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APPLYING A SYSTEMS MINDSET TO STOCK VALUATION

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Research on the life-cycle valuation model began in 1969 at Callard, Madden & Associates in order to improve stock selection and investment returns. Beginning in the mid-1980s, the model was extensively refined and commercialized by HOLT Value Associates. Today, many institutional money managers use the life-cycle valuation model, as well as relevant data from the global database of 20,000 companies in 60 countries provided by Credit Suisse HOLT.

This is a review of the five important choices that guided this 40-year research journey. A systems mindset that stressed intensive measurement and experimentation with variables was especially instrumental to the evolution of the life-cycle model. Systems thinking led to distinct departures from mainstream finance practices. For example, the life-cycle model uses a discount rate that is dependent upon the procedure used to forecast a firm's long-term, net cash receipt stream.

Based on this research experience, I offer suggestions about the potential evolution of a new research program to address additional important, practical needs.

Choice 1. A Systems Mindset

Knowledge improvement generally is a product of inquiry, undertaken to better understand or solve a perceived problem (Umpleby and Dent, 1999). When we are involved in inquiry, we are as much a part of the inquiry as the “external” environment because we have preconceptions that affect what is, literally, observed, and the conceptual interpretations of those observations (Madden, 1991).

Being constructs of human thought, all theories are actually conditional statements subject to tests of their usefulness for solving a problem in its context. Users of a theory (or model) want it to reliably serve as a guide for taking action to achieve an intended goal. This is the ultimate “predictability” test of a model.

Researchers who chose a systems mindset begin with intensive observations and trial descriptions of phenomena to uncover both critically important variables and consequential relationships among them. For example, the life-cycle model uses a discount rate that is *dependent* on the procedure used to forecast a firm's long-term, net cash receipt stream. In general, a systems mindset promotes bottom-up (inductive)

thinking that is crucial to discovering essential but difficult-to-quantify variables, the kind that might be observed in data as outliers and omitted as anomalies or that might be buried in error terms in the construction of econometric models.

However straightforward and commonsense systems thinking is in principle, it oftentimes is ignored in practice. For example, many mainstream finance researchers rely heavily on top-down (deductive) theory such as market efficiency and the Capital Asset Pricing Model (CAPM). In the past, the strong pull of this dominant view slowed down experimentation with variables that could jeopardize the market efficiency and CAPM constructs. For example, note how long it took for behavioral finance to emerge.

An overemphasis on top-down theory can be harmful as articulated by Robert Haugen (1999, p. 139 and 140):

Finance scholars have long embraced the notion that we advance faster and better by *first* creating theories that make predictions about the way the world works. *Next* we turn to the data to see if the numbers conform to the predictions. If we find that they do not, we either (a) ‘refine’ the theories, by altering the assumptions upon which they are based, or (b) ‘refine’ the empirical tests until the data speaks in a voice we can *appreciate and understand*. ... But most of the major advances in the frontier of human knowledge did not follow an arrow running through the theories into the empirical tests. Rather, *most of our greatest triumphs proceeded in the opposite direction from data to theory*. The arrow goes from straightforward empirical observation to the development of theories which give us the insights *to understand what we have seen*. ... We have two choices. We can *advance* by developing radically new theories to help us understand what we now see in the data. Or we can *go back*, denying what is now readily apparent to most, bending the data through ever more convoluted econometric processes, *until it screams its compliance with our preconceptions*. [italics in original]

Modern finance researchers by and large have used CAPM to guide much of their work. So much so that Perold (2004) would say it dominated modern finance. An elegant explanation of a mathematically logical relationship between expected returns on stocks and risk, CAPM provides a blueprint, given its assumptions, for investors to optimize their portfolios to the highest expected return for a given level of risk. Notwithstanding CAPM’s poor empirical record of predictability (Fama and French, 2004) and its challengeable assumptions, it continues to exert a strong hold on mainstream finance.¹

In the past decade or so, behavioral finance researchers have presented serious challenges to the premises and empirical underpinnings of mainstream finance theory (Thaler, 2005). But proponents of the status quo seem little concerned about the weaknesses of their theory. Rather, they take the offensive, asking Where is the better theory? Believing none has been offered as yet, the core body of knowledge presented in finance textbooks and taught to finance students has not been significantly changed. Thus is the dominant theory preserved.

The intended takeaway from this quick sidetrack into the philosophy of knowing is that: empirical work based on innovative formulations of questions/problems and different ways of manipulating and testing variables can: (a) reveal deeply rooted, but flawed, assumptions, (b) improve the specification of components of an existing model and (c) lead to new conceptual advancements; i.e., better theory for “insights to understand what we have seen,” and for reliably guiding action to achieve a goal.

Choice 2. Firms’ Competitive Life-Cycle

Early on in life-cycle research, the accepted goal of the research program became to better understand *levels* and *changes* in company stock prices on a global basis so portfolio managers could make better investment decisions. In contrast, mainstream finance was focused on a logically consistent equilibrium model that related risk to expected return — and CAPM became the answer. CAPM was not designed to explain the level of firms’ market prices, but rather the *change* in prices that drive investor returns.

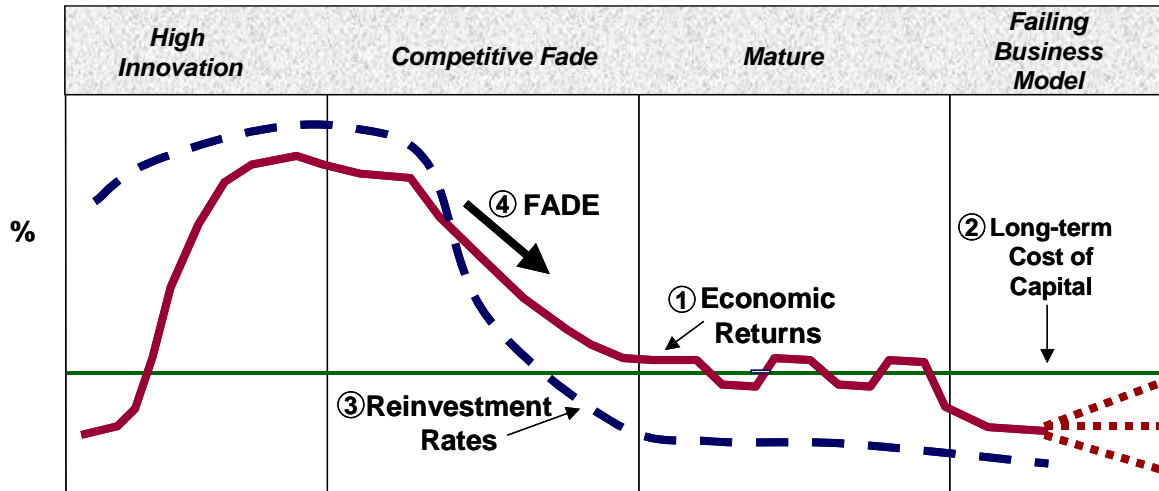
A dominant academic premise has been that the market is efficient in incorporating all value-relevant information into stock prices. Consequently, finance academics gave relatively little attention to the process of forecasting firms’ long-term, net cash receipt (NCR) streams. Why? Because stock prices have already incorporated these forecasts, and forecasting better than the market is ruled out by the efficiency assumption.

