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Impact of Earnings Management on the Value-Relevance of Earnings and Book Value: a Comparison of Short-Term and Long-Term Discretionary Accruals.

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**The Impact of Earnings Management on the Value-Relevance
of Earnings and Book Value: A Comparison of Short-term
and Long-term Discretionary Accruals**

**A dissertation submitted to the Faculty of Business
in candidacy for the degree of Doctor of Philosophy**

by

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May 2004

STATEMENT OF SOURCES

To the best of my knowledge and belief, the work presented in this thesis is original, except as acknowledged in the text. All sources used in the study have been cited, and no attempt has been made to project the contributions of other researchers as my own. Further, the material has not been submitted, either in whole or in part, for a degree at this or any other University.

Catherine Whelan

Date

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The completion of my PhD would not have been possible without the support of my family, friends, and colleagues. However, I would never even have started without the encouragement of my supervisor, Ray McNamara.

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This thesis is dedicated with love to the strong and intelligent women who have shaped my life – my mother, my aunt, and my grandmother.

ABSTRACT

Earnings and book value are commonly used as the basis for firm valuation. However, the reliability of earnings, as indicated by earnings management, may affect its relevance in determining firm value. This thesis investigates the link between earnings management and firm valuation by assessing the impact of earnings management on the value-relevance of earnings and book value.

Three different sources of earnings management are investigated: total discretionary accruals, short-term discretionary accruals, and long-term discretionary accruals. Total discretionary accruals are estimated using the Jones model (Jones 1991). New models are developed to estimate short-term and long-term discretionary accruals. These models enable investigation of the differential impact of earnings management via short-term versus earnings management via long-term discretionary accruals. The primary proposition is that earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

For firm's whose discretionary accruals indicate earnings management, the value-relevance of earnings is expected to be lower than for firms without earnings management. Moreover, in the presence of earnings management, it is expected that there will be a shift from a reliance on earnings to a reliance on book value in the valuation process. This would be reflected in a decrease in the value-relevance of earnings and an increase in the value-relevance of book value.

This thesis provides evidence that earnings management plays a role in the valuation process. A major contribution of this study is the development of models to enable the estimation of short-term and long-term discretionary accruals, thereby extending the earnings management literature by addressing the differential effect of short-term versus long-term discretionary accruals. The results clearly demonstrate that low reliability of information reduces its value-relevance. This link between the integrity of accounting information and its usefulness to market participants supports the need for ongoing regulatory activity to improve the integrity of the financial reporting process.

Preliminary results demonstrate the value-relevance of earnings and book value using Australian data. The effect of earnings management on the relative value-relevance of these accounting measures depends on the source of earnings management. Earnings management via total discretionary accruals has no impact. When examined independently, earnings management via either short-term or long-term discretionary accruals reduces the value-relevance of earnings but has no impact on the value relevance of book value. Examination of both measures simultaneously reveals the differential impact of short-term versus long-term discretionary accruals. Earnings management via short-term discretionary accruals has no impact, whereas earnings management via long-term discretionary accruals reduces the value-relevance of earnings and increases the value-relevance of book value. Therefore, it is concluded that earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

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CHAPTER 1 INTRODUCTION

1.1 OVERVIEW

Firm value is derived from the market's expectations of firm performance. Accounting provides the necessary information for the market to form these expectations. Book value of equity represents past performance and current earnings are indicative of future performance. Thus, these measures are commonly used as the basis for firm valuation (Easton and Harris 1991; Wild 1992; Ohlson 1995; Penman 1998; Ou and Sepe 2002).

This study proposes that the reliability of accounting information may affect its relevance to the market in determining firm value. The earnings figure is susceptible to manipulation that may reduce its reliability and thus its usefulness in the valuation process. This is due to the accrual component of earnings which is, in part, subject to managerial discretion. Because Generally Accepted Accounting Principles (GAAP) allow a degree of freedom, this pliancy may be exploited by management (Levitt 1998). The prospect of exploitation increases when incentives exist for management to manipulate the accrual component of earnings to reach specific earnings targets (Beaver and Engel 1996; Dechow et al 1996; Wu 1997; Teoh et al 1998b; Erickson and Wang 1999; Holland and Ramsay 2003).

The rationale for the use of accrual accounting is that it allows management to adjust cash flows to better reflect the performance and position of the firm. In this context, accruals are used as a signal to the market. However, when managers use accruals to opportunistically manage earnings, the earnings measure is not a reliable indicator of the firm's financial performance. Accordingly, such opportunistic behavior will reduce the usefulness of the information contained in earnings. The difficulty for market

participants is to identify when accruals are used as a credible signal and when they are used opportunistically; that is, market participants must assess whether earnings are reliable.

1.2 EARNINGS MANAGEMENT AND THE RELIABILITY OF EARNINGS

The Conceptual Framework identifies relevance and reliability as the key characteristics of accounting information used in making valuation decisions. Information is relevant when it influences users' decisions by helping them to form predictions and/or confirm or correct past evaluations. Information is reliable if it can be depended upon to faithfully represent, without bias or undue error, the transactions or events that it purports to represent (Statement of Accounting Concepts – SAC 3 [Australia]; Statement of Financial Accounting Concepts – SFAC 2 [US]). SAC 3 and SFAC 2 not only define these concepts but also emphasize their interrelationship.

While the conceptual framework suggests an integral relationship between relevance and reliability, it is the reliability of accounting information that is significant to market participants. For information to be value-relevant, it must be both relevant and reliable in terms of the definition provided in the conceptual framework (Barth et al 2001). Therefore, the absence of value-relevance may indicate a lack of relevance and/or a lack of reliability. As the conceptual framework predicates the relevance of accounting information to decision makers, then low value-relevance may be attributed to low reliability.

There are three accounting summary measures presented in a firm's financial statements that may have questionable reliability; (1) earnings, as reported in the Statement of

Financial Performance, (2) book value of equity, or net assets, as reported in the Statement of Financial Position, and (3) net cash flows, as reported in the Statement of Cash Flows. As these measures provide information about the financial performance and position of the firm, they are potentially relevant in determining the firm value subject to a reliability assessment by the market.

Support for the value-relevance of earnings comes from studies of the earnings response coefficients. These studies demonstrate the value-relevance of earnings in a variety of contexts (Kormendi and Lipe 1987; Collins and Kothari 1989; Easton and Harris 1991). The cash and accrual components of earnings were extensively investigated through comparisons of cash flows versus earnings, and more recently, cash flows versus accruals (Wilson 1986; Bowen et al 1987; Dechow 1994; Cheng et al 1996; Cotter 1996; Subramanyam 1996). The relative superiority of earnings over cash flows in predicting stock returns is well documented (Beaver and Dukes 1972; Wilson 1986; Dechow 1994).

Book value is considered to be value-relevant when a firm's book value proxies for expected future normal earnings, assuming the firm is a going concern (Penman 1992; Ohlson 1995). In addition, book value may become a proxy for the liquidation value of the firm when the firm is not a going concern (Burgstahler and Dichev 1997a; Barth et al 1998). Evidence indicates that book value plays a role in valuation for firms with losses when the losses are transitory. In this case, the role of book value may either be as a proxy for the abandonment option (Berger et al 1996) or for the expected future normal earnings (Collins et al 1999).

Both earnings and book value are value-relevant with the exclusion of one, or the other, leading to a possible misspecification of the valuation model (Easton and Harris 1991; Ohlson 1995; Burgstahler and Dichev 1997a; Barth et al 1998, Collins et al 1999). Investigations of changes in the value-relevance of these measures since the late 1950's found that the value-relevance of earnings has declined, but that this has been offset by the increased value-relevance of book value. Overall, the combined value-relevance of the two measures has not declined (Collins et al 1997; Francis and Schipper 1999).

It is an empirical question as to which measure, earnings or book value, is the superior measure of firm value. However, the literature suggests that if the reliability of one measure is low, other measures will become more value-relevant (Berger et al 1996; Burgstahler and Dichev 1997a; Collins et al 1997; Barth et al 1998). This study focuses on the reliability of earnings when assessing the relative value-relevance of earnings and book value.

1.3 EARNINGS, BOOK VALUE & EARNINGS MANAGEMENT: SHORT-TERM AND LONG-TERM DISCRETIONARY ACCRUALS

Earnings reliability becomes questionable when motivation exists for the manipulation of earnings (Brown 1999; Healy and Wahlen 1999; Dechow and Skinner 2000; Rosenfield 2000; Duncan 2001). When a firm engages in earnings management, the earnings figure may no longer be a true and fair reflection of firm performance thus reducing the reliability of earnings. When information is unreliable it is unlikely to be useful as the basis for firm valuation. Thus, earnings management may result in a decline in the value-relevance of earnings. As the earnings measure becomes less

reliable, the market may look to book value as an alternate measure of value, thereby leading to an increase in the value-relevance of book value.

The accrual component of earnings may be a potent detractor from the reliability of earnings. If management uses accruals to adjust cash flows to present a credible signal to the market, then earnings should remain value-relevant. However, if accruals are used opportunistically by management, the reliability of the earnings figure is undermined and thus should be less value-relevant.

Total accruals can be decomposed into discretionary and non-discretionary components. Non-discretionary accruals are required by the accounting standards and are influenced by a firm's economic circumstances. Consequently, they are relatively free from managerial discretion. However, discretionary accruals may be the result of opportunistic behavior and therefore lead to a decline in the perceived reliability of earnings. As the discretionary component of accruals provides management with the opportunity to manipulate earnings, they are used as an indicator of earnings management (Jones 1991; Boynton et al 1992; DeFond and Jimbalvo 1994; Dechow et al 1995; Teoh et al 1998a, 1998b; Bartov et al 2001; Bowman and Navissi 2003)¹. The body of literature investigating this opportunistic behavior is known as "Earnings Management".

The motivation for this body of literature is the detection of earnings management (Healy 1985; DeAngelo 1986; Jones 1991; Dechow et al 1995) or the identification of circumstances in which earnings management is most likely to occur (McNichols and

¹ These studies either separate accruals based on some threshold level (e.g. those above the median), or use a matched pair design where selected companies are likely to manage earnings.

Wilson 1988; DeFond and Jimbalvo 1994; Perry and Williams 1994; Wu 1997; Erickson and Wang 1999; Kasnik 1999; Black et al 2000; Wells 2002). There is also some evidence of a link between earnings management, as evidenced by discretionary accruals, and stock prices (Rangan 1998; Teoh et al 1998a, 1998b). For example, firms with higher levels of discretionary accruals prior to stock issues tend to have poorer post-issue stock price performance. What has not been examined is the impact of earnings management on the value-relevance of earnings and book value.

The fact that all accruals reverse, but do so differentially, may influence the way in which management may manipulate accruals. Management may find it difficult to conceal the manipulation of short-term accruals as the market expects these accruals to reverse within one accounting period. As long-term accruals tend to reverse further into the future, they provide management with the opportunity to conceal their manipulations for longer than if short-term accruals were used. Some accruals such as future income tax benefits and liabilities do not appear to reverse at all.

Both short-term and long-term accruals provide incremental information to the market. In general, short-term accruals are more value-relevant than long-term accruals (Wilson 1986; Chia et al 1997; Guay and Sidhu 2001), however, the impact of long-term accruals increases as the return interval increases (Cotter 1996; Guay and Sidhu 2001). This reflects the different roles played by short-term and long-term accruals in alleviating timing and matching problems, thus providing management with alternatives in the use of discretionary accruals. The discretionary nature of short-term versus long-term accruals has not been addressed in the literature.

The commonly used measures of discretionary accruals have a short-term focus (Healy 1985; DeAngelo 1986; Dechow and Sloan 1991; Jones 1991; DeFond and Jimbalvo 1994; Dechow et al 1995). Consequently, the manipulation of long-term discretionary accruals has not been adequately examined. There is a need to investigate both short-term and long-term discretionary accruals to better evaluate the impact of earnings management on the value-relevance of financial statement information.

1.4 ADDRESSING THE PROBLEM

This research investigates the relative value-relevance of both earnings and book value in the presence of earnings management. Total discretionary accruals, short-term discretionary accruals and long-term discretionary accruals, are potential sources of earnings management. Where discretionary accruals indicate opportunistic behavior, the market should respond negatively. All firms are expected to have some level of discretionary accruals so the mere presence of discretionary accruals is not in itself an indicator of earnings management. At any given time, one can expect discretionary accruals to range across firms from those that are information relevant to the prediction of permanent earnings (hereafter referred to as “low” discretionary accruals) to those that do not relate to future permanent earnings (hereafter referred to as “high” discretionary accruals)². In other words, it is assumed that within a given industry a firm with high discretionary accruals is more likely to have engaged in earnings management than a firm with low discretionary accruals.

² This construct is operationalized in Chapter 3. However, the construct is relative in that what are high accruals in an absolute sense may be low accruals from an earnings management perspective.

Earnings management, as measured by high discretionary accruals, may reduce the reliability of earnings and thus the value-relevance of earnings. The value-relevance of book value may increase as the market looks for an alternate source of information. The magnitude of these effects will differ depending on whether the discretionary accruals are short-term or long-term. Long-term discretionary accruals are expected to have a greater impact than short-term discretionary accruals on the value-relevance of the accounting measures because their effects will be apparent over a longer time period.

The value-relevance of earnings and book value is measured by the market's response to this information. As stock prices reflect aggregate investor behavior, the market response is measured by the coefficients in a regression model using stock price as the dependent variable and earnings and book value as the independent variables. The moderating effect of earnings management is assessed through the inclusion of a dummy variable in the valuation model to represent the presence of earnings management. The indicator of earnings management is determined using each of total, short-term, and long-term discretionary accruals.

1.5 CONTRIBUTION TO KNOWLEDGE

This study develops a link between valuation research and earnings management research. Earnings management literature has primarily focused on the detection of earnings management with little consideration given to impact of earnings management on the value-relevance of accounting information. This study will provide evidence that earnings management plays a role in the valuation process.

Standard setters and regulators have assumed that earnings management decreases the reliability of accounting information. Earnings management research supports a value

effect for the manipulation of earnings information but has not provided guidance for book value. The interactive impact of earnings management on market value is examined in this study through inclusion of both earnings and book value in the valuation model. This research extends the earnings management literature by addressing the differential impact of short-term versus long-term discretionary accruals.

The existing discretionary accrual models do not distinguish between the short-term and long-term components of discretionary accruals. This study presents a method for identifying these components through the development of a new model for long-term discretionary accruals. Consequently, standard setters and regulators will be better able to target the area of earnings management that has the greater impact on the reliability of information. That is, whether it is short-term or long-term accruals that provide the greater manipulation effect.

1.6 ORGANIZATION OF THE THESIS

Chapter Two develops the theory underlying the proposed model, which embodies the influence of earnings management on the value-relevance of accounting information. The theoretical constructs are identified and justified through examination of existing research. The chapter concludes with the presentation of propositions.

Chapter Three outlines the research method used to test the propositions presented in Chapter Two. The chapter commences with an overview of the models and restatement of the propositions as hypotheses to be empirically tested. A description of the data collection procedures is followed by an explanation of the operationalization of the theoretical constructs. The chapter concludes with an explanation of the analysis procedures.

Chapter Four starts with the preliminary analysis of the sample. This is followed by the presentation of the results of the model estimations and the inferences drawn from the tests of the hypotheses. The chapter concludes with a discussion of the sensitivity analysis undertaken to evaluate the robustness of the results.

Chapter Five provides a summary of the research question and presents the conclusions based on the results in Chapter Four. Limitations of the study and suggestions for future research are also discussed. The conclusion restates this study's contribution to knowledge.

CHAPTER 2 THEORY DEVELOPMENT

2.1 INTRODUCTION

Chapter One identifies the role of earnings management in the valuation process as an issue for investigation. Of particular interest is the impact of earnings management on the value-relevance of earnings and book value. Moreover, there is a need to explore the differential impact of the use of short-term and long-term discretionary accruals as earnings management tools.

Section 2.2 of this chapter presents the general model to assess the extent to which earnings management moderates the value-relevance of accounting information. Section 2.3 discusses the conceptual basis for the model that relates earnings and book value to market value. Following this, section 2.4 reviews the earnings management and accruals literature and states the propositions relating earnings management to the value-relevance of earnings and book value. Limitations of the model are presented in section 2.5. Section 2.6 summarizes the chapter and stated propositions.

2.2 MODEL OVERVIEW

The impact of financial statement information on capital markets is an enduring and well documented area of research (Kothari 2001). The value-relevance stream of this research is based on the premise that if information is useful, investors will adjust their behavior and the market will respond through changes in stock prices. Therefore, information is considered value-relevant if stock price movements are associated with the release of the information. To understand the impact of earnings manipulation on value requires a valuation model that links accounting information to market value.

Ohlson (1995) proposed a valuation framework that links firm value to earnings and book value, with both measures contributing to the value of the firm. Book value is presented as a proxy for the present value of expected future normal earnings, whilst current earnings proxy for abnormal earnings. In his model, firm value is dependent on book value, abnormal earnings and other information. Firm value is represented by stock price which is the measure of market value.

$$P_t = y_t + \alpha_1 x_t^a + \alpha_2 v_t$$

Where

P_t = stock price at time t

y_t = book value at time t

x_t^a = abnormal earnings for period t-1 to t

v_t = other information

The empirical application of Ohlson's model (Ohlson 1995) requires the "other information" variable to be replaced with an intercept and an error term.

$$P_t = \beta_0 + \beta_1 E_t + \beta_2 BV_t + \varepsilon_t$$

Where

P_t = stock price at time t

E_t = earnings for period t-1 to t

BV_t = book value at time t

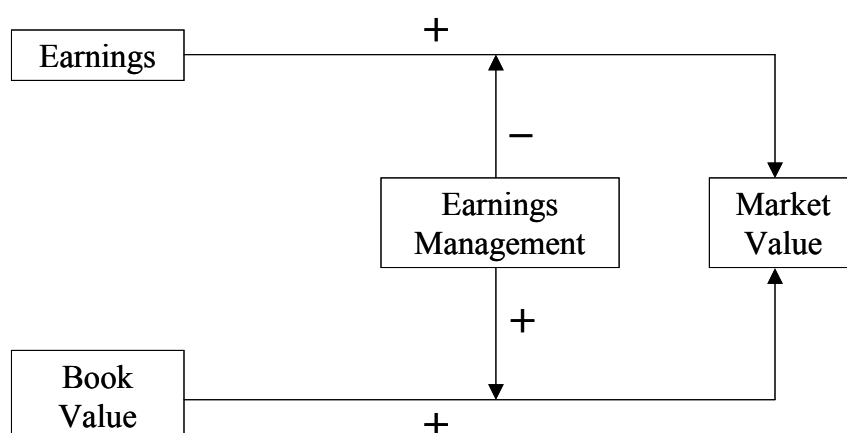
ε_t = error term

The relevance of accounting information in determining the value of the firm is influenced by the market's perception of the reliability of that information. As discretionary accruals may be indicative of the opportunistic manipulation of earnings, they can be used as an indicator of earnings reliability. When the reliability of earnings declines, the market may place less reliance on earnings and look for other sources of

information, such as book value. However, as book value is only one of a number of alternate sources of information, the decline in the value-relevance of earnings may not be exactly offset by the increase in the value-relevance of book value, resulting in a change in the overall reliance on these two measures.

Figure 2-1 depicts the relationship between accounting information and market value. Both earnings and book value are expected to have a positive association with market value reflecting the value-relevance of these accounting measures. Earnings management plays a moderating role, impacting on the association between the accounting measures and market value. Earnings management may reduce the reliability of earnings, thereby reducing the value-relevance of earnings. In other words, earnings management may have a negative impact on the association between earnings and market value. When earnings are perceived to be unreliable, the market may look for other information such as book value on which to base its valuation. Earnings management may therefore have a positive impact on the association between book value and market value, thereby enhancing the value-relevance of book value.

Figure 2-1: Earnings Management Valuation Model



The investigation is extended to examine the differential effect of earnings management via short-term discretionary accruals and earnings management via long-term discretionary accruals on the value-relevance of earnings and book value. As long-term accruals are potentially more susceptible to earnings management than short-term accruals, the impact on value-relevance is expected to be more pronounced for long-term discretionary accruals.

2.3 CONCEPTUAL BASIS FOR THE MODEL

2.3.1 Value-relevance of Earnings

The value-relevance of earnings is demonstrated in the early works of Ball and Brown (1968), Beaver and Dukes (1972) and Patell and Kaplan (1977). Previous studies that examined earnings and cash flows in terms of their information content found that each measure provides incremental information when used in conjunction with the other (Rayburn 1986; Wilson 1986; Bowen et al 1987; Livnat and Zarowin 1990; Percy and Stokes 1992; Cheng et al 1996; Pfeiffer et al 1998).

