during that time [2].

Due to the pandemic, the world economy was in a great recession, which consequently battered Coca-Cola's performance. The revenue of Coca-Cola in 2020 was \$33 billion, which is \$ 4.2 billion less than the revenue in 2019. The lockdown and closure of restaurants and bars reduced the sales of beverages, and the global ventures business also suffered a setback as a result of the downturn of the world economy. Even though the market and Coca-Cola itself were experiencing a difficult time, the market cap of Coca-Cola barely changed during the pandemic and went back to growing in 2021.

So it is worth looking into the valuation of Coca-Cola and hence to evaluate if the stock of Coca-Cola is still worth being held as a long-term investment.

1.2 Literature Review

One of the most widely used valuation methods is comparable company analysis (CCA). This method has been introduced in many textbooks [3-4] and papers [5]. It selects the target company's peer companies (comparable companies) from the market. It analyses their financial metrics to obtain valuation multiples (e.g., price/earnings ratio, EV/EBITDA ratio, EV/sales ratio). Then the fair valuation of the market company can be calculated by the median of the multiple multipliers of the corresponding financial metric of the target company. This is a handy method of evaluating a

company, as the valuation multiples of publicly listed companies can be found on financial websites, and the calculation is straightforward.

However, this method essentially uses external information to value a company and is also subject to market change.

Thus, this paper uses discounted cash flow (DCF) analysis to value Coca-Cola and hence gives investors another insight into the valuation of Coca-Cola. Discounted free cash flow valuation is a method that estimates the present value of a business by applying its projected future cash flow discounted for the time value of money. DCF analysis has been utilised in the industry since the 18th or 19th century [6]. It was explained by John Burr Williams in “The Theory of Investment Value” in 1938 [7]. Then it was popular in financial sectors in the 60’s and was frequently adopted in the US in the 80’s and 90’s [8].

Discounted cash flow analysis uses precise numbers and is more objective than other valuation methods. This method includes a series of specific data (e.g., free cash flow, growth rate, etc.) generated from the business. And it does not require market value comparisons to peer companies, which means it sets aside the subjective market sentiment and focuses on the ‘intrinsic’ value of the business. Furthermore, the DCF method takes the time value of money into account and assesses the performance of the business across its economic life.

2. Methodology

2.1 Basic Formula

DCF analysis is an absolute valuation method. Based on the prediction of the future free cash flow of the target company, the model uses WACC to adjust the sum of the projected free cash flow to the present value and hence give a fair value to the target company. The basic formula of DCF is:

$$Enterprise\ Value = \sum_{t=1}^n \frac{FCFF_t}{(1+WACC_t)^t} + \frac{TV}{(1+WACC_n)^n} \quad (1)$$

Where:

$FCFF$ = free cash flow to the firm

$WACC$ = weighted average cost of capital

TV = terminal value of the firm

2.2 Free Cash Flow

A firm’s profitability, excluding all expenses and reinvestments, is measured by free cash flow. It is a very important metric that determines the financial health of the company, and it is also an important indicator of the stock price [9]. The future FCFF may be predicted by the historical financial data of the firm. FCFF is calculated as:

$$FCFF = EBIT \times (1 - Tax\ Rate) + Depreciation\ and\ Amortization - Capital\ Expenditure - \Delta WC \quad (2)$$

Where:

$EBIT$ = earnings before interest and tax

ΔWC = the change in net working capital

2.3 WACC

WACC is a cost a firm would pay to support its assets of it. It can include common stock, preferred stock, bonds, different kinds of debt, etc. [10]. This is crucial to the DCF model. The WACC essentially represents the time value of money and is used as the discount factor in the model.

In the DCF model, WACC consists of the cost of equity and the cost of debt, and these two costs contribute to WACC proportionally:

$$WACC = \left(\frac{E}{V} \times R_e\right) + \left(\frac{D}{V} \times R_d\right) \quad (3)$$

Where:

E = market value of equity

D = market value of debt

V = sum of E and D

R_e = cost of equity

R_d = cost of debt

T_c = corporate tax rate

2.3.1 Cost of Equity

The cost of equity is given by:

$$E = R_f + \beta \times R_p \quad (4)$$

Where:

R_f = risk-free rate

R_p = market risk premium

β = beta index of the firm

The risk-free rate means the interest of a hypothetical investment without any risk. The risk premium is the extra return investors expect due to the investment risk. Beta determines the volatility of the firm compared to the whole market. Specifically, beta is a scale factor that magnifies or minifies the fluctuation of the market to the firm. The S&P 500 is usually the benchmark, representing the market and having a beta of 1.

