6.1 Overview

The measurement perspective on decision usefulness implies greater usage of fair values in the financial statements proper. Following from our discussion in Section 2.5.1, greater use of fair values suggests a balance sheet approach to financial reporting, as opposed to the income statement approach which underlies the research described in Chapter 5. This, in turn, implies a larger role for the financial statements proper to assist investors in predicting the firm’s fundamental value, that is, the value the firm’s shares would have if all relevant information was in the public domain. We define the measurement perspective as follows:

The measurement perspective on decision usefulness is an approach to financial reporting under which accountants undertake a responsibility to incorporate fair values into the financial statements proper, providing that this can be done with reasonable reliability, thereby recognizing an increased obligation to assist investors to predict fundamental firm value.

Of course, if a measurement perspective is to be useful, it must not be at the cost of a substantial reduction in reliability. While it is unlikely that a measurement perspective will replace the historical cost basis of accounting, it does seem to be the case that the relative balance of cost-based versus fair value-based information in the financial statements is moving in the fair value direction. This may seem strange, given the problems that techniques such as RRA accounting have experienced. However, a number of reasons can be suggested for the change in emphasis.

One such reason involves securities market efficiency. Despite the impressive results outlined in Chapter 5 in favour of the decision usefulness of reported net income, recent years have seen increasing theory and evidence suggesting that
securities markets may not be as efficient as originally believed. This suggestion has major implications for accounting. To the extent that securities markets are not fully efficient, the reliance on efficient markets to justify historical cost-based financial statements supplemented by much supplementary disclosure, which underlies the information perspective’s approach to decision usefulness, is threatened. For example, if investors collectively are not as adept at processing information as efficiency theory assumes, perhaps usefulness would be enhanced by greater use of fair values in the financial statements proper. Furthermore, while beta is the only relevant risk measure according to the CAPM, perhaps accountants should take more responsibility for reporting on firm risk if markets are not fully efficient.

Other reasons derive from a low proportion of share price variability explained by historical cost-based net income, from the Ohlson clean surplus theory that provides support for increased measurement, and from the legal liability to which accountants are exposed when firms become financially distressed.

In this chapter we will outline and discuss these various reasons.

6.2 Are Securities Markets Efficient?

6.2.1 INTRODUCTION

In recent years, increasing questions have been raised about the extent of securities market efficiency. These questions are of considerable importance to accountants since, if they are valid, the practice of relying on supplementary information in notes and elsewhere to augment the basic historical cost-based financial statements may not be completely effective in conveying useful information to investors. Furthermore, to the extent that securities markets are not fully efficient, improved financial reporting may be helpful in reducing inefficiencies, thereby improving the proper operation of securities markets. That is, better reporting of firm value will enable investors to better estimate fundamental value, thereby more easily identifying mispriced securities. In this section, we will outline and discuss the major questions that have been raised about market efficiency.

The basic premise of these questions is that average investor behaviour may not correspond with the rational decision theory and investment models outlined in Chapter 3. Investors may be biased in their reaction to information, relative to how they should react according to Bayes’ theorem. For example, psychological evidence suggests that individuals tend to be overconfident—they overestimate the precision of information they collect themselves (see, for example, the discussion in Odean (1998)). If an individual’s information collecting activities reveal GN, for example, he or she will revise their subjective probability of high future earnings by more than they should according to Bayes’ theorem. If, on average, investors behave this way, share price will overreact.
Another attribute of many individuals is **self-attribution bias**, whereby individuals feel that good decision outcomes are due to their abilities, whereas bad outcomes are due to unfortunate realizations of states of nature, hence not their fault. Suppose that following an overconfident investor’s decision to purchase a firm’s shares, its share price rises (for whatever reason). Then, the investor’s faith in his or her investment ability rises. If share price falls, faith in ability does not fall. If the average investor behaves this way, share price **momentum** will develop. That is, reinforced confidence following a rise in share price leads to the purchase of more shares, and share price rises further. Confidence is again reinforced, and the process feeds upon itself, that is, it gains momentum. Daniel, Hirshleifer and Subrahmanyam (1998) present a model whereby momentum develops when investors are overconfident and self-attribution biased. Daniel and Titman (1999), in an empirical study, report that over the period 1968–1997 a strategy of buying portfolios of high-momentum shares and short-selling low-momentum ones earned high and persistent abnormal returns (i.e., higher than the return from holding the market portfolio), consistent with the overconfidence and momentum arguments.1

Self-attribution bias and momentum are, of course, inconsistent with securities market efficiency and underlying decision theory. According to the CAPM, higher returns can only be earned if higher beta risk is borne. Yet Daniel and Titman report that the average beta risk of their momentum portfolios was less than that of the market portfolio. Furthermore, share price momentum implies positive serial correlation of returns, contrary to the random walk behaviour of returns under market efficiency.

The study of behavioural-based securities market efficiencies is called **behavioural finance**. For a comprehensive review of the theory and evidence of behavioural finance, see Hirshleifer (2001). We now review several other questions about efficiency that have been raised in this theory.

### 6.2.2 PROSPECT THEORY

The **prospect theory** of Kahneman and Tversky (1979) provides a behavioural-based alternative to the rational decision theory described in Section 3.3. According to prospect theory, an investor considering a risky investment (a “prospect”) will separately evaluate prospective gains and losses. This contrasts with decision theory where investors evaluate decisions in terms of their effects on their total wealth (see Chapter 3, Note 4). Separate evaluation of gains and losses about a reference point is an implication of the psychological concept of **narrow framing**, whereby individuals analyze problems in too isolated a manner, as a way of economizing on the mental effort of decision making. This mental effort may derive from information overload (i.e., more information than the individual can handle) and/or from a feeling that it is not worth the effort to acquire more information. As a result, an individual’s utility in prospect theory is defined over deviations from zero for the prospect in question, rather than over total wealth.
The investor's utility for gains is assumed to exhibit the familiar risk averse, concave shape as illustrated in Figure 3.2. However, at the point where the investment starts to lose in value, the investor's rate of utility loss is greater than the rate of utility increase for a gain in value. Indeed, the utility for losses is assumed to be convex rather than concave, so that the investor exhibits “risk taking” behaviour with respect to losses. This assumption derives from loss aversion, a behavioural concept whereby individuals are averse to even very small losses. This leads to a disposition effect, whereby the investor holds on to losers and sells winners. This effect was studied by Shefrin and Statman (1985). They identified a sample of investors whose rational decision was to sell loser securities before the end of the taxation year. They found, however, that the investors tended to avoid selling, consistent with the disposition effect.

Figure 6.1 shows a typical investor utility function under prospect theory.

Prospect theory also assumes that when calculating the expected value of a prospect, individuals “weight” their probabilities. This weighting is a ramification of overconfidence. Thus, evidence (e.g., GN) that a state (e.g., high earning
power) is likely to happen will be underweighted, particularly if the evidence is abstract, statistical, and highly relevant. In effect, by underweighting evidence that a state is likely to happen, the main diagonal probabilities of the information system are perceived by the overconfident investor as lower than they actually are. As a result, the individual’s posterior probability of the state is also too low. However, individuals tend to overweight salient, anecdotal, and extreme evidence (e.g., a media article claiming that a stock is about to take off), even though realization of such states is a rare event.

These tendencies lead to “too-low” posterior probabilities on states that are likely to happen, and “too high” on states that are unlikely to happen. The posterior probabilities need not sum to one.

The combination of separate evaluation of gains and losses and the weighting of probabilities can lead to a wide variety of “irrational” behaviours. For example, fear of losses may cause investors to stay out of the market even if prospects have positive expected value according to a decision theory calculation. Also, they may underreact to bad news by holding on to “losers” so as to avoid realizing a loss, or may even buy more of a loser stock, thereby taking on added risk. Thus, under prospect theory, investor behaviour depends in a complex way on the levels of payoff probabilities, risk aversion with respect to gains and risk taking with respect to losses.

There are few empirical accounting tests of prospect theory, relative to the empirical tests based on rational investor behaviour described in Chapter 5. One such test, however, was conducted by Burgstahler and Dichev (1997). In a large sample of U.S. firms from 1974–1976, these researchers documented that relatively few firms in their sample reported small losses. A relatively large number of firms reported small positive earnings. Burgstahler and Dichev interpreted this result as evidence that firms that would otherwise report a small loss manipulate cash flows and accruals to manage their reported earnings upwards, so as to instead show small positive earnings (techniques of earnings management are discussed in Chapter 11).

As Burgstahler and Dichev point out, this result is consistent with prospect theory. To see why, recall first that prospect theory assumes that investors evaluate gains and losses relative to a reference point of zero—if earnings are positive, share value, hence investor wealth and utility, increases, and vice versa if earnings are negative. Now observe from Figure 6.1 that the rate at which investor utility increases is greatest for small gains, and the rate at which it decreases is even greater for small losses. This implies a very strong rate of negative investor reaction to a small reported loss, and a strong rate of positive reaction to small reported positive earnings. Managers of firms that would otherwise report a small loss thus have an incentive to avoid this negative investor reaction, and enjoy a positive reaction, by managing reported earnings upwards. (Of course, managers of firms with large losses have similar incentives, but as the loss increases it becomes more difficult to manage earnings sufficiently to avoid the loss. Also, the
incentive to manage earnings upwards declines for larger losses since the rate of negative investor reaction is not as great, and runs into a disposition effect.)

However, Burgstahler and Dichev suggest that their evidence is also consistent with rational behaviour. Lenders will demand better terms from firms that report losses, for example. Also, suppliers may cut the firm off, or demand immediate payment for goods shipped. To avoid these consequences, managers have an incentive to avoid reporting losses if possible. As a result, the extent to which Burgstahler and Dichev’s findings support prospect theory is unclear.

6.2.3 IS BETA DEAD?

As mentioned in Section 4.5, an implication of the CAPM is that a stock’s beta is the sole firm-specific determinant of the expected return on that stock. If the CAPM reasonably captures rational investor behaviour, share returns should be increasing in $\beta_j$ and should be unaffected by other measures of firm-specific risk, which are diversified away. However, in a large sample of firms traded on major U.S. stock exchanges over the period 1963–1990, Fama and French (1992) found that beta had little ability to explain stock returns. Instead, they found significant explanatory power for the book-to-market ratio (ratio of book value of common equity to market value) and for firm size. Their results suggest that rather than looking to beta as a risk measure, the market acts as if firm risk increases with book-to-market and decreases with firm size. These results led some to suggest that beta is “dead.”

