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Valuation

Avoiding the Winner's Curse

Kenneth R. Ferris • Barbara S. Pécherot Petitt

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Preface

Valuation is the essence of finance. It asks the question, "What is the 'fair' price to pay for an asset that has a set of uncertain future cash flows?" In the past, the answer to this question was provided by time-tested methods. In recent years, however, new approaches have emerged as practitioners have sought improved ways to assess value. New approaches have also evolved in response to the development of the "new economy" and the many e-commerce companies that were privatized without a history of either earnings or cash flows.

With the backdrop of a rapidly changing valuation environment, this book presents a practitioner-oriented view of the fundamentals of firm valuation. The focus is on valuation for acquisition purposes. In large measure, an acquisition is viewed herein as equivalent to the purchase of any productive asset, namely, as a capital budgeting exercise. Furthermore, valuation is considered to be an art, not a science. Consequently, the reader will find that there are many "rules of thumb" but few inviolable principles to guide them.

The metrics used for valuing companies are not well defined, varying often according to the objectives of the valuation and often with the companies themselves. Consequently, executives and equity analysts face many choices and dilemmas as they try to assess value. Throughout

this book, practical solutions are suggested for dealing with these dilemmas and for helping the reader make informed choices. The methods discussed are principally for use in nonfinancial companies; the topic of valuing financial companies is beyond the scope of this book.

To use this book effectively, the reader will need an understanding of the fundamentals of accounting and finance. Furthermore, a background in spreadsheet software, such as EXCEL™, is also beneficial.

This book is the result of numerous years of teaching, research, and industry experience. It is also the result of considerable advice from respected friends and colleagues, to include Barry Graham, Michael Moffett, and Anant Sundaram but especially Francis Nzeuton, Graeme Rankine, and Tom Selling. Our thanks go to Torrey Mann, who processed the manuscript throughout its many stages of development.

Kenneth R. Ferris and Barbara S. Pécherot Petitt
June 2001

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1 Valuation: An Overview

MARKET VIEW
Eli Lilly and Company— A Question of Assumptions

On 24 June 1997, the major financial newspapers carried a significant press release from Eli Lilly and Company, one of the world's leading pharmaceutical companies.* The company indicated that it would take a $2.4 billion charge against its second-quarter 1997 results to write down the value of its investment in PCS Health Systems. Three years earlier, Lilly had purchased PCS in an acquisition transaction valued at $4.1 billion.

The company indicated that two unanticipated factors had caused its investment in PCS to decline by more than half of its original value. First, Lilly had expected two other drug companies to buy stakes in PCS and, in so doing, reduce Lilly's exposure in the investment. Those investments failed to materialize after the U.S. Federal Trade Commission began scrutinizing the acquisition because of antitrust concerns. Second, the outlook in the health-care industry had shifted dramatically since 1994. A U.S. health-care program overhaul proposed by the Clinton administration in 1993 that would have substantially expanded the market for PCS's services did not obtain the necessary congressional support for passage.

*See T. M. Burton, "Lilly Will Swallow $2.4 Billion Charge," *The Wall Street Journal,* 24 June 1997, A4; M. Freudenheim, "Lilly Cuts Distribution Unit's Book Value by $2.4 Billion," *The New York Times,* 24 June 1997, D7.

Most Wall Street analysts agreed that the PCS situation provided an excellent illustration of the dangers of making assumptions about future events in merger and acquisition transactions. Lilly's PCS Health Systems debacle eventually came to an end in 1998 when PCS was sold to Rite Aid Corporation for $1.5 billion, bringing Lilly's total acquisition error to $2.6 billion.

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Probably no question in the financial community is asked more often than "What is this investment worth?" Whether the investment is a bond, a share of stock, or an entire company, assessing the economic value of an investment is often the ultimate objective of the corporate executive or equity analyst.

The fundamental tenet of investment valuation is well established in corporate finance: *The value of an asset today is the present value of the future cash flows that the asset is expected to provide its owners.*[1] Valuation thus becomes an exercise in modeling the future cash flows of an investment and deciding how to value those cash flows. Because financial modeling can be quite time-consuming, and often imprecise, valuation analysts have frequently turned to short-cut techniques that (they hope) yield equivalent results with a reduced time expenditure. Alternative valuation metrics have also emerged because not all investments have sufficiently predictable cash flows to permit effective modeling. This was particularly true for many of the "dot.com" companies that characterized the Internet industry in 1999 and 2000. In the chapters that follow, a variety of valuation frameworks are considered: discounted cash flow analysis, earnings multiples analysis, adjusted present value analysis, equity method analysis, revenue multiples analysis, and economic value analysis. We consider each of these frameworks in the context of corporate valuation for merger or acquisition purposes, although the methods discussed can be used for a variety of valuation objectives.

