CHAPTER 5

Introduction to Company Valuation

A successful investment indicates that the buyer had a more accurate view of the asset's true value than the seller had (otherwise, the seller would have demanded a higher price). The reverse is true for failed investments. This implies that different market participants have different views of the value of an asset, like a company's stock. (Remember that a share of company stock is simply partial ownership of the entire company.) In fact, it is this mixture of views that enables a market to work.

This suggests that investing opportunities appear when an investor spots an asset whose current price diverges from what he believes is its true value. Financial markets may be quite efficient —that is, they may rapidly reflect most relevant information that affect an asset's value in its current market price—but hedge funds and other investors seek to make money from these occasional differences, or inefficiencies. (Market efficiency or inefficiency will be treated in a later chapter). If the current price is below estimated true value, it presents an opportunity to go long on that asset; if the asset is presently overpriced, it presents a short opportunity.

Successful investors develop and apply techniques that independently value companies to discover discrepancies between price and value. The first popular book on "value investing," Benjamin Graham's *The Intelligent Investor* (often cited by Graham protégé Warren Buffett as the definitive work on this investing style), argued that investors should seek a *margin of safety*—that is, they should only buy stocks whose price was well below the investor's estimate of their true value. This has been called "buying dollar bills for fifty cents." But value investing is only possible if the investor is confident of his or her own personal estimate of true value. This chapter is an introduction to valuation techniques.

The methods that follow are often called *fundamental analysis*, because they are based on the fundamentals of a company's business operations and finances. These methods are distinct from *technical analysis*, which attempts to predict stock prices based on past price behavior. Technical analysis also is known more descriptively as "charting."

We will cover three key methods for estimating the value of a company using fundamental factors:

- Book value: An estimate based on the sum of assets and liabilities of the company
- Intrinsic value: An estimate based on future dividends to be paid by the company
- Earnings growth: Projection of expanded earnings into the future

Asset-Based Valuation: Book Value

Companies are required to periodically report their assets and their liabilities, with the difference between the two constituting the firm's net worth. Assets are productive items the firm owns, which can be tangible assets such as factories, or intangible assets such as patents. Assets are categorized according to how quickly they can be converted into cash. Liabilities are financial obligations the firm has undertaken: debts, commitments to pay for raw materials, employment contracts, and so forth; they are likewise categorized by their duration into the future. If the firm closed its doors tomorrow, its net worth is the best available approximation of what its owners would be left with after selling off its assets and paying off its obligations. On the balance sheet this is shown as stockholder's equity or *book value*: it is the value of the firm as captured by accountants on its books.

Book value can diverge from *market value*—the value of the firm as appraised by market prices, also known as *market capitalization*—for several reasons. First, accounting rules are biased to be conservative, so even if an asset has risen in value since the firm originally purchased it—say, a piece of real estate in a growing city—it will be carried on the balance sheet at its original price, less accumulated depreciation. This deflates book value relative to the firm's intrinsic value. For these reasons, the reported book value is usually below the price the company is worth if it were actually liquidated. However, if the firm is forced to sell an asset involuntarily—such as in bankruptcy—it may receive far less than what it had paid, especially if the sale is forced by bad economic conditions that depress the price of all assets. So, in a recession, book value may overstate true value.

When using book value for investing purposes, an asset-based assessment would compare a company's book value—possibly adjusted if the investor believes it is inflated or depressed by special conditions—to its market capitalization. On a per-share basis, the investor would compute the *price-to-book ratio*:

Price-to-book ratio = share price/book value per share

Mature companies with few growth prospects (discussed in further text), or troubled companies that may face liquidation, may have a share price below book value, or little above it. That is, a price-to-book ratio of less than 1.0 or barely above 1.0. Conservative value–style investors are attracted when they can buy a share for less than its book value; this is not uncommon if the company, its industry, or the entire economy is in distress.

Intrinsic Value: Dividend-Based Valuation

Companies exist to use assets in such a way that their value grows over time. This is one of the reasons why book value may underestimate the company's true value: Book value does not reflect future prospects. Capturing this element of value requires us to examine one of the fundamental concepts in finance: the time value of money.

Time Value of Money

Assets are more valuable if they generate cash into the future. If I buy that asset from you, cash flows you received while you owned it will now be paid to me. But I will probably pay you a single lump sum to gain ownership, a sum that is likely far more than one year of cash flows. So the price we negotiate must somehow convert a stream of future cash flows—that the seller relinquishes and the buyer expects—into a lump sum. This process is called *discounting* to reflect the *time value of money*.

Money's time value can be illustrated with a simple example. Say your friend is scheduled to receive a sum of money in one year—for instance, when his deceased grandfather's estate is settled. He can document with certainty that he will receive $10,000 one year from today. But he needs money now. He offers to sell you his right to that bequest. What would you pay for it?

