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Digging Into The Dividend Discount Model

By Ben McClure

It's time to dust off one of the oldest, most conservative methods of valuing stocks - the dividend discount model (DDM). It's one of the basic applications of a financial theory that students in any introductory finance class must learn. Unfortunately, the theory is the easy part. The model requires loads of assumptions about companies' dividend payments and growth patterns, as well as future interest rates. Difficulties spring up in the search for sensible numbers to fold into the equation. Here we'll examine this model and show you how to calculate it. (Will the dividend discount model work for you? Find out more in *How To Choose The Best Stock Valuation Method*.)

Tutorial: Top Stock-Picking Strategies

The Dividend Discount Model

Here is the basic idea: any stock is ultimately worth no more than what it will provide investors in current and future dividends. Financial theory says that the value of a stock is worth all of the future cash flows expected to be generated by the firm, discounted by an appropriate risk-adjusted rate. According to the DDM, dividends are the cash flows that are returned to the shareholder. (We're going to assume you understand the concepts of time value of money and discounting. You can learn more about these subjects in *Understanding The Time Value Of Money*.)

To value a company using the DDM, you calculate the value of dividend payments that you think a stock will throw-off in the years ahead. Here is what the model says:

$$\text{Zero Growth}: P_0 = \frac{\text{Div}}{r}$$

Where:
P= the price at time 0
r= discount rate

For simplicity's sake, consider a company with a $1 annual dividend. If you figure the company will pay that dividend indefinitely, you must ask yourself what you are willing to pay for that company. Assume expected return, or, more appropriately in academic parlance, the required rate of return, is 5%. According to the dividend discount model, the company should be worth $20 ($1.00 / .05).

How do we get to the formula above? It's actually just an application of the formula for a perpetuity:

$$P_0 = \frac{\text{Div}_1}{1+r} + \frac{\text{Div}_2}{(1+r)^2} + \ldots = \frac{\text{Div}}{r}$$

The obvious shortcoming of the model above is that you'd expect most companies to grow over time. If you think this is the case, then the denominator equals the expected return less the dividend growth rate. This is known as the constant growth DDM or the Gordon model after its creator, Myron Gordon. Let's say you think the company's dividend will grow by 3% annually. The company's value should then be $1 / (.05 - .03) = $50. Here is the formula for valuing a company with a constantly growing dividend, as well as the proof of the formula:

$$\text{Constant Growth}: P_0 = \frac{\text{Div}}{r-g}$$

$$P_0 = \frac{\text{Div}}{1+r} + \frac{\text{Div}(1+g)}{(1+r)^2} + \frac{\text{Div}(1+g)^2}{(1+r)^3} + \ldots = \frac{\text{Div}}{r-g}$$

The classic dividend discount model works best when valuing a mature company that pays a hefty portion of its earnings as dividends, such as a utility company.

The Problem of Forecasting

Proponents of the dividend discount model say that only future cash dividends can give you a reliable estimate of a company's intrinsic value. Buying a stock for any other reason - say, paying 20 times the company's earnings today because somebody will pay 30 times tomorrow - is mere speculation.

In truth, the dividend discount model requires an enormous amount of speculation in trying to forecast future dividends. Even when you apply it to steady, reliable, dividend-paying companies, you still need to make plenty of assumptions about their future. The model is subject to the axiom "garbage in, garbage out", meaning that a model is only as good as the assumptions it is based upon. Furthermore, the inputs that produce valuations are always changing and susceptible to error.

The first big assumption that the DDM makes is that dividends are steady, or grow at a constant rate indefinitely. But even for steady, reliable, utility-type stocks, it can be tricky to forecast exactly what the dividend payment will be next year, never mind a dozen years from now. (Find out some of the reasons why companies cut dividends in *Your Dividend Payout: Can You Count On It?*)

Multi-Stage Dividend Discount Models

To get around the problem posed by unsteady dividends, multi-stage models take the DDM a step closer to reality by assuming that the company will experience differing growth phases. Stock analysts build complex forecast models with many phases of differing growth to better reflect real prospects. For example, a multi-stage DDM may predict that a company will have a dividend that grows at 5% for seven years, 3% for the following three years and then at 2% in perpetuity.

However, such an approach brings even more assumptions into the model - although it doesn't assume that a dividend will grow at a constant rate, it must guess when and by how much a dividend will change over time.

What Should Be Expected?

Another sticking point with the DDM is that no one really knows for certain the appropriate expected rate of return to use. It's not always wise simply to use the long-term interest rate because the appropriateness of this can change.

The High-Growth Problem

No fancy DDM model is able to solve the problem of high-growth stocks. If the company's dividend growth rate exceeds the expected return rate, you cannot calculate a value because you get a negative denominator in the formula. Stocks don't have a negative value. Consider a company with a dividend growing at 20% while the expected return rate is only 5%: in the denominator (r-g) you would have -15% (5%-20%)!

In fact, even if the growth rate does not exceed the expected return rate, growth stocks, which don't pay dividends, are even tougher to value using this model. If you hope to value a growth stock with the dividend discount model, your valuation will be based on nothing more than guesses about the company's future profits and dividend policy decisions. Most growth stocks don't pay out dividends. Rather, they re-invest earnings into the company with the hope of providing shareholders with returns by means of a higher share price.

Consider Microsoft, which didn't pay a dividend for decades. Given this fact, the model might suggest the company was worthless at that time - which is completely absurd. Remember, only about one-third of all public companies pay dividends. Furthermore, even companies that do offer payouts are allocating less and less of their earnings to shareholders.

Conclusion

The dividend discount model is by no means the be-all and end-all for valuation. That being said, learning about the dividend discount model does encourage thinking. It forces investors to evaluate different assumptions about growth and future prospects. If nothing else, the DDM demonstrates the underlying principle that a company is worth the sum of its discounted future cash flows. (Whether or not dividends are the correct measure of cash flow is another question.) The challenge is to make the model as applicable to reality as possible, which means using the most reliable assumptions available.