This chapter addresses the following key questions:

- What are the principal reasons that companies merge or acquire one another?
- Why do acquirers pay a premium over the preannouncement share price in takeover transactions?
- What are the typical steps followed when a company is being valued?
- What are the most frequently used methods for assessing firm value?

Why Firms Merge or Acquire: A Historical Perspective

Companies merge with or acquire one another for a variety of reasons. The 1890s, for example, witnessed what is considered to be the earliest "wave" of mergers and acquisitions as companies in the United States tried to gain monopoly power in their respective industries through the formation of trusts — in essence, an extreme form of **horizontal integration.** Examples of this include The Standard Oil Company of New Jersey in 1899, the United States Steel Corporation in 1901, and the International Harvester Corporation in 1902. After the Sherman Antitrust Act successfully outlawed this practice, acquisition-oriented companies turned their attention to the use of vertical integration mergers as a means of growth. **Vertical integration** is perhaps no better illustrated than by the U.S. oil and gas industry; companies that began as pure oil exploration businesses eventually moved into refining, transportation, and ultimately retailing of oil and gas products.

The 1970s witnessed a second major wave of mergers as companies tried to diversify their revenue streams and, in so doing, reduce their perceived riskiness. This trend led to the creation of conglomerates and holding companies composed of many diverse businesses. General Electric Company is one of the most successful examples of this trend. Today's capital markets, however, no longer place a premium on the value of these highly diversified entities. In fact, the share prices of most holding companies today are subject to a **conglomerate discount** as the equity markets struggle to place a fair value on these complex enterprises.[2] In essence, the equity markets now prefer a "pure play" — that is, a single-industry business — to a highly diversified entity, in large part because of the transparency of operations provided by these more easily understood, and consequently more easily valued, businesses.

In the 1980s, a third wave of mergers and acquisitions occurred, but for very different reasons. This period was characterized by relatively high inflation rates and consequently high borrowing costs. Thus, many firms merged in an effort to lower their financing costs, which reached as high as 25 to 30 percent in some instances. Still other firms merged during this period to gain size and thereby take advantage of the economies of scale associated with larger volume producers. These size-driven mergers and acquisitions were also motivated by the inflationary environment of the 1980s as companies tried to become low-cost producers

and ultimately survive the industry "shake-outs" that inevitably characterize such economic periods.

The 1990s saw the emergence of still new justifications for merging or acquiring. Some firms used acquisition transactions as a means to acquire knowledge-based assets. This was particularly true in the late 1990s when the "first mover" advantage became highly prized. With the evolution of the global economy, many companies saw merger and acquisition as the quickest and least expensive means for acquiring a presence in a foreign marketplace and thus preserving their place in the global economy. This latter trend was largely driven by the formation of multination trade pacts such as the European Union (EU), Mercosur, and the North Atlantic Free Trade Agreement (NAFTA). Owning a business within the EU or NAFTA member countries meant that a foreign parent company could avoid the high cost of trade tariffs or other barriers to cross-border trade. Finally, some entities saw merger and acquisition as a means to "roll up" or consolidate those industries characterized by excess market participants, and hence marginal profitability. These "consolidators" recognized that not every participant could survive such economic conditions and consequently fostered a mentality of "acquire or be acquired." Examples of this global trend included the energy industry (e.g., BP Amoco Plc and ExxonMobil Corporation), the pharmaceutical industry (e.g., Pharmacia Corporation, a merger of Pharmacia and Upjohn with Monsanto Company; and GlaxoSmithKline, a merger of SmithKline Beecham and Glaxo Wellcome), and the automobile industry (e.g., the mergers of Daimler and Chrysler and Ford, Volvo, and Jaguar).