Certainly less than $10,000. Your first reaction is probably that you can't be certain that something won't go wrong and deny you the transferred bequest, so you need to lower your price to reflect that uncertainty. That's an absolutely correct reaction; but for simplicity's sake, let's assume that there is absolutely no doubt that the $10,000 will be forthcoming in 1 year. Is this asset—your purchased claim on the grandfather's estate—worth $10,000 to you?

Again, almost certainly not. Why? Because whatever sum you spend to buy this claim can't be used for some other productive purpose—to deposit in a bank, to start a business, or to buy shares in an existing business. If you buy your friend's promissory note due in 1 year, you lose the use of your money for 1 year. The lost opportunity—which economists call, literally, "opportunity cost"—is the return that you've sacrificed by failing to make the best alternative investment. Let's say that the alternative is to buy shares in the S&P 500 ETF, SPY, which you expect will return 10 percent over the next year. Then your friend's note is only attractive if its expected return is at least as good.

We "charge" the proposed investment—your friend's promissory note, $10,000 payable in 1 year—for the opportunity that you are sacrificing to invest in SPY and earn 10 percent. We *discount* the expected $10,000 payout in 1 year by 10 percent per year to express that *future value* as a value in the present or *present value*. Specifically,

Present value = future value/(1 + discount rate) ^ (number of years till payment)

$PV = FV/(1 + DR)$ ^ I
PV = $10,000/(1.1) ^ 1
PV = $9,090.91

Where *I* is the number of years until payment. So you should not pay more than roughly $9,091 for the promissory note. The *discount rate*, shown as DR, is the rate of return the investor could receive from investing in the best alternative asset. We used the example of the stock market, but others often use a less risky investment such as the interest rate on Treasury bonds. The discount rate chosen should reflect the lost opportunity associated with most likely alternative investment. We charge that opportunity cost to this investment by discounting it to reflect the time value of money we are sacrificing by investing here.

Assets can offer either a single payment, like the aforementioned promissory note, or a stream of payments. Stocks differ from bonds or promissory notes in that they may provide a stream of payments in the form of dividends. These dividends will be paid on a regular basis into the infinite future as long as the company's board elects to maintain the dividend. Note, however, that not all companies pay dividends, and, of course, sometimes companies suspend dividends or fail completely.

Accordingly, assessing the value of a stock based on those future dividend payments is a bit more complex. The present value of all the future dividend payments is equivalent to the present value of each payment, added together.

To explain this, let's go back to the example of promissory notes: If you bought two promissory notes—one payable in 1 year, and the other offering $10,000 payable in 2 years—the value of that portfolio would be the sum of the present values of each note:

PV note 1 (due in 1 year): $10,000/(1.1) ^ 1 = $9,090.91
PV note 2 (due in 2 years): $10,000/(1.1) ^ 2 = $8,264.46
Portfolio value (sum of each note's PV) = $17,355.37

The *intrinsic value* of any asset is simply the present value of all future returns. This is true whether the returns are a single payment or multiple payments, uniform in amount (as in this example), or nonuniform.

The math of discounting to compute the present value is straightforward if the future payments are constant. A challenge is in estimating the future value cash flows, which is outside this book's scope. So we will illustrate valuing a share of stock with simple constant cash flows: dividends.

The Dividend Discount Model

Say that you own a share in an electric utility company, Divco, which pays $1 per year in dividends. Also assume that your best alternative use of your capital offered a return of 8 percent per year. Then the value of the stream of dividends over 10 years from Divco would be as follows:

Year 1: $1/(1.08) ^ 1 = $0.9259
Year 2: $1/(1.08) ^ 2 = $0.8573
Year 3: $1/(1.08) ^ 3 = $.07938
.
.
.
Year 10: $1/(1.08) ^ 10 = $0.4632

The total value of this 10-year stream of dividends is simply the sum of these ten present values, or $6.71. If the only returns to shareholders were this constant stream of dividends for 10 years, a share of Divco stock would have an intrinsic value of $6.71. If it traded in the market for $7.00, it would be overpriced. If it sold for $5.00 a share, it would be a bargain.

Note that each successive year's dividend is worth less in the present, because each dividend is paid farther in the future. By year 10, one dollar in dividends a decade hence is worth less than half as much today. However, dividends don't usually end after 10 years. What if we extended payments farther in the future? For example, a $1.00 dividend payable 50 years from now would today be worth as follows:

Year 50: $1/(1.08) ^ 50 = $0.0213
… or barely 1/50th of its future value of $1.

Long-Term Ownership of an Asset

You can see that if you extend the time horizon far enough into the future, the present value of a dividend then is effectively zero today. So an infinite time horizon won't generate an infinite present value, since beyond some time horizon the present value of future cash flows will be as close to zero as to be negligible. Still those future payments do have value, so how can we compute it?

