24 March, 2004

CFROI® Valuation, Efficient Markets, and Behavioral Finance
Forthcoming *Valuation Issues*

Bartley J. Madden

www.LearningWhatWorks.com

Executive Summary

For an investor making a buy/sell decision, the key question is not whether to accept or reject the hypothesis that *the market* is efficient, but whether the investor's valuation tools and company knowledge are sufficiently powerful and complete to warrant the conclusion that a *particular stock* is priced *efficiently*.

From the investor's perspective, a stock is priced inefficiently if:

- the investor's forecast of the firm's economic performance is materially higher or lower than that implied by the current stock price;
- the firm's subsequent economic performance is closer to the investor's forecast than to the market's expectation; and
- the firm's stock price subsequently performs vis-à-vis the general market in accordance with the investor's judgment.

In other words, the market is inefficient for investors who generate *company-specific insights* that are unrecognized or not fully discounted by most market participants at particular times for particular stocks. Three factors are critical to gaining such insights:

- comprehensiveness and accuracy of the valuation model chosen;
- the investor's skill in applying the model; and
- the investor's depth of performance-relevant company information.

This suggests that the research agenda of behavioral finance could be advanced by engaging explicit valuation models that help investors overcome behavioral biases and improve the forecasts of key valuation variables. To effectively participate in the learning experience, investors need some useful standards for evaluating and selecting their preferred model. CFROI® Valuation, Efficient Markets, and Behavioral Finance was crafted with this purpose in mind and is available for downloading at www.LearningWhatWorks.com.

The CFROI (Cash-Flow-Return-on-Investment) Valuation Framework is keyed to the firm's life-cycle of economic returns, measured as CFROIs. The CFROI is:

- calculated from annual balance sheets and income statements;
- indicative of the average ROIs being achieved on the firm's portfolio of projects;
- inflation-adjusted and incorporates adjustments that minimize accounting distortions; and
- enables direct comparisons across time, across companies of widely varying asset composition, and across countries with different inflation environments and accounting conventions.

Translating CFROIs into warranted value requires a forecast of both a net cash receipt (NCR) stream and the investor's discount rate. The NCR stream is generated from a forecast of patterns over time of CFROIs and reinvestment rates. A life-cycle chart displays past and forecast corporate performance. The firm's life-cycle is displayed with the following inflation-adjusted, or real, time series:

- CFROIs,
- reinvestment rates, and
- the investors' discount rates.

Long-term excess positive/negative shareholder returns are invariably caused by firms delivering CFROI and reinvestment *fade* rates that were more/less favorable than anticipated.

The CFROI model is a total system that emphasizes the multiple ways that variables are related. In contrast to mainstream finance valuation models, a total system approach illuminates that a firm's discount rate estimate is *critically dependent* on the forecasting procedures used for the firm's calculated NCR stream. Therefore, how one forecasts CFROI fade rates impacts how one assigns discount rates.

Even though they lead to nonsensical answers for many companies, mainstream finance has promoted CAPM/Beta discount rates. Investors' discount rates are *forward-looking*, but the CAPM/equity risk premium based on historical data, is *backward-looking*. Company-specific discount rates in the CFROI model are assigned using a *forward-looking*, market-derived base rate for the corporate sector with positive or negative risk differentials reflecting company-specific characteristics.

Investors price assets on the expected *real return net of applicable taxes* including transactions costs. A fundamental, real pretax equity rate can be calculated by combining:

- a plausible real, after-personal-tax return demanded by taxable equity investors; and
- an incremental return to compensate for the combined impact of dividend taxes, capital gain taxes, and the expected inflation rate.

Levels and changes in this fundamental equity rate roughly parallel the market-derived equity rate. Therefore, in order to gauge the impact on the stock market of tax law changes, one should calculate how tax law changes translate to discount rate changes.

To continually improve one's analyses, maintain a healthy skepticism of the entire process of forecasting future economic performance and translating those forecasts into warranted equity value. This mindfulness is fundamental to the process for model improvement.

A unique empirical test-bed for model improvement derives from:

- the comprehensiveness of the CFFROI model;
- its focus on relationships among variables;
- insightful life-cycle displays of corporate performance; and
- feedback loop reflected in the comparison of historical stock prices to warranted values.

Model users uncover problems continually, but follow a scientific path to develop solutions that better link corporate performance to stock prices. The improved model invariably raises deeper issues to be addressed. The result is an evolutionary CFROI framework of increasing breadth and usefulness.

In summary, from the perspective of buying and selling stocks there is an obvious motivation for security analysts, portfolio managers, and quantitatively-oriented retail investors to seek the most useful valuation model for their needs. Much of the detailed discussion in this essay will appeal to that audience.

The benefits of the CFROI valuation model extend to managements and boards of directors of business firms who need a model to make operational their goal of maximizing long-term shareholder value. It should provide insights and satisfactory accuracy for connecting corporate performance to stock prices. It should be a useful gauge to estimate the likely effects of proposed major capital outlays on shareholder value. Finally, investors, managements and boards all benefit by using the CFROI model to *better understand levels and changes in stock prices over time.*

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Background and Context

The book, *CFROI Valuation: A Total System Approach to Valuing the Firm*, was written to summarize the core thinking and technical details of the Cash-Flow-Return-on-Investment valuation framework and the benefits from using it.[1] The underlying research for the book began in 1970 and continues to be improved by the research staff of CSFB HOLT.

With its companion *ValueSearch*™ global database covering 18,000 companies in 36 countries, CSFB HOLT's CFROI valuation software is actively used by over 600 money management firms worldwide. CFROI valuation has become the dominant DCF model that institutional portfolio managers use in analyzing stocks.

The most basic premise of CFROI valuation is that a firm's value reflects its ability to create economic wealth. A great deal of initial effort went into constructing the CFROI metric to more accurately measure a firm's economic wealth creation/destruction. That effort continues today, primarily in the form of seeking to devise adjustments to accounting financial data that will better capture the firm's economics and lead to improved forecasts of future corporate performance.

The CFROI valuation framework evolved as problems were identified in measuring corporate performance and explaining levels and changes in stock prices for individual companies. Problems led to detailed understanding and insights that were then tested against a large universe of companies. Improvements to the model and related data displays led to a new round of refinements. This continuous process of improvement is greatly aided by dealing with a global universe of companies operating in different environments of accounting rules, inflation, and investors' taxation. Quite often problems were identified by analysts at investment management firms who were highly knowledgeable of the companies and home country environments. These same analysts critiqued the proposed solutions.

This approach differs markedly from the emphasis of mainstream academic finance on highly mathematical and elegant model building critically hinging on key assumptions

that comfortably fit into the paradigm of efficient markets but arguably blocked the basic discovery process of science. This state of affairs has its roots in the methodology of positive economics. This methodology says, essentially, that the "realism" of a model's assumptions is not a necessary condition for a model's validity; its predictive success is the key requirement.[2]

Early into the work on what became the CFROI framework, the efficient market hypothesis (EMH) and the capital asset pricing model (CAPM) already were paradigms of modern finance. Much academic work was directed at honing or extending those theories, the surest path to publication, respect, and promotions for academics, though some was directed at refuting the paradigms. In recent years, behavioral finance has emerged as a new school of thought critical of the EMH.

Over the years, a substantial number of academic studies have produced empirical evidence at odds with the EMH. EMH supporters have criticized the usefulness of those studies arguing the results are anomalies attributable to data mining and/or misspecification of risk. Besides, they have argued, anomalies in the absence of a unifying theory accounting for them, are not sufficient for overturning the volume of argument and evidence consistent with the EMH.

The proponents of behavioral finance reply that humans are not the rational actors they are assumed to be and must be for the EMH to be relevant to actual life.[3] They point to market behavior that, to them, represents prima facie evidence of inefficient markets: the 20.5 percent one day decline in the S&P 500 Index on October 19, 1987 absent any prominent news; and the recent internet/tech stock market bubble and collapse. More difficult to dismiss is the evidence from brain studies that humans have cognitive biases in information processing and decision making.

But what has been missing from the academic research is a focus on the fundamental matter of how investors make the individual stock decisions that in the aggregate determine stock prices. Although this essay is largely a description of key CFROI valuation concepts, it also makes a case that looking for more empirical evidence on either side of the EMH/behavioral finance controversy is mostly unproductive and that for empirical work to be more productive it needs to go in a new direction.

It seems safe to say that in making their buy/sell/hold decisions, the majority of investors, whether implicitly or explicitly and with varying degrees of competence, perform these four tasks:

- assess the causes of past levels of, and changes in, stock prices of individual firms;
- calibrate market expectations reflected in a current stock price;
- compare the inferred market expectations to their own expectations – or forecasts – of a firm's future corporate performance; and
- use some type of model, ranging from casually tested rules of thumb to highly specified models supported by extensive quantitative evaluations.

For an investor making a buy/sell decision, the key question is not whether to accept or reject the hypothesis that *the market* is efficient, but whether the investor's valuation tools and company knowledge are sufficiently powerful and complete to warrant the conclusion that a *particular stock* is priced *efficiently*.

From the investor's perspective, a stock is priced inefficiently if:

- the investor's forecast of the firm's economic performance is materially higher or lower than that implied by the current stock price;
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In other words, the market is inefficient for investors who generate *company-specific insights* that are unrecognized or not fully discounted by most market participants at particular times for particular stocks. Three factors are critical to gaining such insights:

- comprehensiveness and accuracy of the valuation model chosen;
- the investor's skill in applying the model; and
- the investor's depth of performance-relevant company information.

A legitimate point raised by behavioral finance supporters is that for periods of time, investor behavior and resulting stock prices can be inconsistent with any plausible forecasts of firms' future corporate performance. We accept that point. Nevertheless, our foundational view is that *over longer periods of time, economic reality rules as to the valuations of individual companies*. For example, there is no ambiguity as to the different levels of corporate performance and different rewards to shareholders over longer time periods for Wal-Mart versus K-Mart.

In the remainder of this essay, a different angle on behavioral finance is promoted: start with an explicit valuation model and consider ways to improve the forecasts of key inputs to the model that overcome documented behavioral biases.

This paper summarizes the *CFROI Valuation* book as Ten Key Points. The first is a list of criteria for grading valuation models. The other nine points describe important technical features of the CFROI model and related benefits, which presumably account for its wide acceptance by knowledgeable institutional investors.

1. Criteria for Grading Valuation Models

The following six criteria for grading competing valuation models are based on decades of feedback from thousands of users of the CFROI model who had a vested interest in

improving the model and its related *ValueSearch*™ database. These criteria address important practical issues involved with managing common stock portfolios: communicating reasons for buy/hold/sell recommendations, facilitating debates among members of the investment firm, and striving to continually improve the investment process. The six criteria are:

(1) Insights from analyzing firms' track records
(2) Identification of key valuation issues
(3) Accuracy
(4) Plausibility judgments
(5) Ease of implementation
(6) Process for model improvement

Users of valuation models should demand that a model enables them to glean insights from analyzing firms' track records that help in formulating forecasts of future corporate performance. For example, valuing the firm as the present value of future dividends offers little for optimizing the use of historical data, especially so for firms not currently paying dividends.

Models have associated data displays that tie into key valuation drivers. Those data displays should help users decide if a particular firm is likely to earn a future ROI greater than/equal to/less than its cost of capital. Ideally, the display of past asset growth should help judge the contributions from organic growth, acquisitions, and capital structure changes.

With these data displays, users can identify key valuation issues. If a mature firm is expected to earn substantially less than its cost of capital, then a key issue is ROI improvement, and asset growth should be whatever it takes to accommodate this improvement (i.e., negative growth is probably desirable). In contrast, if a firm is expected to earn substantially more than its cost of capital, then a key issue is how large a reinvestment rate can be achieved.

What counts for users of a valuation model are the results of their investment decisions using the model's calculated warranted values. Users can benefit from a comprehensive audit of historical tracking of firms' warranted values versus actual stock prices.

Accuracy is not the consequence of an isolated act. It involves a *process* for identifying sources of inaccuracy and resolving such problems. Consider a situation in which warranted values are consistently less than actual. First, note that it is important to *identify* this problem before using a calculated warranted value to make an investment decision. Second, one wants to fix the problem if possible. Perhaps, the firm uses accelerated depreciation and this has not been properly adjusted for, with the consequence that the asset life is substantially understated. Computing a more realistic asset life and recalculating warranted values with historical data might well bring warranted values close to actual historical prices and that would suggest the proposed fix is indeed a fix.

Valuation models either make an explicit forecast of a net cash receipt stream or deal with the components that drive the NCR stream. The critical components are some measure of a return-on-assets, an asset growth rate, and the fade patterns over time for these two variables.

Forecasts of the NCR drivers are more amenable to plausibility judgments than forecasts made in absolute terms for NCRs. Keep in mind that corporate performance over the long term is, at bedrock, determined by managerial skill and competition. Users can associate levels of asset returns/CFROIs and asset growth with levels of managerial skill.

Plausibility judgments involve comparisons with other firms, especially competitors. A forecast of better (worse) corporate performance than a competitor is typically more acceptable if this is consistent with demonstrated levels of managerial skill for the firm and its competitors, i.e., their financial track records. This puts a premium on minimizing accounting distortions so that cross-company comparisons are valid.

Academic work on residual income valuation models asserts that accounting biases can be ignored due to offsetting errors in forecasting NCR streams. This approach fails miserably to meet the need of analysts to judge the plausibility of their forecasts.

Another area of importance for plausibility judgments is the rate at which firms' economic returns fade toward the cost of capital. Oftentimes this is the weakest part of a typical analyst's forecast. A valuation model becomes more useful when it facilitates empirical research that helps to better assign fade rates.

Economists point out that life is about tradeoffs. So, it appears at first glance that the criterion of ease of implementation is a tradeoff with the other five criteria. The inclination may be to make a rough guess as to how much complexity in a valuation model and related database is tolerable, and beyond that point assume that benefits are less than the cost. This can be a mistake for investment management firms whose success or failure hinges on a sound research process and valuation accuracy. The incremental benefit to money managers from improving the value-added of their portfolio returns is huge.