The study by Dechow (1994) was one of the first to investigate the relative superiority of earnings versus cash flows as a predictor of returns. Over short intervals, earnings displayed a stronger association with returns than did cash flows. Dechow (1994) proposed that when a firm is experiencing changes in working capital requirements and investing and financing activities, cash flows may have severe matching and timing problems and as such would be less able to reflect performance. Results indicate that under such conditions earnings are superior to cash flows in explaining returns, thereby suggesting that accruals enhance the ability of earnings to reflect firm performance.

The persistence or permanence of earnings influences the value-relevance of earnings, with the market assigning greater weight to persistent earnings than to those that are perceived as transitory (Kormendi and Lipe 1987; Collins and Kothari 1989; Lipe 1990; Ali and Zarowin 1992a, 1992b; Cheng et al 1996; Sloan 1996). Sloan (1996) examined earnings quality in relation to the persistence of the accrual and cash flow components of earnings. Sloan's (1996) results reveal a reliance on the earnings figure regardless of its composition. Although cash flows were found to be more persistent than accruals, suggesting they should be more value-relevant, the market did not appear to weight cash flows more heavily than accruals. These results demonstrate that the market does not differentiate between the permanence of these two components of earnings. Sloan (1996) suggests this indicates possible mispricing by the market due to a fixation on earnings.

Many of the studies into the persistence of earnings have used earnings levels and earnings changes to discriminate between the permanent and transitory components (Easton and Harris 1991; Biddle and Seow 1991; Cheng et al 1996; Baber et al 1999). These studies found that both earnings and earnings changes are value-relevant. Cheng et al (1996) used both levels and changes to investigate the effect of earnings permanence on the information content of cash flows. Findings indicate that a decrease in the permanence of earnings results in a decrease in value-relevance of earnings and an increase in the value-relevance of cash flows. This suggests that the market looks to cash flows as an alternative source of information if inadequacies are perceived in the earnings number. Similarly, book value can be used by the market as an alternate source of information for valuation purposes.

2.3.2 Value-relevance of Book Value

The potential lack of reliability of the earnings figure has led investors to look to book value as measure of value. Collins et al (1997) investigated the causes of the shift in focus from earnings to book value. These causes include the increasing magnitude and frequency of abnormal and extraordinary items (Elliott and Hanna 1996), the increasing occurrence of reported losses (Hayn 1995), the decline in firm size (Wild 1992), and the increase in the incidence of intangibles (Amir and Lev 1996). These factors, which are linked to a reduction in the value-relevance of earnings, have also been shown to be associated with an increase in the value-relevance of book value (Berger et al 1996; Burgstahler and Dichev 1997a; Collins et al 1997; Barth et al 1998).

A number of studies have investigated the impact of various factors on the relative value-relevance of earnings versus book value. Table 2-1 identifies the circumstances in which greater reliance is placed on book value rather than on earnings.

Table 2-1 Studies on the value-relevance of book value versus earnings

<i>Study</i>	<i>Greater Value-Relevance of Book Value</i>
Burgstahler and Dichev 1997a	Low ROE
Penman 1998	Extreme ROE
Barth et al 1998	Deterioration in firm's financial health
Collins et al 1999	Net losses; Increase in firm's risk of liquidation
Ou and Sepe 2002	High forecasted change in earnings

Book value can be viewed as a proxy for expected future earnings for loss firms (Hayn 1995), and as a proxy for the abandonment option for firms likely to cease operations (Berger et al 1996; Subramanyam and Wild 1996; Barth et al 1998). Collins et al (1999) test book value as a correlated omitted variable to demonstrate that the basic earnings valuation model is mis-specified if book value is excluded. The key findings indicate

that as investors realize a firm cannot sustain losses indefinitely, negative earnings are less value-relevant than positive earnings. As a firm's likelihood of failure increases, earnings no longer provide information for forming future expectations. Consequently, earnings become less value-relevant and book value becomes more value-relevant as it represents the option to liquidate.

The relative value-relevance of earnings and book value has also been examined in the context of return on equity (Burgstahler and Dichev 1997a; Penman 1998). Burgstahler and Dichev (1997a) develop an option-style valuation model in which market value is a convex non-additive function of earnings and book value. A high return on equity (ROE) suggests that the firm is using its assets efficiently and will therefore continue to employ the assets in the same manner. Therefore, future earnings are expected to be similar to current earnings. This perception of permanence may result in value-relevant earnings. Conversely, if ROE is low, the firm will look for a better way to employ its assets. This would result in the need to revise the expectation of earnings and thus book value becomes more relevant as the predictability of earnings declines.

A similar result was found by Penman (1998) who combined earnings and book value multipliers in a valuation model. Weights were calculated for capitalized earnings and book value dependent on the relative size of each measure. It was found that the weights varied non-linearly with respect to the difference between the measures.

The research establishing the value-relevance of earnings and book value has predominantly used US data. The use of Australian data in this study provides an opportunity to investigate the generalizability of past results to another market. The similarities between the US and Australian markets, with the exception of size, suggest

that the magnitude and direction of value-relevance of earnings and book value should be comparable for Australian and US firms. It is expected that both earnings and book value are value-relevant as indicated by a positive association with price.

Proposition 1: Earnings and book value are positively associated with firm value.

2.4 EARNINGS MANAGEMENT

Both earnings and book value play a role in the valuation process as they provide alternate sources of information. However, if the market perceives a decline in the reliability of the earnings figure it may look to book value as the basis for its valuation. The development of an indicator of earnings reliability will provide guidance as to the reliance that should be placed on these measures in the valuation process.

The literature presents three dominant approaches to the measurement of earnings management (McNichols 2000; Beneish 2001). Studies focusing on the detection of earnings management have traditionally used measures based on aggregate accruals (Healy 1985; DeAngelo 1986; Jones 1991; DeFond and Jimbalvo 1994; Dechow et al 1995). Some industry-based studies have examined specific accruals that are likely to be used to manage earnings (McNichols and Wilson 1988; Liu et al 1997; Teoh et al 1998a; Beaver and McNichols 1998; Petroni et al 1999). The final approach examines the distribution of reported earnings with earnings management indicated by discontinuities in the distribution (Burgstahler and Dichev 1997b; Degeorge et al 1999; Holland and Ramsay 2003). This study uses the discretionary component of total accruals as the indicator of earnings management.

2.4.1 Discretionary and Non-discretionary Accruals

Accruals-based measures are widely accepted as indicators of earnings management activity (Healy 1985; DeAngelo 1986; Jones 1991; Dechow et al 1995; Becker et al 1998; Krishnan 2003). The decomposition of total accruals into discretionary and non-discretionary components acknowledges that not all accrual choices represent earnings management. Accruals may also be used to make financial statements more informative. The difficulty is in determining into which category the accrual choices fall.

Extensive research has been undertaken to identify the circumstances in which earnings management is more likely to occur (Jones 1991; Boynton et al 1992; De Fond and Jimbalvo 1994; Perry and Williams 1994; Wu 1997; Teoh et al 1998a, 1998b; Erickson and Wang 1999; Kasznik 1999; Wells 2002). For example, there is evidence that firms use income-increasing accruals prior to initial public offers (Teoh et al 1998b) and stock financed acquisitions (Erickson and Wang 1999), and in order to meet earnings targets (Kasznik 1999). There is also evidence of the use of income-decreasing accruals in order to reduce tax liabilities (Boynton et al 1992).

Research has demonstrated that the market differentially values discretionary and non-discretionary accruals (Guay et al 1996; Subramanyam 1996; Hribar and Collins 2002). Using the cross-sectional Jones model (DeFond and Jimbalvo 1994) to estimate non-discretionary accruals, Subramanyam (1996) finds that discretionary accruals are value-relevant, although contain less information for the market than non-discretionary accruals. This is consistent with discretionary accruals being less persistent than non-discretionary accruals and may reflect the possibility of opportunism. Additional tests reveal evidence of income smoothing that enhances the persistence and thus the predictability of earnings. Subramanyam (1996) suggests that because this income

smoothing improves the value-relevance of earnings, the manipulation of accruals is intended as a credible signal and should not be perceived as opportunistic behavior. However, there is no evidence that the opposite is not true. Management's smoothing of income may be opportunistic with the intention of enhancing value by misleading the market to believe that earnings are persistent.

Guay et al (1996) find similar results with the market placing greater reliance on non-discretionary accruals than discretionary accruals. Comparison of the commonly used discretionary accrual models reveals that the Jones model (Jones 1991) and modified-Jones model (Dechow et al 1995) estimate discretionary accruals that are consistent with income smoothing. However, Guay et al (1996) were not able to distinguish between opportunistic and performance-related use of discretionary accruals.

Whilst the literature has provided evidence of the value-relevance of discretionary accruals, the impact of earnings management on the value-relevance of earnings and book value has not been thoroughly investigated. Stock price declines and negative abnormal returns have been found for firms with severe cases of earnings management such as GAAP violations or SEC enforcements (Dechow et al 1996; Beneish 1997) but less extreme examples of earnings management have not been satisfactorily examined.

Earnings management, as signaled by high levels of discretionary accruals, provides an indicator of poor earnings reliability. The perceived lack of earnings reliability may result in the market placing less reliance on earnings in the valuation process. The focus may then shift to book value as a source of information for valuation purposes.

Proposition 2: Earnings management reduces the value-relevance of earnings and increases the value-relevance of book value.

2.4.2 Short-term and Long-term Discretionary Accruals

Discretionary accruals can contain both short-term and long-term accruals. Short-term accruals are those accruals that affect working capital accounts and reflect changes to current assets and liabilities. Long-term accruals include depreciation, future tax benefits, employee entitlements, asset revaluation, and adjustments to the fair value of financial instruments. The information content of these components of accruals has been established in the literature (Wilson 1986; Dechow 1994; Cotter 1996; Loftus and Sin 1997; Chia et al 1997; Guay and Sidhu 2001). Results predominantly suggest that short-term accruals are more value-relevant than long-term accruals (Wilson 1986; Dechow 1994; Chia et al 1997; Guay and Sidhu 2001).

The relative usefulness of the components of accruals depends on the return interval being examined. As short-term accruals tend to reverse within one year, they are most relevant for a one-year return interval. Long-term accruals become more value-relevant as the return interval increases, as they tend to reverse over longer periods or not at all (Cotter 1996; Guay and Sidhu 2001).

Chia et al (1997) examine the impact of aggregation bias through comparison of models using earnings and earnings components. The components examined were cash flows from operations, short-term accruals, and long-term accruals. By allowing the response coefficients to vary across the earnings components, the explanatory power of the model increased significantly, suggesting that each component has incremental information content over and above total earnings. The results also indicate that the value-relevance of short-term accruals is greater than that of long-term accruals. Thus, as the proportion of short-term accruals to long-term accruals increases, the value-relevance of total

accruals should increase. This suggests that short-term accruals may contribute more to the value-relevance of earnings than long-term accruals.

Furthermore, Guay and Sidhu (2001) find that the information contained in long-term accruals is obscured when total earnings is used as the sole explanatory variable. This assists in explaining the contradictory results presented by Loftus and Sin (1997). Using Australian data, they found that long-term accruals dominate short-term accruals in the earnings-return relationship. Adopting an approach similar to Dechow (1994), they compared regression models relating each of three different performance measures with returns. The three measures used were earnings, operating cash flows, and operating cash flows adjusted for short-term accruals. Rather than estimating the response coefficients for each component of earnings, they examine the relative explanatory power for each model. This approach suffers from aggregation bias by restricting the components of earnings to the same response coefficient, thus masking the incremental effects of each component.

Management can take advantage of the differential reversing characteristics of the components of accruals. As the market expects short-term accruals to reverse relatively quickly, there is little opportunity for manipulation by management. Sloan (1996) demonstrated that it can take up to three years for an accrual to reverse. However, the expected behavior of long-term accruals provides more prospects for opportunistic behavior as the manipulation of long-term accruals may remain undetected for several accounting periods if the market is not expecting a reversal to occur.

Richardson et al (2001) examined the information content of accruals with respect to earnings quality and find that long-term accruals provide more information about future

SEC enforcements than short-term accruals. Furthermore, the use of long-term accruals to manipulate financial statements has been revealed in recent corporate collapses. For example, unreliable estimates of the fair value of merchant investments and energy assets were used by Enron managers to meet unrealistic revenue targets (Benston and Hartgraves 2002). In Australia, HIH Ltd manipulated its future income tax benefit and other deferred costs in order to inflate earnings (CCH Australia 2001).

As short-term and long-term accruals have the potential to mitigate different timing and matching problems, distinguishing between these components is an important consideration in any investigation of the role of discretionary accruals as an earnings management tool. However, in the earnings management literature, the existing measures of discretionary accruals fail to address this consideration.

Earlier studies tested for earnings management using models based on total accruals. Healy (1985) used the mean total accruals from the estimation period to represent non-discretionary accruals. Similarly, DeAngelo (1986) used the previous period's total accruals as the estimate of non-discretionary accruals. The industry model proposed by Dechow and Sloan (1991) also use total accruals, estimating the non-discretionary accruals based on the industry median. No consideration is given to the short-term and long-term components of discretionary accruals in these models.

The Jones model (Jones 1991) and its modifications (DeFond and Jimbalvo 1994; Dechow et al 1995) attempt to identify the drivers of non-discretionary accruals based on a firm's economic circumstances. The two key variables included in these models are the change in revenue and the level of property, plant and equipment. The change in revenue may capture much of the short-term component of discretionary accruals whilst

property, plant and equipment may capture the long-term depreciation accrual. However, a number of potential drivers of long-term accruals are overlooked by these models. Therefore, there is a need to develop a model that decomposes total accruals in order to examine the differential effect of short-term and long-term discretionary accruals to manage earnings.

The market may perceive the use of long-term discretionary accruals as an earnings management tool differently from the use of short-term discretionary accruals. The use of long-term discretionary accruals may reduce the perception of earnings reliability more so than the use of short-term discretionary accruals as they provide greater opportunity for manipulation. Therefore, the impact on the value-relevance of earnings and book value will be greater when long-term discretionary accruals are used to manage earnings than for short-term discretionary accruals.

Proposition 3: Earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

2.5 LIMITATIONS OF THE MODEL

The model aims to test the proposition that the value-relevance of accounting information is influenced by the perceived reliability of that information. The proposed indicators of earnings management may have some limitations. Whilst the use of discretionary accruals can be theoretically justified, the construct cannot be accurately measured empirically. Firstly, the measurement error associated with the estimation of total accruals is cause for concern. Similarly, the literature indicates a high level of measurement error in the various discretionary accrual models commonly used to detect

earnings management. Therefore, the ability of these models to detect earnings management is questionable. Consequently, tests of the propositions will be joint tests of the impact of earnings management and the construct validity of the discretionary accrual models.

The model will be tested using archival data that contain the effects of all influences, not just the release of accounting information. Therefore, it may prove difficult to isolate the impact of earnings management on the value-relevance of earnings and book value.

2.6 SUMMARY

This chapter links earnings management to firm valuation. The value-relevance of accounting information is affected by the perceived reliability of the information. This study focuses on earnings and book value as the accounting information used in firm valuation and examines earnings management as an indicator of earnings reliability. Consistent with past research it uses discretionary accruals as the measure of earnings management.

If both earnings and book value are value-relevant, it is proposed that when earnings are not reliable, the market may look to book value as an alternate source of information on which to base its valuation. This research examines the impact of earnings management on the value-relevance of earnings and book value. For firm's whose discretionary accruals indicate earnings management, the value-relevance of earnings is expected to be lower than for firms without earnings management. Moreover, in the presence of earnings management, it is expected that there will be a shift from a reliance on earnings

to a reliance on book value in the valuation process. This will be reflected in a decrease in the value-relevance of earnings and an increase in the value-relevance of book value.

Earnings management may be achieved through the use of total, short-term, or long-discretionary accruals. This study will develop a method to decompose total accruals in order to investigate the differential valuation effect of earnings management via short-term and long-term discretionary accruals.

The following propositions were developed from the discussion in this chapter:

Proposition 1: Earnings and book value are positively associated with firm value.

Proposition 2: Earnings management reduces the value-relevance of earnings and increases the value-relevance of book value.

Proposition 3: The effect of long-term discretionary accruals on the value relevance of earnings and book value is greater than the effect of short-term discretionary accruals on the value relevance of earnings and book value.

CHAPTER 3 RESEARCH DESIGN

3.1 INTRODUCTION

Chapter One discussed the potential impact of earnings management on the value-relevance of accounting information. Chapter Two presented a valuation model based on earnings and book value, with earnings management incorporated as an indicator of earnings reliability. Propositions regarding the impact of earnings management on the value-relevance of earnings and book value were developed from the literature.

The methods used to empirically test the propositions are detailed in this chapter. Section 3.2 provides an overview of the research design and states the hypotheses to be tested. The sample and data collection procedures are discussed in Section 3.3. The operationalization of the dependent, independent and moderating constructs is detailed in Sections 3.4, 3.5 and 3.6 respectively. Section 3.7 identifies the control variables for inclusion in the model and Section 3.8 outlines the analysis procedures. The chapter concludes with a summary of the variables, models and hypotheses presented in Section 3.9.

3.2 OVERVIEW OF RESEARCH DESIGN

Value-relevance research investigates the association between accounting information and some measure of value. The objective is to provide an assessment of the usefulness to investors of accounting information in valuing the firm. Consistent with existing research on the value-relevance of accounting information, this study uses regression analysis to test the hypotheses. Value-relevance is represented by significant estimated regression coefficients for the accounting variables. Pooled regressions and yearly

cross-sectional regressions are estimated for the 5-year period from 1997 to 2001 inclusive.

3.2.1 Value-relevance Model

This study uses the valuation framework developed by Ohlson (1995) to examine the value-relevance of earnings and book value of equity. An empirical adaptation of Ohlson's theoretical model has been used extensively in the value-relevance literature (Burgstahler and Dichev 1997a; Collins et al 1997; Barth et al 1998; Collins et al 1999; Ou and Sepe 2002). In the empirical model, market price is a linear function of earnings and book value of equity.

$$P_{jt} = \alpha_0 + \alpha_1 E_{jt} + \alpha_2 BV_{jt} + \tau_{jt} \quad [1]$$

Where

P_{jt} = stock price for firm j at the end of the third month of year t+1

E_{jt} = earnings before extraordinary items per share for firm j in year t

BV_{jt} = book value of equity per share for firm j at end year t

τ_{jt} = error term for firm j in year t

Hypothesis 1: Earnings and book value are value-relevant.

The coefficients, α_1 and α_2 , represent the value-relevance of earnings and book value respectively. The value-relevance of earnings and book value is well established in the literature using US data. Similar results are anticipated using Australian data in this study. It is expected that both earnings and book value display a positive association with firm value. Thus, both α_1 and α_2 are expected to be positive and significant.

Hypothesis 1 can be stated in terms of the regression coefficients from Equation [1] as follows:

$$H1_0: \alpha_1 = 0, \alpha_2 = 0$$

$$H1_1: \alpha_1 > 0, \alpha_2 > 0$$

3.2.2 Earnings Management Model

The Earnings-Management Model captures the additional information provided by the indicator of earnings management through the inclusion of slope dummies for earnings and book value. Each dummy variable has a value of one when the level of discretionary accruals indicates earnings management, as defined in Section 3.6.4. The dummy variables assist in evaluating the impact of earnings management on the value-relevance of earnings and book value. The earnings management indicator is established using each of total discretionary accruals, short-term discretionary accruals, and long-term discretionary accruals.

As the value-relevance of earnings and book value may be affected by the reliability of earnings, the coefficient for each of these accounting measures is a function of earnings management as indicated by the dummy variable. An intercept dummy is also included in the model to assess the value-relevance of earnings management in its own right.

$$P_{jt} = \alpha_0 + \alpha_1 E_{jt} + \alpha_2 BV_{jt} + \tau_{jt} \quad [1]$$

With

$$\alpha_0 = a_0 + a_1 D_{jt} \quad \text{and} \quad \alpha_1 = a_2 + a_3 D_{jt} \quad \text{and} \quad \alpha_2 = a_4 + a_5 D_{jt}$$

Where

$$D_{jt} = 1 \text{ if Earnings Management; } 0 \text{ otherwise}$$

Thus

$$P_{jt} = (a_0 + a_1 D_{jt}) + (a_2 + a_3 D_{jt}) E_{jt} + (a_4 + a_5 D_{jt}) BV_{jt} + \tau_{jt}$$

$$P_{jt} = a_0 + a_1 D_{jt} + a_2 E_{jt} + a_3 E_{jt} D_{jt} + a_4 BV_{jt} + a_5 BV_{jt} D_{jt} + \tau_{jt}$$

$$P_{jt} = \beta_0 + \beta_1 D_{jt} + \beta_2 E_{jt} + \beta_3 E_{jt} D_{jt} + \beta_4 BV_{jt} + \beta_5 BV_{jt} D_{jt} + \varpi_{jt} \quad [2]$$

Hypothesis 2A: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via total discretionary accruals.