Ownership of an income-producing asset means, in principle, that you will receive payments *in perpetuity*. (This applies, for example, to any stock: as long as the company survives, its owners receive its earnings.) Consider our earlier equation for a single payment *I* years in the future:

$$PV = FV/(1 + DR) \wedge I$$

We're looking for the sum of all these future values, so we can take advantage of the solution to the infinite sum

$$\sum_{i=1}^{\infty} \frac{1}{n^i} = \frac{1}{n-1} \quad \text{where } |n| > 1$$

And substitute (1 + DR) for *n* in the equation to get:

$PV = FV/((1 + DR) – 1)$
$PV = FV/DR$

The value of a perpetuity—that is, a stream of equal payments forever—is simply the payment (we will use D for dividend now instead of FV) divided by the discount rate. Thus, the PV of perpetuity of payments of *D* each year is *D*/*DR*. In the Divco example, the present value of a share of Divco stock paying $1.00 in dividends each year forever (assuming an 8 percent DR) is

PV (Divco share) = $1.00/.08 = $12.50

So more than half of the share's total value will be realized within the first 10 years,

since PV (10 years) = $6.71, while
PV (forever) = $12.50.

Said differently, all of the dividends paid from years 11 to infinity are worth $5.79.

Growth-Based Valuations

Fast-growing assets, like small growth companies, are valued based on the projections of (fast growing) future earnings. The methods used are identical to those mentioned in the previous sections. The difference is that each year's earnings are projected to be higher than the previous years. The company's value is the sum of each year's discounted cashflow (i.e., present value). In theory, this could be infinity, but, in practice, for any reasonable discount rate, cash flows many years in the future will be discounted essentially to zero. This is why a perpetual cash flow still has a finite present value.

Of course, valuations will depend critically on the assumed rate of growth in earnings. Small differences in growth assumptions can lead to big disparities in valuations.

Integrating Asset-Based and Cash Flow–Based Valuations

The mathematics is the easy part; the challenging part is all the judgments that must be made to create the inputs and assumptions used in these calculations.

Usually asset-based estimates produce lower valuations than do those based on long-term discounted cash flows. This is because asset-based valuations are based mainly on past prices paid for assets, not the—hopefully—enhanced value they have achieved from their use (hopefully superior) by the company. But even book value can overestimate company value if the conditions of sale are not conducive to getting a good price—like a forced liquidation, or a bad recession. Asset-based calculations are often viewed as "lower bounds," but even they may need to be adjusted downward in distress sale circumstances. Analysts commonly discount book value by 30 percent or 50 percent to represent what they believe is the true "worst case."

Cash flow–based estimates are slightly more involved, since it may be necessary to compute, and then discount, future cash flow for each of a number of years. Clearly, the farther in the future you project, the more conjectural your projection will be, since the number of intervening surprises can only increase. You can be reassured that forecasting errors have declining importance farther in the future, because their present values will be more heavily discounted.

An asset-based valuation implicitly ignores future earnings; while a cash flow–based valuation focuses exclusively on those future earnings. Adding the two together can produce the most complete valuation.

Analysts commonly produce a range of valuations. Different methods (such as asset- vs. cash flow–based methods) produce different values, as just noted. Different assumptions will likewise cause variations in values.

What If?

As an example, say, Divco is building a new power plant in an undeveloped area expected to experience rapid population growth (and therefore growth in demand for electric power). The investor might develop several scenarios, reflecting different hypothetical growth rates (and therefore rates of growth in power sales). The "base case" reflects the expected future—say, 4 percent annual population growth for 10 years, tapering to 1 percent per year thereafter. But the investor would be prudent to consider an alternative, more pessimistic scenario, of, say, 2 percent for 10 years and 0 percent annually thereafter. The optimistic scenario might produce a value several times the pessimistic scenario.

For asset-based valuations, an optimistic scenario might assume that each asset will be sold for full book value, and a pessimistic scenario might assume, say, 50 percent of book.

So with several possible valuations—different methods, and different scenarios—which one is right? There is no way to know until the future unfolds. Investors commonly consider a *range* of value estimates. If they are aggressive, they will emphasize the high end; if conservative, the low end. Graham argued for a margin of safety—emphasizing the low end, or possibly something even lower.

In the interests of simplicity, many Wall Street analysts produce a single, point-estimate "target price," but that is really substituting precision for accuracy. All of us have been "mugged by reality"—surprised by developments, usually on the downside, that made a mockery of optimistic valuations. (Dramatic examples of this were behind the 2008 meltdown of most financial institutions.) Your authors believe *it is better to be roughly right than precisely wrong*. Further, we agree with Graham about the importance of a margin of safety. While we can rarely buy dollar bills for 50 cents, we generally aren't tempted unless dollars are priced below 80 cents.