The Role of Analysts’ Earnings Forecasts in the Valuation Process:
An Introductory Overview

Morris G. Danielson, Thomas D. Dowdell and Michael P. Schoderbek

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Morris G. Danielson
Associate Professor of Finance
Saint Joseph’s University
Philadelphia, PA 19131

Thomas D. Dowdell
Assistant Professor of Accounting
North Dakota State University
Fargo, ND 58105

Michael P. Schoderbek
Associate Professor of Accounting
Rutgers University
New Brunswick, NJ 08903

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Abstract

This teaching note explains how analysts’ earnings estimates (issued early in a fiscal year) affect the valuation process, illustrating key concepts with analyst forecast data. To derive estimates of future earnings, analysts observe historical performance (using accounting data) and adjust for changing conditions. The empirical results in this paper reveal that while analyst forecasts are imprecise point-estimates of future earnings (a well-known result), these estimates can help investors distinguish between firms most likely, and least likely, to experience a large earnings change. Yet, this information will not necessarily make an investor rich, as a firm’s future stock return is not directly related to its realized earnings growth. Instead, a firm’s stock return depends on whether its future performance exceeds, or falls short of, expectations. This article is designed as a supplemental reading for students in introductory accounting or finance courses, to illustrate the links between the two disciplines. A project appropriate for classroom use is included in an appendix.
1. Introduction

If an investor can identify a company that will experience above-average future growth, should the investor purchase the firm’s stock? That is, will the stock turn out to be a good investment?

Experienced investors know that the answer to both of these questions is “not necessarily.” Yet, this concept – a “good stock” is not necessarily a “good investment” – can be difficult for students in introductory accounting and finance courses to master. Part of the problem is that most introductory accounting and finance texts do not include a simple, intuitive description of how earnings forecasts are used in the valuation process. The goal of this paper is to provide such an overview.

In a nutshell, the story goes as follows. One of the first lessons in finance is that the price of a financial asset is equal to the present value of its future cash flows. The main challenge when applying this idea to stock valuation is in forecasting the future cash flows. To derive such estimates, investors observe a firm’s past performance (using accounting information) and adjust for changing conditions. The resulting cash-flow estimates both determine the current stock price, and serve as a benchmark against which the firm’s future performance will be evaluated. That is, a firm’s future stock return will depend on whether the firm’s realized cash flows are higher or lower than the expected amounts.

Differences between cash flows and accounting earnings create additional challenges for investors when evaluating stock prices. The future cash flows received by the owner of a share of stock (e.g., cash dividends or stock repurchases) will not equal future accounting earning per share for two reasons. First, the accrual process (recording of depreciation, receivables, payables, and prepayments) can create differences between net income and operating cash flow. Second, most firms do not pay out their entire operating cash flow, opting instead to reinvest a portion of this amount.

Nevertheless, a firm’s expected future accounting performance plays an important role in the valuation process. For instance, future cash flows are calculated as a function of future earnings in some valuation models. In turn, a firm’s future stock return will depend on whether actual earnings are

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1 In the finance literature, future cash flows are calculated as a function of future earnings in models developed by Leibowitz and Kogelman (1990), Gordon and Gordon (1997), Danielson (1998), O’Brien (2003), and Brealey and
greater than or less than expected earnings. Firms with earnings that exceed (fall short of) expectations will earn higher (lower) stock returns.

We illustrate the links between earnings estimates and future operating performance (e.g., is future performance predictable?), and between expectations and stock returns, using analyst earnings estimates from 1995 to 2007. As in many prior studies, the results here show that analyst forecasts are poor point estimates of future earnings. At the same time, though, analyst earnings estimates – despite their imperfections – provide useful information about a firm’s potential future performance. In particular, these forecasts can help investors distinguish between those firms most likely, and those least likely, to experience a large earnings change. Thus, a firm’s future operating performance is to some extent predictable, in part because of the information provided in financial reports. The results also confirm that an investor cannot become rich by simply selecting firms with successful operations. Instead, a firm’s future operating performance must exceed expectations for its stock to generate an above-average return.

Appendix A outlines a written assignment – using data that is available without subscription on the internet – that can be used to illustrate the relations between earnings forecasts, earnings realizations, and stock returns.

2. Estimating Future Performance

One of the most important differences between accounting and finance is that the fields focus on different time periods. Accounting information reports on a firm’s past performance; the value of a financial asset is a function of future performance. In the most general valuation model, the stock price $P_0$ is written as a function of the per-share cash flow (cash dividends and share repurchases) expected to be generated in each future year $n$, $CF_n$, and the required return on equity, $r$, as shown in Equation (1).

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2 See for example, Ali, Klein, and Rosenfeld (1992); Chopra (1998); Harris (1999); Doukas, Kim, and Pantzalis (2002); Richardson, Teoh, and Wysocki (2004); Fortin, Gilkeson, and Michelson (2007); and Higgins (2008).
Because the future cash flows to be paid by a share of stock are not defined by contract, investors must estimate these future outcomes before a stock price can be calculated. Although a firm’s past performance is unlikely to be exactly replicated in the future, historical and potential future performance are related. 

