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William R. Scott
UNIVERSITY OF WATERLOO
QUEEN'S UNIVERSITY

PEARSON
Prentice Hall
Toronto

Chapter 6

The Measurement Approach to Decision Usefulness

Figure 6.1 Organization of Chapter 6

6.1 OVERVIEW

The **measurement approach** to decision usefulness implies greater usage of current values in the financial statements proper. We define the measurement approach as follows:

> *The* ***measurement approach*** *to decision usefulness is an approach to financial reporting under which accountants undertake a responsibility to incorporate current 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 firm performance and value.*

The measurement approach does not invalidate our argument in Section 3.1 that it is the investor's responsibility to make his/her own predictions of future firm performance. Rather, the intent is to enable better predictions of this performance by means of a more informative information system. Of course, if a measurement approach is to be useful, it

must not be at the cost of a substantial reduction in reliability. While it is unlikely that current values will completely replace historical cost in the mixed measurement model, it is the case that the relative balance of cost-based versus current value-based information in the financial statements is moving in the measurement 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 investor rationality and 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—recall our statement in Section 4.1 that we view efficiency as a matter of degree, rather than efficient/not efficient.

Our interest in the extent of efficiency arises because lack of efficiency has major implications for accounting, the most basic being whether or not the theory of rational decision-making outlined in Chapter 3 underlies investor behaviour. To the extent that markets are not efficient and investors are not rational, reliance on these theories to justify historical cost-based financial statements enhanced by much supplementary disclosure, which underlies the information approach to decision usefulness, is threatened. If investors collectively are not as adept at processing information as rational decision theory assumes, perhaps usefulness would be enhanced by greater use of current values in the financial statements proper. Furthermore, while beta is the only relevant risk measure according to the CAPM, there is evidence that other variables, such as firm size and book-to-market ratio, do a better job than beta of predicting share return. If so, perhaps accountants should take more responsibility for reporting on firm risk.

We shall conclude that while securities markets are not fully efficient, they are sufficiently so that accountants can be guided by efficient markets theory. We shall also conclude that lack of full efficiency can be explained equally well by rational decision theory as by non-rational investor behaviour. Furthermore, to bring our discussion back to financial reporting, we shall argue that the extent of inefficiency and non-rational investor behaviour can be reduced by a measurement approach.

Other reasons for moving towards a measurement approach 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.

Figure 6.1 outlines the organization of this chapter.

6.2 ARE SECURITIES MARKETS FULLY EFFICIENT?

6.2.1 Introduction

In recent years, increasing questions have been raised about investor rationality and securities market efficiency. That is, there is evidence that shares are mispriced relative to their efficient market values. Questions of investor rationality and market efficiency are of considerable importance to accountants since, if these questions are valid, the practice of relying on supplementary information in notes and elsewhere to augment historical cost-based financial statements proper may not be completely effective in conveying useful information to investors. Furthermore, if shares are mispriced, improved financial reporting may be helpful in reducing inefficiencies, thereby improving the working of securities markets. In the next few sub-sections 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. For example, individuals may have **limited attention**. That is, they may not have time and ability to process all available information. Then, they will concentrate on information that is readily available, such as the "bottom line," and ignore information in notes and elsewhere in the annual report. Furthermore, investors may be biased in their reaction to information, relative to how they should react according to Bayes' theorem. For example, there is evidence that individuals are **conservative** (not to be confused with conservatism in accounting as in lower-of-cost-or-market and ceiling tests) in their reaction to new evidence. Conservative individuals revise their beliefs by *less than* Bayes' theorem implies.

Psychological theory and evidence also suggests that individuals are often **overconfident**—they overestimate the precision of information they collect themselves. For example, an investor that privately researches a firm may overreact to the evidence he or she obtains. If we equate the individual's self-collected information with prior probabilities in Bayes' theorem, this implies that the overconfident individual will *underreact* to new information that is not self-collected relative to information that is. This underreaction seems to be particularly apparent if the new information, such as an earnings report, is perceived as statistical and abstract.

Another individual characteristic from psychology is **representativeness**. Here, the individual assigns too much weight to evidence that is consistent with the individual's impressions of the population from which the evidence is drawn. For example, suppose that a firm's profits have grown strongly for several years. The investor subject to representativeness will assign this firm to the growth firm category, ignoring the fact that true growth firms are a rare event in the economy—the individual assigns too much weight to the recent evidence of earnings growth and not enough to the prior information that the base rate of growth firms in the population is low. This behaviour seems particularly likely if the evidence is salient, anecdotal, or extreme—for example, a firm's earnings growth may be the subject of sensational media articles. Thus, the investor overreacts to the evidence, revising his/her beliefs that the firm in question is a growth firm by *more than* prescribed by Bayes' theorem. In effect, the individual takes the evidence of a few years of growth in earnings as *representative* of a growth firm, ignoring the fact that it is quite likely that earnings will revert to normal in the future. If enough investors behave this way, share price will *overreact* to the reported growth in earnings.

Yet 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 enough investors behave this way, share price **momentum** can 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]

These various behavioural characteristics are, of course, inconsistent with securities market efficiency and underlying rational 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.

As is apparent from the foregoing, behavioural characteristics can produce a wide variety of share price behaviours over time. For example, overconfidence leading to share price momentum implies positive serial correlation of returns while the momentum continues (and negative longer-term correlation as the overconfidence is eventually revealed), whereas representativeness implies negative serial correlation (i.e., share price overreacts to evidence, leading to subsequent price correction as overvaluation is revealed). All of these patterns are contrary to the random walk behaviour of returns under market efficiency.

The study of behavioural-based securities market inefficiencies is called **behavioural finance**, which began with the seminal paper of De Bondt and Thaler (1985). 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 separate evaluation 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

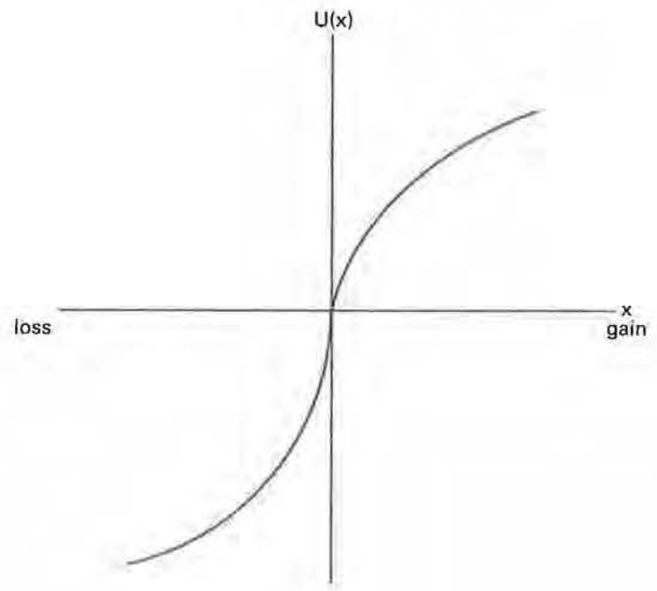
implication of the psychological concept of **narrow framing**, whereby individuals analyze problems in too isolated a manner, as a way of economizing on the mental effort of decision-making. This economizing on mental effort may derive from limited attention, as mentioned above. As a result, an individual's utility in prospect theory is defined over deviations from zero for the prospect in question, rather than over total wealth.

Figure 6.2 shows a typical investor utility function under prospect theory.

The investor's utility for gains is assumed to exhibit the familiar risk-averse, concave shape as illustrated in Figure 3.3. However, prospect theory assumes **loss aversion**, a behavioural concept whereby individuals dislike even very small losses. Thus, beginning 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.[2] 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 leads to a **disposition effect**, whereby the investor holds on to losers and sells winners, and, indeed, may even buy more of a loser security. The disposition 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.

Prospect theory also assumes that when calculating the expected value of a prospect, individuals under- or overweight their probabilities (i.e., posterior probabilities are less than or greater than those resulting from application of Bayes' theorem). Underweighting

Figure 6.2 Prospect Theory Utility Function



of probabilities is a ramification of overconfidence. Thus, information not generated by the investor him/herself, such as GN in reported earnings, will be underweighted relative to other evidence. As a result, the individual's posterior probability of the high future performance state may be too low. BN will be underweighted for similar reasons, in which case the posterior probability of low future performance may also be underweighted.

Overweighting of probabilities is a ramification of representativeness, whereby individuals tend to overweight current evidence that, for example, a stock's value is about to take off, even though realization of the state "taking off" is a rare event.

These tendencies can 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 and, as mentioned above, 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 payoff probabilities that may differ from those obtained from Bayes' theorem, risk aversion with respect to gains, and risk taking with respect to losses.

Theory in Practice 6.1

A number of experiments have tested the predictions of prospect theory. In one experiment (Knetsch 1989), a group of student subjects was each given a chocolate bar and another group each given a mug. The two items (i.e., prospects) were of roughly equal monetary value. The subjects were then allowed the option of trading with other subjects. For example, a student who had received a chocolate bar but who preferred a mug could exchange with someone who wanted a chocolate bar. While the longevity of the two items did differ, they were of equal monetary value, and were assigned randomly to the subjects. Then, rationality predicts that about half of them would trade. However, only about 10% traded.

These results are consistent with prospect theory. This can be seen from Figure 6.2. Since the rate at which investor utility decreases for small losses is greater than the rate at which it increases for small gains, disposing of ("losing") an item already owned creates a larger utility loss than the utility gained by acquiring another item of equal value. As a result, the subjects tended to hold on to the item they had been given.

Subsequent experiments by List (2003) cast these results in a different light, however. List conducted experiments in real markets, rather than in simulated markets with student subjects as above. A distinguishing feature of real markets is that they contain traders with varying degrees of experience. List found that as their experience increased, the behaviour of market participants converged towards that predicted by rational decision theory. He also showed how more experienced traders could buy and sell from less sophisticated ones so as to drive market prices towards their efficient levels.[3] Consequently, List's results tend to support the rational decision theory over prospect theory.

There are few empirical accounting tests of prospect theory. However, one such test was conducted by Burgstahler and Dichev (1997) (BD). 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. That is, there is a "gap" just below zero in the distribution of firms' reported 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, note again from Figure 6.2 that the rate at which investor utility decreases for small losses is greater than the rate at which it increases for small gains. This implies a relatively strong negative investor reaction to a small reported loss. 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.)

However, Burgstahler and Dichev suggest that their evidence is also consistent with managers behaving rationally. 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. Also, firms in a loss position may be eligible for income tax refunds, which could put them into a small profit position even without deliberate earnings management.

BD's interpretation that a gap in reported earnings just below zero indicates earnings management has generated considerable subsequent research. For example, Durtschi and Easton (2005) conclude that the apparent gap may result instead from the statistical methods used by the authors. Subsequently, however, evidence consistent with BD is reported by Jacob and Jorgenson (2007). Indeed, these authors find that earnings management extends to well above and below the small gains and losses documented by BD. To the extent that prospect theory predicts earnings management only in small intervals around zero, this finding suggests other motivations (to be discussed in Chapter 11) also operate. The extent to which the BD results support prospect theory is thus 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 β_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, and thus the CAPM, had little ability to explain stock returns. Instead, they found significant explanatory power for the book-to-market ratio (B/M) (ratio of book value of common equity to market value). They also found explanatory power 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.