Consider firms in countries where management is allowed considerable freedom in revaluing the plant account while still meeting that country's accounting standards. With the CFROI model's procedure for inflation adjustments to original-cost gross plant data and incorporation of relevant footnote data from the financial reports, this problem is *easily resolved*. A less comprehensive model that appears easy to implement would either ignore this problem or face serious challenges in dealing with the volatility of performance metrics induced by plant revaluations.

A premature decision to simplify a valuation model can interfere with solving complex problems in linking corporate performance to stock prices and thereby impede a process for model improvement. With this in mind, a preferred approach is to choose a model

that is *sufficiently comprehensive* to deal with the formidable task of understanding levels and changes in global stock prices over time.

How to improve a valuation model over time is a neglected topic in mainstream finance. Our work argues for orchestrating empirical feedback in the context of a comprehensive valuation model that plainly identifies how variables are related to one another. Particularly important are data displays plotting the component drivers of NCRs and comparing warranted values to actual stock prices. Our experience strongly suggests that the more rigorous the empirical work, the more one is convinced that the market is impressively accurate in:

- seeing through complex accounting issues;
- valuing firms on economic fundamentals; and
- anticipating future corporate performance.

2. How Do You Know What You Think You Know?

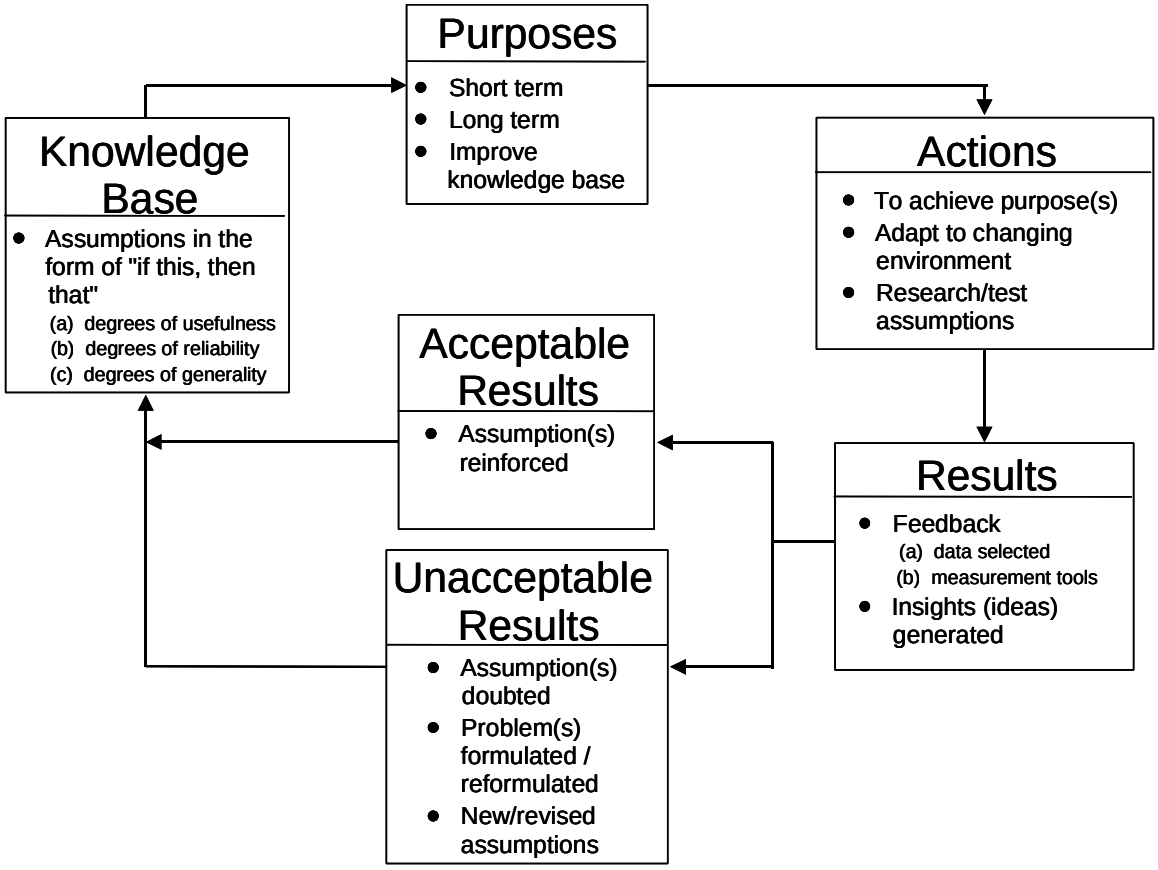
The opening chapter of *CFROI Valuation* outlines a knowledge and action system by which we build up our working knowledge base and generate feedback with the potential to improve the accuracy of our assumptions. To continually improve one's analysis, it is critical to maintain a healthy skepticism of the entire process of forecasting future economic performance and translating those forecasts into warranted values.

Along these lines, behavioral finance supporters are on solid ground when they emphasize the importance of biases in processing information and making decisions. The CFROI data displays help in comparing a company's past and forecast economic performance to relevant peer companies and laying out "objective facts" that can reveal and counteract preconceived biases. Analysts are thereby assisted in better gauging their subjective probabilities of particular forecasts being achieved and in avoiding the behavioral tendency to extrapolate near-term results into unduly optimistic or pessimistic long-term forecasts.

In the knowledge and action system of Figure 1, assumptions (i.e., hypotheses) are tested via purposeful action. Feedback results lead to reinforcement or doubt. This process parallels the logic of the scientific method of research and is foundational to knowing in all fields.[4]

Security analysis is replete with assumptions of varying degrees of reliability. Careful attention to the evaluation of assumptions is a hallmark of useful security analysis.

Figure 1. Knowledge and Action System



Source: Adapted from Bartley J. Madden, "A transactional approach to economic research," Journal of Socio-Economics, Vol. 20, No.1, 1991, Figure 2.

The above diagram puts the spotlight on the critical role of assumptions in the *process* of building up reliable knowledge. It is obviously important for analysts to be vigilant in continually critiquing their assumptions about business firms' strategy and operations. Much less obvious is the need to be continually critical of how components to the valuation model interact in calculating warranted valuations.

A major critique from the efficient markets proponents is that behavioral finance research amounts to simply a continuing series of empirical "anomalies" that do not connect to any *unifying theory* like the CAPM.[5] Why not combine the DCF economics of the CFROI valuation model with enhanced behavioral understanding of information processing/decision making? In other words, as noted earlier, use behavioral finance findings to guide additional empirical research for improving the forecasting of critical inputs to an explicit valuation model.

3. Net Cash Receipts, the Discount Rate, and Warranted Value

A theoretically sound model of bond pricing connects the bond's anticipated net cash receipts in terms of interest and principal payments to the bond's market price by way of a discount rate, or yield-to-maturity. This model facilitates understanding how changes in firms' creditworthiness or inflation expectations translate into changing bond prices.

Application of this DCF model to the stock market is vastly more difficult due to the uncertainty in forecasting NCRs. Although analysts place heavy weight on their most likely forecast of NCRs, a firm's market value actually represents the expected value of a distribution of NCR outcomes.

So, how investors set prices for individual companies is a complex process. One would have expected *modern finance* to have done considerable research to help analysts use DCF in order to improve understanding of levels and changes in stock prices.

With the exception of work on residual income valuation models, the top journals have devoted very little attention to this area for more than three decades. Why? Because in an efficient market all value-relevant information is already captured in stock prices, so that any further valuation analysis is wasted effort.[6]

In contrast, the CFROI development history was rooted in *understanding* the process of how market prices are set for individual companies. The core valuation building blocks are the articulation of a firm's forecasted net cash receipt stream and the investors' discount rate used to translate NCRs to a warranted value.

Figure 2. Components to Warranted Value

$$\text{Warranted Value} = \sum_{t=1}^{n} \frac{\text{Net Cash Receipts}_t}{(1+\text{Discount Rate}_t)^t}$$

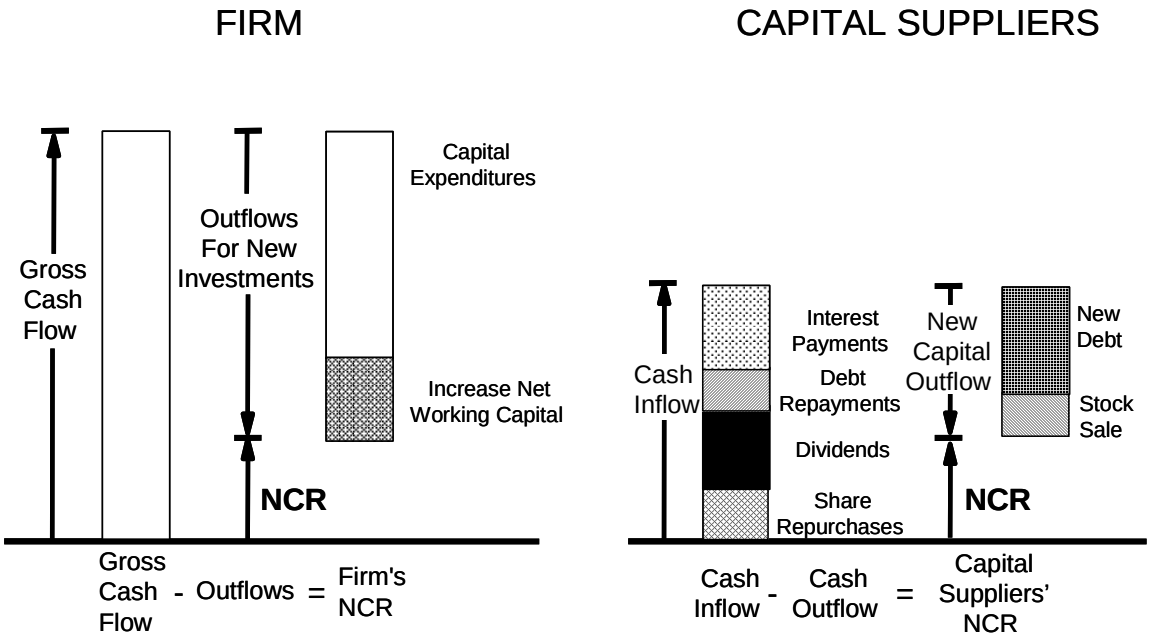
Source: CSFB HOLT Equity Research

The above seems to be quite simple. Yet, analysts not using the CFROI model typically default to using a CAPM/Beta discount rate that is notorious for wide variation inconsistent with common sense.

In addition, many analysts make errors in calculating NCRs. This causes valuation errors and, among other things, confusion regarding the effects of capital structure decisions such as share repurchases. Figure 3 explains how to calculate NCRs from the firm's (operations) perspective, which are also identical to NCRs calculated from the capital

owners' perspective. The precise, logically sound NCR definition illustrated below has advantages compared to the multitude of definitions of free cash flow.

Figure 3. Firm's NCR = Capital Suppliers' NCR



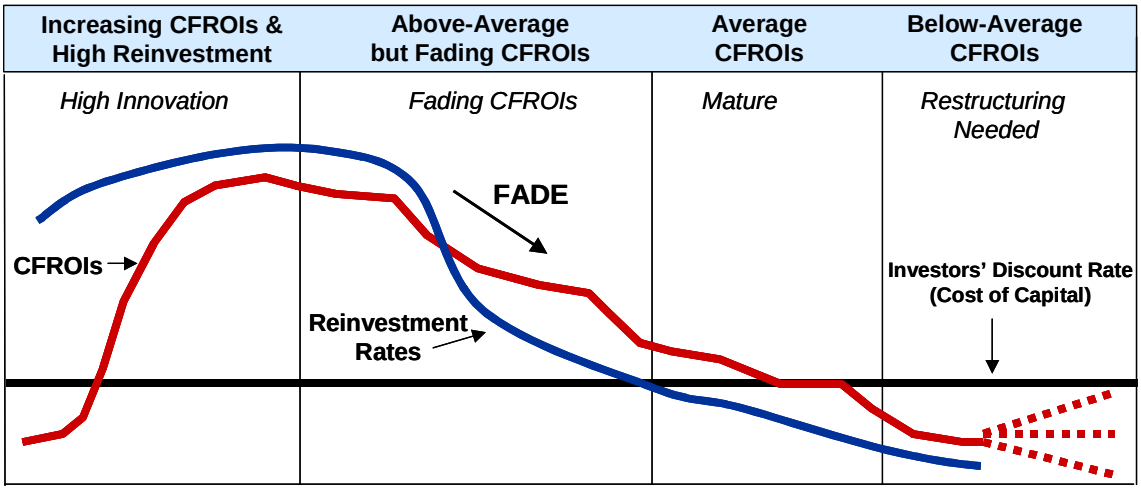
Source: Bartley J. Madden *CFROI® Valuation: A Total System Approach to Valuing the Firm, 1999, Butterworth Heinemann, Figure 3.3.*

4. Firms' Competitive Life-Cycle

Earlier it was mentioned that CFROI development focused on practical valuation problems ignored by mainstream academic finance. At the top of that list is the mechanics of forecasting the NCR stream. A great benefit of the economic-return metric CFROI is its usefulness for improving NCR forecasting.

The calculation begins with the fact that firms go through a competitive life-cycle resembling Figure 4. The firm's early years of successful high innovation are marked by high CFROIs coupled with high reinvestment rates. Over the long term, competition forces firms' CFROIs to *fade* towards the average, or cost-of-capital, level as the rate of growth in reinvestment opportunities to earn wealth-creating CFROIs diminishes.

