Business Valuation Method in Investment Decision-Making

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Abstract. In this thesis, valuation of Apple's stock by employing three essential methods: Discounted Cash Flow, Free Cash Flow, and the Discounted Dividend Method. The aim is to project the future prices of Apple's stock based on thorough analysis of the data provided in the company's annual reports over the last decade, particularly focusing on factors like dividends. As per the recent stock market data, Apple's stock is valued at $172.62 per share on March 18, 2024. However, through meticulous calculations using various valuation models, the author has determined that the intrinsic value of Apple's stock stands at a higher value of $188.00 per share. This suggests that the stock is currently undervalued in the market. Given that the intrinsic value of the stock surpasses its current market price, so it is sensible for investors to consider buying Apple's stock. By doing so, people may potentially benefit from the future expected growth and returns that the stock is projected to offer based on fundamental analysis. This analysis provides a suggestion for investors to have confidence in the long-term potential of Apple's stock and consider it a wise investment choice.

Keywords: Investment decision-making, business valuation, Discounted Dividend Model, Free cash flow method, discounted cash flow method.

1. Introduction

With the support of data, there are more and more investors and investment products, and one of the investment products that investors could choose is equity investment. Compared with other investment products, such as bonds, T-bills, and commercial notes, equity has a higher risk and may also have higher returns. However, for investors themselves, because every one of them is risk aversion, which means they are always looking for low-risk investments, they will choose to give up some returns to obtain lower risks. To prevent equity investment from facing too high risks, choosing reasonable and correct investment products is an essential part of making investment decisions, and people need to analyze stocks, predict their future value trend, and find a price of stock that balances risk and return.

On the other hand, for corporate finance, all enterprises need working capital, that is, money. So, how can people get enough funds to support the development of enterprises? This requires corporation financing. There are many ways to finance a corporation, and their costs and returns differ. For firms, it is very important to choose the right financing way. So, under what circumstances will enterprises choose equity financing? The answer is when the stocks are overvalued. In this research, two business valuation methods will be selected to help investors evaluate their aim companies' stock by comparing their current share price to the reasonable share price from the Discounted Dividend Model (hereafter DDM) and the Free Cash Flow to the Firm method (hereafter FCFF) to find out whether the firms' share price is overvalued or undervalued. Therefore, enterprises need valuation, an integral part of equity financing. This research aims to provide several methods to calculate the company's value for investors to help with decision-making regarding equity investment. Moreover, the methods involved in this research are discounted cash flow, dividend, and free cash flow methods. In conclusion, this article provides investors with valuation methods and results for Apple Inc., and investors can use the mentioned methods to conduct valuation analysis in investment decisions to make reasonable investment decisions.

2. Methodology

This essay uses two valuation methods to estimate the market value of Apple Inc., and the following is an introduction to these two methods.

The two methods used in this article are DDM and FCFF. FCFF model is widely used in company valuation. In this method, the most important thing is FCFF and discounted rate., which is mainly divided into two parts; the first is to predict the free cash flow of the enterprise, that is, FCFF, and the second step is to determine the discount rate.

2.1. Free Cash Flow to the Firm Method

Free cash flow means a company's available cash repaid to creditors, such as dividends and interests to investors [1]. The core idea of this model is to calculate the cash flow created by the company's experience after excluding the impact of capital expenditure on cash flow. The calculation formula of the FCFF model is Equation (1).

$$FCFF = EBIT - Tax + Depreciation - CAPEX - Changes\ in\ working\ capital \quad (1)$$

However, the FCFF model has some limitations. Firstly, the prediction of FCFF needs large numbers of assumptions, so the valuation result will be inaccurate. Moreover, the FCFF model mainly focuses on the discount of the company's future cash flow, which may sometimes ignore the company's potential assets, such as brand value and patents.

2.2. Discounted Dividend Model

The DDM method is used to solve these problems and is based on dividend payment for valuation. [2] Compared with the DCF model, which makes complex predictions of future cash flow, the DDM model can reduce future uncertainty.

DDM (Discounted Dividend Model) The core idea of the DDM model is that from the perspective of equity investors, if the return from holding company shares comes only from the dividends issued by the company, and the company can continue to pay dividends steadily, then the value of these shares today can be calculated using DDM. The establishment of the DDM model is based on the following three assumptions [3]:

- The dividend growth rate is constant.
- The company dividend payment is indefinite.
- The discount rate is greater than the dividend growth rate.

Theoretically, if a company's net profit dividend is relatively stable and the dividend does not differ much from the distributable dividend, it can be valued using the DDM model. Nevertheless, the DDM model will be divided into two cases. In some companies, dividends paid to shareholders will increase constantly, called the dividend growth rate. The calculation formula of the DDM model is Equation (2).

$$V = \frac{D}{r - g} \quad (2)$$

In this formula, V represents the stock's intrinsic value, D represents the expected dividend in the next period, r represents the discount rate of return required by the investor, and g represents the dividend growth rate. This formula shows that the stock's intrinsic value equals its future indefinite dividend discount rate. The second case is when the dividend growth rate is 0, which means the company pays the same dividend yearly. The calculation of the DDM method is Equation (3).

$$V = \frac{D}{r} \quad (3)$$

DDM method also has drawbacks. First, the valuation of stocks by DDM is based on dividend payment, so it may not be appropriate for new companies with changes in dividend growth rate or no

dividend payment. Secondly, DDM is very sensitive to parameter input and ignores the impact of stock repurchase. When r is lower than g, the DDM formula will also fail.

