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Competitive Advantage
Period “CAP”

The Neglected Value Driver

Why CAP Matters

In 1991, a Goldman Sachs limited partner, Barrie Wigmore, released a study that attempted to determine what factors drove the stock market's above-average returns in the decade of the 1980s. After carefully accounting for earnings growth, interest rate declines, M&A activity and analysts' "too-rosy" forecasts, it appeared a full 38% of the shareholder value created in the 1980s remained unexplained. Dubbed the "X" factor, this mysterious driver of value left Wigmore and the *Wall Street Journal*¹, which published a feature article on the study, at a loss. Given overwhelming evidence of well-functioning capital markets, it appears completely unsatisfactory to attribute such a large component of share price performance to some unidentifiable and seemingly inexplicable force².

Fortunately, we believe there is an answer to this problem. However, to understand the solution there must be a recognition that share prices are not set by capitalizing accounting-based earnings, which are at best flawed and at worst substantially misleading. It appears that this was precisely the paradigm under which both Mr. Wigmore and the *Wall Street Journal* were operating. The focus must be on the economic drivers of a business, which can be defined as cash flow (cash-in versus cash-out), risk (and appropriate demanded return) and what we have dubbed "competitive advantage period"—CAP—or how long returns above the cost of capital will be earned. CAP is also known as "value growth duration"³ and "T"^{4,5} in the economic literature. CAP is also similar in concept to "fade rate."

In this context, we believe Mr. Wigmore's "X" factor can be explained by the market's extension of expectations for above-cost-of-capital returns. As Mr. Wigmore's analysis suggests, the length and relative change of CAP can have a substantial impact on the value of a business and the market overall. For example, the revision in expectations of Corporate America's ability to generate returns above its cost of capital is a powerful indicator that investors believed that America was *more* competitive at the end of the 1980s than it was entering the decade. This conclusion was later supported by economic analysis.

It should be noted that in a well-functioning capital market all assets, including bonds and real estate, are valued using similar economic parameters. In the case of bonds, for example, the coupon rate (or cash flow) is contractually set, as is the maturity. The bond price is set so that the expected return of the security is commensurate with its perceived risk. Likewise for most commercial real estate transactions⁶. At the end of the day, the process of investing returns to the analysis of cash flow, risk and time horizon. Since these drivers are not contractually set for equity securities, they are by definition expectational and, in most cases, dynamic.

Remarkably, in spite of CAP's importance in the analytical process—which we will attempt to demonstrate below—it remains one of the most neglected components of valuation. This lack of focus appears attributable to two main factors. First, the vast majority of market participants attempt to understand valuation and subsequent stock price changes using an accounting-based formula, which generally defines value as a price/earnings multiple times earnings. Thus CAP is rarely explicitly addressed, even though most empirical evidence suggests that the stock market deems cash flow to be more important than earnings, holds true to the risk/reward relationship over time, and recognizes cash flows many years into the future⁷.

CAP Defined

Second, most companies use a forecast period for strategic planning purposes (usually three to five years) that is substantially different from their CAP. As a result, investor communication is geared more toward internal company-based expectations rather than external market-based expectations. If the determination of stock prices is approached with an economically sound model, as we argue it should be, the concept of CAP becomes immediately relevant, as we show below.

Competitive advantage period (CAP) is the time during which a company is expected to generate returns on incremental investment that exceed its cost of capital. Economic theory suggests that competitive forces will drive returns down to the cost of capital over time (and perhaps below it for a period). Said differently, if a company earns above market required returns, it will attract competitors that will accept lower returns, eventually driving industry returns lower.