Figure 4. Firms' Competitive Life-Cycle



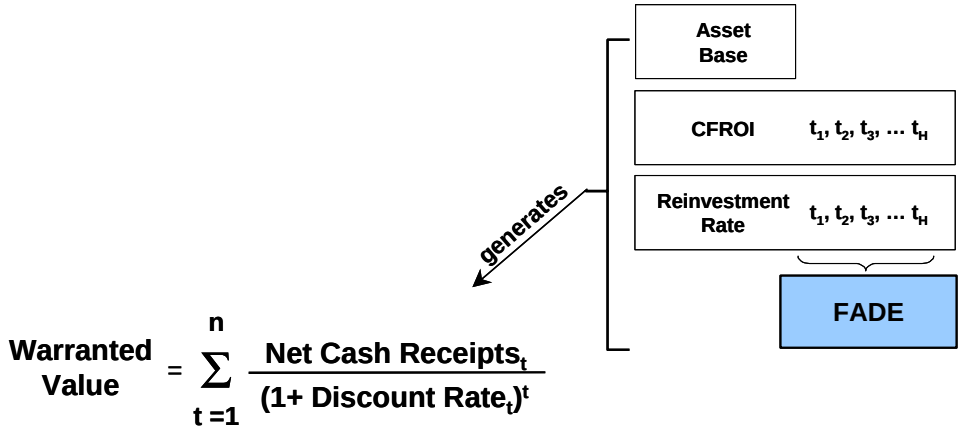
Source: CSFB HOLT Equity Research

Instead of forecasting a firm's future NCR stream in specific yearly sums, the analyst can forecast a pattern of CFROIs and reinvestment rates that generate those NCRs. The competitive *fade rate* for CFROIs and the *fade rate* for reinvestment often follow correlated paths over longer time periods. Both are important to improving estimates of firm valuations. The double-barrelled aspect of the fade process is reflected in empirical evidence that, all else equal, faster reinvestment generally will result in faster fade of above-average CFROIs.[7]

5. Valuing the Firm as a Total System

Figure 5 displays the basic components to the CFROI valuation model. A critical aspect is the total system, in which relationships among variables have logical implications for how these variables should be calculated.

Figure 5. CFROI Valuation Model --- A Total System



Source: CSFB HOLT Equity Research

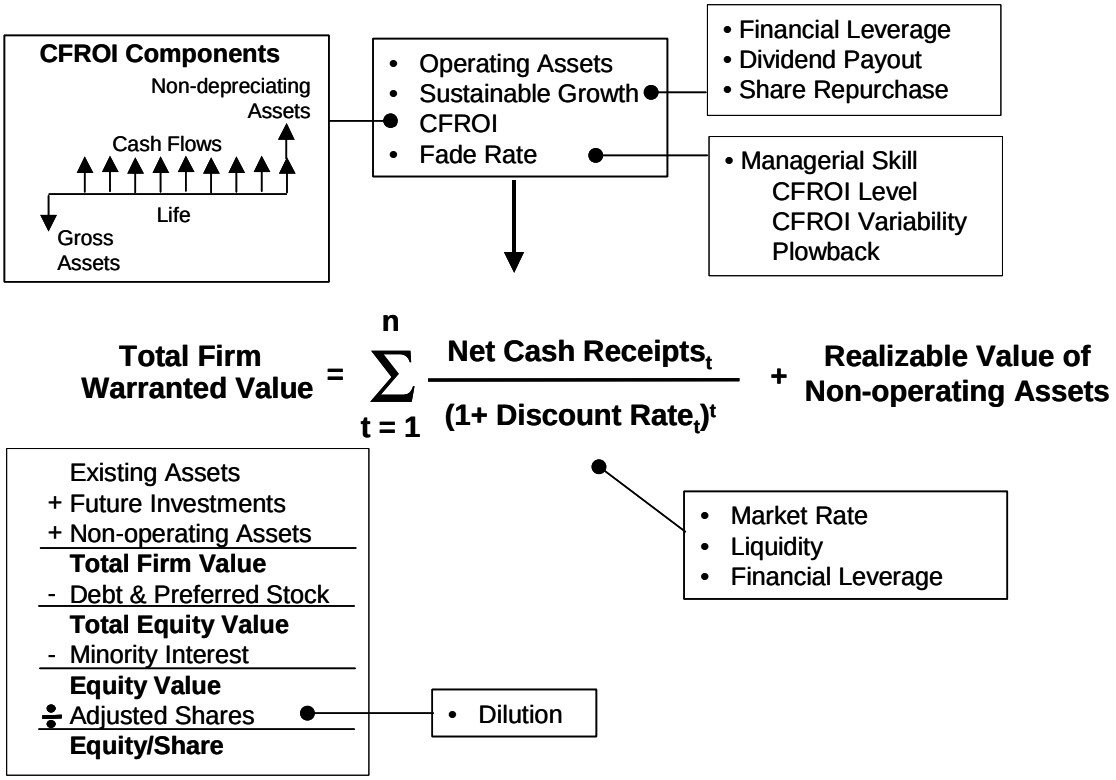
One especially important total system issue is recognition that an estimate of a firm's discount rate is contingent upon how the NCR stream is forecasted. In other words, the forecasting of fade rates logically affects the estimate of the investors' discount rate. If a model employs highly optimistic fade forecasts, the calculated warranted values will systematically exceed actual stock prices unless the model adjusts with a higher discount rate and vice versa. This fundamental point is totally missed, or disregarded, by users that parachute the *same* CAPM/Beta discount rate into valuation models employing widely *different* algorithms for forecasting NCRs.

As noted earlier, the hallmark of a total-system approach is relationships among variables. Specifically, a procedure for handling off-balance-sheet leased property would impact:

- the asset base and CFROIs;
- the risk differential used in calculating a company-specific discount rate;
- the empirical work in measuring historical fade rates; and
- the calculation of debt in arriving at warranted equity value.

Figure 6 summarizes the connections among variables that led to the subtitle of *CFROI Valuation*, "A Total System Approach to Valuing the Firm."

Figure 6. A Total System Approach to Valuing the Firm



Source: Bartley J. Madden, CFROI Valuation – A Total System Approach to Valuing the Firm, 1999, Butterworth Heinemann, Figure 3.1.

6. Units of Measurement

As mentioned earlier, behavioral finance research typically involves some combination of empirical findings that are inconsistent with market efficiency and references to documented behavioral/psychological biases that offer an explanation for the empirical findings. But why end research there? Many observed behavioral inefficiencies could be overcome by orchestrating feedback data that would identify and purge faulty information or assumptions. Operationally useful historical benchmark data on key valuation drivers are needed for this task.

Forecasts of firms' future economic performance can be improved as measured past performance more closely approximates economic performance. Consequently, in our model the distortions induced by changes in the purchasing power of the monetary unit over time are removed. The time series for CFROIs, asset growth rates, and discount rates are in real units (inflation-adjusted) and are directly comparable across time.

Oftentimes it is noted that the distinction between real and nominal is merely that nominal rates include expected inflation and are directly observable in the bond market. Hence, many believe that it is simply more convenient to work in nominal space when

analyzing company data. However, plausibility checks and benchmarks necessarily involve the study of long-term levels and trends, which are far more informative when expressed in real units.

It is especially important that CFROIs use real units. This improves longer-term empirical analyses of the relationships between company characteristics and a range of outcomes for achieved CFROI fade rates. These observed frequencies of outcomes are a reality check that counteract tendencies to focus too much on the near-term to the detriment of long-term NCR forecasts.

Displays of real CFROIs along with real discount rates, or costs of capital, readily reveal wealth creation spreads that are directly comparable for firms on a global basis. This is clearly superior to the common practice of viewing wealth creation spreads as the firm's estimated nominal cost of capital along with the firm's return-on-equity (ROE) or return-on-net-assets (RONA). Both ROE and RONA use balance-sheet amounts reflecting aggregations of historical capital-expenditure vintages recorded in monetary units of different purchasing power. Thus ROE and RONA reflect embedded monetary unit distortions that vary in complex ways with each individual firm's asset composition, depreciable life, and past inflation rates and are *not* comparable across companies even within a single country, let alone across companies globally.

7. The Firm as a Portfolio of Projects

The original Miller and Modigliani work on equivalent valuation approaches set into motion mathematical conventions that have become standard practice.[8] Two M&M conventions not used within the CFROI model are:

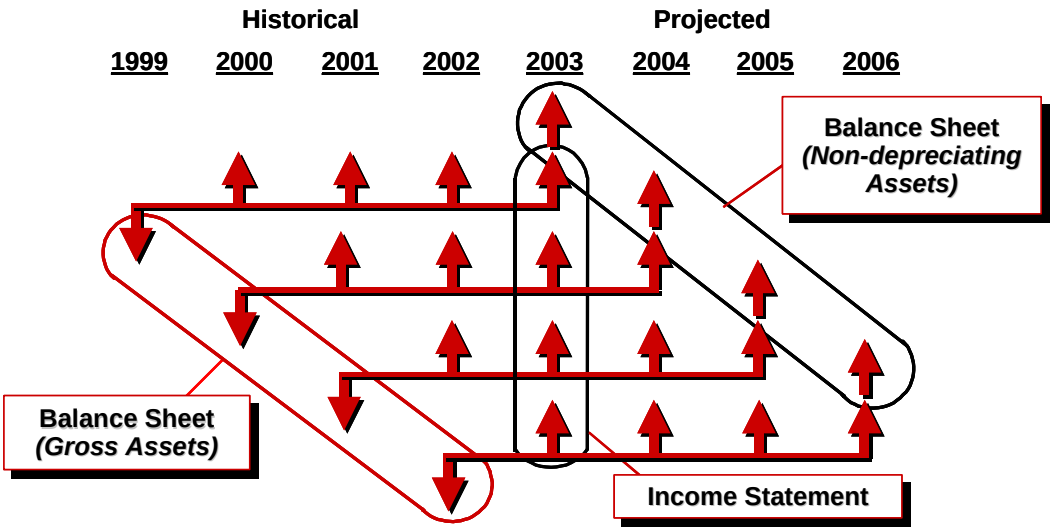
- estimating the present value of the firm's existing assets as current earnings divided by the discount rate which implies that these earnings are maintained as a perpetuity; and
- impounding the benefit of the tax deductibility of interest payments into a lower, after-tax cost of debt capital.

The CFROI approach values existing assets as the present value of the wind-down of cash flows over the remaining asset lives. Also, since CFROIs already benefit from lower taxes paid due to the tax deductibility of interest, no adjustment to the debt rate is needed.

The CFROI valuation structure stresses the importance of management's expected ROI on new projects. A proposed capital expenditure is a *project* where a *real* ROI can be precisely calculated as an internal rate of return if all cash outflows and cash inflows over the life of the project are known and expressed in constant monetary units. This real project ROI differs from annual cross-sectional measures of accounting returns.

A firm's operations can be conceptualized as an ongoing portfolio of annual projects represented cross-sectionally at points in time by balance sheets and income statements.

Figure 7. Firm as a Portfolio of Projects



Source: CSFB HOLT Equity Research

The above highlights that the financial performance for any given year (2003 in Figure 7) represents the combined results from past projects. The gross outlays for past project investments are shown on the balance sheet. The non-depreciating portion of gross assets will be released in future years as projects end. Also illustrated above, the income statement is driven by the aggregate cash flows from the firm's past projects.

The project ROI perspective highlights explicit recognition of asset composition, including the extent of non-depreciating assets and the estimated lives of depreciable assets. In the section that follows, we explain how asset composition is used in constructing the CFROI, which mimics project ROIs.

Explicitly dealing with asset composition is useful for ROI measurement and valuing existing assets. The value of existing assets should not include future project cash flows. The value of existing assets is the present value of cash flows from existing projects over their remaining lives, plus the present value of released non-depreciating assets. This approach is clearly more representative of economic reality than the perpetuity approach.

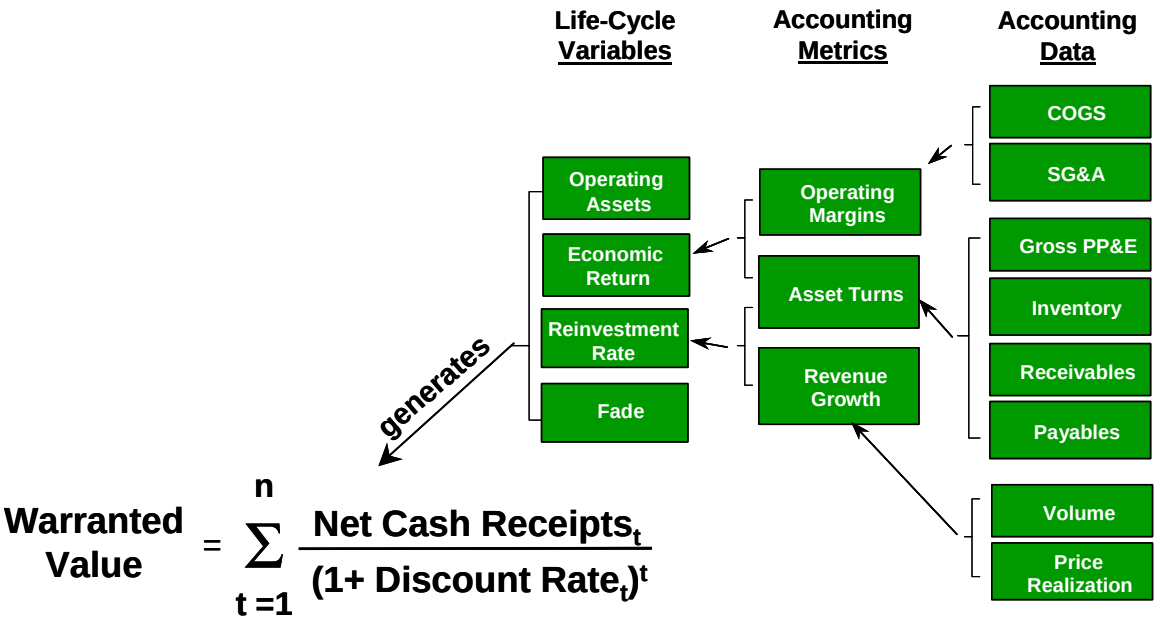
The framework depicted in Figure 7 can be used to think through a tough accounting problem by separating it into a corporate performance issue and a valuation issue. For example, what is the preferred accounting treatment for an oil and gas exploration project: expensing the cost of drilling dry holes, or, capitalizing such costs and putting dry holes on the balance sheet?