Fama and French's findings are not necessarily inconsistent with rational investor behaviour and efficient securities markets. For example, investors may purchase shares of low B/M firms to protect themselves against undiversifiable risk of, say, a downturn in the economy that would lead many firms into financial distress. Purchasing shares of low B/M firms provides such protection since one reason that the market assigns high market value, relative to book value, to a firm is that the firm is unlikely to become financially distressed. The $E(R_{Mt})$ term of the market model (see Section 4.5) may not fully capture the risk of financial distress since it is an average across all firms in the market. As a result, rational investors will look to other risk measures, such as book-to-market, when making their portfolio decisions.[4]

The Fama and French results do threaten the CAPM, however, since they imply that beta is not an important risk measure. The low explanatory power for beta documented by Fama and French has led some to suggest that beta is "dead."

Somewhat 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.

Behavioural finance, however, provides a different perspective on the validity of the CAPM and beta. That is, share return behaviour inconsistent with the CAPM is viewed as evidence of market inefficiency. In this regard, 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 self-collect information. This drives share price too high or low, driving the firm's book-to-market ratio too low or high. 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. Thus, in the Daniel, Hirshleifer, and Subrahmanyam model, the positive book-to-market relation to future share returns found by Fama and French is not driven by rational investors protecting themselves against financial distress. Rather, it is driven by overconfidence, a behavioural effect inconsistent with rationality and efficiency.

The status of the CAPM and its implications for beta thus seem 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, 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 market-wide return, thereby affecting the value of firms' betas. If so, evidence of share return behaviour 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 figure out when and by how much firms' betas change. This is a difficult question to answer in a timely manner, and different investors will have different opinions. Different estimates of beta introduce differences in investment decisions, even though all investors have access to the same information and proceed rationally with respect to their estimate of what beta is. In effect, another source of estimation risk is introduced into the market. As a result, additional volatility is introduced into share price behaviour, but beta remains as a variable that explains this behaviour. According to this argument, the CAPM implication that beta is an important risk variable is reinstated, with the proviso that beta is non-stationary. Models that assume rational investor behaviour in the face of non-stationarity[5] 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).[6]

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 that, holding beta and the risk-free interest rate constant, a change in the expected return on the market portfolio, $E(R_{Mt})$, is the only reason for a change in the expected return of firm j's shares. Now the fundamental determinant of $E(R_{Mt})$ 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 $E(R_{Mt})$ 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) argued 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 at the market level 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 (2001) 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 market volatility does exist, it can possibly be explained by rational models based on non-stationarity. Alternatively, volatility may be driven by behavioural factors that cause share prices to overreact then fall back as the overreaction is revealed, inconsistent with full 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 (2000) investigated bubble behaviour with specific reference to the surge in share prices of technology companies in the United States in the years leading up to 2000. Bubbles, according to Shiller, derive from a combination of biased self-attribution and momentum, positive feedback trading, and "herd" behaviour reinforced by optimistic media predictions of market "experts." These reasons underlie then 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 now consider 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 may not fully react to financial statement information right away, 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. In statistical terms, share returns are serially correlated. Cases such as these that appear inconsistent with securities market efficiency are called **efficient securities market anomalies**. We now consider two 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 (GN) in quarterly earnings, their abnormal security returns tend to drift upwards for some time following their earnings announcement. Similarly, firms that report bad news (BN) in earnings tend to have their abnormal security returns drift downwards for a similar period. This phenomenon is called **post-announcement drift** (PAD). Traces of this behaviour can be seen in the Ball and Brown study reviewed in Section 5.3—see Figure 5.3 and notice that abnormal share returns drift upwards and downwards for some time following the month of release of GN and BN, respectively.

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 PAD in quarterly earnings. Indeed, an investor following a 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% per annum over and above the market-wide return, before transactions costs, in their sample. By GN or BN here, BT mean the difference between current quarterly reported earnings and those of the same quarter last year. These differences are called **quarterly seasonal earnings changes**. The assumption is that investors' expectations of current quarterly earnings are based on those of the same quarter of the previous year.[7]

It seems that *investors 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 for up to three subsequent quarters. Thus, 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 future-quarter earnings will also be GN. 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* quarters. However, BT's evidence suggests that this does not happen. The implication is that PAD results from investors taking considerable time to figure this out, or at least that they underestimate 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.[8]

Be sure you see the significance of PAD. If it exists, sophisticated investors could earn arbitrage profits, at least before transactions costs, by modifying the diversified investment strategy described in Section 3.7. For example, an investor could buy GN shares on the

day the GN was announced. If he or she could then sell short other companies' shares whose returns were perfectly correlated with the efficient market price changes of the GN shares, the combined portfolio would be riskless—all price changes other than those arising from PAD would cancel out since gains and losses on the GN shares are offset by losses and gains on the short sales shares. Then, the investor will earn a riskless profit as the value of the GN shares drifts upwards over future quarters. Furthermore, proceeds from the short sales can be used to buy the GN shares, so little if any capital is required.

The existence of such a "money machine" seems hard to imagine. One would expect that the scramble of investors to exploit a riskless profit opportunity would immediately bid up the prices of GN shares, thereby restoring them to their efficient market value. Yet, the results of BT suggest this does not happen.

Indeed, PAD continues to exist. In a more recent study involving a large sample of firms over 1980–2004, Narayanamoorthy (2006) documented the continued existence of PAD. He showed that a strategy of investing only in GN firms earned an abnormal return even greater than BT's 18%.[9]

Researchers continue to try to understand the PAD puzzle. Chordia and Shivakumar (2005) suggest that investors do not fully incorporate the effects of inflation on firms' future profits into their decisions, and present evidence that this is at least partly responsible for PAD.[10]

Bartov, Radhakrishnan, and Krinsky (2000) find that PAD is less if a greater proportion of a firm's shares is held by institutions, such as banks, investment houses, and insurance companies. Institutions may possess greater expertise and economies of scale than behaviourally biased or unsophisticated investors. This finding implies that institutional investors earn arbitrage profits, thereby eliminating at least some PAD. Ke and Ramalingegowada (2005), who studied a large sample of quarterly earnings announcements over 1986–1999, also report that some institutions earn arbitrage profits by trading to take advantage of PAD. The proportion of their profits from PAD is quite small, however, being dominated by other strategies such as buy and hold or momentum trading.

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 drawing again on the formula:

$$\text{Net income} = \text{cash flow from operations} \pm \text{net accruals}$$

As pointed out in Section 5.4, net accruals, which can be positive (i.e., income-increasing) or negative, include changes in non-cash working capital accounts such as receivables, allowance for doubtful accounts, inventories, accounts payable, and amortization expense.

Sloan pointed out that accruals are more subject to errors of estimation and possible manager bias than cash flows, and argued that this lower reliability should reduce the association between current accruals and next period's net income. Operating cash flows, however, result from continuing operations. They are less likely to reverse and are less subject to error and bias. Recall from Section 5.4 that persistence is the extent to which the good or bad news in current earnings is expected to continue into the future. Since accruals are less reliable than cash flows, the good or bad news they contain in the current period is less likely to continue into the next period than good or bad news in cash flows. In effect, Sloan argued, the cash flow component of earnings is more persistent than the accrual component.

Sloan examined separately the persistence of the operating cash flows and accruals components of net income for the firms in his sample, and found that 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, supporting his argument of greater cash flow persistence.

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 did not happen. 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. Instead, share returns of high positive accrual firms tended to drift downwards over time rather than falling right away, and vice versa. Sloan designed a simulated investment strategy to exploit the apparent market mispricing. By buying shares of low-accrual firms and selling short shares of high-accrual firms, and holding for one year, he demonstrated a return of 10.4% per annum over and above the market return, before transactions costs.

Sloan's results raise questions about securities market efficiency similar to PAD. It seems that a money machine is available for accruals as well.

As with PAD, researchers continue to try to understand the accruals anomaly. For example, Lev and Nissim (2006) studied a large sample of firms over 1965–2002. They found that the accruals anomaly continues, even subsequent to publication of Sloan's results (1996). They did find that institutional investors trade on the anomaly, indicating that they are aware of it. But, similar to the PAD findings of Ke and Ramalingegowada referenced above, the amount of their trading is quite low, well short of what would be needed to arbitrage the accruals anomaly away. Lev and Nissim point out that the firms in their sample tend to be small, young, with relatively low share prices, low dividend yield, and low book-to-market ratios, and argue that these are not investment characteristics favoured by financial institutions.

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 earlier. An

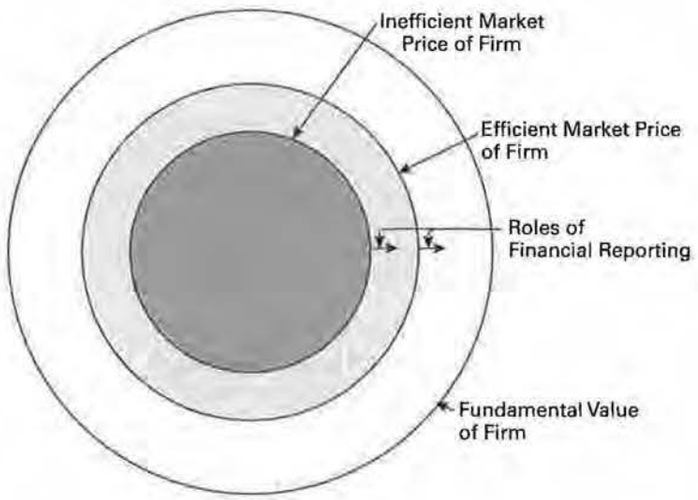
immediate consequence is that noise no longer has expectation zero. That is, even in terms of expectation, share prices may be mispriced relative to the prices they would have if markets were fully efficient. Over time, however, rational investors, including analysts, will discover such mispricing and take advantage of it, driving prices towards fundamental values. This is what we observed in the anomalies studies. In both cases, share price did not fully respond right away. Instead, share returns drifted up or down following the reporting of accounting information as its full information content became apparent over time.

Improved financial reporting, by giving investors more help in predicting efficient firm value, will speed up share price response to the full information content of financial statements. Examples of improved reporting include full disclosure of low persistence components of earnings, high quality MD&A and, as we suggest in this chapter, moving current value information into the financial statements proper. 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 approach.

This argument is shown in Figure 6.3, which is an extension of Figure 4.2.

Figure 6.3 adds an inner circle to Figure 4.2, representing the information included in actual share price when markets are not fully efficient. Then, share price does not incorporate all publicly available information. This adds a second role for financial reporting: to reduce inefficiencies by making the mispricing area between the two inner circles as small as possible.

Figure 6.3 Roles of Financial Reporting When Securities Market Is Not Fully Efficient



6.2.8 Discussion of Market Efficiency Versus Behavioural Finance

Collectively, the behavioural finance theory and evidence discussed in the previous sections raise serious questions about the extent of securities market efficiency and rational investor behaviour. Fama (1998), however, evaluated much of this evidence and concluded that it did not 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 pointed out that apparent overreaction of share prices to information is about as common as underreaction. 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. For example, Barberis, Shleifer, and Vishny (1998) draw on the behavioural concept of conservatism to explain underreaction. That is, conservative investors underweight new evidence relative to their prior information. As a result, share price underreacts, relative to an efficient market reaction, and drifts upwards or downwards over time as the under/overvaluation becomes apparent from future earnings reports or other sources.