For example, consider a retail firm such as Wal-Mart. Because (most of) the stores operating during a given year will continue operating during the next, past performance is a logical starting point when predicting future outcomes. However, business conditions may change from year to year, so the financial performance of these stores could improve or deteriorate. In addition, the firm may open additional (or close existing) outlets in the future, or expand into new (or exit from established) product lines. Similarly, for a pharmaceutical firm, estimates of future cash flows will be a function of past performance, patent expirations (for the specific firm and its competitors), and new product introductions (again, for both the firm and its competitors). Therefore, past performance cannot be blindly extrapolated into the future. Instead, it should be adjusted for changing conditions—including macroeconomic, industry, and firm-specific changes—to derive cash-flow estimates.

To aid investors and analysts in this process, firms must include qualitative narratives identifying business conditions that helped shape historical performance in the annual report, Form 10-k, filed with the Securities and Exchange Commission (SEC).3 Investors can then make assessments about whether these conditions will continue when predicting future performance. The SEC also encourages firms to include forward-looking statements in annual reports, to inform the investment community about a firm’s investment plans as well as potential changes in its product mix. Forward-looking statements have become more prevalent in recent years, because the Private Securities

\[ P_0 = \sum_{n=1}^{\infty} \frac{CF_n}{(1+r)^n} \] 

3 This discussion is typically included in a section titled “Management’s Discussion and Analysis.”
Litigation Reform Act of 1995 (PSLRA) now provides firms with liability protection if predictions made in these statements turn out to be wrong.

Thus, annual reports provide investors with much more information than just the four basic financial statements. These reports also contain a description of the business conditions that could cause future performance to differ from past performance. When estimating cash flows as part of the valuation process, this supplemental material can be of equal, or even greater, importance than the underlying financial statements.

3. **Cash Flows vs. Accounting Earnings**

One of the challenges investors face in applying Equation (1) is that CF\(_n\) does not directly correspond to either operating cash flow from the Statement of Cash Flows (restated on a per share basis), or earnings per share from the Income Statement. Both of these numbers describe historical realizations; Equation (1) requires estimates of future payments to shareholders.

Nevertheless, a firm’s past – and projected future – accounting earnings is a logical starting point in the valuation process. A firm’s operating cash flow (in both historical and future periods) is a function of accounting earnings, as shown in Equation (2).

\[
\text{Operating Cash Flow} = \text{Net Income} + \text{Depreciation} \pm \Delta(\text{Working Capital}) \tag{2}
\]

A firm’s operating cash flow in each year \(n + 1\) can be written as the product of the operating cash flow in year \(n\) and a one-year growth rate. Similarly, net income in \(n + 1\) can be written as the product of net income in year \(n\) and the growth rate. Although this growth rate is often assumed to be constant in textbooks, growth is typically not constant from year-to-year in practice.

The estimation challenges do not end at this point. The future cash flow CF\(_n\) required for Equation (1) is not necessarily equal to the estimated operating cash flow for year \(n\) from Equation (2). The potential difference arises because each year a firm must decide how to use its operating cash flow, ostensibly for the benefit of the shareholders. A portion of the cash flow might be paid out to shareholders in the form of dividends or stock repurchases. This portion of the operating cash flow is
CFₙ in Equation (1). The remaining cash flow is effectively invested in the firm and will (depending on
the effective return on investment) contribute to future growth.

Further complicating matters, not all investments impact future cash flows in the same way.
The objective of some investments is to expand the scale of a firm’s operations, and to grow its cash
flow stream. Other investments replace assets as they wear out. Replacement investments will not
necessarily cause the firm’s cash flow stream to grow; the goal is simply to maintain the existing scale
of operations (i.e., to keep the cash flow stream from declining). In each case, though, shareholders
forego dividends today, in hopes of receiving larger future dividends than would be otherwise possible.⁴

Thus, the cash flow estimates required by Equation (1) are complex functions of a firm’s
historical operating cash flows, as adjusted for changing conditions. The trajectory of a firm’s future
payouts will depend on reinvestment policies (e.g., what portion of the operating cash flow will be
reinvested in the firm?), the relative sizes of the growth-related and maintenance investments, and the
return on new investments. Estimates of future earnings play a critical role in this process. Holding
other factors constant, an increase (decrease) in earnings will result in higher (lower) future cash flows.

