Using the Dividend Discount Model to calculate the stock price in the American stock market

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Abstract. Nowadays, more investors are trying to invest in different companies or projects to generate more profit. Thus, a method to evaluate stocks becomes necessary for investors. A method has been created to help investors always successfully invest by predicting the stock price by paying each company's dividend, a calculating model called the Dividend Discount Model. This research mainly investigates whether the Dividend Discount Model is suitable for use in the American stock market. This paper uses two American companies as examples to analyse. The researcher is asked to identify the influencing factors, such as dividends, growth, and discounts. The calculated stock value is compared with the real stock value to determine the accuracy of this model. After the experiment, the researcher found out that the dividends of each company stay in an increasing trend, so the Dividend Discount Model can assume the stock price correctly, which helps people to finish more successful investments.

Keywords: Business investment, Stock price, Dividend Discount Model, American stock market.

1 Introduction

Investing is the process by which a person or a company invests in another enterprise, and the investor is the one who controls it all [1]. Investors want to get the maximum profit from the company while investing. People invest money in a company by buying its shares on the stock market, and this process is called equity investing [2]. However, it is always challenging for investors to determine which company they should invest in. If the investors do not understand the company, they will quickly lose the invested money and make wrong decisions. If so, investors need a method to help them evaluate whether the stock is undervalued or overvalued, and that way is to use the Dividend Discount Model to make predictions about stock values. The dividend discount model is one method used to calculate the stock price by using the yearly dividend of each company [3]. This research will show how to complete the business valuation with the Dividend Discount Model with a sample of the US stock market by taking the example of Coca-Cola and Walmart.

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During the research process, the stock price will be calculated through DDM using the dividend and discount rate and compared with the stock value to prove the accuracy of DDM in the American stock market. In order to complete this research, it is necessary to collect dividends for a certain year, calculate the growth rate through these dividends in each year, and finally calculate the results to obtain real data from a reliable website and complete the research. This research tends to provide a method to investors to help them make good investment decisions through understanding the corporate and earning profit.

2 The companies selected for business valuation

The first example is Coca-Cola, a company that sells soft drinks. Coca-Cola is a trendy drink worldwide; this company was established in America in 1886 [4]. In the 21st century, almost 1.7 billion people purchase Coca-Cola soft drinks, so the company's brand valuation was ranked 47th in the world in 2024. The revenue for Coca-Cola is about 12.4 billion dollars for the second quarter of 2024, which is higher than last year's revenue of about 3%. The company's gross profit is about 7.6 billion dollars for the second quarter of 2024. The earnings per share is 0.55 dollars simultaneously, which is better than the past quarter. Thus, Coca-Cola is profitable and stable due to its creative package and special taste [5]. This company has extensive market penetration and diversified product lines to increase its customer base and improve sales [6].

The second example in this paper is Walmart, a company built in America. Walmart is a chain that operates shopping malls with 8,500 stores in 15 countries [7]. Walmart is much larger than ordinary supermarkets and has many different commodities. Moreover, Walmart has achieved the lowest cost, thus lowering the selling price. The total revenue of Walmart is about 648,125,000 in the first quarter of 2024, which stays with an increasing trend compared with the past year. The gross profit of Walmart company is 157,983,000 dollars, and the net income is 15,511,000 dollars. The earnings per share in the first quarter of 2024 is 0.24 dollars [8]. Walmart can earn such profit by selling products and offering timely service. This way allows people to buy necessities in the supermarket and at home [9].

3 Method (DDM method)

The dividend discount model refers to DDM, a method often used by people to calculate and predict the values of stocks for the following year [10]. The basic formula of DDM was calculated through dividend and discount rates for each company. (Equation 1)

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + r_t)^t} \tag{1}$$

Its primary purpose is to calculate in stages, using each year's dividend value to accumulate to obtain the stock value, which makes the stock value more accurate. However, in the simplified formula, a new variable appears: the growth rate of dividends. The formula is shown in Equation (2).

$$P = \frac{D}{r - g} \tag{2}$$

The P represents the stock price, the D represents the dividend of companies, the r represents the discount rate, and the g represents the dividend growth rate. This method is only available when the companies have a stable dividend without any sudden growth or sudden decrease, so it is more convenient to get the calculation results than the basic formula [11]. The DDM model mainly predicts the stock value of the following year through the company's dividends over the past years, and the method will be more accurate if people analyze more years of dividends. This method can help buyers understand the company's stocks to judge whether the stock should be bought. DDM lets people know more about it and makes more meaningful transactions. However, in the stock markets of different countries, the use and accuracy of DDM are different, too, and the amount of dividends dramatically affects the use of DDM.

4 Business Valuation

4.1 Valuation of Coco-Cola

In the experiment, The experimenter will first calculate the value of the stock through the Dividend Discount Model and then compare it with the real value to draw a real conclusion. The first example used is Coca-Cola. It is first necessary to search for information about Coca-Cola in the current US stock market and have some basic background understanding. Secondly, This research looked at the dividend value of Coca-Cola. In this experiment, a total of eight years of dividend values were collected. From 2023-2016, the paying dividends and its yearly growth were calculated, as shown in Table 1 [12].

