

# THE ACADEMIC'S APPROACH TO SECURITIES RESEARCH: IS IT RELEVANT TO THE ANALYST?

**Clyde P. Stickney**

*is the Signal Companies professor of management at the Amos Tuck School of Business Administration at Dartmouth College in Hanover, New Hampshire.*

There is a fundamental difference between the research conducted by academics and that conducted by professional security analysts. For the most part, academic research focuses on the *average* relation between selected accounting information and stock prices across a large number of firms. Equity analyst research, in contrast, uses accounting information of *individual* firms, along with other information, to make buy, hold, and sell stock recommendations. The pertinent question is: Does an average relation between accounting information and stock prices for a portfolio of firms have any relevance to the analyst responsible for making firm-specific stock recommendations?

This article addresses the apparent gap between these two communities by 1) providing an overview of academic research relating accounting information and stock prices, with emphasis on methodological issues that analysts should understand when attempting to draw on academic research in conducting their own research, and 2) summarizing the principal findings to date that might guide the direction of analysts' future research.

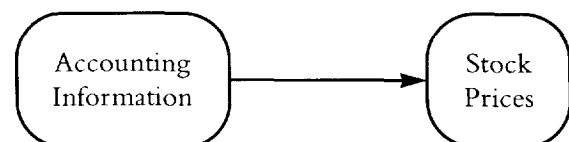
The fact remains, however, that inherent differences will always exist between research conducted across large sets of firms and that conducted on individual firms. Analysts should therefore not generally expect immediate payoffs from the research of academics.

## BROAD APPROACHES OF RESEARCH

Academic research has followed two general approaches when studying the relation between accounting information and stock prices: 1) the information perspective, and 2) the valuation model perspective. The *information perspective* examines the relation between accounting information and stock prices without explicitly considering how the market transforms the information into prices. That is, the valuation model is a black box. Thus we have the relationship in Exhibit 1.

This approach begins with the assumption that the market is efficient in pricing securities (that is, stock prices reflect economic values). Any item of information showing a significant relation to stock prices must be relevant by definition to that valuation, and vice versa. The advantage of this approach is that the researcher does not need to identify, or specify, *ex ante* the valuation methods that the market uses in pricing securities.

### EXHIBIT 1 INFORMATION PERSPECTIVE



A principal drawback of this approach is the difficulty encountered in assessing whether in fact markets are efficient. A low association between earnings and stock prices might suggest that the market is not responding appropriately to earnings information (that is, the market is inefficient). A low association may also indicate that earnings are not relevant to security pricing, that the posited relation between earnings and stock pricing is misspecified (for example, failing to consider lags between earnings and stock prices), or other possibilities. A high association may indicate the relevance of earnings to market pricing but not necessarily that the market responded wisely. For example, a high association between reported earnings and stock prices may not indicate market efficiency if firms have managed earnings to such an extent that it is a misleading indicator of economic values.

The *valuation model perspective* specifies a model as to how accounting information should translate into security prices. The model's output represents the intrinsic value of a security against which the analyst can compare the actual market price to identify under- or overvalued securities. Thus we have the relationship in Exhibit 2.

The advantage of the valuation model approach is that it provides a means for testing the efficiency of capital markets, particularly in the pricing of individual securities. Inferences about capital market efficiency rely, however, on the ability of the researcher to identify the appropriate valuation model

and the accounting inputs to that model. A finding that intrinsic values differ from market prices might suggest either market mispricing (that is, inefficiencies) or inappropriate identification or application of the valuation model.

Two observations may be helpful at this point. First, dating to the work of Graham, Dodd, and Cottle [1962], the term "fundamental analysis" has often been linked with the valuation model approach. Fundamental analysis refers to identifying important economic and strategic factors in operating a business and measuring the success of a firm in managing these factors using financial statement ratios.

Note, however, that fundamental analysis underlies both the information perspective and the valuation model perspective. Fundamental analysis forms the basis for identifying the types of accounting information that should relate to stock prices and provides academics with a basis for their initial hypotheses. Fundamental analysis also provides the inputs to various valuation models. Penman [1992] provides a discussion of fundamental analysis relative to the information and valuation model perspectives.