Hypothesis 2B: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals.

Hypothesis 2C: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals.

The β_2 slope coefficient represents the value-relevance of earnings in the absence of earnings management. The market's response to earnings when earnings are managed is represented by the sum of the coefficients β_2 and β_3 . Likewise, the β_4 slope coefficient represents the value-relevance of book value in the absence of earnings management. The market's response to book value when the earnings are managed is represented by the sum of the coefficients β_4 and β_5 .

The slope coefficients β_3 and β_5 represent the impact of earnings management on the value-relevance of earnings and book value respectively. Following Proposition 2, it is expected that β_3 is negative, indicating a decline in the value-relevance of earnings. Conversely, it is expected that β_5 is positive, indicating an increase in the value-relevance of book value as the market shifts its reliance away from earnings.

Hypothesis 2 can be stated in terms of the regression coefficients from Equation [2] as follows:

$$H2_0: \beta_3 = 0, \beta_5 = 0$$

$$H2_1: \beta_3 < 0, \beta_5 > 0$$

3.2.3 Extended-Earnings-Management Model

The Extended-Earnings-Management Model allows for tests of the combined valuation effect of earnings management via both short-term and long-term discretionary accruals. This is achieved through the inclusion of separate dummy variables for short-term discretionary accruals and long-term discretionary accruals. A positive dummy variable indicates the existence of earnings management.

The dummy variables are surrogates for the reliability of accounting information. The coefficients for earnings and book value are a function of both of these indicators of reliability. Intercept dummy variables are included in the model to represent earnings management via short-term discretionary accruals and earnings management via long-term discretionary accruals in order to assess the value-relevance of these sources of earnings management. The formal representation of the relationship starts with the following equation:

$$P_{jt} = \alpha_0 + \alpha_1 E_{jt} + \alpha_2 BV_{jt} + \tau_{jt} \quad [1]$$

With

$$\alpha_0 = a_0 + a_1 S_{jt} + a_2 L_{jt} \quad \text{and} \quad \alpha_1 = a_3 + a_4 S_{jt} + a_5 L_{jt} \quad \text{and} \quad \alpha_2 = a_6 + a_7 S_{jt} + a_8 L_{jt}$$

Where

$S_{jt} = 1$ if Earnings Management via short-term discretionary accruals; 0 otherwise

$L_{jt} = 1$ if Earnings Management via long-term discretionary accruals; 0 otherwise

Thus

$$P_{jt} = (a_0 + a_1S_{jt} + a_2L_{jt}) + (a_3 + a_4S_{jt} + a_5L_{jt}) E_{jt} + (a_6 + a_7S_{jt} + a_8L_{jt}) BV_{jt} + \tau_{jt}$$

$$P_{jt} = a_0 + a_1S_{jt} + a_2L_{jt} + a_3E_{jt} + a_4E_{jt}S_{jt} + a_5E_{jt}L_{jt} + a_6BV_{jt} + a_7BV_{jt}S_{jt} + a_8BV_{jt}L_{jt} + \tau_{jt}$$

$$P_{jt} = \phi_0 + \phi_1S_{jt} + \phi_2L_{jt} + \phi_3E_{jt} + \phi_4E_{jt}S_{jt} + \phi_5E_{jt}L_{jt} + \phi_6BV_{jt} + \phi_7BV_{jt}S_{jt} + \phi_8BV_{jt}L_{jt} + \xi_{jt}$$

[3]

Hypothesis 3: Earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

The ϕ_3 slope coefficient represents the value-relevance of earnings in the absence of earnings management. The impact on the value-relevance of earnings of earnings management via short-term discretionary accruals and long-term discretionary accruals is represented by ϕ_4 and ϕ_5 respectively. Similarly, the ϕ_6 slope coefficient represents the value-relevance of book value in the absence of earnings management. The impact on the value-relevance of book value of earnings management via short-term discretionary accruals and long-term discretionary accruals is represented by ϕ_7 and ϕ_8 respectively.

From Hypotheses 2B and 2C, ϕ_4 and ϕ_5 are expected to be negative. Following Proposition 3, if earnings management via long-term discretionary accruals are expected to have more of an impact than earnings management via short-term discretionary accruals, then ϕ_5 is expected to be less than ϕ_4 . Similarly, from Hypotheses 2B and 2C, ϕ_7 and ϕ_8 are expected to be positive. Therefore, if earnings management via long-term discretionary accruals are expected to have more of an impact than earnings management via short-term discretionary accruals, then ϕ_8 will be greater than ϕ_7 .

Hypothesis 3 can be stated in terms of the regression coefficients from Equation [3] as follows:

$$H3_0: \phi_4 = \phi_5, \phi_7 = \phi_8$$

$$H3_1: \phi_4 > \phi_5, \phi_7 < \phi_8$$

The Extended-Earnings-Management Model can also be used for a secondary test of Hypotheses 2B and 2C. Following Proposition 2, when earnings are managed via short-term discretionary accruals, it is expected that ϕ_4 is negative, indicating a decline in the value-relevance of earnings. Conversely, it is expected that ϕ_7 is positive, indicating an increase in the value-relevance of book value as the market shifts its reliance away from earnings in the presence of earnings management via short-term discretionary accruals. Hypothesis 2B can be stated in terms of the regression coefficients from Equation [3] as follows:

$$H2B_0: \phi_4 = 0, \phi_7 = 0$$

$$H2B_1: \phi_4 < 0, \phi_7 > 0$$

Similarly, it is expected that ϕ_5 is negative and ϕ_8 is positive in the presence of earnings management via long-term discretionary. Hypothesis 2C can be stated in terms of the regression coefficients from Equation [3] as follows:

$$H2C_0: \phi_5 = 0, \phi_8 = 0$$

$$H2C_1: \phi_5 < 0, \phi_8 > 0$$

3.3 SAMPLE AND DATA COLLECTION PROCEDURES

This study covers the reporting periods from 1997 to 2001 inclusive. The initial sample includes firms with a 30 June balance date listed on the Australian Stock Exchange. Firms in the banking, insurance and finance industry are eliminated from the sample due to unique industry regulations imposed by the Australian Prudential Regulation Authority (APRA). Also, the estimation of discretionary accruals is likely to be difficult for these industries due to the nature of industry-specific accounting practices. Stock price data and financial statement data are obtained from the SIRCA ASX and ASPECT databases respectively.

3.4 OPERATIONALIZATION OF THE DEPENDENT CONSTRUCT

Assessing the value-relevance of financial statement information requires an examination of the extent to which investors use this information in valuing the firm. Market price per share is the dependent variable in the model and is the benchmark against which the accounting information is compared.

This study aims to identify accounting measures that drive equity value. The timeliness of the information is not the primary issue, unlike that of an event study, which focuses on the price reaction. The choice of price or returns as the dependent variable depends on the question being examined. Price is appropriate when the aim is to determine the value-relevance of accounting measures, whereas returns are more appropriate when the objective is to explain changes in value over a specified time. As the focus of this study is value-relevance, it is more appropriate to use price levels rather than returns.

Although stock price is the appropriate measure theoretically, there are potential econometric problems with using this measure. The issue of scale when using a price specification is well documented (Christie 1987; Kothari and Zimmerman 1995; Barth and Kallapur 1996; Barth and Clinch 2001). Cross-sectional scale difference among firms can result in biased coefficient estimates and heteroscedasticity of the regression errors.

The issue of biased coefficient estimates can be addressed through the use of a proxy variable for scale. Common scale proxies include the number of shares outstanding, book value of equity, sales, total assets, and lagged price. These variables can be used to deflate the regression variables or be included as an independent variable in the regression (Barth and Kallapur 1996). However, it has been found that biased coefficient estimates can best be overcome through the inclusion of a scale proxy as an independent variable rather than as a deflator (Barth and Kallapur 1996).

In this study, the model is estimated on a per share basis and includes book value of equity as an independent variable. The number of shares outstanding has been criticized as a scale proxy primarily due to the fact that this number is relatively easy for management to alter and so does not necessarily reflect firm size (Easton and Sommers 2000). Book value of equity will act as a scale proxy thus addressing the problem of biased coefficients. The issue of heteroscedasticity is best addressed through the use of White (1980) standard errors to calculate the t-statistics used to test the significance of the coefficient estimates (Barth and Kallapur 1996).

The stock price used in the regression is the price per share at the end of September, 3 months after the June 30th balance date. This approach is used in order to ensure that the

stock price fully reflects the information presented in the annual reports (Hayn 1995; Cheng et al 1996; Ou and Sepe 2002).

3.5 OPERATIONALIZATION OF THE INDEPENDENT CONSTRUCTS

The two accounting measures examined in this study are earnings and book value. It is common practice in the valuation literature to define earnings as earnings before extraordinary items per share (Dechow 1994; Hayn 1995; Cheng et al 1996; Subramanyam 1996; Barth et al 1998; Barth et al 2001; Ou and Sepe 2002). This study will use earnings before extraordinary items per share as the primary measure. Earnings before abnormal items and earnings after extraordinary items will also be examined as part of the sensitivity analysis. This approach assists in the identification of discretionary accruals that may be found in the abnormal or extraordinary component of earnings. Consistent with past research, book value is defined as book value of equity per share (Barth et al 1998; Ou and Sepe 2002). The number of shares outstanding as at 30 June is used as the deflator.

3.6 OPERATIONALIZATION OF THE MODERATING CONSTRUCT

In order to test the hypotheses presented in Section 3.2, an indicator variable for earnings management must be developed. Section 2.4 presented the three alternative approaches to measuring the incidence of earnings management that are currently used in the literature.

The first approach separates aggregate accruals into discretionary and non-discretionary accruals, with the level of discretionary accruals indicating earnings management (Jones

1991; DeFond and Jimbalvo 1994; Dechow et al 1995). The assumption underlying this approach is that the level of accruals is driven by the economic conditions of the firm and by managerial discretion. This approach requires the application of regression models in which total accruals is the dependent variable and a range of accounting variables are used as the explanatory variables. The expected level of accruals is deemed to be non-discretionary and the unexpected component to be discretionary and thus susceptible to manipulation.

A second approach is the examination of the expected behavior of specific accruals. Research has investigated specific accruals including depreciation estimates and bad debt provisions (Teoh et al 1998b), bank loan loss provisions (Collins et al 1995; Liu et al 1997), insurance claim loss reserves (Beaver and McNichols 1998; Petroni et al 1999), and deferred tax valuation allowances (Visvanathan 1998; Miller and Skinner 1998). An advantage of this approach is that it enables investigation of the accruals that are most likely to be manipulated by management. However, the industry specific nature of this approach puts limitations on the sample size and limits the generalizability of results (Beneish 2001).

The third approach requires the examination of the distribution of earnings to detect discontinuities in the distribution. It is assumed that such discontinuities are an indication that firms manage earnings to meet specific benchmarks such as zero earnings, previous year's earnings, or an analyst forecast. The research provides evidence of the existence of this type of earnings management (Burgstahler and Dichev 1997b; Degeorge et al 1999; Holland and Ramsay 2003). Whilst this approach identifies the likelihood of earnings management in specific firms, it is not possible to assess the

extent of earnings management or the nature of the earnings management (Beneish 2001). As this study aims to investigate the differential effect of earnings management via short-term versus long-term discretionary accruals, the distribution approach is not appropriate.

The aggregate accruals approach is adopted in this study with the level of discretionary accruals used as the indicator of earnings management. Moreover, short-term and long-term discretionary accruals are estimated to examine the differential impact of these sources of earnings management on the value-relevance of earnings and book value.

Before discretionary accruals can be estimated, total accruals need to be identified. Accruals can be derived either from the income statement or from the balance sheet. The basic definition of total accruals is the difference between earnings and cash flow from operations. Nevertheless, most studies of accruals use balance sheet information to indirectly estimate accruals as the change in working capital excluding the change in cash (Bowen et al 1987; Jones 1991; Dechow 1994; Sloan 1996; Pfeiffer et al 1998; Bartov et al 2001; Guay and Sidhu 2001).

In this study, total accruals are determined directly as the difference between earnings before extraordinary items and cash flows from operations.

$$ACC_{j,t} = EARN_{j,t} - CFO_{j,t} \quad [4]$$

where

$ACC_{j,t}$ = Total Accruals for firm j in year t

$EARN_{j,t}$ = Earnings before extraordinary Items for firm j in year t

$CFO_{j,t}$ = Cash Flows from Operations for firm j in year t

This method results in less measurement error than the balance sheet approach for estimating accruals, due to certain non-operating items that impact on the current accounts without flowing through the income statement (Hribar and Collins 2002). Such items include reclassifications, acquisitions, divestitures, and foreign currency transactions. Consequently, as many of these items also include long-term accruals, the value-relevance of long-term accruals is underestimated when the indirect method is used to determine cash flows (Guay and Sidhu 2001). As part of the sensitivity analysis presented in Section 4.6.3, total accruals will also be estimated using earnings before abnormal items and earnings after extraordinary items.

Previous studies of the value-relevance of accrual components have provided the following definition of short-term accruals (Dechow 1994; Loftus and Sin 1997; Pfeiffer and Elgers 1999; Guay and Sidhu 2001).

$$STACC_{j,t} = \Delta AR_{j,t} + \Delta INV_{j,t} + \Delta OCA_{j,t} - \Delta AP_{j,t} - \Delta TXP_{j,t} - \Delta OCL_{j,t} \quad [5]$$

where

$STACC_{j,t}$ = Short-term Accruals for firm j in year t

$\Delta AR_{j,t}$ = Accounts Receivable at end year t less Accounts Receivable at end year t-1 for firm j

$\Delta INV_{j,t}$ = Inventory at end year t less Inventory at end year t-1 for firm j

$\Delta OCA_{j,t}$ = Other Current Assets at end year t less Other Current Assets at end year t-1 for firm j

$\Delta AP_{j,t}$ = Accounts Payable at end year t less Accounts Payable at end year t-1 for firm j

$\Delta TXP_{j,t}$ = Tax Payable at end year t less Tax Payable at end year t-1 for firm j

$\Delta OCL_{j,t}$ = Other Current Liabilities at end year t less Other Current Liabilities at end year t-1 for firm j

As total accruals are the sum of the short-term and long-term components, long-term accruals can be determined by the difference between total accruals and short-term accruals (Teoh et al 1998b).

$$LTACC_{j,t} = ACC_{j,t} - STACC_{j,t} \quad [6]$$

where

$LTACC_{j,t}$ = Long-term Accruals for firm j in year t

$ACC_{j,t}$ = Total Accruals for firm j in year t (calculated using equation [4])

$STACC_{j,t}$ = Short-term Accruals for firm j in year t (calculated using equation ([5])

The literature proposes a number of models to estimate a firm's discretionary accruals. The earliest earnings management studies use total accruals to proxy for expected non-discretionary accruals and assume that non-discretionary accruals are constant (Healy 1985; DeAngelo 1986). Jones (1991) introduced the idea that non-discretionary accruals may vary in relation to a firm's economic situation and as such, there is a need to distinguish the discretionary from the non-discretionary components of total accruals. The decomposition of accruals is most commonly achieved through the application of the Jones model (Jones 1991) or the modified-Jones model (Dechow et al 1995) either in time series or cross-sectional form (DeFond and Jimbalvo 1994).

Comparisons of these models attempted to determine the most accurate model for estimating discretionary accruals (Dechow et al 1995; Subramanyam 1996; Young 1999; Peasnell et al 2000; Thomas and Zhang 2000). These comparisons show that parameter estimates are better specified for cross-sectional than for time-series versions of the Jones and modified-Jones models (Subramanyam 1996). Estimation of a model using time-series data is limited by the number of years of data availability, whereas the

cross-sectional approach allows for a greater number of observations to be used. The cross-sectional approach also mitigates potential survivorship bias problems (DeFond and Jimbalvo 1994). Pooling by industry also improves the accuracy of the estimates (Boynton et al 1992; Dechow et al 1995) based on the assumption that industry is a good proxy for the inherent non-discretionary component of accruals. However, cross-sectional estimation of discretionary accruals also has its limitations. For example, cross-sectional models are unlikely to capture industry-wide earnings management or the effects of the mean reversion properties of accruals (Peasnell et al 2000). Despite this drawback, the cross-sectional method is used in this study.

A limitation of the existing models for estimating discretionary accruals is that these models do not effectively partition out the short-term and long-term components. Some models appear to focus on the short-term through examination of working capital accruals (Jones 1991; DeFond and Jimbalvo 1994; Dechow et al 1995). However, long-term discretionary accruals have generally been disregarded. In the Jones model (Jones 1991), the change in revenue variable may capture most of the short-term accruals, but the property, plant and equipment variable captures only one dimension of long-term accruals. Consequently, there is a need to develop models to better identify the discretionary component of short-term and long-term accruals. This study uses the Jones model (Jones 1991) as a basis for developing two distinct models to estimate short-term and long-term discretionary accruals.

3.6.1 Total Discretionary Accruals

An estimate of expected accruals for a firm is developed using the industry-based cross-sectional Jones model (Jones 1991). The modified-Jones model has been rejected for

this study as it is more applicable for firms that are ex ante likely to manage earnings (Thomas and Zhang 2000).

$$\frac{ACC_{j,t}}{TA_{j,t-1}} = \varphi_1 \left(\frac{1}{TA_{j,t-1}} \right) + \varphi_2 \left(\frac{\Delta REV_{j,t}}{TA_{j,t-1}} \right) + \varphi_3 \left(\frac{PPE_{j,t}}{TA_{j,t-1}} \right) + \varepsilon_{j,t} \quad [7]$$

where

$ACC_{j,t}$ = accruals for firm j in year t (calculated using equation [4])

$TA_{j,t-1}$ = total assets for firm j at end year t-1

$\Delta REV_{j,t}$ = revenues in year t less revenues in year t-1 for firm j

$PPE_{j,t}$ = property, plant and equipment for firm j at end year t

$\varepsilon_{j,t}$ = error term for firm j in year t

The cross-sectional regression equation is estimated for each industry sector based on the ASX classification as detailed in Appendix 1. Industry sectors are used in preference to sub-sectors in order to obtain a sufficient number of observations for the industry regressions. Unfortunately, there may be considerable diversity of firms within an industry sector which may limit the effectiveness of this approach in identifying industry-wide discretionary accruals. Sectors with less than ten firms in any one year are excluded from the analysis.

The estimated coefficients from Equation [7] are used to calculate the expected accruals for each firm. As the forecast is assumed to represent non-discretionary component of accruals, the difference between this estimation and actual accruals is deemed to be the total discretionary accruals.

$$DACC_{j,t} = \frac{ACC_{j,t}}{TA_{j,t-1}} - \left[j_1 \left(\frac{1}{TA_{j,t-1}} \right) + j_2 \left(\frac{\Delta REV_{j,t}}{TA_{j,t-1}} \right) + j_3 \left(\frac{PPE_{j,t}}{TA_{j,t-1}} \right) \right] \quad [8]$$

where

$DACC_{j,t}$ = discretionary accruals for firm j in year t

$ACC_{j,t}$ = accruals for firm j in year t (calculated using Equation [5])

$TA_{j,t-1}$ = total assets for firm j at end year t-1

$\Delta REV_{j,t}$ = revenues in year t less revenues in year t-1 for firm j

$PPE_{j,t}$ = property, plant and equipment for firm j at end year t

j_1, j_2, j_3 = industry specific estimated coefficients from Equation [7]

3.6.2 Short-term Discretionary Accruals

An estimate of expected short-term accruals for a firm is developed using the revenue component of the Jones model (Jones 1991).

$$\frac{STACC_{j,t}}{TA_{j,t-1}} = \gamma_1 \left(\frac{1}{TA_{j,t-1}} \right) + \gamma_2 \left(\frac{\Delta REV_{j,t}}{TA_{j,t-1}} \right) + \varepsilon_{j,t} \quad [9]$$

Where

$STACC_{j,t}$ = short-term accruals for firm j in year t (calculated using Equation [5])

$TA_{j,t-1}$ = total assets for firm j at end year t-1

$\Delta REV_{j,t}$ = revenues in year t less revenues in year t-1 for firm j

$\varepsilon_{j,t}$ = error term for firm j in year t

The cross-sectional regression equation is estimated for each industry. The estimated coefficients from Equation [9] are then used to calculate the expected short-term accruals for each firm. As the forecast is assumed to represent non-discretionary component of short-term accruals, the difference between this estimation and actual short-term accruals is deemed to be the discretionary component of short-term accruals.

$$\text{STDACC}_{j,t} = \frac{\text{STACC}_{j,t}}{\text{TA}_{j,t-1}} - \left[g_1 \left(\frac{1}{\text{TA}_{j,t-1}} \right) + g_2 \left(\frac{\Delta \text{REV}_{j,t}}{\text{TA}_{j,t-1}} \right) \right] \quad [10]$$

Where

$\text{STDACC}_{j,t}$ = short-term discretionary accruals for firm j in year t

$\text{STACC}_{j,t}$ = short-term accruals for firm j in year t (calculated using Equation [5])

$\text{TA}_{j,t-1}$ = total assets for firm j at end year t-1

$\Delta \text{REV}_{j,t}$ = revenues in year t less revenues in year t-1 for firm j

g_1, g_2 = industry specific estimated coefficients from Equation [9]

3.6.3 Long-term Discretionary Accruals

An estimate of expected long-term accruals for a firm is developed using the key drivers of long-term accruals. The relevant variables include property, plant and equipment, intangibles, and non-current provisions.

$$\frac{\text{LTACC}_{j,t}}{\text{TA}_{j,t-1}} = \eta_1 \left(\frac{1}{\text{TA}_{j,t-1}} \right) + \eta_2 \left(\frac{\text{PPE}_{j,t}}{\text{TA}_{j,t-1}} \right) + \eta_3 \left(\frac{\text{INT}_{j,t}}{\text{TA}_{j,t-1}} \right) + \eta_4 \left(\frac{\text{NCP}_{j,t}}{\text{TA}_{j,t-1}} \right) + \varepsilon_{j,t} \quad [11]$$

Where

$\text{LTACC}_{j,t}$ = long-term accruals for firm j in year t (calculated using Equation [6])

$\text{TA}_{j,t-1}$ = total assets for firm j at end year t-1

$\text{PPE}_{j,t}$ = property, plant and equipment for firm j at end year t

$\text{INT}_{j,t}$ = intangibles for firm j at end year t

$\text{NCP}_{j,t}$ = non-current provisions for firm j at end year t

$\varepsilon_{j,t}$ = error term for firm j in year t

Property, plant and equipment and intangibles are included to capture the accruals associated with depreciation and amortization. It is assumed that these accounts are not managed thereby leading to an estimation of non-discretionary accruals. Total non-

current provisions for the firm are included to capture any industry-specific long-term accruals such as warranty provisions and provisions for mine maintenance as well as employee entitlements.