Different results are reported by Kothari, Shanken, and Sloan (1995), however. They found that over a longer period of time (1941–1990) beta was a significant predictor of return. Book-to-market also predicted return, but its effect was relatively weak. They attributed the difference between their results and those of Fama and French to differences in methodology and time period studied.

The status of the CAPM thus seems unclear. A possible way to “rescue” beta is to recognize that it may change over time. Our discussion in Section 4.5 assumed that beta was stationary. However, events such as changes in interest rates and firms’ capital structures, improvements in firms’ abilities to manage risk, and development of global markets may affect the relationship between the return on individual firms’ shares and the marketwide return, thereby affecting the value of firms’ betas. If so, evidence of volatility that appears to conflict with the CAPM could perhaps be explained by shifts in beta.

If betas are non-stationary, rational investors will want to know when and by how much they have changed. This is a difficult question to answer in a timely manner, and different investors will have different opinions. This introduces differences in their investment decisions, even though they all have access to the same information and proceed rationally with respect to their opinion as to what beta is. In effect, an additional source of uncertainty, beyond the uncertainty resulting from random states of nature, is introduced into the market. This uncertainty
arises from the mistakes investors make in evaluating new values of non-stationary share price parameters. As a result, additional volatility is introduced into share price behaviour but beta remains as the only variable that explains this behaviour. That is, the CAPM implication that beta is the sole firm specific risk variable is reinstated, with the proviso that beta is non-stationary. Models that assume rational investor behaviour in the face of non-stationarity are presented by Kurz (1997). Evidence that non-stationarity of beta explains much of the apparent anomalous behaviour of share prices is provided by Ball and Kothari (1989).

Behavioural finance, however, provides a different perspective on the validity of the CAPM. Daniel, Hirshleifer, and Subrahmanyam (2001) present a model that assumes two types of investors—rational and overconfident. Because of rational investors, a stock's beta is positively related to its returns, as in the CAPM. However, overconfident investors overreact as they gather information. In the case of GN, this drives share price too high, thereby driving down the firm's book-to-market ratio. Over time, share price reverts towards its efficient level as the overconfidence is revealed. As a result, both beta and book-to-market ratio are positively related to future share returns, consistent with the results of Kothari, Shanken, and Sloan, and inconsistent with the CAPM's prediction that beta is the only firm-specific return predictor.

From an accounting standpoint, to the extent that beta is not the only relevant firm-specific risk measure, this can only increase the role of financial statements in reporting useful risk information (the book-to-market ratio is an accounting-based variable, for example). Nevertheless, in the face of the mixed evidence reported above, we conclude that beta is not dead. However, it may change over time and may have to "move over" to share its status as a risk measure with accounting-based variables.

### 6.2.4 EXCESS STOCK MARKET VOLATILITY

Further questions about securities market efficiency derive from evidence of excess stock price volatility at the market level. Recall from the CAPM (equation 4.2) that, holding beta and the risk-free interest rate constant, a change in the expected return on the market portfolio, $E(R_M)$, is the only reason for a change in the expected return of firm $j$'s shares. Now the fundamental determinant of $E(R_M)$ is the aggregate expected dividends across all firms in the market—the higher are aggregate expected dividends the more investors will invest in the market, increasing demand for shares and driving the stock market index up (and vice versa). Consequently, if the market is efficient, changes in $E(R_M)$ should not exceed changes in aggregate expected dividends.

This reasoning was investigated by Shiller (1981), who found that the variability of the stock market index was several times greater than the variability of aggregate dividends. Shiller interpreted this result as evidence of market inefficiency.

Subsequently, Ackert and Smith (1993) pointed out that while expected future dividends are the fundamental determinant of firm value, they should be
defined broadly to include all cash distributions to shareholders, such as share repurchases and distributions following takeovers, as well as ordinary dividends.

In a study covering the years 1950–1991, Ackert and Smith showed that when these additional items were included, excess volatility disappeared.

However, despite Ackert and Smith’s results, there are reasons why excess volatility may exist. One reason, consistent with efficiency, derives from non-stationarity, as outlined in the previous section. Other reasons derive from behavioural factors. The momentum model of Daniel, Hirshleifer, and Subrahmanyam (1998) implies excess market volatility as share prices overshoot and then fall back. A different argument is made by DeLong, Shleifer, Summers, and Waldmann (1990). They assume a capital market with both rational and positive feedback investors. Positive feedback investors are those who buy in when share price begins to rise, and vice versa. One might expect that rational investors would then sell short, anticipating the share price decline that will follow the price run-up caused by positive feedback buying. However, the authors argue that rational investors will instead “jump on the bandwagon,” to take advantage of the price run-up while it lasts. As a result, there is excess volatility in the market.

In sum, it seems that the question of excess market volatility raised by Shiller is unresolved. The results of Ackert and Smith suggest it does not exist if dividends are defined broadly. Even if excess volatility does exist, it can possibly be explained by rational models based on non-stationarity. Alternatively, volatility may be driven by behavioural factors, inconsistent with market efficiency.

6.2.5 STOCK MARKET BUBBLES

Stock market bubbles, wherein share prices rise far above rational values, represent an extreme case of market volatility. Shiller (2001) investigates bubble behaviour with specific reference to the surge in share prices of technology companies in the United States in the years leading up to 2001. Bubbles, according to Shiller, derive from a combination of biased self-attribution and resulting momentum, positive feedback trading, and to “herd” behaviour reinforced by optimistic media predictions of market “experts.” These reasons underlie Federal Reserve Board Chairman Greenspan’s famous “irrational exuberance” comment on the stock market in a 1996 speech.

Shiller argues that bubble behaviour can continue for some time, and that it is difficult to predict when it will end. Eventually, however, it will burst because of growing beliefs of, say, impending recession or increasing inflation.

6.2.6 EFFICIENT SECURITIES MARKET ANOMALIES

We conclude this section with evidence of market inefficiency that specifically involves financial accounting information. Recall that the evidence described in Chapter 5 generally supports efficiency, and the rational investor behaviour
underlying it. There is, however, other evidence suggesting that the market may not respond to information exactly as the efficiency theory predicts. For example, share prices sometimes take some time to fully react to financial statement information, so that abnormal security returns persist for some time following the release of the information. Also, it appears that the market may not always extract all the information content from financial statements. Cases such as these that appear inconsistent with securities market efficiency are called efficient securities market anomalies. We now consider three such anomalies.

**Post-announcement Drift**
Once a firm’s current earnings become known, the information content should be quickly digested by investors and incorporated into the efficient market price. However, it has long been known that this is not exactly what happens. For firms that report good news in quarterly earnings, their abnormal security returns tend to drift upwards for at least 60 days following their earnings announcement. Similarly, firms that report bad news in earnings tend to have their abnormal security returns drift downwards for a similar period. This phenomenon is called post-announcement drift. Traces of this behaviour can be seen in the Ball and Brown study reviewed in Section 5.3—see Figure 5.2 and notice that abnormal share returns drift upwards and downwards for some time following the month of release of GN and BN, respectively.

Reasons for post-announcement drift have been extensively studied. For example, Foster, Olsen, and Shevlin (1984) examined several possible explanations for its existence. Their results suggested that apparent post-announcement drift may be an artifact of the earnings expectation model used by the researcher. As outlined in Chapter 5, most studies of securities market response to earnings announcements measure their information content by some proxy for unexpected earnings, on the grounds that the market will only respond to that portion of a current earnings announcement that it did not expect. When these authors proxied unexpected earnings by the change in earnings from the same quarter last year, they found strong evidence of post-announcement drift. However, with other proxies for unexpected earnings, there appeared to be no such drift. Since we do not know which earnings expectation model is the correct one, or, for that matter, even whether unexpected earnings is the best construct for measuring investor reaction (see Section 5.4.3), the Foster, Olsen, and Shevlin results tended to leave the existence of post-announcement drift up in the air, so to speak.

Be sure you see the significance of post-announcement drift. If it exists, investors could earn arbitrage profits, at least before transactions costs and before taking risk into account, by buying shares of good news firms on the day they announced their earnings and selling short shares of bad news firms. But, if investors scrambled to do this, the prices of good news firms’ shares would rise right away, and those of bad news firms’ shares would fall, thereby eliminating the post-announcement drift.
Bernard and Thomas (1989) (BT) further examined this issue. In a large sample of firms over the period 1974–1986, they documented the presence of post-announcement drift in quarterly earnings. Indeed, an investor following the strategy of buying the shares of GN firms and selling short BN on the day of earnings announcement, and holding for 60 days, would have earned an average return of 18%, over and above the marketwide return, before transactions costs, in their sample.

An explanation is that investors appear to underestimate the implications of current earnings for future earnings. As BT point out, it is a known fact that quarterly seasonal earnings changes are positively correlated. That is, if a firm reports, say, GN this quarter, in the sense that this quarter's earnings are greater than the same quarter last year, there is a greater than 50% chance that its next-quarter earnings will also be greater than last year's. Rational investors should anticipate this and, as they bid up the price of the firm's shares in response to the current GN, they should bid them up some more due to the increased probability of GN in future periods. However, BT's evidence suggests that this does not happen. The implication is that post-announcement drift results from the market taking considerable time to figure this out, or at least that it underestimates the magnitude of the correlation (Ball and Bartov, 1996). In terms of the information system given in Table 3.2, BT's results suggest that Bill Cautious evaluates the main diagonal probabilities as less than they really are.

Researchers continue to try to solve the post-announcement drift puzzle. For example, Bartov, Radhakrishnan, and Krinsky (2000) point out that the market contains sophisticated and unsophisticated investors. They find that post-announcement drift is less if a greater proportion of a firm's shares is held by institutional investors. To the extent that institutions are a good proxy for sophisticated investors, their results suggest that post-announcement drift is driven by unsophisticated investors who, presumably, do not comprehend the full information in current quarterly earnings. Also, Brown and Han (2000) find that post-announcement drift holds, in their sample, only for firms with poor information environments (small firms, firms with little analyst following, and firms with few institutional investors).

While studies such as these increase our understanding of post-announcement drift, they do not fully explain why it continues to exist. Thus, post-announcement drift continues to represent a serious and important challenge to securities market efficiency.