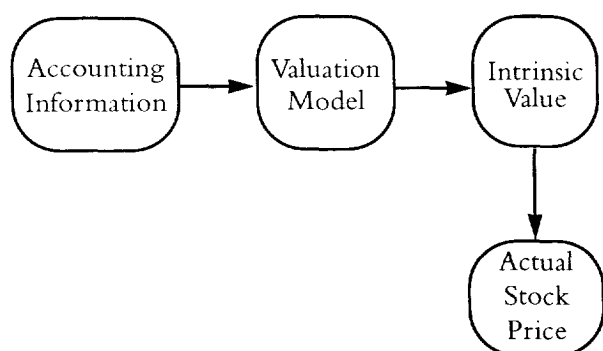
Second, empirical research from the information perspective is far more extensive than from the valuation model perspective. Most published academic research between the mid-1960s and early 1990s assumes the efficiency of capital markets and sees no need to specify a valuation model *ex ante*. The primary task is to identify the accounting information most closely associated with stock prices.

The 1990s have witnessed renewed interest in the earlier valuation perspective of Graham and others. This renewed interest in valuation models reflects in part evidence of what academics refer to as "market anomalies," or indications that the market may not be as efficient as once assumed (Ball [1995]). Anomalies include the apparent failure of market prices to fully reflect certain fundamental information about a firm (Ou and Penman [1989]; Holthausen and Larcker [1992]; Lev and Thiagarajan [1993]) and delays in capturing new information fully in market prices, a phenomenon referred to as post-earnings announcement drift (Bernard and Thomas [1989]; Ball and Bartov [1996]).

The renewed interest in valuation models has also been aided by the more explicit formulation of a

## EXHIBIT 2

### VALUATION MODEL PERSPECTIVE



valuation model relating market value to book value of shareholders' equity by Ohlson [1990; 1995] and Feltham and Ohlson [1995]. Research from the valuation model perspective, however, is in relative infancy, with initial efforts aimed at empirically testing the reasonableness of the models as judged by market prices (Frankel and Lee [1996a; 1996b]).

One might characterize academics at this point as falling into different camps. Those emphasizing the information perspective continue to refine their research methodologies in an effort to increase the explanatory power of earnings, cash flows, and other accounting-based variables. There is a tendency to view market anomalies more as research methodology flaws than capital market inefficiencies. Researchers in this camp also question the ability to identify the appropriate valuation models needed to test the valuation model approach empirically.

Those emphasizing the valuation model perspective see an opportunity to be more explicit as to how accounting information identified as "relevant" to market pricing by researchers during the last several decades might be transformed into appropriate market prices. The valuation model approach also holds promise of relating more directly to the valuation task faced by professional analysts.

## **RESEARCH FROM AN INFORMATION PERSPECTIVE**

I will not attempt to summarize twenty-five years of research conducted from an information perspective but rather to address some of the issues with which analysts should be familiar when reading and applying the results of academic research.

### **The Central Role of Earnings**

The classic study by Ball and Brown [1968] showing a relation between earnings and stock prices has led a generation of researchers to attempt to understand this relation better. Economic theory suggests that stock prices should reflect a firm's future earning ability. Two avenues of research developed, one examining the relation between past earning and future earnings (referred to as time series studies) and the other relating analysts' forecasts of future earnings with realized future earnings.

Research suggests that analysts' forecast errors are generally smaller than those from using time series models, particularly models that predict that next year's earnings will equal the current year's earnings (that is, earnings follow a random walk). The superiority of analysts' forecasts is positively related to the size of firms (larger firms provide more information to enhance the accuracy of analysts' forecasts), and negatively related to the dispersion of analysts' forecasts (that is, when analysts display extreme uncertainty about their forecasts of earnings, analysts forecast errors are no smaller than those using time series models) (Brown, Richardson, and Schwager [1987]; Wiedman [1996]).

A second general finding is that analysts appear to underutilize information in prior earnings changes when forecasting future earnings (Elgers [1994]). A third general finding is that analysts tend to be overly optimistic in their earnings forecasts (this helps them maintain good relations with management) and that they are most optimistic for firms that have performed poorly in the past (Francis and Philbrick [1993]).

### **Methodological Issues Relating Earnings and Stock Prices**

Most studies examining the relation between earnings and stock prices use statistical regression. A statistically significant coefficient on the earnings (independent) variable in the regression with stock prices (dependent) variable suggests that a relation exists (that is, the coefficient is significantly different from zero). The R-square measures the proportion of the covariability of stock prices explained by earnings.

Academic research has generally found a significant coefficient on earnings but very low R-squares (or the order of less than 10%) (Lev [1989]). Thus, earnings represent only one of several variables that might explain stock prices, but earnings themselves are insufficient to develop a full valuation model of stock pricing.

Academic research has attempted to increase the R-square by adding additional accounting variables to the regressions. The additional variables might be finer partitions of earnings (for example, separating earnings related to continuing operations from non-recurring gains and losses) or non-earnings variables (for example, book value of shareholders' equity).