The notion of CAP has been around for some time; nonetheless, not much attention has been paid to it in the valuation literature. The concept of CAP was formalized by Miller & Modigliani through their seminal work on valuation (1961). The M&M equation can be summarized as follows:

$$\text{Value} = \frac{\text{NOPAT}}{\text{WACC}} + \frac{\text{I(R-WACC)CAP}}{(\text{WACC})(1+\text{WACC})}$$

where

NOPAT = net operating profit after tax

WACC = weighted average cost of capital

I = annualized new investment in working and fixed capital

R = rate of return on invested capital

CAP = competitive advantage period

Rearranged, the formula reads:

$$\text{CAP} = \frac{(\text{Value} * \text{WACC} - \text{NOPAT})(1 + \text{WACC})}{\text{I(R-WACC)}}$$

These formulas have some shortcomings that make them limiting in practice, but they demonstrate, with clarity, how CAP can be conceptualized in the valuation process.

A company's CAP is determined by a multitude of factors, both internal and external. On a company-specific basis, considerations such as industry structure, the company's competitive position within that industry, and management strategies define the length of CAP. The structured competitive analysis framework set out by Michael Porter can be particularly useful in this assessment⁸. Important external factors include government regulations and antitrust policies. CAP can also reflect investor psychology through implied optimism/pessimism regarding a firm's prospects.

We believe that the key determinants of CAP can be largely captured by a handful of drivers. The first is a company's current return on invested capital. Generally speaking, higher ROIC businesses within an industry are the best positioned competitively (reflecting scale economies, entry barriers and management execution). As a result, it is often costlier and/or more time consuming for competitors to wrest competitive advantage away from high-return companies. Second is the rate of industry change. High returns in a rapidly changing sector (e.g., technology) are unlikely to be valued as generously as high returns in a more prosaic industry (e.g., beverages). The final driver is barriers to entry. High barriers to entry—or in some businesses, “lock-in” and increasing returns—are central to appreciating the sustainability of high returns on invested capital.

Note that CAPs are set at the margin by self-interested, motivated and informed investors. That is, if an implied CAP is “too short” (too long) for the shares of a given company, astute investors will purchase (sell) those shares in an attempt to generate excess returns. Accordingly, changes in CAP are a critical driver in valuation. Experience shows that CAPs are rarely static, and are usually in the process of expanding or shrinking.⁹

Graphically, CAP can be represented by the accompanying two figures. In Figure 1, the Y axis represents expected return spread (return on invested capital less the cost of capital) while the X axis is time. As time goes on, competitive forces drive returns to a level equal to the cost of capital. The shaded area under the curve, therefore, is what the market is trying to determine, and is the basis for P/E ratios, cash flow multiples and various rate of return measures. Figure 1 presents the theoretical decay in excess returns as competitors are drawn into the industry. Figure 2, on the other hand, is how we believe the market actually works. Although value creation may occur beyond the CAP, as shown in this figure, risk-averse investors are only willing to go so far into the future. This notion has implications that will be explored below.

Figure 1
Theoretical Decay in Excess Returns

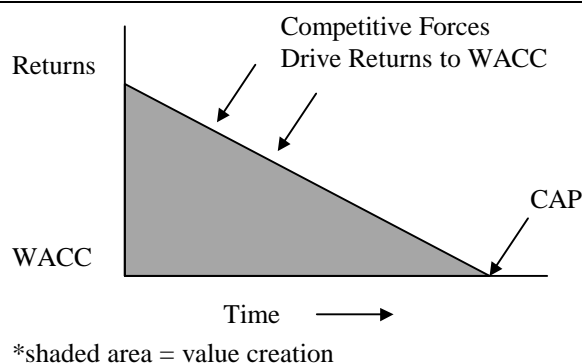
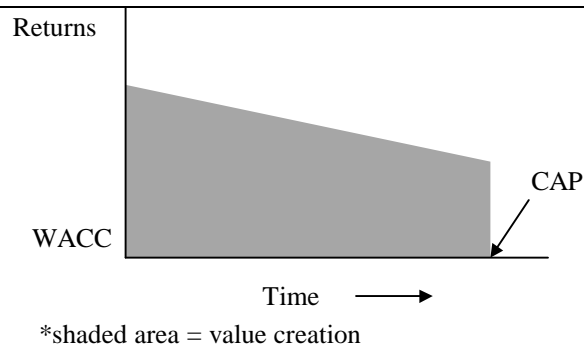


Figure 2
How the Market Works



A careful look at these figures also reveals that they capture the three traditional components of a discounted cash flow model. The first is a “prestrategy,” or “steady state”¹⁰ value—the worth of the company if no value is created. This point is represented by the intersection of the X and Y axis. The second component is the

value created by the company's pursued strategy, represented by the shaded area. Finally, there is the terminal value, which often, but not always, assumes no further value creation. The terminal value is where the "CAP" line intersects the X axis.