The cost of future dry holes is plainly necessary in finding wet holes. A CFROI computation reflecting project economics should include the costs of drilling dry holes. Yet, from the valuation perspective of the wind-down of cash flows from existing reserves, dry holes are clearly not relevant.

The project orientation focuses on the core economics of an achieved project ROI and amounts reinvested into new projects. This cash-in-and-cash-out process generates the firm's net cash receipts over time and ultimately determines warranted value.

Those accustomed to translating forecast financial statement data directly to warranted value may initially be uncomfortable with a shift to connecting life-cycle variables such as CFROI and reinvestment rate to warranted value. Figure 8 illustrates how the familiar financial statement data and accounting metrics conceptually tie into CFROI and reinvestment rate.

Figure 8. Connecting Accounting Data To Warranted Value



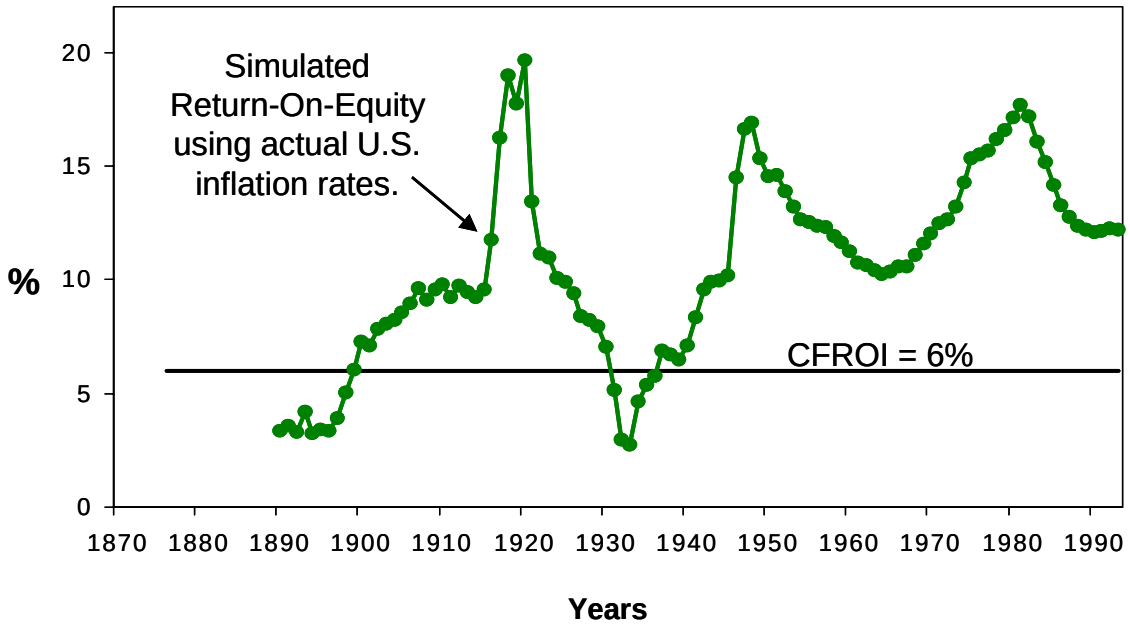
Source: CSFB HOLT Equity Research

8. CFROI as Part of a Total System

Figure 9 presents simulated results of the long-term, as-reported ROE for most of the 1900s that would have been calculated for a representative U.S. industrial firm specified to earn 6 percent ROIs on all of its projects throughout the time period covered. The

impact of the actual U.S. inflation rates coupled with historical cost accounting can be seen in the ROE roller coaster time series ranging from 3 percent to 20 percent.

Figure 9. Simulated Firm Earning Repetitive 6 Percent Real Project ROIs

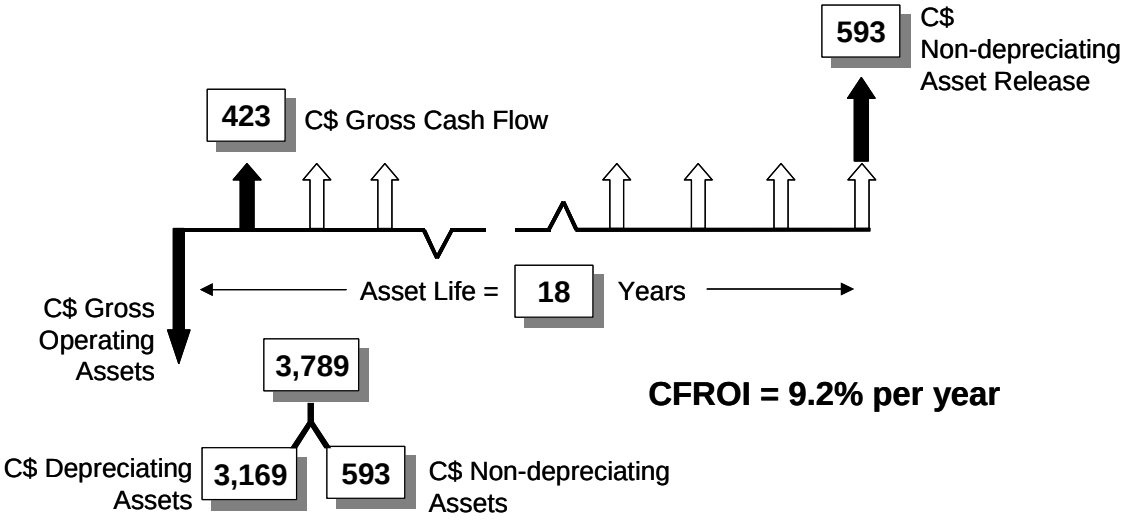


Source: Bartley J. Madden, "The CFROI Life-Cycle," Journal of Investing, Vol. 5, No. 2, 1996, exhibit 4.

In the above figure, CFROIs calculated from simulated as-reported financial statements were identical to the average project ROIs of 6 percent, indicating that the inflation adjustments added important information – by reducing false information. This exercise highlights the fundamental purpose of a CFROI metric: to translate financial statements to a cross-sectional ROI metric that, over time, reflects the approximate average ROI being achieved from the firm's portfolio of projects. In addition to adjustments for inflation, CFROIs incorporate adjustments to accounting rules in order to more closely approximate the underlying economics of the firm's business activities. Such adjustments make CFROIs comparable across time periods of varying inflation rates and across companies regardless of asset structure or home-country accounting conventions.

The CFROI metric (Figure 10) is not a hard-wired set of calculations.[10] It is a *research tool* that evolves over time.

Figure 10. CFROI Calculation for Hershey Foods Corporation, 1993

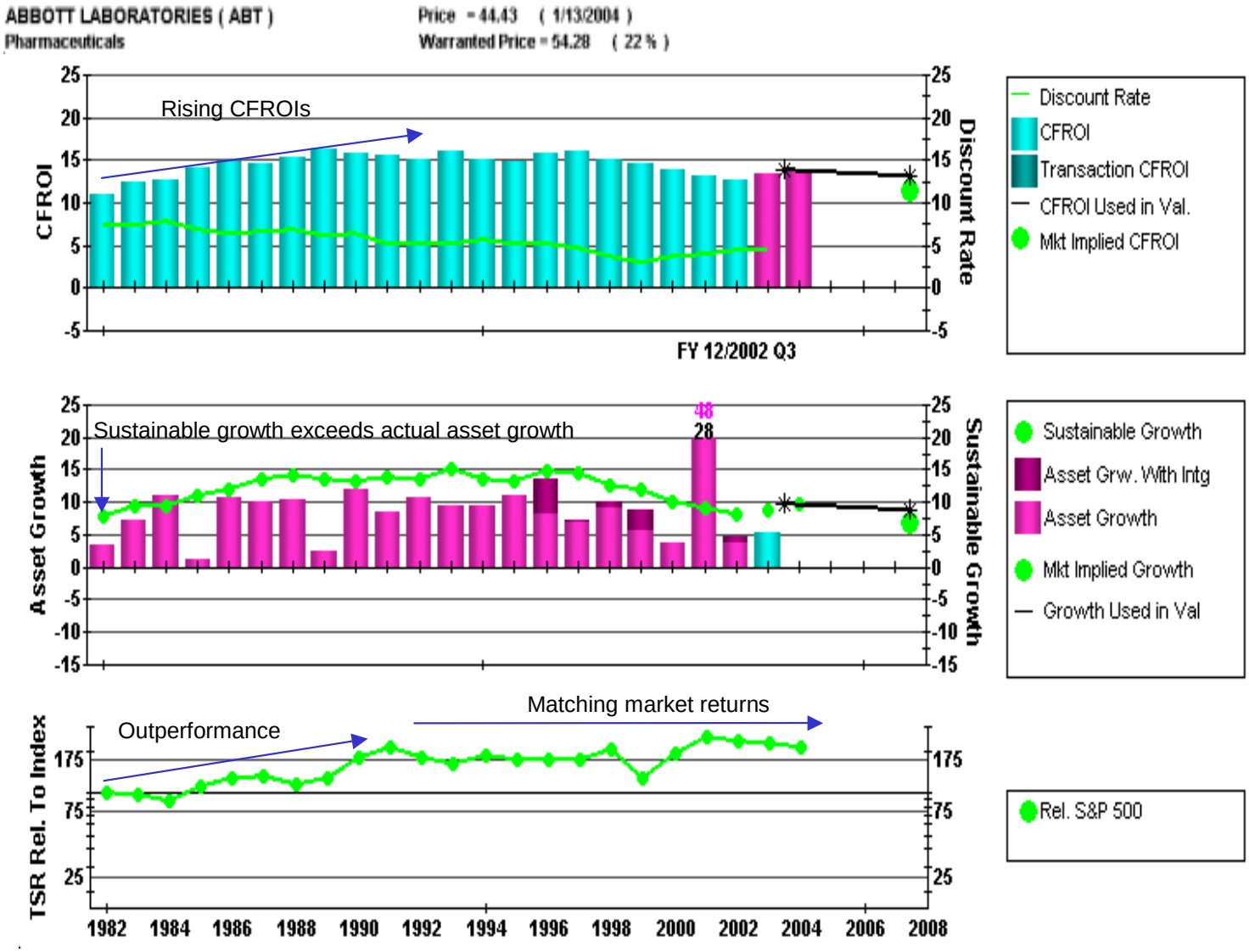


Source: Bartley J. Madden *CFROI Valuation: A Total System Approach to Valuing the Firm, 1999, Butterworth Heinemann, Figure 5.3.*

Calculation improvements evolve as users confront problems and develop solutions within the 18,000 company universe contained in CSFB HOLT's *ValueSearch*™ global database. Note that more penetrating and productive problems are encountered when a valuation model's algorithms are challenged by wide variations in the environment as reflected in the differing accounting conventions, inflation histories, and investor tax rates for the 36 countries in CSFB HOLT's *ValueSearch*™.

Two data displays below dissect and identify problem situations. The Relative Wealth Chart (Figure 11) displays the firm's basic life-cycle history. The Value Chart (Figure 12) plots actual stock prices versus warranted equity values calculated using the most likely CFROI fade rates given the firm's financial history previous to the year of calculation.

Figure 11. Abbott Labs Relative Wealth Chart, 1982-2003



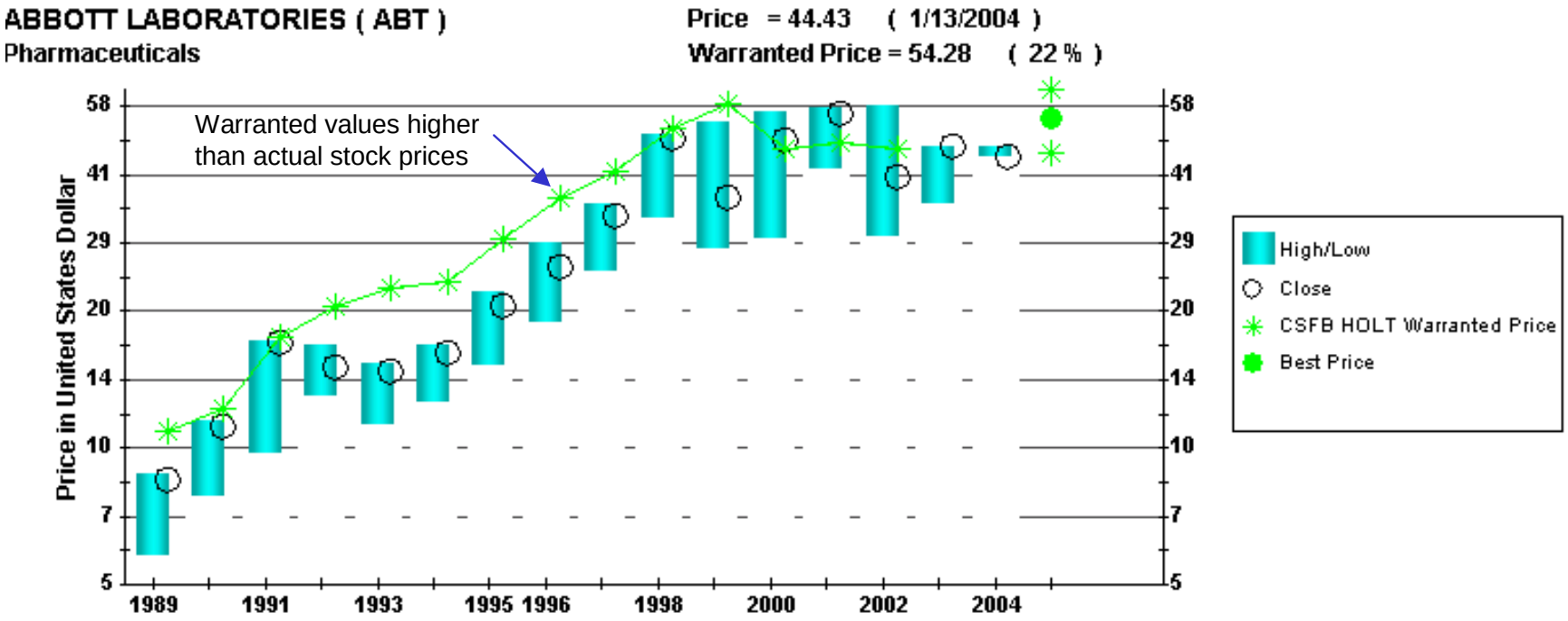
Source: CSFB HOLT ValueSearch™

The Relative Wealth Chart of Figure 11 displays Abbott Laboratories' (ABT) life-cycle of corporate performance including the forecast near-term future, and the market-implied future CFROIs and asset growth. During the 1980s (top panel) CFROIs rose from 10 percent to about 15 percent and in the last few years have faded modestly lower. The two bars at the end of the historical period represent forecast CFROIs derived from consensus EPS estimates. They drive the t+1 CFROI forecast (the star between the forecast CFROI bars). Subsequent forecast CFROIs (the line) to the CFROI at t+5 (star) reflect a typical fade-rate pattern for a firm with ABT's financial characteristics. The dot at t+5 is the CFROI level implied by the stock price for the date shown. The dot being slightly below the star at t+5 indicates that ABT's price of $44.43 implies a slightly faster fade than is typical for a firm with ABT's financial characteristics.