In contrast, the life-cycle, commercial research program wanted a vehicle to deal with NCR forecasts so that both levels and changes in stock prices could be fruitfully studied (without any preconceived beliefs about market efficiency). We chose the firms’ competitive life-cycle construct in order to connect firms’ economic performance to market valuation in a conceptual way that incorporates competition, and yet was useful for forecasting NCRs.

Figure 1 illustrates the firms’ competitive life-cycle in four stages captured as patterns of the four key variables that drive a firm’s economic performance. The assumed role for competition over time had especially strong empirical support and was aptly stated by George Stigler (1963, p. 54):

There is no more important proposition in economic theory than that, under competition, the rate of return on investment tends toward equality in all industries. Entrepreneurs will seek to leave relatively unprofitable industries and enter relatively profitable industries.

Figure 1. Firms' Competitive Life-Cycle



Source: Madden (2005)

In the life-cycle framework one can observe the effects of Joseph Schumpeter's (1942, p. 84) creative destruction at work — "... [the] kind of competition which counts ... competition from the new commodity, the new technology, the new source of supply, the new type of organizations ... competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives."

The radical competition Schumpeter alludes to oftentimes comes from High Innovation stage firms. These firms have satisfied the fundamental criterion of wealth creation, namely *economic returns* clearly in excess of the *cost of capital*. Particularly successful firms exhibit high *reinvestment rates* (i.e., growth in operating assets) in order to meet high demand for their products or services, and this creates additional wealth.

As competitors attempt to duplicate and improve upon the highly demanded innovative product/service, the Competitive Fade stage (Wiggins and Ruefli, 2005) follows. Due to competitive pressure, firms' *economic returns fade* towards the cost of capital and *reinvestment rates fade* to lower levels (Fama and French, 2000).

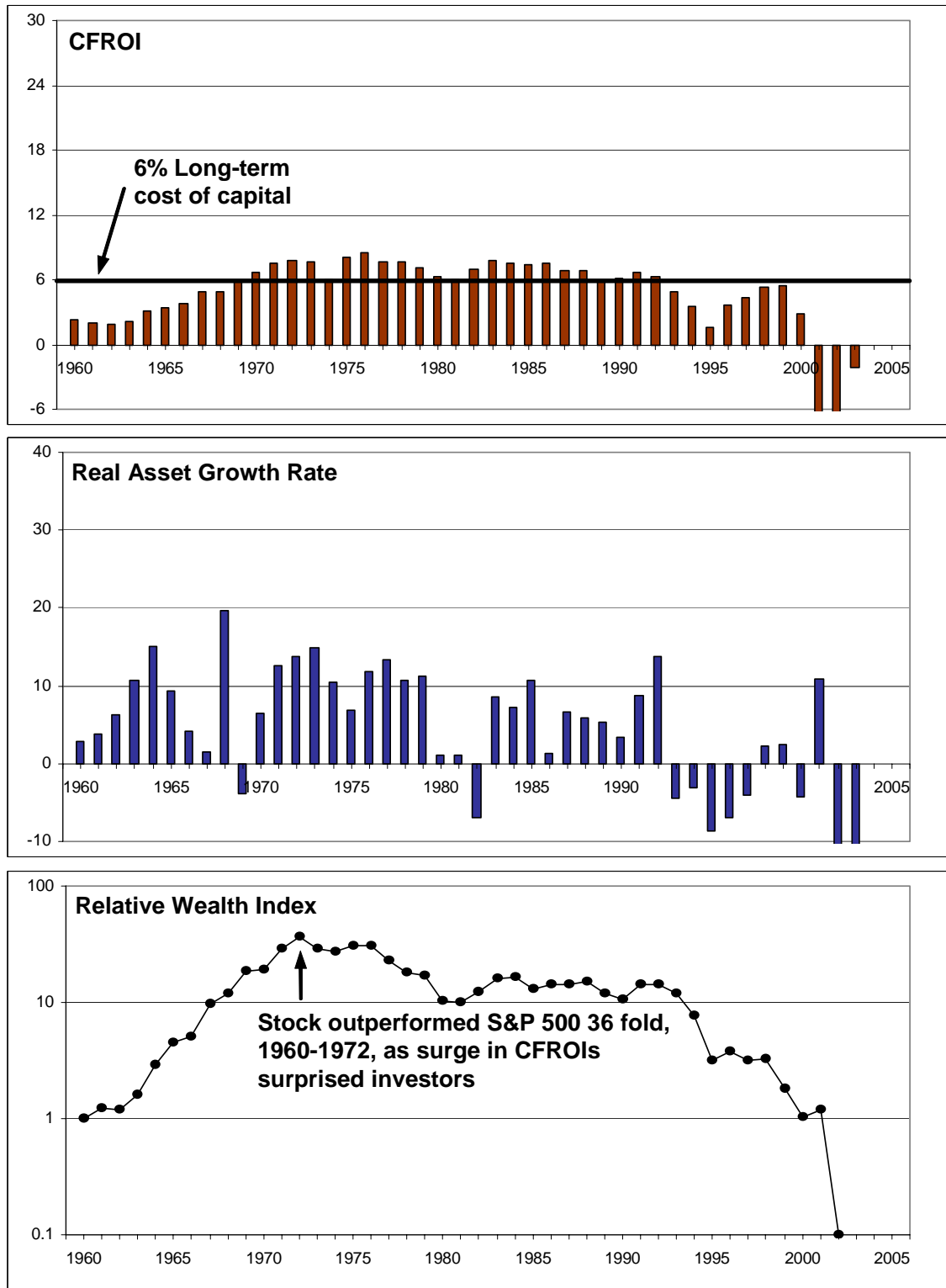
Next is the Mature life-cycle stage wherein top management is typically lulled into a business-as-usual complacency. Inertia prevails, with a bias towards making perceived "low risk" investments that incrementally expand businesses that were profitable in the past.

A transition to the Failing Business Model stage occurs as profitability declines which is consistent with a shortfall, relative to competitors, in providing value to customers. At

this stage, purging bureaucratic inefficiencies and down-sizing/refocusing are almost always needed in order to restore profitability and avoid bankruptcy.

A critical task in the application of the life-cycle concept to actual firms is to estimate economic returns (discussed below). Life-cycle track records, based on firms' reported, or suitably adjusted, accounting data and stock price histories are a valuable tool for better understanding the past, and thereby for making better forecasts of the future. The life-cycle track record for Kmart from 1960 to its bankruptcy in 2002 is displayed below in Figure 2.