Market Efficiency with Respect to Financial Ratios

The results of several studies suggest that the market does not respond fully to certain balance sheet information. Rather, it may wait until the balance sheet information shows up in earnings or cash flows before reacting. If so, this raises further questions about securities market efficiency, and it should be possible to devise an investment strategy that uses balance sheet information to “beat the
Evidence that the market does wait, and details of a strategy that did appear to beat the market, appear in a paper by Ou and Penman (1989) (OP).

OP began their study by deriving a list of 68 financial ratios. They obtained a large sample of firms and, for each firm, calculated each ratio for each of the years 1965 to 1972 inclusive. Then, for each ratio, they investigated how well that ratio predicted whether net income would rise or fall in the next year. Some ratios predicted better than others did. For example, the return on total assets proved to be highly associated with the change in next year’s net income—the higher the ratio in one year the greater the probability that net income would increase the next. However, the ratio of sales to accounts receivable, also called accounts receivable turnover, did not predict the change in next year’s net income very well.

OP then took the 16 ratios that predicted best in the above investigation and used them as independent variables to estimate a multivariate regression model to predict changes in next year’s net incomes. This model then represents their sample’s best predictor of next year’s earning changes, since it takes the 68 ratios they began with, distills them to the 16 best on an individual-ratio basis, and uses these 16 in a multivariate prediction model.

Armed with this model, OP then applied it to predicting the earnings changes of their sample firms during 1973 to 1983. That is, the prediction model was estimated over the period from 1968 to 1972 and then used to make predictions from 1973 to 1983. For each firm and for each of the years 1973 to 1983, the prediction from the multivariate model is in the form of a probability that net income will rise in the following year.

OP then used these predictions as the basis for the following investment strategy. For each firm and for each year, buy that firm’s shares at the market price three months after the firm’s year-end if the multivariate regression model predicts that the probability of that firm’s net income rising next year is 0.6 or more (the three months is to allow sufficient time for the firm’s financial statements to be released and for the market to digest their contents). Conversely, if the model’s prediction is that the probability of net income rising is 0.4 or less, sell short that firm’s shares three months after its year-end.

Notice that this investment strategy is implementable—it is based on information that is actually available to investors at the time. Also, in theory, the strategy need not require any capital investment by the investor because the proceeds from the short sales can be used to pay for the shares that are bought. (In practice, some capital would be required due to restrictions on short sales and, of course, brokerage fees and other transactions costs.)

In the OP model, once bought, shares were held for 24 months and then sold at the market price at that time. Shares sold short were purchased at the market price 24 months later to satisfy the short-sale obligation.

The reasoning behind this investment strategy is straightforward. We know from Chapter 5 that the share prices respond to earnings announcements. If we can predict in advance, using ratio information, which firms will report GN and which BN, then we can exploit these predictions by the above investment strategy.
The question then was, did this investment strategy beat the market? To answer this question, OP calculated the profit or loss on each transaction, which was then converted into a rate of return. These returns were then aggregated to give the total return over all transactions. Next, it was necessary to adjust for the market-wide rate of return on stocks, so as to express returns net of the performance of the market as a whole. For example, if OP’s investment strategy produced a return of 8%, but the whole market rose by 10%, one could hardly say that the strategy beat the market. However, when market-wide returns were removed, OP found that their strategy earned a return of 14.53% over two years, in excess of market-wide return, before transactions costs. As the chances of this happening by chance are almost zero, their investment strategy appeared to have been successful in beating the market.

OP’s results were surprising, because under efficient markets theory those results should not have occurred. The investment strategy was based solely on information that was available to all investors—financial ratios from firms’ financial statements. Efficient market theory suggests that this ratio information will quickly and efficiently be incorporated into market prices. The share prices of the firms that OP bought or sold short should have already adjusted to reflect the probable increases or decreases in next year’s net incomes by the time they bought them, in which case their investment strategy would not have earned excess returns. The fact that OP did earn excess returns suggests that the market did not fully digest all the information contained in financial ratios. Rather, the market price only adjusted as the next two years’ earnings increases or decreases were actually announced. But by then, OP had already bought or sold short. Consequently, the OP results served as another anomaly for efficient securities market theory.

**Market Response to Accruals**

Sloan (1996), for a large sample of 40,769 annual earnings announcements over the years 1962–1991, separated reported net income into operating cash flow and accrual components. This can be done by noting that:

\[
\text{Net income} = \text{operating cash flows} \pm \text{net accruals}
\]

where net accruals, which can be positive or negative, include amortization expense, and net changes in non-cash working capital such as receivables, allowance for doubtful accounts, inventories, accounts payable, etc.

Sloan points out that, other things equal, the efficient market should react more strongly to a dollar of good news in net income if that dollar comes from operating cash flow than from accruals. The reason is familiar from elementary accounting—accruals reverse. Thus, looking ahead, a dollar of operating cash flow this period is more likely to be repeated next period than a dollar of accruals, since the effects of accruals on earnings reverse in future periods. In other words, cash flow is more persistent. Sloan estimated separately the persistence of the operat-
ing cash flows and accruals components of net income for the firms in his sample, and found that operating cash flows had higher persistence than accruals. That is, consistent with the above “accruals reverse” argument, next year’s reported net income was more highly associated with the operating cash flow component of the current year’s income than with the accrual component.

If this is the case, we would expect the efficient market to respond more strongly to the GN or BN in earnings the greater is the cash flow component relative to the accrual component in that GN or BN, and vice versa. Sloan found that this was not the case. While the market did respond to the GN or BN in earnings, it did not seem to “fine-tune” its response to take into account the cash flow and accruals composition of those earnings. Indeed, by designing an investment strategy to exploit the market mispricing of shares with a high or low accruals component in earnings, Sloan demonstrated a one-year return of 10.4% over and above the market return.

Sloan’s results raise further questions about securities market efficiency.

Discussion of Efficient Securities Market Anomalies

Numerous investigators have tried to explain anomalies without abandoning efficient securities market theory. One possibility is risk. If the investment strategies that appear to earn anomalous returns identify firms that have high betas, then what appear to be arbitrage profits are really a reward for holding risky stocks. The authors of the above three anomaly studies were aware of this possibility, of course, and conducted tests of the riskiness of their investment strategies. In all cases, they concluded that risk effects were not driving their results.

However, others have investigated the risk explanation. Greig (1992) reexamined the OP results and concluded that their excess returns were more likely due to the effects of firm size on expected returns than on the failure of the market to fully evaluate accounting information. The evidence of Fama and French (1992) suggests that firm size explains share returns in addition to beta (see Section 6.2.3. See also Banz (1981)). On the basis of more elaborate controls for firm size than in OP, Greig’s results suggest that OP’s excess returns go away when size is fully taken into account.

Stober (1992) confirmed excess returns to the OP investment strategy. He showed, however, that the excess returns continued for up to six years following the release of the financial statements. If the OP excess returns were due to a deviation of share prices from their efficient market value, one would hardly expect that it would take six years before the market caught on. In other words, while the market may wait until the information in financial ratios shows up in earnings, this would hardly take six years. This suggests that the OP results reflect some permanent difference in expected returns such as firm size or risk rather than a deviation from fundamental value.

Different results are reported by Abarbanell and Bushee (1998), however. In a large sample of firms over the years 1974–1988, they also documented an excess
return; to a strategy of buying and short-selling shares based on non-earnings financial statement information such as changes in sales, accounts receivable, inventories, and capital expenditures. Unlike Stober, however, the excess returns did not continue beyond a year, lending support to OP’s results.

Another possible explanation for the anomalies is transactions costs. The investment strategies required to earn arbitrage profits may be quite costly in terms of investor time and effort, requiring not only brokerage costs but continuous monitoring of earnings announcements, annual reports, and market prices, including development of the required expertise.5 Bernard and Thomas (1989) present some evidence that transactions costs limit the ability of investors to exploit post-announcement drift. Thus, their 18% annual return, as well as the 14.53% over two years reported by Ou and Penman, and Sloan’s 10.4% may appear to be anomalous only because the costs of the investment strategies required to earn them are at least this high.

If we accept this argument, securities market efficiency can be reconciled with the anomalies, at least up to the level of transactions costs. To put it another way, we would hardly expect the market to be efficient with respect to more information than it is cost-effective for investors to acquire.

The problem with a transactions cost-based defence of efficiency, however, is that any apparent anomaly can be dismissed on cost grounds. If cost is used to explain everything, then it explains nothing. That is, unless we know what the costs of an investment strategy should be, we do not know whether the profits earned by that strategy are anomalous. We conclude that the efficient securities market anomalies continue to raise challenging questions about the extent of securities market efficiency.

6.2.7 IMPLICATIONS OF SECURITIES MARKET INEFFICIENCY FOR FINANCIAL REPORTING

To the extent that securities markets are not fully efficient, this can only increase the importance of financial reporting. To see why, let us expand the concept of noise traders introduced in Section 4.4.1, as suggested by Lee (2001). Specifically, now define noise traders to also include investors subject to the behavioural biases outlined above. An immediate consequence is that noise no longer has expectation zero. That is, even in terms of expectation, share prices may be biased up or down relative to their fundamental values. Over time, however, rational investors, including analysts, will discover such mispricing and take advantage of it, driving prices towards fundamental values.

Improved financial reporting, by giving investors more help in predicting fundamental firm value, will "speed up" this arbitrage process. Indeed, by reducing the costs of rational analysis, better reporting may reduce the extent of investors’ behavioural biases. In effect, securities market inefficiency supports a measurement perspective.
6.2.8 CONCLUSIONS ABOUT SECURITIES MARKET EFFICIENCY

Collectively, the theory and evidence discussed in the previous sections raise serious questions about the extent of securities market efficiency. Fama (1998), however, evaluates much of this evidence and concludes that it does not yet explain the “big picture.” That is, while there is evidence of market behaviour inconsistent with efficiency, there is not a unified alternative theory that predicts and integrates the anomalous evidence. For example, Fama points out that apparent overreaction of share prices to information is about as common as underreaction. Thus, post-announcement drift and the Ou and Penman financial ratio anomaly involve underreaction to accounting information whereas the Sloan accruals anomaly involves overreaction to the accrual component of net income. What is needed to meet Fama’s concern is a theory that predicts when the market will overreact and when it will underreact.

This lack of a unified theory may be changing. The models of Daniel, Hirshleifer, and Subrahmanyam (see Sections 6.2.1 and 6.2.3) incorporate behavioural variables into rigorous economic models of the capital market. They generate predictions of momentum, volatility, and drift that are consistent with many of the empirical observations.