The cross-sectional regression equation is estimated for each industry sector. For industries with less than ten firms, the observations are removed from the sample. The estimated coefficients from Equation [11] are used to calculate the expected long-term accruals for each firm. As the forecast is assumed to represent the non-discretionary component of long-term accruals, the difference between this estimation and actual long-term accruals is deemed to be the discretionary component of long-term accruals.

$$LTDACC_{j,t} = \frac{LTACC_{j,t}}{TA_{j,t-1}} - \left[h_1 \left(\frac{1}{TA_{j,t-1}} \right) + h_2 \left(\frac{PPE_{j,t}}{TA_{j,t-1}} \right) + h_3 \left(\frac{INT_{j,t}}{TA_{j,t-1}} \right) + h_4 \left(\frac{NCP_{j,t}}{TA_{j,t-1}} \right) \right] \quad [12]$$

Where

$LTDACC_{j,t}$ = long-term discretionary accruals for firm j in year t

$LTACC_{j,t}$ = long-term accruals for firm j in year t (calculated using Equation [6])

$TA_{j,t-1}$ = total assets for firm j at end year t-1

$PPE_{j,t}$ = property, plant and equipment at end year t for firm j

$INT_{j,t}$ = intangibles at end year t for firm j

$NCP_{j,t}$ = non-current provisions at end year t for firm j

h_1, h_2, h_3, h_4 = industry specific estimated coefficients from Equation [11]

3.6.4 Indicator of Earnings Management

Discretionary accruals are either positive or negative as the intent may be to manage current earnings in either direction to reach a target. Consequently, it is the magnitude rather than the direction of the accruals that is of interest. The absolute value of the discretionary accruals is used to rank firms according to the level of accrual usage. High

levels of discretionary accruals are more likely to reflect opportunistic behavior than conservative levels of discretionary accruals and thus signal low reliability of earnings. Therefore, high discretionary accruals are used as the indicator of earnings management in this study. On this basis, firms are allocated to one of two groups representing (1) Earnings Management and (2) No Earnings Management.

The allocation is achieved using two alternative benchmarks. The first approach uses the industry median as the benchmark. Firms with absolute discretionary accruals above the industry median are assigned to the “Earnings Management” group, with those below assigned to the “No Earnings Management” group. The alternative approach is to use industry quartiles as the benchmark to provide a stronger test between the two groups. The top quartile is assigned to the “Earnings Management” group and the bottom quartile to the “No Earnings Management” group. The allocation is made using each of total discretionary accruals, short-term discretionary accruals and long-term discretionary accruals. Allocation on the basis of quartiles is used for the main analysis. Comparison of the results when the median is used as the allocation basis is provided in the sensitivity analysis.

The Earnings-Management Model (Equation [2]) is estimated using total discretionary accruals, short-term discretionary accruals, and long-term discretionary accruals as the indicators of earnings management. The Extended-Earnings-Management Model (Equation [3]) requires estimation using both the short-term and long-term indicators of earnings management.

3.7 CONTROL VARIABLES

Research has identified variables that influence the relative value-relevance of earnings and book value. The control variables used in this study are Return on Equity (Burgstahler and Dichev 1997a; Penman 1998), Leverage (Barth et al 1998; Collins et al 1999), and Negative Earnings (Hayn 1995; Collins et al 1999). These factors are controlled for through inclusion of additional independent variables in the Value-relevance Model (Equation [1]), the Earnings-Management Model (Equation [2]) and the Extended-Earnings-Management Model (Equation [3]).

$$P_{jt} = \alpha_0 + \alpha_1 E_{jt} + \alpha_2 BV_{jt} + \alpha_3 ROE_{jt} + \alpha_4 LEV_{jt} + \alpha_5 NE_{jt} + v_{jt} \quad [1a]$$

$$P_{jt} = \beta_0 + \beta_1 E_{jt} + \beta_2 E_{jt} D_{jt} + \beta_3 BV_{jt} + \beta_4 BV_{jt} D_{jt} + \beta_5 ROE_{jt} + \beta_6 LEV_{jt} + \beta_7 NE_{jt} + \zeta_{jt} \quad [2a]$$

$$P_{jt} = \phi_0 + \phi_1 E_{jt} + \phi_2 E_{jt} S_{jt} + \phi_3 E_{jt} L_{jt} + \phi_4 BV_{jt} + \phi_5 BV_{jt} S_{jt} + \phi_6 BV_{jt} L_{jt} \\ + \phi_7 ROE_{jt} + \phi_8 LEV_{jt} + \phi_9 NE_{jt} + v_{jt} \quad [3a]$$

Where

ROE_{jt} = return on equity = E_{jt} / BV_{jt}

E_{jt} = earnings before extraordinary items per share for firm j in year t

BV_{jt} = book value of equity per share for firm j at end year t

LEV_{jt} = leverage = TA_{jt} / TL_{jt}

TA_{jt} = total assets for firm j at end year t

TL_{jt} = total liabilities for firm j at end year t

NE_{jt} = negative earnings = 1 if firm j has negative earnings in year t, 0 otherwise

3.8 ANALYSIS PROCEDURES

3.8.1 Preliminary Analysis

Preliminary analysis of the data includes the calculation of descriptive statistics and correlations for the market and accounting variables. This analysis is performed on the

sample as a whole as well as for sub-samples according to the presence and type of earnings management undertaken by firms. Comparisons are made between the earnings management and non earnings management firms for earnings management via total discretionary accruals, short-term discretionary accruals, and long-term discretionary accruals.

3.8.2 Determination of Earnings Management Dummy Variables

The discretionary accrual measures of earnings management are determined using Equations [4] to [12] following the procedures outlined in Section 3.6. Ordinary Least Squares (OLS) regression is used to estimate Equations [7], [9] and [11]. Firms are designated as either “earnings management” or “no earnings management”, based on their level of discretionary accruals relative to other firms in the same industry sector.

3.8.3 Tests of the Hypotheses

Pooled OLS regression is used to estimate the three models used in this study; the Value-relevance Model (Equation [1]), the Earnings-Management Model (Equation [2]), and the Extended-Earnings-Management Model (Equation [3]). Hypothesis 1 is tested using the estimated coefficients from the Value-relevance Model. The Earnings-Management Model is estimated for each of the three alternate sources of earnings management; total discretionary accruals, short-term discretionary accruals, and long-term discretionary accruals. The estimated coefficients are used to test Hypotheses 2A, 2B and 2C. A Wald test is applied to the estimated coefficients from the Extended-Earnings-Management Model to test Hypothesis 3. Hypotheses 2B and 2C are also tested using the estimated coefficients from the Extended-Earnings-Management Model.

The assumptions underlying pooled OLS regression suggest no relationship within or between each cross-section or year. If some relationship does exist and is not specified in the model, then the misspecification is captured in the error and may contaminate the coefficient estimates. This can be overcome by using either the fixed effects or random effects models.

The Generalized Least Squares (GLS) method used to estimate the random effects model is more efficient than the Least Squares with Dummy Variables (LSDV) method used to estimate the fixed effect model. However, the consistency of the estimation is questionable if the assumptions are not satisfied. Of particular concern is the assumption that the firm-specific component captured in the error term is uncorrelated with the explanatory variables. In other words, there is a trade-off between the consistency of the fixed effect model and the efficiency of the random effects model.

In a fixed effects model a different intercept is estimated for each pool member through the inclusion of firm identifying dummy variables. For the samples used in this study, this would result in a large number of parameters relative to the number of observations. Thus, the power of the model would be diminished due to the loss of degrees of freedom. The random effects model assumes that the relationship among the cross-sections is random and captured in the error term. Unfortunately, this method is susceptible to the same problems as the fixed effects model if the number of observations is small relative to the number of different pool members. Thus, neither the fixed effects model nor the random effects model is appropriate for this study due to the nature of the sample.

The pooling of firm observations may lead to bias in the t-statistics due to a lack of independence of the observations. This issue is addressed in two ways. The results are reported on an annual basis as well as for the pooled data. Although this reduces the power of the test due to the reduced sample size, it does overcome the estimation bias. Furthermore, to control for possible heteroscedasticity in the residuals, the significance of the coefficients is tested using White's heteroscedasticity-consistent standard errors.

3.8.4 Sensitivity Analysis

The initial sensitivity analysis aims to control for known influences on the relative value-relevance of earnings and book value. Return on equity, leverage, and negative earnings are included as additional explanatory variables in the Value-relevance Model (Equation [1a]), Earnings-Management Model (Equation [2a]), and the Extended-Earnings-Management Model (Equation [3a]) as presented in Section 3.7.

The primary analysis is undertaken using the industry quartiles as the earnings management allocation method as discussed in Section 3.6.4. To test the robustness of the results, the models are estimated using the earnings management dummy and interaction variables based on the industry median as the benchmark.

Further sensitivity analysis will consider an alternative definition of earnings. The earnings variable in the each model is replaced with earnings before abnormal items and earnings after extraordinary items. The models are then re-estimated using OLS regression and the hypotheses tested using the new coefficients. The comparison will also require the recalculation of the indicator of earnings management via total discretionary accruals and long-term discretionary accruals as these accruals differ depending on the measure of earnings. Short-term accruals are unaffected by the

measure of earnings as can be seen in the definition provided by Equation [5] in Section 3.6.

3.9 SUMMARY

This chapter described the empirical analysis required to test the propositions presented in Chapter Two. Discussion of the operationalization of the constructs provides definitions of the variables used in the models. A summary of these definitions is presented in Table 3.1. The hypotheses were developed from the propositions in conjunction with the discussion of the analysis procedures. Tables 3.2 and 3.3 present a summary of the models and hypotheses respectively.

Table 3-1 Definition of Variables

SYMBOL	VARIABLE	DEFINITION
P_{jt}	Market Price	Stock price for firm j at end of the third month of year t+1
E_{jt}	Earnings	Earnings before extraordinary items per share for firm j in year t
BV_{jt}	Book Value	Book value of equity per share for firm j at end year t
D_{jt}	Earnings Management Dummy	D = 1 if Earnings Management, 0 otherwise
S_{jt}	Short-term Discretionary Accruals Earnings Management Dummy	S = 1 if Earnings Management via short-term discretionary accruals; 0 otherwise
L_{jt}	Long-term Discretionary Accruals Earnings Management Dummy	L = 1 if Earnings Management via long-term discretionary accruals; 0 otherwise
$ACC_{j,t}$	Total Accruals	Total accruals for firm j in year t
$EARN_{j,t}$	Earnings	Earnings before extraordinary items for firm j in year t
$CFO_{j,t}$	Cash Flows from Operations	Cash flows from operations for firm j in year t
$TA_{j,t-1}$	Total Assets	Total assets for firm j at end year t-1
$\Delta REV_{j,t}$	Change in Revenue	Revenues in year t less revenues in year t-1 for firm j
$PPE_{j,t}$	Property, Plant and Equipment	Property, plant and equipment at end year t for firm j
$INT_{j,t}$	Intangibles	Intangibles at end year t for firm j
$NCP_{j,t}$	Non-current provisions	Non-current provisions at end year t for firm j
$DACC_{j,t}$	Discretionary Accruals	Discretionary accruals for firm j in year t
$STACC_{j,t}$	Short-term Accruals	Short-term accruals for firm j in year t
$LTACC_{j,t}$	Long-term Accruals	Long-term accruals for firm j in year t
$STDACC_{j,t}$	Short-term Discretionary Accruals	Short-term discretionary accruals for firm j in year t
$LTDACC_{j,t}$	Long-term Discretionary Accruals	Long-term discretionary accruals for firm j in year t
$\Delta AR_{j,t}$	Change in Accounts Receivables	Accounts receivable at end year t less accounts receivable at end year t-1 for firm j
$\Delta INV_{j,t}$	Change in Inventories	Inventory at end year t less inventory at end year t-1 for firm j
$\Delta OCA_{j,t}$	Change in Other Current Assets	Other current assets at end year t less other current assets at end year t-1 for firm j
$\Delta AP_{j,t}$	Change in Accounts Payable	Accounts payable at end year t less accounts payable at end year t-1 for firm j
$\Delta TXP_{j,t}$	Change in Tax Payable	Tax payable at end year t less tax payable at end year t-1 for firm j
$\Delta OCL_{j,t}$	Change in Other Current Liabilities	Other current liabilities at end year t less other current liabilities at end year t-1 for firm j
ROE_{jt}	Return on Equity	EB_{jt} / BV_{jt}
LEV_{jt}	Leverage	TA_{jt} / TL_{jt}
TA_{jt}	Total Assets	Total Assets for firm j at end year t
TL_{jt}	Total Liabilities	Total Liabilities for firm j at end year t
NE_{jt}	Negative Earnings	NE = 1 if firm j has negative earnings in year t, 0 otherwise

Table 3-2 Summary of Models

<p>Value-relevance Model [1]</p> $P_{jt} = \alpha_0 + \alpha_1 E_{jt} + \alpha_2 BV_{jt} + \tau_{jt}$
<p>Earnings-Management Model [2]</p> $P_{jt} = \beta_0 + \beta_1 D_{jt} + \beta_2 E_{jt} + \beta_3 E_{jt} D_{jt} + \beta_4 BV_{jt} + \beta_5 BV_{jt} D_{jt} + \varpi_{jt}$
<p>Extended-Earnings-Management Model [3]</p> $P_{jt} = \phi_0 + \phi_1 S_{jt} + \phi_2 L_{jt} + \phi_3 E_{jt} + \phi_4 E_{jt} S_{jt} + \phi_5 E_{jt} L_{jt} + \phi_6 BV_{jt} + \phi_7 BV_{jt} S_{jt} + \phi_8 BV_{jt} L_{jt} + \xi_{jt}$
<p>Value-relevance Model with Control Variables [1a]</p> $P_{jt} = \alpha_0 + \alpha_1 E_{jt} + \alpha_2 BV_{jt} + \alpha_3 ROE_{jt} + \alpha_4 LEV_{jt} + \alpha_5 NE_{jt} + \upsilon_{jt}$
<p>Earnings-Management Model with Control Variables [2a]</p> $P_{jt} = \beta_0 + \beta_1 E_{jt} + \beta_2 E_{jt} D_{jt} + \beta_3 BV_{jt} + \beta_4 BV_{jt} D_{jt} + \beta_5 ROE_{jt} + \beta_6 LEV_{jt} + \beta_7 NE_{jt} + \zeta_{jt}$
<p>Extended-Earnings-Management Model with Control Variables [3a]</p> $P_{jt} = \phi_0 + \phi_1 E_{jt} + \phi_2 E_{jt} S_{jt} + \phi_3 E_{jt} L_{jt} + \phi_4 BV_{jt} + \phi_5 BV_{jt} S_{jt} + \phi_6 BV_{jt} L_{jt} \\ + \phi_7 ROE_{jt} + \phi_8 LEV_{jt} + \phi_9 NE_{jt} + \upsilon_{jt}$

Table 3-3 Summary of Hypotheses

<p>Hypothesis 1: Earnings and book value are value-relevant.</p>	<p>H1₀: $\alpha_2 = 0, \alpha_3 = 0$ H1₁: $\alpha_2 > 0, \alpha_3 > 0$</p>	<p>Equation [1]</p>
<p>Hypothesis 2A: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via total discretionary accruals.</p>	<p>H2A₀: $\beta_3 = 0, \beta_5 = 0$ H2A₁: $\beta_3 < 0, \beta_5 > 0$</p>	<p>Equation [2]</p>
<p>Hypothesis 2B: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals.</p>	<p>H2B₀: $\beta_3 = 0, \beta_5 = 0$ H2B₁: $\beta_3 < 0, \beta_5 > 0$</p>	<p>Equation [2]</p>
	<p>H2B₀: $\phi_4 = 0, \phi_7 = 0$ H2B₁: $\phi_4 < 0, \phi_7 > 0$</p>	<p>Equation [3]</p>
<p>Hypothesis 2C: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals.</p>	<p>H2C₀: $\beta_3 = 0, \beta_5 = 0$ H2C₁: $\beta_3 < 0, \beta_5 > 0$</p>	<p>Equation [2]</p>
	<p>H2C₀: $\phi_5 = 0, \phi_8 = 0$ H2C₁: $\phi_5 < 0, \phi_8 > 0$</p>	<p>Equation [3]</p>
<p>Hypothesis 3: Earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.</p>	<p>H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$ H3₁: $\phi_4 > \phi_5, \phi_7 < \phi_8$</p>	<p>Equation [3]</p>

CHAPTER 4 ANALYSIS AND HYPOTHESIS TESTS

4.1 INTRODUCTION

This chapter details the results from the tests of hypotheses presented in Chapter Three. Section 4.2 outlines the sample selection and Section 4.3 presents the results of the univariate analysis. Section 4.4 describes the development of the dummy variables for earnings management through the estimation of total, short-term, and long-term discretionary accruals. The results of the tests of hypotheses are presented in Section 4.5. The sensitivity analysis discussed in Section 4.6 includes estimation of the models incorporating control variables, using an alternate benchmark for the earnings management allocation and using alternate measures of earnings. Section 4.7 provides a summary of the findings.

4.2 SAMPLE SELECTION

The initial sample included all firms listed on the Australian Stock Exchange (ASX) with a balance date of June 30. The stock price and financial data were obtained from the SIRCA ASX and Aspect databases respectively. Whilst these databases contain a comprehensive selection of ASX listed firms, discrepancies between the databases resulted in missing observations and the subsequent removal of firms from the sample. The inconsistencies primarily relate to changes in firm names and the associate code changes. The price data are listed using the code at the time of the stock trade, regardless of any subsequent name changes. However, the accounting data are listed using the most recent code for the firm. Thus, the price data and accounting data for the same firm and year may be listed under two different codes. Whilst every effort was made to identify these firms and make the appropriate changes, the situation was further

exacerbated by the incomplete list of company name changes provided with the databases.

Firms in the financial, banking and insurance industries (ASX Sectors³ 16, 17, 19 & 20) were excluded from the sample. This eliminated firms in industries with regulations that may potentially affect the use of discretionary. As OLS regression is used to determine the dummy variables for earnings management, it is necessary to only include industries with sufficient firm observations to ensure unbiased estimation of the regression models. Thus, industries with less than 10 firms in any one year were excluded from the sample. This resulted in the removal of firms in ASX Sectors 3, 5, 7, 10, 12, and 14. The remaining 2900 firm observations are drawn from 807 firms. Table 4-1 outlines the sample distribution across the five years 1997 to 2001. This sample is used to test Hypothesis 1 which states that earnings and book value are value-relevant.