Figure 2 Kmart Life-Cycle Performance, 1960 to 2003



Source: Credit Suisse HOLT *ValueSearch* global database

The top panel of the figure above shows inflation-adjusted (real) economic returns, estimated as a cash-flow-return-on-investment, or CFROI® (registered trademark of Credit Suisse Securities). The panel includes a benchmark, long-term, corporate average CFROI of 6% real to approximate the cost of capital.² The middle panel shows real asset growth rates. The bottom panel shows a cumulative index that reflects annual changes in the yearly excess (positive or negative) of the total shareholder return (dividends plus price appreciation) of the company's stock relative to the S&P 500. A positive share performance versus the S&P 500 is depicted by rising trends in the relative wealth index, and negative performance by falling trends.

Shareholder returns in excess (positive/negative) of the general market are attributed to firms' fade rates being more/less favorable than investors expected. That is, at the margin, investors were positively/negatively surprised. From 1960 to the early 1970s, Kmart's innovative concept of a discount store propelled its CFROIs from barely positive levels to above the cost of capital. This unanticipated upward fade of CFROIs enabled long-term shareholders to outperform the market 36-fold during this period. Then, over the next 20 years, Kmart slightly underperformed the market while CFROIs averaged around 7%. From the mid-1990s to bankruptcy in 2002, Kmart had four CEOs. Each failed to develop and execute a viable strategy to counteract fierce competition from Wal-Mart.

Let's turn now to some important technical issues in life-cycle research.

Choice 3. Inflation Adjustments and Economic Returns

In the early 1970s, it occurred to me that a project orientation would be useful for developing the CFROI metric (Larsen and Holland, p. 119-143). An *economic return* was specified as the standard return-on-investment (ROI) measure of a completed project, reflecting each period's NCR over the full project life. When all outflows and inflows are expressed in monetary units of equivalent purchasing power, the calculated ROI is an inflation-adjusted, or real, economic return.

A firm was then viewed as a portfolio of on-going projects (Larsen and Holland, p. 159-163). The problem facing an analyst using reported financial statements is to estimate the average economic returns being achieved on the aggregate of the firm's ongoing portfolio of projects.

The balance sheet and income statement data provide: gross assets, cash flow, nondepreciating assets, and life. These can be arranged as a project ROI with an initial outlay of gross assets, followed by equal cash flows over the assigned life with a release of nondepreciating assets in the final year. When the ROI calculation uses assets marked up to match the purchasing power of cash flows, the result is a real CFROI.

I chose not to use a conventional RONA (return-on-net-assets) for three reasons. First, explicit identification of the ROI components helps resolve problems in adjusting accounting data to match business economics in order to more closely approximate

economic returns. Second, the productive capacity of plant and equipment does not decline as rapidly as implied by straight line depreciation (Thomas, 2002, p. 2-3), which is wired into most RONA calculations.

And third, the project emphasis used to construct a CFROI is a useful tie-in to the value of existing assets. At any specific point in time, a portfolio of projects has different vintages, from the oldest to the most recent project started. The oldest projects have the shortest remaining economic lives, and typically have the least amount of cash flows remaining and the opposite is true for the newest projects. A project orientation easily translates into a conceptual view of the valuation of existing assets as the wind-down of cash flows as projects meet the end of their economic lives.

This valuation perspective of the cash flow wind-down of existing assets had more plausibility compared to the conventional, and mathematically convenient, present value of existing assets as a perpetuity (current earnings divided by the cost of capital). This is particularly evident, for example, in the use of the wind-down approach when estimating the value of a firm's existing oil/gas reserves.

Keep in mind that progress with the task of connecting firms' economic performance to market valuation involves learning better ways to *approximate* important variables such as economic returns and investor expectations. For example, a time series of CFROIs can help one infer the level of economic returns being earned by the firm, and thus help in making a forecast of ROIs on future investments — a key variable driving long-term NCRs.

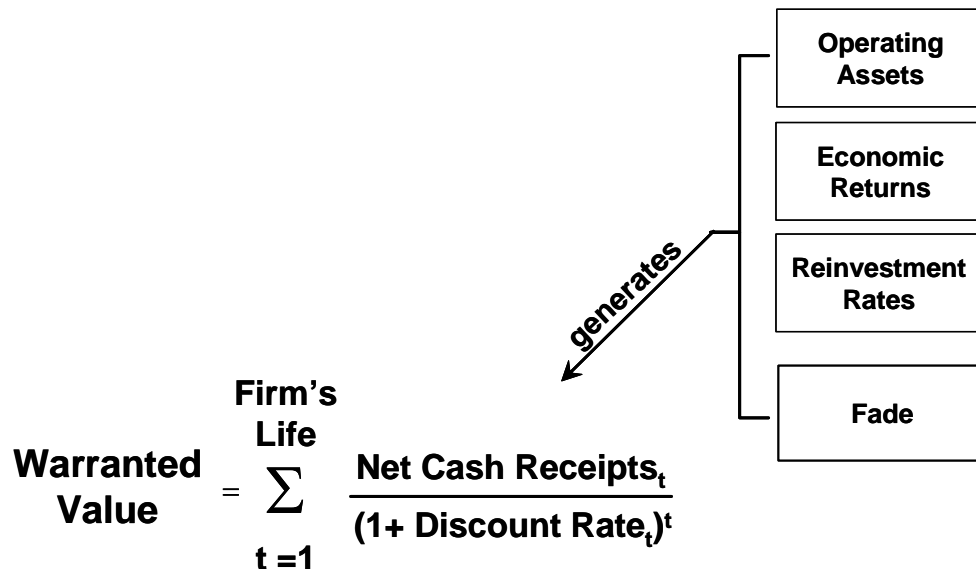
Arguably, a *prerequisite* in working with, and learning from, time series data is that key variables should have the same meaning over time (Madden, 1999, p.17). All of the components of the life-cycle valuation model are real variables in order to minimize the noise due to fluctuations in monetary unit values (different inflation/deflation rates). Consequently, levels of and changes in CFROIs and discount rates can be meaningfully compared across historical time periods and across national borders.

There is a large body of academic work in the accounting literature on the connection between economic returns and accounting returns (Brief, 1986). But the research tends to be mathematical exercises, absent track record analyses. Also, researchers have devoted considerable energy to residual income valuation models (Ohlson, 1995; and Feltham and Ohlson, 1995, 1996) which ignore the divergence between “true” economic returns and accounting returns such as earnings on book equity. The assumption is that in forecasting a long-term earnings stream, biases will offset (e.g., a bias of “too low” book equity would be offset by a “too high” earnings on book equity). In finessing the flaws in accounting data in this way, the residual income proponents shut off a potential learning process, a learning process that is integral to a systems mindset.

Choice 4. Denominator Depends Upon the Numerator

All conceptually sound, discounted cash flow valuation models incorporate some form of the four fundamental life-cycle variables: economic returns, reinvestment rates, competitive fade, and cost of capital (investors' discount rate). Figure 3 maps the role of these variables in generating net cash receipts which are discounted to a present value; i.e., a warranted value contingent upon the forecasted variables.