Fama also criticizes the methodology of many of the empirical inefficiency studies, arguing that many of the anomalies tend to disappear with changes in how security returns are measured. Kothari (2001) gives an extensive discussion of these issues, cautioning that much apparent inefficiency may instead be the result of methodological problems. Consideration and evaluation of these problems is beyond our scope here.

Studies that claim to show market inefficiencies are often disputed on the grounds that the “smart money,” that is, rational investors, will step in and immediately arbitrage away any share mispricing. Defenders of behavioural finance argue that this is not necessarily the case. One argument is that rational, risk averse investors will be unsure of the extent of irrational investor behaviour, and will not be sure how long momentum and bubbles will last. As a result, they hesitate to take positions that fully eliminate mispricing. Another argument (DeLong, Shleifer, Summers, and Waldmann (1990)—see Section 6.2.4) is that rational investors may jump on the bandwagon to take advantage of momentum-driven price rises while they last. In effect, behavioural finance argues that “irrational” behaviour may persist.

There is evidence that biased investor behaviour and resultant mispricing is strongest for firms for which financial evaluation is difficult, such as firms with a large amount of unrecorded intangible assets, growth firms and, generally, firms where information asymmetry between insiders and outsiders is high. For example, Daniel and Titman (1999)—see Section 6.2.1—found greater momentum in stocks with low book-to-market ratios than in stocks with high ratios. Firms with
low book-to-market ratios are likely to be growth firms, firms with unrecorded intangibles, etc. This suggests that greater use of a measurement perspective for intangible assets, such as goodwill (to be discussed in Section 7.5), has a role to play in reducing investor biases and controlling market inefficiencies. Kothari (2001) cautions, however, that studies that claim to find evidence of inefficiencies for firms in poor information environments are particularly subject to methodological problems, since, by definition, data on such firms are less reliable.

Finally, notwithstanding the title of this section, whether securities markets are or are not efficient is really not the right question. Instead, the question is one of the extent of efficiency. The evidence described in Chapter 5, for example, suggests considerable efficiency. To the extent that markets are reasonably efficient, the rational decision theory which underlies efficiency continues to provide guidance to accountants about investors’ decision needs. A more important question for accountants is the extent to which a measurement perspective will increase decision usefulness, thereby reducing any securities market inefficiencies that exist.

We conclude that the efficient securities market model is still the most useful model to guide financial reporting, but that the theory and evidence of inefficiency has accumulated to the point where it supports a measurement perspective, even though this may involve a sacrifice of some reliability for increased relevance.

6.3 OTHER REASONS SUPPORTING A MEASUREMENT PERSPECTIVE

A number of considerations come together to suggest that the decision usefulness of financial reporting may be enhanced by increased attention to measurement. As just discussed, securities markets may not be as efficient as previously believed. Thus, investors may need more help in assessing probabilities of future earnings and cash flows than they obtain from historical cost statements. Also, we shall see that reported net income explains only a small part of the variation of security prices around the date of earnings announcements, and the portion explained may be decreasing. This raises questions about the relevance of historical cost-based reporting.

From a theoretical direction, the clean surplus theory of Ohlson shows that the market value of the firm can be expressed in terms of income statement and balance sheet variables. While the clean surplus theory applies to any basis of accounting, its demonstration that firm value depends on fundamental accounting variables is consistent with a measurement perspective.

Finally, increased attention to measurement is supported by more practical considerations. In recent years, auditors have been subjected to major lawsuits, particularly following failures of financial institutions. In retrospect, it appears that asset values of failed institutions were seriously overstated. Accounting standards that require marking-to-market, ceiling tests, and other fair value-based techniques may help to reduce auditor liability in this regard.

We now review these other considerations in more detail.
6.4 THE VALUE RELEVANCE OF FINANCIAL STATEMENT INFORMATION

In Chapter 5 we saw that empirical accounting research has established that security prices do respond to the information content of net income. The ERC research, in particular, suggests that the market is quite sophisticated in its ability to extract value implications from financial statements prepared on the historical cost basis.

However, Lev (1989) pointed out that the market’s response to the good or bad news in earnings is really quite small, even after the impact of economy-wide events has been allowed for as explained in Figure 5.1. In fact, only 2 to 5% of the abnormal variability of narrow-window security returns around the date of release of earnings information can be attributed to earnings itself. The proportion of variability explained goes up somewhat for wider windows—see our discussion in Section 5.3.2. Nevertheless, most of the variability of security returns seems due to factors other than the change of earnings. This finding has led to studies of the value relevance of financial statement information, that is, the extent to which financial statement information affect share returns and prices.

An understanding of Lev’s point requires an appreciation of the difference between statistical significance and practical significance. Statistics that measure value relevance such as $R^2$ (see Note 6) and the ERC can be significantly different from zero in a statistical sense, but yet can be quite small. Thus, we can be quite sure that there is a security market response to earnings (as opposed to no response) but at the same time we can be disappointed that the response is not larger than it is. To put it another way, suppose that, on average, security prices change by $1 during a narrow window of three or four days around the date of earnings announcements. Then, Lev’s point is that only about two to five cents of this change is due to the earnings announcement itself, even after allowing for market-wide price changes during this period.

Indeed, value relevance seems to be deteriorating. Brown, Lo, and Lys (1999), for a large sample of U.S. stocks, conclude that $R^2$ has decreased over the period 1958–1996. They also examined the trend of the ERC over the same period—recall from Section 5.4.2 that the ERC is a measure of the usefulness of earnings. Brown, Lo, and Lys found that the ERC also had declined over 1958–1966. Lev and Zarowin (1999), in a study covering 1978–1996, found similar results of declining $R^2$ and ERC. A falling ERC is more ominous than a falling $R^2$, since a falling $R^2$ is perhaps due to an increased impact over time of other information sources on share price, rather than a decline in the value relevance of accounting information. The ERC, however, is a direct measure of accounting value relevance, regardless of the magnitude of other information sources.

Of course, we would never expect net income to explain all of a security’s abnormal return, except under ideal conditions. The information perspective recognizes that there is always a large number of other relevant information sources and that net income lags in its recognition of much economically significant information,
such as the value of intangibles. Recognition lag lowers $R^2$ by waiting “too long” before recognizing value-relevant events. Collins, Kothari, Shanken, and Sloan (1994) present evidence of the lack of timeliness of historical cost-based earnings.

Even if accountants were the only source of information to the market, our discussion of the informativeness of price in Section 4.4, and the resulting need to recognize the presence of noise and liquidity traders, tells us that accounting information cannot explain all of abnormal return variability. Also, non-stationarity of parameters such as beta (Section 6.2.3) and excess volatility introduced by non-rational investors (Section 6.2.4) further increase the amount of share price volatility to be explained.

Nevertheless, a “market share” for net income of only 2 to 5% and falling seems low, even after the above counterarguments are taken into account. Lev attributed this low share to poor earnings quality, which leads to a suggestion that earnings quality could be improved by introducing a measurement perspective into the financial statements. At the very least, evidence of low value relevance of earnings suggests that there is still plenty of room for accountants to improve the usefulness of financial statement information.

6.5 Ohlson’s Clean Surplus Theory

6.5.1 THREE FORMULAE FOR FIRM VALUE

The Ohlson clean surplus theory provides a framework consistent with the measurement perspective, by showing how the market value of the firm can be expressed in terms of fundamental balance sheet and income statement components. The theory assumes ideal conditions in capital markets, including dividend irrelevancy. Nevertheless, it has had some success in explaining and predicting actual firm value. Our outline of the theory is based on a simplified version of Feltham and Ohlson (1995) (F&O). The clean surplus theory model is also called the residual income model.

Much of the theory has already been included in earlier discussions, particularly Example 2.2 of P.V. Ltd. operating under ideal conditions of uncertainty. You may wish to review Example 2.2 at this time. In this section we will pull together these earlier discussions, and extend the P.V. Ltd. example to allow for earnings persistence. The F&O model can be applied to value the firm at any point in time for which financial statements are available. For purposes of illustration, we will apply it at time 1 in Example 2.2, that is, at the end of the first year of operation.

F&O begin by pointing out that the fundamental determinant of a firm’s value is its dividend stream. Assume, for P.V. Ltd. in Example 2.2, that the bad-economy state was realized in year 1 and recall that P.V. pays no dividends, until a liquidating dividend at time 2. Then, the expected present value of dividends at time 1 is just the expected present value of the firm’s cash on hand at time 2:
Recall that cash flows per period are $100 if the bad state happens and $200 for the good state. The first term inside the brackets represents the cash on hand at time 1 invested at a return of $R_f = 0.10$ in period 2.

Given dividend irrelevancy, P.V.’s market value can also be expressed in terms of its future cash flows. Continuing our assumption that the bad state happened in period 1:

\[
PA_1 = \frac{0.5}{1.10} (\$110 + \$100) + \frac{0.5}{1.10} (\$110 + \$200)
\]

\[
= \$95.45 + \$140.91
\]

\[
= \$236.36
\]

where the first term is cash on hand at time 1, that is, the present value of $100 cash is just $100.

The market value of the firm can also be expressed in terms of financial statement variables. F&O show that:

\[
PA_t = bv_t + g_t
\]

at any time \(t\), where \(bv_t\) is the net book value of the firm’s assets per the balance sheet and \(g_t\) is the expected present value of future abnormal earnings, also called goodwill. For this relationship to hold it is necessary that all items of gain or loss go through the income statement, which is the source of the term “clean surplus” in the theory.

To evaluate goodwill for P.V. Ltd. as at time \(t = 1\), we look ahead over the remainder of the firm’s life (1 year in our example).\(^8\) Recall that abnormal earnings are the difference between actual and expected earnings. Using F&O’s notation, define \(\alpha_2\) as earnings for year 2 and \(\alpha_2^a\) as abnormal earnings for that year.\(^9\) From Example 2.2, we have:

If the bad state happens for year 2, net income for year 2 is

\[
(100 \times 0.10) + 100 - 136.36 = -\$26.36,
\]
where the first bracketed expression is interest earned on opening cash. If the good state happens, net income is

\[ 10 + 200 - 136.36 = \$73.64 \]

Since each state is equally likely, expected net income for year 2 is

\[ E[\alpha_2] = 0.5 \times -26.36 + 0.5 \times 73.64 = \$23.64 \]

Expected abnormal earnings for year 2, the difference between expected earnings as just calculated and accretion of discount on opening book value, is thus

\[ E[\alpha_2^n] = 23.64 - .10 \times 236.36 = 0 \]

Goodwill, the expected present value of future abnormal earnings, is then

\[ g_1 = 0/1.10 = 0 \]

Thus, for P.V. Ltd. in Example 2.2 with no persistence of abnormal earnings, goodwill is zero. This is because, under ideal conditions, arbitrage ensures that the firm expects to earn only the given the interest rate on the opening value of its net assets. As a result, we can read firm value directly from the balance sheet:

\[ PA_1 = 236.36 + 0 = \$236.36 \]

Zero goodwill represents a special case of the F&O model called unbiased accounting, that is, all assets and liabilities are valued at fair value. When accounting is unbiased, and abnormal earnings do not persist, all of firm value appears on the balance sheet. In effect, the income statement has no information content, as we noted in Example 2.2.

