



# Business Valuation of Microsoft Corporation: Based on the DDM Model and the FCFE Model

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**Abstract.** Since the four Industrial Revolutions brought people mechanisation, electrification, digital manufacturing technology, and smart production, more attention has been paid to technology. Moreover, developing technology has become the top priority in the modern world. The appearance of Microsoft Corporation (MSFT) hit the world dramatically. During its successful operation over five decades, MSFT has launched products like Microsoft Office, LinkedIn, and Xbox, bringing more investors to the company. However, some of them are confused about the company's true value. Whether MSFT is fairly priced becomes the question for investors worldwide. So, this paper tries to calculate the intrinsic value of MSFT using multiple methods, as the DDM Model and the FCFE Model. The assessed value will be contrasted to the firm's market share price to determine if it's undervalued, overvalued, or reasonably priced. Two approaches are used to reduce haphazard. The paper tries to give investors a more comprehensive view of MSFT's stock to help them make investment decisions and optimise their portfolios.

**Keywords:** Corporate Valuation, DDM Model, FCFE Model

## 1 Introduction

Since the 1750s, humanity has entered the era of the Industrial Revolution. The first Industrial Revolution was marked by the advent of textile machinery, which ushered in a new age of mechanisation [1]. By the 1870s, following the invention of the power generator, the second Industrial Revolution was brought about through the achievement of electrification [2]. In the 1940s, the Soviet Union launched the first artificial Earth satellite, heralding the third Industrial Revolution, characterised by digital manufacturing technology [3]. Today, many countries are actively competing in areas such as smart production, the Internet of Things, and cloud computing, entering what is known as the fourth Industrial Revolution [4]. The progression of technology has always been lengthy and continuous, making it a top priority in the development of modern society. Having experienced four Industrial Revolutions, technology has matured significantly. The emergence of Microsoft serves as a milestone in the history of scientific and technological advancement as well.

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Microsoft Corporation (MSFT) is one of the largest software companies in the world and has been a leader in computer science for over four decades. It is well-known for its Windows operating system, Microsoft Office suite, Azure cloud services, and Xbox gaming consoles. With the ongoing development of these products, MSFT remains a significant player in the technology industry, attracting considerable attention from investors worldwide. For these reasons, when deciding what products to invest in, MSFT is always on the list. However, some investors are considering whether MSFT is fairly priced. This paper analyses the company's intrinsic value using the Dividend Discount Model (DDM) and the Free Cash Flow to the Firm Model (FCFF) to help investors determine whether MSFT's stock is undervalued, overvalued, or fairly priced. Such methods are frequently employed in valuing firms, especially those with a consistent record of dividend payment. As for the DDM model, the growth rate of dividends and the required rate of return are important to know [5]. The company's value can also be computed using the FCFF formula, according to the free cash flow predicted for next year, WACC, and the annual growth rate of FCFF [6]. WACC depends on the company's capital structure, which differs from company to company. The significance of this research lies in its ability to provide investors with an objective assessment of Microsoft's stock value. By applying both the DDM Model and the FCFF model to estimate intrinsic value, the results will offer investors a more comprehensive view of Microsoft's stock, reducing the likelihood of biased conclusions that might arise from using a single method.

This study will benefit investors in several ways. First, it aims to assist investors in deciding whether to buy, sell, or hold MSFT stock by comparing the company's intrinsic value with its market price. Additionally, it evaluates Microsoft's sustainability and growth prospects, which are crucial factors for long-term investors. The research also assesses the investment risks associated with Microsoft, especially considering its recent diversification into cloud services and gaming. This paper will also provide financial analysts and institutional investors valuable insights, allowing them to make strategic investment decisions and optimise their portfolios.