The middle panel shows the real annual Asset Growth rates in operating assets, including acquired assets. Asset Growth with Intangibles is the annual change in intangibles relative to the prior year's operating asset base. Sustainable Growth reflects available cash for reinvestment consistent with a particular year's CFROI. Forecast sustainable growth rates for t+1 to t+5 are consistent with forecast CFROIs, holding constant the existing capital structure and dividend payout policy. Historically, ABT's actual asset growth has been less than its sustainable growth.

The bottom panel of Figure 11 displays a cumulative index reflecting annual changes in the yearly excess (positive or negative) total shareholder return on ABT's stock relative to the S&P 500. Periods when ABT's shares out-performed (under-performed) the S&P 500 are represented by rising (falling) trends in this index. From 1982 into early 2004 ABT's total shareholder returns were approximately double the S&P 500, with the major sustained out-performance occurring during the 1980s when CFROIs were fading upward and exceeding investor expectations.

Figure 12. Abbott Labs Value Chart, 1982-2003



Source: CSFB HOLT ValueSearch™

The Value Chart of Figure 12 displays:

- CSFB HOLT's year-end warranted values as stars connected by line;
- the high-low annual range of stock prices; and
- the closing price (open dot) at yearend or the latest price for the current year.

This display reveals how well the baseline valuation model, with its employment of typical fade patterns, tracked actual prices.

At the far right in Figure 12, the stars above and below the best target price (closed dot) represent CSFB HOLT's high and low target prices. The best target price is calculated using the consensus EPS estimate; the high (low) is calculated using the highest (lowest) EPS estimate and a 100 basis point lower (higher) company-specific discount rate.

Close tracking indicates our model and standard inputs explain share prices quite well and supports a fairly high degree of confidence in the calculated target prices. Poor tracking indicates that our standard inputs and/or algorithms don't adequately capture the firm's economics. The reason might be readily understandable. For example, ABT's sustainable growth rate was regularly higher than the actual growth rate which, for a high, positive CFROI-spread firm, would produce warranted values above actual prices. More plausible and lower forecast asset growth rates would produce warranted values for ABT more in line with actual prices.

Poor tracking is common for startups and firms with a wide range of plausible future performance paths. Nevertheless, the historical database and foundational components of our model can serve as a useful template for organizing thought and debate regarding scenarios and their share price implications. When most firms within a sector track poorly, we immediately suspect some discrepancy in reporting versus economics specific to that sector. This feedback mechanism has initiated many research efforts that led to adjustments now incorporated in the CSFB HOLT *ValueSearch*™ database.

There are two basic problem types. In one, company-specific data has been or is in error and can be fixed in a straightforward manner. For example, a special item is buried in cost of goods sold or a large asset impairment charge is lumped into depreciation expense.

In the other type, a company is representative of a class of companies sharing the same problem. A fix to the model's algorithms must make economic sense and should lead to improved valuation tracking for most companies in the class. For example, many years ago a corporate/performance valuation issue was identified for pensions. Business economics dictated that gross cash flow should reflect the service component of pension expense. Pension liabilities were added to the firm's calculated debt and the financing component of pension expense was treated as interest payments to a debt owner. This revised treatment materially improved the tracking of warranted versus actual stock prices for those firms greatly affected by pension accounting vs. pension economics.

The above use of well-designed feedback data fulfills the critical role of identifying and changing faulty assumptions as discussed at the beginning of this essay. A comparable feedback loop of problem-recognition-to-model-improvement is missing from mainstream academic research on common stock valuation.

9. CFROI Fade Rates

As noted earlier, competition tends to force firms' CFROIs toward the average or cost of capital level. Similarly, competition tends to decrease reinvestment opportunities at wealth-creating CFROI levels, so reinvestment rates also tend to slow as firms grow larger. This *competitive-fade* process is empirically evident, and its incorporation in the CFROI valuation framework is critical to understanding why investors achieve excess returns over longer periods of time.

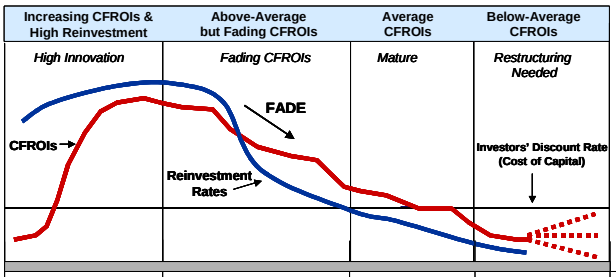
Buy/sell decisions will improve as one better identifies firms that will deliver competitive fade rates different from fade expectations implied in current stock prices. Arguably, the single most valuable skill for investors is their analytical ability to forecast long-term competitive fade.

In general, fade depends upon managerial skill and competition.[11] The study of firms' life-cycle histories points out the dominant role of the CEO's business strategy in determining fade rates and long-term shareholder returns. Smart managements anticipate the future, adapt their business strategies accordingly, and innovate in *commercially-successful* ways that produce sustained above-average CFROIs. Slow-thinking managements see the future as a mirror image of the past. Their typical strategy is to "do better what we have done in the past" and frequently this is coupled with large "growth" acquisitions.

More specifically, the study of individual companies puts a useful lens on the industry/economy context plus the unique details of managements' actions and competitors' responses. By studying firms' life-cycle histories, analysts acquire a knowledge base for judging firms' future fade rates. For example, for large, established firms steadfastly earning CFROIs well below their cost of capital, the odds for substantial improvement increase if management shrinks the asset base and breaks the business-as-usual mentality.

To illustrate briefly how rewarding the study of firms' life-cycles is within the CFROI framework, Figure 13 summarizes the life-cycle transitions from 1982 to 2003 for seven companies in widely different industries.

Figure 13. Life-Cycle Transitions and Shareholder Returns, 1982-2003

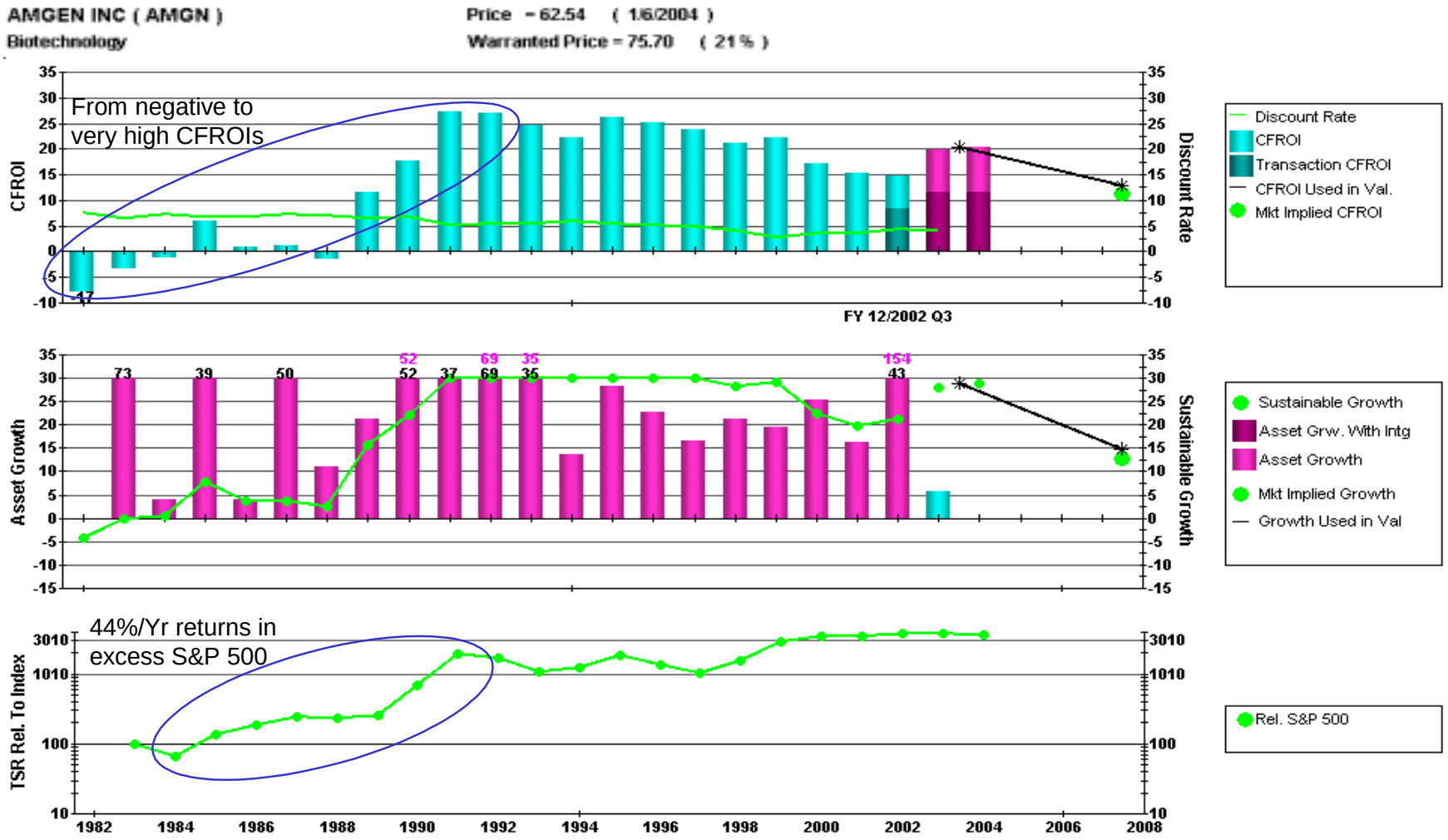


					1982-2003 Shareholder Returns, Net S&P 500, % / Yr
Amgen	**AMGN**	**AMGN**			**19.9**
Paychex	**PAYX**	**PAYX**			**15.8**
Walgreen			**WAG**		**6.5**
Dow Chemical			**DOW**		**0.6**
IBM			**IBM**	**IBM**	**-3.7**
Apple Computer	**AAPL**	**AAPL**	**AAPL**	**AAPL**	**-5.1**
K-Mart			**KMRT**	**KMRT**	**-35.5**

Source: CSFB HOLT Equity Research

The following individual Relative Wealth Charts explain the different shareholder returns, net of the S&P 500, achieved by their common stock owners.

Figure 14. Amgen Relative Wealth Chart, 1982-2003



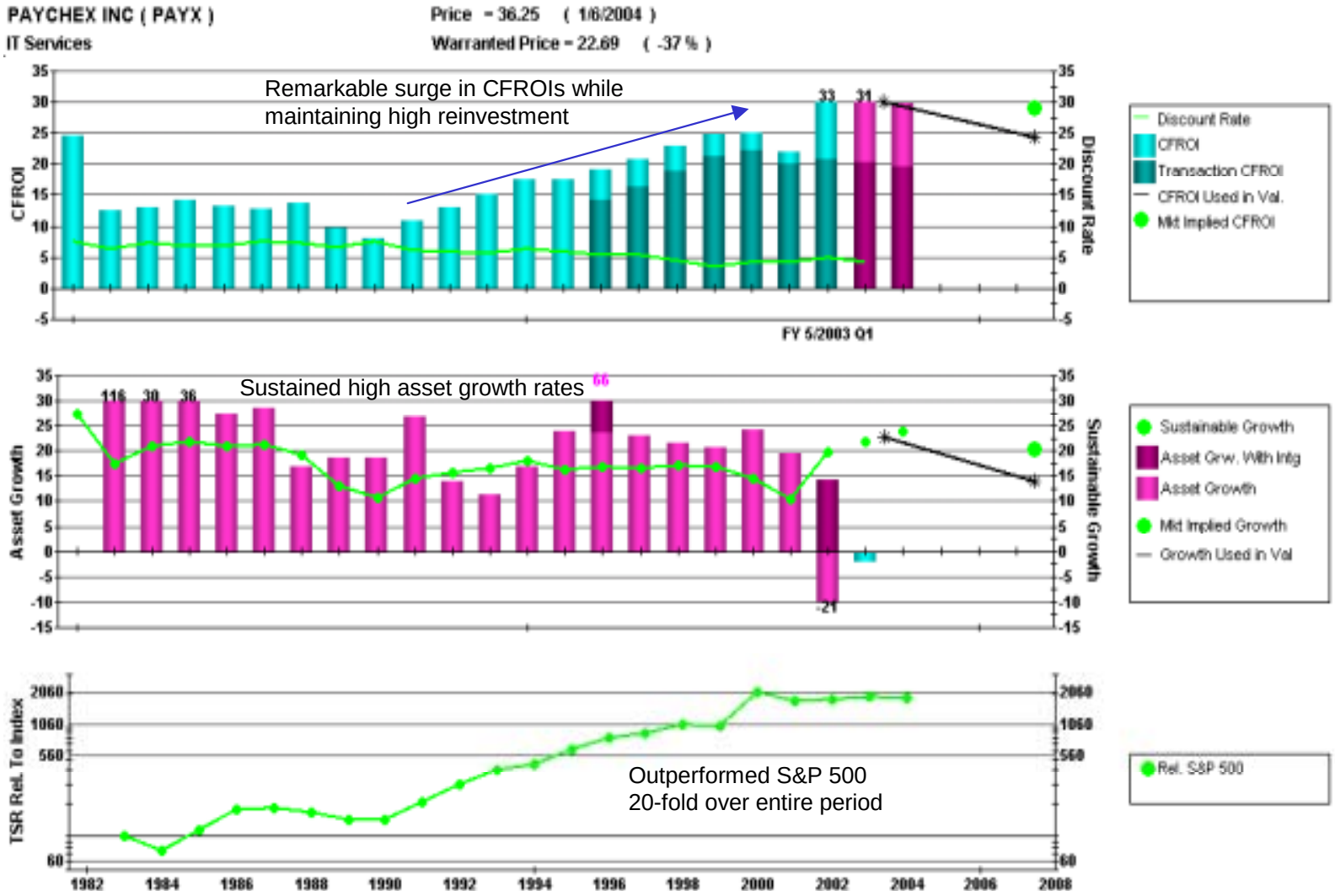
Source: CSFB HOLT ValueSearch™

Amgen

Invariably, long-term investors are rewarded with superior returns after buying an early-stage development company that subsequently is commercially successful in a very big way, by which we mean that the firm converts its innovations into high CFROIs with high reinvestment rates and holds this wealth-creating level of performance for an extended time period. Amgen was such a company.