With respect to overreaction, Barberis, Shleifer, and Vishny draw on representativeness. Suppose that an investor subject to this characteristic observes a firm's earnings increasing steadily over time. This investor will regard (i.e., represent) this firm as a growth firm, despite the fact that real growth firms are rare. That is, the investor downgrades the prior information of a low population base rate for growth firms. Then, relative to an efficient market, share price overreacts to reported earnings, and continues to increase until, as is likely to happen, an earnings reversal eventually takes place.

As another example, Hirshleifer and Teoh (2003) present a model in which some investors are fully rational but others have limited attention, which affects their ability to process publicly available information. Limited attention implies that the *form* of presentation, as opposed simply to its information content, affects investors' interpretations of the information. Then, the market may underreact to supplemental information. For example, consider the difficulty researchers have had in documenting a securities market response to RRA, discussed in Section 5.7. We suggested there that low reliability and availability of alternate reserves information were responsible. Another explanation derives from limited attention. Suppose that the present value of proved reserves has decreased sharply this year. The Hirshleifer and Teoh model predicts that the market will underreact to this information, since investors with limited ability to process information concentrate on reported net income, ignoring the RRA information included in MD&A or the notes. Thus, instead of fully reacting right away, the firm's share price will drift downwards as the bad news about reserves becomes apparent over time. Bringing current value accounting for proved reserves into the financial statements proper would make it easier for these investors to realize the implications for future firm performance, speeding up the market reaction.

Empirical support for this argument is provided by Ahmed, Kilic, and Lobo (2006), who studied a sample of U.S. banks that disclosed values of their derivatives as supplemental information prior to SFAS 133, and valued them at fair value in their financial statements proper subsequent to SFAS 133 (SFAS 133, which requires all derivatives to be valued on the balance sheet at fair value, is discussed in Section 7.3.4). They found no significant share price reaction to the value of derivatives disclosed as supplemental information but a significantly positive reaction when disclosed on the balance sheet. This finding contrasts with efficient securities market theory, which predicts that as long as the derivative values are disclosed, and assuming equal reliability, the location of disclosure does not matter.

Thus, by setting out how different behavioural characteristics lead to overreaction and underreaction, behavioural researchers are responding to Fama's concern.

If share mispricing results from behavioural factors, why do sophisticated investors not step in to earn arbitrage profits, thereby eliminating the mispricing? An answer is that there are **limits to arbitrage**, which constrain the market's ability to eliminate share mispricing. One such limit is transactions costs. The investment strategies required to earn arbitrage profits may be quite costly. Costs include more than brokerage commissions. They also include costs of short selling, which can be high. Time and effort are also required, including continuous monitoring of earnings announcements, annual reports, market prices, overcoming any behavioural biases, and development of the required expertise.[11] In this regard, Mashruwala, Rajgopal, and Shevlin (2006) (MRS), in a study of the accruals anomaly, use share price and trading volume as proxies for transactions costs. Trading volume is a proxy because low trading volume suggests that transactions costs are high. Share price is a proxy because buying and selling commissions are relatively higher for low-priced shares. MRS studied a large sample of firms over 1975–2000. They found that firms with very high (income-increasing) and very low (income-decreasing) accruals exhibited lower and greater, respectively, average share returns for the year following their earnings announcements than firms with intermediate accruals levels, and that these extreme-accruals firms had on average low share prices and trading volume. That is, the accruals anomaly was greater for these firms. This suggests that transactions costs at least partially constrain sophisticated investors' abilities to exploit the accruals anomaly—the highest amounts of money left "on the table" are for firms where the money machine is most costly to access.

In their study of PAD, Ke and Ramalingegowada (2005) estimated the transactions costs for the institutions in their sample, and found that PAD arbitrage profits earned are confined largely to institutions with low costs, suggesting again that high costs do indeed limit arbitrage. The results of Bartov et. al, and Lev and Nissim referenced earlier also support a transactions cost argument.

A second reason why arbitrage does not eliminate mispricing is risk. As mentioned earlier, a portfolio containing shares for which mispricing exists, such as that produced by the PAD and accruals anomalies, represents a departure from a fully diversified investment strategy. Instead, the investor tries to earn a return greater than that of the market

portfolio by investing in shares that he or she perceives as mispriced. As a result of less diversification, firm-specific variance of returns assumes a greater role. This firm-specific risk of an arbitrage investment strategy is called **idiosyncratic risk**.

In our money-machine investment strategy described above, idiosyncratic risk was eliminated, since the investor sold short shares with efficient market price changes perfectly correlated with those of the mispriced shares in his/her portfolio. MRS argue, however, that as a practical matter it is difficult, if not impossible, to find such shares. Consequently, idiosyncratic risk remains to limit the arbitrage of rational, risk-averse investors. MRS report that the highest levels of return to a strategy of investing in extreme-accrual firms in their sample are concentrated in shares of high idiosyncratic risk, consistent with their argument. Mendenhall (2004) reports similar results for the PAD anomaly.

It thus seems that transactions costs and idiosyncratic risk are major barriers to arbitraging away share mispricing. As a result, anomalies such as PAD and accruals persist.

A more fundamental question, however, is why the anomalies appear in the first place. Do they necessarily result from behavioural characteristics, or can rational investor behaviour produce similar observations? If the latter, the theory of rational investor behaviour can be salvaged, even though markets may not be fully efficient.

Indeed, share price behaviour similar to that predicted by behavioural finance can be generated by rational investors, if we relax the assumption that parameters underlying firm performance are stationary and known by the decision-maker. This was shown by Brav and Heaton (2002). To see their argument, suppose that a firm has just reported a substantial increase in earnings. The question then is, has the firm's expected earning power increased, or is this simply a one-time blip produced by some low-persistence earnings item or short-run favourable state realization? While careful analysis of the financial statements may help, the rational investor is unlikely to know the answer with complete accuracy, due, for example, to inside information, possibly compounded by poor disclosure. That is, the investor faces estimation risk with respect to the underlying non-stationary firm parameter of expected earning power.

In the face of this estimation risk, the rational investor will place some probability on each possibility. His/her estimate of expected future earnings will increase, but by less than the increase in current earnings. Other rational investors will do the same. The additional demand will trigger an immediate share price increase. This increase will be less than it would be if investors were certain of the increase in expected earning power, but more than if they knew there was no expected earning power increase.

To reduce their estimation risk, investors will watch for additional information. If expected earning power has in fact increased, new information that is on balance favourable will be observed over time. For each information item, investors will revise their expected earning power estimate and will buy additional shares. The firm's share price will drift upwards.

Notice that this upward drift produces a time pattern of share returns similar to the behavioural concept of conservatism. It is also similar to the upward drift for GN firms'

share prices documented in the PAD studies, and for the upward drift of share prices of low-accrual firms.

Conversely, if expected earning power has not increased, unfavourable information will be observed over time. Then, we would expect the share overvaluation to reverse as the overvaluation is revealed. This overreaction to net income produces a time pattern of share returns similar to the behavioural concept of representativeness, and is consistent with PAD for BN firms, and with high-accrual firms.

The point is that if we relax the assumption of stationarity of underlying financial reporting parameters, rational investor behaviour can produce similar patterns of under-reaction and overreaction to accounting information as behavioural finance.

This argument can possibly explain the findings of Doyle, Lundholm, and Soliman (2006) (DLS). These authors examined a large sample of quarterly earnings announcements over 1988–2000. They found that the share returns of those firms reporting large positive earnings surprises (actual reported earnings less analysts' consensus forecasts) on average drifted upwards for three years following the earnings announcement. Similarly, share returns of firms with large negative earnings surprises drifted downwards over the same period. DLS reported an average three-year return of 24% to a strategy of buying shares of sample firms in the top 10% of earnings surprises and selling short shares of firms in the lowest 10% category. Furthermore, these returns continued to hold after allowing for the effects on returns of risk (e.g., beta) and other anomalies (e.g., accruals anomaly).[12]

The three-year upward drift reported by DLS suggests that their firms reporting extreme earnings surprises have in fact experienced an upward or downward shift in expected earning power on average, but that it takes investors up to three years to find enough confirming evidence to fully accept the shift. This result is consistent with the Brav and Heaton argument. Of course, this result is also consistent with behaviourally biased investors. However, DLS report that their extreme sample firms are relatively small, with relatively little analyst following and relatively few institutional shareholders, leading to high transactions costs. Furthermore, it is likely that investors trying to earn the 24% excess return reported by DLS would bear idiosyncratic risk. As discussed earlier, all of these considerations lead to high limits to arbitrage. Nevertheless, as Brav and Heaton point out, it is difficult to distinguish convincingly which theory is operative, since both theories predict the same share price behaviour over time.

This last observation leads to an interesting possibility, namely that behavioural theories of investment and the theory of rational investment that underlies market efficiency may be moving together. Is there a great difference in claiming, on the one hand, that failure of share prices to fully reflect accounting information is due to behavioural characteristics such as conservatism and representativeness, and claiming, on the other hand, that such failures are driven by investor uncertainty about underlying firm parameters? Perhaps it is not cost effective for rational investors to fully remove this uncertainty, so that they behave as predicted by behavioural finance. In both cases, the market is not fully efficient. However, the inefficiency can be attributed just as well to rational investor behaviour, to behavioural biases, or to both.

6.2.9 Conclusions About Securities Market Efficiency

With respect to securities market efficiency, efficient or not efficient is the wrong question. Instead, the question is one of the *extent* of efficiency. We conclude that securities markets are not fully efficient, based largely on the continued existence of anomalies such as those described above. However, we also conclude that securities markets are sufficiently close to full efficiency that accountants can be guided by its implications, as outlined in Chapter 4. Our conclusion is based in part on the evidence described in Chapter 5, which suggests considerable efficiency. It is also based on increasing evidence that limits to arbitrage, such as cost and risk, make it difficult, if not impossible, for investors to actually earn riskless profits by taking advantage of anomalies. We can hardly expect the market to be efficient with respect to more information than it is cost effective to exploit.

With respect to whether investor rationality or behavioural theories best underlie securities market behaviour, the question seems to be open. Undoubtedly, investors exhibit each type of behaviour. However, a strong argument can be made that the rational decision theory model is still the most useful model for accountants to understand investor needs. This argument is based on theoretical arguments that non-stationarity of underlying earnings quality parameters provides a rational explanation for what is often interpreted as evidence of inefficiency, and on the fact that bounds on investor behaviour imposed by the costs and risks of earning arbitrage profits are consistent with rationality.

However, in the final analysis, it may not matter to accountants whether the rational model or behavioural models are most descriptive of investors, since the action implications are similar. One can argue that reducing the costs and risks of rational investing, by bringing current values into the financial statements proper, will increase decision usefulness and market efficiency. Alternatively, one can argue that helping investors overcome behavioural biases by bringing current values into the financial statements proper will increase decision usefulness and market efficiency. In either case, a measurement approach should help attain these desirable goals.