In practice, of course, all other factors will not remain constant. An increase (or decrease) in
earnings could be caused by a one-time item, or could be the result of adjustments to a firm’s
discretionary accruals, such as the reserve for uncollectible accounts receivable. Thus, investors must
pay attention to both the direction and the quality of an earnings change (i.e., is the earnings change due
to a change in a firm’s economic performance, a one-time event, or a change in the firm’s accounting
policies?) before extrapolating this change into the future.⁵ Nevertheless, the link between earnings and

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⁴ Finance teaches that a firm should make an investment (i.e., reinvest funds into the firm) as long as the present
value of the incremental cash flows (i.e., cash flows with the investment minus cash flows without the investment)
equals or exceeds the amount of the investment. That is, a firm should make an investment if the net present value
of the investment is greater than or equal to zero. In theory, this decision rule should govern both growth-related
and maintenance investments. The cash flows used in Equation (1) are frequently called free cash flows. Jensen
(1986) defines free cash flow as the cash flow after all positive net present value investments, including both
growth-related and maintenance projects.

⁵ Weil (2009) shows that relatively small adjustments to accrual balances can have a noticeable impact on net
income. This provides managers with the opportunity to manage earnings (e.g., artificially increase earnings to
meet a target), reducing the usefulness of a firm’s reported accounting earnings as a proxy for its unobservable
cash flows – defined by Equation (2) – justifies the attention investors give earnings estimates issued by professional analysts.

4. **Expectations and Stock Returns**

Clearly, the process of estimating a firm’s future performance is not an exact science. And, because future outcomes are a function of many developments than cannot be foreseen, it is not unusual – indeed, it is typical – for realized earnings to differ from the earnings estimates underlying the stock price $P_0$. This difference – the forecast error – is a key determinant of a firm’s stock return. If actual earnings exceed (are less than) the original estimates, the realized stock return will exceed (be less than) the required return, $r$.

4.1. **A Numerical Example**

To illustrate this idea, consider a simple one-period example. A stock is expected to pay only one cash flow: a $110 cash flow in one year. For simplicity, assume that this cash flow will equal the firm’s earnings. If the required return, $r$, is 10%, Equation (1) says that the current stock price is $100. After an investor purchases the stock, there is no guarantee that the earnings and cash flow in one year will be $110. If the firm does better than expected and pays $120, the investor’s return will be 20% ($= 120/100 – 1$). If the firm does worse than expected and pays $90, the investor’s return will be −10% ($= 90/100 – 1$). Only if the firm pays the expected cash flow of $110 will the actual return equal the required return of 10%.

4.2. **A Betting Analogy**

The valuation process parallels – in many respects – the process of setting odds and determining payoffs in the sports-betting world. As an example, consider the annual NCAA men’s basketball tournament. Before the tournament starts, the selection committee seeds each team. To do this, they observe past performance (e.g., winning percentage, average points scored/allowed, strength of economic earnings. As the potential difference between accounting and economic earnings increases, the quality of the accounting earnings decreases. Empirical evidence (e.g., Imhoff and Lobo [1992]; Teoh and Wong [1993]; and Wilson [2008]) suggests that the stock price reaction to unexpected earnings is related to various measures of earnings quality.
schedule, etc.), and adjust for changing conditions. In this case, the changing conditions include injuries, coaching changes, and recent performance trends, rather than new product introductions, lawsuits, actions of competitors, and macroeconomic factors.

The results of past basketball tournaments suggest that future performance is, to some extent, predictable. From 1979 to 2004, the 2005 ESPN Sports Almanac reports the percent of tournament games won by seed as follows: 1 = 77.4%; 2 = 70.3%; 3 = 62.3%; 4 = 58.1%; 5 = 53.5%; 6 = 57.7%; 7 = 45.3%; 8 = 44.0%; 9 = 36.4%; 10 = 40.9%; 11 = 30.1%, 12 = 30.1%; 13 = 19.2%; 14 = 15.8%, 15 = 4.8%; 16 = 0.0%. Clearly, the higher seeds typically perform much better than teams seeded 11 to 16. Yet, teams seeded 6 have won more games than teams seeded 5; teams seeded 10 have won more games than teams seeded 9. Because future outcomes cannot be identified with certainty beforehand, such forecast errors are inevitable. Nevertheless the selection committee has shown that it can distinguish the better teams from the lesser ones before the tournament begins.

However, simply being able to identify the better basketball teams is not enough to make a person rich. For example, teams seeded 1 have won every game against a 16 seed. But, number 1 seeds are frequently favored by 25 points of more when facing a 16 seed. So, for a bet on a number 1 seed to pay off, the team may have to win the game by 26 points or more! That is, the gambler will not make money on the bet unless the team’s performance exceeds expectations.

Conceptually, this process is replicated continuously in the stock market. Investors observe past performance, adjust for changing conditions, and develop forecasts of future cash flows. These cash flow estimates support the observed stock prices. As events unfold in the future, investors will assess whether the firm’s performance is exceeding (or falling short of) expectations, they will adjust future cash flow estimates up or down accordingly, and the stock price will rise or fall.