Figure 3. Life-Cycle Valuation Model



How one specifies operating assets influences the calculated values of economic returns and reinvestment rates. Consequently, the *observed* historical fade rates for economic returns and asset growth rates (proxy for reinvestment rates) also depend on the specification of operating assets. For example, the life-cycle track record for a typical pharmaceutical company is significantly different if R&D expenditures are capitalized and included in operating assets.

Let's go another step. Since forecasted fade rates are a key driver of NCRs (the numerator), discount rates (the denominator) depend upon the analysis of historical fade rates used as the basis for forecasting future fade rates. Thus, a less obvious relationship is that the assignment of a company-specific discount rate should be logically consistent with the NCR forecasting procedure being used.

Applying systems thinking to discount rates is not an unreasonable point of view. Bond investors set market prices for bonds by applying a forward-looking discount rate (their demanded yield-to-maturity) to an expected NCR stream of interest and principal

payments. So too, for common stock investors, although it is far more difficult to estimate expected NCR streams for business firms. Help in this area came from client feedback as part of the commercial research process. Portfolio managers and security analysts, with in-depth knowledge of individual companies, provided a continual stream of problems whose solutions involved new ways to better estimate economic returns. This, in turn, helped improve NCR forecasting.

Net Cash Receipt Streams, Discount Rates, and Problem Solving

First, let's specify a procedure for forecasting NCRs. Then we'll discuss how forecasted NCRs are used to calculate a company's forward-looking (market-derived), cost of capital or discount rate.

NCRs are driven by a forecast life-cycle. The present value today of NCRs from investments made beyond 40 years in the future is quite small, especially when those investments are expected to earn close to cost-of-capital economic returns. A life-cycle forecast period of 40 years (Madden, 1999, p. 173) is one practical choice, although the selection of a longer horizon does not much impact warranted value calculations.

As today is year T, a near-term fade window from T+1 to T+5 begins with a normalized T+1 CFROI which is derived from consensus analyst EPS forecasts for years T, T+1, and T+2. The fade of both CFROIs and reinvestment rates from T+1 to T+5 is primarily based on past company CFROI variability and asset growth rates (Madden, 1999, p. 165-167). From T+5 to T+40, CFROIs regress to a long-term corporate average CFROI of 6% real. And asset growth rates regress to a mature economy growth rate at T+40. Improved fade forecasts, in particular for the early part of firms' future life-cycles, continue to be researched and implemented.

This has been the standard NCR forecast procedure used for many years. An argument to add a longer, more favorable, near-term fade window for certain types of companies hinges on the strength of economic reasons and empirical data presented to support more customized forecasting procedures. Note that the forecast procedures being discussed are *standardized* procedures used to maintain a monitored database of companies.

Company-specific discount rates at points in time are calculated with a regression equation. Given the standard fade forecast for a company keyed to a normalized forecast T+1 CFROI, the market-derived discount rate is the rate which provides a present value of the future NCR stream equal to today's known market value.³ This forward-looking discount rate is the dependent variable.

There are two independent variables (Madden, 1999, p. 102-104). Because CFROIs include the benefit to cash flows from tax-deductible interest payments, an offsetting risk differential for financial leverage is called for. That is, higher leverage should result in higher discount rates, all else equal. The other independent variable is a liquidity risk differential. That is, all else equal, less liquid companies involve higher trading costs and should result in higher demanded returns as compensation. Less liquid companies are

small companies. As the economic environment becomes better (worse) for small companies, this effect will decrease (increase) the measured liquidity risk differential.

In summary, the application of a market-derived process for assigning a discount rate to a particular company can be compared to estimating the average yield-to-maturity (YTM) for bonds with a particular credit rating. For a sample of bonds, one could assemble data for a regression equation with YTM as the dependent variable and credit rating as the independent variable. A regression line for bonds then transforms a credit rating into an expected YTM. In a similar manner, for stocks, a regression line value for a company's discount rate is contingent on its financial leverage and trading liquidity. Market-derived discount rates serve as an alternative to CAPM costs of capital.

Market-derived discount rates do not address important CAPM issues such as how investors are assumed to handle systematic or market risk in building their portfolios. Rather, market-derived discount rates represent the end result of how investors are currently pricing individual company risk in terms of financial leverage and liquidity.

An ability to assign a specific discount rate to a specific firm at a specific point in time enabled the development of a warranted value chart. This is the workhorse tool for identifying problems. It is a long-term plotting of both a company's annual stock price ranges and annual warranted values based on the standardized NCR forecasts using estimated company-specific discount rates. Systematic over- or under-tracking of actual prices compared to warranted values are seen as red flags for possible problems. Another common source of problems is when life-cycle track record data for a company seems implausible compared to industry peers; and/or relative stock price performance does not make sense when compared to time series data for CFROIs and reinvestment rates.

Dealing with a problem almost always begins with skepticism about how closely accounting data matches business economics. A small sample of issues include: capitalization of R&D expenses, operating lease capitalization, acquisition intangibles, financial subsidiaries, off-balance-sheet liabilities, special items, stock option expenses, and asset lives. A typical "fix" for a problem would have entailed finding an economically sound reason to adjust accounting data that not only improved the original company situation, but also resulted in similar improvements for other companies that share this economic characteristic. Improvement is gauged by closer tracking of actual versus warranted values.

The on-going life-cycle research program leads to insightful ways to adjust accounting data to better estimate economic returns. *Improved NCR forecasts lead to improved discount rates.*

Taiwan Mystery Resolved

A recent experience with Taiwanese companies serves as an excellent example of the benefit of a systems mindset. In a systems approach, learning is a function of identifying problems and developing solutions paying attention to interactions among variables. In a 2006 Credit Suisse HOLT report, Ng, Jhaveri, and Graziano described a major improvement for Taiwanese companies.

Let's begin with problem recognition. The aggregate market-derived discount rate for Taiwanese companies seemed implausibly high. Also, Taiwanese companies with low financial leverage had *higher* discount rates than the high leverage companies — a negative leverage risk differential that did not make economic sense.

The root cause of these problems was identified as excessively high CFROIs for the many companies that generously dispensed shares for employee stock bonuses. From the shareholders' perspective, this outlay was clearly an economic expense, although it was ignored in computing accounting net income.⁴ This artificially boosted CFROIs, which in turn boosted market-derived discount rates.

Figure 3 is helpful in understanding this point. Substitute a firm's known market value for the warranted value. The market value can be matched either by: (1) discounting higher NCRs (boosted by ignoring employee stock bonuses) at a higher rate, or (2) discounting lower NCRs (this is more accurate) at a lower rate.

The solution was to incorporate an appropriate charge, which lowered cash flow used in calculating CFROI. With the new, lower CFROIs (better reflecting business economics), calculated market-derived discount rates declined. Interestingly, technology companies were the biggest users of employee stock bonuses and these companies also tend to have low financial leverage. Thus, the CFROI fix also resolved the mystery of a too high discount rate for low leverage companies. Finally, there was an across the board improvement in the tracking of warranted values with actual stock prices.

CAPM is a Problem

CAPM captured and still holds the minds (and hearts?) of finance academics with its elegant mathematics grounded in the neoclassical economic principles of equilibrium, rationality, and efficient markets.