From a practical standpoint, we find that the discounted cash flow analysis done by most analysts and strategic planners has a forecast period, or CAP, that is too short and a terminal value that incorporates too much of the overall value. As a result, the calculation of value becomes highly sensitive to the implicit growth assumptions beyond the forecast horizon that are imbedded in the terminal value. For example, it is not unusual for 75% or more of a company's value to be attributable to a terminal value. In contrast, a DCF model incorporating CAP usually has a longer forecast horizon, all growth assumptions are explicitly stated, and the terminal value is usually a modest contributor to overall value.

In a theoretical sense, the allocation of intrinsic value among the components is not important; in real life, valuations vary widely as a result of different CAPs and methods employed to calculate terminal value.¹¹ To paraphrase John Maynard Keynes, we would rather be vaguely right than precisely wrong.

We often hear that it is completely unreasonable to forecast beyond two or three years, because "anything beyond that is guessing"¹². This logic misses the point, which is that the market often *does* impound cash flows beyond the near term. Accordingly, an analyst must gain an understanding of *why* cash flows are recognized for so long and *whether or not* those cash flow expectations are reasonable.¹³

Our discussion so far has dwelled on those companies that generate returns above the cost of capital, a universe which represents roughly one-third of corporate America (another one-third are estimated to be value-neutral with the last third value destroying).¹⁴ Two points are noteworthy about value-neutral and value-destroying companies. First, the CAP for a value-neutral company is of little consequence, since returns are assumed to be equal to the cost of capital (i.e., the second part of the M&M formula has little or no value). Applying such performance to either Figure 1 or Figure 2 would show little area under the curve, thus having a minimal impact on value. Second, value-destroying companies are often tricky to model, because many of them appear to have an "imbedded option" for better performance. That is, the market is willing to pay more for these companies than one would otherwise expect due to the *possibility* that the company will restructure, and hence generate better returns in the future.¹⁵

How Long Are CAPs and How Should They Be Determined?

The CAP for the U.S. stock market, as a whole, is estimated to be between 10 and 15 years. However, within that aggregate, individual company CAPs can vary from 0-2 years to over 20 years. As a general rule, companies with low multiples tend to have shorter CAPs (interestingly, these low multiples are accompanied by above-market-average earnings growth in some industries). Alternatively, companies with high multiples typically have long CAPs. For example, companies like Microsoft and Coca-Cola have CAPs well in excess of 20 years, demonstrating their perceived market dominance, the sustainability of high returns, and the market's willingness to take the long view. If a substantial percentage of the value of a company can be attributed to cash flows beyond a few years, it is difficult to argue persuasively that the market is short-term-oriented. In turn, it follows that the forecast periods used in most valuation models are not long enough.

As we will argue below, it may be more important for the investor to try to quantify CAP than to pass judgment on its correctness. As noted earlier, the components of value are all expectational, and therefore must be considered relative to one another and against the expectations for the business overall.

There are a number of ways of estimating CAP, but one of the most useful methods was developed by Al Rappaport¹⁶. We have chosen to borrow and slightly alter Rappaport's name for the technique—market-implied duration—and call it market-implied CAP (MICAP). Determination of the MICAP has a few steps. First, the analyst needs a proxy for unbiased market expectations as the key input into a discounted cash flow model (we use *Value Line* long-term estimates). Since, by definition, there is no value creation assumed after CAP, the model uses a perpetuity assumption ($\text{NOPAT}_{\text{CAP}}/\text{WACC}$) for the terminal value. Next, the length of the forecast horizon is stretched as many years as necessary to achieve the current stock price. This period is the company's MICAP.