Table 4-1 Sample for Value-relevance Model – Equation [1]

Year	1997	1998	1999	2000	2001	Pooled
All Firms June 30 Balance Date	924	988	1064	1085	1104	5165
Less						
Missing Data	179	215	260	196	234	1084
ASX Sectors 16, 17, 19 & 20	167	178	188	178	183	894
Outliers	24	21	34	25	29	133
ASX Sectors 3, 5, 7, 10, 12, & 14	32	33	31	32	26	154
Sample	522	541	551	654	632	2900

Notes:

Data missing from either the SIRCA ASX or Aspect databases.

ASX Sectors 16, 17, 19 & 20 are financial, banking and insurance industries.

Outliers are in the top and bottom 1% of earnings, top 1% of book value, or negative book value⁴.

ASX Sectors 3, 5, 7, 10, 12, & 14 are industries with less than 10 firm observations in any one year.

³ ASX Sectors are listed in Appendix 1.

⁴ Due to the sensitivity of regression to extreme outliers, firm observations were eliminated if they fell in the top or bottom 1% of earnings per share, the top 1% of book value per share or negative book value per share.

The tests of Hypotheses 2 and 3 examine the market response to earnings and book value in the presence of earnings management. This requires the categorization of each firm as either engaging in earnings management or not. Examining the absolute value of a firm's discretionary accruals relative to other firms in the same industry establishes the presence of earnings management. The absolute value is used as it is the size of the discretionary accruals rather than the direction that is an indicator of earnings management (Becker et al 1998; Francis et al 1999; Krishnan 2003).

The hypotheses are tested for two alternative measures of earnings management. The first approach uses the industry median for absolute discretionary accruals as the benchmark to divide the sample with firms above the median being classified as earnings management firms and those below the median as non-earnings management firms. The second approach allocates firms using industry quartiles. A firm is deemed to engage in earnings management if the absolute value of its discretionary accruals is in the top quartile in the industry. Firms in the bottom quartile are deemed to not engage in earnings management. This classification method requires a more rigorous allocation of firms than when using the median, thus allowing stronger tests of the hypotheses. For this reason, the quartile benchmark is used for the primary analysis in this study.

Tables 4-2, 4-3, and 4-4 provide summaries of the samples resulting from the use of dummy variables created using industry quartiles. This measure of earnings management excludes the middle two quartiles from the sample. The observations are removed on the basis of their discretionary accruals within each industry rather than for the sample as a whole. Consequently, the number of observations excluded was not exactly half of the original sample. The earnings management dummy variable was

generated for each of the three forms of earnings management as measured by total discretionary accruals, short-term discretionary accruals, and long-term discretionary accruals. The creation of the dummy variable based on total discretionary accruals resulted in the exclusion of 1452 firm observations, leaving a sample of 1448. When the short-term earnings management dummy variable was created, 1441 of the original 2900 firm observations were eliminated, resulting in a sample size of 1459. Only 1408 firm observations were removed when creating the long-term earnings management dummy variable, resulting in a sample size of 1492. These samples were used for the tests of Hypotheses 2A, 2B, and 2C which examine the value-relevance of earnings in the presence of earnings management.

**Table 4-2 Sample for Earnings-Management Model – Equation [2]
Earnings Management via Total Discretionary Accruals**

Year	1997	1998	1999	2000	2001	Pooled
Full Sample	522	541	551	654	632	2900
<i>Less</i> Middle Quartiles	260	268	280	327	317	1452
Sample	262	273	271	327	315	1448

**Table 4-3 Sample for Earnings-Management Model – Equation [2]
Earnings Management via Short-term Discretionary Accruals**

Year	1997	1998	1999	2000	2001	Pooled
Full Sample	522	541	551	654	632	2900
<i>Less</i> Middle Quartiles	260	266	280	322	313	1441
Sample	262	275	271	332	319	1459

**Table 4-4 Sample for Earnings-Management Model – Equation [2]
Earnings Management via Long-term Discretionary Accruals**

Year	1997	1998	1999	2000	2001	Pooled
Full Sample	522	541	551	654	632	2900
<i>Less</i> Middle Quartiles	255	259	275	314	305	1408
Sample	267	282	276	340	327	1492

Additional loss of firm observations occurred when preparing the sample to run the regressions for the Extended-Earnings-Management Model (Equation [3]). As the model requires values for both the short-term and long-term earnings management dummy variables, firm observations without values for either of these variables were eliminated. For example, a firm may be in the top or bottom quartile for short-term discretionary accruals but may be in either of the middle quartiles for long-term discretionary accruals. Such a firm would not have a value for the long-term dummy variable and would be excluded from the sample.

The absence of a value for the dummy variable is not an indication that the firm does not engage in earnings management. Rather, it means that the firm's discretionary accruals did meet the criterion indicating either the presence or absence of earnings management. Consequently no value was assigned for the dummy variable.

Table 4-5 reports that 2122 firm observations were removed due to the exclusion of the two middle quartiles based on both short-term and long-term discretionary accruals. This resulted in a final sample of 778 firm observations to be used to test the value-relevance of earnings management via long-term discretionary accruals and earnings management via short-term discretionary accruals (Hypothesis 3).

Table 4-5 Sample for Extended-Earnings-Management Model – Equation [3]

Year	1997	1998	1999	2000	2001	Pooled
Full Sample	522	541	551	654	632	2900
<i>Less</i> Middle Quartiles	386	395	415	470	456	2122
Sample	136	146	136	184	176	778

Table 4-6 provides a summary of the samples to be used for each of the hypotheses. Hypothesis 1 is tested using the full sample of 2900 firm observations. Hypotheses 2A,

2B and 2C are tested using samples of 1448, 1459 and 1492 firm observations respectively. Hypothesis 3 is tested using the final sample of 778 firm observations. This sample is also used for a secondary test of Hypotheses 2B and 2C.

Table 4-6 Samples for Tests of Hypotheses

Year	1997	1998	1999	2000	2001	Pooled
H1: Earnings and book value are value-relevant.	522	541	551	654	632	2900
H2A: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via total discretionary accruals.	262	273	271	327	315	1448
H2B: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals.	262	275	271	332	319	1459
H2C: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals.	267	282	276	340	327	1492
H3: Earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.	136	146	136	184	176	778

4.3 UNIVARIATE ANALYSIS

4.3.1 Descriptive Statistics

Descriptive statistics were generated for the samples used to test each of the hypotheses. Hypothesis 1 is tested using the full sample of 2900 firm observations. The descriptive statistics for the key variables in this model are presented in Table 4-7.

The Earnings-Management Model is estimated for each of the three definitions of earnings management; (1) earnings management via total discretionary accruals, (2) earnings management via short-term discretionary accruals, and (3) earnings

management via long-term discretionary accruals. Table 4-8 presents the descriptive statistics for the sample used to estimate the Earnings-Management Model (Equation [2]) when the earnings management dummy variable is derived from discretionary accruals estimated by the Jones model (Jones 1991). The descriptive statistics for the sample based on earnings management via short-term discretionary accruals are reported in Table 4-9. Table 4-10 presents the descriptive statistics for the sample based on earnings management via long-term discretionary accruals.

**Table 4-7 Descriptive Statistics – Market, Accounting and Control Variables
Sample for Value-Relevance Model – Equation [1]**

	ALL FIRMS n = 2900					
	P	E	BV	LEV	ROE	NE
Mean	1.150	0.025	0.608	0.346	-0.527	0.566
Standard Deviation	2.519	0.152	0.941	0.252	3.621	0.496
Minimum	0.002	-0.630	0.000	0.000	-90.481	0.000
Maximum	46.600	0.938	7.848	1.493	7.788	1.000

Notes:

E - Earnings before extraordinary items per share at time t

BV - Book value per share at time t

P - Stock price per share at time t + 3 months

LEV - Leverage (Total Assets/Total Liabilities)

ROE - Return on Equity

NE - Negative Earnings

Regardless of the source of earnings management, firms that manage earnings display lower stock price, earnings per share and book value per share than non-earnings management firms. The lower earnings figures suggest firms that typically engage in earnings management are the poorer performing firms. Furthermore, the lower stock price indicates that the market may interpret the use of discretionary accruals as earnings management rather than as a signal to the market. As indicated by the standard deviation, the variability of stock price, earnings per share and book value per share is lower for earnings management firms. This may be the result of firms using earnings management to smooth earnings in an attempt demonstrate stability to the market.

**Table 4-8 Descriptive Statistics – Market, Accounting and Control Variables
Sample for Earnings-Management Model – Equation [2]
Earnings Management via Total Discretionary Accruals**

	Earnings Management n = 716			No Earnings Management n = 732		
	P	E	BV	P	E	BV
Mean	0.812	-0.021	0.343	1.392	0.050	0.787
Standard Deviation	2.392	0.151	0.606	2.807	0.154	1.155
Minimum	0.006	-0.630	0.000	0.002	-0.377	0.001
Maximum	46.600	0.686	5.218	44.950	0.884	7.848

Notes: E - Earnings before extraordinary items per share at time t
BV - Book value per share at time t
P - Stock price per share at time t + 3 months

**Table 4-9 Descriptive Statistics – Market, Accounting and Control Variables
Sample for Earnings-Management Model – Equation [2]
Earnings Management via Short-term Discretionary Accruals**

	Earnings Management n = 725			No Earnings Management n = 734		
	P	E	BV	P	E	BV
Mean	0.836	0.009	0.418	1.393	0.037	0.813
Standard Deviation	1.547	0.136	0.628	2.535	0.172	1.178
Minimum	0.005	-0.630	0.000	0.006	-0.549	0.001
Maximum	16.250	0.784	4.712	19.350	0.884	7.248

Notes: E - Earnings before extraordinary items per share at time t
BV - Book value per share at time t
P - Stock price per share at time t + 3 months

**Table 4-10 Descriptive Statistics – Market, Accounting and Control Variables
Sample for Earnings-Management Model – Equation [2]
Earnings Management via Long-term Discretionary Accruals**

	Earnings Management n = 725			No Earnings Management n = 734		
	P	E	BV	P	E	BV
Mean	0.696	-0.009	0.385	1.337	0.038	0.704
Standard Deviation	1.495	0.144	0.697	2.909	0.147	1.056
Minimum	0.005	-0.549	0.000	0.002	-0.462	0.001
Maximum	13.481	0.938	5.165	44.950	0.796	7.848

Notes: E - Earnings before extraordinary items per share at time t
BV - Book value per share at time t
P - Stock price per share at time t + 3 months

The Extended-Earnings-Management Model (Equation [3]) includes dummy variables for earnings management via both short-term and long-term discretionary accruals. The sample used for the estimation of this model includes firms that engage in earnings management through the use of either short-term discretionary accruals, long-term discretionary accruals or both. Consequently, firms in this sample fall into one of four categories;

- (1) No earnings management,
- (2) Earnings management via both short-term and long-term discretionary accruals,
- (3) Earnings management via short-term discretionary accruals only, or
- (4) Earnings management via long-term discretionary accruals only.

Table 4-11 provides descriptive statistics for the market and accounting variables for the sample of 778 firm observations and separated into the four categories outlined above. A preliminary examination of the descriptive statistics reveals differences in the key variables between the categories. Firms with earnings management exhibit lower stock price, earnings per share and book value per share than firms with no earnings management. Moreover, firms using long-term rather than short-term discretionary accruals to manage earnings have lower stock price, earnings per share and book value per share. This suggests a differential role of short-term versus long-term discretionary accruals as the means of earnings management.

**Table 4-11 Descriptive Statistics – Market, Accounting and Control Variables
Sample for Extended-Earnings-Management Model – Equation [3]**

ALL FIRMS n = 778						
	P	E	BV			
Mean	0.982	0.012	0.544			
Standard Deviation	1.969	0.145	0.897			
Minimum	0.006	-0.549	0.000			
Maximum	16.250	0.784	7.191			

(1) No Earnings Management n = 235			(2) Earnings Management Short-term AND Long-term n = 310			
	P	E	BV	P	E	BV
Mean	1.243	0.034	0.813	0.653	-0.004	0.356
Standard Deviation	2.275	0.138	1.180	1.229	0.114	0.607
Minimum	0.007	-0.327	0.001	0.006	-0.501	0.000
Maximum	15.900	0.774	7.191	9.990	0.607	4.712

(3) Earnings Management Short-term only n = 112			(4) Earnings Management Long-term only n = 121			
	P	E	BV	P	E	BV
Mean	1.226	0.029	0.541	1.097	-0.004	0.509
Standard Deviation	2.198	0.169	0.676	2.486	0.193	0.932
Minimum	0.007	-0.430	0.001	0.006	-0.549	0.003
Maximum	16.250	0.784	3.182	13.481	0.686	5.165

Notes:

E - Earnings before extraordinary items per share at time t

BV - Book value per share at time t

P - Stock price per share at time t + 3 months

LEV - Leverage (Total Assets/Total Liabilities)

ROE - Return on Equity

NE - Negative Earnings

The development of the dummy variables required the calculation of total, short-term and long-term accruals. Table 4-12 presents descriptive statistics for total, short-term and long-term accruals scaled by total assets. The mean total accruals are negative at 9.7% of total assets. However there is a clear distinction between the short-term and

long-term component of accruals. The mean short-term accruals are positive at 4.2% of total assets whereas mean long-term accruals are negative at 13.9% of total assets. The standard deviation, maximum and minimum values suggest considerable variation in these components of accruals. However, for both short-term and long-term accruals, approximately 96% of firms have accruals within one standard deviation of the mean. The firms with extreme values for short-term and long-term accruals are not excluded from the sample as outliers because these are potentially the earnings management firms that are the focus of this study.

Table 4-12 Descriptive Statistics – Accruals

	Full Sample n = 2900		
	ACC	STACC	LTACC
Mean	-0.097	0.042	-0.139
Standard Deviation	1.086	0.708	0.828
Minimum	-26.811	-3.808	-27.197
Maximum	27.291	27.443	7.163

Notes:

ACC – Total Accruals scaled by Total Assets

STACC – Short-term Accruals scaled by Total Assets

LTACC – Long-term Accruals scaled by Total Assets

The positive-mean short-term accruals suggest that firms use short-term accruals to manage earnings upwards. Conversely, the negative-mean long-term accruals imply the downward management of earnings via long-term accruals. This indicates a need to distinguish between short-term and long-term discretionary accruals when determining the presence and impact of earnings management. Application of the Jones model (Jones 1991) provides an estimate of total discretionary accruals in which the positive short-term accruals may be offset by the negative long-term accruals thus masking earnings management. This supports the need for separate models to estimate the short-term and long-term discretionary accruals.

4.3.2 Correlation Coefficients

Tables 4-13 and 4-14 report the Pearson correlation coefficients measuring the relationship between stock price and each of the independent variables, earnings per share and book-value per share. Correlation coefficients were calculated for the full sample and for the sub-samples of earnings management and non-earnings management firms based on the three sources of earnings management.

When firms manage earnings via total or short-term discretionary accruals, there is a reduction in the strength of the relationship between earnings and price, and between book value and price. However, for earnings management via long-term discretionary accruals the decline in correlation between earnings and price is offset by an increase in correlation between book value and price. This suggests that earnings management via long-term discretionary accruals has a different effect on value-relevance than other forms of earnings management.

Table 4-13 Pearson Correlation of Earnings with Price & Book Value with Price Samples for Value-relevance and Earnings Management Models

Hypothesis		Correlation with Price		
		EPS	BVPS	n
H1	All Firms	0.597***	0.651***	2900
H2A	No Earnings Management	0.678***	0.710***	732
	Earnings Management via Total Discretionary Accruals	0.437***	0.498***	716
	All Firms	0.576***	0.634***	1448
H2B	No Earnings Management	0.718***	0.750***	734
	Earnings Management via Short-term Discretionary Accruals	0.532***	0.656***	725
	All Firms	0.657***	0.731***	1459
H2C	No Earnings Management	0.618***	0.635***	748
	Earnings Management via Long-term Discretionary Accruals	0.588***	0.799***	744
	All Firms	0.590***	0.793***	1492

Notes: *** Significant at 1%, two-tailed.

Table 4-14 Pearson Correlation of Earnings with Price & Book Value with Price Sample for Extended-Earnings-Management Model

Hypothesis	Correlation with Price			
	EPS	BVPS	n	
H3	No Earnings Management	0.733***	0.708***	235
	Earnings Management via Short-term and Long-term Discretionary Accruals	0.485***	0.751***	310
	Earnings Management via Short-term Discretionary Accruals	0.572***	0.519***	112
	Earnings Management via Long-term Discretionary Accruals	0.712***	0.827***	121
	All Firms	0.642***	0.707***	778

Notes: *** Significant at 1%, two-tailed.

Where there is no earnings management, earnings per share displays a higher correlation with price ($\rho = 0.733$, $p = 0.00$) than does book value per share ($\rho = 0.708$, $p = 0.00$). However, when a firm engages in earnings management via both short-term and long-term discretionary accruals, this relationship is reversed. The correlation between price and earnings per share is lower in the presence of earnings management ($\rho = 0.485$, $p = 0.00$) whereas the correlation between price and book value per share is higher ($\rho = 0.751$, $p = 0.00$). This is consistent with the proposition that earnings management reduces the value-relevance of earnings and increases the value-relevance of book value.

The differential impact of short-term versus long-term discretionary accruals is also evident in these correlations. When earnings management is via short-term discretionary accruals alone, the correlation of earnings with price ($\rho = 0.572$, $p = 0.00$) is greater than the correlation of book value with price ($\rho = 0.519$, $p = 0.00$). However, the correlations are weaker than for firms with no earnings management, suggesting that earnings management via short-term discretionary accruals reduces the value-relevance of both earnings and book value.

In contrast, when earnings management is via long-term discretionary accruals alone, the correlation of earnings with price ($\rho = 0.712$, $p = 0.00$) is less than the correlation of book value with price ($\rho = 0.824$, $p = 0.00$). These figures represent a weaker relationship with earnings but a stronger relationship with book value compared to firms with no earnings management.

4.4 DISCRETIONARY ACCRUALS

Chapter Three presented three models to estimate the discretionary component of accruals to be used in developing dummy variables to represent earnings management. The first model provides an estimate of total discretionary accruals and is commonly referred to as the Jones model (Jones 1991). Using this model as a foundation, two other models were developed; one to estimate short-term discretionary accruals and the other to estimate long-term discretionary accruals.

In order to apply these models it is first necessary to estimate total accruals and its short-term and long-term components. This is achieved through the application of Equations [4] through [6] as presented in Section 3.6. Total accruals are calculated as the difference between earnings before extraordinary items and cash flows from operations (Equation [4]). Short-term accruals are estimated as the change in non-cash current assets less the change in current liabilities (Equation [5]). Long-term accruals are defined as the difference between total accruals and short-term accruals (Equation [6]) as determined by Equations 4 and 5.

The Jones Model, represented by Equation [7], uses change in revenue and the level of property, plant and equipment as the explanatory variables for predicting total accruals. Ordinary least squares (OLS) regression is used to estimate this equation by industry for

each year. The resulting model is then used to calculate the expected total accruals for each firm. The same method is applied to estimate expected short-term accruals and expected long-term accruals. Equation [9] models the relationship between short-term accruals and change in revenue. Equation [11] models property, plant and equipment, intangibles, and non-current provisions as explanatory variables for long-term accruals.

The calculation of the total, short-term, or long-term discretionary accruals requires the estimation of 140 regression equations, covering 14 industries across 5 years. As the results of these estimations are too numerous to efficiently report, an example for one industry is presented in Appendix 2. Additionally, Equations [7], [9] and [11] were also estimated for the full sample to demonstrate the explanatory power of these models. The results of these regressions are presented in Tables 4-15, 4-16, and 4-17.

Table 4-15 Estimation of Jones Model for Total Accruals

Equation [7]: $ACC_t = \varphi_1 + \varphi_2\Delta REV_t + \varphi_3PPE_t + \varepsilon$				
Adj R ²	γ_1	γ_2	γ_3	N
0.201	169,061.86	0.20	-0.25	2900
(244.88)***	(13.37)***	(27.16)***	(16.82)***	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

Pooled: 1997-2001

Table 4-16 Estimation of Short-term Accrual Model

Equation [9]: $STACC_t = \gamma_1 + \gamma_2\Delta REV_t + \varepsilon$			
Adj R ²	γ_1	γ_2	N
0.319	372,733.68	0.15	2900
(680.93)***	(35.98)***	(26.00)***	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

Pooled: 1997-2001

Table 4-17 Estimation of Long-Term Accrual Model

Equation [11]: $LTACC_t = \eta_1 + \eta_2PPE_t + \eta_3INT_t + \eta_4NCP_t + \varepsilon$					
Adj R ²	η_1	η_2	η_3	η_4	N
0.191	-247,201.34	-0.19	-0.05	-0.41	2900
(172.57)***	(21.50)***	(9.27)***	(2.90)***	(2.54)**	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

Pooled: 1997-2001

All three models are significant at the 1% level. The Jones model has an explanatory power of 20.1%. The short-term model has a higher explanatory power of 31.9% whereas the long-term model has a slightly lower explanatory power of 19.1%. The positive intercept and coefficients in the short-term model suggest an expectation of positive short-term accruals. Conversely, the negative intercept and coefficients in the long-term model suggest an expectation of negative long-term accruals. This is also reflected in the coefficients in the Jones model. The coefficient on change in revenue is positive and the coefficient on property, plant and equipment is negative. These results are consistent with the descriptive statistics presented in Table 4-12.