4.3. Implications

The efficient market hypothesis from finance (Fama [1970]) claims that a firm’s observed stock price is an unbiased estimate of its (unobservable) intrinsic value. When stock prices are set at fair
(unbiased) levels, it is impossible for investors to identify with certainty (beforehand) those stocks that will outperform the market (i.e., earn excess returns) in future periods.

Because a stock price is the present value of future cash flows, the estimated cash flows must be unbiased forecasts of future realizations for the stock price to be fair. Thus, for the market to be efficient – and for excess stock returns to be unpredictable – a firm’s future cash flows must be (to some extent) predictable using publicly available information.

The efficient market hypothesis is controversial, and the results of many studies suggest that stock prices are not perfectly efficient.6 Nevertheless, the efficient market hypothesis predicts a well-defined relation between unexpected earnings (i.e., earnings above or below expected levels) and stock returns. Firms with future earnings that exceed (are less than) expectations will earn higher (lower) stock returns. To the extent that accounting disclosures lead investors to better forecasts of future performance, accounting information can help improve market efficiency.

5. Analyist Estimates and Future Stock Returns

Because future cash flows will be a function of future earnings, investors pay attention to earnings estimates issued by financial analysts, and respond when actual performance differs from expected performance. We now use analyst forecast data to illustrate this process. We focus on two questions. First, are analyst earnings forecasts plausible estimates of future outcomes? Second, is a firm’s future operating performance related to its future stock returns, and if so, how?

In this descriptive empirical exercise, we focus on analyst earnings forecasts issued early in a fiscal year. We use these forecasts because in many valuation models (e.g., Leibowitz and Kogelman [1990]; Gordon and Gordon [1997]; Danielson [1998]; O’Brien [2003]; and Brealey and Myers [2003]), the stock price is calculated as a function of a firm’s estimated earnings over the next 12 months, estimated future growth, and a discount rate.

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6 Dimson and Mussavian (1998) summarize empirical evidence for, and against, the efficient markets hypothesis. Grossman and Stiglitz (1980) argue that because information is costly, it is not possible for markets to be perfectly informationally efficient.
Because future business conditions are uncertain, it is not surprising that numerous studies report that analyst forecasts produce substantial errors (e.g., Ali, Klein, and Rosenfeld [1992]; Chopra [1998]; Harris [1999]; Doukas, Kim, and Pantzalis [2002]; Richardson, Teoh, and Wysocki [2004]; Fortin, Gilkeson, and Michelson [2007]; and Higgins [2008]) and that these errors increase in size as the forecast period lengthens (Elton, Gruber, and Gultekin [1984]). In addition, recent studies explain how conflicts of interest can distort analyst forecasts (e.g., Richardson, Teoh, and Wysocki [2004]; and Chan, Karceski, and Lakonishok [2007]). The underlying theme of much of this literature is that analyst forecasts—especially those issued early in a fiscal year—should be used only with caution. We investigate whether early-in-the-year earnings estimates can provide information about a firm’s potential future performance—despite the sometimes large forecast errors.

This study uses annual earnings estimates from the Thomson Financial I/B/E/S database for the period covering 1995 to 2007. We analyze forecast accuracy using three variables, as defined by Equations (3) to (5). The forecasted earnings change ($FCHG_{t+1}$) is the predicted change in earnings between years $t$ and $t+1$, using forecasts issued early in the fiscal year. The realized earnings change ($EPSCHG_{t+1}$) is the actual change in earnings. The forecast error ($FE_{t+1}$) measures the difference between the forecasted and actual earnings for year $t+1$.

$$FCHG_{t+1} = \frac{(FEPSt,t+1 - EPSt,)/APS_t}{APS_t}$$

$$EPSCHG_{t+1} = \frac{(EPSt+1 - EPSt,)/APS_t}{APS_t}$$

$$FE_{t+1} = \frac{(EPSt+1 - FEPSt,t+1)/APS_t}{APS_t}$$

$EPSt$ and $EPSt+1$ are the actual annual earnings-per-share for years $t$ and $t+1$. $FEPSt,t+1$ is the mean analyst forecast of $EPS_{t+1}$ listed on I/B/E/S during the fourth month after the end of year $t$. This variable uses earnings forecasts from the fourth month after year end to provide ample time for analysts to adjust their forecasts for prior year operating results and for other information disclosed by the firm in its annual report. By doing so, we assure that the estimates fully reflect the business conditions facing

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7 This sample period provides 12 full years of observations for statistical analysis because each year requires data for year $t$ and year $t+1$. 

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the firm at the end of year $t$ (i.e., twelve months prior to the end of year $t+1$). $APS_i$ is total assets per share at the end of year $t$. In this exercise, we scale the variables by assets per share so that the forecasted earnings change and the forecast error can be interpreted relative to a firm’s return on assets.

The variable $X_{RET_{t+1}}$ measures the stock return over an eleven-month period starting at the end of the fourth month of the forecast year, and culminating at the beginning of the fourth month of the next fiscal year. This assures that the stock return covers a period that begins after the earnings forecast is known, and ends after the earnings for the test year have been incorporated into the stock price. To convert this stock return to an excess return measure, we subtract the CRSP equally-weighted market return for the same period.