Unbiased accounting represents the extreme of the measurement perspective. Of course, as a practical matter, firms do not account for all assets and liabilities this way. For example, if P.V. Ltd. uses historical cost accounting for its capital asset, \( b_1 \) may be biased downwards relative to fair value. F&O call this biased accounting. When accounting is biased, the firm has unrecorded goodwill \( g_t \). However, the clean surplus formula (6.1) for \( PA_t \) holds for any basis of accounting, not just unbiased accounting under ideal conditions. To illustrate, suppose that P.V. Ltd. uses straight line amortization for its capital asset, writing off
$130.17 in year 1 and $130.16 in year 2. Note that year 1 present value-based amortization in Example 2.2 is $123.97. Thus, with straight line amortization, earnings for year 1 and capital assets as at the end of year 1 are biased downwards relative to their ideal conditions counterparts. We now repeat the calculation of goodwill and firm value as at the end of year 1, continuing the assumption of bad state realization for year 1.

With straight line amortization, expected net income for year 2 is:

\[ E(\alpha_2) = (100 \times 0.10) + 0.5(100 - 130.16) + 0.5(200 - 130.16) = 29.84 \]

Expected abnormal earnings for year 2 is:

\[ E(\alpha_2^a) = 29.84 - 0.10 \times 230.16 = 6.82, \]

where $230.16 is the firm's book value at time 1, being $100 cash plus the capital asset book value on a straight line basis of $130.16.

Goodwill is then

\[ g_1 = 6.82/1.10 = 6.20, \]

giving firm market value of

\[ PA_1 = 230.16 + 6.20 = 236.36, \]

the same as the unbiased accounting case.

While firm value is the same, the goodwill of $6.20 is unrecorded on the firm's books. This again illustrates the point made in Section 2.5.1 that under historical cost accounting net income lags real economic performance. Here, historical cost-based net income for year 1 is $100 - $130.17 = -$30.17, less than net income of -$23.97 in Example 2.2. Nevertheless, if unrecorded goodwill is correctly valued, the resulting firm value is also correct.

This ability of the F&O model to generate the same firm value regardless of the accounting policies used by the firm has an upside and a downside. On the upside, an investor who may wish to use the model to predict firm value does not have to be concerned about the firm's choice of accounting policies. If the firm manager biases reported net income upwards to improve apparent performance, or biases net income downwards by means of a major asset writedown, the firm value as calculated by the model is the same.\(^\text{10}\) The reason is that changes in unrecorded goodwill induced by accounting policy choice are offset by equal but opposite changes in book values. The downside, however, is that the model can provide no guidance as to what accounting policies should be used.
We now see the sense in which the Ohlson clean surplus theory supports the measurement perspective. Fair value accounting for P.V.’s assets reduces the extent of biased accounting. In doing so, it moves more of the value of the firm onto the balance sheet, thereby reducing the amount of unrecorded goodwill that the investor has to estimate. While the sum of book value and unrecorded goodwill is the same in theory, whether or not the firm uses fair value accounting; in practice the firm can presumably prepare a more accurate estimate of fair value than can the investor. If so, and if the estimate is reasonably reliable, decision usefulness of the financial statements is increased, since a greater proportion of firm value can simply be read from the balance sheet. This is particularly so for investors who may not be fully rational, and who may need more help in determining firm value than they receive under the information perspective.

6.5.2 EARNINGS PERSISTENCE

F&O then introduce the important concept of earnings persistence into the theory. Specifically, they assume that operating earnings are generated according to the following formula:

\[ o\alpha_t = \omega o\alpha_{t-1} + u_{t-1} + \xi_t \]  

(6.2)

F&O call this formula an earnings dynamic. The \( \xi_t \) are the effects of state realization in period \( t \) on abnormal earnings, where the “~” indicates that these effects are random, as at the beginning of the period. As in Example 2.2, the expected value of state realization is zero and realizations are independent from one period to the next.

The \( \omega \) is a persistence parameter, where \( 0 \leq \omega < 1 \). For \( \omega = 0 \), we have the case of Example 2.2, that is, abnormal earnings do not persist. However, \( \omega > 0 \) is not unreasonable. Often, the effects of state realization in one year will persist into future years. For example, the bad-state realization in year 1 of Example 2.2 may be because of a rise in interest rates, the economic effects of which will likely persist beyond the current year. Then, \( \omega \) captures the proportion of the $50 abnormal earnings in year 1 that would continue into the following year.

However, note that \( \omega < 1 \) in the F&O model. That is, abnormal earnings of any particular year will die out over time. For example, the effects of a rise in interest rates will eventually dissipate. More generally, forces of competition will eventually eliminate positive, or negative, abnormal earnings, at a rate that ultimately depends on the firm’s business strategy.

Note also that persistence is related to its empirical counterpart in the ERC research. Recall from Section 5.4.1 that ERCs are higher the greater the persistence in earnings. As we will see in Example 6.1 below, this is exactly what clean surplus theory predicts—the higher \( \omega \) is, the greater the impact of the income statement on firm value.
The term $\nu_{t-1}$ represents the effect of other information becoming known in year $t-1$ (i.e., other than the information in year $t-1$'s abnormal earnings) that affects the abnormal earnings of year $t$. When accounting is unbiased, $\nu_{t-1} = 0$. To see this, consider the case of R&D. If R&D was accounted for on a fair value basis (i.e., unbiased accounting) then year $t-1$'s abnormal earnings includes the change in value brought about by R&D activities during that year. Of this change in value, the proportion $\omega$ will continue into next year's earnings. That is, if R&D is valued at fair value, there is no relevant other information about future earnings from R&D—current earnings includes it all.

When accounting is biased, $\nu_{t-1}$ assumes a much more important role. Thus, if R&D costs are written off as incurred, as is the case under current GAAP, year $t-1$'s abnormal earnings contain no information about future abnormal earnings from R&D activities. As a result, to predict year $t$'s abnormal earnings it is necessary to add in as other information an outside estimate of the abnormal earnings in year $t$ that will result from the R&D activities of year $t-1$. That is, $\nu_{t-1}$ represents next period’s earnings from year $t-1$’s R&D.

In sum, the earnings dynamic models current year’s abnormal earnings as a proportion $\omega$ of the previous year’s abnormal earnings, plus the effects of other information (if accounting is biased), plus the effects of random state realization.

Finally, note that the theory assumes that the set of possible values of $\epsilon_i$ and their probabilities are known to investors, consistent with ideal conditions. It is also assumed that investors know $\omega$. If these assumptions are relaxed, rational investors will want information about $\epsilon_i$ and $\omega$ and can use Bayes’ theorem to update their subjective state probabilities. Thus, nothing in the theory conflicts with the role of decision theory that was explained in Chapter 3.

**EXAMPLE 6.1 PRESENT VALUE MODEL UNDER UNCERTAINTY AND PERSISTENCE**

We now extend Example 2.2 to allow for persistence. Continue all the assumptions of that example and add the further assumption $\omega = 0.40$. Since we assume ideal conditions, $\nu_{t-1} = 0$. Recall that abnormal earnings for year 1 are $-50$ or $50$, depending on whether the bad state or good state happens. Now, 40% of year 1 abnormal earnings will persist to affect operating earnings in year 2.

We begin with the amortization schedule for P.V.’s capital asset, based on the expected decline in the asset’s present value as at time 0. This amortization schedule is the same as in Example 2.2, that is:

Amortization, year 1 = $260.33 - $136.36 = $123.97
Amortization, year 2 = $136.36 - 0 = $136.36
\[= 260.33\]
Now, assume that the bad state happens in year 1. (A similar analysis applies if the good state happens.) Then, we calculate P.V.’s market value at time 1. We begin with the formula based on expected future dividends.

$$PA_1 = \frac{0.5}{1.10} (\$110 - 0.40 \times \$50 + \$100) + \frac{0.5}{1.10} (\$110 - 0.40 \times \$50 + \$200)$$

$$= \frac{0.5}{1.10} \times \$190 + \frac{0.5}{1.10} \times \$290$$

$$= \$86.36 + \$131.82$$

$$= \$218.18$$

Note the effect of persistence—40% of year 1 abnormal earnings will persist to reduce year 2 cash flows. Otherwise, the calculation is identical with Example 2.2. We see that the effect of persistence of the bad state is to reduce the time 1 firm value by \$218.18 − \$18.18 = \$18.18, the present value of the \$20 of reduced future cash flows.

Now, moving from the dividends formula to the clean surplus formula for firm value (6.1), F&O use the earnings dynamic equation (6.2) to show that the firm’s goodwill \(g_t\) can be expressed in terms of the current year’s abnormal earnings, giving a market value of:

$$PA_t = bv_t + \alpha \times \alpha t^2$$  \hspace{1cm} (6.3)

where \(\alpha = \omega/(1 + R_f)\) is a capitalization factor. \(^{11} \) Note, as mentioned above, that the higher is the persistence parameter \(\omega\) the higher is the impact of current earnings information on share price \(PA_t\). In our example, for \(t = 1\):

<table>
<thead>
<tr>
<th>Cash on hand</th>
<th>$100.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book value of asset, based on amortization schedule, $260.33 − $123.97 = $136.36</td>
<td>$236.36</td>
</tr>
</tbody>
</table>

This gives:

$$PA_t = bv_t + \alpha \times \alpha t^2$$

$$= $236.36 + \frac{0.40}{1.10} \times -$50$$

$$= $236.36 − $18.18$$

$$= $218.18$$

which agrees with the market value based on expected future dividends.
The implications of the F&O model with persistence are twofold. First, even under ideal conditions, *all the action is no longer on the balance sheet*. The income statement is important too, because it reveals the current year’s abnormal earnings, 40% of which will persist into future periods. Thus, we can regard abnormal earnings as 40% persistent in this example.