The calculation of the discretionary component of accruals requires the assumption that the expected level of accruals represents the non-discretionary component. That is, the discretionary component is the difference between the actual and the expected accruals. This difference is calculated using Equations [8], [10] and [12] for total accruals, short-term accruals and long-term accruals respectively. For the full sample of 2900 firm observations, the mean short-term discretionary accruals is -0.007, which is not significantly different from zero ($t = 1.07$, $p = 0.284$).

This is indicative of the reversing nature of short-term accruals. By definition, short-term accruals are expected to exist only in the short-run with the market anticipating

reversal within one accounting period. Therefore, an average of zero for short-term discretionary accruals may simply reflect positive accruals in one year canceling out negative accruals from the previous year. This explanation does not apply for long-term accruals as the reversal may occur at any time in the future. The mean long-term discretionary accruals of -0.055 is significantly different from zero ($t = 5.21$, $p = 0.000$). This suggests that long-term accruals may be used for downward earnings management.

As discussed in Section 4.2, the industry median and quartiles were used to allocate firms as either earnings management firms or non-earnings management firms. The absolute values are used as it is the size and not the direction of the discretionary accruals that reflects earnings management. Table 4-18 provides a comparison of the mean absolute discretionary accruals for earnings management and non-earnings management firms.

Table 4-18 Comparison of Mean Absolute Discretionary Accruals for Earnings Management and Non-Earnings Management Firms

	EM Firms	Non-EM Firms	Difference in Means	n
	Mean	Mean		
Absolute Total Discretionary Accruals	0.5236	0.0261	0.4976 (13.84)***	1488
Absolute Short-term Discretionary Accruals	0.4031	0.0154	0.3876 (22.75)***	1459
Absolute Long-term Discretionary Accruals	0.5712	0.1063	0.4649 (8.76)***	1492

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

EM - Earnings Management

Absolute Discretionary Accruals scaled by Total Assets

t-statistics are in parentheses. Calculated assuming unequal variances.

The allocation method generates groups with significantly different means for short-term discretionary accruals and long-term discretionary accruals. The means are in line with expectations given the allocation method. That is, the mean absolute discretionary

accruals are higher for firms with earnings management than for firms with no earnings management.

As the discretionary accruals generated by these models are scaled by total assets, the values can be interpreted as a percentage of total assets. For firms that manage earnings, the mean absolute discretionary accruals is 52.36% of total assets compared to only 2.61% for non-earnings management firms. Similar differences are apparent for short-term and long-term discretionary accruals. The mean absolute short-term discretionary accruals for earnings management firms is 40.31% of total assets and 1.54% for non-earnings management firms. The proportions are greater for long-term discretionary accruals. For earnings management firms, mean long-term discretionary accruals are 57.12% of total assets whereas for non-earnings management firms, the mean is 10.63%. Again, this demonstrates the differential role played by short-term and long-term discretionary accruals. Thus, if the market is cognizant of the use of accruals, it is expected that long-term discretionary accruals would have a greater effect on market behavior than short-term discretionary accruals.

4.5 TESTS OF HYPOTHESES

4.5.1 Value-relevance Model

Chapter Three presented the Value-relevance Model (Equation [1]) to assess the value-relevance of earnings and book value. The model is an empirical adaptation of Ohlson's valuation framework (Ohlson 1995) in which earnings and book value are regressed against stock price. Value-relevance is measured by the coefficients on earnings and book value. Thus, Equation [1] is a test of the value-relevance of earnings and book value.

Hypothesis 1: Earnings and book value are value-relevant.

Table 4-19 presents the results for the Equation [1] regression using the full sample of 2900 firm observations. The coefficient estimates and the explanatory power of the model are consistent with past research (Collins et al 1997; Ou & Sepe 2002), thus confirming the value-relevance of earnings and book value for firms in this sample. Whilst the response coefficients for both earnings and book value are positive and significant, they are slightly higher than found in previous studies. This may be due to the different time period being examined or due to the use of Australian rather than US data.

Table 4-19 Value-relevance of Earnings and Book Value

Equation [1]: $P_t = \alpha_0 + \alpha_1 E_t + \alpha_2 BV_t + \varepsilon$				
Sample	Adj R ²	α_1	α_2	n
Pooled	0.477	5.02 (6.50)***	1.22 (9.24)***	2900
1997	0.698	3.88 (5.51)***	1.40 (12.09)***	522
1998	0.617	3.42 (4.00)***	1.19 (5.91)***	541
1999	0.558	6.90 (5.23)***	0.86 (5.74)***	551
2000	0.434	3.91 (2.60)***	1.50 (4.08)***	654
2001	0.364	6.91 (2.48)**	1.25 (2.66)***	632

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

E_t - Earnings before extraordinary items per share at time *t*

BV_t - Book value per share at time *t*

P_t - Stock price per share at time *t* + 3 months

An important premise in this research is the trade-off between earnings and book value in the valuation process. As such, it is interesting to note the oscillating nature of the estimated coefficients over the five years of the study. In general, as the response

coefficient for earnings declines from one year to the next, the response coefficient for book value increases, and vice versa. As the sample of firms is not consistent across the years, it can only be assumed that this phenomenon is driven by economy-wide factors.

The positive and significant coefficient estimates for the pooled and yearly regression support Hypothesis 1. That is, both earnings and book value are value-relevant. Furthermore, the coefficient on earnings (α_1) is over four times larger than the coefficient on book value (α_2), indicating that a dollar of earnings per share has over four times the impact on price as a dollar of book value per share. More specifically, a one cent increase in earnings per share is expected to generate a 5.02 cent increase in stock price per share, whilst a one cent increase in book value per share is expected to generate a stock price increase of 1.22 cents per share.

4.5.1.1 Assessing the Assumptions

OLS regression assumes constant variance of the residuals. However, when using panel data, it is common for the residuals to display heteroscedasticity. The residual plots from each of the estimated models indicated heteroscedasticity of the residuals. Additionally, the residuals from the estimation of Equation [1] were tested for heteroscedasticity using both the Breusch-Pagan Test (Breusch and Pagan 1979) and the White Test (White 1980). Although these tests are very similar, the White Test can be more generally applied as it does not assume prior knowledge of the source of the heteroscedasticity and is less sensitive to violations of the normality assumption. However, a limitation of the White Test is its potential to indicate heteroscedasticity when in fact the model is simply mis-specified (Thursby 1982). Table 4-20 presents details of these tests which both indicate the presence of heteroscedasticity.

Table 4-20 Equation [1] - Tests for Heteroscedasticity

H₀: $\sigma^2_i = \sigma^2$ for all i	
H₁: $\sigma^2_i \neq \sigma^2$	
Chi-square	
Breusch-Pagan Test	42.267***
White Test	109.486***

Notes:

*, **, *** Significant at 10%, 5%, 1% respectively

As heteroscedasticity may lead to inefficient coefficient estimates, the t-statistics for the estimated regressions coefficients of the model were calculated using White's heteroscedasticity-consistent standard errors. This overcomes the problem of biased and inconsistent covariance estimates which would result in invalid tests of the hypotheses. Table 4-21 presents a comparison of standard t-statistics for Equation [1] with those calculated using White's standard errors. The estimated coefficients are significant at the 1% level and thus there are no changes to the inferences drawn from Value-relevance Model (Equation [1]). That is, earnings and book value are value-relevant.

Table 4-21 Value-relevance of Earnings and Book Value: A Comparison of Results Using White's t-statistics

Equation [1]: $P_t = \alpha_0 + \alpha_1 E_t + \alpha_2 BV_t + \epsilon$				
	Adj R ²	α_1	α_2	n
Pooled	0.477	5.02	1.22	2900
Standard		(17.16)***	(25.90)***	
White [#]		(6.50)***	(9.24)***	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price per share at time t + 3 months

[#] t-statistics based on White heteroscedasticity-consistent standard errors

4.5.2 Earnings Management Model

The Earnings-Management Model (Equation [2]) examines the value-relevance of earnings and book value in the presence of earnings management. This is achieved

through the addition to Equation [1] of a slope dummy variable to represent earnings management. The development of the dummy variable was discussed in Section 4.4. The estimated coefficients are used to test Hypotheses 2A, 2B, and 2C which test the impact of earnings management via total discretionary accruals, short-term discretionary accruals and long-term discretionary accruals respectively. The results reported in the following sections are based on the samples discussed in section 4.2. Results for the full sample of 2900 firm observations using the industry median as the allocation benchmark are included in the sensitivity analysis in Section 4.7.

4.5.2.1 Hypothesis 2A

Hypothesis 2A states that the value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via total discretionary accruals. This hypothesis is tested by estimating Equation [2] using the earnings management dummy variable derived from the Jones model (Jones 1991). Table 4-22 presents the results of the OLS regressions for the pooled sample and by year.

The significant coefficient on earnings ($\beta_2 = 6.35$, $p = 0.000$) demonstrates the value-relevance of earnings in the absence of earnings management. Likewise, the significant coefficient on book value ($\beta_4 = 1.12$, $p = 0.000$) demonstrates the value-relevance of book value.

Table 4-22 Earnings Management Model
Earnings Management via Total Discretionary Accruals

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \varepsilon$							
Sample	Adj R ²	β_1	β_2	β_3	β_4	β_5	n
Pooled	0.461	0.19 (1.10)	6.35 (7.57)***	-2.02 (0.99)	1.12 (5.04)***	0.38 (1.36)	1448
1997	0.785	-0.14 (0.84)	9.15 (4.38)***	-7.12 (3.26)***	0.82 (4.49)***	1.34 (3.90)***	262
1998	0.599	-0.04 (0.22)	6.01 (3.05)***	-5.06 (2.11)**	0.74 (3.20)***	0.36 (1.11)	273
1999	0.557	0.32 (1.21)	5.91 (3.68)***	1.01 (0.27)	0.94 (4.94)***	0.12 (0.25)	271
2000	0.690	-0.11 (0.68)	5.80 (3.54)***	-5.52 (3.16)***	1.16 (3.61)***	0.05 (0.14)	327
2001	0.382	1.10 (1.47)**	5.54 (2.42)**	4.86 (0.73)	2.04 (2.05)**	0.27 (0.22)	315

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

D_t - Earnings management via total discretionary accruals – Jones Model (Allocation by quartiles)

D = 1 Firm engages in earnings management

D = 0 Firm does not engage in earnings management

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price per share at time t + 3 months

However, the results indicate that earnings management via total discretionary accruals is not value-relevant in its own right, nor does it impact on the value-relevance of earnings and book value. This is demonstrated by the insignificant coefficient on the intercept dummy ($\beta_1 = 0.19$, $p = 0.272$) and the insignificant coefficients on the earnings interaction variable ($\beta_3 = -2.02$, $p = 0.325$) and the book value interaction variable ($\beta_5 = 0.38$, $p = 0.175$).

Although not significant, the sign of the coefficients on the interaction variables are consistent with Hypothesis 2A. β_3 is negative, indicating a decline in the value-relevance of earnings when firms manage earnings via total discretionary accruals. β_5 is

positive, indicating an increase in the value-relevance of book value when firms manage earnings via total discretionary accruals. The coefficient on the interaction variable for earnings is significant in three of the five yearly regressions and is significant in only one year for book value. However, the coefficients for the pooled regression lead to the rejection of Hypothesis 2A.

4.5.2.2 Hypothesis 2B

Hypothesis 2B states that the value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals. This hypothesis is tested by estimating Equation [2] using the earnings management dummy variable derived from short-term discretionary accruals. Table 4-23 presents the results of the OLS regressions for the pooled sample and by year.

The insignificant coefficient on the intercept dummy ($\beta_1 = -0.05$, $p = 0.582$) indicates that earnings management via short-term discretionary accruals is not value-relevant in its own right. However, the impact of earnings management is evident in the coefficients on the interaction terms.

The coefficient on earnings ($\beta_2 = 5.79$, $p = 0.000$) represents the market's reaction to earnings in the absence of earnings management. For firms with earnings management, the market's reaction to earnings is reduced, as reflected in the negative coefficient on the earnings interaction variable ($\beta_3 = -2.93$, $p = 0.014$). The reaction to earnings declines from 5.79 to 2.86 in the presence of earnings management via short-term discretionary accruals.

Table 4-23 Earnings Management Model
Earnings Management via Short-term Discretionary Accruals

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \varepsilon$							
Sample	Adj R ²	β_1	β_2	β_3	β_4	β_5	n
Pooled	0.608	-0.05 (0.55)	5.79 (6.25)***	-2.93 (2.45)**	1.05 (9.42)***	0.23 (1.38)	1459
1997	0.735	-0.21 (1.26)	6.24 (4.25)***	-3.74 (2.21)**	1.07 (5.92)***	0.60 (1.43)	262
1998	0.704	-0.03 (0.17)	4.72 (3.08)***	-3.71 (1.67)*	1.06 (5.02)***	0.45 (1.29)	275
1999	0.545	-0.02 (0.08)	9.52 (3.56)***	-1.98 (0.44)	0.77 (2.98)***	0.011 (0.02)	271
2000	0.642	0.13 (0.78)	3.62 (3.39)***	-2.38 (1.51)**	1.32 (5.24)***	0.00 (0.01)	332
2001	0.530	-0.19 (0.80)	5.76 (2.00)**	-3.11 (1.02)	0.98 (3.58)***	0.20 (0.55)	319

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

D_t - Earnings management via short-term discretionary accruals (Allocation by quartiles)

D = 1 Firm engages in earnings management

D = 0 Firm does not engage in earnings management

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price per share at time t + 3 months

The market's reaction to book value in the absence of earnings management is represented by the coefficient on book value ($\beta_4 = 1.05$, $p = 0.000$). The insignificant coefficient on the book value interaction variable ($\beta_5 = 0.23$, $p = 0.168$) indicates that earnings management via short-term discretionary accruals has no impact on the value-relevance of book value.

Thus, the coefficient estimates from the pooled regression lead to the rejection of Hypothesis 2B. β_3 is negative and significant at the 1% level, indicating a decline in the value-relevance of earnings when firms manage earnings via short-term discretionary accruals. However, although β_5 is positive it is not significant, indicating that the value-

relevance of book value is unaffected when firms manage earnings via short-term discretionary accruals.

4.5.2.3 Hypothesis 2C

Hypothesis 2C states that the value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals. This hypothesis is tested by estimating Equation [2] using the earnings management dummy variable derived from long-term discretionary accruals. Table 4-24 presents the results of the OLS regressions for the pooled sample and by year.

**Table 4-24 Earnings-Management Model
Earnings Management via Long-term Discretionary Accruals**

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \varepsilon$							
Sample	Adj R ²	β_1	β_2	β_3	β_4	β_5	n
Pooled	0.525	-0.15 (1.06)	7.14 (5.71)***	-5.59 (4.13)***	1.12 (4.37)***	0.39 (1.35)	1492
1997	0.726	-0.31 (1.82)*	5.00 (4.03)***	-2.72 (1.81)*	1.19 (7.73)***	0.53 (1.38)***	267
1998	0.575	0.00 (0.01)	6.51 (3.03)***	-6.12 (2.41)**	1.07 (2.31)**	0.00 (0.00)	282
1999	0.626	-0.28 (1.45)	8.95 (2.95)***	-5.43 (1.63)	0.78 (3.00)***	0.83 (2.20)**	276
2000	0.511	-0.37 (2.17)**	9.62 (2.57)**	-8.75 (2.29)**	0.45 (1.29)	1.05 (2.78)***	340
2001	0.437	0.42 (0.62)	4.40 (1.80)*	-2.96 (1.10)	2.31 (1.63)	-0.55 (0.37)	327

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

D_t - Earnings management via long-term discretionary accruals (Allocation by quartiles)

D = 1 Firm engages in earnings management

D = 0 Firm does not engage in earnings management

E_t - Earnings before extraordinary items per share at time *t*

BV_t - Book value per share at time *t*

P_t - Stock price per share at time *t* + 3 months

The coefficient on the intercept dummy ($\beta_1 = -0.15$, $p = 0.289$) is not significant suggesting that earnings management via long-term discretionary accruals is not value-relevant in its own right.

The coefficient on earnings ($\beta_2 = 7.14$, $p = 0.000$) represents the market's reaction to a firm's earnings in the absence of earnings management. For firms with earnings management, the market's reaction to earnings is reduced, as reflected in the negative coefficient on the earnings interaction variable ($\beta_3 = -5.59$, $p = 0.000$). The reaction to earnings declines from 7.14 to 1.55 in the presence of earnings management via long-term discretionary accruals.

The market's reaction to book value in the absence of earnings management is represented by the coefficient on book value ($\beta_4 = 1.12$, $p = 0.000$). The impact of earnings management is reflected in the coefficient on the book value interaction variable ($\beta_5 = 0.39$, $p = 0.178$). This coefficient is not significant for the pooled regression but is significant in three of the five yearly regressions. Whilst this suggests support for the hypothesis, the pooled regression indicates that earnings management via long-term discretionary accruals has no impact on the value-relevance of book value.

The coefficient estimates in the pooled regression of Equation [2] do not support Hypothesis 2C. The coefficient β_3 is negative and significant, indicating a decline in the value-relevance of earnings when firms manage earnings via long-term discretionary accruals. However, β_5 is not significant, indicating that the value-relevance of book value is unaffected by via long-term discretionary accruals.

4.5.2.4 Assessing the Assumptions

The use of pooled regression leads to the possibility estimation bias due to heteroscedasticity. This is addressed through the use of t-statistics based on White's standard errors. Table 4-25 presents a comparison of standard t-statistics for the Earnings-Management Model (Equation [2]) with those calculated using White's standard errors.

**Table 4-25 Earnings-Management Model
A Comparison of Results Using White's t-statistics**

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \varepsilon$							
	Adj R ²	β_1	β_2	β_3	β_4	β_5	n
Total							
Pooled	0.461	0.19	6.35	-2.02	1.12	0.38	1448
Standard		(1.55)	(9.55)***	(2.38)**	(12.57)***	(2.41)**	
White [#]		(1.10)	(7.57)***	(0.99)	(5.04)***	(1.36)	
Short-term							
Pooled	0.608	-0.05	5.79	-2.93	1.05	0.23	1459
Standard		(0.56)	(15.21)***	(5.08)***	(18.90)***	(2.11)**	
White [#]		(0.55)	(6.25)***	(2.45)**	(9.42)***	(1.38)	
Long-term							
Pooled	0.525	-0.15	7.14	-5.59	1.12	0.39	1492
Standard		(1.43)	(13.84)***	(7.60)***	(15.59)***	(3.04)***	
White [#]		(1.06)	(5.71)***	(4.13)***	(4.37)***	(1.35)	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

D_t - Earnings management via short-term/long-term discretionary accruals (Allocation by quartiles)

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price at time t + 3 months

[#] t-statistics based on White heteroscedasticity-consistent standard errors

The impact of earnings management on the value-relevance of earnings and book value is less apparent after controlling for heteroscedasticity via White's standard errors. When using standard t-statistics, the value-relevance of earnings declines and the value-relevance of book value increases in the presence of earnings management. This holds true for earnings management via total discretionary accruals, short-term discretionary

accruals, and long-term discretionary accruals. Thus, Hypotheses 2A, 2B, and 2C are not rejected when standard t-statistics are used as the basis for the tests.

4.5.3 Extended-Earnings-Management Model

The Extended-Earnings-Management Model (Equation [3]) examines the relative impact of earnings management via short-term versus long-term discretionary accruals. Where the Earnings-Management Model (Equation [2]) examines the impact of earnings management via either short-term or long-term discretionary accruals, the Extended-Earnings-Management Model (Equation [3]) examines both simultaneously through the inclusion of two dummy variables; one representing earnings management via short-term earnings management and the other representing earnings management via long-term discretionary accruals.

4.5.3.1 Hypothesis 3

The coefficient on the intercept dummy for earnings management via long-term discretionary accruals is significant at the 10% level for the pooled sample. This suggests that this source of earnings management is value-relevant in its own right, and not just when interacting with earnings and book value. The negative coefficient indicates that firms engaging in earnings management via long-term discretionary accruals are expected to have a lower stock price than firms that do not engage in this type of earnings management. This finding is consistent with the descriptive statistics presented in Section 4.3.