Not all of these mergers and acquisitions, however, created shareholder value. In fact, most destroyed value. Although evidence clearly indicates that the shareholders of a target company profit from a takeover, that cannot also be said for the shareholders of the acquirer company. An abundance of evidence shows that although the share price of almost all target companies rises after the disclosure of an intended merger or acquisition, the share price of most acquirer companies declines (for a review of the literature, see Jensen and Ruback 1983). This evidence suggests, among other things, that the securities market has become increasingly skeptical about the value-enhancing effects of merger and acquisition transactions. Whether offer prices are seen as excessive, the proposed synergies are thought unlikely to materialize, or current management is perceived as incapable of successfully merging two different cultures, today's capital markets appear to doubt the value of most merger and acquisition transactions.

Exhibit 1.1 Stock Market Performance of Acquirers After a Merger or Acquisition

Source	Market	Period	Performance
Agrawal, Jaffe, and Mandelker (1992)	U.S.	60 months	−10.26%
Gregory (1997)	U.K.	24 months	−11.89%
Loughran and Vijh (1997)	U.S.	60 months	−15.90%
Rau and Vermaelen (1998)	U.S.	36 months	−4.04%
Pécherot (2000)	France	36 months	−25.41%

Sadly, the markets are correct: *Few merger and acquisition transactions achieve their anticipated gains.* In 1995, for instance, *Business Week* magazine reported that for a sample of 150 mergers and acquisitions from 1990 to 1995, only half produced positive returns to the acquirer shareholders. Similarly, in a 1997 book, *The Synergy Trap,* author Mark Sirower reported that of the 168 mergers and acquisitions analyzed from 1979 to 1990, more than two-thirds destroyed shareholder value. Finally, in a study of 700 mergers and acquisitions from 1996 to 1998, KPMG International found that more than 80 percent of the transactions failed to increase shareholder value and that more than 50 percent actually destroyed shareholder value.

In short, the latest research on the long-run performance of mergers and acquisitions shows that, on average, acquirers experience a destruction of wealth. For instance, as shown in Exhibit 1.1, Agrawal, Jaffe, and Mandelker (1992), Loughran and Vijh (1997), and Rau and Vermaelen (1998) indicate that U.S. firms involved in a merger or acquisition underperform the market by 10 to 15 percent.[3] Gregory (1997) and Pécherot (2000) likewise confirm this result for the English and French capital markets. To help understand why so few mergers and acquisitions actually enhance shareholder value, it is instructive to consider recent data on the premiums paid in these transactions, to which we now turn.

Merger and Acquisition Premiums

A substantial body of evidence indicates that merger and acquisition premiums average 20 to 30 percent above a target firm's preacquisition share price. For example, in a study of 855 takeover offers between 1987 and 1996, Hand and Lynch (1999) found that the mean target price increase

averaged 20.3 percent. In general, merger and acquisition premiums, which are sometimes referred to as "control premiums," are thought to be demanded by the capital markets as compensation for transferring controlling interest in a target firm to an acquirer. Majority control in a firm conveys many valuable rights and benefits, including control over all operating policies and decisions, the selection of management and the board of directors, and the distribution of funds to shareholders.

Merger and acquisition premiums can also represent compensation for other economic benefits, for example:

- **Synergy benefits** from the installation of a more efficient target management team, improved production techniques, the redeployment of assets to more profitable uses, the exploitation of increased market power, and/or cost efficiencies from economies of scale
- Target firm **operating tax loss carrybacks and carryforwards** that may be used to shield acquirer-firm operating profits from taxation
- **Capital market pricing inefficiencies,** wherein target companies may be undervalued because of the market's preoccupation with short-term earnings or a poor industry outlook

If merger and acquisition transactions yield these valuable economic rights and benefits, why then do most destroy shareholder value? The reasons are many, but the five principal explanations for value destruction appear to be the following:

1. Overestimation of target firm growth and/or market potential (i.e., a forecasting error problem)
2. Overestimation of expected cost and/or revenue synergies (i.e., another forecasting error problem)
3. Overbidding (or what is sometimes called "executive hubris")
4. Failure to undertake a thorough due diligence of the target firm's operating and financial risks
5. Failure to successfully integrate an acquiree after a successful merger or acquisition

In essence, in about one of every two mergers or acquisitions, the acquirer management commits some type of critical error — in the assessment of target-firm value, in the bidding process, or in the postacquisition inte-

gration of the acquiree. How to avoid each of these pitfalls is beyond the scope of this book; instead, we focus on the *process* of assessing firm value, namely, the specific accounting, finance, and taxation issues that the analyst must successfully deal with in order to assess economic value, to which we now turn.

The Process of Valuation

Analysts refer to five types of "firm value": book value, break-up value, economic value, liquidation value, and market value.