In general, finance textbooks (Brealey, Myers, and Allen, 2006 is an example) explain portfolio construction as investors striving to achieve higher expected returns and to reduce risk. CAPM is an integral part of this explanation. In this manner, CAPM becomes a foundation for thinking about stock prices.

CAPM was brought into discounted cash flow valuation of individual firms as the basis for assigning a firm's equity cost of capital. A firm's equity discount rate equals the risk free rate plus the product of a stock's *Beta* (i.e., volatility) times the *risk premium* of the

overall equity market (i.e., expected excess return of the equity market over the risk free rate). This is the standard method finance students are taught to use for estimating a firm's cost of equity capital.

One objection to market-derived discount rates replacing CAPM rates is the necessity for maintaining a monitored database and attending to all sorts of issues concerning accounting conventions versus business economics. Fair enough. But increased valuation accuracy through more appropriate company-specific discount rates can generate big rewards.

The other major objection is more subtle. This criticism is that the market-derived discount rate methodology can produce "illogical" discount rates. For example, consider a technology company and a food company that have approximately the same financial leverage and the same liquidity (company size). The previously described regression procedure for assigning discount rates would give the same discount rate to both companies. Yet, as critics point out, everyone "knows" that food companies have a lower cost of capital than technology companies because food companies have more stable and predictable cash flows and lower Betas than technology companies.

The false perception of illogic only shows the absence of a systems mindset. The life-cycle valuation model's standard fade forecast for a typical technology company is much less favorable compared to that of a typical food company. A technology company with above-cost-of-capital, but highly variable, economic returns and/or high reinvestment rates would be assigned a faster downward fade compared to a food company, which typically has more stable economic returns and slower reinvestment rates. The life-cycle approach handles the "risk" difference in the numerator.

There are at least two important reasons to consider for rejecting the standard CAPM equation in favor of the market-derived approach for use in valuation models. First, application of the CAPM equation requires two inputs that are notoriously difficult to judge — Beta and the equity market risk premium over the risk free rate. These are applied as forward-looking variables but they are necessarily estimated from historical data.

Estimates based on historical time periods are especially troublesome when tax legislation, such as capital gains tax rates, that affects investors' after-tax returns (and thus their demanded returns) is expected to pass or becomes law (Madden, 1999. p. 97-99 and 250-252). Market-derived discount rates immediately reflect these changes.

Depending on the past time periods selected, a stock's Beta could easily range from say 1.2 to 1.5 and the market premium could easily range from say 4% to 7%. Users of CAPM have little to guide them in the selection of these two critical inputs. Combining a risk free rate of 3% with a Beta of 1.2 and a 4% market premium yields a 7.8% equity cost of capital. In contrast, substitution of a Beta of 1.5 and a market premium of 7% yields a 13.5% equity cost of capital.

The valuation impact of using a 7.8% or 13.5% equity cost of capital is enormous. A similar big impact on an EVA calculation occurs when the equity cost of capital is estimated with the CAPM equation or alternative procedures, such as arbitrage pricing theory or the Fama-French three-factor model which is increasingly being used by quantitative portfolio managers (Fabozzi, Focardi, and Jones, 2008).

In practice, market-derived discount rates for a sample of companies have a much smaller range. Particularly important is that these discount rates have a hand-in-glove compatibility fit with the valuation model in which the discount rate is applied.

In contrast, two analysts using radically different assumptions for forecasting long-term fade rates (read as risk adjustments) and using the same CAPM cost of capital would calculate widely different valuations. But, they would not have a clue about the impact of parachuting into their valuation models a discount rate that is totally independent of how NCRs are forecasted.

Another reason for rejecting CAPM equity rates is, as noted earlier, that the systems mindset promotes intensive data analysis as part of a process to improve higher level understanding. In valuation applications, CAPM users tend to implement theory that arrives on a plate served up by the theory developers. But theory developers don't analyze firms' track records, struggle with measurement issues, calibrate market expectations, forecast future NCR streams, and make investment decisions. These activities focus the mind on all sorts of important technical issues that have implications for higher order model building.

In my opinion, which is echoed by many portfolio managers and analysts who actively work with life-cycle data, business risk analysis is most usefully handled in the numerator and not the denominator.

Choice 5. Insights and Plausibility Judgments

Mainstream finance, as reflected in standard corporate finance textbooks, has little to say about how the users of valuation models develop their skill in making forecasts. In other words, the users' forecasting skill is viewed as being independent from the model.

Not so with the life-cycle research program. The three primary research tools — life-cycle track records, warranted value charts, and valuation model to translate forecast inputs (see Figure 3) to warranted values — comprise the product provided to institutional money manager clients. Client users sharpen their forecasting skills by participating in the same learning process as the research staff.

When users employ these tools to investigate a firm, they gain an opportunity to study the causes of a firm's long-term fade within the unique context of an industry and economic environment, and to build up expertise in understanding how "the market" makes forecasts (sets expectations) and revises these expectations as new data arrive.

The more experience users accumulate with the application of these tools, the better prepared they are to analyze a new company. There are two main analytical benefits.

First, users can quickly generate insights as to the key valuation issues for a particular firm and to the actions management should give top priority to taking in order to maximize long-term shareholder value. Second, the users' growing base of experience facilitates plausibility judgments about investor forecasts (expectations), their own forecasts, and the forecasts of others. Judging the degree of difficulty in achieving these forecasted levels of performance is greatly aided by a comparison to the type of companies that have historically achieved these same levels of life-cycle performance.

As for plausibility judgments and investor expectations, an informative application of the life-cycle model was reported in a September 9, 1996 *Forbes* article "Follow the Cash." The article described the life-cycle framework used by HOLT Value Associates in consulting with institutional investors. *Forbes* pointed out that HOLT had rated Wal-Mart as a strong sell five years earlier before it sharply declined, whereas HOLT now considered Wal-Mart a strong buy. The main point here is not that these two recommendations worked out; rather, the important point being illustrated is the judgment process for competitive fade and managerial skill at those two points in time versus investor expectations.

Although the Wal-Mart success story is well known, the magnitude of Wal-Mart's wealth creation achievement is striking when displayed in life-cycle terms as seen in Figure 4. We see CFROIs rising from 12% to about 15% from 1970 to 1990 coupled with enormous real asset growth rates. That remarkable performance was continually underestimated by investors and the stock outperformed the S&P 500 by 100-fold from 1970 to 1990.