The sample includes 31,976 observations for which data is available to calculate all four variables. Of these observations, 14,370 are for NYSE firms, 930 are AMEX firms, and the remaining 16,676 observations are NASDAQ firms.

5.1. How Accurate are Analyst Earnings Forecasts?

We focus first on the question of forecast accuracy. We are not looking for pinpoint accuracy; future outcomes are uncertain, there is no reason to expect analysts to be clairvoyant. Instead, we define forecast accuracy more broadly. In particular, can analysts distinguish between those firms most likely, and those least likely, to experience substantial earnings growth?

Table 1 lists median values of $FCHG_{t+1}$, $EPSCHG_{t+1}$, and $FE_{t+1}$. These values are shown for the entire sample, and within quartiles defined by the values of $FCHG_{t+1}$. The largest values of $FCHG_{t+1}$ are in Quartile 4.

Table 1 reveals that analyst forecasts are noisy estimates of future outcomes. Supporting prior evidence, Table 1 reveals the optimistic bias embedded in analyst forecasts. The median value of $FCHG_{t+1}$ is 0.00886, meaning that return on assets, on average, is expected to increase. However, most
firms do not realize the full amount of the expected performance improvements. The median realized earnings change, $EPSCHG_{t+1}$, is 0.00405, and the forecast error is negative for the majority of sample firms.

Confirming evidence in Fortin, Gilkeson, and Michelson (2007), forecast errors become more negative as the predicted earnings change increases. In the quartile with the largest forecasted earnings changes (i.e., the fourth quartile of $FCHG_{t+1}$), the median value of $FE_{t+1}$ is -0.00493; in the three quartiles with smaller values of $FCHG_{t+1}$, the median values of $FE_{t+1}$ range from –0.00021 to –0.00075.

If forecast errors become progressively larger as the predicted earnings change increases, a sizeable forecast error in dollars may not be large relative to the predicted earnings change. For example, assume that an analyst predicted a 100 percent increase in earnings, but earnings actually increased by only 75 percent. In this case, the analyst correctly identified the direction and approximate magnitude of the change and the large forecast error is not necessarily evidence of analyst failure.

Along these lines, Table 1 shows that the realized earnings changes ($EPSCHG_{t+1}$) increase with the predicted earnings changes ($FCHG_{t+1}$). The median $EPSCHG_{t+1}$ is 0.03880 in the fourth quartile of $FCHG_{t+1}$ (large expected earnings change), but only -0.00566 in the first quartile of $FCHG_{t+1}$ (small expected earnings change). Thus, many analysts did correctly surmise that the earnings of firms in the fourth quartile of $FCHG_{t+1}$ would increase by a substantial amount, and that the earnings of firms in the first quarter of $FCHG_{t+1}$ were less likely to increase.

Overall, the results in Table 1 suggest that analyst forecasts provide useful, albeit general, information about a firm’s future prospects.

5.2. Operating Performance and Stock Returns

Table 2 analyzes the relations between forecasted earnings changes, realized earnings changes, forecast errors, and future stock returns. The columns of the table divide the sample into quartiles based on the observed values of $FCHG_{t+1}$. The rows look at quartiles based on $EPSCHG_{t+1}$. In each case, Quartile 4 includes the largest values. Each cell reports the number of firms in the category, and the median values of $FE_{t+1}$ and $XRET_{t+1}$ for these firms.
Confirming the results in Table 1, the hypothesis that the earnings realizations are independent of the predictions can be rejected at a 1 percent significance level using a chi-squared test (chi-square = 16,756). The vast majority of firms in Quartile 4 of $\text{EPSCHG}_{t+1}$ had predicted earnings changes above the median of $\text{FCHG}_{t+1}$. Over two-thirds of the firms in Quartile 4 of $\text{EPSCHG}_{t+1}$ were also in Quartile 4 of $\text{FCHG}_{t+1}$. An additional one-fourth had predicted earnings changes in Quartile 3 of $\text{FCHG}_{t+1}$. Conversely, a firm is unlikely to experience a large increase in earnings if analysts are pessimistic. Approximately 89 percent of the firms in $\text{FCHG}_{t+1}$ Quartile 1 end up in $\text{EPSCHG}_{t+1}$ Quartile 1 or 2 (= (3,900+3,206)/7,994).

Although analyst forecasts can help investors distinguish between firms most likely, and those least likely, to experience a large earnings change, the results in Table 2 show that future stock returns do not display a strong positive relation with the forecasted earnings change. Indeed, firms in $\text{FCHG}_{t+1}$ Quartile 4 (which were expected to experience the largest, positive earnings change) have the lowest median future stock return: median $\text{XRET}_{t+1} = -0.01430$. Thus, investors cannot earn above-average returns by simply selecting those firms expected to be most successful in the future.