## Levels of Earnings and Stock Prices

Some research relates the level of stock prices to the level of earnings. The impetus for this research derives from the emphasis on price/earnings (P/E) ratios in most security analysts' reports. The higher the coefficient on earnings, the higher the P/E multiple applied to earnings is likely to be. Although research has generally shown a significant coefficient on the level of earnings variable, interpreting this coefficient presents difficulties.

- Earnings for the current period might represent a good measure of the ongoing (permanent) earning ability of a firm, or earnings might include non-recurring gains and losses. Earnings are described as persistent in the first case and as including some transitory elements in the second case. The regression coefficient on earnings should be higher when earnings include only persistent components and lower when they include transitory components.
- Earnings might reflect the application of conservative accounting principles and be lower than earnings measured less conservatively. The regression coefficient on earnings measured more conservatively should exceed the coefficient on earnings measured less conservatively if capital markets are efficient and the differences in accounting principles have no cash flow, or real economic, effects.
- The market multiple applied to the earnings of a high-risk firm should be lower than the market multiple applied to the earnings of a lower-risk firm to compensate the investor for assuming different levels of risk. Thus, the regression coefficient on earnings should be lower for the high-risk firm than for the low-risk firm.
- The market multiple applied to the earnings of a high-growth firm should be higher than that applied to a low-growth firm because the current earnings of the high-growth firm understate its longer-term (permanent) earnings ability. Thus, the regression coefficient on earnings should be higher for high-growth firms than for low-growth firms.
- Market prices reflect a firm's future earnings power. Measuring earnings power for short, discrete periods requires allocations of revenues and

expenses that might provide a biased measure of longer-term earnings ability. The significance of these allocations lessens as the earnings measurement period expands. Thus, the regression coefficient should increase as the time period over which earnings are measured increases.

- The relation between stock price and earnings might change over time (that is, the coefficient on earnings may not be stable).

The difficulty in studying the relation between stock prices and earnings is that each of these factors might affect the regression coefficient. To examine the relation effectively, the researcher must somehow control for these various factors. The typical approach is to add independent variables to the regression. For example, the researcher might add size of firm or market beta to control for risk, include analysts' projections of earnings growth to control for growth, and separate income from continuing operations and non-recurring gains and losses to control for transitory components in earnings.

## Changes in Earnings and Stock Prices

An alternative approach to studying the relation between stock prices and earnings is to examine the association between changes in stock prices and changes in earnings. The impetus for this line of research stems from the emphasis on stock returns as a measure of investment performance. Several issues are relevant to understanding this stream of research.

- Market prices at any time include *expected* changes in future earnings. Actual, or realized, changes in earnings, however, reflect both *expected* and *unexpected* components. Furthermore, the unexpected component might represent a change to a new permanent earnings level or simply reflect transitory factors. Thus, regressing changes in stock prices on changes in earnings requires the researcher to filter out the effect of expected changes in both stock prices and earnings in order to break out unexpected changes. A large, significant coefficient on the unexpected change in earnings suggests persistence of the change, while a small coefficient implies the change is largely transitory.
- Researchers use different approaches to specifying

expected earnings. One approach assumes that next year's earnings will equal the current year's earnings. This approach rests on the assumption that the current year's earnings include no transitory elements and that the future will therefore be a continuation of the past. Future earnings therefore follow a random walk relative to current earnings. The best prediction of future earnings in this case is current earnings.

- Another approach recognizes that current earnings may include both permanent and transitory elements. The transitory elements will soon disappear, a process referred to as mean reversion (that is, earnings will revert over time to their permanent level). The researcher obtains expected earnings in these cases by eliminating transitory elements from current earnings.
- A third approach studies the time series behavior of earnings for a particular firm and develops a firm-specific model of its earnings process. For example, the time series behavior of earnings for a firm in a cyclical industry may differ from one in a non-cyclical industry. Likewise, the time series behavior of earnings for a firm subject to high technological change may differ from one selling branded consumer products. Firm-specific earnings expectation models can capture these different patterns.
- A fourth approach uses analysts' forecasts of earnings. One difficulty with this approach is that firms might manage their earnings to achieve the analysts' forecasts and thereby not surprise the market (Lowenstein, [1997]; Fox [1997]).

### **Earnings versus Cash Flows**

Concerns with the quality of earnings and the economic significance of cash have led researchers to study whether earnings or cash flow from operations are more highly correlated with stock prices. The design of these studies incorporates the relation:  $\text{Net Income} \pm \text{Accrual Adjustments} = \text{Cash Flow from Operations}$ . Accrual adjustments include such items as the addback to net income for depreciation, amortization, and deferred taxes and changes in working capital accounts other than cash.