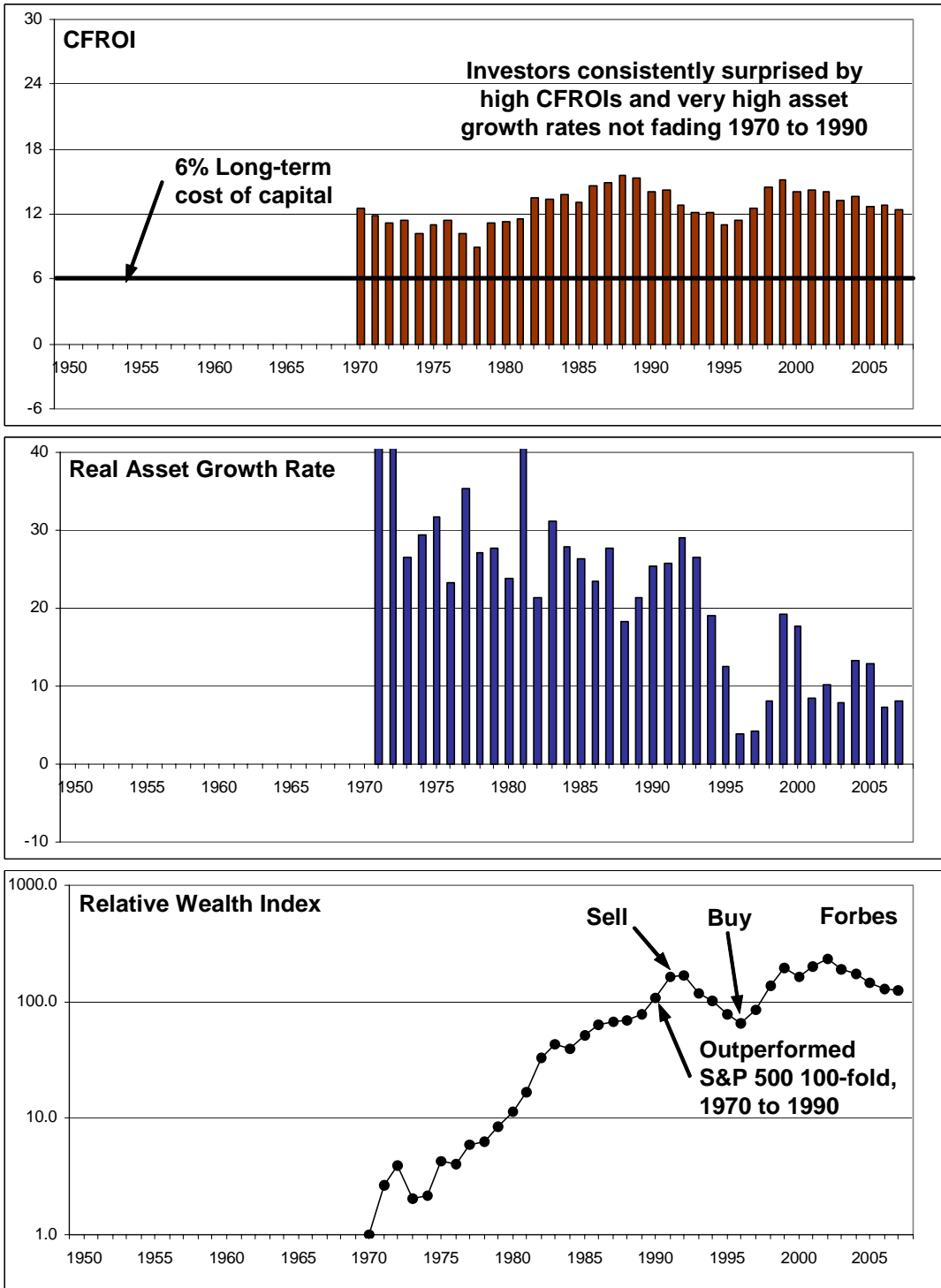
In 1991, Wal-Mart's stock price implied no downward competitive fade in both CFROIs and real asset growth rates for the next five years. While possible, our experience suggested that, at its much bigger size relative to the 1970s and 1980s, Wal-Mart was unlikely to meet those extremely optimistic investor expectations. The stock subsequently underperformed the market substantially from 1991 to 1996 (see bottom panel of Figure 4) as CFROIs declined and asset growth sharply fell off.

At the time of the 1996 *Forbes* article, investor expectations were for Wal-Mart's CFROIs to rapidly fade downward over the next five years to a level close to the long-term corporate average of 6% CFROIs. We felt comfortable in betting against an expectation that Wal-Mart was on the verge of becoming an average firm. This time, the stock subsequently rose sharply more than the S&P 500 during the next three years as Wal-Mart handily beat the 1996 expectations.

Although it is convenient to distill investor expectations into a single, best estimate forecast, more rigorous analysis deals with warranted value as the expected value of a probability-weighted distribution of scenarios for future fade of economic returns and reinvestment rates (Alessandri, Ford, Lander, Leggio, and Taylor, 2004).

To illustrate the concept of fade distribution, let's return to Figure 4 and reflect on the process that produced such extraordinary excess shareholder returns during the 1970s and 1980s. At various times during this period, I analyzed Wal-Mart and decided not to buy it because I viewed the probability as low for a scenario in which Wal-Mart would maintain high CFROIs while sustaining an extraordinarily high 25 % per year organic asset growth rate. I was wrong. My mistake was in not sufficiently understanding Wal-Mart's business model and exceptional managerial skill, which enabled the firm to perform so spectacularly as to drive its chief competitor, Kmart, into bankruptcy.

Figure 4. Wal-Mart Life-Cycle Performance, 1970 to 2007



Source: Credit Suisse HOLT *ValueSearch* global database

Back to the Future

The life-cycle model is but one application of discounted cash flow that specifies a cause and effect relationship for: (1) firms' economic performance, leading to a market valuation and (2) investor expectations and the firm's subsequent economic performance, leading to excess (positive/negative) shareholder returns.

Whatever the life-cycle research program's contribution to knowledge is, it is the product of a different way of thinking and going about research as compared to mainstream practices. The life-cycle research process has always been grounded in data observations with a bottom-up, inductive path for its constructs (e.g., a market-derived discount rate, fade, etc.). Because mainstream theory was not at the foundation of our work, the CAPM never had a top-down, deductive hold on our thinking and doing.

“Believers” of either CAPM or the life-cycle model can easily lose skepticism about what they think they know. The important point is that theory building often makes the most progress when: problems are approached from new angles, where a healthy competition exists among alternative models, and commitment is strong enough to actively search for situations where one's preferred model fails (Carlile and Christensen, 2005). These attitudes, I submit, would serve well for the evolution of a powerful research program that could significantly improve our understanding of how firms' strategies, business processes, organizational structures, cultures, financing decisions, and the like produce the firm's long-term, net cash receipt stream — and how this gets reflected in levels and changes in stock prices over time.

Empirical testing of a large menu of different valuation models for overall usefulness would be most fruitful when applied to a broad range of environmental conditions and user circumstances. Testing valuation models with innovative research designs might produce strong enough evidence to overcome deeply held beliefs (Atra and Thomas, 2008).

In this way, theory building would increasingly become part of the process in which researchers continually loop through intensive data observations and measurement challenges coupled with ongoing deeper understanding of cause and effect. So, how to get from here to there?