Scrutiny of the MICAP determination process would correctly identify it as a circular exercise. That is, if a stock price increases without changes in cash flow expectations and/or risk, the MICAP will necessarily expand. This in no way weakens CAP's value as an analytical tool, however, as the next section will explain. In fact, we believe this tight link with valuation highlights the power of including CAP as a key tool in the analytic toolbox.

We believe that MICAPs can be key to the analytic process. For instance, a calculated MICAP can be compared to previous MICAPs for the same company, an average MICAP for the industry (if possible and appropriate), and the company's historical cash-on-cash return on invested capital. We have done this analysis for the packaged food industry over the past few years, and have consistently derived industry MICAPs in the range of 14-16 years¹⁷.

How Can CAP Be Used for Security Analysis?

The first use for CAP in security analysis is to help translate the market expectations impounded in a share price into value drivers that are easy to understand and assess. The value of any asset can be expressed with a limited number of variables—in particular, cash flow, risk and CAP. As such, the analyst can hold constant one of the three main drivers and consider what the security price is implying about the other two. For example, consider the shares of the Kellogg Company. With the shares at about \$70 and a weighted average cost of capital of 11%, the market is impounding roughly 10% cash flow growth¹⁸ for about 15 years. If the analyst lowers his or her projection of CAP to 10 years, the cash flow growth rate would have to rise just to equal the current share price. Similarly, if the CAP were deemed to be 20 years, the implied cash flow growth rate would decline to a rate under 10%.

Table 1
Relation of FCF, WACC and CAP for Kellogg

Scenario	Estimated FCF Growth	Estimated WACC	CAP (Years)	Equity Value Per Share
A	10%	11%	15	\$70
B	>10	11	10	70
C	<10	11	20	70

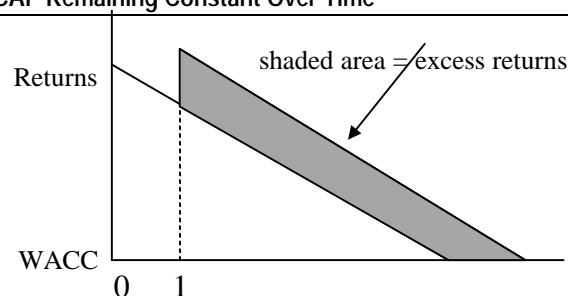
Source: CREDIT SUISSE FIRST BOSTON CORPORATION.

By breaking cash flow down into its essential drivers—including sales, margins, capital needs and taxes—this technique can help analysts translate intuitive assessments about a business into an economically correct, multidimensional framework. Rappaport uses an analogy of a high jumper. The analyst has a feeling for the future performance of the company—how “high” the business can jump—and using CAP in analysis can help determine how “high” the bar is set. If the anticipated performance of the business is greater (worse) than the implied performance, the stock is a buy (sell).

A second important concept is that if the CAP for a value-creating company remains constant, an investor can expect to generate excess returns over time¹⁹. Note that a constant CAP is contrary to economic theory, but it may be achieved through outstanding management (i.e., resource allocation, acquisitions). To illustrate this point, refer to Figure 3. Imagine going from year 0 to year 1. As the length of CAP remains unchanged, a year of value creation is added, and the past year of value creation is lopped off. As the investor purchased the shares expecting above-cost-of-capital returns for the implied period, the additional year of value creation represents a “bonus,” or excess returns.

It appears that Warren Buffett has used this concept for years in his investment process. He buys businesses with “high returns on capital” (returns in excess of the cost of capital) that have “deep and wide moats” (sustainable CAPs) and holds them “forever” (hoping that the CAPs stay constant). Although this technique seems fairly straightforward, finding businesses with enduring CAPs is not simple.²⁰ Witness IBM. Although the company is reemerging as a formidable competitor, the company’s CAP shortened dramatically in the early 1990s as the result of changes within the industry and several management missteps. Once considered impenetrable, the company came to be viewed as a weakened giant, and its MICAP shortened as a consequence.

