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Tools and Techniques for Determining
the Value of Any Asset

Fourth Edition

ASWATH DAMODARAN



Investment **Valuation**

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

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Preface to the Fourth 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 two decades have been eventful ones 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 macroeconomic factors on company valuations during the bank crisis of 2008 and the pandemic in 2020, both which shook faith in markets and created new questions in valuation. The lessons I learned about financial fundamentals during these crises about risk-free rates, risk premiums, and cash flow estimation are incorporated into the text. Third, the past decade has seen the surge in platform companies, where the most impressive numbers about these companies are not in their operating metrics, but in the users and subscribers on their platforms. In this edition, we directly confront the question of how to value a subscriber, user, or customer, and use the answer to value these companies. Fourth, I have spent more time in the last decade talking about how valuations are bridges between stories and numbers, and in this edition, I have added a chapter explaining how to build these bridges. Finally, as meme stocks and crypto investments capture the imagination of some in the market, we look at pricing and valuing them.

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 website 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, 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 benefit. 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.

Introduction to Valuation

Every asset, financial as well as real, that is expected to generate cash flows in the future, 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. It is undeniable that 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.

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 many who 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 dangerous, at least as an investment starting point. Perceptions may be all that matter when the investment is a painting or 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 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.

PRICING VERSUS VALUATION

Financial academics and practitioners use the words “price” and “value” interchangeably, with the former perhaps swayed by their early beliefs in efficient markets, where the two are expected to converge, and the latter by an assumption that these words measure the same things. In Figure 1.1, we draw a distinction between valuation and pricing, and argue that value and price are not only determined by different factors but require different tools. As the book’s title indicates, we will examine the details of how to value assets, and we will also look at how best to price those assets in later chapters.

It is true that large numbers of market participants, perhaps even most, are not investors, but instead choose to play the “pricing” game. In that game, winning is defined as buying at a low price and selling at a higher one, taking advantage of shifts in market mood and momentum, with value playing little or no role. Throughout this book, we will classify these participants as traders, and we will hope that they, too, will be able to find use for the pricing portions of this book.

As a final note, we will argue that no matter which side of the investing/pricing divide you fall on, you will benefit by understanding how the other side works. Thus, if you are a true believer in intrinsic value, you will find yourself become better at valuation, if you understand how traders price assets. Conversely, if you are a trader, focused on the pricing process, you will become a better trader, if you learn more about how investors think and value companies.

THE BERMUDA TRIANGLE OF VALUATION

Like all analytical disciplines, valuation has developed its own set of myths over time. This section examines and debunks some of those myths and argues that the biggest challenges to valuation are not technical or mechanical, but come from the way we, as human beings, bring bias into our analyses and deal with uncertainty about the future and from the complexity that has been a by-product of access to data and powerful tools.

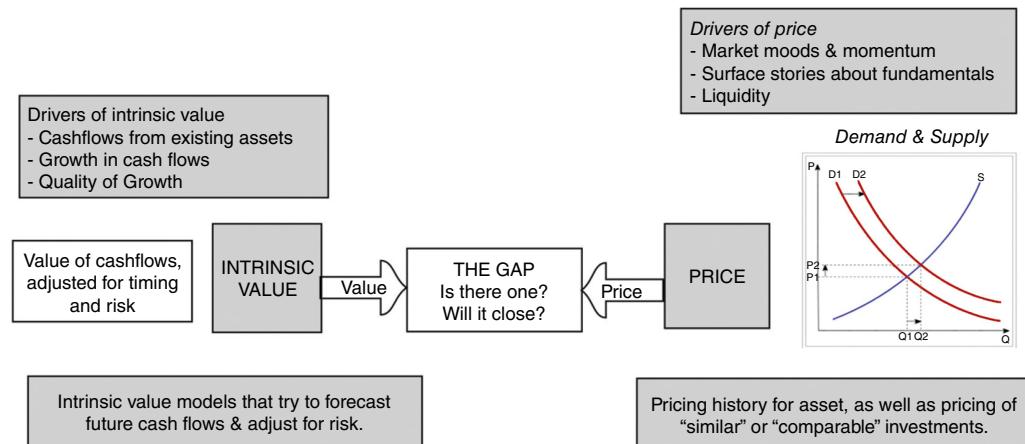


FIGURE 1.1 Value versus Price—The Difference

Bias: The Power of Your Priors

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. In fact, a great deal of bias is subconscious. An investor who picks a company to value almost never does so with a blank slate, since that pick was probably triggered by something he or she heard about the company or read about it. In some cases, the bias can come from what you think about a company's products or its managers. If, like me, you have been an Apple products user for four decades, you will be biased to finding Apple undervalued and Microsoft overvalued before you even look at either company's numbers. Similarly, if you are an investor valuing Tesla in early 2024, it would be impossible for you to separate your views on Tesla from your views on Elon Musk, a man who evokes strong positive and negative reactions.