Let's speculate on how finance academics, and both investment and corporate practitioners, could jointly evolve improved valuation models that better serve the practical needs of users. The foundation for just such a joint collaboration has already been laid with the Financial Management Association's recent startup of PDDARI — Practitioner Demand Driven Academic Research Initiative.⁵

PDDARI is coordinating an intellectual marketplace for ideas with the goal of expediting big advancements in finance theory that are of a high practical value. A major target is a new theory that integrates both risk/return and the level of firms' market valuations.

Searching for Failures and Successes

Searching for failures as well as successes can be the bridge needed for genuine collaboration among finance academics and those who work in the trenches (Heuer, 1999).

As for environmental conditions and user circumstances, one classification system to consider would be the five categories listed and briefly discussed below.

Firm Maturity: According to firm size and/or life-cycle position, how much can different valuation models benefit from analyses of firms' historical financial data in order to make most likely or best estimate forecasts of the input variables of the various models?

In addition, how capable are these models in handling risk in the numerator? That is, how does accuracy vary when historical data are used as part of a process for calculating the expected value of a probability-weighted distribution of potential scenarios for a firm's future profitability?

For example, consider a bullish scenario for an early stage firm with a specified level of high economic returns and high reinvestment rates in the future. The historical frequency of achieving that level of economic performance for early-stage firms could be tabulated after certain milestones were delivered. A milestone could be one quarter of 25% plus organic sales growth, or two back-to-back quarters of 25% plus growth, etc. This type of information could help assign a probability for a particular early-stage firm to achieve a bullish scenario. For the same early-stage firm, historical frequencies could be tabulated for a bearish scenario, giving consideration to the data on cash balances and product diversification in addition to sales growth. This perspective seems better suited for handling firms with low probability/high valuation impact scenarios compared to a simple, most likely estimate forecast of future profitability.

Industry: Users of models employing EVA, CFROI, or other metrics that stress economic performance accept that valuation accuracy improves after accounting data are adjusted to more closely mirror business economics. How does valuation accuracy vary across industries and across valuation models as different types of accounting adjustments are implemented? For a given industry, how does valuation model accuracy vary as the estimated proportion of intangibles in firms' economic assets changes and as asset life changes?

Model Users: Connecting firms' operating performance to market valuation is clearly important to investors, managements, boards of directors, and accounting rule makers. How well do models perform to meet the primary needs of each group? Government officials involved with wealth creation issues include managements of regulatory agencies as well as politicians and their staffs. Policy decisions about corporate tax rates,

personal tax rates, regulation, property rights, and the like impact a society's ability to create wealth. In what innovative ways can these macroeconomic policy lever variables be connected via valuation models to levels and changes in aggregate stock prices for countries over longer time periods?

Data: Value relevant data sources include:

- **Market prices for ownership claims:** At points in time when firms could easily fall into bankruptcy, does the concurrent market price behavior of equity, debt, and options reveal fundamental weaknesses in how valuation models incorporate risk? Another question of interest is whether the fat-tailed distributions of actual stock price changes lead to insights about the environmental (institutional) causes of firms' economic performance? At the macro level, Baumol (2002) argues convincingly that productive entrepreneurial activity is the dominant source of a society's wealth generation. Perhaps the conditions that favor more (less) entrepreneurial activity set the stage for Schumpeter's creative destruction and result in an increase (decrease) in the fat-tails of a country's distribution of long-term shareholder returns (Fogel, Morck, and Yeung, 2006).
- **Accounting Data:** As intangible assets increase in importance (Corrado, Haltiwanger and Sichel, 2005), accounting rule makers and corporate executives are grappling with measuring and managing intangibles. Valuation models (including real options) could provide new empirical angles to help decide if an outlay (e.g., R&D expenditures) should be capitalized as an intangible asset and expensed (Hand and Lev, 2003), and how best to do this (Healey, Myers, and Howe, 2002). To handle this extremely difficult challenge, does it not make sense for academic researchers to join forces with CFOs and their staffs (those closest to the data)?
- **Human Capital Data:** Some intangibles are so soft/qualitative that they are not candidates for inclusion in reported accounting data. Many of the long-term benefits of human capital fit this category. For example, Toyota's efficiency seems to result not only from its lean production techniques, but also from its *culture* that promotes continuous learning and problem solving, with every layer of employees deeply involved, including top management (Liker and Hoseus, 2008). Although quite difficult to measure, the effects of human capital improvements or degradations can be broadly observed in firms' long-term fade rates. Creativity in developing new measuring sticks is needed. Hewitt Associates has taken a step in this direction by showing that a measure of firms' ability to attract and retain higher grade (pivotal) employees correlates with *future* fade of CFROIs.⁶

Management Dynamics: At any point in time, management could be initiating improvements in strategy, core business processes, or corporate culture, yet the reported accounting data usually does not adequately reflect the value change at an early stage. For example, most valuation models have a component for the present value of future investments. But consider, for example, the potential misperception during the early stage of a firm's successful transformation to lean manufacturing. During this period, lean processes free up a great deal of capacity to enable management to pursue new opportunities without having to make the kind of capital outlays customary in its less efficient past. The resulting decrease in the asset growth rate could easily be misread as a reduction in new investment opportunities and a concomitant reduction in the warranted value of future investments. Also, management could be asleep at the switch, as was the case for Kmart for many years, yet the reported accounting data did not reflect the extent of shareholder value deterioration. How do different valuation models fare in their quickness to pick up these big value changes. Given firm maturity and the type of high priority initiatives that management has disclosed in their annual report, what signals are helpful in the early identification of the direction and magnitude of the value change?

CONCLUSION

To guide our actions so that we may achieve a goal we develop models about how the world works. Straightforward as that may seem, any *future* knowledge building process is made difficult by our *existing* knowledge assumptions. At any point in time, assumptions representing faulty concepts impact how we perceive the world, define problems, explore data, and generate hypotheses to test. Therefore, a significant challenge is to manage the personal biases that always exist, even if the researcher is not consciously aware of them. Leamer (1983, p. 36) summarized the challenge as follows:

The econometric art as it is practiced at the computer terminal involves fitting many, perhaps thousands, of statistical models. One or several that the researcher finds pleasing are selected for reporting purposes. This searching for a model is often well intentioned, but there can be no doubt that such a specification search invalidates the traditional theories of inference. The concepts of unbiasedness, consistency, efficiency, maximum likelihood estimation, in fact, all the concepts of traditional theory, utterly lose their meaning by the time an applied researcher pulls from the bramble of computer output the one thorn of a model he likes best, the one he chooses to portray as a rose.

The new research program outlined above, keyed to searching for the failures as well as the successes of any model, holds the potential to gain knowledge by overcoming our personal biases. A better understanding of cause and effect throughout the wealth creation process will lead to better decisions for the long-term, mutual benefit of customers, employees, and shareholders.

Most especially, managements and boards of directors need better valuation tools in order to make the right long-term decisions. Their decisions may, at times, disappoint Wall Street's myopic fixation on quarterly earnings expectations. But managements should finally quit playing Wall Street's game. Managements should employ an insightful valuation model and value-relevant accounting information to make sure their decisions make economic sense (Madden, 2007) and then they need to clearly communicate this to investors.