Amgen was a biotech startup in the early 1980s that grew into a major pharmaceutical company with sales of $8.3 billion by 2003. Although Amgen's CFROIs were negative or very low through 1988, its stock outperformed the S&P 500 in those years as investors were expecting future big success. When CFROIs shot into high-positive territory over the next 3 years, Amgen's shares skyrocketed. For the period 1984 through 1991, Amgen shares outperformed the S&P 500 by an average of 44 percent per year. See the steeply rising relative wealth index in the bottom panel of Figure 14. As is evident in that figure, returns in excess of the S&P 500 over the subsequent period through 2003 were not nearly so high, but they were in excess of market returns nonetheless.[12]

Figure 15. Paychex Relative Wealth Chart, 1982-2003



Source: CSFB HOLT ValueSearch™

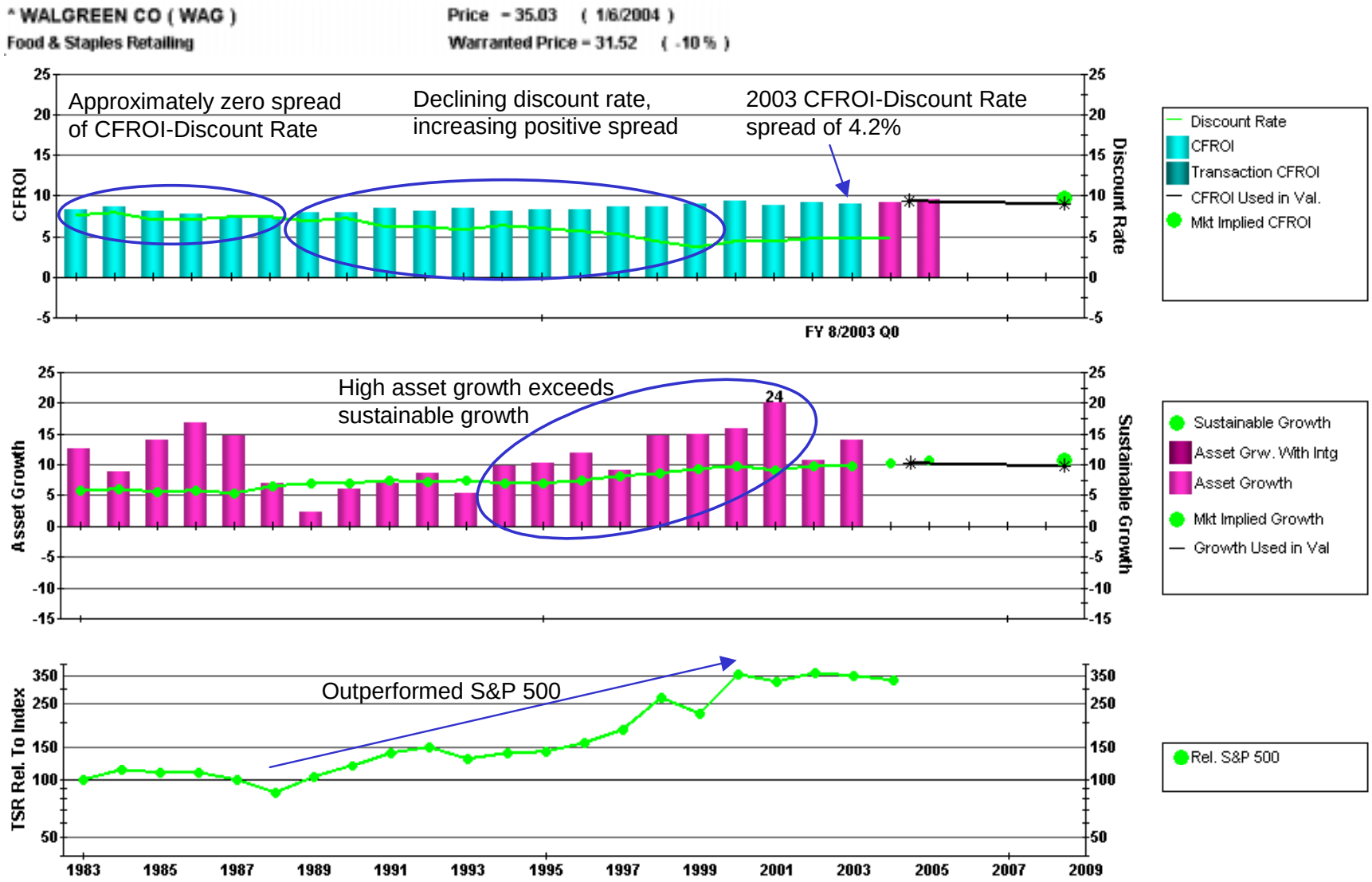
Paychex

Results are what counts. How often have we heard that truism? Yet, many investors when looking for exceptionally big winners in the stock market believe the firms must operate in "glamorous" businesses.

A firm's economic wealth creation *results* are reflected in its level of CFROIs in relation to its cost of capital and of the magnitude of its reinvestment rates plus their sustainability over time, that is, their fade patterns. Consider a firm like Paychex (Figure 15) in the "unglamorous" business of helping small companies process payrolls and other accounting needs. During the 1980s Paychex was creating wealth with CFROIs about 12 percent and high asset growth. Normally, a company like this would be expected to fade downward (falling CFROIs and slowing asset growth).

Paychex's CFROIs started trending downward at the end of the 1980s but this was temporary. Paychex has become the dominant firm in this industry. Since 1990, its CFROIs have *risen* coupled to high asset growth, and shareholders who bought in 1983 and held the stock until 2003 achieved a return almost 20-fold more than an investment in the S&P 500 over the same period.

Figure 16. Walgreen Company Relative Wealth Chart, 1983-2003



Source: CSFB HOLT ValueSearch™

Walgreen Company

I would like to digress a bit and use Walgreen's track record to highlight the role of corporate performance/valuation measurement in corporate governance. Recent passage of the Sarbanes-Oxley bill has compelled managements to give even more weight to a single earnings number calculated according to GAAP. This has the harmful effect of driving managements to use earnings as the compass for guiding their businesses. The unintended consequence will likely be a tendency for managements to take actions beneficial to *short-term* earnings but detrimental to the *long-term* interests of shareholders.

Is the problem best addressed by using the lens of EVA® to translate accounting profits to economic profits? Not really, and Walgreen offers a good illustration.

Our main critique of EVA is twofold.[13] First, EVA uses a dubious CAPM/Beta cost of capital that leads to serious inaccuracies. Second, to achieve the simplicity of a single compass for wealth creation, it *compacts* capital return, cost of capital, and asset size (reinvestment) into one number at the cost of lost insightful information. In contrast, the CFROI Relative Wealth Chart lays out these key valuation drivers as *separate* inflation-adjusted time series, enabling users to readily observe important *differences* in levels and trends in these key economic wealth-determining variables over time. These information rich, *detailed insights* are unavailable from studying a time series of EVAs.

It is noteworthy in Figure 16 that Walgreen's CFROIs barely moved since 1988 while its stock beat the S&P 500 by a wide margin. Why?

Observe that the wealth-creation spread of CFROIs versus the investors' discount rate widened from 0.0 percent in 1988 to 4.2 percent in 2003 due primarily to a declining discount rate. Big gains in shareholder wealth are possible if firms earning substantial positive spreads are grown rapidly. Importantly, Walgreen's management hugely scaled its successful drugstore business model. This is revealed in the very high asset growth rates displayed in the middle panel of Figure 16.

This robust wealth-creating combination was unanticipated by investors' valuations of Walgreen in 1988 and subsequent years. As this high level of corporate performance was delivered, investors repeatedly revised their expectations and valuations upward.

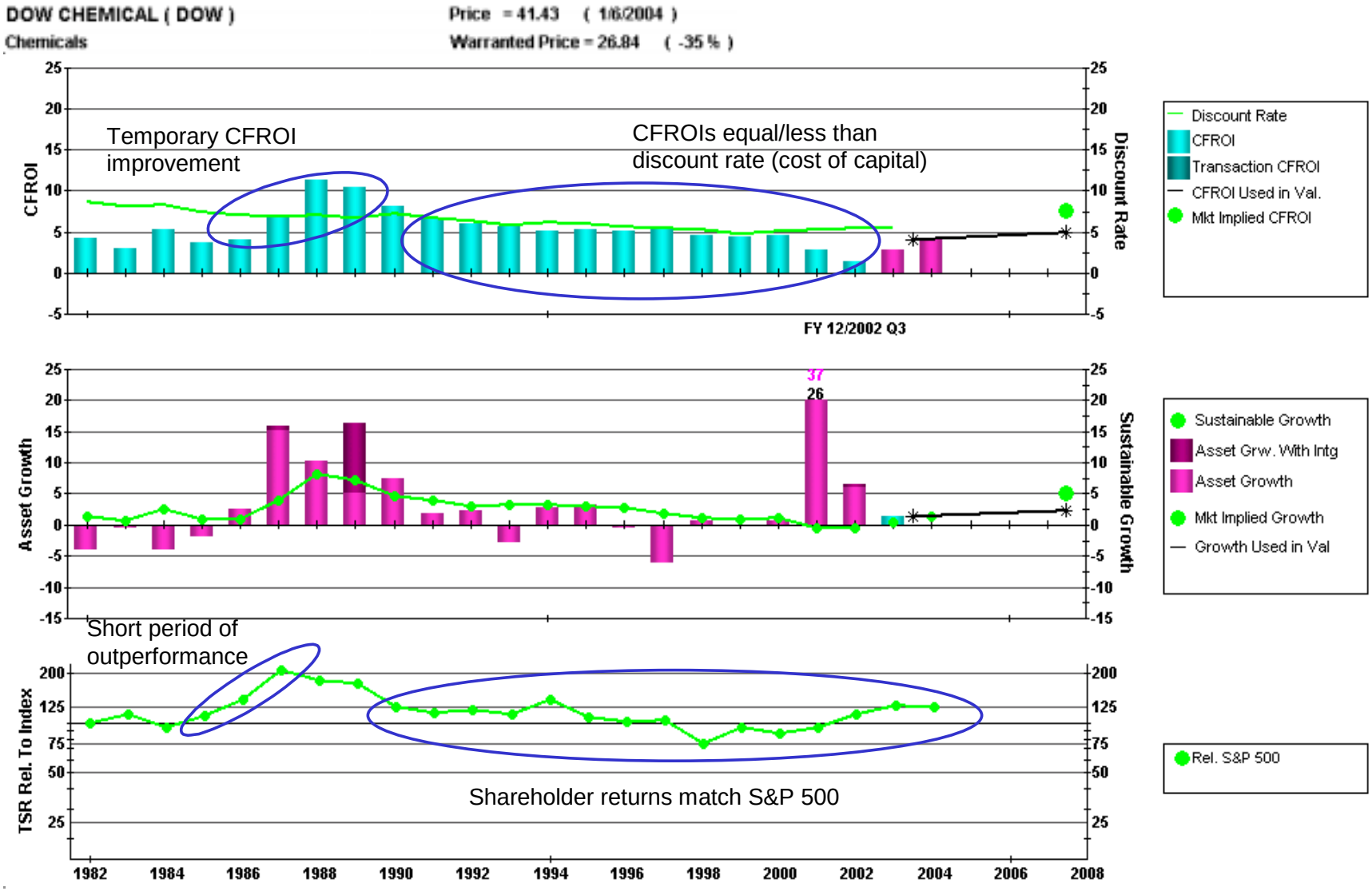
Managements and their boards of directors would be well served to use the CFROI valuation model to gain an understanding of how shareholder value is driven by CFROIs, discount rates (cost of capital), reinvestment rates, and fade rates. Key valuation issues for the firm and its individual business units are made plain in the CFROI model format.

In addition, with respect to the deleterious effects of emphasizing short-term earnings, many intangible investments (e.g., employee training) tend to depress earnings in the short term but can have favorable effects on long-term fade rates for CFROIs and

reinvestment rates. The comprehensiveness of the CFROI model facilitates more informative analysis of outlays for intangibles that are expensed for accounting purposes but are likely to bring long-term, economic wealth-creating benefits to the firm.

EVA® is a registered trademark of Stern Stewart & Co.