Second, the formula (6.2) implies that investors will want information to help them assess persistent earnings, since these are important to the future performance of the firm. Our discussion of extraordinary items in Section 5.5 showed how accountants can help in this regard by appropriate classification of items with low persistence. Also, the formula is consistent with the empirical impact of persistence on the ERC as outlined in Section 5.4.1, where we saw that greater persistence is associated with stronger investor reaction to current earnings.12

### 6.5.3 ESTIMATING FIRM VALUE

The F&O model can be used to estimate the value of a firm’s shares. This can then be compared to the actual market value, to indicate possible over- or undervaluation by the market, and to aid in investment decisions. The following example applies the model to Bombardier Inc. The methodology used in this example is based on the procedures outlined in Lee (1996).

**EXAMPLE 6.2 ESTIMATING THE VALUE OF COMMON SHARES OF BOMBARDIER INC.**

From Bombardier’s 2001 annual report (not reproduced here), we take 2001 net income (NI$_{2001}$) as $988.6, before unusual items and after preferred share dividends (all dollar figures are in millions), its book value as $3,512.4 at January 31, 2001 and $3,311.8 at January 31, 2000. (both after deducting preferred shares). This gives Bombardier’s 2001 return on opening equity (ROE$_{2001}$) as .300. Somewhat arbitrarily, we assume that this return will continue for the next seven years, after which return will equal Bombardier’s cost of capital. This assumption implies a persistence parameter of $\omega = 1$ for seven years. We will return to this assumption shortly.

Common dividends totalled $186.3 for 2001, giving a dividend payout ratio of $186.3/988.6 = .188$. We assume that this ratio will also continue for seven years.

To estimate Bombardier’s cost of capital, we use the CAPM (Section 4.5):

$$E(R_{j}) = R_f(1 - \beta_j) + \beta_j E(R_{Mj}),$$

where firm $j$ is Bombardier and $t$ is January 31, 2001. We take the risk-free rate of interest as $R_f = .04$, and $E(R_{Mj})$, somewhat arbitrarily, as $.10.$
Bombardier’s equity $\beta$ was obtained from Globeinvestor.com as about .80. Then, our estimate of the firm’s cost of equity capital is:

$$E(R_{jt}) = .04(1 - .8) + .80 \times .10$$

$$= .09$$

We assume that this 9% cost of capital will stay constant.

Next, we evaluate Bombardier’s unrecorded goodwill. As stated earlier, goodwill is the present value of expected future abnormal earnings, which we evaluate over a seven-year horizon from January 2001. First, we use the clean surplus relation to project end-of-year book values:

$$bv_{2002} = bv_{2001} + NI_{2002} - d_{2003}$$

where $d$ is dividends. Using the relationship $d_t = kNI_t$, where $k$ is the dividend payout ratio, this becomes:

$$bv_{2002} = bv_{2001} + (1 - k)NI_{2002}$$

$$= bv_{2001} [1 + (1 - k)ROE]$$

$$= 3512.4 (1 + .812 \times .3)$$

$$= $4,369$$

Similar calculations give:

$$bv_{2003} = $5,435$$
$$bv_{2004} = $6,761$$
$$bv_{2005} = $8,411$$
$$bv_{2006} = $10,463$$
$$bv_{2007} = $13,016$$

Now abnormal earnings are defined as the difference between expected and actual earnings. We take expected earnings as cost of capital times opening book value. Actual earnings for a given year are projected as ROE times opening book value. Thus expected abnormal earnings for 2002 are:

$$o_{t2002}^a = (ROE - E(R_j))bv_{2001}$$

$$= (.30 - .09)3,512.4$$

$$= $737.6$$
Similar calculations give:

\[ ox_{2003} = $917.5 \]
\[ ox_{2004} = $1,141.4 \]
\[ ox_{2005} = $1,419.8 \]
\[ ox_{2006} = $1,766.3 \]
\[ ox_{2007} = $2,197.2 \]
\[ ox_{2008} = $2,733.4 \]

The present value of these abnormal earnings, that is, goodwill, at January 31, 2001, discounted at Bombardier's cost of capital, is

\[ g_{2001} = \frac{737.6}{1.09} + \frac{917.5}{1.09^2} + \frac{1,141.4}{1.09^3} + \frac{1,419.8}{1.09^4} + \frac{1,766.3}{1.09^5} + \frac{2,197.2}{1.09^6} + \frac{2,733.4}{1.09^7} \]
\[ = $7,289.5 \]

Finally, we add in January 31, 2001 book value (i.e., \( bv_{2001} \)):

\[ PA_{2001} = 3,512.4 + 7,289.5 \]
\[ = $10,801.9 \]

Bombardier had 1,366.051 million common shares outstanding\(^{13}\) as at January 31, 2001, giving an estimated value per share of $7.91.

Bombardier's actual share price around the middle of March, 2001, which we take as the date that the market became aware of the contents of the financial statements\(^{14}\) was approximately $20, over twice the amount of our estimate! While one could adjust estimates of the risk-free interest rate, dividend payout ratio and cost of capital, reasonable changes to these estimates would not affect the calculation significantly.

Our estimate of abnormal earnings is more problematic. In effect, we have ignored abnormal earnings beyond seven years. If we were to extend the number of years, this would increase the estimated share value in our example. For example, an assumption that ROE of 30% will continue for 10 and 12 years raises estimated share value to $14.68 and $19.45, respectively. However, it is not clear that this should be done. Note that earnings at the rate of cost of capital (i.e., ROE = E(Rj)) have zero effect on \( PA_{2001} \). Thus, in effect, we have assumed that Bombardier earns .30 ROE for seven years and .09 thereafter. As mentioned above, competitive pressures operate to eliminate abnormal earnings over time. Nevertheless, it appears that the market's expectation of Bombardier's future earning power is substantially higher than we can justify. In this regard, it should be noted that on October 31, 2001, Bombardier shares traded as low as $9.19, closing at $10.30. This is still somewhat higher than our estimate of $7.91, however.
Despite discrepancies such as this between estimated and actual share value, the F&O model can be useful for investment decision making. To see how, suppose that you carry out a similar analysis for another firm—call it Firm X—and obtain an estimated share value of $5. Which firm would you sooner invest in if they were both trading at $20? Bombardier may be the better choice, since it has a higher ratio of model value to share value. That is, more of its share value is “backed up” by book value and expected abnormal earnings. Indeed, Frankel and Lee (1998), who applied the methodology of Example 6.2 to a large sample of U.S. firms during 1977–1992, found that the ratio of estimated market value to actual market value was a good predictor of share returns for two to three years into the future. Thus, for the years following 2001, Frankel and Lee’s results suggest that Bombardier’s share return should outperform that of Firm X.

Nevertheless, the discrepancy between estimated and actual share price in Example 6.2 seems rather large. One possibility is that Bombardier’s shares are affected by the momentum and bubble behaviour described in Sections 6.2.1 and 6.2.5. Indeed, Dechow, Hutton, and Sloan (1999) (DHS), in a large sample of U.S. firms over the period 1976–1995, present tentative evidence that investors may not fully anticipate the extent to which abnormal earnings decline over time. This evidence supports our refusal above to extend the period of abnormal earnings beyond seven years.

Another possibility, however, is that our estimate did not fully use all available information. DHS also report that estimates of firm value based on the F&O model that ignored other information were too low, consistent with our results for Bombardier. This brings us back to the $\nu_{t-1}$ term in the earnings dynamic (6.2). Recall that this term represents additional information in year $t-1$, beyond that contained in $o_{t-1}$, that affects earnings in year $t$, and that it is non-zero when accounting is biased. Biased accounting is certainly the case. For example, Bombardier deducted R&D expenses of $123.4$ millions in 2001. As you know, under GAAP, most R&D costs are written off in the year they are incurred, even though they may have significant impact on future earnings. To the extent that R&D will increase future earnings, we may wish to increase our projected ROE above 30% by adding back to reported earnings all or part of 2001 R&D expense. This would increase our estimate of share value. However, as a practical matter, estimating the future value of R&D is difficult, and we are reluctant to do this here.

Another source of additional information is analysts’ forecasts of earnings. Analysts will consider additional information in preparing their forecasts, not just the information from current earnings as we did for Bombardier. If we had taken analysts’ earnings forecasts into account in our estimates of future periods’ earnings, this may have improved our estimate of share price. Bombardier’s earnings per common share for 2001 were $0.70, and, from Globeinvestor.com in mid-July, 2001, the average analyst forecast of Bombardier’s earnings per share for 2002 and 2003 are $0.90 and $1.14, respectively. Thus analysts are forecasting an increase in earnings per share of 28.57% for 2002 and 26.67% for 2003, greater
than the \((\text{ROE} \times (1 - k)) = 24.36\%\) increase implicit in Example 6.2. This suggests that we may wish to increase our estimate of Bombardier’s future profitability beyond 30% ROE. Supporting this suggestion, DHS report that undervaluations of share price were reduced (but not eliminated) in their sample when analysts’ forecasts were included in their predictions. Nevertheless, in view of the possibility of analyst optimistic bias pointed out in Section 5.4.3, we are hesitant to increase our estimate further.

We conclude that while our procedure to estimate Bombardier’s share price is on the right track, it may not have fully exploited all the financial statement and analyst information that is available. This leads to an examination of empirical studies of the ability of the clean surplus approach to predict earnings and share price.

### 6.5.4 empirical studies of the clean surplus model

Clean surplus theory has generated much empirical research. One aspect of this research compares the relative predictive ability of the dividend, cash flow and residual income models. Recall from Section 6.5.1 that under ideal conditions all three models produce identical valuations. However, when conditions are not ideal, the model that produces the best predictions is an empirical matter. For example, it is often argued that the clean surplus model has an advantage because it uses balance sheet information and, as a result, has to project only abnormal or residual income. Cash flow and dividend models must predict total future flows. Thus, the clean surplus model has “less” to predict and is thereby less subject to error. It is also argued that the clean surplus model is more convenient to apply than the cash flow model. It uses readily-available financial statement information and does not have to back cash flows out of accrual accounting-based reports.