6.3 OTHER REASONS SUPPORTING A MEASUREMENT APPROACH

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 firm performance 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 in the mixed measurement model.

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 approach.

Finally, increased attention to measurement is supported by more practical considerations. In recent years, auditors have been subjected to major lawsuits. In retrospect, it appears that net asset values of failed firms were seriously overstated. Conservative accounting standards that require current value-based techniques, such as ceiling tests, 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.

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 5.2. 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.[13] 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. Value relevance is closely related to the concept of earnings quality, since it uses securities market reaction to measure the extent to which financial statement information assists investors to predict future firm performance.

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 13) 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 may be deteriorating. Brown, Lo, and Lys (1999), for a large sample of U.S. stocks, examined the wide-window relationship between share price and annual earnings, concluding that R^2 has decreased over the period 1958–1996. Similar results are reported by Kim and Kross (2005). Lev and Zarowin (1999), in a study covering 1978–1996, found similar results of declining R^2. They also reported a falling 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.[14]

Contrasting evidence, however, is provided by Landsman and Maydew (2002) for a sample of quarterly earnings announcements over 1972–1988. Instead of R^2 and ERC, they measured the information content of quarterly earnings by the abnormal security return (i.e., by the residual of the market model [Section 4.5]) over a three-day window surrounding the earnings release date. Recall from Section 5.2.3 that the residual term of the market model measures the firm-specific information content of an earnings announcement. By this measure, Landsman and Maydew found that the information content of earnings had *increased* over the period they studied.

This raises the question, how can the R^2 and ERC fall but abnormal return increase? A reconciliation is suggested by Francis, Schipper, and Vincent (2002). They point out an increasing tendency for large firms to report other information, such as sales, unusual and non-recurring items, and forward-looking information, at the same time as they make their earnings announcements. Thus, while the share price response to net income as such (measured by R^2 and ERC) may be falling, the response to the earnings announcement taken as a whole (measured by abnormal return) is increasing. Francis, Schipper, and Vincent examined the three-day abnormal returns to a sample of quarterly earnings announcements containing other information, during 1980–1999, and report results consistent with this argument.

Of course, we would never expect net income to explain *all* of a security's abnormal return, except under ideal conditions. Historical cost accounting and conservatism mean that net income lags in recognizing much economically significant information, such as increased value of intangibles. Recognition lag lowers R^2 by waiting longer than the market before recognizing value-relevant events.

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. This suggests that earnings quality could be improved by introducing a measurement approach 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 approach, 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.[15] 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) (FO). 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 FO 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.

FO point 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:

$$\begin{aligned} PA_1 &= \frac{0.5}{1.10}(\$110 + \$100) + \frac{0.5}{1.10}(\$110 + \$200) \\ &= \$95.45 + \$140.91 \\ &= \$236.36 \end{aligned}$$

Recall that cash flows per period are \$100 if the bad state happens and \$200 for the good state. The \$110 term inside the brackets represents the \$100 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:

$$\begin{aligned} PA_1 &= \$100 + \left(0.5 \times \frac{\$100}{1.10}\right) + \left(0.5 \times \frac{\$200}{1.10}\right) \\ &= \$100 + \$136.36 \\ &= \$236.36 \end{aligned}$$

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. FO show that:

$$PA_t = bv_t + g_t \qquad (6.1)$$

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, look ahead over the remainder of the firm's life (one year in our example).[16] Recall that **abnormal earnings** are the difference between actual and expected earnings. Using FO's notation, define ox_2 as earnings for year 2 and ox_2^a as abnormal earnings for that year.[17] 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 bracketed expression includes 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

$$E\{ox_2\} = (0.5 \times -26.36) + (0.5 \times 73.64) = \$23.64$$

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

$$E\{ox_2^a\} = 23.64 - (0.10 \times 236.36) = \$0$$

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 interest rate on the opening value of its net assets. As a result, we can read firm value directly from the balance sheet:

$$\begin{aligned} PA_1 &= \$236.36 + \$0 \\ &= \$236.36 \end{aligned}$$

Zero goodwill represents a special case of the FO model called **unbiased accounting**, that is, all assets and liabilities are valued at current 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 approach. 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 or, more generally, conservative accounting for its capital asset, bv_1 may be biased downwards relative to current value. FO call this **biased accounting**. When accounting is biased, the firm has *unrecorded* goodwill g_t. However, the clean surplus formula (Equation 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:

$$E\{ox_2\} = (100 \times 0.10) + 0.5\,(100 - 130.16) + 0.5\,(200 - 130.16) = \$29.84$$

Expected abnormal earnings for year 2 is:

$$E\{ox_2^a\} = 29.84 - (0.10 \times 230.16) = \$6.82$$

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

$$\begin{aligned} PA_1 &= 230.16 + 6.20 \\ &= \$236.36 \end{aligned}$$

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 FO 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 in theory 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 conservative accounting, the firm value as calculated by the model is the same.[18] 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 approach. Current 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 in theory the sum of book value and unrecorded goodwill is the same whether or not the firm uses current value accounting, in practice the firm can presumably prepare more accurate estimates of the current values of its assets and liabilities than can the investor. If so, and if the estimates are 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 approach.

*6.5.2 Earnings Persistence

FO then introduce the important concept of *earnings persistence* into the theory. Specifically, they assume that abnormal earnings are generated according to the following formula:

$$ox_t^a = \omega ox_{t-1}^a + v_{t-1} + \tilde{\epsilon}_t \qquad (6.2)$$

FO call this formula an **earnings dynamic**. The $\tilde{\epsilon}_t$ 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 ω is a persistence parameter, where $0 \le \omega < 1$. 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 due to a rise in interest rates, the economic effects of which will likely persist beyond the current year. Then, ω 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 FO 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, this is exactly what clean surplus theory predicts—the higher ω is, the greater the impact of the income statement on firm value.

*Section 6.5.2 can be skipped without loss of continuity.

The term v_{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, $v_{t-1} = 0$. To see this, consider the case of R&D. If R&D was accounted for on a current value basis (i.e., unbiased accounting) then year $t-1$'s abnormal earnings include the change in value brought about by R&D activities during that year. Of this change in value, the proportion ω will continue into next year's earnings. That is, if R&D is valued at current value, there is no relevant other information about future earnings from R&D—current earnings includes it all.

When accounting is biased, v_{t-1} assumes a much more important role. Thus, if R&D costs are written off as incurred, 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, v_{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 ω 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 $\tilde{\epsilon}_t$ and their probabilities are known to investors, consistent with ideal conditions. It is also assumed that investors know ω. If these assumptions are relaxed, rational investors will want information about $\tilde{\epsilon}_t$ and ω 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 ideal conditions imply unbiased accounting, $v_{t-1} = 0$. 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.

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.

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

$$= \left(\frac{0.5}{1.10} \times \$190\right) + \left(\frac{0.5}{1.10} \times \$290\right)$$

$$= \$86.36 \times \$131.82$$

$$= \$218.18$$

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 236.36 – 218.18 = $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 (Equation 6.1), FO use the earnings dynamic equation (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:

$$PA_1 = bv_t + (\alpha \times ox_t^a) \tag{6.3}$$

where $\alpha = \omega/(1 + R_f)$ is a capitalization factor.[19] Note, as mentioned above, that the higher is the persistence parameter ω the higher is the impact of current earnings information on share price PA_t. In our example, for $t = 1$:

Cash on hand	= $100.00
Book value of asset, as per Example 2.2	= $136.36
bv_t	= $236.36

This gives:

$$PA_1 = bv_t + (\alpha \times ox_t^a)$$

$$= \$236.36 + \left(\frac{0.40}{1.10} \times -\$50\right)$$

$$= \$236.36 - \$18.18$$

$$= \$218.18$$

which agrees with the market value based on expected future dividends.

The implications of the FO 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, since 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 (Equation 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.[20]

6.5.3 Estimating Firm Value

The FO 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 Canadian Tire Corporation, Limited. 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 Canadian Tire Corporation

From Canadian Tire's 2006 annual report (not reproduced here), we take 2006 net income (NI_{2006}) as $357, before minority interest (all dollar figures are in millions), its book value as $2,511.1 at December 31, 2005, and $2,785.2 at December 30, 2006 (bv_{2006}) (both including minority interest). This gives Canadian Tire's 2006 return on opening equity (ROE_{2006}) as 0.14. Somewhat arbitrarily, we assume that this return will continue for the next seven years, after which return will equal Canadian Tire's cost of capital. We will return to this assumption shortly.

Dividends totalled $53.8 for 2006, giving a dividend payout ratio of 53.8/357 = 0.15. We assume that this ratio will also continue for seven years.

To estimate Canadian Tire's cost of equity capital, we use the CAPM (Section 4.5):

$$E(R_{jt}) = R_f(1 - \beta_j) + \beta_j E(R_{Mt})$$

where firm j is Canadian Tire and t is March 2007. That is, we assume the market became aware of Canadian Tire's 2006 annual report during March 2007. $E(R_{jt})$ thus represents the rate of return demanded by the market for Canadian Tire shares at that time or, equivalently, its cost of capital. We take the risk-free rate of interest as $R_f = 0.06$ per annum, the bank prime rate in March 2007. To this rate, we add a market risk premium[21] of 4%, to estimate the expected annual rate of return on the market portfolio as 0.10. To estimate beta, we use the formula from Section 3.7:

$$\beta = \frac{\text{Cov(j,M)}}{\text{Var(M)}} = \frac{0.000615}{0.000906} = 0.68$$

where Cov (j, M) and Var (M) are estimated from returns data[22] for Canadian Tire and the S&P/TSX 300 index for March 2007. Then, our estimate of the firm's cost of equity capital in March 2007 is:

$$E(R_{jt}) = 0.06(1 - 0.68) + 0.68 \times 0.10 = 0.06 \times 0.32 + 0.07 = 0.02 + 0.07 = 0.09$$

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

Next, we evaluate Canadian Tire'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 December 2006. First, we use the clean surplus relation to project end-of-year book values:

$$bv_{2007} = bv_{2006} + NI_{2007} - d_{2007}$$

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

$$\begin{aligned} bv_{2007} &= bv_{2006} + (1 - k)NI_{2007} \\ &= bv_{2006}(1 + (1 - k)ROE) \\ &= 2{,}785.2\,(1 + (0.85 \times 0.14)) \\ &= 2{,}785.2 \times 1.12 \\ &= \$3{,}119 \end{aligned}$$

Similar calculations give:

$$\begin{aligned} bv_{2008} &= \$3{,}494 \\ bv_{2009} &= \$3{,}913 \\ bv_{2010} &= \$4{,}382 \\ bv_{2011} &= \$4{,}908 \\ bv_{2012} &= \$5{,}497 \end{aligned}$$

Now abnormal earnings are defined as the difference between actual earnings and accretion of discount. Accretion of discount is 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 2007 are:

$$\begin{aligned} ox^a_{2007} &= [ROE - E(R)]bv_{2006} \\ &= (0.14 - 0.09) \times 2{,}785.2 \\ &= 0.05 \times 2{,}785.2 \\ &= \$139 \end{aligned}$$

Similar calculations give:

$$\begin{aligned} ox^a_{2008} &= \$156 \\ ox^a_{2009} &= \$175 \\ ox^a_{2010} &= \$196 \\ ox^a_{2011} &= \$219 \\ ox^a_{2012} &= \$245 \\ ox^a_{2013} &= \$275 \end{aligned}$$

The present value of these abnormal earnings, that is, goodwill, at December 30, 2006, discounted at Canadian Tire's cost of capital, is

$$g_{2006} = \frac{139}{1.09} + \frac{156}{1.09^2} + \frac{175}{1.09^3} + \frac{196}{1.09^4} + \frac{219}{1.09^5} + \frac{245}{1.09^6} + \frac{275}{1.09^7}$$
$$= \$972$$

Finally, we add in December 30, 2006, book value (i.e., bv_{2006}):

$$PA_{2006} = 2{,}785.2 + 972$$
$$= \$3{,}757.2$$

Canadian Tire had 81,575,556 common shares outstanding[23] during 2006, giving an estimated value per share of $46.06.