Can you avoid being biased? We don't think so, but you can be open about these biases, at least with yourself, since that may allow you to counter them, when you estimate numbers for the future. You can also 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 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 whom might have large positions in the stock. In some cases, this trend is exacerbated by the pressure on equity research analysts to deliver investment banking business. Similarly, when bankers are asked to value target companies for mergers and acquisitions, the fact that banking compensation is tied to whether the deal is done and not to whether the deal is favorably priced, will cause target company valuations to be biased upwards. Again, if you do work for these institutions, it may be difficult, if not impossible, to counter those biases, but being aware that they exist is the first step to dealing with them.

As consumers of other people's valuations, the lesson of this section is that when using a valuation done by a third party, the biases of the analyst(s) should be considered before

¹This is most visible in takeovers, where the decision to acquire a firm often seems to precede the valuation of the firm. It should come as no surprise, therefore, that the analysis almost invariably supports the decision.

²In most years, buy recommendations outnumber sell recommendations by a margin of 10 to 1. In recent years, this trend has become even stronger.

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 many 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 dot-com 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 reinforced 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, because 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 is biased 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.

Uncertainty: Feature, Not Bug!

There is a widely held view in valuation that the answer to feeling uncertain about your inputs is to collect more information and do more research. That is not true. 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 economy. It is unrealistic to expect or demand certainty in valuation, since cash flows and discount rates are estimated, and those estimates will be wrong, in hindsight, because the real world delivers surprises that cannot be anticipated.

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. 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 that 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.

There is another aspect of valuation where uncertainty comes into play. After you finish valuing a company, you may be tempted to think that you are done, but it is a work in progress. The value obtained from any valuation model is affected by firm-specific as well as market-wide information, and that value will change as new information is revealed. This information may be specific to the firm, affect an entire sector, or alter expectations for all firms in the market. As examples of firm-specific information, consider earnings reports that firms release on a quarterly basis, which can cause large swings in stock prices and value. On the macro front, inflation rising unexpectedly, as in 2022, and interest rates rising can change valuations across all companies in the market. In 2020, a pandemic that shut the global economy down, altered business valuations dramatically, and so can wars and natural disasters. Put simply, the notion that a well-done intrinsic valuation is timeless and never has to be revisited is delusional. Even the best-done valuation ages quickly and must be updated to reflect current information, and with globalization and business disruption, we would argue that value has become more unstable over time. 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?”

The biggest damage to valuation comes from how analysts and investors react to uncertainty, not its presence. Instead of facing up to uncertainty and using the statistical, financial, and probabilistic tools that we can use to deal with it in a healthy fashion, the more common responses seem to be denial, i.e., acting as if uncertainty does not exist, or paralysis, where you stop valuing companies during crises, or if the companies are young start-ups, with the excuse that valuation is pointless in the face of uncertainty. We believe that the payoff to doing valuation is greatest when times are darkest, and when uncertainty looms, since even an imprecise valuation is better than not doing valuation at all!

Complexity: Bigger, Not Always Better!

A few decades ago, valuations were simpler because analysts and investors had no choice. Data was limited, and the tools we had to use that data were primitive, and the analyses had to reflect those limitations. As data access has broadened and become more effortless, and the tools that we have become more powerful, it has become easier and easier to build big models, and to resist the temptation to add more detail. Complexity in valuation is now more the rule than the exception, with hundreds of line items and layers of detail.

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

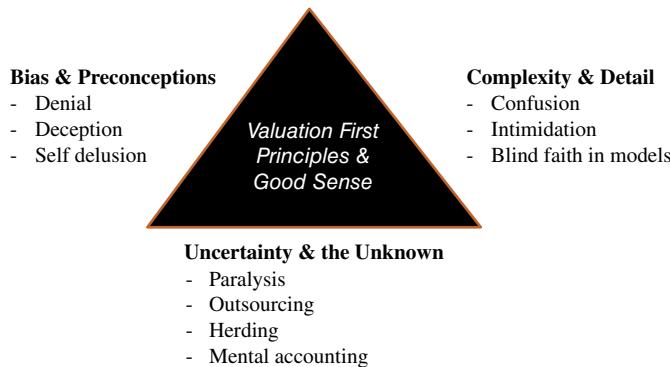


FIGURE 1.2 The Bermuda Triangle of Valuation

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.