2.3.2 Cost of Debt

The DCF model uses after-tax cost debt for the cost of debt, which means the tax shield needs to be deducted from the pre-tax cost of debt, and this is given by:

$$\text{Cost of debt (after tax)} = \text{Cost of debt (after tax)} \times (1 - \text{Tax Rate}) \quad (5)$$

2.4 Terminal Value

2.4.1 Perpetuity Method

Free cash flow may be predicted for discrete intervals in company valuation. Yet the performance of long-term operation becomes trickier to predict because estimates extend further away. Also, it is hard to predict the time a firm may discontinue. To tackle these constraints, it could be assumed that cash flows will increase steadily in perpetuity, beginning at some time from now on. The sum of the cash flows with the perpetuity growth rate represents the terminal value of the firm, and this is given by:

$$TV = \frac{FCF \times (1+g)}{(d-g)} \quad (6)$$

Where:

FCF = last free cash flow forecast

g = growth rate of perpetuity

d = discount factor, WACC in this scenario

g is the growth rate of a firm in the long term (i.e., forever). In DCF models, this rate begins from the last period of the cash flow forecast and continues in perpetuity. This rate usually follows the domestic inflation rate in the long term [11].

2.4.2 Exit Multiple Method

If the operation of the business is not assumed to be indefinite, the perpetuity method for estimating terminal value will be unsuitable. In this case, the terminal value needs to imply the realisable value of the firm's assets at the time. Exit multiples estimate the firm's fair value by multiplying financial metrics (sales, profit, EBITDA, etc.) by a common factor of its peer companies.

3. Results

3.1 Projected Financial Data and Assumptions

3.1.1 Free Cash Flow Forecast

The free cash flow in the past is analyzed to predict future free cash flow. Hence, the best prediction for the future can be made. Figure 1 shows the free cash flow of Coca-Cola in the past five years.

Table 1. Free cash flow of Coca-Cola from 2017 to 2021 (\$Mil)

	2017	2018	2019	2020	2021
Revenue	36,212	34,300	37,266	33,014	38,655
EBIT	9340	10203	10625	9990	11321
Tax Rate	0.21	0.21	0.21	0.21	0.21
Tax	1,961.40	2,142.63	2,231.25	2,097.90	2,377.41
EBIT after Tax	7,378.60	8,060.37	8,393.75	7,892.10	8,943.59
Plus:					
D&A	1,260.00	1,086.00	1,365.00	1,536.00	1,452.00
Less:					
CAPEX	1750.00	1548.00	2054.00	1177.00	1367.00
ΔWC	3877.00	(6308.00)	(1090.00)	(1061.00)	(1796.00)
FREE CASH FLOW	14265.60	4386.37	10722.75	9544.10	9966.59

CAGR (compound annual growth rate) can predict revenue growth, EBIT, depreciation & amortization, and capital expenditures. Using CAGR, the rise and fall in the short term would be ignored, and the rate of return measured is smoothed. CAGR is given by [12]

$$CAGR = \left(\frac{V_{final}}{V_{begin}} \right)^{\frac{1}{t}} - 1 \quad (7)$$

Where:

V_{final} is the final value

V_{begin} is the beginning value

t is time in years

The CAGRs of revenue, EBIT, depreciation & amortization and capital expenditures are 1.6%, 4.9%, 3.6%, and -6.0% respectively.

Since ΔWC is always related to revenue and inventories, the average ratio of Δrevenue and ΔWC is calculated and used to predict the future ΔWC, which is 0.44. Table 2 shows the projected free cash flow of Coca-Cola from 2022 to 2026.

Table 2. Free cash flow forecast of Coca-Cola from 2022 to 2026 (\$Mil)

	2022E	2023E	2024E	2025E	2026E
Revenue	39,291.08	39,937.63	40,594.81	41,262.81	41,941.81
EBIT	11,878.71	12,463.89	13,077.91	13,722.17	14,398.17
Tax Rate	0.21	0.21	0.21	0.21	0.21
Tax	2,494.53	2,617.42	2,746.36	2,881.66	3,023.61
EBIT after Tax	9,384.18	9,846.48	10,331.55	10,840.51	11,374.55
Plus:					
D&A	1,504.41	1,558.71	1,614.97	1,673.26	1,733.65
Less:					
CAPEX	1,285.14	1,208.19	1,135.84	1,067.82	1,003.88
ΔWC	276.92	281.47	286.10	290.81	295.60
FREE CASH FLOW	9,326.53	9,915.53	10,524.57	11,155.13	11,808.73

The tax rate used to predict the future free cash flow is 21%, which is the corporation tax rate of States.