Canadian Tire's actual share price around the end of March 2007 was $74, considerably more than 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.

Consequently, the discrepancy between estimated and actual share price in Example 6.2 seems rather large. One possible explanation is that Canadian Tire's shares may be affected by the momentum behaviour described in Section 6.2.1. However, returns for both Canadian Tire shares and the S&P/TSX 300 index showed little evidence of momentum during March 2007.

Another possibility lies with the ROE used in our earnings projections. We have assumed that Canadian Tire's ROE stays constant at 0.14. Perhaps the market expects that ROE will increase. That is, our estimate may not have fully used all available information. Dechow, Hutton, and Sloan (1999), in a large sample of U.S. firms over the period 1976–1995, report that estimates of firm value based on the FO model that ignored other information were too low. To gain some insight into this possibility, consider analysts' forecasts of Canadian Tire earnings. We have used only information from the 2006 financial statement in our estimates, whereas analysts can bring considerably more information to bear. Canadian Tire reports earnings per share for 2006 of $4.35, and from reuters.com in July 2007, the average of analysts' earnings per share forecasts was $4.93 for 2007 and $5.63 for 2008. These forecasts represent earnings increases of 14% per year. This compares with an annual earnings increase of (ROE × (1 − k)) 12% implicit in our analysis. Thus, while it may be a bit low, our ROE estimate seems reasonably consistent with analysts' estimates.

Another earnings-related concern arises from recognition lag. For example, firms that conduct R&D will have their reported net income and net worth biased downwards relative to share values, since the market will look through these biased amounts to the expected value of the R&D. To the extent that R&D will increase *future* earnings, we may wish to increase our projected ROE by adding back to reported earnings all or part of 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, in the case of Canadian Tire, there is little R&D to add back.

Market expectations of growth opportunities for Canadian Tire could also contribute to the discrepancy. Instead of an ROE of 14%, assume an ROE of 16.5%, which could arise as Canadian Tire expands its profitable operations in future. Then, given the dividend payout ratio of 15%, expected growth rate of earnings is (0.165 × 0.85) 14%, equal to analysts' expected growth in earnings for 2007 and 2008 given above. With this assumption, estimated share value rises to $55.68.

Yet another possibility for the discrepancy is the persistence of abnormal earnings. We have assumed that Canadian Tire generates abnormal earnings of (0.14 − 0.09) 0.05 for seven years and zero thereafter. That is, current abnormal earnings are assumed to be completely persistent for seven years and then immediately fall to zero. Other persistence assumptions are possible. Since Canadian Tire is well established in a stable industry, perhaps abnormal earnings will persist longer. 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 14% will continue for 14 and 20 years, with other assumptions unchanged, raises estimated share value to $60.46 and $75.17, respectively.

However, it is not clear that these adjustments should be made. Even for well-established firms, competitive pressures operate to reduce growth rates and eliminate abnormal earnings over time. Supporting this refusal, Dechow, Hutton, and Sloan (1999) present tentative evidence that investors may not fully anticipate the extent to which future abnormal earnings decline.

In sum, the most likely explanation for the excess of market value over our estimate is that the market expects earnings to grow more than 12% per annum, and that abnormal earnings will persist considerably longer than our assumption of seven years.

Despite discrepancies such as this between estimated and actual share value, the FO 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 $40. Which firm would you sooner invest in if they were both trading at $74? Canadian Tire, with estimated share value of $46.06, may be the better choice, since it has a higher ratio of model value to actual share value. That is, more of its actual 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 2006, Frankel and Lee's results suggest that Canadian Tire's share return should outperform that of Firm X.

We conclude that while our procedure to estimate Canadian Tire's share price is on the right track, the market seems to have considerably higher earnings expectations than ours. 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 argued that the clean surplus model has an advantage because it uses financial statement information, which includes accruals. Since accruals anticipate future cash flows, they, in effect, bring these cash flows forward onto the balance sheet. Thus, to the extent accruals are value relevant, much of the forecasting work is already done. Cash flow and dividend models have "more" to predict, since they must predict total future flows. 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.

Our discussion in Sections 6.5.1 and 6.5.2 assumed that earnings, cash flows, and dividends were known for the complete future of the firm (only two years for P.V. Ltd.). In reality, the life of the firm and its future earnings, cash, and dividend flows are not known. What is usually done when using clean surplus to estimate firm value is to predict earnings for a **forecast horizon** of a few years into the future, and then estimate a **terminal value**, that is, the present value of abnormal earnings for all remaining years of the firm's life. A major practical problem in applying all three models is the choice of forecast horizon, and what amount, if any, to assign to the terminal value. Our Canadian Tire 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 Canadian Tire'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. Indeed, if the firm has opportunities for future growth that outweigh competitive pressures, abnormal earnings will increase, rather than decrease, beyond the forecast horizon, further increasing terminal value.

An alternative terminal value approach is based 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 dividend, cash flow, and clean surplus models, using a five-year forecast horizon. They found that predictions using arbitrary terminal value assumptions, as we did for Canadian Tire, substantially underestimated share market prices. When terminal values were based on analysts' forecasts of share price at the end of year 5, predictions of current share prices were much more accurate. Furthermore, the three models were then roughly equal in their forecasting ability, consistent with our theoretical expectation.

Conservative accounting further complicates the forecast horizon, since it biases downwards both book value and reported earnings. In Section 6.5.1, we showed that in theory this does not matter, since abnormal earnings over the life of the firm increase to counteract the bias. As mentioned, however, in actual applications the forecast horizon is shorter than the life of the firm, so that all of the bias is not counteracted. If the terminal value estimate is not increased to recognize this shortfall, firm value estimates will be too low. This could at least partially explain why our estimate of share price for Canadian Tire is low.

A second type of empirical clean surplus research studies the prediction of future earnings, since future earnings over the forecast horizon are a main input into the goodwill estimate. This represents a significant change in emphasis from research under the information approach, which studies the association between financial statement information and share returns.

For most large firms, analysts' forecasts provide readily available future earnings estimates (as opposed to our estimates for Canadian Tire based on ROE). However, analysts' forecasts are only as good as the analysts who prepare them. In this regard, Abarbanell and Bushee (1997), in an extension of the approach used by Lev and Thiagarajan (1993) (Section 5.7), 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. In a similar vein, Begley and Feltham (2002) added analysts' forecasts and current capital expenditures as other information in the earnings dynamic. They found that this significantly improved prediction of unrecorded goodwill for their sample firms. Overall, these results suggest that analysts' earnings forecasts would benefit from greater attention to the full information potential of financial statements.

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. Thus, the clean surplus model provides an alternative to the CAPM for cost of capital estimation. Indeed, clean surplus offers some advantages over the CAPM by eliminating the need to estimate beta and the expected return on the market portfolio (see Section 4.5).

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 approach, since more current values reported on the balance sheet means a lower proportion of firm value included in unrecorded

goodwill, hence 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 fully efficient.

6.6 AUDITORS' LEGAL LIABILITY

Perhaps the main source of pressure for the measurement approach, however, comes as a reaction to spectacular failures of large firms. Many such events have taken place in the United States. During the early 1980s, numerous financial institutions, specifically savings and loan associations, failed.[24] While these failures preceded the Enron and WorldCom financial reporting disasters (see Section 1.2), they remain important because they generated many of the pressures leading to the measurement approach.

The savings and loan debacle began with an inverted yield curve in the late 1970s. That is, short-term interest rates became higher than long-term rates. As a result, the savings and loans had to pay more interest to depositors than they earned from their long-term loans. Failure to write these loans down to current value resulted in overstatement of net assets on the audited balance sheets, with resultant overstatements of earnings. Auditors are often under considerable pressure from management, or even politicians, to bend or "stretch" GAAP, so that legal capital requirements, earnings targets, and/or analysts' forecasts will be met. Indeed, such stretching was a major contributing factor to the savings and loan failures. But, yielding to such pressure can result in substantial legal liability. For example, an article in *The Wall Street Journal* (March 11, 1994, p. A2) reported lawsuits against the audit firm of Deloitte and Touche totalling $1.85 billion. The charges arose from alleged clean audit opinions issued to savings and loan associations that, in retrospect, were insolvent. The article described a proposed settlement of these lawsuits in excess of $300 million. While considerably less than the amounts at suit, this was 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.)

How can auditors protect themselves against pressures and potential liabilities such as these? One response, of course, is ethical behaviour. Auditors should recognize that the long-run interests of the accounting/auditing profession are served by not yielding to inappropriate pressures to stretch GAAP.

Ethical behaviour, however, can be bolstered by conservative accounting. As we have mentioned previously, the lower-of-cost-or-market rule for inventories is a long-standing example. Furthermore, historical cost accounting contains conservative elements, such as recording profitable capital assets at cost even though current value is higher, and retaining inventories at historical cost until reliable evidence of realization is obtained.

Nevertheless, GAAP did not at the time of the savings and loan failures require recognition of current value decreases for major classes of assets and liabilities if the firm intended to hold them to maturity. Examples include certain financial assets, capital assets, intangibles, and long-term debt. Retention of these items at cost or amortized cost was justified by the going concern assumption of historical cost accounting. But, as mentioned above, overvaluation of net assets was a major criticism of financial reporting following the savings and loan failures.

It seemed that a stronger form of conservatism, requiring an extension of lower-of-cost-or-market thinking, was needed. Standard setters have implemented several standards of this nature in the years following the savings and loan debacle, such as **ceiling tests** for capital assets and goodwill. These tests represent a partial application of the measurement approach.[25] If undiscounted net future cash flows from an asset are less than book value, the asset is written down to its current value. Then, perhaps, the fact that such writedowns are required by GAAP will help auditors resist management pressure to overstate net assets. Furthermore, auditors can reduce their liability exposure by pointing out that, with ceiling tests, the financial statements proper incorporated the negative value changes leading to bankruptcy, merger, downsizing, environmental liabilities, etc. Indeed, to the extent negative value changes are inside information, their disclosure via ceiling tests informs the market about the existence and magnitude of such changes. Of course, determination of current value requires greater use of estimates and judgement but, because of legal liability, the relevance/reliability tradeoff may have shifted towards greater relevance.