## 2 Methodology

### 2.1 The DDM Model

The DDM Model is a frequently employed technique for assessing a company's stock's inherent value. The key concept is that it assumes that a stock's value is determined by adding up all its future dividends and adjusting them to the present value through discounting [7]. This suggests that a stock's worth is judged by its potential to yield prospective cash inflows for its shareholders via dividend payments [7]. It is important that the company being valued has a dividend history, and its historic dividends should be stable enough to predict future dividends better. Moreover, the discount rate should be greater than the dividend growth rate. Valuing stock based on future dividends began in the early 20th century. Date back in 1938, "The Theory of Investment Value" was published by American economist John Burr Williams, where he introduced the thought that it can use a firm's upcoming dividends to compute the worth of stocks [5].

Williams' work contributed to the further study of the DDM, as he found that the dividends in determining a stock's value are very important [5]. In 1956, American economist Myron J. Gordon developed the model by introducing the Gordon Growth Model [8]. It is a variant of DDM, assuming that a company lasts indefinitely and that its dividend grow at a steady rate when it comes to assessing its stock's value [8]. The Gordon Growth Model provides a effective instrument for valuing companies, especially those with stable dividend growth. Since then, the DDM model has maturely developed and is widely used in academia and practice.

The most basic form of the DDM is expressed as Equation (1).

$$p = \frac{D_1}{r-g} \quad (1)$$

Where:

$D_1$  is the dividend expected next year.

$r$  is the required rate of return.

$g$  is the growth rate of dividends.

This paper analyses ten years of dividends from 2015 to 2024 to calculate the compound annual growth rate of dividends over that period. Next, the Capital Asset Pricing Model (CAPM) is utilised to calculate MSFT's required return, using figures reported on Nasdaq and Yahoo Finance, such as the risk-free return, MSFT's beta, and the expected market return (Nasdaq, Yahoo Finance) [9]. The dividend for 2025 is projected based on the annual growth rate, and then the company's intrinsic value is calculated using the DDM. Once MSFT's value is established, it should be compared to its current share price. Investors should consider buying the stock if the intrinsic value is greater than the share price. Investors may want to sell if it is significantly lower than the share price. If the values are comparable, it may be wiser for investors to hold onto their stocks.

There are two variants of DDM [10]. Despite the contribution DDM builds in corporate valuation, it has several limitations. This model is not suitable for companies without paying dividends, and its dividends should be stable enough. The projected dividend, which is assumed to grow continuously, may not be consistent with real-world scenarios. The DDM model is very sensitive to tiny changes in discount and growth rates.

## 2.2 The FCFF Model

Another common way to evaluate a company in corporate finance is the Free Cash Flow to the Firm (hereafter FCFF) Model, usually known as the FCFF Model. The core idea of the FCFF model is that a company's intrinsic value is determined by the present value of its future free cash flows that can be used for financial operations for all debt and equity holders after covering reinvestment and other operational expenses [11]. This model focuses more on real cash flows rather than profit. Moreover, the discounted rate for present value is the Weighted Average Cost Of Capital (WACC) unique to each company [11]. It is worth mentioning that FCFF considers cash flows before debt payment, making it suitable for firms with varying capital structures.

The emergence of the concept of the FCFF model dates back to 1938. It was when American economist John Burr Williams published his book “The Theory of Investment Value” that he raised the Discounted Cash Flow (DCF) framework, emphasising the value of future cash flows in the present is top crucial for valuing a firm [5]. The modern FCFF model was popularised by an Indian economist, Aswath Damodaran, a leading expert in valuation. He further studied the model in his books *Tools and Techniques for Determining the Value of Any Asset* and *Damodaran on Valuation: Security Analysis for Investment and Corporate Finance* [6,12]. Other academics like Richard Brealey, Stewart Myers, and Franklin Allen contributed to adopting FCFF through textbooks like *Principles of Corporate Finance* [13].

The formula of the FCFF is expressed as Equation (2).

$$\text{Value} = \frac{\text{FCFF}_1}{\text{WACC}-g} \quad (2)$$

The WACC can be calculated with Equation (3).

$$\text{WACC} = \left(\frac{E}{V} \times R_e\right) + \left(\frac{D}{V} \times R_d \times (1 - T)\right) \quad (3)$$

Where:

FCFF<sub>1</sub> is free cash flow expected next year.

g is the annual growth rate of FCFF for MSFT.

