

3rd
Edition



**INVESTMENT
VALUATION**

UNIVERSITY EDITION

*Tools and Techniques for Determining
the Value of Any Asset*

**ASWATH
DAMODARAN**

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Series

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Investment **Valuation**

Tools and Techniques for
Determining the Value of *Any* Asset

Third Edition

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I would like to dedicate this book to Michele, whose patience and support made it possible, and to my four children—Ryan, Brendan, Kendra, and Kiran—who provided the inspiration.

Preface to the Third Edition

This is a book about valuation—the valuation of stocks, bonds, options, futures and real assets. It is a fundamental precept of this book that any asset can be valued, albeit imprecisely in some cases. I have attempted to provide a sense of not only the differences between the models used to value different types of assets, but also the common elements in these models.

The past decade has been an eventful one for those interested in valuation for several reasons. First, the growth of Asian and Latin American markets brought emerging market companies into the forefront, and you will see the increased focus on these companies in this edition. Second, we saw the havoc wreaked by macro-economic factors on company valuations during the bank crisis of 2008, and a blurring of the lines between developed and emerging markets. The lessons I learned about financial fundamentals during the crisis about risk-free rates, risk premiums and cash flow estimation are incorporated into the text. Third, the past year has seen the influx of social media companies, with small revenues and outsized market capitalizations, in an eerie replay of the dot-com boom from the late 1990s. More than ever, it made clear that the more things change, the more they stay the same. Finally, the entry of new players into equity markets (hedge funds, private equity investors and high-frequency traders) has changed markets and investing dramatically. With each shift, the perennial question arises: “Is valuation still relevant in this market?” and my answer remains unchanged, “Absolutely and more than ever.”

As technology increasingly makes the printed page an anachronism, I have tried to adapt in many ways. First, this book will be available in e-book format, and hopefully will be

just as useful as the print edition (if not more so). Second, every valuation in this book will be put on the web site that will accompany this book (www.damodaran.com), as will a significant number of datasets and spreadsheets. In fact, the valuations in the book will be updated online, allowing the book to have a much closer link to real-time valuations.

In the process of presenting and discussing the various aspects of valuation, I have tried to adhere to four basic principles. First, I have attempted to be as comprehensive as possible in covering the range of valuation models that are available to an analyst doing a valuation, while presenting the common elements in these models and providing a framework that can be used to pick the right model for any valuation scenario. Second, the models are presented with real-world examples, warts and all, so as to capture some of the problems inherent in applying these models. There is the obvious danger that some of these valuations will appear to be hopelessly wrong in hindsight, but this cost is well worth the benefits. Third, in keeping with my belief that valuation models are universal and not market-specific, illustrations from markets outside the United States are interspersed throughout the book. Finally, I have tried to make the book as modular as possible, enabling a reader to pick and choose sections of the book to read, without a significant loss of continuity.

CHAPTER 1

Introduction to Valuation

Every asset, financial as well as real, has a value. The key to successfully investing in and managing these assets lies in understanding not only what the value is, but the sources of the value. Every asset can be valued, but some assets are easier to value than others, and the details of valuation will vary from case to case. Thus, valuing of a real estate property will require different information and follow a different format than valuing a publicly traded stock. What is surprising, however, is not the differences in techniques across assets, but the degree of similarity in the basic principles of valuation. There is uncertainty associated with valuation. Often that uncertainty comes from the asset being valued, though the valuation model may add to that uncertainty.

This chapter lays out a philosophical basis for valuation, together with a discussion of how valuation is or can be used in a variety of frameworks, from portfolio management to corporate finance.

A PHILOSOPHICAL BASIS FOR VALUATION

It was Oscar Wilde who described a cynic as one who “knows the price of everything, but the value of nothing.” He could very well have been describing some analysts and many investors, a surprising number of whom subscribe to the “bigger fool” theory of investing, which argues that the

value of an asset is irrelevant as long as there is a “bigger fool” around willing to buy the asset from them. While this may provide a basis for some profits, it is a dangerous game to play, since there is no guarantee that such an investor will still be around when the time to sell comes.

A postulate of sound investing is that an investor does not pay more for an asset than it's worth. This statement may seem logical and obvious, but it is forgotten and rediscovered at some time in every generation and in every market. There are those who are disingenuous enough to argue that value is in the eye of the beholder, and that any price can be justified if there are other investors willing to pay that price. That is patently absurd. Perceptions may be all that matter when the asset is a painting or a sculpture, but investors do not (and should not) buy most assets for aesthetic or emotional reasons; financial assets are acquired for the cash flows expected on them. Consequently, perceptions of value have to be backed up by reality, which implies that the price that is paid for any asset should reflect the cash flows it is expected to generate. The models of valuation described in this book attempt to relate value to the level and expected growth of these cash flows.