The incidence of conservative financial reporting in the United States was investigated by Basu (1997). He measured conservatism by the correlation between net income and share returns. Basu argued that an efficient securities market will bid up the share prices of firms that are performing well and bid down the prices of firms that are performing poorly. Under conservative accounting, the earnings of firms that are performing well *will not* include the unrealized increases in assets that characterize a firm that is doing well. However, the earnings of firms that are performing poorly *will* include decreases in the values of their assets. It follows that the correlation between share returns and earnings will be higher for firms that are performing poorly than for firms that are performing well. As Basu puts it, earnings are more timely in their recognition of poor performance than of good performance. The difference between these two correlations can thus be viewed as evidence of conservative accounting. In a large sample of firms over the years 1963–1990, Basu found significantly higher correlation across firms in his sample that were doing poorly than for firms that were doing well, consistent with his argument.

Using this measurement approach, Basu went on to examine the period 1983–1990. This period has been identified as a period of high growth in litigation against auditors and corresponds roughly to the aftermath of the savings and loan failures described above.

He found that conservatism increased in this period relative to earlier periods of low litigation growth. This suggests that standard setters reacted to investor losses and auditors' legal difficulties by increasing conservatism, as in the ceiling test standards referred to above. Indeed, the trend to increasing conservatism continues. Ball and Shivakumar (2006) document increasing conservatism to 2002, a period ending after the Enron and WorldCom failures. It seems that investor losses, auditor liability, and severe penalties for managers who overstate earnings following these failures have further reinforced conservative accounting. For more discussion of these litigation and regulation-based explanations for conservatism, see Watts (2003).

6.7 ASYMMETRY OF INVESTOR LOSSES

These explanations for conservatism can also be supported by the decision theory outlined in Chapter 3. To see this, consider the following examples.

*Example 6.3
Asymmetry of Investor Losses I

Bill Cautious, a rational investor, has an investment in the shares of X Ltd., with current market value of $10,000. He plans to use this amount to live on over the next two years. After that time, he will have graduated and will have a high-paying job. Consequently, he is not concerned right now about planning beyond two years. His goal is to maximize his total utility over this period. For simplicity, we assume that X Ltd. pays no dividends over these two years. Bill is risk-averse, with utility in each year equal to the square root of the amount he spends in that year.

It is easy to see that Bill's total utility will be maximized if he spends the same amount each year. Thus, he sells $5,000 of his shares now and plans to sell the remaining $5,000 at the beginning of the second year.[26]

Suppose, however, that as at the beginning of year 1, certain X Ltd. assets have fallen in value. The loss is unrealized, and the X Ltd. auditor fails to recognize it. Consequently, the loss remains as inside information, and the market value of Bill's unsold shares remains at $5,000. The loss becomes realized during year 1, and Bill's remaining shares are worth $3,000 at year-end.

Calculate Bill's utility for the two years, evaluated as at the end of year 1:

$$\begin{aligned} EU^a \text{ (Overstatement)} &= \sqrt{5{,}000} + \sqrt{3{,}000} \\ &= 70.71 + 54.77 \\ &= 125.48 \end{aligned}$$

where EU^a denotes Bill's actual utility, being the utility of the $5,000 he spends in the first year plus the utility to come in year 2 from the sale of his shares for $3,000.[27]

If Bill knew at the beginning of the first year that his wealth was only $8,000, he would plan to spend $4,000 each year. His expected utility would have been:

$$\begin{aligned} EU \text{ (Overstatement)} &= \sqrt{4{,}000} + \sqrt{4{,}000} \\ &= 63.25 + 63.25 \\ &= 126.50 \end{aligned}$$

*Examples 6.3 and 6.4 can be skipped without loss of continuity.

where EU denotes Bill's utility if he knew the ultimate value of his shares. Thus Bill loses utility of 126.50 − 125.48 = 1.02 as a result of an opening $2,000 wealth overstatement.

Now assume instead that the X Ltd. assets have risen in value by $2,000 at the beginning of year 1. Again, the unrealized gain is not recognized by the auditor at the beginning of year 1, and it remains as inside information. The gain becomes realized during the year, and Bill's shares are worth $7,000 at year-end. His actual utility over the two years is:

$$\begin{aligned} EU^a \text{ (Understatement)} &= \sqrt{5{,}000} + \sqrt{7{,}000} \\ &= 70.71 + 83.67 \\ &= 154.38 \end{aligned}$$

Whereas, if Bill had known his wealth was $12,000:

$$\begin{aligned} EU \text{ (Understatement)} &= \sqrt{6{,}000} + \sqrt{6{,}000} \\ &= 77.46 + 77.46 \\ &= 154.92 \end{aligned}$$

Thus, Bill loses utility of 154.92 − 154.38 = 0.54 as a result of an opening wealth understatement. Note that even though Bill's total consumption will be $2,000 higher than he had originally expected, he still suffers a loss of utility, since the understatement costs him the opportunity to optimally plan his spending over time.[28]

The main point of the example is that while the amount of misstatement is the same, Bill's loss of utility for an overstatement is almost twice the loss for an understatement. The loss arises because Bill misallocates his consumption over time due to errors and bias in reporting his wealth. Bill will be upset in either case, but he is more upset about an overstatement. Consequently, the auditor is more likely to be sued for overstatement errors.[29] For a more formal model to demonstrate this asymmetry, see Scott (1975).

Anticipating the investor's loss asymmetry, the auditor reacts by being conservative. When current value has decreased, writing assets down to current value benefits the investor in our example by avoiding the utility loss of 1.02, thereby decreasing the likelihood of the investor suing the auditor. Regulators, who would also like to see fewer investor losses and lawsuits, will encourage this conservatism with punitive laws for firms and their managers who fail to release bad news in a timely manner, and with new accounting standards such as ceiling tests.

Example 6.3 illustrates conditional, or *ex post*, conservatism (see Chapter 3, Note 8). The economic loss in value has already occurred, although it has not been realized at the beginning of year 1. Example 6.3 suggests a rationale for recognizing the unrealized loss—lower investor losses and less exposure to lawsuits.

In sum, one way that accountants and auditors can bolster ethical behaviour, increase usefulness for investors, and protect themselves against legal liability is to expand

conditional conservatism. Note that since conditional conservatism requires measurement of current values, we can regard it as an asymmetric (i.e., one-sided) version of the measurement approach.

Of course, Example 6.3 raises the question, why not write assets up to current value as well? Recognizing a $2,000 unrealized asset increase at the first of year 1 would have increased Bill's utility by 0.54. While not as great as the utility increase from recognizing a $2,000 unrealized loss, this would constitute a further improvement in financial statement usefulness. A possible answer is that the auditor may be concerned about the reliability of current values. The increase in usefulness and decrease in lawsuit exposure from writing assets down may be high enough to outweigh reliability concerns, whereas the benefits from writing assets up may not be. Also, in addition to the investor-oriented motivation illustrated here, conditional conservatism has contracting and corporate governance motivations (to be discussed in Section 8.5.2). Writing assets up works against these motivations.

This asymmetry of utility losses, which is driven by the concavity of a risk-averse investor's utility function, constitutes an investor demand for conservatism, which underlies the litigation and regulation explanations for conservatism outlined in Section 6.6.

Example 6.4
Asymmetry of Investor Losses II

To pursue conservatism further, continue the assumptions above, except that now there has been no change in X Ltd. asset value as at the beginning of year 1. However, asset value, hence Bill's share value, may change in future. Specifically, assume that the auditor expects that as at the end of year 1, assets will either have fallen in value by $2,000 or risen in value by $2,000, each with probability of 0.5. What asset value should the auditor report at the beginning of year 1? Specifically, should the assets be reported at their expected value (i.e., current value) of $10,000?

To answer this question, assume that the auditor wants to maximize financial statement usefulness for Bill. That is, he/she wants to assist Bill to maximize his expected utility of consumption over the two years. Bill's expected utility (EU) at the beginning of the first year is:

$$EU = \sqrt{x/2} + 0.5\sqrt{8{,}000 - x/2} + 0.5\sqrt{12{,}000 - x/2} \qquad (6.4)$$

where x is the value of wealth that Bill uses for planning purposes, and x/2 is his consumption in the first year. Second year consumption is either $8,000 minus first year consumption or $12,000 minus first year consumption, each with probability 0.5.

Now, if Bill uses x = $10,000, and X Ltd. assets are worth $8,000 at year-end, he will suffer a utility loss of 1.02, as calculated in Example 6.3. Similarly, he will lose utility of 0.54 if X Ltd. assets turn out to be worth $12,000. Given this loss asymmetry, Bill should base his first year consumption on a wealth estimate less than $10,000. In fact, to maximize EU, he should use a wealth estimate of x = $9,400, yielding EU = 140 in Equation 6.4. If Bill uses a wealth estimate of x = $10,000 (i.e., the expected value of his wealth), his EU falls to 139.93.[30]

Anticipating this loss asymmetry, the auditor may value X Ltd. assets at $9,400 at the beginning of year 1, rather than their current value of $10,000. This alerts Bill to use a conservative wealth value for his consumption planning.[31] Also, legal liability is reduced, since auditors are also likely to be sued for failing to anticipate losses (as opposed to Example 6.3, where the auditor is sued for failing to report a loss that has already occurred). Experimental evidence consistent with auditors' greater avoidance of potential overstatements relative to understatements in the presence of litigation risk is reported by Barron, Pratt, and Stice (2001). Example 6.4 provides a rational underpinning to evidence such as this.

This example illustrates *ex ante* or **unconditional conservatism**, under which risky assets are reported at less than their current value even though an economic gain or loss has not yet taken place. Note that, unlike Example 6.3, no change in current value has yet taken place. However, unconditional conservatism does convey information to investors. Given that the auditor has better information about the distribution of future asset value than the investor, the conservative valuation of $9,400 represents the auditor's estimate of the most decision useful value for risk-averse investors who need a wealth estimate for decision-making purposes.

In practice, there are several ways that unconditional conservatism is implemented. For example, profitable capital investments are valued at historical cost, inventories are retained at historical cost until an increase in value is realized through sale, and amortization expense may run ahead of economic depreciation. Also, historical cost accounting requires certain expenditures on intangibles, such as research costs, to be expensed as incurred. Some of these policies can be justified on grounds of reliability. However, they can also be viewed as a response to an investor demand for unconditional conservatism.

Of course, as an alternative to reporting a single value for an asset, the auditor could report the various possible asset values and their probabilities. In Example 6.4, the $8,000 and $12,000 possible end-of-year 1 values and their probabilities could be reported as supplementary risk information. Then, Bill could pick whatever wealth value he wants for planning purposes, rather than rely on a single number from the financial statements. As a practical matter, however, this would involve overcoming possible manager objections and, for such a report to be credible, would require auditing a large multivariate probability distribution of the current values of all assets and liabilities, complete with covariances. Thus, even though the auditor will have a better estimate of this distribution than the investor, it is more reliable, and almost as relevant, to report conservative net income and balance sheet values instead.[32]

Note that unconditional conservatism pre-empts conditional conservatism (the lower is asset valuation now, the less there is to write down later). If the X Ltd. asset was valued

at the beginning of year 1 at $9,400, as per this example, and a $2,000 loss on the asset is realized in year 1 as per Example 6.3, the writedown would be only $1,400 ($2,000 − $600), since $600 of the loss is pre-empted by the initial conservative asset valuation. Thus, the utility loss Bill suffers in Example 6.3 is reduced.