Figure 3
CAP Remaining Constant Over Time



Finally, understanding the concept of CAP helps reconcile relationships that appear counterintuitive when viewed through the accounting-based lens. For example, a relatively slow-growth, high-return company in a stable industry may well command a higher valuation (i.e., higher P/E, price/book value, etc.) than a fast-growing, high-return company in rapidly changing industry. While part of such a multiple discrepancy could be explained by different risk profiles, we believe that the market implied CAPs would also be justifiably different for the two companies. Without CAP, we believe that it would be difficult to explain the differences in valuation between the companies. Accounting-based valuation techniques are not helpful in resolving these disparities.

Value versus Growth Investing—CAP's Importance

In his 1992 letter to shareholders, Warren Buffett suggests that differentiating between growth and value investing is “fuzzy thinking.”²¹ Buffett points out that stocks with low price-to-book ratios, low P/E ratios or high dividend yields are not necessarily good values while stocks with high valuations are not necessarily bad values.²² We concur with Buffett's dismissal of the growth versus value debate, and believe the inclusion of CAP in the dialogue helps explain the seeming success of some investors, irrespective of their stated approach. Said differently, the techniques employed by most successful money managers—no matter how they are characterized—collapse into a model that is rooted in the drivers of cash flow, risk and CAP.

The essence of growth investing, it appears, is to purchase stocks of companies with high returns, and stable or expanding CAPs. We would note that CAP is unlikely to expand if the rate of return on incremental investment is declining sharply or is below the cost of capital. Value investing, on the other hand, appears to either seek out those value-creating companies that have particularly short CAPs for reasons that can be identified as transitory, or to identify businesses with improving returns, and hence potential for widening CAPs. Investing that focuses solely on statistically cheap companies often leaves portfolio managers with a number of value neutral or value-destroying companies that show little potential to improve their performance.

Can CAP Work for Growth Companies?

It is generally accepted that discounted cash flow analysis, and therefore the use of CAP, is not helpful in valuing fast-growing companies, such as technology businesses. These companies, it is asserted, are “earnings driven.” We will argue that in fact “earnings-driven” companies are implicitly valued by the market based on cash flow projections and that CAP is a very important consideration in the analysis of these businesses.

Microsoft has been one of the most successful companies in Corporate America over the past ten years. The company has grown sales from under \$200 million in fiscal 1986 (the year it went public) to \$8.7 billion in the most recent fiscal year. The company has created a phenomenal amount of shareholder value in the process. When the company went public on March 13, 1986, it had a market capitalization of \$519 million. The company's market value was approximately \$100 billion at year-end 1996. Microsoft created roughly \$100 billion in shareholder value over a decade.

How is this possible? We argue that approximately two-thirds of the increase in shareholder value was the result of a dramatic lengthening of the company's implied CAP. We calculate that Microsoft's CAP was eight to ten years the day it went public—using then-prevailing consensus estimates. Interestingly, the actual CAP at the time proved to be only about three years, as the company's actual results far exceeded expectations.

We calculate that Microsoft's current implied CAP is 17-20 years. If the company still had an implied CAP of eight to ten years, the current market value would be roughly \$33 billion. Therefore, we argue that two-thirds of the company's current valuation is the result of an expansion in its implied CAP. Without the concept of CAP, we believe that most of Microsoft's massive value creation cannot be explained.

Intel is also an impressive company. During calendar 1996, the stock increased approximately 135% as investor expectations for the company's growth and profitability increased dramatically. Interestingly, once again we think that CAP played a critical role in the company's reevaluation. In May 1996, Intel announced that it would not lower pricing in the fall of 1996 as it had in each of the prior years. This announcement proved to be a watershed event as it implied that—as the result of lower production costs and economies of scale—earnings and returns on invested capital (ROIC) would expand. From the time of this announcement to the end of the year, the stock doubled.