3.1.2 WACC Estimation

Since Coca-Cola is a global company based in the US and is also publicly listed in the US, R_f is set as 3.38%. Because this is the average return of the treasury bill (T-Bill) in the past 10 years [13], and the treasury bill is reckoned as one of the least risky investments in the US. Thus R_f is 3.38%.

The average market risk premium in the US in the past 10 years is 5.60% [14], so this is set as the R_p in the DCF model.

By examining the stock price change and the market fluctuation over the past five years, it can be found that the beta index, β , of Coca-Cola is 0.54 [2]. So Coca-Cola is a firm with less volatility, and it is less sensitive to the change in the market.

By inserting the variables into the formula of the cost of equity, the cost of equity of Coca-Cola can be obtained, which is 6.4%:

$$E = R_f + \beta \times R_p = 3.4\% + 0.54 \times 5.6\% = 6.4\% \quad (8)$$

The cost of debt of Coca-Cola is 4.3% (pre-tax) [2]. The actual cost of debt needs to be minus the tax shield, thus:

$$\text{Cost of debt} = 4.3\% \times (1 - 21\%) = 3.4\% \quad (9)$$

The after-tax cost of debt is 3.4%.

Before reaching the final answer of the WACC, the weights of the debt and the equity need to be determined. The current market values of the debt and the equity of Coca-Cola are \$42.143 billion and \$268.806 billion [2]. Thus, the equity weighs 86.4%, and the debt weighs 13.6% of the total capital.

Therefore the WACC of Coca-Cola is:

$$WACC = \left(\frac{E}{V} \times R_e\right) + \left(\frac{D}{V} \times R_d \times (1 - T_c)\right) = 86.4\% \times 6.4\% + 13.6\% \times 3.4\% = 6.0\% \quad (10)$$

3.1.3 Present Value of Cash Flows

As the WACC has been determined, the discount factors used to adjust future cash flows can also be calculated. The discount factor for each year is $\frac{1}{(1+6.0\%)^t}$, where t is the number of years. Table 3 shows the discounted future cash flows

Table 3. PV of the projected free cash flow of Coca-Cola from 2022 to 2026 (\$Mil)

	2022E	2023E	2024E	2025E	2026E
Discount Factor	0.9434	0.8901	0.8397	0.7922	0.7474
PV of Cash Flows	8,799.02	8,825.61	8,837.87	8,837.56	8,826.23

3.1.4 Terminal Value Estimation

If the terminal value is estimated by the Perpetuity Method (also known as Gordon Growth Method), the perpetuity growth rate must be determined. As introduced in 2.4, the perpetuity growth rate usually follows the inflation rate in the long term. So this rate is assumed to be the predicted long-term inflation rate of the US1, which is 2.4% [15]. By inserting this rate into the formula of the Perpetuity Method, the terminal value of Coca-Cola is:

$$TV = \frac{11808.73 \times (1+2.4\%)}{6.0\% - 2.4\%} = \$335,892.76 \text{ Mil} \quad (11)$$

If the exit multiple methods estimate the terminal value, the peer company of Coca-Cola needs to be selected, as well as the specific valuation multiple. By investigating the market share, geography, and the recent financial positions of other beverage companies, PepsiCo Inc, Keurig Dr Pepper Inc, Nestle SA, and Monster Beverage Corp are selected as peers of Coca-Cola. The valuation multiple chosen is EV/EBITDA. Table 4 shows the EV/EBITDA ratio of each company.