There are many areas in valuation where there is room for disagreement, including how to estimate true value and how long it will take for prices to adjust to true value. But there is one point on which there can be no disagreement: Asset prices cannot be justified by merely using the argument that there will be other investors around willing to pay those prices.

GENERALITIES ABOUT VALUATION

Like all analytical disciplines, valuation has developed its own set of myths over time. This section examines and debunks some of these myths.

Myth 1: Since valuation models are quantitative, valuation is objective.

Valuation is neither the science that some of its proponents make it out to be nor the objective search for true value that idealists would like it to become. The models that we use in valuation may be quantitative, but the inputs leave plenty of room for subjective judgments. Thus, the final value that we obtain from these models is colored by the bias that we bring into the process. In fact, in many valuations, the price gets set first and the valuation follows.

The obvious solution is to eliminate all bias before starting on a valuation, but this is easier said than done. Given the exposure we have to external information, analyses, and opinions about a firm, it is unlikely that we embark on most valuations without some bias. There are two ways of reducing the bias in the process. The first is to avoid taking strong public positions on the value of a firm before the valuation is complete. In far too many cases, the decision on whether a firm is under- or overvalued precedes the actual valuation,¹ leading to seriously biased analyses. The second is to minimize, prior to the valuation, the stake we have in whether the firm is under- or overvalued.

Institutional concerns also play a role in determining the extent of bias in valuation. For instance, it is an acknowledged fact that equity research analysts are more likely to issue buy rather than sell recommendations² (i.e., they are more likely to find firms to be undervalued than overvalued). This can be traced partly to the difficulties analysts face in obtaining access and collecting information on firms that they have issued sell recommendations on,

and partly to pressure that they face from portfolio managers, some of whom might have large positions in the stock. In recent years, this trend has been exacerbated by the pressure on equity research analysts to deliver investment banking business.

When using a valuation done by a third party, the biases of the analyst(s) should be considered before decisions are made on its basis. For instance, a self-valuation done by a target firm in a takeover is likely to be positively biased. While this does not make the valuation worthless, it suggests that the analysis should be viewed with skepticism.

BIAS IN EQUITY RESEARCH

The lines between equity research and salesmanship blur most in periods that are characterized by “irrational exuberance.” In the late 1990s, the extraordinary surge of market values in the companies that comprised the new economy saw a large number of equity research analysts, especially on the sell side, step out of their roles as analysts and become cheerleaders for these stocks. While these analysts might have been well-meaning in their recommendations, the fact that the investment banks that they worked for were leading the charge on initial public offerings from these firms exposed them to charges of bias and worse.

In 2001, the crash in the market values of new economy stocks and the anguished cries of investors who had lost wealth in the crash created a firestorm of controversy. There were congressional hearings where legislators demanded to know what analysts knew about the companies they recommended and when they knew it, statements from the Securities and Exchange Commission (SEC) about the need for impartiality in equity research, and decisions taken by some investment banks to create at least the appearance of objectivity. Investment banks even created Chinese walls to separate their investment bankers from their equity research analysts. While that technical separation has helped, the real source of bias—the intermingling of banking business, trading, and investment advice—has not been touched.

Should there be government regulation of equity research? It would not be wise, since regulation tends to be heavy-handed and creates side costs that seem quickly to exceed the benefits. A much more effective response can be delivered by portfolio managers and

investors. Equity research that creates the potential for bias should be discounted or, in egregious cases, even ignored. Alternatively, new equity research firms that deliver only investment advice can meet a need for unbiased valuations.

Myth 2: A well-researched and well-done valuation is timeless.

The value obtained from any valuation model is affected by firm-specific as well as marketwide information. As a consequence, the value will change as new information is revealed. Given the constant flow of information into financial markets, a valuation done on a firm ages quickly and has to be updated to reflect current information. This information may be specific to the firm, affect an entire sector, or alter expectations for all firms in the market.

The most common example of firm-specific information is an earnings report that contains news not only about a firm's performance in the most recent time period but, even more importantly, about the business model that the firm has adopted. The dramatic drop in value of many new economy stocks from 1999 to 2001 can be traced, at least partially, to the realization that these firms had business models that might deliver customers but not earnings, even in the long term. We have seen social media companies like LinkedIn and Zynga received enthusiastic market responses in 2010, and it will be interesting to see if history repeats itself. These companies offer tremendous promise because of their large member bases, but they are still in the nascent stages of commercializing that promise.

In some cases, new information can affect the valuations of all firms in a sector. Thus, financial service companies that were valued highly in early 2008, on the assumption that the high growth and returns from the prior years would continue into the future, were valued much less in early

2009, as the banking crisis of 2008 laid bare the weaknesses and hidden risks in their businesses.