References

- Alessandri, Todd M., David N. Ford, Diane M. Lander, Karyl B. Leggio, and Marilyn Taylor, 2004, "Managing risk and uncertainty in complex capital projects," *Quarterly Review of Economics and Finance* December, 44(5), 751-767.
- Atra, Robert J. and Rawley Thomas, 2008, "The Fundamentals of Automated DCF Modeling," <http://www.fma.org/texas/PDDARI/accepts.hym>.
- Baumol, William J., 2002, *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*, Princeton, NJ: Princeton University Press.
- Brealey, Richard A., Stewart C. Myers, and Franklin Allen, 2006, *Principles of Corporate Finance*, 8th edition, New York, NY: McGraw-Hill Irwin.
- Brief, Richard P., (ed.), 1986, *Estimating the Economic Rate of Return From Accounting Data*, New York, NY: Garland Publishing.
- Carlile, Paul R. and Clayton Christensen, 2005, "The Cycles of Theory Building in Management Research," Version 6.0, Harvard Business School Working Paper No. 05-057.
- Corrado, Carol, John Haltiwanger, and Daniel Sichel, 2005, *Measuring Capital in the New Economy*, Chicago, IL: University of Chicago Press.
- Fama, E.F. and K.R. French, 1999, "The Corporate Cost of Capital and the Return on Corporate Investment," *Journal of Finance* December, 54(6), 1939-1967.
- , and ———, 2000, "Forecasting Profitability and Earnings," *Journal of Business* April, 73(2), 161-175.
- , and ———, 2004, "The Capital Asset Pricing Model: Theory and Evidence," *Journal of Economic Perspectives* Summer, 18:3, 25-46.
- Fabozzi, Frank J., Sergio M. Focardi, and Caroline Jonas, 2008, *Challenges in Quantitative Equity Management*, Charlottesville, VA: Research Foundation of CFA Institute.

Feltham, Gerald A. and James A. Ohlson, 1995, "Valuation and clean surplus accounting for operating and financial activities," *Contemporary Accounting Review* 11 Spring, 689-731.

——, and ——, 1996, "Uncertainty resolution and the theory of depreciation measurement," *Journal of Accounting Research* 34 Autumn, 209-234.

Fogel, Kathy, Randall Morck, and Bernard Yeung, 2006, "Big Business Stability and Economic Growth: Is What's Good For General Motors Good For America, NBER Working Paper No. 12394.

Frankfurter, George M. and Elton G. McGoun, 1996, *Toward Finance With Meaning The Methodology of Finance: What It Is and What It Can Be,* Greenwich, CT: JAI Press.

Friedman, Milton, 1953, *Essays in Positive Economics,* Chicago: University of Chicago Press.

Hand, J. and B. Lev, (eds.), 2003, *Intangible Assets: Values, Measures, and Risks,* London, England: Oxford University Press.

Haugen, Robert A., 1999, *The New Finance: The Case Against Efficient Markets,* 2nd ed., Upper Saddle River, New Jersey: Prentice Hall.

Healy, Paul M., Stewart C. Myers, and Christopher D. Howe, 2002, "R&D Accounting and the Tradeoff Between Relevance and Objectivity," *Journal of Accounting Research* 40 (No. 3, June), 677-710.

Heuer, Richards J. *Psychology of Intelligence Analysis,* Government Printing Office, 1999. Free download at <http://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/psychofintelnew.pdf>.

Larsen, Tom and David Holland, "Beyond Earnings: A User's Guide to Excess Return Models and the HOLT CFROI[®] Framework," in *Equity Valuation: Models from Leading Investment Banks,* edited by Jan Viebig, Thorsten Poddig, and Armin Varmaz, 2008, West Sussex, England: John Wiley & Sons.

Leamer, Edward E., 1983, "Let's take the con out of econometrics," *American Economic Review*, 73(1), 31-43.

Liker, Jeffrey K. and Michael Hoseus, 2008, *Toyota Culture: The Heart and Soul of the Toyota Way,* New York, NY: McGraw Hill.

Madden, Bartley J., 1991, "A Transactional Approach to Economic Research," *Journal of Socio-Economics* 20(1), 57-71.

——, 1999, *CFROI Valuation — A Total System Approach to Valuing the Firm*, Oxford: Butterworth-Heinemann.

——, 2005, *Maximizing Shareholder Value And The Greater Good*, Naperville, IL: LearningWhatWorks, Inc.

——, 2007, "Guidepost to Wealth Creation: Value-Relevant Track Records," *Journal of Applied Finance* Fall/Winter 17(2), 102-114.

Ng, Chiew Leng, Viral Jhaveri, and Ron Graziano, "HOLT Taiwan: Accounting for Employee Stock Bonus," Credit Suisse HOLT, 5 December 2006.

Ohlson, James A., 1995, "Earnings, book values, and dividends in equity valuation," *Contemporary Accounting Research* 11 Spring, 661-687.

Perold, Andre F., 2004, "The Capital Asset Pricing Model," *Journal of Economic Perspectives*, Summer, 18:3, 3-24.

Schumpeter, Joseph A., 1942, *Capitalism, Socialism and Democracy*, New York, NY: Harper&Row.

Stigler, George, 1963, *Capital and Rates of Return in Manufacturing Industries*, Princeton: Princeton University Press.

Thaler, Richard H., 2005, *Advances in Behavioral Finance, Volume II*, Princeton: Princeton University Press.

Thomas, Rawley, 2002, "Value Management – Past, Present, and Future," Working Paper, LifeCycle Returns, Inc.,
http://www.lcrt.com/value_management_past_present_future_3_19_02.pdf.

Umpleby, Stuart A. and Eric B. Dent, 1999, "The Origins and Purposes of Several Traditions in Systems Theory and Cybernetics," *Cybernetics and Systems: An International Journal*, 30, 79-103.

Wiggins, R.R. and T.W. Ruefli, 2005, "Schumpeter's Ghost: Is Hypercompetition Making The Best Of Times Shorter?", *Strategic Management Journal* 26(10), 887-911.

Endnotes

1. Friedman's (1953) methodology of positive economics promoted the view that the realism of assumptions is immaterial as long as the world behaves "as if" the assumptions were true. This gave added credibility to mathematical models such as CAPM, and

deflected criticism of the use of empirically unsupported assumptions (Frankfurter and McGoun, 1996).

2. For the period 1960 to 1996, aggregate US industrial CFROIs approximated 6% real, and a “market-derived” real discount rate (cost of capital) also averaged approximately 6% real (Madden, 1999, p. 92). For the non-financial sector, 1950 to 1996, Fama and French (1999) estimated the real cost of capital at 5.95% and the return on corporates assets, unadjusted for inflation, at 7.38%.

3. Especially difficult to forecast companies, such as biotech startups, should be excluded from the universe of companies used for the regression.

4. Starting in 2008, Taiwan companies are required to expense the cost of employee stock bonuses.

5. See <http://www.fma.org/pddari/pddari.htm>.

6. See http://www.evidence-basedmanagement.com/guests/ubelhart_jan07.html.