A major practical problem in applying all three models is the choice of forecast horizon, and what value, if any, to assign to flows beyond the horizon (called the terminal value problem). Our Bombardier estimate used a forecast horizon of seven years, with a terminal value of zero on the grounds that competitive pressures are expected to eliminate abnormal returns beyond that time. Of course, this zero terminal value assumption is rather arbitrary. Perhaps a better (but still arbitrary) assumption is that Bombardier’s abnormal earnings would not fall to zero, but rather start to decline after seven years. Then, terminal value is greater than zero, which would increase our value estimate.

An alternative assumption is to base terminal value on analysts’ long-range forecasts. In this regard, Courteau, Kao, and Richardson (2001), for a sample of U.S. firms over the period 1992–1996, studied the relative predictive ability of the three models, using analyst’s predictions of earnings in place of predictions from the earnings dynamic equation (6.2), and a five-year forecast horizon. They found that predictions using arbitrary terminal value assumptions, as we did for Bombardier, substantially underestimated share market prices. When terminal
values were based on analyst’s long-range forecasts, predictions were much more accurate. Furthermore, the three models were then roughly equal in their forecasting ability, consistent with our theoretical expectation.

A second type of empirical clean surplus research studies the prediction of future earnings, since future earnings are a main input into the goodwill estimate. In particular, this research examines how other information can improve earnings and share price predictions. This represents a significant change in emphasis from research under the information perspective, which studies the association between financial statement information and share returns. As an example of this change in emphasis, consider the study of Abarbanell and Bushee (1997). In an extension of the approach used by Ou and Penman (1989) (Section 6.2.6) and Lev and Thiagarajan (1993) (Section 5.4.1), they showed how certain “fundamental signals” from the current financial statements, such as changes in sales, accounts receivable, inventories, gross margin, and capital expenditure could improve the prediction of next year’s earnings changes. They went on to show that analysts appeared to underuse the fundamental signals when predicting earnings, suggesting that their earnings forecasts would benefit from greater attention to the full information potential of financial statements. Myers (1999) adds order backlog as other information in the earnings dynamic, but finds this does not remove a tendency for under-prediction of firm value by the clean surplus model. Begley and Feltham (2002) add analysts’ forecasts and current capital expenditures as other information. They find that these variables significantly improve prediction of unrecorded goodwill for their sample firms. Overall, these results suggest considerable promise for the usefulness of financial statement information, beyond the information in current earnings, in improving earnings and share price predictions.

A third type of research relates to the earnings dynamic itself. Instead of using the earnings dynamic to predict abnormal earnings, why not simply use analysts’ earnings forecasts? These are readily available for up to five years ahead. Furthermore, despite the results of Abarbanell and Bushee (1997), outlined above, that analysts appear to underuse fundamental signals, they presumably use a large amount of other information, in addition to current earnings, when preparing their forecasts. As a result, the investor can be less concerned about what other information should be added in the earnings dynamic. Dechow, Hutton, and Sloan (1999), in their evaluation of different earnings prediction models, found that a simple projection of abnormal earnings based on analysts’ one-year ahead earnings forecasts predicted share price as well as a full application of the earnings dynamic equation (6.2). Also, the study of Courteau, Kao, and Richardson (2001) referred to above uses analyst forecasts throughout. It seems clear that the question of the best earnings prediction model, and the extent to which accounting information is useful in this process, is unsettled.

Finally, another use of the theory is to estimate a firm’s cost of capital. In Example 6.2, note that any four of the five variables—share price, book value, expected future earnings, risk-free interest rate, and cost of capital—can be used,
in principle, to solve for the other one. This approach was used by Botosan (1997). In a study to be discussed in Section 12.3, Botosan used the clean surplus model to estimate the costs of capital of the firms in her sample, and then went on to demonstrate conditions under which high quality financial statement disclosure lowered cost of capital. Thus, the clean surplus model provides an alternative to the CAPM for cost of capital estimation.

6.5.5 SUMMARY

Clean surplus theory has had a major impact on financial accounting theory and research. By demonstrating that firm value can equally well be expressed in terms of financial accounting variables as in terms of dividends or cash flows, it has led to increased research attention to earnings prediction. Much of this research explores how current financial statement information can be used to improve this prediction. Better earnings prediction enables better estimates of unrecorded goodwill, leading to better predictions of firm value and hence better investment decisions.

The theory also leads to a measurement perspective, since the more fair values are reported on the balance sheet the less the proportion of firm value included in unrecorded goodwill, hence the less the potential for investor mistakes in estimating this complex component of firm value. This can improve investor decision making and proper securities market operation, particularly if securities markets are not as fully efficient as once believed.

6.6 Auditors’ Legal Liability

Perhaps the main source of pressure in favour of the measurement perspective, however, comes as a reaction to spectacular failures of large firms, particularly financial institutions. Many such failures have taken place in the United States. For example, an article in *The Wall Street Journal* (March 11, 1994, p. A2) reported that Resolution Trust Corp. had lawsuits against the audit firm of Deloitte and Touche totalling $1.4 billion, and the Federal Deposit Insurance Corp. had lawsuits of another $450 million. The charges arose from alleged clean audit opinions issued to savings and loan associations that, in retrospect, were insolvent. The article describes a proposed settlement of these lawsuits in excess of $300 million. While considerably less than the amounts at suit, this would still be the second-largest liability settlement surrounding the savings and loan debacle. (The largest was a $400-million settlement by Ernst and Young for similar charges.)

Under historical cost accounting, it can happen that firms that are here today, in the sense that their balance sheets and income statements show them to be going concerns, are gone tomorrow. While accountants and auditors may claim that information about impending failure was implicit in the notes or other
sources, or was not their responsibility, there is a certain logic to questions raised by those who ask why the financial statements proper did not more clearly foretell the disaster. Auditors often have considerable difficulty in defending themselves from the lawsuits that usually accompany business failure.

Furthermore, these legal liability pressures are likely to continue to increase. For example, Jensen (1993) points out that as technology advances, more and more firms are finding themselves with substantial excess capacity. The resulting need to downsize leads to mergers and acquisitions, reorganizations, layoffs, or bankruptcy. All of these events put severe pressure on the adequacy of historical-cost-based net income and asset valuation.

In addition, firms are facing increasing pressures to behave in socially and environmentally responsible ways. Many firms face substantial future liabilities in this regard, for example in site restoration costs, which severely strain the concept of matching costs and revenues.

One way that accountants and auditors can protect themselves against these pressures is to adopt a measurement perspective, that is, introduce more fair values into the accounts. Then, they can point out that the financial statements anticipated the value changes leading to bankruptcy, merger, downsizing, environmental liabilities, etc. Of course, this requires greater use of estimates and judgement but, because of legal liability, accountants may be more willing to adopt at least those fair valuations that can be attained without substantial loss of reliability.

6.7 Conclusions

Recall that the information perspective on financial reporting is content to accept the historical cost basis of accounting, and rely on full disclosure to enhance usefulness to investors. The form of disclosure does not matter, since it is assumed that there are enough rational, informed investors to quickly and correctly incorporate any reasonable form into the efficient market price. Empirical research has confirmed that the market finds net income information at least to be useful. In effect, empirical research under the information perspective tends to accept the efficient market price and to evaluate the usefulness of accounting information in terms of its association with this market price.

However, there are a number of questions about the information perspective. First, securities markets may not be as fully efficient as had previously been believed, suggesting that investors might need some help in figuring out the full implications of accounting information for future returns. Second, a “market share” of 2 to 5% for net income seems low and, despite theoretical support, it has been difficult to find much direct market reaction at all to non-earnings accounting information. In addition, legal liability may force accountants to increase the use of fair values in the financial statements. These questions are reinforced by the devel-
opment of the Ohlson clean surplus theory, which emphasizes the fundamental role of financial accounting information in determining firm value. This theory implies a more basic role for financial statements in reporting on firm value than the information perspective, which views accounting information as one of many information sources competing for the attention of the efficient market. Thus, the clean surplus theory leads naturally to the measurement perspective.

Of course, for reasons of reliability, the measurement perspective would never extend to a complete set of financial statements on a fair value basis. Historical cost is unlikely to be displaced as the primary accounting basis for capital assets, for example. Rather, the question is one of degree—to what degree will fair values supplant costs in useful financial reporting? Consequently, in the next chapter we review GAAP from a valuation perspective. There always has been a substantial present value and market value component to the financial statements. But, as we shall see, recent years have witnessed a number of new fair value standards.

Questions and Problems

1. Why does a measurement perspective on decision usefulness suggest more value-relevant information in the financial statements proper, when efficient securities market theory implies that financial statement notes or other disclosure would be just as useful?

2. What will be the impact on relevance, reliability and decision usefulness of financial statement information as accountants adopt the measurement perspective?

3. Explain what “post-announcement drift” is. Why is this an anomaly for securities market efficiency?

4. An investor considers two mutual funds. Based on past experience, the first fund has expected return of .08 and standard deviation of .05. The second fund has expected return of .07 and standard deviation of .06. There is no reason to assume that future performance of these funds will differ from past performance. However, the second fund has a guarantee attached that return in any year will not be negative.

   The investor buys the second fund. Use prospect theory to explain why.

5. Lev, in his article “On the Usefulness of Earnings” (1989), points out the low ability of reported net income to explain variations in security prices around the date of release of earnings information. Lev attributes this low explanatory power to low earnings quality.

   Required

   a. Define earnings quality. Relate your answer to the concept of an information system in single-person decision theory.
b. What other reasons might there be for the low explanatory power of earnings?
c. How might an increased measurement perspective in financial statements increase earnings quality, and hence the impact of earnings on security prices?

6. In Section 6.4, the concept of value relevance of net income is introduced. It appears that the value relevance of reported earnings, as measured by \( R^2 \) or ERC, is low, and falling over time. Use single person decision theory to explain why value relevance of reported earnings can be measured by \( R^2 \) or ERC.

7. On January 26, 1995, *The Wall Street Journal* reported that Compaq Computer Corp. posted record 1994 fourth-quarter results. Despite $20.5 million in losses from the December, 1993, Mexican currency devaluation, and losses on currency hedging, earnings grew to $0.90 per share from $0.58 in the same quarter of 1993, on a revenue growth of 48%. Furthermore, Compaq captured the No. 1 market share spot, with shipments up 50% from 1993 and with slightly higher profit margin.

Nevertheless, on the same day, Compaq’s share price fell by $5.00, a decline of about 12%. The *Journal* reported that analysts had been expecting earnings of about $0.95 per share. Also, there were concerns about Compaq’s scheduled introduction of new products in March 1995, following a warning by Compaq’s CEO Eckhard Feiffer that first-quarter, 1995 earnings were likely to be “flat.”