Table 4. Valuation multiples of Coca-Cola and its peer companies (data adapted from [2])

Companies	EV/EBITDA
Coca-Cola Co	21.64
PepsiCo Inc	16.41
Keurig Dr Pepper Inc	16.64
Nestle SA	23.54
Monster Beverage Corp	25.96

The median EV/EBITDA of the peer companies of Coca-Cola is 20.09. EBITDA is simply EBIT plus DA, and this can be found in Table 2. So the EBITDA of Coca-Cola in the last forecast period is \$16131.82 Mil. Thus, the estimation of the TV using the multiple exit methods is given by:

$$TV = 16131.82 \times 20.09 = \$324088.26 \text{ Mil} \quad (12)$$

3.2 Final Valuation of Coca-Cola

The enterprise value is obtained by adding the PV of projected cash flows and the adjusted terminal value of the firm. Table 5 shows the final valuation of Coca-Cola by using the perpetuity method and exit multiple method.

Table 5. Valuation of Coca-Cola

ENTERPRISE VALUE: PERPETUITY GROWTH RATE METHOD				
Grow Rate in Perpetuity				2.4%
WACC				6.0%
PV of Cash Flows		PV of Terminal Value		Enterprise Value
44,126.29	+	251,402.97	=	295,529.26
ENTERPRISE VALUE: EBITDA MULTIPLE METHOD				
EBITDA Multiple				20.090
WACC				6.0%
PV of Cash Flows		PV of Terminal Value		Enterprise Value
44,126.29	+	242,234.14	=	286,360.43

For the simplicity of comparing the value of Coca-Cola, we can subtract the EV by total debt plus cash to obtain the market cap of Coca-Cola. Then finds the stock price by using market cap and the share volume. Thus, the fair value of stock price estimated by perpetuity method and exit multiple method are \$61.36 and \$59.24, respectively.

In DCF valuations, neither the perpetuity growth rate method nor the exit multiple method gives the firm a perfect valuation. The perpetuity method generally gives a higher valuation than the exit multiple valuation. For investors, believing in either method depends on their optimism about the firm. So, the average of these two methods might be taken and hence obtain the final valuation estimate, which is \$ 60.30. The current stock price of Coca-Cola is \$59.40 (on September 21st) [2]. This suggests that Coca-Cola is about fairly valued.

4. Discussion

Although Coca-Cola was experiencing a revenue decline from 2013 to 2018 and Covid-19 from 2020 onwards, the market cap of Coca-Cola was still increasing every year, and the valuation conducted justified that the increase of the market cap of Coca-Cola is not irrational.

This is because the EBIT of Coca-Cola is not reduced as significantly as the revenue. So the free cash flow of Coca-Cola was maintained at a healthy level. Also, at the end of the transition phase of Coca-Cola (2018-2019), the EBIT bounced back quickly, and Coca-Cola recovered from the pandemic swiftly as well. This means Coca-Cola still has great potential to grow. The same trend can also be observed in earnings per share (EPS), and the dividend per share has kept increasing for the past 10 years. Thus, shareholders are confident in Coca-Cola's stock and less likely to be affected by the market change. This explains the constant increase in Coca-Cola's market cap. Considering the above, Coca-Cola's stock is still a good choice for long-term investment.

DCF analysis is not perfect, and it comes with lots of drawbacks. For example, since energy drinks are becoming increasingly popular, Coca-Cola is strategically expanding its portfolio to cover more energy-boosting ranges. This is a huge market to explore and could bring the growth of Coca-Cola to another level. However, DCF valuation can't recognize such future strategy, and it isn't easy to put such planning in the model. DCF valuation is purely based on the company's internal data to predict its future and output the valuation. It does not foresee future changes in the market or the company itself. Also, DCF valuation relies on several assumptions, and the final result is very sensitive to these assumptions. Thus, if there are errors in assumptions, the result could be far off from reality.

5. Conclusion

5.1 Key findings

The fair value of the stock price of Coca-Cola given by the DCF analysis is very close to the current market stock price of Coca-Cola. This suggests Coca-Cola is neither overvalued nor undervalued. Coca-Cola maintained a healthy level of free cash flow during its transition phase and the pandemic. This proves Coca-Cola is in a good financial position, and it is also well managed. By taking further consideration of other financial metrics and the recent performance of Coca-Cola, it is suggested that Coca-Cola still has great potential to grow, and it is a good choice for long-term investment.

5.2 Limitations and Future Study

Due to the inherent problem of DCF analysis, the valuation is an estimation instead of an absolute conclusion or advice. The growth of Coca-Cola could change due to various factors. For a more comprehensive and accurate valuation of Coca-Cola, more financial data will be needed to estimate WACC and the growth of free cash flows. Sensitivity analysis can also be conducted to observe how the valuation varies subject to changes in different variables, giving an interval of the valuation.

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