Again, we ask the question: How can a stock with such a large capitalization (roughly \$120 billion at year-end) better than double in one year? We estimate that Intel's market implied CAP was roughly five years at the beginning of 1996, but expanded to about nine years by the end of the year. Expectations of net operating profit after tax (NOPAT) increased during the year as a result of the strategic change in pricing strategy, but we calculate that 65% of the increase in market capitalization—\$45 billion—was related to a lengthening in the implied CAP. Once again, the dramatic change in market value cannot be explained without CAP.

We have also used CAP as a heuristic in our analysis. An example is the semiconductor industry in late 1995. At the time, the sector had produced excellent appreciation for three years. Expectations about the future of the industry were generally upbeat. However, there was growing evidence that significant new capacity would begin to come onstream during the second half of 1996, negatively affecting the profitability of the industry and causing the industry ROIC to fall. These concerns notwithstanding, industry capacity at the time remained constrained, allowing the leading vendors to post impressive financial results.

However, the leading semiconductor stocks were beset with peculiar behavior. The companies reported record earnings—easily beating consensus expectations—but their stocks failed to rise. In fact, the stocks started to show considerable weakness (some dropped as much as 50% in the ensuing three to six months) in the face of the impressive financial performance. How could this have happened? As earnings estimates continued to rise, a valuation based solely on price/earnings multiples was clearly of no help.

We assert that the market-implied CAPs shortened because of concerns surrounding the impending capacity additions. Future expectations for ROICs were effectively being cut by investors, even as short-term earnings forecasts were rising. Once again, CAP proved to be a critical component in the valuation process.

Lengthening CAP Could Explain the "X" Factor

In an effort to demonstrate how changing CAPs can affect stock prices—and explain the "X" factor—we studied a handful of companies within the packaged food industry in the September 1982 to August 1989 period. As our goal was to identify approximate CAPs in each period, we used *Value Line* long-term forecasts as a proxy for consensus cash flows and used then-current risk-free rates, betas and equity risk premiums to estimate expectations for the cost of capital. These drivers, when considered next to the stock price, allowed for an estimate of CAP. As we accounted for changes in perceived growth rates and actual interest rates in each period, extraordinary changes in the share values could be largely attributable to CAP.

Table 3 summarizes our findings. The prevailing CAP for this group roughly doubled in the seven-year period (the food group stock index outperformed the S&P 500 index during those years), implying that the industry had become better competitively positioned. In fact, most of the companies in the group streamlined their business portfolios, cut costs, increased vital marketing spending and increased their cash flows sharply. Further, an active market for corporate control in the sector forced managements to focus on shareholder value improvement.

Table 3
Variation in Food Industry CAPs, 1982–1989

Company	1982 CAP	1989 CAP
Campbell Soup	4	20*
CPC International	10	15
H.J. Heinz	5	13
Hershey Foods	6	20
Kellogg	18	19
Average	8.6	17.4

(*) = This number was actually higher, as CPB was the subject of takeover rumors. We normalized the estimate for this exercise.

Source: *Value Line*, Kidder Peabody, authors estimates.

We suspect that a similar expansion in CAPs—albeit less dramatic—occurred in the broader market, allowing for shareholder returns to outstrip both historical averages and those that could be justified based on changes in cash flows and interest rates alone. In fact, the business-friendly environment that prevailed through much of the 1980s—and the growing pressure on managements to create shareholder value or run the risk of losing the entire company—may have been enough of a driver itself to create this sentiment of increased competitiveness and enhanced confidence.

Summary

Although competitive advantage period has unassailable importance in valuation, it is a subject that has not been explicitly addressed in finance textbooks in a way commensurate with its importance. Further, many analysts and strategic planners that adhere to a DCF framework reduce the model's validity by using explicit forecast periods that do not reflect CAP. We believe that CAP can play an important role in linking valuation theory and practice.