Finally, information about the state of the economy and the level of interest rates affects all valuations in an economy. A weakening in the economy can lead to a reassessment of growth rates across the board, though the effect on earnings is likely to be largest at cyclical firms. Similarly, an increase in interest rates will affect all investments, though to varying degrees.

When analysts change their valuations, they will undoubtedly be asked to justify them, and in some cases the fact that valuations change over time is viewed as a problem. The best response is the one that John Maynard Keynes gave when he was criticized for changing his position on a major economic issue: “When the facts change, I change my mind. And what do you do, sir?”

Myth 3: A good valuation provides a precise estimate of value.

Even at the end of the most careful and detailed valuation, there will be uncertainty about the final numbers, colored as they are by assumptions that we make about the future of the company and the economy. It is unrealistic to expect or demand absolute certainty in valuation, since cash flows and discount rates are estimated. This also means that analysts have to give themselves a reasonable margin for error in making recommendations on the basis of valuations.

The degree of precision in valuations is likely to vary widely across investments. The valuation of a large and mature company with a long financial history will usually be much more precise than the valuation of a young company in a sector in turmoil. If this latter company happens to operate in an emerging market, with additional

disagreement about the future of the market thrown into the mix, the uncertainty is magnified. Later in this book, in Chapter 23, we argue that the difficulties associated with valuation can be related to where a firm is in the life cycle. Mature firms tend to be easier to value than growth firms, and young start-up companies are more difficult to value than companies with established products and markets. The problems are not with the valuation models we use, though, but with the difficulties we run into in making estimates for the future. Many investors and analysts use the uncertainty about the future or the absence of information to justify not doing full-fledged valuations. In reality, though, the payoff to valuation is greatest in these firms.

Myth 4: The more quantitative a model, the better the valuation.

It may seem obvious that making a model more complete and complex should yield better valuations; but it is not necessarily so. As models become more complex, the number of inputs needed to value a firm tends to increase, bringing with it the potential for input errors. These problems are compounded when models become so complex that they become “black boxes” where analysts feed in numbers at one end and valuations emerge from the other. All too often when a valuation fails, the blame gets attached to the model rather than the analyst. The refrain becomes “It was not my fault. The model did it.”

There are three important points that need to be made about all valuation. The first is to adhere to the principle of parsimony, which essentially states that you do not use more inputs than you absolutely need to value an asset. The second is to recognize that there is a trade-off between the additional benefits of building in more detail and the estimation costs (and error) with providing the detail. The

third is to understand that models don't value companies—*you* do. In a world where the problem that you often face in valuations is not too little information but too much, and separating the information that matters from the information that does not is almost as important as the valuation models and techniques that you use to value a firm.

Myth 5: To make money on valuation, you have to assume that markets are inefficient (but that they will become efficient).

Implicit in the act of valuation is the assumption that markets make mistakes and that we can find these mistakes, often using information that tens of thousands of other investors have access to. Thus, it seems reasonable to say that those who believe that markets are inefficient should spend their time and resources on valuation whereas those who believe that markets are efficient should take the market price as the best estimate of value.

This statement, though, does not reflect the internal contradictions in both positions. Those who believe that markets are efficient may still feel that valuation has something to contribute, especially when they are called on to value the effect of a change in the way a firm is run or to understand why market prices change over time. Furthermore, it is not clear how markets would become efficient in the first place if investors did not attempt to find under- and over-valued stocks and trade on these valuations. In other words, a precondition for market efficiency seems to be the existence of millions of investors who believe that markets are not efficient.

On the other hand, those who believe that markets make mistakes and buy or sell stocks on that basis must believe

that ultimately markets will correct these mistakes (i.e., become efficient), because that is how they make their money. This is therefore a fairly self-serving definition of inefficiency—markets are inefficient until you take a large position in the stock that you believe to be mispriced, but they become efficient after you take the position.

It is best to approach the issue of market efficiency as a skeptic. Recognize that on the one hand markets make mistakes but, on the other, finding these mistakes requires a combination of skill and luck. This view of markets leads to the following conclusions: First, if something looks too good to be true—a stock looks obviously undervalued or overvalued—it is probably *not* true. Second, when the value from an analysis is significantly different from the market price, start off with the presumption that the market is correct; then you have to convince yourself that this is not the case before you conclude that something is over- or undervalued. This higher standard may lead you to be more cautious in following through on valuations, but given the difficulty of beating the market, this is not an undesirable outcome.

Myth 6: The product of valuation (i.e., the value) is what matters; the process of valuation is not important.

As valuation models are introduced in this book, there is the risk of focusing exclusively on the outcome (i.e., the value of the company and whether it is under- or overvalued), and missing some valuable insights that can be obtained from the process of the valuation. The process can tell us a great deal about the determinants of value and help us answer some fundamental questions: What is the appropriate price to pay for high growth? What is a brand name worth? How important is it to improve returns on projects? What is the