3. Analysis

In this paper, Apple is an example of stock investment analysis. Apple Inc. is in the technology industry, mainly producing electronic products, such as iPhone, iPad, and Mac computers, and providing related software and services. [4] Apple's target customers are mainly quality-conscious, fashion-conscious and high-end technology consumers. The scope covers the world, and the main markets include the United States and China. Apple has been in good financial shape, with a substantial cash pile, high-profit margins and a solid stock performance, making it one of the most valuable companies in the world. Apple's products also often get good sales and user praise. Apple's competitive advantage in the technology industry is mainly reflected in its unique product design, innovative technology, strong brand influence and perfect ecosystem. Due to the competition in the market, Apple is also constantly trying to innovate products and expand services to stay ahead. In this article, the analysis will use FCFF and DDM these two methods to calculate Apple's value, to determine whether the company's stock price is reasonable, and to provide investment advice

3.1. Free Cash Flow to the Firm

Firstly, FCFF is used to evaluate Apple Inc. and study the target price. The author finally selected the target price estimated as $ 188.00, 8.8% higher than the March 18, 2024 closing price. The FCFF analysis chart from Excel was used to estimate the target price.

First, this paper will get the total unlevered free cash flow of each year through the data of the income statement and cash flow statement in Apple's annual report; in order to get the total net present value, the author also need to predict Apple's WACC. AAPL's Weighted Average Cost of Capital (WACC) is calculated as the weighted average of its cost of its cost of equity and cost of debts, adjusted for tax; the WACC stands at 8.59% [4]. (Table 1)

Table 1. Cost of Capital of Apple

cost of equity	cost of debt	debt weight	WACC
8.73%	4.76%	3.33%	8.59%

After calculating WACC, free cash flow to the firm (FCFF) is calculated using the cash flow information from the annual report. According to the annual report of AAPL, between 2021 and 2022, the sales annual growth rate was 8%.

Apple has a market cap or net worth of $2800 billion, and its enterprise value is $2730 billion. Apple's cash and short-term investments (quarterly) were 73.10 billion on December 31, 2023. According to Apple's most recent financial statement, reported on December 2023, total debt was $108.04 billion. The equity value of Apple in 2023 was $74.10 billion. Moreover, total minority interest was $352.6 billion in September of 2023—finally, Apple's long-term marketable securities were $100.54 billion. You can use the above value found in the annual report to estimate the equity value, that is 2368.9 billion, divisible by the total number of shares issued by Apple, and finally obtain the estimated share price of $188,00 per share, which is 8.8% higher than the closing price on March 18, 2024.

3.2. Discounted Dividend Model

Due to the limitation of the FCFF method, the author chose another valuation method, the discounted dividend method, to estimate Apple's share value again and compare the two estimated values.

Firstly, the required return rate will be calculated based on some consumptions [5]. (Table 2)

Table 2. Assumptions of DDM

Assumptions	
Rate of return on LT Treasury Composite	4.53%
Expected rate of return on market portfolio	13.63%
Systematic risk of Apple Inc. common stock	1.26
Required rate of return on Apple Inc. common stock	15.96%

Secondly, the dividend growth rate is also based on the historical dividend data from the past ten years' annual reports [5]. (Table 3)

Table 3. Calculation of Dividends growth rate

Year	Value	g(t)
1	g(1)	88.75%
2	g(2)	70.40%
3	g(3)	52.04%
4	g(4)	33.69%
5 and after	g(5)	15.33%

Hence, based on the above data, the author can predict the intrinsic value of Apple's stock [5]. (Table 4)

Table 4. Value of Apple based on DDM

Year	Value	DPS(t) or TV(t)	Present value at 15.96%
0	DPS(0)	0.94	
1	DPS(1)	1.77	1.53
2	DPS(2)	3.02	2.25
3	DPS(3)	4.60	2.95
4	DPS(4)	6.15	3.40
5	DPS(5)	7.09	3.38
5	TV(5)	1,301.55	620.71
Intrinsic value of Apple Inc. common stock (per share)			$634.21
Current share price			$172.62

Through the above calculation, the intrinsic value of the stock is $634.12 per share, while the closing price is $172.62 per share, far lower than the intrinsic value. Therefore, the investors should choose to buy Apple stock because the market price of Apple stock will eventually be consistent with the intrinsic value.

4. Conclusion

In this paper, based on the annual report provided by Apple for nearly ten years, the author uses three valuation models, DCF, FCFF and DDM, to provide risk-averse investor with the forecast of the intrinsic value and future price of Apple's stock, as well as investment advice. The value of the share is a strong reference for investment decisions. From above analysis, it can be concluded that the future value of the stock predicted by FCFF method is $188.00 per share, and the intrinsic value calculated by the DDM model is $634.12 per share. The conclusion reached by both methods is higher than the closing price of $173.62 per share on May 18, 2024, so it can be concluded that the stock of Apple is undervalued. Hence, investors should choose to buy Apple's stock.

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