E is the market value of equity.

D is the market value of debt.

V is the total market value of the company’s financing (V=E+D).

R<sub>e</sub> is the company’s cost of equity.

R<sub>d</sub> is the company’s cost of debt.

T is the corporate tax rate.

This paper uses data from Nasdaq and MSFT’s 10-K forms to calculate free cash flow, including EBIT, the corporate tax rate, depreciation expense, changes in working capital, and capital expenditures (Nasdaq, 10-K form) [14]. Once the necessary free cash flows are calculated, they are used to determine the annual growth rate of FCFF. Applying the Weighted Average Cost of Capital (WACC) formula, the average rate of return expected by the company’s security holders can be found, which is crucial for financing operations and investments [15]. After obtaining the WACC value, Microsoft’s intrinsic value can be calculated using the above-mentioned data. Like the Dividend Discount Model (DDM), the estimated inherent worth should be evaluated against its market price to assess whether it is undervalued, overvalued, or fairly priced. However, the FCFF model limits firms with frequent changes in capital structure, as they may need to readjust the WACC. A small change in WACC and growth rate assumptions can also significantly impact valuation.

### 3 Valuation of MSFT's Stock

#### 3.1 The use of DDM Model

**Calculation of the annual growth rate (g).** The following Table 1 contains the company's dividends for each quarter from 2015 to 2024 and the sum for each year (Nasdaq).

**Table 1.** Dividend Per Share of MSFT in 2015 to 2024 (U.S. dollars) (Nasdaq)

Year	2015	2016	2017	2018	2019
Total dividend	1.29	1.47	1.59	1.72	1.89
Year	2020	2021	2022	2023	2024
Total dividend	2.14	2.36	2.60	2.86	3.16

The compound annual growth rate (g) is calculated using Equation (4), and it's 10.4671%.

$$g = \sqrt[9]{\frac{D_{2024}}{D_{2015}}} - 1 \quad (4)$$

Where:

$D_{2024}$  is the total dividend paid in 2024.

$D_{2015}$  is the total dividend paid in 2015.

9 is the number of years between 2015 and 2024.

According to the formula, MSFT's dividend growth rate between 2015 and 2024 reaches 10.4671% annually.

**Estimation of the Required Rate of Return (r).** It is calculated by using the Capital Asset Pricing Model (CAPM) formula as Equation (5).

$$r = R_f + \beta(R_m - R_f) \quad (5)$$

Where:

$R_f$  is the Risk-Free Rate.

$\beta$  is Microsoft's Beta.

$R_m$  is the Expected Market Return.

4.1% in the formula above (Equation (5)) is the current yield of the 10-year U.S. Treasury (Nasdaq). 0.89 is Microsoft's Beta (Yahoo Finance). 12.8% is the S&P 500 index, which produced a total return of 233.6% since mid-2014, compounding at a 12.8% annualised rate (Nasdaq). As calculated, MSFT's required rate of return is 11.843%.

**Calculation of the Fair Value of Microsoft's Stock.** The DDM formula for valuing a stock is presented in Equation (6).

$$p = \frac{D_1}{r-g} \quad (6)$$

Where:

$D_1$  is the dividend expected next year (2025's projected dividend).

According to the annual growth rate calculated above, MSFT corporation’s dividend in 2025 is predicted to reach \$3.48. Thus, the fair value of its stock is around \$253.16.

### 3.2 The Use of FCFF Model

#### Calculation of the annual growth rate (g) of FCFF.

**Table 2.** Free Cash Flow of MSFT in 2021 to 2024 (U.S. dollars in billion) (Nasdaq)

Year	EBIT	Tax Rate	Depreciation	CapEx	ΔWorking Capital	FCFF
2024	107.79	18.23%	22.29	44.48	-16.37	49.58
2023	89.31	18.98%	13.86	28.11	-4.22	53.89
2022	83.72	13.11%	14.46	23.89	-3.27	60.04

The free cash flow during three years, from 2021 to 2024, is listed in Table 2 (Nasdaq), and the annual growth rate of free cash flow is computed at -9.13%.