Figure 17. Dow Chemical Relative Wealth Chart, 1982-2003



Source: CSFB HOLT ValueSearch™

Dow Chemical

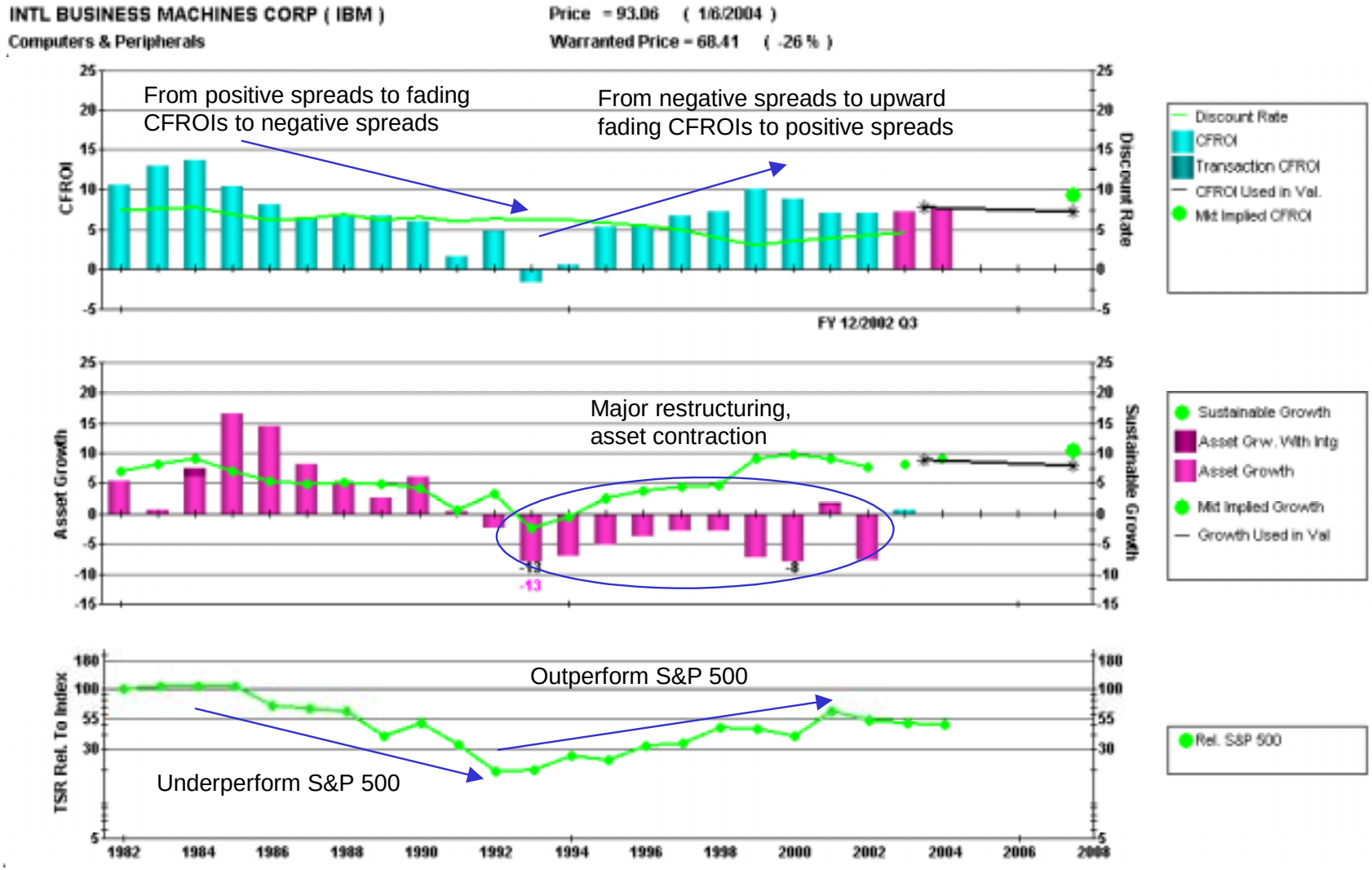
The life-cycle perspective accessible with CSFB HOLT's Relative Wealth Charts can be especially helpful for a firm's CEO and board in developing core business strategy. For large, mature firms, the shareholders' concern is that capital expenditures create zero (negative) wealth if CFROIs are approximately equal to (less than) the investors' required return. This is relevant to a firm such as Dow Chemical.

Dow chemical has long been viewed as a "blue chip" firm with large market shares in its businesses. Is Dow's corporate performance in Figure 17 blue chip quality? Far from it.

Dow has 50,000 employees, which is one of many reasons why it is very difficult to substantially improve and hold its CFROIs well above the discount rate. So, a mega-merger should be viewed with extreme skepticism as it would likely make the combined entity even more difficult to effectively manage.

Fundamentally improving CFROIs requires purging the firm of businesses that cannot realistically earn their cost of capital. Other potentially more viable businesses may well be held back by a culture that is ill-suited to exploiting new opportunities. Regrettably, effective management/board actions for mature firms tend not to be undertaken until these firms fall into survival-threatening financial difficulties.

Figure 18. IBM Relative Wealth Chart, 1982-2003



Source: CSFB HOLT ValueSearch™

IBM

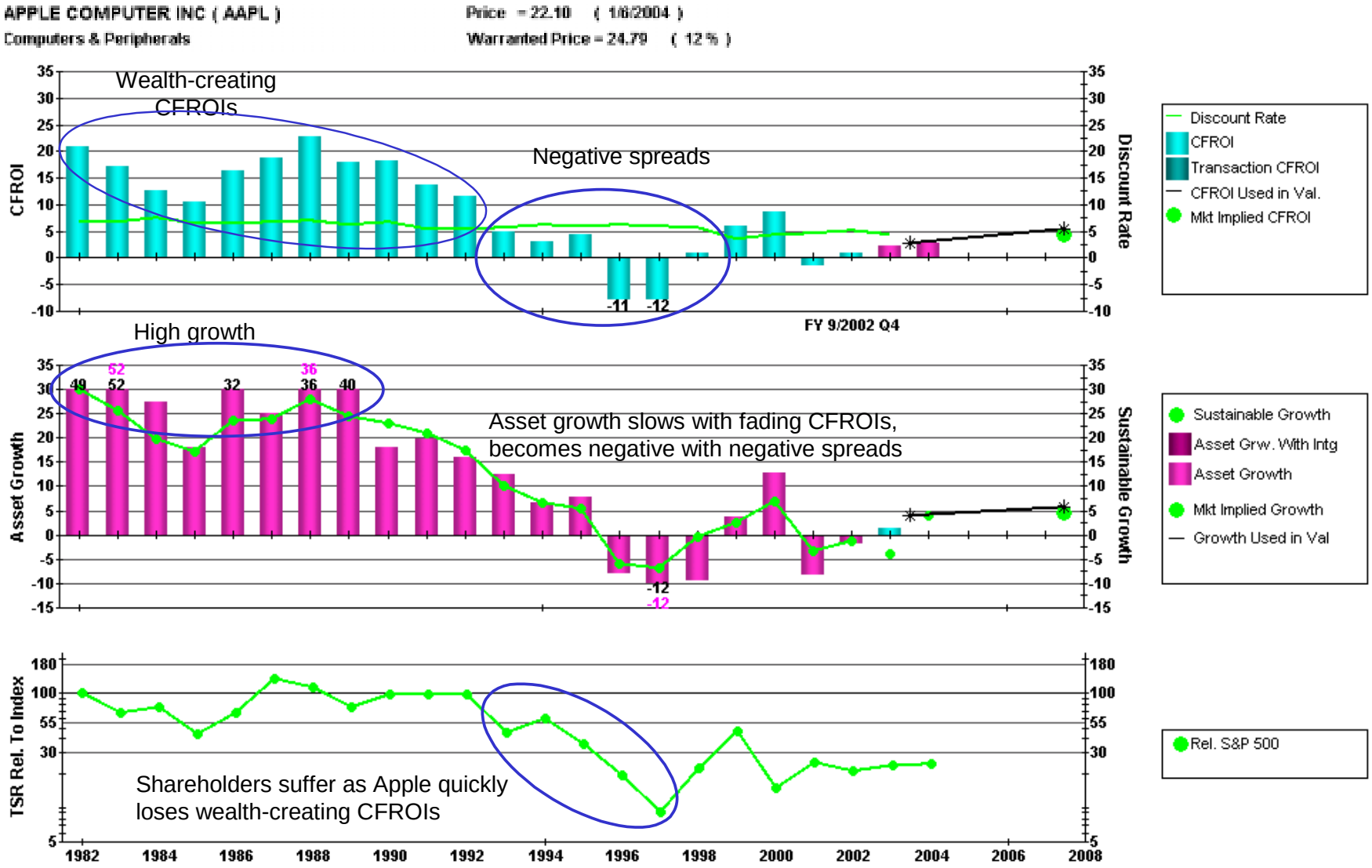
As firms mature and grow very large over their life-cycle and CFROIs trend downward to or below their cost of capital, changing strategic course to increase CFROIs becomes exceedingly difficult. Consider IBM (Figure 18) at the end of the 1980s. At that time, IBM had 380,000 employees and a legacy of dominating the computer industry, which was mainframe technology in IBM's heyday. The business processes and culture that had brought success in the past were entrenched throughout the firm, and its top management was not attuned to a rapidly changing industry.

As shown in Figure 18, during the last half of the 1980s, CFROIs headed down toward the cost of capital as IBM continued to make large investments. CFROIs plummeted during the early 1990s, with shareholder returns underperforming the S&P 500 by a wide margin.

During this long downward fade period, IBM's top management was in denial about the changing reality that customers embracing of cost-effective personal computers would seriously erode the mainframe market. Top management did not have a functioning feedback loop (see Figure 1) to challenge its obsolete assumptions about customer needs.

IBM's Board made a wise decision in hiring Lou Gerstner as CEO in 1993. Gerstner was not wedded to a business model suited to the past. He initiated needed downsizing, leading to negative asset growth rates, and refocused IBM's skills on the emergent IT consulting and service needs of customers. Success was reflected in CFROIs rising above the cost of capital and shareholders outperforming the general market.

Figure 19. Apple Computer Relative Wealth Chart, 1982-2003



Source: CSFB HOLT ValueSearch™

Apple Computer

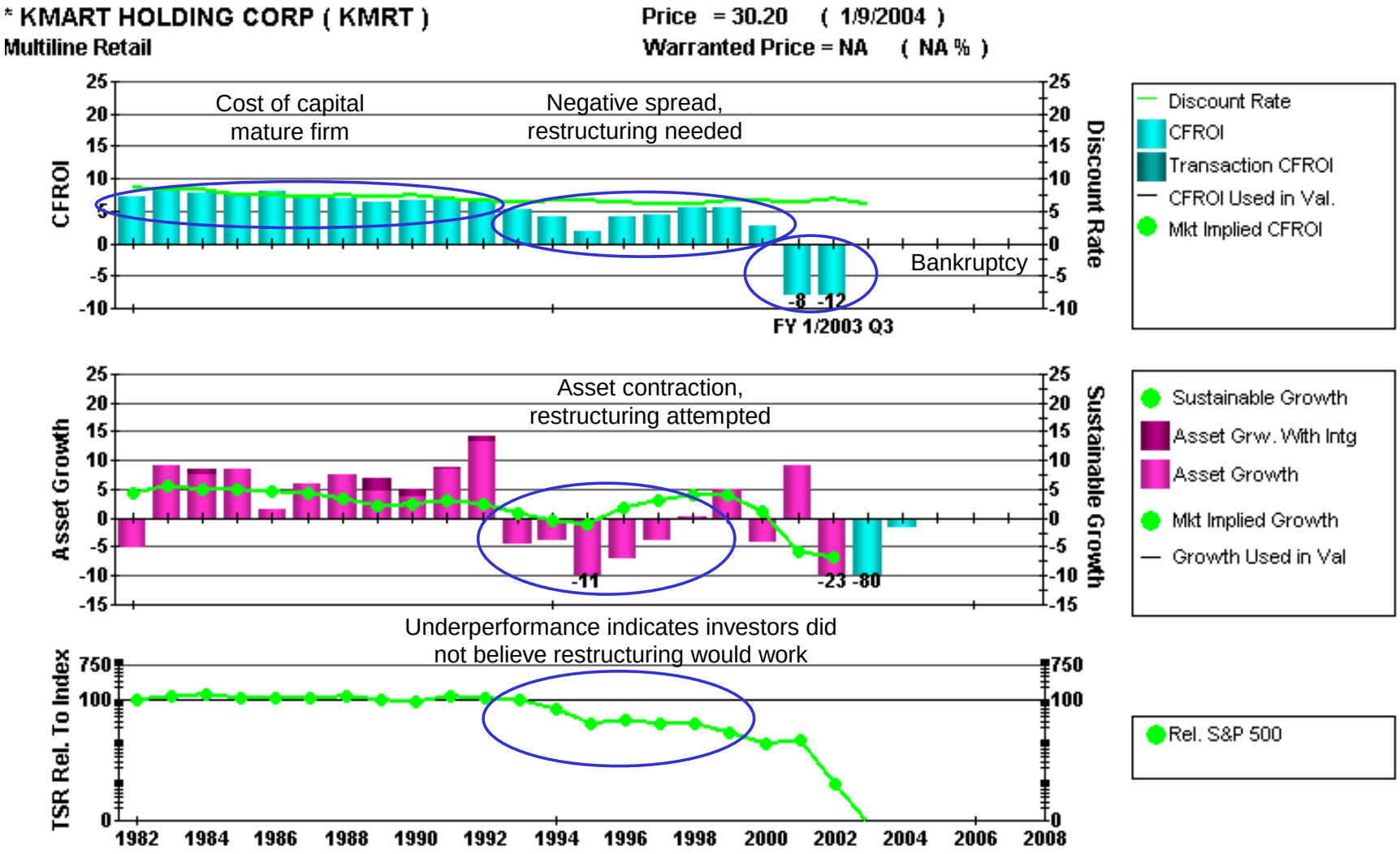
One of the lessons from Paychex mentioned above is that big winners can be found among companies in decidedly unglamorous businesses. A corollary lesson is that investors should not naively believe that owning glamorous firms with leading-edge innovations is a sure ticket to beating the market. An informative example of this point is Apple Computer (Figure 19).