N.B.: CREDIT SUISSE FIRST BOSTON CORPORATION has, within the last three years, served as a manager or co-manager of a public offering of securities for Coca-Cola, IBM, and Kellogg, and makes a primary market in issues of Intel and Microsoft. Closing prices are as of January 10, 1997.

Campbell Soup (CPB, 82, Hold)
Coca-Cola (KO, 54¹/₈, Buy)
CPC International (CPC, 78³/₄, Hold)
Hershey Foods (HSY, 45, Hold)
H.J. Heinz (HNZ, 37, Hold)
International Business Machines (IBM, 163, Not Rated)
Intel (INTC, 144.¹/₂, Buy)
Kellogg (K, 64⁵/₈, Buy)
Microsoft (MSFT, 84¹/₄, Not Rated)

¹ *Wall Street Journal*, June 6, 1991.

² Wigmore actually claims, "This paper is a slap at efficient market theory." Integrating the concept of CAP appears to make this statement invalid.

³ CFOs and Strategists: Forging a Common Framework," Alfred Rappaport, *Harvard Business Review*, May-June, 1992.

⁴ "Dividend Policy, Growth, and the Valuation of Shares," Merton Miller and Franco Modigliani, *The Journal of Business*, October, 1961. Also, *The Quest for Value*, G. Bennett Steward III, (Harper Collins, New York, 1991), pps. 289-298.

⁵ The phrase "competitive advantage period" has recently appeared in numerous writings, including Morgan Stanley research and *The Journal of Applied Corporate Finance*. The authors claim exclusive credit for the term "CAP."

⁶ An outstanding illustration of this was the 1991 sale of the Empire State Building, arguably one of the most famous buildings in the world. Real estate experts pegged the value of the building at around \$450 million. The purchase price, however, was approximately \$40 million, reflecting the building's long-term below-market-rate master leases.

⁷ *Valuation: Measuring and Managing the Value of Companies*. Copeland, Koller, Murrin, (John Wiley & Sons, New York, 1991).

⁸ *Competitive Strategy*, Michael E. Porter, (Free Press, New York, 1980).

⁹ Warren Buffett— One of America's leading investors— made a comment to this effect during Berkshire Hathaway's 1993 annual meeting for shareholders.

¹⁰ *Creating, Shareholder Value*, Alfred Rappaport. (Free Press, New York, 1986), pps. 68. Also, Miller and Modigliani.

¹¹ Copeland, Koller, Murrin.

¹² "EVA[®] and Market Value," Stephen F. O'Byrne, *Journal of Applied Corporate Finance*, Spring 1996, pps. 116-125.

¹³ A favorite analogy comes from the game show "Name That Tune." One segment was called Bid-a-Note, where the master of ceremonies gave a clue about a popular song and the contestants "bid" on who could name the song after hearing the fewest notes. In the stock market, the "clue" is information, and investors "bid" on the future stream of cash flows until a price is set.

¹⁴ "These Companies Add Value for Shareholders," *Corporate Finance*. October 29, 1991.

¹⁵ O'Byrne.

¹⁶ Rappaport, pps. 156-57.

¹⁷ "Packaged Food Industry Profile," Michael J. Mauboussin, CREDIT SUISSE FIRST BOSTON CORPORATION Equity Research, May 19, 1993.

¹⁸ Cash Flow is defined as net operating profit after taxes (NOPAT) minus investment for future growth (I), or free cash flow.

¹⁹ The authors acknowledge the inputs of Al Rappaport in developing this thought.

²⁰ "Corporate Strategy and the Capital Budgeting Decision," Alan Shapiro, *The New Corporate Finance: Where Theory Meets Practice*, Donald H. Chew, Jr., Editor, (McGraw Hill, New York, 1993), pps. 75-89.

²¹ Berkshire Hathaway 1992 Annual Report, p. 14.

²² As a guide to determining value, Buffett refers to *The Theory of Investment Value* by John Burr Williams. In that book, Williams formalized the idea that the value of a business is the present value of future cash flows.

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