In contrast, investors could have earned impressive returns by investing in firms that ultimately realized the largest earnings changes: the median $\text{XRET}_{t+1}$ for firms in $\text{EPSCHG}_{t+1}$ Quartile 4 was 0.11620. However, the firms that would earn these high returns could not be identified with certainty at time $t$. Although 5,349 of the $\text{EPSCHG}_{t+1}$ Quartile 4 firms were from $\text{FCHG}_{t+1}$ Quartile 4, the other 2,645 firms from $\text{FCHG}_{t+1}$ Quartile 4 did not end up in $\text{EPSCHG}_{t+1}$ Quartile 4. In order to benefit from the large returns realized by firms in $\text{EPSCHG}_{t+1}$ Quartile 4, an investor must have been able to distinguish between these two subsets of $\text{FCHG}_{t+1}$ Quartile 4 at the end of year $t$.

Table 2 suggests that the operating performance of the average firm in $\text{EPSCHG}_{t+1}$ Quartile 4 was better than expected, contributing to its high stock return. Firms in $\text{EPSCHG}_{t+1}$ Quartile 4 had the highest median forecast error, $\text{FE}_{t+1}$, of the $\text{EPSCHG}_{t+1}$ quartiles. At the other end of the spectrum, firms with the lowest realized earnings growth, $\text{EPSCHG}_{t+1}$ Quartile 1, had the lowest median $\text{XRET}_{t+1}$.
Again, this poor return was not predictable; Quartile 1 firms had the lowest (negative) median forecast error, \( FE_{t+1} \), of the \( EPSCHG_{t+1} \) quartiles.

Table 2 shows that a firm’s realized stock return depends not only on the firm’s earnings realization (\( EPSCHG_{t+1} \)), but also on how this realization compares to forecasted performance (\( FCHG_{t+1} \)). In each \( EPSCHG_{t+1} \) row, the median excess stock return \( XRET_{t+1} \) is much greater when the predicted earnings change is low (\( FCHG_{t+1} \) Quartiles 1 or 2) than when a larger earnings change was expected (\( FCHG_{t+1} \) Quartiles 3 or 4).

Because Table 2 categorizes firms using both earnings predictions and realizations, the results control for the optimistic bias embedded in the earnings forecasts. If the earnings realization quartile is lower than the forecasted earnings change quartile, the excess return is typically negative. These firms fall in the six shaded cells above the diagonal of Table 2 (i.e., \( EPSCHG_{t+1} \) Quartile 1 vs. \( FCHG_{t+1} \) Quartile 2; \( EPSCHG_{t+1} \) Quartile 2 vs. \( FCHG_{t+1} \) Quartile 3; etc.). In these cells, median \( XRET_{t+1} \) is negative. When the earnings realization quartile is higher than the forecasted earnings change quartile, the median excess return is positive. These firms fall in the six shaded cells below the diagonal of Table 2 (i.e., \( EPSCHG_{t+1} \) Quartile 2 vs. \( FCHG_{t+1} \) Quartile 1; \( EPSCHG_{t+1} \) Quartile 3 vs. \( FCHG_{t+1} \) Quartile 2; etc.).

Therefore, analyst earnings estimates can serve as a benchmark level of performance in the valuation process. If an investor believes future performance will be substantially higher (or lower) than expectations, the investor should purchase (sell) the stock.

6. Conclusions

There are important conceptual differences between the fields of accounting and finance. Financial formulas provide estimates of an asset’s value, using forecasts of future cash flows. Because accounting information focuses on historical periods, financial statement information cannot be plugged directly into these formulas. Nevertheless, historical performance is the logical starting point when estimating future cash flows. Thus, accounting information plays a prominent role in the valuation process.
Although accounting and finance courses tend to be very quantitative, the process of estimating future outcomes can be more of an art than a science. Will customers continue to value a firm’s product offerings? Can a firm keep pace with the technological innovations of its competitors? Will the actions of regulatory bodies help, or impede, the firm’s efforts to create effective, yet safe, new products? Financial statements help investors develop partial answers to these questions, by providing qualitative discussions of the business conditions that help to create past performance and by including forward-looking statements. Investor must then make numerous subjective judgments – based on information outside the financial statements – when estimating future operating performance.

Analyst forecasts provide an ideal framework in which to see how effectively this process works. Can informed investors observe past performance, adjust for changing conditions, and arrive at plausible estimates of future performance? Because predicting the future is difficult, we find that analyst forecasts issued early in a fiscal year are not pinpoint estimates of future earnings. However, analyst forecasts – despite their imprecision – can help investors distinguish between firms most likely, and least likely, to experience substantial earnings growth. In addition, the difference between expected and realized operating performance has a direct impact on a firm’s stock price. In order to generate a stock return in excess of the required return, a firm’s operating performance must beat expectations.