Table 1. Dividend of Coca-Cola

	Dividend	Growth rate
2023	1.84	4.55%
2022	1.76	4.76%
2021	1.68	2.44%
2020	1.64	2.50%
2019	1.6	2.56%
2018	1.56	5.41%
2017	1.48	5.71%
2016	1.4	6.06%

The company did not affect the internal dividend value due to some special external factors, such as COVID-19. The dividend payment trend is increasing. After obtaining the dividend value and growth rate in those eight years, the next step is to obtain the average number of those two amounts, which is 1.62 for dividend and 4.25% for growth rate, to facilitate the calculation of the formula of DDM. Subsequently, Coca-Cola's discount rate was searched on the internet, which is 7.65%, so variables such as discount rate, dividend and growth rate have been collected for this experiment. During the calculation, the average dividend, 6.29, should be divided by the difference between the discount rate, 7.65%, and growth rate, 4.25%, then the calculated stock price will be 47.65. While researchers searched the internet for information about Coca-Cola's stock price, it showed that the price was 64.77, which is 26% different from the real results. Such a deviation is likely to be caused by the retention of decimals, and a 26% difference is not much, which is entirely acceptable. Therefore, using the Dividend Discount Model for stock valuation is effective for Coca-Cola Company. The company's steady dividend payout and growth rate can make the results more credible.

4.2 Valuation of Walmart

The second example is Walmart, which is a large-scale supermarket. The company's dividend and the growth rate from 2023-2016 are shown in Table 2 [13].

Table 2. Dividend of Walmart

	Dividend	Growth rate
2023	2.28	1.79%
2022	2.24	1.82%
2021	2.2	1.85%
2020	2.16	1.89%
2019	2.12	1.92%
2018	2.08	1.96%
2017	2.04	2.00%
2016	2	2.04%

According to this graph, the average dividend and growth rate are 2.14 and 1.91%, lower than the last company. After calculating these values, the discount rate found on the internet is 8.02%. Finally, the stock value is calculated similarly, and the final result is 35.02. It is 50% different from the actual value of 70.38. Such a gap is very average, proving that the results calculated with DDM are meaningful and relatively accurate.

In calculating the dividend and growth rate, both studies took eight years of data, calculated the average value, and tried to retain multiple decimal places. In order to obtain a more accurate value, the DDM calculation was finally carried out. This analysis method is mainly based on the real dividend situation of a company. This analysis method uses the example of listed companies in the United States to prove the accuracy of DDM operations. In these two examples, it can be well judged that the DDM model can effectively calculate and infer the price of stocks, thus proving that DDM can be used in the US stock market, especially when the company has relatively stable dividends. Although the calculated stock price differs, it is all within the acceptable range. However, still, in this analysis, it is very limited. This research only carried out calculations for two companies and could not calculate the DDM of all companies for analysis. Therefore, some companies may not use DDM for calculation, but because there are only a few companies, not all companies are like this. In addition, the dividend value on the network cannot be guaranteed to be 100% correct. Some decimal numbers likely differ due to rounding, so they do not match the real calculation results.

5 Conclusion

In summary, this paper is mainly about predicting the stock price using the Dividend Discount Model and its accuracy. In America's stock market, most companies tend to have a stable dividend paying increase a little bit every year, which helps the Dividend Discount Model become more useful and accurately predicts the stock price. The purpose of the research is to prove the point that the DDM is either valuable or useless. This time, the investigation is based on Coca-Cola and Walmart samples. The experiment guides researchers in finding the dividend, calculating the dividend growth rate, and finding the discount rate online. The dividend discount model calculates the stock price and compares it with the real price. This approach not only helps people infer the stock price and make suitable investments, but it also gives them a deeper understanding of the economic status of a company by looking at its dividends or revenues. In the evaluation process, all the dividend information is found in the official US stock market, so the accuracy and reliability of the information can be guaranteed so that the experiment becomes more rigorous and meaningful. However, there may be some error in some subtle decimal point retention. Most decimals are kept to two decimal places, and the number of digits omitted may affect the final calculation result. Hope this research paper can help investors make the right investment decision by calculating its intrinsic value and comparing it with its market value.

Reference

1. Islam S M. Impact risk management in impact investing: How impact investing organizations adopt control mechanisms to manage their impact risk. Journal of Management Accounting Research, 35(2): 115-139, 2023.
2. Bogle J C. The little book of common sense investing: the only way to guarantee your fair share of stock market returns. John Wiley & Sons, 2017.
3. Aduda J O, Kimathi H. The Applicability of the constant dividend model for companies listed at the Nairobi stock exchange. Journal of Financial Studies & Research, 2011, 11(1): 1-16.
4. Byala S. Bottled: How Coca-Cola Became African. Oxford University Press, 2023.
5. (N.d.-d). Nasdaq.com. Retrieved August 24, 2024, from https: //www.nasdaq.com/ market-activity/stocks/aapl/revenue-eps
6. Banutu-Gomez M B. Coca-Cola: International business strategy for globalization. The Business & Management Review, 2012, 3(1): 155.

7. Sun Z, Zhang Y. Marketing Strategies of Multinational Enterprises in China--Taking Wal-Mart as an Example. Highlights in Business, Economics and Management, 2023, 14: 278-284.
8. Nasdaq.com. [2024-08-24].
    i. https://www.nasdaq.com/market-activity/stocks/wmt/revenue-eps.
9. Taylor J B. The Effect of the COVID-19 Pandemic on Online Shopping at a Traditional Ground Retailer: Walmart, Inc from the Customer Perspective. Trident University International, 2022.
10. Sutjipto E, Setiawan W, Ghozali I. Determination of intrinsic value: Dividend discount model and discounted cash flow methods in Indonesia Stock Exchange. Eddy Sutjipto, Wawan Setiawan and Imam Ghozali, Determination of Intrinsic Value: Dividend Discount Model and Discounted Cash Flow Methods in Indonesia Stock Exchange, International Journal of Management, 2020, 11(11).
11. Jensen G R, Johnson J M. The dynamics of corporate dividend reductions. Financial Management, 1995: 31-51.
12. Nasdaq.com. [2024-08-24]. https://www.nasdaq.com/market-activity/stocks/aapl/dividend-history.
13. Nasdaq.com. [2024-08-24]. https://www.nasdaq.com/market-activity/stocks/wmt/dividend-history.