Apple's track record in delivering technical innovations has long been widely respected. But its series of successful technical innovations – from the early Apple personal computer and various PC software improvements to the recent Apple iPod for downloading music – has not been turned into a commercially successful, sustaining business model.

Apple made a monumental, strategic blunder in keeping its operating system proprietary to Apple computers. Microsoft saw the market opportunity of licensing an operating system to create an industry standard.

Microsoft has had high economic wealth-creating performance from its inception in 1985 even though many believed that Apple's operating system was superior. Microsoft's stock outperformed the market 40-fold by 1999. Our point is that successful technical innovation, by itself, is not enough for commercial success or investor success.

Figure 20. Kmart Relative Wealth Chart, 1982-2003



Source: CSFB HOLT ValueSearch™

K-Mart

The life-cycle display for K-Mart (Figure 20) covers 1982 to 2003. Having entered bankruptcy in 2003, K-Mart recently emerged for a second life. A study of K-Mart extending back to the 1950s when it was S.S. Kresge reveals that during the 1960s the firm successfully executed a disruptive technology (discount stores) and its shareholders outperformed the S&P 500 15-fold.

The difference between K-Mart of the 1960s versus 1990s hinged on, respectively, smart management having created a way to add value for customers versus complacent managements staying too long with what worked in the past – that is, with obsolete business assumptions. The speed at which a firm like K-Mart moves from a below-average but surviving enterprise to a failed, bankrupt enterprise depends in part on the skill of competitors. Wal-Mart's uniquely efficient business model and scalability (i.e., high reinvestment rate opportunities) clearly expedited the collapse of K-Mart.

Concluding the review of fade rates for these company examples, we return to the importance of accuracy. A prerequisite for effectively studying life-cycle histories of CFROIs, growth, and discount rates is that accounting biases be eliminated or minimized from the data and that the data be expressed in real units. Only then, will levels of and trends in the data series usefully represent the firm's economic performance history. Such accuracy is critically important to observing reasonably accurate relationships between company characteristics and subsequent performance fade rates. After observing in Figure 9 on page 20 the ROE roller coaster while project ROIs were constant, who would knowingly chose an unadjusted ROE as a metric for measuring fade rates for industrial companies?

Our early empirical research on fade rates showed that CFROI fade rates are not random. Past information on company characteristics enhance predicting the most likely future fade rate.[14] Some important relationships documented include:

- Firms currently earning average/cost-of-capital returns tend to stay at that level.
- Above-average CFROI firms with high/low CFROI variability tend to fade at faster/slower rates. All else equal, lower variability for above-average CFROI firms is correlated with more-skilled managements.
- Above-average CFROI firms with high/low reinvestment rates tend to fade at faster/slower rates. Higher reinvestment is correlated with larger market opportunities and heightened competition.

One of the most important areas of ongoing CFROI research at CSFB HOLT is more detailed empirical work on the relationships between company characteristics and fade. This will provide two important benefits:

- an objective assessment of the chances for a firm delivering a particular analyst forecast for CFROIs and reinvestment rates and
- a quantitative guide for calculating a firm's warranted value as the *expected value of a range of NCR forecasts* as opposed to a single, most likely NCR forecast.

10. Investors' Discount Rate

For more than three decades, mainstream finance has promoted CAPM/Beta discount rates even though the procedure produces nonsensical rates for many companies.[15] Investors' discount rates are forward-looking, yet the CAPM equity risk is backward-looking. Worse, the view one gets from this backward look can be quite different depending on the measurement period selected from a large number of equally reasonable possibilities. These serious flaws with CAPM/Beta have long been widely recognized, yet the CAPM/Beta approach dominates academic finance and continues to be widely used by practitioners.

The CFROI framework uses a different approach – one that is both supported by reasonable argument and evidence and generates logically consistent estimates of discount rates across companies.

The CFROI framework parallels the procedure used in bond markets of solving for a discount rate (yield-to-maturity for a bond) which, when applied to future NCRs, provides a warranted value equal to the current market price. Interest rate changes have a huge and easily quantifiable impact on the bond market. The impact of changes in the investors' discount rate on the stock market is also huge, but quantifying the effect is far more difficult, and its importance is not widely recognized by investors.

Because CFROIs are based on cash flows to all of the firm's capital owners, these cash flows include full interest payments; the cash benefit of the tax deductibility of interest payments is realized as lower taxes paid. CFROIs are directly comparable to investors' discount rates which are the weighted averages of real equity rates and real debt rates.[16]

Some of the important points about the CFROI discount rate methodology include:

- Investors price assets on the expectation of achieving some real return net of applicable taxes including transaction costs. Like bond investors, stock investors take inflation and taxes into account when they value companies, not after tax changes are effective or after a change in inflation shows up in the data, but rather when the *expectation* of change occurs.

- A "fundamental" real pretax equity rate begins with a plausible real, after-personal-tax return demanded by taxable equity investors. To this is added an incremental return to compensate for the expected real tax bite attributable to the combined effects of the expected nominal tax rates on dividends and capital gains and the expected inflation rate.

- Levels of and changes in this fundamental equity rate approximately parallel the time series of the market-derived equity rate. This gives empirical support to forecasting the direction and rough magnitude of likely discount rate changes resulting from tax law changes and therefore the impact on the stock market.[17]

- Company-specific discount rates are assigned by using a market-derived base rate for the corporate sector with the addition of risk differentials based on company-specific characteristics (i.e., trading liquidity and financial strength). Occasionally, there is some confusion concerning a company-specific discount rate involving a *market-derived* calculation process. It can be incorrectly claimed that circular reasoning is at work if one simply solves for a discount rate given a *known* price and a *known* NCR stream.

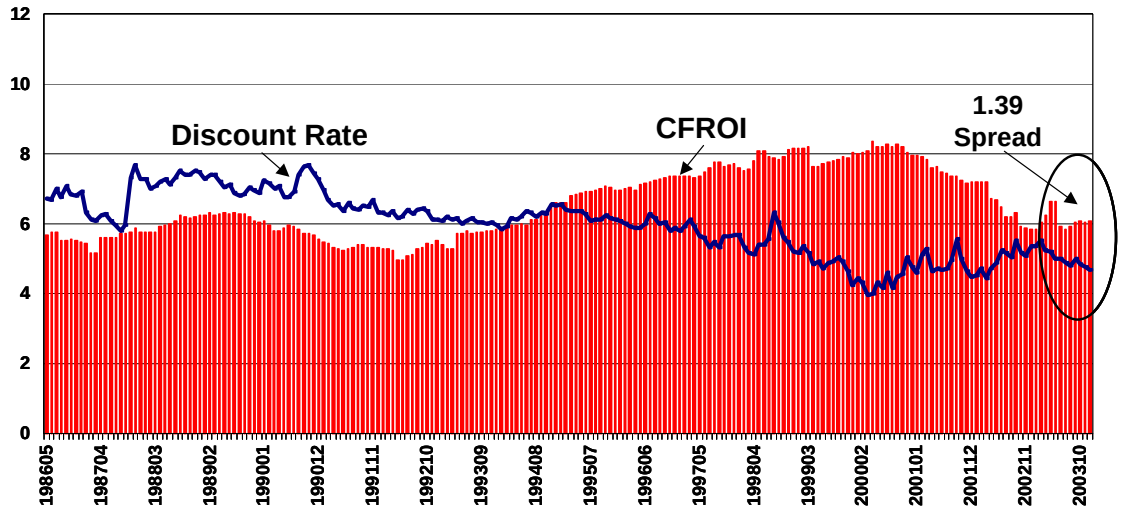
  The actual process involves calculation of an *average* discount rate for a large universe of firms. Firms' NCR streams are *not* known; rather they are tied to forecast fade rates based on how firms with specified financial characteristics have faded historically. On average, NCR forecasts should represent investor expectations assuming firms fade in the future as they have faded historically. With a market-derived process, the discount rate clearly is related to how fade rates are articulated.

  Today's market-derived base rate depends on determining, for a large universe of firms, the implied discount rates that generate net present values of forecast NCR streams equal to the firms' current market values, which is equivalent to deriving a bond's current yield-to-maturity. The final step in estimating a company-specific discount rate is to add risk differentials (positive/negative) to the base rate to adjust for trading liquidity and financial risk from the greater/lesser use of debt capital. Since the benefit of interest tax deductibility is included in measured CFROIs, the tradeoff for higher/lower debt loads in the CFROI model is higher/lower discount rates.

- Compared to the most recent three decades, the decade of the 1970s was characterized by very high inflation expectations coupled to high nominal tax rates on dividends and capital gains. This resulted in high real pretax demanded equity returns, which fueled high investors' discount rates that combined with relatively low CFROIs and pushed stock returns for the decade way below average and deeply negative for some years.

The bull market that began in the early 1980s was substantially due to a declining real discount rate attributable to sharply declining inflation expectations and a drop in the nominal dividend tax rate.

Figure 21. U.S. Aggregate (1,900 companies) CFROIs and Discount Rates



Source: CSFB HOLT ValueSearch™

Figure 21 displays *aggregate* CFROIs versus the investors' discount rate from May 1986 through December 2003. The bull market peak in 2000 and 2001 was accompanied by an extraordinarily wide positive spread of CFROIs over the discount rate. The ensuing bear market saw the ratcheting down of New Economy CFROIs towards the historical long-term average of 6 percent real.

The 2003 Bush tax rate reductions on dividends and capital gains sharply lowered the demanded equity return for high-tax-bracket investors and, to no surprise, the aggregate discount rate declined and equity prices rose. At the beginning of 2004, the positive 1.39 percent spread of CFROIs over the discount rate implies more robust capital spending and is consistent with a forecast of strong economic growth.

Summary

The widespread adoption by money management firms of the CFROI model suggests that many portfolio managers, security analysts, and finance students either have, or will have, the opportunity to participate in the continued development of the CFROI framework. The Ten Key Points in this essay will serve as useful guidelines for pursuing a research methodology and for developing a knowledge base and skill set now absent from the standard finance and investment textbooks. This essay will remain posted on www.LearningWhatWorks.com to be freely downloaded by finance professionals and students who otherwise might not have been exposed to the ideas discussed.

Endnotes

1. Madden, Bartley J., *CFROI Valuation – A Total System Approach to Valuing the Firm*, Butterworth-Heinemann, 1999.

2. Madden, Bartley J., "A Transactional Approach to Economic Research," *Journal of Socio-Economics*, 1999, Vol. 20, No. 1, 57-71.

3. Shiller, Robert J., *Irrational Exuberance*, 2000, Princeton: Princeton University Press.

4. The importance and practical application of the knowledge and action system are further explained in *Psychology of Intelligence Analysis*, by Richards J. Heuer, Jr., who was among the top CIA analysts for many decades. A free download of Heuer's book is available at www.cia.gov/csi/books/19104/. Another knowledge-action recommendation is *Managing the Unexpected* by Karl E. Weick and Kathleen M. Sutcliffe. In this book the authors describe how high-reliability organizations (aircraft carriers, nuclear power plants, etc.) create a state of mindfulness for early detection of errors – not unlike the analysts' need to identify faulty assumptions, recognize early signs of major change, and recognize "errors" in stock prices of firms that subsequently deliver big positive/negative returns for their shareholders.

5. Frankfurter, George M. and Elton G. McGoun, *From Individualism to the Individual – Ideology and Inquiry in Financial Economics*, 2002, Aldershot, England: Ashgate. There are insights throughout this book dealing with the efficient markets versus behavioral finance controversy; in particular, see pages 99-119 and 247-251.

6. Fama, Eugene F., "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 1970, Vol. 25, 383-417.

7. Managements should develop core competencies and business strategies consistent with explicit knowledge of the effect of different fade rates on shareholder value. Invariably, over the long term, the fade rates of big winners (losers) in the stock market were much more favorable (unfavorable) than investors expected.

   Managements of established businesses should periodically communicate to investors details of planned investments in tangible and intangible assets and of expected operating results *over a three to five year horizon.* Actions that are likely to lower quarterly earnings for an expected quarter or longer but can be defended as economic wealth creators and decidedly favorable to shareholders' long-term interests *should be taken*. Stock prices should not be adversely impacted if managements have a track record of creating value and they clearly explain their strategies.

8. Miller, Merton H. and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business*, 1961, Vol. 34, No. 4, 411-433.

9. For example, R&D expenditures are now capitalized and, when acquisitions involve purchase accounting, adjustments are made to assets and cash flow to approximate a pooling treatment. See Eddins, Samuel T. and Bartley J. Madden, "Will Your Next Acquisition Pay Off?," *Shareholder Value*, May/June 2002.

10. Figure 10 details how the 1993 balance sheet and income statement of Hershey Foods Corporation were used to calculate the CFROI according to best practices as of 1998 when the *CFROI Valuation* book was written.

11. See the discussion on managerial skill and the competitive life cycle, pages 18-19 of *CFROI Valuation*.

12. Note that since the *CFROI Valuation* book was published in 1999, a continuing stream of technical improvements has been maintained. One major improvement was the capitalizing of R&D expenditures, which impacts calculations of CFROIs and of the asset base and asset growth rates. In particular, the asset growth rates (middle panel of Figure 14) are vastly more attuned to the "economics of the business" with R&D capitalized.

13. See Chapter 8 of *CFROI Valuation* for a comparison of valuation models based on CFROI versus EVA.

14. See Chapter 7 of *CFROI Valuation.*

15. See Chapter 8 of *CFROI Valuation.*

16. See Chapter 4 of *CFROI Valuation.*

17. Eddins, Samuel T., Bartley J. Madden, Robb A. Stone, and Ernest P. Welker, "Where Is The Market Headed? Part I – The Bush Tax Proposal," *CSFB HOLT Research Report*, February 4, 2003.