The regression results from Equation [2] reported in Tables 4-23 and 4-24 indicate support for Hypothesis 3, which states that earnings management via long-term

discretionary accruals has a greater effect on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals. The coefficient β_3 , which represents the impact of earnings management on the value-relevance of earnings, is -2.93 for the short-term model and -5.59 for the long term model. Conversely, the coefficient β_5 , which represents the impact of earnings management on the value-relevance of book value, is 0.23 for the short-term model and 0.39 for the long-term model. The coefficients have greater magnitude in the long-term model, suggesting that earnings management via long-term discretionary accruals has a greater impact on value-relevance than earnings management via short-term discretionary accruals.

Equation [3] was estimated in order to assess more accurately the differential impact of short-term and long-term discretionary accruals. Table 4-26 presents the results of the OLS regressions for the pooled sample and by year. Consistent with the estimations of the Value-relevance Model and the Earnings Management Model, the market's response to earnings in the absence of earnings management is positive and significant ($\phi_3 = 8.09$, $p = 0.000$). Earnings management via long-term discretionary accruals reduces this response by 4.38 ($\phi_5 = -4.38$, $p = 0.019$). The coefficient on the interaction variable for earnings management via short-term discretionary accruals is not significant, therefore indicating that this form of earnings management has no impact on the value-relevance of earnings. For firms that manage earnings using long-term discretionary accruals, the market's response to earning is reduced from 8.09 to 3.71.

Table 4-26 Extended-Earnings-Management Model
Earnings Management via Short-term and Long-term Discretionary Accruals

Equation [3]: $P_t = \phi_0 + \phi_1 S_t + \phi_2 L_t + \phi_3 E_t + \phi_4 E_t S_t + \phi_5 E_t L_t + \phi_6 BV_t + \phi_7 BV_t S_t + \phi_8 BV_t L_t + \xi$										
Sample	Adj R ²	ϕ_1	ϕ_2	ϕ_3	ϕ_4	ϕ_5	ϕ_6	ϕ_7	ϕ_8	n
Pooled	0.606	0.10 (0.62)	-0.31 (1.96)*	8.09 (4.92)***	-2.54 (1.40)	-4.38 (2.36)**	0.80 (5.24)***	-0.14 (0.48)	0.84 (2.72)***	778
1997	0.791	0.10 (0.51)	-0.60 (3.19)***	5.90 (2.45)**	-2.64 (1.13)	-1.16 (0.48)	0.81 (4.29)***	-0.07 (0.20)	1.42 (3.40)***	136
1998	0.603	-0.27 (1.26)	0.30 (1.28)	6.44 (1.66)*	-8.01 (2.64)***	-0.92 (0.25)	1.40 (2.63)***	0.97 (1.92)**	-0.97 (7.55)***	146
1999	0.614	0.89 (1.21)	-0.80 (1.26)	13.49 (3.22)***	0.86 (0.08)	-10.62 (1.31)	0.69 (2.30)**	-1.12 (0.70)	1.56 (1.24)	136
2000	0.697	0.17 (1.27)	-0.30 (2.27)**	6.14 (5.17)***	-0.27 (0.14)	-5.10 (3.14)***	0.65 (4.58)***	-0.42 (1.47)	1.12 (4.84)***	184
2001	0.457	-0.11 (0.55)	-0.22 (1.50)	4.38 (1.56)	-1.72 (0.70)	-1.08 (0.39)	0.67 (2.87)***	-0.05 (0.12)	1.36 (1.43)	176

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

S_t - Earnings management via short-term discretionary accruals (Allocation by quartiles)

L_t - Earnings management via long-term discretionary accruals (Allocation by quartiles)

E_t - Earnings before extraordinary items per share at time *t*

BV_t - Book value per share at time *t*

P_t - Stock price at time *t* + 3 months

The market's response to book value in the absence of earnings management is also positive and significant ($\phi_6 = 0.80$, $p = 0.000$). The coefficient on the short-term interaction variable for book value is not significant, suggesting that earnings management via short-term discretionary accruals does not influence the value-relevance of book value. However, the coefficient on the long-term interaction variable for book value is significantly positive ($\phi_8 = 0.84$, $p = 0.007$). Thus, when firms manage earnings via long-term discretionary accruals it is expected that the market's response to book value will increase from 0.80 to 1.84.

The test of Hypothesis 3 requires a comparison of the estimated coefficients of the short-term and long-term interaction variables. As the magnitude of the coefficients on the long-term interaction variables are greater than the coefficients on the short-term interaction variables, there is preliminary support for the hypothesis that long-term discretionary accruals have a greater impact on the value-relevance of earnings and book value than short-term discretionary accruals.

A Wald test is used to make a more formal comparison of the coefficient estimates. The null of Hypothesis 3 states that there is no difference between the coefficients for the short-term and long-term interaction variables. There are two sets of interaction variables to be tested; the interaction of earnings management with earnings per share and the interaction of earnings management with book value per share. The Wald test is applied to each of these interactions separately and also to test the joint restriction. The results of these tests are presented in Table 4-27.

Table 4-27 Hypothesis 3: Wald Tests

	H3₀: $\phi_4 = \phi_5$ H3₁: $\phi_4 > \phi_5$	H3₀: $\phi_7 = \phi_8$ H3₁: $\phi_7 < \phi_8$	H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$ H3₁: $\phi_4 > \phi_5, \phi_7 < \phi_8$
	χ^2	χ^2	χ^2
Pooled	14.53***	6.92***	56.12***
1997	3.71*	3.28*	21.73***
1998	4.02**	0.28	8.15**
1999	1.14	1.25	28.04***
2000	6.31**	12.03***	43.50***
2001	1.93	1.94	3.50

Notes:

*, **, *** Significant at 10%, 5%, 1% respectively

The joint restriction requires two relationships to hold; (1) the coefficient on the earnings interaction term for earnings management via long-term discretionary accruals is less than the coefficient on the earnings interaction term for earnings management via short-term discretionary accruals, and (2) the coefficient on the book value interaction term for earnings management via long-term discretionary accruals is greater than the coefficient on the book value interaction term for earnings management via short-term discretionary accruals. The Wald test of the joint restriction is significant for the pooled sample and for four of the five years individually, indicating that earnings management via long-term discretionary accruals has a greater effect on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

4.5.3.2 Hypothesis 2B and Hypothesis 2C

The Extended-Earnings-Management Model (Equation [3]) can also be used to test Hypotheses 2B and 2C. When earnings are managed via short-term discretionary accruals, the impact on the value-relevance of earnings and book value is reflected in the coefficients ϕ_4 and ϕ_7 respectively. Neither of these coefficients is significant for

Equation [3], thus there is no support for Hypothesis 2B. However, the model does provide support for Hypothesis 2C. When earnings are managed via long-term discretionary accruals, the impact on the value-relevance of earnings and book value is reflected in the coefficients ϕ_5 and ϕ_8 respectively. The significant negative coefficient ($\phi_5 = -4.38$, $p = 0.019$) on the earnings interaction variable indicates that the value-relevance of earnings declines in the presence of earnings management via long-term discretionary accruals. The significant positive coefficient ($\phi_8 = 0.84$, $p = 0.007$) on the book value interaction variable indicates that the value-relevance of book value increases in the presence of earnings management via long-term discretionary accruals.

4.5.3.3 Assessing the Assumptions

Table 4-28 presents a comparison of standard t-statistics for Equation [3] with those calculated using White's standard errors to control for possible heteroscedasticity. The only difference in results is the coefficient on the interaction of earnings with earnings management via short-term discretionary accruals (ϕ_4). The coefficient is significant when using standard t-statistics but insignificant when the using t-statistics calculated using White's standard errors. The Wald statistics presented in Table 4-29 indicate support for Hypothesis 3 regardless of the method used to calculate the t-statistics. That is, long-term discretionary accruals have a greater impact on the value-relevance of earnings and book value than short-term discretionary accruals.

Table 4-28 The Impact of Earnings Management via Short-term and Long-term Discretionary Accruals on the Value-relevance of Earnings and Book Value: A Comparison of Results Using White's t-statistics

Equation [3]: $P_t = \phi_0 + \phi_1 S_t + \phi_2 L_t + \phi_3 E_t + \phi_4 E_t S_t + \phi_5 E_t L_t + \phi_6 BV_t + \phi_7 BV_t S_t + \phi_8 BV_t L_t + \xi$										
Sample	Adj R ²	ϕ_1	ϕ_2	ϕ_3	ϕ_4	ϕ_5	ϕ_6	ϕ_7	ϕ_8	n
Pooled	0.605	0.10	-0.31	8.09	-2.54	-4.38	0.80	-0.14	0.84	778
Standard		(0.80)	(2.54)**	(12.68)***	(3.22)***	(5.60)***	(9.87)***	(0.89)	(5.62)***	
White [#]		(0.62)	(1.96)*	(4.92)***	(1.40)	(2.36)**	(5.24)***	(0.48)	(2.72)***	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

S_t - Earnings management via short-term discretionary accruals (Allocation by quartiles)

L_t - Earnings management via long-term discretionary accruals (Allocation by quartiles)

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price at time t + 3 months

[#] t-statistics based on White heteroscedasticity-consistent standard errors

Table 4-29 Hypothesis 3: Wald Tests Using White Standard Errors

	H3₀: $\phi_4 = \phi_5$	H3₀: $\phi_7 = \phi_8$	H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$
	H3₁: $\phi_4 > \phi_5$	H3₁: $\phi_7 < \phi_8$	H3₁: $\phi_4 > \phi_5, \phi_7 < \phi_8$
	χ^2	χ^2	χ^2
Standard	74.437***	23.056***	222.830***
White [#]	14.529***	6.918***	56.122***

Notes:

*, **, *** Significant at 10%, 5%, 1% respectively.

[#] Regression t-statistics based on White heteroscedasticity-consistent standard errors

4.6 SENSITIVITY ANALYSIS

4.6.1 Control variables

Section 3.6 discussed the need to control for known determinants of the value-relevance of earnings and book value. The three variables used in this study are leverage, return on equity and negative earnings. These variables were included as additional explanatory variables in Equations [1], [2], and [3], to create Equations [1a], [2a], and [3a] respectively.

Table 4-30 reports a comparison of the regression results for Equation [1] and Equation [1a]. The coefficients on leverage and negative earnings are positive and significant. This result is somewhat surprising as it suggests stock price will increase as a firm's debt ratio increases and if it has negative earnings. The coefficient for return on equity is not significant. This may reflect the possibility of a non-linear relationship with earnings and book value that is not captured in this model. The coefficients for leverage and negative earnings are similar for all models. However, in Equations [2a] and [3a], the coefficient for return on equity is significant. The coefficient is positive in Equation [2a] when examining earnings management via total or long-term discretionary accruals, indicating that firms are expected to have a higher stock price as return on equity increases. However, the coefficient on return on equity is negative in Equation [2a] when examining earnings management via short-term discretionary accruals. As with the coefficients on leverage and negative earnings, the direction of this coefficient is somewhat surprising as it suggests higher stock prices in the presence of lower return on equity.

The coefficient estimates for Equation [1a] provide support for Hypothesis 1. The coefficient on earnings is slightly higher while the coefficient on book value is slightly lower with the inclusion of the control variables. Nevertheless, the coefficients remain significant indicating the both earnings and book value are value-relevant.

Table 4-30 Value-relevance Model: Impact of Control Variables

Equation [1]: $P_t = \alpha_0 + \alpha_1 E_t + \alpha_2 BV_t + \varepsilon$						
Equation [1a]: $P_t = \alpha_0 + \alpha_1 E_t + \alpha_2 BV_t + \alpha_3 LEV_t + \alpha_4 ROE_t + \alpha_5 NE_t + \varepsilon$						
Adj R ²	α_1	α_2	α_3	α_4	α_5	n
0.477	5.020	1.220				2900
	(6.50)***	(9.24)***				
0.485	5.990	1.207	0.770	-0.076	0.546	
	(6.58)***	(8.86)***	(5.33)***	(0.22)	(4.88)***	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

E_t - Earnings before extraordinary items per share at time *t*

BV_t - Book value per share at time *t*

P_t - Stock price per share at time *t* + 3 months

A similar pattern is evident in the results for Equations [2a] and [3a], as reported in Tables 4-31 and 4-32 respectively. That is, the coefficient on earnings is higher while the coefficient on book value remains unchanged or is slightly lower. The inferences drawn from the models are unaffected by the inclusion of the control variables. In other words, Hypotheses 2A, 2B, and 2C are rejected, while there is support for Hypothesis 3. The test of equation [2a] demonstrates that while earnings management via short-term or long-term discretionary accruals reduces the value-relevance of earnings, it has no impact on the value-relevance of book value.

Table 4-31 Earnings Management Model: Impact of Control Variables

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \varepsilon$										
Equation [2a]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \beta_6 LEV_t + \beta_7 ROE_t + \beta_8 NE_t + \varepsilon$										
	Adj R ²	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	n
Total	0.461	0.19	6.35	-2.02	1.12	0.38				1448
Discretionary		(1.10)	(7.57)***	(0.99)	(5.04)***	(1.36)				
Accruals	0.470	0.14	7.31	-1.92	1.10	0.43	0.80	0.22	0.63	
		(0.84)	(8.23)***	(0.94)	(4.96)***	(1.62)	(4.14)***	(2.71)***	(3.60)***	
Short-term	0.608	-0.05	5.79	-2.93	1.05	0.23				1459
Discretionary		(0.55)	(6.25)***	(2.45)**	(9.42)***	(1.38)				
Accruals	0.618	-0.09	6.45	-2.70	1.03	0.25	0.77	-0.07	0.43	
		(0.97)	(6.57)***	(2.27)***	(9.35)***	(1.49)	(5.52)***	(2.67)***	(4.60)***	
Long-term	0.525	-0.15	7.14	-5.59	1.12	0.39				1492
Discretionary		(1.06)	(5.71)***	(4.13)***	(4.37)***	(1.35)				
Accruals	0.531	-0.16	7.93	-5.50	1.12	0.39	0.63	0.04	0.47	
		(1.23)	(5.70)***	(4.08)***	(4.31)***	(1.36)	(4.63)***	(2.23)**	(3.23)***	

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

D_t - Earnings management via short-term/long-term discretionary accruals (Allocation by quartiles)

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price per share at time t + 3 months

LEV_t - Leverage

ROE_t - Return on Equity

NE_t - Negative Earnings

Table 4-32 Extended-Earnings-Management Model: Impact of Control Variables

Equation [3]: $P_t = \phi_0 + \phi_1 S_t + \phi_2 L_t + \phi_3 E_t + \phi_4 E_t S_t + \phi_5 E_t L_t + \phi_6 BV_t + \phi_7 BV_t S_t + \phi_8 BV_t L_t + \xi$												
Equation [3a]: $P_t = \phi_0 + \phi_1 S_t + \phi_2 L_t + \phi_3 E_t + \phi_4 E_t S_t + \phi_5 E_t L_t + \phi_6 BV_t + \phi_7 BV_t S_t + \phi_8 BV_t L_t + \phi_9 LEV_t + \phi_{10} ROE_t + \phi_{11} NE_t + \xi$												
Adj R ²	ϕ_1	ϕ_2	ϕ_3	ϕ_4	ϕ_5	ϕ_6	ϕ_7	ϕ_8	ϕ_9	ϕ_{10}	ϕ_{11}	n
0.605	0.10 (0.62)	-0.31 (1.96)*	8.09 (4.92)***	-2.54 (1.40)	-4.38 (2.36)**	0.80 (5.24)***	-0.14 (0.48)	0.84 (2.72)***				778
0.612	0.05 (0.33)	-0.26 (1.68)*	8.51 (5.03)***	-2.46 (1.35)	-4.20 (2.27)**	0.80 (5.40)***	-0.11 (0.37)	0.79 (2.61)***	0.61 (3.81)***	0.14 (2.32)**	0.34 (2.70)***	778

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

S_t - Earnings management via short-term discretionary accruals (Allocation by quartiles)

L_t - Earnings management via long-term discretionary accruals (Allocation by quartiles)

E_t - Earnings before extraordinary items per share at time t

BV_t - Book value per share at time t

P_t - Stock price per share at time t + 3 months

LEV_t - Leverage

ROE_t - Return on Equity

NE_t - Negative Earnings

The coefficient estimates for Equation [3a] indicate that earnings management via long-term discretionary accruals has an impact on both earnings and book value while earnings management via short-term discretionary accruals has no effect. However, the impact on the value-relevance of earnings and book value is reduced with the inclusion of the control variables in the model.

The test of Hypothesis 3 requires the application of a Wald test to the estimated coefficients. The results presented in Table 4-33 indicate that the inclusion of the control variables do not change the inferences drawn from the coefficients in Equation [3]. The Wald tests for Equation [3a] provide support for Hypothesis 3, which states that long-term discretionary accruals have a greater impact on the value-relevance of earnings and book value than short-term discretionary accruals.

Table 4-33 Hypothesis 3 Wald Tests: Impact of Control Variables

	H3₀: $\phi_4 = \phi_5$	H3₀: $\phi_7 = \phi_8$	H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$
	H3₁: $\phi_4 > \phi_5$	H3₁: $\phi_7 < \phi_8$	H3₁: $\phi_4 > \phi_5, \phi_7 < \phi_8$
	χ^2	χ^2	χ^2
Equation [3]	14.53***	6.92***	56.12***
Equation [3a]	15.51***	6.62***	57.72***

Notes:

*, **, *** Significant at 10%, 5%, 1% respectively.

These results demonstrate that after controlling for known influences on the relative value-relevance of earnings and book value, the inferences drawn from the original models are unchanged. Consequently, it can be concluded that the changes in the value-relevance of earnings and book value are driven by earnings management and not the firm's leverage, return on equity nor the presence of negative earnings.

4.6.2 Earnings Management Allocation by Median Benchmark

The analysis discussed in Section 4.5 used industry quartiles to determine the allocation of firms as either managing earnings or not. An alternative approach is to allocate firms on the basis of the industry median. That is, firms with absolute discretionary accruals above the industry median are deemed to manage earnings, whilst those below the industry median are assumed to not manage earnings. The quartile allocation was used to provide greater distinction between the two groups. However, further analysis indicates that estimation using the median allocation provides similar results.

Table 4-34 presents a comparison of results of the estimation of Equation [2] based on the alternative earnings management allocation methods. When using the median allocation method, the estimated coefficients on the earnings management interaction terms are not significant for total or short-term discretionary accruals. This indicates that earnings management via total or short-term discretionary accruals does not influence the value-relevance of earnings or book value. This is in contrast to the findings when using quartiles as the allocation basis. The lack of significance for the coefficients on the earnings management interaction variables is undoubtedly due to the lack of variability in the earnings management dummy variable. By using the industry median as the benchmark, the sample has simply been split into two.

In contrast, for earnings management via long-term discretionary accruals, the inferences drawn from the estimated coefficients are not affected by the use of the median as the allocation basis. This suggests that the market is more sensitive to changes in long-term discretionary accruals than it is to changes in short-term discretionary accruals. As short-term accruals are expected to reverse within one accounting period, the market may assume that management would be reluctant to

attempt to conceal earnings management within short-term discretionary accruals. However, as long-term accruals tend to reverse further into the future, thus providing management with the opportunity to conceal their manipulations for longer, the market may be more cognizant of the use of long-term discretionary accruals.