The extent of unconditional conservatism can be measured by a firm's market-to-book value ratio, since an efficient market will bid up the value of a firm with unrecorded goodwill and profitable assets even though value increases have not yet been recognized in the accounts. Thus, following from the previous paragraph, there should be a negative relationship between market-to-book and conditional conservatism. Both market-to-book and conditional conservatism may contain error as a conservatism measure, though, since they are also affected by matters such as the firm's future growth prospects, past write-downs, possible market inefficiency, and earnings management tactics. However, in a large sample of U.S. firms over 1970–2001, Pae, Thornton, and Welker (2005) documented empirically that market-to-book and conditional conservatism did exhibit the predicted negative relationship.[33]

6.8 CONCLUSIONS ON THE MEASUREMENT APPROACH TO DECISION USEFULNESS

The information approach to financial reporting is content to accept the historical cost basis of accounting and rely on full disclosure to enhance earnings quality and 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, thereby price protecting investors who may not wish to conduct their own in-depth analyses. Empirical research has confirmed that the market finds net income information at least to be useful. In effect, empirical research under the information approach accepts the efficient market price and evaluates the usefulness of accounting information in terms of its association with this market price.

However, there are a number of questions about the information approach. 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. Behavioural theory suggests that help may be supplied by moving current value information from financial statement notes into the financial statements proper. 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, auditors, and managers to increase conservatism in the financial statements by adopting an asymmetric version of current value measurement.

The measurement approach is reinforced by the development 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 approach, 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 approach.

Of course, the measurement approach runs into problems of reliability. Consequently, we do not expect this approach to extend to a complete set of financial statements on a current value basis. Rather, the question is one of degree—to what degree will current values supplant costs in financial reporting? Consequently, in the next chapter we review GAAP from a current 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 current value standards.

Questions and Problems

1. Why does a measurement approach to 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 approach?
3. Explain in your own words what "post-announcement drift" is. Why is this an anomaly for securities market efficiency? Does post-announcement drift necessarily imply that investors are not rational?
4. Explain in your own words why the market response to accruals, as documented by Sloan (1996), is an anomaly for securities market efficiency.
5. An investor considers two mutual funds. Based on past experience, the first fund has expected return of 0.08 and standard deviation of 0.05. The second fund has expected return of 0.07 and standard deviation of 0.06. 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.
6. 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 value relevance of earnings 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 than low earnings quality might there be for the low value relevance of earnings?

   c. How might an increased measurement approach to financial reporting increase earnings quality, and hence the impact of earnings on security prices?

7. 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. Is it possible for abnormal share return to increase but R^2 and ERC to fall? 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 efficient securities market anomalies?
9. Define two barriers to arbitrage, and explain why these might explain the continued existence of efficient securities market anomalies such as post-announcement drift and the accruals anomaly.
10. Reproduced below 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 (ox_t^a) for that year in our example. Recall that goodwill is calculated as the present value of expected future abnormal earnings.

    It is not clear whether Domtar continues to use EVA, since there is no mention of it in its 2006 annual report. Since 1996 was the last year it gave details of its EVA calculation, we will continue with its 1996 disclosure.

Economic Value Added (EVA)

At the end of 1995, the Corporation adopted a new management system known as Economic Value Added, or EVA®, 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® 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® measurement formula is as follows:

$$EVA® = NOPAT^1 - \text{Capital Charge}^2$$

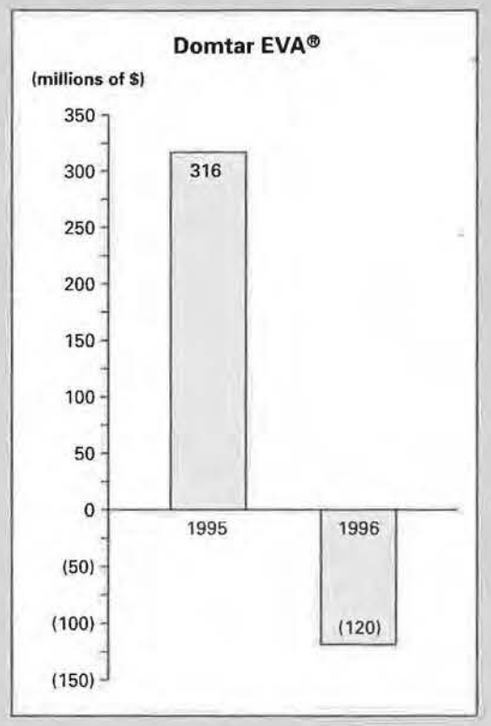
[1]Net operating profit after tax
[2]Capital employed × Cost of capital for the Corporation

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® was created, EVA® for Domtar in 1996 was $120 million negative, due to the decline in selling prices.

	EVA®	=	NOPAT	−	Capital Charge
1995	316	=	539	−	223
1996	(120)	=	88	−	208

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.



Source: Economic Value Added disclosure from Domtar, Inc.'s annual report (1996). Reproduced with permission.

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) and are unrecorded on the company's books, hence not included in the EVA capital charge. How would the unrecorded, 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.

11. A firm is expected to earn $100 net income for next year, at the end of which time the firm will be wound up. The $100 expected earnings includes gains and losses from disposals of assets and liabilities, and all other winding up costs. The firm's book value at the beginning of the year is $500, and its cost of capital is 14%. What is the firm's market value as at the beginning of the year?

a. $526.32

b. $570.00

c. $587.72

d. $600.00

12. Obtain the most recent annual report of a publicly traded company, and use the procedure outlined in Section 6.5.3 to estimate the value per common share of the company. Compare this value with the company's actual market value per share about three months after the company's year-end. Explain any difference. In your explanation, include consideration of possible effects of recognition lag, and justify your assumption about the persistence of abnormal earnings.

13. You are the senior accountant of a large, publicly traded company that is experiencing a decline of business that management feels is temporary. To meet earnings projections given in its previous year's MD&A, management asks you to find an additional $5 million of reported earnings for the current year. After some study, you determine that to increase earnings by this magnitude, it is necessary to recognize additional revenue on contracts in process, even though the contracts are far from completion and it is questionable whether or not any profits will actually be realized. A careful study of accounting standards relating to revenue recognition leads you to the conclusion that to recognize $5 million of profits at this stage would not be in accordance with GAAP. Consequently, the auditors will be expected to object.

You report this to management, but are instructed to proceed anyway. Management assures you that next year's business will be much better and the premature revenue recognition will never be noticed. Furthermore, management is sure it can convince the auditor of this as well.

Required

What will you do in response to this ethical dilemma? Give reasons for and against your decision.

14. Recent years have seen considerable litigation against auditors in the United States. 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 ethical position. The auditor's primary responsibility is to the shareholders. However, it is management that influences the audit committee and pays for auditor appointments. If the auditor does not go along, he or she may lose the audit client, and also any non-audit services also provided. Furthermore, he or she will inevitably be drawn into lawsuits when the earnings management becomes known (as it eventually must, since accruals reverse).

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 prominent investment manager 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 go along with client pressure to manage reported earnings so as to meet analysts' expectations? What are some of the possible longer-run costs to the auditor if he or she goes along?

b. To what extent would increased use of a measurement approach to 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? Use the relationship between change in analysts' earnings estimates and share price change to explain why or why not.

15. In its 2005 annual report, TD Bank Financial Group (TD) reports **economic profit** of $1,062 million. Its calculation of economic profit is summarized as follows (millions of dollars):

Average common shareholders' equity for the year	$14,600
Add goodwill/intangibles amortized to date	3,213
Average invested capital before goodwill amortization	17,813
Net income per income statement	$ 2,229
Capital charge at 10.1% per annum, estimated using CAPM	1,799
Economic profit after amortization of intangibles and items of note	430
Amortization of intangibles ($354) and items of note ($278)	632
Economic profit before amortization of intangibles and items of note	$ 1,062

Required

a. What is the relationship between TD's calculation of economic profit and the calculation of firm value using clean surplus theory, illustrated in Example 6.2?

b. Does TD have unrecorded goodwill? Explain why or why not.

c. Amortization of intangibles of $354 million is added back to 2005 GAAP net income of $2,229 for purposes of calculating economic profit, on the grounds that net income before amortization of intangibles better measures bank performance. The goodwill and other intangibles arise because of TD's acquisitions of Canada Trust in 2000 and Banknorth in 2005. Items of note of $278 are also added back. Items of note are defined in the annual report as items that management does not believe are indicative of underlying business performance. They include a charge for legal liability, costs of preferred share redemption, restructuring charge, loss on derivatives, and several related items.

As an investor in TD Bank shares, do you find economic income more or less useful than reported net income for predicting future bank performance? Explain. Focusing on economic income, do you find economic income before or after adding back amortization of intangibles and items of note to be most useful? Explain.

16. Philip Services Corp. was a large Canadian company with shares traded in Canada and the United States. Its extensive operations included recovery and recycling of scrap metals. In 1997, the company filed a prospectus in the United States, from which it raised additional common share capital. The prospectus included unqualified audited financial statements for 1995 and 1996, together with unaudited financial statement information for nine months of 1997.

In 1998, Philip revealed that it was unable to account for a large quantity of its copper inventory, costing about U.S. $80 million. In addition, it disclosed writeoffs of almost $200 million in restructuring costs and goodwill writedowns arising from acquisitions of other companies over 1993–1996. Its share price quickly fell from about $25 to pennies per share. The company subsequently went into bankruptcy protection.

A number of lawsuits and charges followed. In 2004, the Royal Canadian Mounted Police announced criminal fraud charges against the head of Philip's metals group. In 2006, the Ontario Securities Commission announced that it had banned five senior officers of Philip from serving as officers or directors of a public company for periods of up to 12 years. Furthermore, each officer was fined Can. $100,000 to meet the costs of the OSC investigation.

In March 2007, the Canadian arm of Deloitte and Touche, Philip's auditor, agreed to pay U.S. $50.5 million to settle a class action lawsuit by U.S. investors who claimed to have been misled by the 1997 prospectus. Officers and directors of Philip agreed to pay another $18 million. In December 2007, the Ontario Securities Commission announced a 20-year ban from serving as officer or director of a public company on the head of Philip's metals group. He was also banned from trading securities for 10 years and agreed to pay costs of $125,000.

Required

a. Does the share price reaction to the missing inventory and other writeoffs suggest securities market inefficiency? Explain.

b. Would current value accounting for Philip's metals inventory have helped to reduce the possibility of losing $80 million of copper inventory? Explain.

c. In retrospect, ceiling tests should have been applied to Philip's capital assets, such as its recorded goodwill, prior to the 1998 writedowns. Explain why ceiling tests may help reduce auditor liability.

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. This supports the argument of Fama (1970) (see Section 4.3.1) that a sufficient number of sophisticated investors can drive the efficient market security price.

4. Vassalou (2003), in an empirical study, found that news related to future growth in gross domestic product (a proxy for the risk of an upturn or downturn in the economy) predicted stock returns as well as did book-to-market. This supports the argument that investors are concerned about the risk of a downturn (or upturn) in the economy, and buy low (or high) B/M firms accordingly.

5. 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.