Book value refers to the accounting value of a company — that is, its total assets minus its total liabilities. It is the residual value remaining assuming that a company's assets can be sold for their reported book values and the proceeds used to satisfy all liabilities at their recorded values. **Break-up value,** on the other hand, refers to the amount that could be realized if a company were split into saleable units and disposed of in a negotiated transaction; this concept is principally relevant for those companies composed of a variety of individual business units or segments. **Economic value** refers to the after-tax cash flows that a company is expected to provide to its owners over its expected economic life; it is a forward-looking concept, measured by assessing a firm's potential future cash flows. **Liquidation value** refers to the amount that could be realized if a company were liquidated in a distress sale. Finally, **market value** refers to the consensus value of a company based on values established in an organized and orderly marketplace such as a securities market.

Although all five values may be used for valuing a company, this book deals primarily with the determination of *economic value* because it represents the "ongoing" value of a company. Thus, the value of a company is defined herein with reference to the future cash flows expected to be provided by a company to its owners over the entity's expected economic life.

The process of valuing a company is usually undertaken in five steps:

1. Identify and screen potential merger and acquisition target candidates thoroughly to ensure that the proposed transaction is an appropriate one from a *strategic* standpoint.

2. Analyze the historical performance of the potential acquiree to ensure that the target company is an appropriate partner in a

financial sense, as well as to gain a thorough understanding of the target's operations and business model.

3. Model the future performance of the target company through the preparation of pro forma financial statements. Although much is made about selecting the appropriate valuation multiple or discount rate, *nothing* is more important in assessing firm value than a complete and accurate modeling of a target firm's operations. This critical step requires a thorough understanding of the target's business model — its revenue and cost drivers — as well as the development of realistic assumptions about the target's future operations.
4. Estimate the operating value of the target company after its free cash flows and its continuing value are calculated.
5. Estimate the equity value of a target firm and assess the sensitivity of the key pro forma assumptions on the target's equity value.

As we will see, steps 4 and 5 can be avoided when short-cut valuation techniques, such as earnings or revenues multiples analysis, are used.

Alternative Valuation Frameworks

Several valuation approaches are available depending on whether a target firm is a start-up or a mature entity and also on the target's industry. We focus on the mainstream methods, and the most popular of these can be segmented into two categories: (1) relative valuation methods, and (2) direct valuation methods. Relative valuation methods, by definition, do *not* provide a *specific* assessment of firm value; that is, relative valuation methods do not reveal whether a security is fairly priced but only whether it is fairly priced *relative to* some peer group. Thus, these methods are most useful when an acquirer is making an intraindustry acquisition; but when an acquirer is considering a number of alternative acquisition targets from a variety of industry settings, these methods provide little comparative insight. This group of methods includes earnings multiples valuation, revenues multiples valuation, and book value multiples valuation.

Direct valuation methods, on the other hand, use various conceptual viewpoints to yield specific assessments of the present value of the future

cash flows that an acquisition transaction can be expected to provide to its owners. These methods include the discounted cash flow approach, the adjusted present value approach, the equity method approach, and the economic value approach. Each of these methods has as a central tenet the notion that value is a function of the cash flows provided by an investment.

That there are multiple direct valuation frameworks, all essentially grounded in the same economic tenet, suggests two important observations:

- The financial community is in relative agreement as to what drives value — future cash flows; but
- the financial community is not in agreement as to what drives share price.

In today's global economic setting, it would be naïve to suggest that security prices are driven by any *single* factor. Indeed, the proliferation of alternative valuation frameworks reflects in part the financial community's inability to agree on exactly which factors are the primary drivers of share prices — revenues, accounting earnings, book value, economic income, or discounted cash flows. The dominant viewpoint, however, and hence the framework endorsed in this book, is that (ceteris paribus) discounted cash flows are most closely related to share price *value* movements.

We now turn to a closer examination of the relative and direct valuation frameworks.

Relative Valuation Methods

The notion that "time is money," or stated alternatively, that "time is an expensive and limited commodity," is one of the principal reasons for the presence and use of relative valuation methods. Other reasons are that they are simple to apply and easy to understand. In essence, relative valuation techniques provide executives and equity analysts with a "quick and dirty" way to analyze the value of a company that the potential acquirer can readily understand.

The three most commonly used relative valuation metrics are

- Market price per share–to–earnings per share
- Market price per share–to–revenues per share
- Market price per share–to–book value per share