Discounted Cash Flow: Prediction as Art

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Abstract: In practice, the DCF model is suitable for companies characterized by low or moderate growth rates, stable profit margins and strong competitive advantages. We believe that Microsoft (MSFT), which we used as an example in previous articles, is a good candidate for DCF valuation for several reasons. First, its growth rate isn't too high. Second, its margins are relatively stable. And third, it enjoys a near monopoly in the personal computer market.

Full Text: Headnote Part III in a Series on Determining a Company's Value Many investors consider the discounted cash flow (DCF) model of investment valuation to be overly precise. As the world is uncertain and economic conditions are constantly changing, a model that projects business results many years into the future can lead to inaccurate valuations. This argument certainly has merit because businesses contain many shifting components and the DCF model assumes that the investor has the ability to predict them all. In this article, we analyze the pros and cons of the DCF model as objectively as possible. Our aim is to give investors a better sense of when, and when not, to use it. The Model Becomes Dicey With High Growth Rates The biggest drawback of DCF analysis is its inaccuracy in estimating companies with high growth rates. Consider the table below. Just a simple change in the length of the high-growth period leads to a dramatic difference in revenue after 10 years. As high growth rates distort an investment valuation exponentially because of their compounding effect, the DCF model leads to a large degree of error if the investor inaccurately predicts the rate of growth and its duration. In this sense, the DCF model works better with lowgrowth companies with predictable revenues. DCF Can Be Applied to Cyclical Earnings Utilities and toll roads, for example, have stable revenue and consistent businesses, and the DCF model is thus ideal for their analysis. Such industries as shipping and mining also have predictable businesses, but as they're sensitive to the overall economy, their revenues or margins can fluctuate dramatically depending on the economic circumstances. There are two ways to value cyclical companies: the DCF model and valuation multiples. The drawback with valuation multiples is that they only capture a snapshot in time. Hence, the valuation may not reflect the true worth of a business throughout an economic cycle. For example, forward ratios for price-earnings or EV/EBITDA (enterprise value/earnings before interest, taxes and amortization) value a company on the basis of its earnings in the upcoming year. As neither ratio considers the state of the economy, both produce unreliable results when analysis occurs near the peak or trough of an economic cycle. The DCF model, on the other hand, allows investors to project a business up to many years ahead. Investors can play around with the model and assume different economic scenarios in their calculation, although this exercise will produce inaccurate results if it deviates from the actual course of the economy. As a result, when investors use the DCF model to calculate cyclical companies, they must come up with different assumptions and play with the sensitivities of the results to draw meaningful conclusions. From High Growth to Steady Growth In practice, the DCF model is suitable for companies characterized by low or moderate growth rates, stable profit margins and strong competitive advantages. We believe that Microsoft (MSFT), which we used as an example in previous articles, is a good candidate for DCF valuation for several reasons. First, its growth rate isn't too high. Second, its margins are relatively stable. And third, it enjoys a near monopoly in the personal computer market. The following table presents Microsoft's growth rates and EBIT margins from 2007 to 2011. Microsoft's revenue growth rate fluctuated along with the economy, but its margins were very steady. This makes it easy to estimate the future. We know that the company's main products are unlikely to enjoy explosive growth, but neither will they fade away overnight. This means we can have a high

degree of confidence when valuing the company. Microsoft looked quite different in the 1990s. Its numbers in the 1992-1996 period, for example, were as follows (see table on the following page): Reviewing Microsoft's performance over the past 20 years, we can see that its EBIT margins have changed little since the early 1990s, possibly owing to its monopoly-like competitive position. On the other hand, its revenue growth rates were much higher in the past. This may be because of the technological boom of the 1990s and the way in which the company's product lines gained market share. If we had conducted a DCF analysis of Microsoft in 1996 on the basis of these revenue growth figures, our results would have been inaccurate because of the subsequent significant deterioration in the growth rate, which declined from the high 30s to the low teens in less than 10 years. Although we wouldn't have felt overly confident about the results of DCF analysis on Microsoft in 1996, by 2011 the company had evolved into a steady cash cow with a lower but more predictable growth rate. Now that the company has settled down, it's a good candidate for the DCF model. For additional analysis of Microsoft, please refer to the February 2012 issue of BetterInvesting Magazine. Discount Rate and Terminal Value: Making the Case Two variables in a DCF calculation dominate all others when it comes to valuation: the discount rate and the terminal value. The discount rate is the cost of capital and as we have shown in previous articles, it's an imprecise calculation. For example, it can plausibly be argued that a particular company has a cost of capital of 8 percent or 10 percent. With regard to the terminal value, if it's too large a proportion of the total value, the valuation will be less robust to changes in estimates. We cannot entirely resolve these problems within the DCF framework, but we can mitigate them by instead using sensitivity analysis, which involves plugging in various assumptions and seeing how much they affect the final value. A reasonable range of figures should be plugged in for the discount rate and terminal value, as they're the most important numbers. Here we do so for our Microsoft valuation as a reference: Microsoft's value ranges from around $23 to $34. Our experience and observations suggest that this is a tight range because Microsoft's business is predictable in its current state. If investors were to come up with a wide range of numbers, say from $20 to $50, the implication is that the company is highly sensitive to its growth rate or profit margin. When this happens, investors should use other valuation methods to crosscheck their assumptions. On to Sensitivity Analysis When it comes to investment valuation, the most common mistake is the "baby with a hammer" syndrome. To a baby with a hammer, everything looks like a nail. In other words, Value Investing there's no one-size-fits-all valuation method. The DCF model is powerful and it allows greater flexibility than others in its assumptions. Blindly using it alone, however, can lead to disaster, so investors are strongly advised to consider other valuation metrics before drawing solid investment conclusions. This article wraps up our series on discounted cash flow. An important part of DCF, and perhaps any valuation methodology, is sensitivity or scenario analysis. In our next article, we'll explore this topic and see how it can influence our investment portfolio construction. R AuthorAffiliation Ronald Chan and Brian Lui operate Chartwell Capital Limited, an asset management firm based in Hong Kong. Ronald Chan is also the author of Behind the Berkshire Hathaway Curtain: Lessons from Warren Buffett 's Top Business Leaders.

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