6. While it does not apply directly to beta, further CAPM support is provided by Durnev, Morck, Yeung, and Zarowin (2003) (DMYZ). Recall from Section 4.5 (Equation 4.4) that the residual term ϵ_{jt} of the market model includes the firm-specific portion of share return (whereas the $\alpha_j + \beta_j R_{Mt}$ term captures the market- and industry-wide portion). DMYZ found that the variance of the market model residual is positively related to amounts of future abnormal earnings. Now the variance of ϵ_{jt} can be interpreted as an inverse measure of **synchronicity** (see Chapter 4, Note 7), since the residual variance captures the amount of firm-specific information, relative to the amount of industry- and economy-wide information, incorporated into share price—relatively more firm-specific information generates a bigger variance, or lower synchronicity. Later (since net income lags in recognizing many relevant events), this information shows up as gains and losses in net income. In effect, consistent with the results of Ball and Brown (Figure 5.3), the market anticipates much of the GN and BN in earnings and capitalizes it into share price before the earnings are reported. This result supports the CAPM and the efficient markets theory on which it is based, because, as originally suggested by Roll (1988), the low ability of the CAPM to explain share returns may be due in part to the large amount of firm-specific information constantly being developed by investors, rather than just to the CAPM leaving out important risk variables. DMYZ found no support for an alternative interpretation of the variance of ϵ_{jt} as simply the result of noise trading or investor limited attention.

7. The magnitude of PAD seems to depend on the earnings expectation construct used by the researcher. Most PAD studies measure the GN or BN in quarterly earnings based on quarterly seasonal earnings changes (a time series approach). However, Livnat and Mendenhall (2006) report that PAD is significantly greater when GN and BN are measured based on analysts' forecasts.

8. An alternative possibility is that 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—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.

9. Narayanamoorthy draws on accounting conservatism to argue that the positive correlation between current and next quarters' seasonal earnings changes will be lower for BN firms than for GN firms.

This is because with conservatism at least some of the BN is driven by writedowns, which forces future reported earnings up—a writedown of plant and equipment reduces future amortization expense, for example. For such firms, an increase in future earnings works *against* the positive correlation of current and future quarters' seasonal earnings changes, which is at the heart of PAD. GN firms are less likely to have suffered conservative writedowns, so that this effect does not then operate. Thus, given PAD, there are more profits to be made from investing only in GN firms, which is what Narayanamoorthy demonstrates.

10. Chordia and Shivakumar (CS) base their argument on the Modigliani and Cohn (1979) inflation illusion hypothesis, which states that common stock investors do not seem to incorporate the effects of inflation levels on the nominal growth rate of firms' earnings. CS point out that firms are affected differently by inflation—some firms' earnings benefit and some suffer. The inflation illusion hypothesis predicts that shares of firms that benefit are undervalued, and vice versa. That is, instead of *anticipating* the effects of inflation on future earnings growth, investors seem to wait until the increased or decreased earnings actually show up. Thus share prices drift upwards or downwards over time, depending on whether the firm benefits or suffers from inflation. CS' evidence in favour of this argument is drawn from a large sample of U.S. firms over 1971–2004. CS conclude that inflation provides at least a partial explanation for PAD.

11. 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.

12. These findings resemble a "mega" version of PAD, likely due to basing the measure of earnings surprise on analysts' forecasts rather than quarterly seasonal earnings changes (see Note 7). Other reasons for the findings are the concentration on the extreme top and bottom of GN and BN firms, rather than on all GN and BN firms, and the fact that transactions costs and other barriers to arbitrage by sophisticated investors are high for the extreme firms in their sample.

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

14. Interestingly, Kim and Kross also report that the association between share price and *book value* has *increased* over 1973–2000. This could possibly be due to greater use of current value accounting over this period.

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

16. In the FO model, the firm's life is assumed infinite.

17. 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.

18. 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.

19. Our expression for α differs slightly from that of FO. They assume that the firm has an infinite life, whereas our assumption is that P.V. Ltd. has a two-year life.

20. The persistence parameter ω can be related to the three types of earnings events distinguished by Ramakrishnan and Thomas (1991) (RT) (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 bv_t, in FO notation, by \$1. In addition, ω of this will persist to year t + 1, ω^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 PA_t, that is, the ERC, is

$$ERC = 1 + \frac{\omega}{1 + R_f} + \frac{\omega^2}{(1 + R_f)^2} + \frac{\omega^3}{(1 + R_f)^3} + \cdots$$

$$= \frac{1 + R_f}{1 + R_f - \omega}$$

In RT terms, permanent abnormal earnings have an ERC of $(1 + R_f)/R_f$. To express this ERC in terms of ω, 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 ω in the earnings dynamic (Equation 6.2). That is, for an infinite firm horizon the FO model is not defined for permanent earnings.

RT 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 ω 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 ω, the FO model is not defined for price-irrelevant abnormal earnings.

21. The market risk premium is the additional return, over and above the risk-free rate, demanded by investors to compensate them for bearing the systematic risk of the market portfolio. The 4% estimate of this premium is taken from Palepu, Healy, and Bernard (2000), p. 13–9.

22. Website values for Canadian Tire's beta range from 0.60 to 0.89. Since I do not know the point in time to which these values relate, and since the values vary, I have calculated beta from its formula, as given. Specifically, Cov (j, M) and Var (M) are calculated from daily returns data for Canadian Tire and the S&P/TSX 300 index for March 2007 (21 observations).

23. Canadian Tire Corporation, Ltd. has two classes of common shares outstanding—voting and non-voting, with most of the shares non-voting. For purposes of this example, we combine the two classes.

24. For further information about the 1980s savings and loan debacle, see Zeff (2003, pp. 272–273), and the references therein.

25. Some accountants deny this statement, arguing that ceiling tests are a modified version of historical cost. That is, they regard the written-down value as the new "cost."

26. To verify this, Bill's utility from spending the same amount in each year is

$$\sqrt{5{,}000} + \sqrt{5{,}000} = 70.71 + 70.71 = 141.42$$

Any other spending allocation has lower utility. For example, if he spends \$4,500 in year 1 and \$5,500 in year 2, his utility is

$$\sqrt{4{,}500} + \sqrt{5{,}500} = 67.08 + 74.16 = 141.24$$

For simplicity, we assume that Bill has zero time preference for consumption. That is, a dollar of spending in year 1 has the same utility as in year 2, and vice versa. We also assume that Bill's utility function in year 2 is not affected by the level of consumption in year 1.

27. Strictly speaking, Bill's second year utilities should be discounted, since a dollar's worth of consumption next year is worth less than the same consumption today. However, this would complicate the example without changing the point to be made.

28. Basu (1997), described earlier, assumes that the market becomes aware of unrealized gains and losses as they occur from sources other than the financial statements, whereas our example assumes that the auditor misstatements remain as inside information, hence unknown to the market until their existence is later revealed. To the extent that Basu's assumption is valid, the force of our example is reduced. However, Basu's assumption relies heavily on availability of public information about gains and losses from other sources. It also relies on market efficiency with respect to this information. To the extent that inside information remains and markets are not fully efficient, our example applies. To argue that the market fully figures out inside information is to deny that financial statements have information content and to deny auditor liability.

29. If Bill holds a diversified portfolio, overstatement errors by one firm may cancel out against understatement errors by another. If they do, Bill's wealth at the end of year 1 is correctly stated on average, with no net loss of utility. However, the auditor is not off the hook, since it is unlikely that Bill, or the courts, will forgive one error because the auditor of another firm in his portfolio made an opposite error—we do observe auditor liability for valuation errors. In effect, "two wrongs do not make a right."

30. To find the x that maximizes Bill's EU, take the first derivative of Equation 6.4 with respect to x and equate to zero. With some simplification, this yields:

$$\frac{\partial EU}{\partial x} = x^{-1/2} - \frac{1}{2}\left[(16{,}000 - x)^{-1/2} + (24{,}000 - x)^{-1/2}\right] = 0$$

It can be verified that x = 9,400 satisfies this equation. Substitution of x = 9,400 into Equation 6.4 yields EU = 140.

If Bill uses the expected value of his wealth, substituting x = $10,000 into Equation 6.4 yields EU = 139.93.

31. Instead of reporting a conservative valuation, the auditor could report the asset at current value and disclose the conservative valuation in the financial statement notes. However, the auditor may feel that disclosure is not a substitute for recognition in the financial statements proper, due to investor behavioural biases and/or bounded rationality.

32. We say almost as relevant because to report an asset value that exactly maximizes Bill's expected utility, the auditor needs to know Bill's utility function. Alternatively, the auditor could report an asset value that minimized *his/her own* expected legal liability, on the assumption that legal liability awards accurately reflect investor utility losses. Such an assumption seems heroic, however.

33. Since the market-to-book ratio and the Basu measure are both measures of conservatism, a negative relationship between them has led to criticism of the Basu measure, on grounds that two measures of the same construct (i.e., conservatism) should be positively, not negatively, correlated. However, Basu's measure is of conditional conservatism, whereas we regard market-to-book as primarily a measure of unconditional conservatism. Since these are different conservatism concepts, it is not clear that this criticism is valid.

In this regard, Roychowdhury and Watts (2007) suggest a reconciliation. They point out, as we have, that a firm's market value includes its unrecorded goodwill and unrecognized increases in the economic value of recorded net assets. They also point out a negative association between market-to-book and reported earnings—the higher is opening market-to-book, the lower is its association with reported earnings for the period. This is because high market-to-book means that the firm has lots of unrecorded goodwill and unrecognized increases in net assets. Consequently, if some event lowers firm value, it is unlikely that net income will be lowered, for two reasons. First, since goodwill is not recognized in the first place, there is nothing to write down. Second, since past increases in net asset values are unrecognized due to conservative accounting, a "buffer" is created so that net assets do not need writedown unless their value has declined sufficiently to overcome the buffer. The higher is opening market-to-book, the stronger this effect. If some event increases firm value, book value does not increase under conservative accounting, so that the association between market-to-book and reported earnings is also negative.

Roychowdhury and Watts then assert that there is some persistence in the market-to-book ratio over short periods. For example, a firm with a high opening market-to-book ratio will tend to also have a high ratio at the end of the year. Then, the higher is *closing* market-to-book, the lower its association with reported net income. Thus, for a single short period, the association between a closing market-to-book measure of conservatism and net income is negative, whereas, as documented by Basu, his measure of conservatism for the period (correlation between share return and net income when share return is negative less correlation between share return and net income when share return is positive) is positive. Thus, the association between these two measures is negative over short periods, consistent with the results of Pae, Thornton, and Welker.

Consider what happens over several periods, however. If a firm appreciates in value over several periods, market-to-book rises and the gap between firm market value and conservative book value increases, strengthening the negative association between ending market-to-book and reported earnings. If a firm falls in value over several periods, however, market-to-book falls and reported earnings will also fall since the effects of recognition lag decrease for longer periods. This weakens the negative relationship between ending market-to-book and reported earnings. Combining these two effects, firms with high market-to-book ratios exhibit lower association with reported earnings as the time period lengthens, and firms with low ratios exhibit higher association. That is, the Basu conservatism measure increases. Thus, the association between the Basu measure and market-to-book becomes positive for longer periods. Roychowdhury and Watts present empirical evidence consistent with these predictions.