In Sum

This section was titled the Bermuda Triangle of Valuation for a simple reason. Just as ships and aircraft are rumored to have disappeared in the mythical section of the Atlantic termed the Bermuda Triangle, analysts and investors valuing companies seem to lose their good sense when confronted with bias, uncertainty and complexity, as can be seen in Figure 1.2.

This phenomenon may also explain why, in our view, having more data and powerful tools has led valuations to become qualitatively “worse” rather than “better” over the last four decades.

MARKET EFFICIENCY

There is no idea in finance more likely to cause a strong negative reaction from investors than the notion of market efficiency. In the early years of finance, as a discipline, it is true that the prevailing wisdom was that markets were efficient, nullifying the reason for active investing and making valuations almost pointless.

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. 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 overvalued 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.

THE ROLE OF VALUATION

Valuation is useful in a wide range of tasks. The role it plays, however, is different in different arenas. The following section lays out the relevance of valuation in portfolio management, in acquisition analysis, and in corporate finance.

Valuation in Portfolio Management

The role that valuation plays in portfolio management is determined in large part by the investment philosophy of the investor. Valuation plays a minimal role in portfolio management for a passive investor, whereas it plays a larger role for an active investor. Even among active investors, the nature and the role of valuation are different for different types of active investment. Market timers should use valuation much less than investors who pick stocks for the long term, and their focus is on market valuation rather than on firm-specific valuation. Among stock pickers, valuation plays a central role in portfolio management for fundamental analysts and a peripheral role for technical analysts.

Fundamental Analysts The underlying theme in fundamental analysis is that the true value of the firm can be related to its financial characteristics—its growth prospects, risk profile,

and cash flows. Any deviation from this true value is a sign that a stock is under- or overvalued. It is a long-term investment strategy, and the assumptions underlying it are:

- The relationship between value and the underlying financial factors can be measured.
- The relationship is stable over time.
- Deviations from the relationship are corrected in a reasonable time period.

Valuation should be the central focus in fundamental analysis. Some analysts use discounted cash flow models to value firms, but there are others who use multiples such as the price-earnings and price-book value ratios. Since investors using this approach hold a large number of undervalued stocks in their portfolios, their hope is that, on average, these portfolios will do better than the market.

Franchise Buyers The philosophy of a franchise buyer is best expressed by an investor who has been very successful at it—Warren Buffett. “We try to stick to businesses we believe we understand,” Mr. Buffett writes.³ “That means they must be relatively simple and stable in character. If a business is complex and subject to constant change, we’re not smart enough to predict future cash flows.” Franchise buyers concentrate on a few businesses they understand well and attempt to acquire undervalued firms. Often, as in the case of Mr. Buffett, franchise buyers wield influence on the management of these firms and can change financial and investment policy. As a long-term strategy, the underlying assumptions are that:

- Investors who understand a business well are in a better position to value it correctly.
- These undervalued businesses can be acquired without driving the price above the true value, and sometimes at a bargain.

Valuation plays a key role in this philosophy, as franchise buyers are attracted to a particular business because they believe it is undervalued. They are also interested in how much additional value they can create by restructuring the business and running it right.

Chartists Chartists believe that prices are driven as much by investor psychology, as by any underlying financial variables. The information available from trading—price movements, trading volume, short sales, and so forth—gives an indication of investor psychology and future price movements. The assumptions here are that prices move in predictable patterns, that there are not enough marginal investors taking advantage of these patterns to eliminate them, and that the average investor in the market is driven more by emotion than by rational analysis.

While valuation does not play much of a role in charting, there are ways in which an enterprising chartist can incorporate it into analysis. For instance, valuation can be used to determine support and resistance lines⁴ on price charts.

³This is extracted from Mr. Buffett’s letter to stockholders in Berkshire Hathaway for 1993.

⁴On a chart, the support line usually refers to a lower bound below which prices are unlikely to move, and the resistance line refers to the upper bound above which prices are unlikely to venture. While these levels are usually estimated using past prices, the range of values obtained from a valuation model can be used to determine these levels (i.e., the maximum value will become the resistance line and the minimum value will become the support line).

Information Traders Prices move on information about the firm. Information traders attempt to trade in advance of new information or shortly after it is revealed to financial markets, buying ahead of good news and selling on bad. The underlying assumption is that these traders can anticipate information announcements and gauge the market reaction to them better than the average investor in the market.

For an information trader, the focus is on the relationship between information and changes in value, rather than on value per se. Thus, an information trader may buy stock in even an overvalued firm if he or she believes that the next information announcement is going to cause the price to go up because it contains better than expected news. If there is a relationship between how undervalued or overvalued a company is and how its stock price reacts to new information, then valuation could play a role in investing for an information trader.