As with studies relating earnings to stock prices, these studies examine both the levels and the

changes in cash flow from operations, and distinguish expected from unexpected changes. The results of recent studies are conflicting to some extent, but in general find that earnings are more highly correlated with stock prices than cash flow from operations (Bernard and Stober [1989]; Dechow [1994]; Sloan [1996]). A summary of findings appears below.

- Earnings are more highly correlated with stock prices for short measurement intervals, but earnings and cash flow from operations show similar correlations as the measurement interval lengthens. The rationale for this finding is that earnings and cash flows converge as the measurement interval increases (that is, accrual adjustments at the beginning and end of a five-year period are a smaller proportion of the amounts for that five-year period than are similar accrual adjustments at the beginning and end of the amounts for a one-year period relative to amounts for that one-year period).
- Earnings and cash flow from operations show similar correlations with stock prices when accruals are relatively small (as, for example, for a service firm) but as accruals get larger, the correlation of stock prices with cash flows gets smaller, while that for earnings does not change. Thus, both earnings and cash flows correlate with stock prices for mature (no-growth) firms, but earnings are more highly correlated with stock prices for growth firms.
- Earnings and cash flow from operations show similar correlations with stock prices for firms with relatively short operating cycles (for example, grocery stores), but decrease for cash flows (but not for earnings) as the operating cycle lengthens.
- Cash flow from operations tends to show a higher correlation with stock prices than earnings when earnings include a high transitory component. The transitory component is often a restructuring change with no cash effect (Ali [1994]; Cheng, Liu, and Schaefer [1996]).

### **RESEARCH FROM A VALUATION MODEL PERSPECTIVE**

An important study by Fama and French [1992] provided the needed stimulus for renewed and

increased emphasis on the valuation model approach in accounting research. Fama and French find that the size of the firm (measured by aggregate market value of equity) and the ratio of the book value of shareholders' equity to the market value of shareholders' equity provide better explanations of stock returns than market equity beta, the mainstay of capital market research during the preceding twenty-five years. They posit that size and the book-to-market ratio proxy for some element of risk, since differences in market returns must somehow relate to differences in risk. Recent research in both accounting and finance has attempted to understand just what the book-to-market ratio captures of economic significance, but with little consensus to date.

### The Theoretical Market-to-Book Value Model

The ideas underlying the relation between market values of equity securities and book values of shareholders' equity trace to early work by Preinreich [1938] and Edwards and Bell [1961] and to more recent valuation practice by Stewart [1991]. Ohlson [1990, 1995] and Feltham and Ohlson [1995] have received credit for rigorous development of the model. They developed the theoretical model in the *market-to-book* format because of its greater logic and understandability. Tests of the model, however, use the *book-to-market* format because of the superior distributional qualities of the latter version of the ratio.

Stated succinctly, the market value of a firm should equal its book value (that is, capital contributions plus earnings generated from that capital in excess of dividends) plus the present value of its expected earnings in excess of its cost of equity capital. More formally:

$$P_0 = BV_0 + \sum_{t=1}^n \frac{(\text{Expected ROE}_t - r)(BV_t)}{(1+r)^t}$$

where

- $P_0$  = "appropriate" market price, or intrinsic value, today (time zero);
- $BV_0$  = book value of shareholders' equity today (time zero);
- $ROE$  = rate of return on shareholders' equity;
- $r$  = cost of equity capital; and

$BV_t$  = book value of shareholders' equity at the beginning of each future period  $t$ .

We can express this formulation for price in terms of the market-to-book-value ratio by dividing all terms by the book value:

$$\frac{P_0}{BV_0} = 1 + \sum_{t=1}^n \left[ \frac{(\text{Expected ROE}_t - r)(BV_t)}{(1+r)^t(BV_0)} \right]$$

This valuation model expresses market value in terms of :

- Accumulated profitability (positive relation).
- An ability to generate earnings in the future at a rate exceeding the cost of equity capital (positive relation).
- The cost of equity capital, which captures risk (negative relation).
- The length of time during which a firm can generate returns in excess of the cost of equity capital (positive relation).
- The amounts of net assets, or shareholders' equity, on which the firm generates the excess return.

Note several aspects of this valuation. First, the model provides an indicator of the "appropriate" level of a firm's stock price, usually referred to as the stock's *intrinsic value*. Actual market prices may deviate from the indicated intrinsic value, providing an opportunity either to purchase the securities or to sell them short.