Appendix A. Project for Classroom Use

This assignment provides students with the opportunity to observe the relations between earnings forecasts, forecast revisions, and stock returns for individual firms. The assignment, as described here, assumes that students do not have access to a detailed history of forecast revisions from a subscription service. All of the required data is available from free, publicly-available websites.

Students will track a selected firm’s stock price and analyst earnings forecasts over a four-month period ending one month after the firm’s fiscal quarter (this assignment works best for firms with quarters ending in March, June, September, and December). In the fall semester, the observation period can last from July 1 to October 31. In the spring semester, the observation period can last from October...
1 to January 31. For most large, publicly-traded firms, these observation periods will include the
announcement of quarterly earnings for both the preceding and the concurrent quarter.

In the project, students will explain why analyst forecasts and the firm’s stock price changed
over the four-month observation period. To do this, the student will research news articles (and press
releases) about the firm. This assignment works best (and is much easier to grade) when the instructor
identifies a population of one or more firms students can use in the project.

A 90 day history of the analyst earnings estimates for the chosen firm can be obtained from
finance.yahoo.com. After obtaining the firm’s current stock price, a link to “Analyst Estimates” can be
found on the left-hand side of the page under the “Analyst Coverage” heading. For the current quarter,
Yahoo lists the current EPS estimate, and the estimates 7 days, 30 days, 60 days, and 90 days ago. For
the selected population of firms, the instructor should print this page on September 30 (fall semester) or
December 31 (spring semester) to assure that all students are working with the same information.
Ideally, instructors should select firms for which analyst earnings estimates either increased or
decreased during the observation period.

Students will then track the firm’s stock price over the four-month observation period. Because
stock prices can change in response to both firm-specific and macroeconomic information, the students
should also follow a market index (such as the S&P 500) over this period. Historical stock price
information can be found on quote.yahoo.com by first obtaining a stock quote for a firm, and then
clicking on the link to “Historical Prices” under the “Quote” heading.

In this assignment, students will identify news items that explain why the firm’s stock price
increased or decreased, why the market index increased or decreased, and why the analyst earnings
estimates increased or decreased. These news items can be found by first observing the historical trends
of the stock prices (index values) and the analyst estimates, and identifying the days on which the bulk
of the changes occurred. Then, the student can search for news articles (on finance.yahoo.com, news
items for an individual firm can be found in a link to “Headlines”). In many cases, the news articles that
explain why earnings estimates changed will also explain why the stock price changed.
The specific requirements of the assignment might include the following items:

A. Obtain the closing stock price and the trading volume for “selected company” for each day from July 1, 20XX through October 31, 20XX. In addition, obtain the closing value of the S&P 500 (and the trading volume) for each of these days. Include a list of each series in your paper. You will also reference the earning estimate history for this firm, which is attached to this sheet.

B. Answer the following questions.

1. By how much did the S&P 500 change during the four-month period? Based upon news accounts, why did the S&P 500 change during this period? Focus on the reasons for the overall change, rather than the reasons for each day to day fluctuation. For example, if the market increased by 10%, try to identify 1 or 2 macroeconomic factors that caused investor expectations to change, contributing to this increase. These macroeconomic factors could relate to tax policy, interest rates, etc.

2. By how much did analyst earnings estimates for the company change from July 1 to September 30. Based on news accounts or press releases (this could include “forward-looking” statements in the prior quarterly report, which was released during the observation period), explain why analysts either increased or decreased the earnings estimates.

3. By how much did the stock price of the company change during the period? Is the direction and magnitude of the stock price change congruent with the overall change in the market (from #1)? Did the stock price change in response to changes in analyst earnings estimates (from #2)? Why or why not? If macroeconomic factors and changes in earnings estimates cannot fully explain the stock price change, identify one or two events (from news articles) that can explain the remainder of the stock price change.

Grading Notes:

- This project is not susceptible to assignment sharing between current and former students because the economic events change from semester to semester. Simply copying an “A” project for Microsoft from the spring semester will not earn a student an “A” in the fall semester.
- By selecting the firms for students, an instructor can insure that the complexity of the assignment is appropriate for the ability level of the students (some events are easier to explain than others).
- The best answers to parts 1, 2, and 3 will focus on explaining the overall price (or estimate) change, rather than day-to-day fluctuations. For example, if a stock price increased by 15% during a four month period, it is likely that the bulk of the increase can be attributed to one or two items, even though the stock price will drift up or down each day in response to random trading activity.
- The best answers to parts 1, 2, and 3 will attempt to explain how/why the various news items caused expectations about future cash flow levels to either increase or decrease.
REFERENCES


Table 1
Forecast Errors and the Predicted Earnings Change

This table lists the median values of the listed variables by $FCHG_{t+1}$ quartile.