Market Timers Market timers note, with some legitimacy, that the payoff to calling turns in markets is much greater than the returns from stock picking. They argue that it is easier to predict market movements than to select stocks, and that these predictions can be based on factors that are observable.

While valuation of individual stocks may not be of any use to a market timer, market timing strategies can use valuation in at least two ways:

1. The overall market itself can be valued and compared to the current level.
2. A valuation model can be used to value individual stocks, and the results across all stocks are used to determine whether the market is over- or undervalued. For example, as the number of stocks that are overvalued, using a discounted cash flow model, increases relative to the number that are undervalued, there may be reason to believe that the market is overvalued.

Efficient Marketers Efficient marketers believe that the market price at any point in time represents the best estimate of the true value of the firm, and that any attempt to exploit perceived market efficiencies will cost more than it will make in excess profits. They assume that markets aggregate information quickly and accurately, that marginal investors promptly exploit any inefficiencies, and that any inefficiencies in the market are caused by friction such as transaction costs, and cannot be exploited.

For efficient marketers, valuation is a useful exercise to determine why a stock sells for the price that it does. Since the underlying assumption is that the market price is the best estimate of the true value of the company, the objective becomes determining what assumptions about growth and risk are implied in this market price, rather than on finding under- or overvalued firms.

Valuation in Acquisition Analysis

Valuation should, though it often does not, play a central part in acquisition analysis. The bidding firm or individual has to decide on a fair value for the target firm before making a bid, and the target firm has to determine a reasonable value for itself before deciding to accept or reject the offer.

There are also special factors to consider in takeover valuation. First, the effects of synergy on the combined value of the two firms (target plus bidding firm) have to be considered before a decision is made on the bid. Those who suggest that synergy is impossible to value and should not be considered in quantitative terms are wrong. Second, the effects

on value of changing management and restructuring the target firm, i.e., the value of control, will have to be considered in deciding on a fair price. This is of particular concern in hostile takeovers.

Finally, there is a significant problem with bias in takeover valuations. Target firms may be overly optimistic in estimating value, especially when the takeovers are hostile and they are trying to convince their stockholders that the offer prices are too low. Similarly, if the bidding firm has decided for strategic reasons to do an acquisition, there may be strong pressure on the analyst to come up with an estimate of value that backs up the acquisition.

Valuation in Corporate Finance

If the objective in corporate finance is the maximization of firm value,⁵ the relationship between financial decisions, corporate strategy, and firm value must be delineated. In recent years, management consulting firms have started offering companies advice on how to increase value. Their suggestions have often provided the basis for the restructuring of these firms.

The value of a firm can be directly related to decisions that it makes—on which projects it takes, on how it finances them, and on its dividend policy. Understanding this relationship is key to making value-increasing decisions and to sensible financial restructuring. In short, it is difficult to see how you can make good corporate finance decisions, without understanding valuation.

CONCLUSION

Valuation plays a key role in many areas of finance—in corporate finance, in mergers and acquisitions, and in portfolio management. The models presented in this book will provide a range of tools that analysts in each of these areas will find useful, but the cautionary note sounded in this chapter bears repeating. Valuation is not an objective exercise, and any preconceptions and biases that an analyst brings to the process will find their way into the value. And even the very best valuation will yield an estimate of the value, with a substantial likelihood of you being wrong in your assessment.

QUESTIONS AND SHORT PROBLEMS

In the problems following, use an equity risk premium of 5.5 percent if none is specified.

1. The value of an investment is:
 - a. The present value of the cash flows on the investment.
 - b. Determined by investor perceptions about it.
 - c. Determined by demand and supply.
 - d. Often a subjective estimate, colored by the bias of the analyst.
 - e. All of the above.

⁵The objective in corporate finance is to maximize the value of the business, and it is difficult, if not impossible, to construct sensible corporate financial policy without an understanding of the drivers of value.

2. There are many who claim that value is based on investor perceptions and perceptions alone, and that cash flows and earnings do not matter. This argument is flawed because:
 - a. Value is determined by earnings and cash flows, and investor perceptions do not matter.
 - b. Perceptions do matter, but they can change. Value must be based on something more substantial.
 - c. Investors are irrational. Therefore, their perceptions should not determine value.
 - d. Value is determined by investor perceptions, but it is also determined by the underlying earnings and cash flows. Perceptions must be based on reality.
3. You use a valuation model to arrive at a value of \$15 for a stock. The market price of the stock is \$25. The difference may be explained by:
 - a. A market inefficiency: The market is overvaluing the stock.
 - b. The use of the wrong valuation model to value the stock.
 - c. Errors in the inputs to the valuation model.
 - d. All of the above.

