

GEEK OUT TOPIC: Stock Value and the Dividend Discount Model

The question that has dogged investors since the beginning of time is: what is a stock worth? Clearly, there is no single answer with many differing opinions, which is why we have markets. Many investors buy stocks because they have a gut feeling about a company's prospects or because they like the products produced by the company. Some investors are always in search of stock recommendations from their friends, hair stylists, and the poor stock analyst who gets cornered into a discussion on line at Starbucks or in an elevator. For analysts who are charged with making recommendations and picking price targets, coming up with a stock's true value is a more serious quantitative endeavor that typically involves complex financial models. Because every model is different and they vary from industry to industry, I will cover the high level basics of what goes into the determination of what a stock is worth.

The Dividend Discount Model (DDM)

The dividend discount model is a method for predicting the value of a stock built on present value of all its future dividend payments. If the sum of all future dividends paid by the company discounted to today's dollars is less than the current price of a stock, then the stock is considered to be overvalued. Vice versa if the discounted dividend value is higher than the current stock price. Why dividends? When an investor buys a stock they are, in effect, lending money to a company and, as such, expect to get a return on their investment. If a company is successful and profitable, it will pay investors with dividends. The DDM theory, therefore is centered around the value of a stock being based on the present value of future returns. If you have a background in finance this might remind you of Net Present Value (NPV), which is a method for calculating current value of future returns. The DDM is actually based on the same concept, which is the time value of money.

The time value of money

Consider an example in which you would be given a chance to either receive \$1,000 today or \$1,000 in a year from now. Rationally, you would take the money now and put in the bank to collect interest. If you left the money in the bank for a year with an interest rate of 3%, the account would be worth \$1,030, which would be far better than taking the \$1,000 in a year from now. The value in one year is called its Future Value, which is calculated as follows:

$$FV = PV \times (1 + r)$$

Where:

FV is the future value

PV is the present value

r is the rate of return

In our example:

$$FV = \$1,000 \times (1 + .03) = \$1,030$$

Therefore, using the same variables, we can re-arrange this equation to determine the present value of a future return as follows:

$$PV = \frac{FV}{1+r}$$

Using this equation on our same example in which you were offered \$1,000 in a year from now, you can determine what that money would be worth today as follows:

$$PV = \frac{\$1,000}{1+.03} = \$970$$

Looking at this from an investment perspective, an investment that will pay you \$1,000 in a year with interest rates at 3% is worth \$970 today. If someone offers you this opportunity for anything less than \$970, it would be considered cheap and you should, in theory, take the opportunity.

If we apply this same analysis to a stock, the equation becomes a bit more complicated, but it is based on the same core concept of present value. If we invest in a stock and hold it forever, we

would have to consider all future returns of the stock in order to determine its present value. The way we do that is by expanding our earlier equation as follows:

$$PV = \frac{CF1}{1+r} + \frac{CF2}{(1+r)^2} + \frac{CF3}{(1+r)^3} + \dots + \frac{CFn}{(1+r)^n}$$

Where:

PV is the present value of an investment

CF1 – CFn are future cash flows received from an investment, in our example the dividend

n is the final year of the investment

r is the rate of return expected by an investor

At this point, you might recognize that guessing at and adding up all of the future returns of stock is unlikely to be accurate. As you might expect, finance has an answer for that. The way an analyst can deal with that is by forecasting cash flows, or dividends, for as long as they can possibly be accurate and then coming up with something known as a Terminal Value. Let's say that you can accurately guess at the returns of a company over the next three years (most analysts look out 3 to 5 years). We can use the following equation to come up with a value:

$$PV = \frac{CF1}{1+r} + \frac{CF2}{(1+r)^2} + \frac{CF3}{(r-g)}$$

Where:

PV is the present value of an investment

CF1 – CF3 are future cash flows forecasted over the next three years

r is the rate of return expected by an investor

g is the dividend growth rate expected to happen in perpetuity. That means whatever we expect to get in years three will grow at a rate of *g* forever after.

The third expression of the equation is its Terminal Value.

About those dividends

Now that we know how to put a current value on future dividends we need to consider a number of things. First of all, how confident are we that we can continue to get those dividends? Further, how realistic is it to assume that we will get those dividends forever? These are two of the primary drawbacks to using the dividend discount model. If a company is paying dividends, they have good growth prospects, and we expect the economy to remain stable over the next few years, we can probably come up with a good estimate of value by using a conservative growth rate for the terminal value. Conservative means that we could use

a growth number that is lower than the current growth of the company in order to factor in soft patches in the future. What about companies that don't even pay dividends, such as Lyft or Tesla? How can we value those? It gets a lot more complicated and, in practice, many analysts use alternative valuation methods for these stocks, which are largely based on multiple analysis that relies on the markets to put values on companies. "But what about the finance?", you ask. Well finance has an answer for that too, but you might not like it. For growth companies, which do not typically pay out cash flow in dividends, but rather, plough back profits into the company investing in future products or technologies, investors make investments for future potential. Maybe the company will discover the next big thing and make lots of money in the future. Apple started out as a growth company ploughing back investments for many years before it began paying dividends to shareholders. In this case of a growth company, we would use equations related to the ones above. Here we would calculate the Present Value of Future Growth (PVGO). The calculation, which attempts to bring future returns into today's dollars is tricky and involves many assumptions of future earnings being invested into projects that would yield the company positive returns. Sounds complicated, and it is. What actually ends up happening is that we observe the market value of a company, which is the *de facto* present value and fill in the other side of the equation with as much fact as possible. If we know what a company is worth without factoring in growth based on assumptions about earnings, assets, and market cap, we can calculate PVGO.

In conclusion

Discounting the future returns of an investment into today's dollars is a good way to determine the value of an investment. In the case of dividend paying stocks, we can use dividends along with growth assumptions to come up with a good estimate of a stock's true value. Challenges to the Dividend Discount Model come when applying the financial math to companies that don't pay dividends. In these cases, alternative valuation methods are used relying on market value to assess how much of a stock's current price is based on what is known and what investors hope will be. In a world where many up-and-coming companies tap into public equity markets, valuation becomes a tricky and risky venture. That risk increases as public valuations of "unicorns" reach new heights with each new IPO. In these cases investors are putting a lot of hope in management's finding a way to not only achieve profitability, but to ultimately grow profits to the point that returns can be distributed in the future. Investors need to tread carefully in those investments as "hope" is not a strategy.

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