<table>
<thead>
<tr>
<th></th>
<th>All Firms</th>
<th>$FCHG_{t+1}$:</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Observations</td>
<td>31976</td>
<td>7994</td>
<td>7992</td>
<td>7996</td>
<td>7994</td>
<td></td>
</tr>
<tr>
<td>$FCHG_{t+1}$</td>
<td>0.00886</td>
<td>-0.00381</td>
<td>0.00428</td>
<td>0.01427</td>
<td>0.04389</td>
<td></td>
</tr>
<tr>
<td>$EPSCHG_{t+1}$</td>
<td>0.00405</td>
<td>-0.00566</td>
<td>0.00267</td>
<td>0.01296</td>
<td>0.03880</td>
<td></td>
</tr>
<tr>
<td>$FE_{t+1}$</td>
<td>-0.00064</td>
<td>-0.00075</td>
<td>-0.00021</td>
<td>-0.00039</td>
<td>-0.00493</td>
<td></td>
</tr>
</tbody>
</table>

Definitions of Variables

$$FCHG_{t+1} = \frac{(FEPS_{t+1} - EPS_t)}{APS_t}$$

$$EPSCHG_{t+1} = \frac{(EPS_{t+1} - EPS_t)}{APS_t}$$

$$FE_{t+1} = \frac{(EPS_{t+1} - FEPS_{t+1})}{APS_t}$$

Where:

$EPS_t (or t+1)$ = actual annual earnings per-share for year $t$ (or year $t+1$);

$FEPS_{t+1}$ = analysts’ forecast of annual earnings per-share for year $t+1$ issued in the fourth month following the report date of year $t$;

$APS_t$ = total assets per share at the report date of year $t$. 


TABLE 2
Analysis of Actual and Predicted Earnings Changes

This table reports the median values of $FE_{t+1}$ and $XRET_{t+1}$ by $FCHG_{t+1}$ and $EPSCHG_{t+1}$ quartile.

<table>
<thead>
<tr>
<th></th>
<th>All Firms</th>
<th>$FCHG_{t+1}$</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPSCHG$_{t+1}$: Q1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Firms (Row %)</td>
<td>7994</td>
<td>3900 (48.8)</td>
<td>1303 (16.3)</td>
<td>1400 (17.5)</td>
<td>1391 (17.4)</td>
<td></td>
</tr>
<tr>
<td>$FE_{t+1}$</td>
<td>-0.03200</td>
<td>-0.01612</td>
<td>-0.02362</td>
<td>-0.04000</td>
<td>-0.10291</td>
<td></td>
</tr>
<tr>
<td>$XRET_{t+1}$</td>
<td>-0.15585</td>
<td>-0.08160</td>
<td>-0.18060</td>
<td>-0.21370</td>
<td>-0.29140</td>
<td></td>
</tr>
<tr>
<td>EPSCHG$_{t+1}$: Q2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Firms (Row %)</td>
<td>7994</td>
<td>3206 (40.1)</td>
<td>3447 (43.1)</td>
<td>969 (12.1)</td>
<td>372 (4.7)</td>
<td></td>
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<tr>
<td>$FE_{t+1}$</td>
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<td>0.000815</td>
<td>-0.00124</td>
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<td>$XRET_{t+1}$</td>
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<td>-0.00970</td>
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<td>-0.25150</td>
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<tr>
<td>EPSCHG$_{t+1}$: Q3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Firms (Row %)</td>
<td>7994</td>
<td>547 (6.9)</td>
<td>2910 (36.4)</td>
<td>3655 (45.7)</td>
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<tr>
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<td>0.00970</td>
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</tr>
<tr>
<td>EPSCHG$_{t+1}$: Q4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Firms (Row %)</td>
<td>7994</td>
<td>341 (4.3)</td>
<td>332 (4.1)</td>
<td>1972 (24.7)</td>
<td>5349 (66.9)</td>
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<tr>
<td>$FE_{t+1}$</td>
<td>0.01249</td>
<td>0.06346</td>
<td>0.02585</td>
<td>0.01378</td>
<td>0.00727</td>
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<tr>
<td>$XRET_{t+1}$</td>
<td>0.11620</td>
<td>0.18100</td>
<td>0.22715</td>
<td>0.16000</td>
<td>0.08670</td>
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</tr>
<tr>
<td>All Firms</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td># Firms (Row %)</td>
<td>31976</td>
<td>7994 (25.0)</td>
<td>7992 (25.0)</td>
<td>7996 (25.0)</td>
<td>7994 (25.0)</td>
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</tr>
<tr>
<td>$FE_{t+1}$</td>
<td>-0.00064</td>
<td>-0.00075</td>
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<td>-0.00720</td>
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<td>0.00305</td>
<td>-0.00825</td>
<td>-0.01430</td>
<td></td>
</tr>
</tbody>
</table>

Definitions of Variables

$XRET_{t+1} = $ stock return over an eleven-month period starting at the end of the fourth month of the forecast year and ending at the beginning of the fourth month of the next fiscal year, less the CRSP equally-weighted market return for the same period.

See Table 1 for all other variable definitions.