Note, however, that there is no way to assess whether 1) this valuation model accurately captures the economic variables that should ultimately drive market prices, or 2) the analyst is accurately applying the model in measuring the intrinsic value of a particular firm. That is, a difference between intrinsic values and current market prices might suggest that the fault lies not with market pricing but with the measurement of "intrinsic" values.

Second, unlike the price earnings ratio, this valuation model places weight on both accumulated profitability and expected future profitability. Earnings of a single year do not affect the values as dramatically as with P/E ratios.

Third, the degree of conservatism in measuring earnings should not have an impact on the valuation. Firms using more conservative accounting principles will have a lower current book value of shareholders' equity than firms following less conservative accounting principles. The conservative firm will have higher future earnings than the less conservative firm, because the total earnings from any endeavor must ultimately equal the cash received from sales minus the cash expended to acquire goods and services.

Fourth, future earnings play an important role in valuation, much as they do in research from an information perspective. Thus, the results of previous research are relevant to applications of this valuation model. For example, research has shown high correlations between the accounting rates of return on equity (ROE) of successive periods (Penman [1991]; Fairfield, Sweeney, and Yohn [1994]), providing the analyst with a starting point when projecting future ROEs in the model.

Fifth, firms cannot generate earnings at a rate higher than their cost of capital forever. Competitors will enter markets characterized by such excess earnings ability and compete it away. Firms in industries characterized by rapid technological change may generate excess earnings for only a few years (for example, Apple Computer), while firms with brand recognition (for example, Coca-Cola) may experience a longer period of excess earnings ability. The formulation above allows for changes in ROE over time, as well as expected changes in the cost of equity capital (due, for example, to changes in capital structure).

#### **Empirical Tests of the Market-to-Book Value Model**

Empirical tests of this valuation model are in their infancy, with most studies still in working papers. Frankel and Lee [1996b] compare the power of actual book-to-market ratios and model book-to-market ratios to predict future market returns. They find that the actual and modeled book-to-market ratios have equal power for predicting returns during the succeeding twelve months, but that the modeled version has superior power in predicting returns during the succeeding thirty-six months. They also find that incorporating analysts' forecasts into the valuation model produces a higher correlation with future market

returns than simply assuming a continuation of the ROE of the preceding period (that is, a random walk).

Frankel and Lee [1996a] also apply the valuation model to stocks in twenty countries over an eight-year period. They find that the modeled book-to-market ratio is more closely associated with stock returns than either actual book-to-market ratios or earnings/price ratios.

#### **SOME CONCLUDING THOUGHTS**

Having taught courses in financial statement analysis in both academic and professional settings for many years, I have found myself pulled by the emphasis of my academic colleagues on identifying statistically significant relations between accounting information and stock prices for large samples of firms and the demands of my students to show them the relevance of academic research for their day-to-day responsibilities. One ingredient for linking these two communities is an understanding of the nature of the research questions addressed by academics and the methodologies used. The jargon and the intricacies and subtleties of research design can serve as barriers to professional analysts attempting to understand academic research. The article has attempted to breach these barriers.

Even after scaling the understandability hurdle, the professional analysts must next traverse the applicability hurdle. The relation between accounting information and stock prices for the "average firm" indicates general tendencies that might at least provide a basis for assessing the significance of a deviation from the average for an individual firm being analyzed. Acting on these deviations is the value-added by the professional analysts and the mechanism through which deviations for individual firms revert to the average over time.

Two additional observations are offered. First, the consistent finding over time and across many academic research studies of a relation between stock prices and earnings is at the same time both satisfying and possibly troubling. On the one hand, demonstrating the relevance of earnings in market pricing provides a degree of credibility to the accounting process centered on the principles of accrual measurement. On the other hand, one must wonder whether stock pricing overly emphasizes earnings, particularly in

meeting consensus analysts' forecasts, to the exclusion or suppression of other possibly important measures of economic value. For example, an inability of academic research to find a stronger relation between cash flows and stock prices than earnings and stock prices does not necessarily indicate that earnings are a superior measure of value. It may simply indicate greater fixation on earnings.

Second, the recent reemphasis on the valuation model perspective in academic research provides a possible bridge between academics and professional analysts. We have learned much from the information perspective about the relation between various types of accounting information and stock prices. Now might be the appropriate time to incorporate this learning into the development of valuation models. Different valuation models might be appropriate for firms in different industries or in different stages of their life cycles. With sufficient empirical testing of these models, academic research may yet provide a stronger bridge between these two communities.

## ENDNOTE

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