**Required**

a. Use single-person decision theory and efficient securities market theory to explain why the market price fell.

b. Assume that the $20.5 million in losses from peso devaluation and currency hedging are a *provision*, not a realized cash loss, at the end of the fourth quarter (i.e., an *accrual*). Use the anomalous securities market results of Sloan (1996) to explain why the market price fell.

c. *The Journal* quoted an analyst as stating “the market overreacted.” Use prospect theory to explain why the market might overreact to less-than-expected earnings news.

d. Which of the above three explanations for the fall in Compaq’s share price do you find most reasonable? Explain.

8. For what reasons might transactions costs, including investors’ time to figure out and operate strategies that appear to beat the market, not be a completely adequate explanation for the apparent efficient securities market anomalies?

9. Reproduced on page 208 is the Economic Value Added (EVA) disclosure from the MD&A section of the 1996 annual report of Domtar, Inc. Some of the uses of EVA are outlined in Domtar’s discussion in the disclosure. Of interest here is the close relationship between the EVA measurement formula and the clean surplus-based valuation procedure outlined in Example 6.2. Note that the EVA...
for a given year is equivalent to abnormal earnings (\(\text{OA}^t\)) for that year in our example. Recall that goodwill is calculated as the present value of expected future abnormal earnings.

### ECONOMIC VALUE ADDED (EVA)

At the end of 1995, the Corporation adopted a new management system known as Economic Value Added, or EVA\(^\circ\), to ensure that the decision-making process at Domtar is aligned with the objective of increasing shareholder value.

In 1996, this concept was implemented throughout the Corporation and is being used for measuring performance, evaluating investment decisions, improving communication and for incentive compensation. EVA\(^\circ\) training courses were developed and are being provided to a large number of employees in on-going efforts to develop a value creation culture at Domtar.

The EVA\(^\circ\) measurement formula is as follows:

\[
\text{EVA}^\circ = \frac{\text{NOPAT}}{\text{Capital Charge}}
\]

1 Net operating profit after tax
2 Capital employed \(\times\) Cost of capital for the Corporation

This simple formula highlights the notion that in order to create value for Domtar shareholders, every business unit must generate returns at least equal to its cost of capital, including both debt and shareholders' equity.

Following a record year in 1995 when $316 million of EVA\(^\circ\) was created, EVA\(^\circ\) for Domtar in 1996 was $120 million negative, due to the decline in selling prices.

<table>
<thead>
<tr>
<th>Year</th>
<th>EVA(^\circ) (millions of $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>316</td>
</tr>
<tr>
<td>1996</td>
<td>(120)</td>
</tr>
</tbody>
</table>

Domtar remains committed to creating long-term shareholder value and will intensify its efforts in 1997, especially in areas under its control, such as productivity, costs, customer service and capital management. Domtar will also benefit from an overall lower cost of capital going forward as a result of its debt management program completed in 1996.
Required

a. Evaluate the usefulness of this approach to communicating information to investors. Consider both relevance and reliability issues.

b. If you were the top manager of a company using EVA, would its use encourage or discourage you from initiating major, capital intensive expansion projects? Explain why or why not.

c. You are an investor in a fast-growing, high-tech company that reports EVA. The assets of the company are primarily intangible (patents, skilled workforce), hence not included in the EVA capital charge. How would the largely intangible nature of the assets of such a company affect your interpretation of its EVA? Explain.

d. Note that reporting of EVA is voluntary. Domtar reports this information for 1996 even though its EVA is negative. Does Domtar’s willingness to report this information add credibility to its claim that it “will intensify its efforts in 1997”? Explain.

10. Recent years have seen considerable litigation against auditors in the United States, despite changes to litigation laws in 1995 that made it more difficult for investors to sue auditors.

A major source of this litigation arises from the pressure firms feel to meet analysts’ earnings expectations. To avoid reporting lower-than-expected earnings, firms sometimes use earnings management, such as premature revenue recognition and other devices, to raise reported net income. To avoid a qualified audit report, the firm may pressure its auditor to “stretch” GAAP. This puts the auditor in a difficult position. If the auditor goes along, he or she will inevitably be drawn into lawsuits when the earnings management becomes known (as it eventually must, since accruals reverse).

For example, Waste Management Inc. overstated its earnings during a five-year period in the 1990s, using a variety of earnings management devices such as lengthening the useful life of capital assets, increasing their estimated salvage value, and understating liabilities for rehabilitating contaminated waste disposal sites. In December, 1998, Waste Management’s auditor, Arthur Andersen, offered $220 millions to settle class action lawsuits following revelation of these practices.

One can sympathize with company managers for wanting to meet earnings expectations. The market will severely penalize their stock price if they do not. For example, in 1997, Eastman Kodak announced that revenue would not meet expectations due to the high value of the U.S. dollar, and analysts reduced their estimate of first quarter, 1997, earnings from $0.90 per share to $0.80. Kodak’s share price fell by $9.25 to $79 in heavy trading. Subsequently, Kodak reported earnings per share for the quarter of $0.81, and share price rose $2.25 to $75.37.
This market reaction has been repeated many times since. An article in *The Wall Street Journal* in April, 2000 quoted a principal of Bogle Investment Management as saying that the market is “overdiscounting” changes in earnings expectations and that it is “reacting too much.”

**Required**

a. Why might an auditor be tempted to “cave in” to client pressure to manage reported earnings so as to meet analysts’ expectations?

b. To what extent would increased use of a measurement perspective in financial reporting reduce auditor exposure to client pressure and lawsuits?

c. Use concepts from behavioural finance to explain why the market may “overreact” to changes in earnings expectations.

d. Is the $9.25 reduction in Kodak’s share price reported above inconsistent with efficient securities market theory? Explain why or why not.

**Notes**

1. It should be noted that Daniel and Titman’s investment strategy used hindsight to pick stocks with high and low momentum. The strategy would not be implementable in real time.

2. In mathematical terms, the utility function is continuous but not differentiable at zero.

3. Non-stationarity provides an alternative to noise trading, discussed in Section 4.4.1, for the non-collapse of share prices on an efficient market. When share price parameters, such as beta, are non-stationary, investors will have differing opinions as to whether current share prices reflect their current beta values, and will trade on the basis of these opinions.

4. For example, firms’ betas may shift when they announce good or bad earnings news. If the beta shifts were positive for GN firms and negative for BN, this could explain post-announcement drift as simply an artifact of the higher (for GN firms) and lower (for BN) returns that investors would demand to compensate for the changes in risk, since, as discussed in Sections 3.4, 3.5, and 3.6,
investors trade off risk and return. While BT present evidence that, following earnings announcements, betas do shift in the manner described above, the magnitude of the shifts is much smaller than what would be required to explain the magnitude of the post-announcement drift.

5. Suppose that transactions costs were 5% of the amount invested. Then, if it was possible to gross 5% by a strategy of buying GN firms and selling short BN firms, transactions costs would consume the 5% profit, so investors would not bother. Thus, what might appear to be a profitable investment strategy may merely reflect the level of transactions costs required to earn those profits.

6. The proportion of variability is measured by the \( R^2 \) statistic from the regression of abnormal security returns on unexpected earnings.

7. The clean surplus model can be extended to allow for some information asymmetry, although under restrictive conditions. See Feltham and Ohlson (1996), reviewed in Section 11.6.

8. In the F&O model, the firm’s life is assumed infinite.

9. The "o" stands for “operating.” If the firm has financial assets, such as cash or securities, these are assumed to earn the risk-free rate of interest. Consequently, financial assets do not contribute to goodwill, which is the ability to earn abnormal earnings.

10. The investor may wonder why the manager chose these particular accounting policies, however. That is, the manager’s choice of accounting policies may itself reveal inside information to the market. Then, it is not completely correct to say that the investor need not be concerned about accounting policy choice. This is considered in Chapter 11.

11. Our expression for \( \alpha \) differs slightly from that of F&O. They assume that the firm has an infinite life, whereas our assumption is that P.V. Ltd. has a two-year life.

12. The persistence parameter \( \omega \) can be related to the three types of earnings events distinguished by Ramakrishnan and Thomas (1991) (R&T) (Section 5.4.1), namely permanent, transitory, and price-irrelevant, with ERCs of \( (1 + R_f)/R_f \), 1, and 0, respectively. First, consider a $1 permanent abnormal earnings event occurring in year \( t \) for a firm with an infinite life. This will increase \( b_{t,t} \) in F&O notation, by $1. In addition, \( \omega \) of this will persist to year \( t + 1 \), \( \omega^2 \) to year \( t + 2 \), etc. Thus, the total effect, discounted at the rate \( R_f \), of the $1 of year \( t \) abnormal earnings on \( P_{At} \), that is, the ERC, is

\[
\text{ERC} = 1 + \frac{\omega}{1 + R_f} + \frac{\omega^2}{(1 + R_f)^2} + \frac{\omega^3}{(1 + R_f)^3} + \ldots
\]

\[
= \frac{1 + R_f}{1 + R_f - \omega}
\]
In R&T terms, permanent abnormal earnings have an ERC of \((1 + R_f)/R_f\). To express this ERC in terms of \(\omega\), we have

\[
\frac{1 + R_f}{1 + R_f - \omega} = \frac{1 + R_f}{R_f},
\]

which holds for \(\omega = 1\).

Thus permanent abnormal earnings have \(\omega = 1\). Note that this is outside the range of \(\omega\) in the earnings dynamic (6.2). That is, for an infinite firm horizon the F&O model is not defined for permanent earnings.

R&T transitory abnormal earnings have an ERC of 1. Thus

\[
\frac{1 + R_f}{1 + R_f - \omega} = 1,
\]

which holds for \(\omega = 0\). Thus, transitory earnings have an \(\omega\) of zero.

For price-irrelevant abnormal earnings, with ERC of 0, we have

\[
\frac{1 + R_f}{1 + R_f - \omega} = 0,
\]

which is satisfied only in the limit as \(\omega \to \pm \infty\). Since this is again outside the allowed range for \(\omega\), the F&O model is not defined for price-irrelevant abnormal earnings.

13. Bombardier Inc. has 2 classes of common shares outstanding—A & B. They differ with respect to voting rights and dividend preference. However, their market values and betas are almost identical. For purposes of this example, we combine the 2 classes.

14. This is the date the financial statements for the year ended January 31, 2001 were signed.

15. This is equivalent to adding in other information in the earnings dynamic equation 6.2.