**Calculation of the Fair Value of Microsoft’s Stock.** Calculating a company’s value uses the following equation (Equation (7)).

$$\text{Value} = \frac{\text{FCFF}_{2025}}{\text{WACC}-g} \tag{7}$$

Where:

$\text{FCFF}_{2025}$  is free cash flow expected next year (2025’s projected free cash flow).

The WACC of MSFT is 11.69%. As utilised by the annual growth rate of FCFF, which is calculated above, in 2025, \$45.05 is the projected figure for free cash flow for MSFT. According to the formula, the fair price of MSFT’s stock is about \$216.38.

### 3.3 Result

\$253.16 is the value calculated by the DDM model, and \$216.38 is by the FCFF model. No matter what methods are utilised, the computed data is much lower than the company’s previous close of \$410.54 on February 17, 2025. This suggests that the stock of MSFT is overvalued, having less intrinsic value than the market’s.

The reasons why MSFT’s stock might be considered overvalued generally involve the following factors. First, the PE ratio of MSFT is 39.52, higher than 27.77 on average in the technology industry, which means the market has overly optimistic expectations for its future earnings growth (Nasdaq, Macromicro). This would lead to a stock price bubble, taking the form of overvaluation. This overvaluation also comes from the overall tech stock frenzy. Generally, many tech stocks, especially large-cap tech companies, can experience overheated conditions in the market. When investors see other tech giants like Apple and Google with rising stock prices, they may also drive up MSFT’s price, even though it is not worth the value. Moreover, MSFT’s strategies around stock buybacks and dividends have also driven its stock price up. If the company focuses more on returning capital to shareholders and less on long-term investment, it would lead to a short-term price bubble, pricing the stock.

Maybe because of the reasons mentioned above, it is true that the stock of MSFT is overvalued. It is not a wise choice to buy it at present. It would be much better to sell MSFT's stock.

## 4 Conclusion

Since the Fourth Industrial Revolution, which changed how humans live dramatically, countries worldwide have realised that the development of technology is of great importance in modern society. The emergence of Microsoft as a scientific and technological advancement also shocked the world. MSFT is a global technology leader that does business worldwide and has offices in more than 100 countries. Bill Gates and Paul Allen established it in 1975. It develops, licenses, and supports a wide range of software products and services, such as Microsoft Office, Windows operating systems, and Xbox, for a global customer audience. MSFT has been actively operated for over five decades with rich networks in over 100 countries. Therefore, when it comes to investing decisions, MSFT is always on the list. However, some investors wonder whether its market price roughly equals its intrinsic value.

To help investors determine whether MSFT's stock is undervalued, overvalued, or fairly priced, this paper analyses the company's intrinsic value using two common methodologies for valuation: one is the DDM Model, the other is the FCFF Model. All the data came from websites like Nasdaq, Yahoo Finance, and 10-K Form (Nasdaq, Yahoo Finance, 10-K Form). Using the DDM model, the fair value of MSFT is \$253.16. As for the FCFF model, it is \$216.38. However, unlike both calculated values, MSFT's previous close was \$410.54 on February 17, 2025, which is much greater. This suggests that MSFT is overvalued by the market, taking the form of less intrinsic value than the market's. Some factors contributed to this, like overly optimistic expectations from the high PE ratio, overall tech stock frenzy and MSFT's dividend strategies. All in all, it would be better to sell the stock due to its overvaluation.

The result offers investors a more comprehensive view of Microsoft's stock, reducing the likelihood of conclusions with multiple methods. This paper wants to help investors in investing strategies by comparing the company's intrinsic value and market price. In addition, it provides long-term investors with MSFT's growth prospects. The research also assesses the investment risks related to Microsoft, especially considering its recent diversification into cloud services and gaming. Moreover, this paper assists financial analysts and institutional investors make intelligent investment decisions and optimise their portfolios by providing valuable insights.

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