**Table 4-34 Earnings Management Model:
Alternate Earnings Management Allocation Methods**

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \epsilon$							
	Adj R ²	β_1	β_2	β_3	β_4	β_5	n
Earnings Management via Total Discretionary Accruals							
Quartiles	0.461	0.19 (1.10)	6.35 (7.57)***	-2.02 (0.99)	1.12 (5.04)***	0.38 (1.36)	1448
Median	0.479	0.272 (2.25)***	5.402 (7.80)***	-0.521 (0.37)	1.231 (7.30)***	-0.030 (0.14)	2900
Earnings Management via Short-term Discretionary Accruals							
Quartiles	0.608	-0.05 (0.55)	5.79 (6.25)***	-2.93 (2.45)**	1.05 (9.42)***	0.23 (1.38)	1459
Median	0.477	0.07 (0.61)	4.85 (7.17)***	0.23 (0.20)	1.24 (9.45)***	-0.02 (0.06)	2900
Earnings Management via Long-term Discretionary Accruals							
Quartiles	0.525	-0.15 (1.06)	7.14 (5.71)***	-5.59 (4.13)***	1.12 (4.37)***	0.39 (1.35)	1492
Median	0.491	-0.13 (1.18)	7.45 (5.24)***	-4.84 (3.28)***	1.07 (5.17)***	0.25 (1.13)	2900

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

E_t - Earnings per share at time t

BV_t - Book value per share at time t

P_t - Stock price at time t + 3 months

D_t - Earnings management via short-term or long-term discretionary accruals

Quartiles – Earnings Management allocation by quartiles

Median – Earnings Management allocation by median

Table 4-35 compares the estimation of Equation [3] based on the alternative earnings management allocation methods. Quartile allocation gives a significant coefficient on the book value interaction term. The industry median allocation gives an insignificant

coefficient. However, Hypothesis 3 is not rejected as it tests the differential impact of earnings management via short-term discretionary accruals or via long-term discretionary accruals. The Wald tests (Table 4-36) supports Hypothesis 3. That is, earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

Table 4-35 Extended-Earnings-Management Model: Alternate Earnings Management Allocation Methods

Equation [3]: $P_t = \phi_0 + \phi_1 S_t + \phi_2 L_t + \phi_3 E_t + \phi_4 E_t S_t + \phi_5 E_t L_t + \phi_6 BV_t + \phi_7 BV_t S_t + \phi_8 BV_t L_t + \xi$										
	Adj R ²	ϕ_1	ϕ_2	ϕ_3	ϕ_4	ϕ_5	ϕ_6	ϕ_7	ϕ_8	n
Quartiles	0.605	0.10 (0.62)	-0.31 (1.96)*	8.09 (4.92)***	-2.54 (1.40)	-4.38 (2.36)**	0.80 (5.24)***	-0.14 (0.48)	0.84 (2.72)***	778
Median	0.491	0.09 (0.57)	-0.14 (1.06)	7.21 (6.73)***	0.48 (0.30)	-4.87 (3.18)***	1.09 (6.27)***	-0.01 (0.03)	0.25 (0.94)	2900

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

S_t - Earnings management via short-term discretionary accruals

L_t - Earnings management via long-term discretionary accruals

E_t - Earnings per share at time t

BV_t - Book value per share at time t

P_t - Stock price at time t + 3 months

Quartiles – Earnings Management allocation by quartiles

Median – Earnings Management allocation by median

**Table 4-36 Hypothesis 3 Wald Test:
Alternate Earnings Management Allocation Methods**

	H3₀: $\phi_4 = \phi_5$	H3₀: $\phi_7 = \phi_8$	H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$
	H3₁: $\phi_4 > \phi_5$	H3₁: $\phi_7 < \phi_8$	H3₁: $\phi_4 > \phi_5, \phi_7 < \phi_8$
	χ^2	χ^2	χ^2
Quartiles	14.53***	6.92***	56.12***
Median	15.26***	8.48***	54.94***

Notes:

*, **, *** Significant at 10%, 5%, 1% respectively.

4.6.3 Alternative Measures of Earnings

The preceding analysis was based on earnings measured as earnings before extraordinary items. It has been demonstrated that special or non-recurring items such as abnormal items and extraordinary items may be used to manage earnings (Elliott and Hanna 1996; Black et al 2000; Brewer et al 2002) Therefore, earnings before abnormal items and earnings after extraordinary items are also examined as the impact of earnings management on the value-relevance of earnings and book value may differ depending on the definition of earnings.

The general effect of these alternatives on the value-relevance of earnings and book value is evident in the results for the Value-relevance Model (Equation [1]) presented in Table 4-37. The value-relevance of earnings declines as adjustments are made to earnings through abnormal and extraordinary items. On the other hand, these adjustments enhance the value-relevance of book value. Similarly, the explanatory power of the model declines as earnings is adjusted for abnormal and extraordinary items. These patterns are also evident in the results for the Earnings-Management Model (Equation [2]) and the Extended-Earnings-Management Model (Equation [3]). This may be interpreted with reference to the general theory underlying this study. That is, as the reliability of earnings declines, the value-relevance of earnings declines and the value-relevance of book value increases. The implication is that adjustments via abnormal and extraordinary items reduce the reliability of earnings.

Table 4-37 Value-relevance Model: Alternative Measures of Earnings

Equation [1]: $P_t = \alpha_0 + \alpha_1 E_t + \alpha_2 BV_t + \varepsilon$				
Earnings Measure	Adj R ²	α_1	α_2	n
Earnings before Abnormal Items	0.495	7.23 (6.32)***	0.99 (6.14)***	2900
Earnings before Extraordinary Items	0.477	5.02 (6.50)***	1.22 (9.24)***	2900
Earnings after Extraordinary Items	0.474	4.66 (6.19)***	1.26 (9.63)***	2900

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

Pooled: 1997-2001

The interaction variables in Equations [2] and [3] require re-calculation of the dummy variables for earnings management via total and long-term discretionary accruals as these measures are dependent on the definition of earnings. Equations [7] and [11], which provide the basis for calculating discretionary accruals, are re-estimated based on earnings before abnormal items and earnings after extraordinary items. The re-estimation of Equation [9] for short-term discretionary accruals was not necessary as short-term accruals are independent of the measure of earnings.

A comparison of the results for the Earnings-Management Model is presented in Table 4-38. The conclusions drawn in the preceding analysis are unchanged for earnings management via total discretionary accruals and earnings management via long-term discretionary accruals. However, the impact of earnings management via short-term discretionary accruals is influenced by the definition of earnings. For earnings before extraordinary items, this form of earnings management reduces the value-relevance of earnings but has no effect on the value-relevance of book value.

Table 4-38 Earnings Management Model: Alternative Measure of Earnings

Equation [2]: $P_t = \beta_0 + \beta_1 D_t + \beta_2 E_t + \beta_3 E_t D_t + \beta_4 BV_t + \beta_5 BV_t D_t + \varepsilon$							
Definition	Adj R ²	β_1	β_2	β_3	β_4	β_5	n
Earnings Management via Total Discretionary Accruals							
Before Abnormal Items	0.477	0.27 (1.38)	6.86 (7.44)***	1.79 (0.43)	1.05 (4.51)***	-0.15 (0.32)	1448
Before Extraordinary Items	0.461	0.19 (1.10)	6.35 (7.57)***	-2.02 (0.99)	1.12 (5.04)***	0.38 (1.36)	
After Extraordinary Items	0.458	0.16 (0.98)	6.22 (7.60)***	-2.59 (1.48)	1.13 (5.14)***	0.44 (1.57)	
Earnings Management via Short-term Discretionary Accruals							
Before Abnormal Items	0.632	-0.02 (0.19)	8.75 (6.79)***	-4.68 (2.64)***	0.74 (5.52)***	0.39 (1.93)*	1459
Before Extraordinary Items	0.608	-0.05 (0.55)	5.79 (6.25)***	-2.93 (2.45)**	1.05 (9.42)***	0.23 (1.38)	
After Extraordinary Items	0.606	-0.07 (0.80)	5.75 (6.20)***	-3.32 (3.02)***	1.06 (9.51)***	0.27 (1.69)*	
Earnings Management via Long-term Discretionary Accruals							
Before Abnormal Items	0.530	-0.08 (0.57)	8.04 (5.40)***	-4.55 (2.44)**	0.99 (3.49)***	0.32 (0.97)	1492
Before Extraordinary Items	0.525	-0.15 (1.06)	7.14 (5.71)***	-5.59 (4.13)***	1.12 (4.37)***	0.39 (1.35)	
After Extraordinary Items	0.524	-0.15 (1.11)	7.02 (5.66)***	-5.54 (4.28)***	1.13 (4.43)***	0.39 (1.34)	

Notes: *, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

E_t - Earnings per share at time *t*

P_t - Stock price at time *t* + 3 months

BV_t - Book value per share at time *t*

D_t - Earnings management (Allocation by quartiles)

When earnings is measured before abnormal items or after extraordinary items, earnings management via short-term discretionary accruals affects both earnings and book value. The coefficient on the earnings management interaction with book value is positive and significant at the 10% level, indicating that earnings management enhances the value-relevance of book value. Thus, there is support for Hypothesis 2B, which states that the value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals.

Table 4-39 presents a comparison of the results for the Extended-Earnings-Management Model. The inferences drawn from the estimated coefficients are consistent for earnings before extraordinary items and earnings after extraordinary items. However, when earnings is measured before abnormal items, earnings management has no impact on the value-relevance of earnings or book value regardless of whether it is achieved via short-term or long-term discretionary accruals.

The Wald tests presented in Table 4-40 show support for Hypothesis 3 for earnings before extraordinary items and earnings after extraordinary items. On the other hand, when earnings are measured before abnormal items, the Wald tests suggest a differential impact of short-term and long-term discretionary accruals in the opposite direction to that hypothesized. Thus, Hypothesis 3 is rejected when earnings is measured before abnormal items.

The lack of impact of extraordinary items may be due to the low incidence in this particular sample of firms. Nevertheless, this may also be expected in other samples as, by definition, extraordinary items should not be common. Application of these models to alternate data sets may reveal earnings management via extraordinary items.

Table 4-39 Extended-Earnings-Management Model: Alternative Measures of Earnings

Equation [3]: $P_t = \phi_0 + \phi_1 S_t + \phi_2 L_t + \phi_3 E_t + \phi_4 E_t S_t + \phi_5 E_t L_t + \phi_6 BV_t + \phi_7 BV_t S_t + \phi_8 BV_t L_t + \xi$										
Measure	Adj R ²	ϕ_1	ϕ_2	ϕ_3	ϕ_4	ϕ_5	ϕ_6	ϕ_7	ϕ_8	n
Before Abnormal Items	0.618	0.11 (0.70)	-0.20 (1.29)	9.28 (4.64)***	-4.36 (1.50)	-1.64 (0.60)	0.63 (3.44)***	0.14 (0.35)	0.51 (1.35)	778
Before Extraordinary Items	0.606	0.10 (0.62)	-0.31 (1.96)*	8.09 (4.92)***	-2.54 (1.40)	-4.38 (2.36)**	0.80 (5.24)***	-0.14 (0.48)	0.84 (2.72)***	778
After Extraordinary Items	0.604	0.10 (0.65)	-0.31 (1.93)*	7.87 (4.87)***	-2.42 (1.53)	-4.22 (2.30)**	0.82 (5.42)***	-0.15 (0.52)	0.82 (2.67)***	778

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

S_t - Earnings management via short-term discretionary accruals (Allocation by quartiles)

L_t - Earnings management via long-term discretionary accruals (Allocation by quartiles)

E_t - Earnings per share at time t

BV_t - Book value per share at time t

P_t - Stock price at time t + 3 months

Table 4-40 Hypothesis 3 Wald Tests: Alternative Measures of Earnings

	H3₀: $\phi_4 = \phi_5$	H3₀: $\phi_7 = \phi_8$	H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$
	H3₁: $\phi_4 < \phi_5$	H3₁: $\phi_7 < \phi_8$	H3₁: $\phi_4 < \phi_5, \phi_7 < \phi_8$
	χ^2	χ^2	χ^2
Earnings Before Abnormal Items	10.89***	1.12	58.00***
	H3₀: $\phi_4 = \phi_5$	H3₀: $\phi_7 = \phi_8$	H3₀: $\phi_4 = \phi_5, \phi_7 = \phi_8$
	H3₁: $\phi_4 > \phi_5$	H3₁: $\phi_7 < \phi_8$	H3₁: $\phi_4 > \phi_5, \phi_7 < \phi_8$
	χ^2	χ^2	χ^2
Earnings Before Extraordinary Items	14.53***	6.92***	56.12***
Earnings After Extraordinary Items	16.46***	7.99***	57.38***

Notes:

*, **, *** Significant at 10%, 5%, 1% respectively.

4.7 SUMMARY OF THE FINDINGS

The chapter presented the results of preliminary analysis and tests of the hypotheses based on a variety of assumptions. Table 4-41 summarizes the results of the hypothesis tests using the coefficient estimates from the pooled regression models. Significance of the coefficients was tested using t -statistics based on White's heteroscedasticity-consistent standard errors.

Table 4-41 Summary of Hypotheses and Results

Hypothesis 1: Earnings and book value are value-relevant.	
H1 ₀ : $\alpha_1 = 0, \alpha_2 = 0$	Reject
H1 ₁ : $\alpha_1 > 0, \alpha_2 > 0$	Do Not Reject
Hypothesis 2A: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via total discretionary accruals.	
H2A ₀ : $\beta_3 = 0, \beta_5 = 0$	Do Not Reject
H2A ₁ : $\beta_3 < 0, \beta_5 > 0$	Reject
Hypothesis 2B: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals.	
H2B ₀ : $\beta_3 = 0, \beta_5 = 0$	Do Not Reject
H2B ₁ : $\beta_3 < 0, \beta_5 > 0$	Reject
H2B ₀ : $\phi_4 = 0, \phi_7 = 0$	Do Not Reject
H2B ₁ : $\phi_4 < 0, \phi_7 > 0$	Reject
Hypothesis 2C: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals.	
H2C ₀ : $\beta_3 = 0, \beta_5 = 0$	Do Not Reject
H2C ₁ : $\beta_3 < 0, \beta_5 > 0$	Reject
H2C ₀ : $\phi_5 = 0, \phi_8 = 0$	Reject
H2C ₁ : $\phi_5 < 0, \phi_8 > 0$	Do Not Reject
Hypothesis 3: The effect of long-term discretionary accruals on the value relevance of earnings and book value is greater than the effect of short-term discretionary accruals on the value relevance of earnings and book value.	
H3 ₀ : $\phi_4 = \phi_5, \phi_7 = \phi_8$	Reject
H3 ₁ : $\phi_4 > \phi_5, \phi_7 < \phi_8$	Do Not Reject

Table 4-42 presents a comparison of the hypothesis test results based on the sensitivity analysis presented in Section 4.5. Different model estimations relate to variable definitions and the inclusion of control variables.

The results indicate unconditional support for the Hypothesis 1, which states that both earnings and book value are value relevant. Similarly, Hypothesis 3 is supported under all assumption with the exception of when earnings per share is measured before abnormal items. Thus, it can be concluded that earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.

Tests using the coefficients from the Earnings-Management Model (Equation [2]) lead to the rejection of Hypotheses 2A, 2B, and 2C. That is, earnings management does not affect the value-relevance of earnings or book value. However, when earnings per share is measured before abnormal items or after extraordinary items, there is weak support for Hypothesis 2B. These results are based on tests using White's *t*-statistics to control for heteroscedasticity. If the assumption of heteroscedasticity is relaxed, the use of standard *t*-statistics generates significant coefficients on all variables in the Earnings Management Models. Thus, earnings management affects the value-relevance of earnings and book value. Further support for Hypothesis 2C is provided by the estimated coefficients from the Extended-Earnings-Management Model (Equation [3]).

Table 4-42 Sensitivity Analysis - Comparison of Results

Model	Hypothesis 1 Equation [1]	Hypothesis 2A Equation [2]	Hypothesis 2B Equation [2]	Hypothesis 2C Equation [2]	Hypothesis 2C Equation [3]	Hypothesis 3 Equation [3]
Quartile Allocation for Earnings Management	Do not reject	Reject	Reject	Reject	Do not reject	Do not reject
Median Allocation for Earnings Management	Do not reject	Reject	Reject	Reject	Reject	Do not reject
Control Variables	Do not reject	Reject	Reject	Reject	Do not reject	Do not reject
Before Abnormal Items	Do not reject	Reject	Do not reject	Reject	Reject	Reject
After Extraordinary Items	Do not reject	Reject	Do not reject	Reject	Do not reject	Do not reject
Standard <i>t</i> -statistics	Do not reject	Do not reject	Do not reject	Do not reject	Do not reject	Do not reject

Notes:

t-statistics based on White heteroscedasticity-consistent standard errors unless otherwise stated

Quartile Allocation for Earnings Management - Discussed in Section 4.5

Median Allocation for Earnings Management - Discussed in Section 4.6.2

Control Variables - Discussed in Section 4.6.1

Before Abnormal Items - Discussed in Section 4.6.3

After Extraordinary Items - Discussed in Section 4.6.3

Standard *t*-statistics – Discussed in Sections 4.5.1.1, 4.5.2.4, & 4.5.3.3

In conclusion, there is some evidence to support the hypotheses presented in this study. Both earnings and book value are value-relevant using Australian data. Additionally, the value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals. Moreover, the differential impact of the different sources of earnings management is also supported. The effect of earnings management via long-term discretionary accruals on the value relevance of earnings and book value is greater than the effect of earnings management via short-term discretionary accruals on the value relevance of earnings and book value.

CHAPTER 5 CONCLUSIONS

5.1 INTRODUCTION

This chapter presents a discussion of the research, its conclusions, limitations, and the implications for future research and practice. Sections 5.2 and 5.3 provide a summary of the research objectives and the research conclusions respectively. Limitations of the research in terms of the validity the results are examined in Section 5.4. Section 5.5 discusses the implications of this study for regulation, practice, education, and future research.

5.2 SUMMARY OF THE RESEARCH

The primary objective of this research was to examine the impact of earnings management on the value-relevance of earnings and book value. Three sources of earnings management were examined; (1) earnings management via total discretionary accruals, (2) earnings management via short-term discretionary accruals, and (3) earnings management via long-term discretionary accruals. Additionally, the research investigated the differential effect of short-term versus long-term discretionary accruals as the earnings management tool.

As with prior research, the value-relevance of accounting information is assessed by examining the significance of the response coefficients on the accounting measures in a regression against stock price (Easton and Harris 1991; Dechow 1994; Sloan 1996). The literature examining the relative value-relevance of earnings and book value identifies circumstances in which the market shifts its reliance from earnings to book value (Barth et al 1998; Collins et al 1999; Ou and Sepe 2002). This study investigated the shift in reliance with respect to the reliability of earnings. The basic model in this study is a

linear equation with stock price as the dependent variable and earnings per share and book value per share as the independent variables.

Earnings management was used as the indicator of reliability and was introduced to the model as an intercept dummy variable and as an interaction term with both earnings and book value. Consistent with prior research, this study used discretionary accruals as a proxy for earnings management (Healy 1985; DeAngelo 1986; Jones 1991; Dechow 1995).

Total accruals were estimated as the difference between earnings and cash flows from operations. The Jones model (Jones 1991) was used to determine the discretionary component of accruals. This involved regressing total accruals against change in revenue and property, plant, and equipment. The estimated regression equation was used to calculate the expected level of total accruals. The difference between the actual accruals and this expectation was deemed to be discretionary component of total accruals.

This procedure was repeated for short-term accruals and long-term accruals. Total accruals was divided into its short-term and long-term components. Separate models were developed from the Jones model for each accrual component. Short-term accruals were regressed against change in revenue. The estimated regression equation was used to calculate the expected level of short-term accruals. The difference between the actual short-term accruals and this expectation was deemed to be discretionary component of short-term accruals. Long-term accruals was regressed against property, plant, and equipment, intangibles, and non-current provisions. The estimated regression equation was used to calculate the expected level of long-term accruals. The difference between

the actual long-term accruals and this expectation was deemed to be discretionary component of long-term accruals.

Discretionary accruals reflect accounting choices made by management. Some of these choices are made by management to provide a signal to the market about future firm performance. Other choices are motivated by the need to ensure earnings meet market expectations. Consequently, some discretionary accruals may reflect the opportunistic use of accruals to manage earnings. In this study, it is assumed that the excessive use of discretionary accruals indicates earnings management. As it is the magnitude rather than the direction of discretionary accruals that is indicative of earnings management, firms were ranked within each industry sector by the absolute value of their discretionary accruals (Becker et al 1998; Francis et al 1999; Krishnan 2003). A firm was deemed to manage earnings if it was in the top quartile by industry. Conversely, firms in the bottom quartile were deemed to not manage earnings.

The sample of firms consisted of those companies listed on the Australian Stock Exchange with a June 30 balance date. Sample inclusion depended on the availability of both accounting and market data. Firms in the financial, insurance and banking industries were excluded due to industry-specific regulations that may influence accrual choices. The study covers the period from 1997 to 2001 inclusive.

Hypothesis 1 tested the value-relevance of earnings and book value. Pooled OLS regression was used to estimate the Value-relevance Model (Equation [1]). The significance of the response coefficients on earnings and book value indicate that earnings and book value are value-relevant. Examination of the residuals from this model revealed the presence of heteroscedasticity. Accordingly, the significance of the

coefficient estimates was assessed using White's heteroscedasticity-consistent standard errors. This approach was used for all pooled regressions in the study.

The Earnings-Management Model (Equation [2]) was used to test Hypotheses 2A, 2B, and 2C. This model incorporated earnings management through the inclusion of an intercept dummy to measure the value-relevance of earnings management and slope dummies to measure the impact of earnings management on the value-relevance of earnings and book value. Similar to Hypothesis 1, these hypotheses required examination of the significance of the coefficient estimates from the pooled regression.

Hypothesis 2A examined the impact of earnings management via total discretionary accruals. The results of the pooled regression indicated that this form of earnings management has no impact on the value-relevance of earnings and book value.

Hypothesis 2B examined the impact of earnings management via short-term discretionary accruals. The coefficients from the pooled regression signified that this form of earnings management reduces the value-relevance of earnings but has no impact on the value-relevance of book value. It was hypothesized that earnings management would not only reduce the value-relevance of earnings, but also increase the value-relevance of book value. Thus, Hypothesis 2B is not supported.

Hypothesis 2C examined the impact of earnings management via long-term discretionary accruals. The coefficients from the pooled regression signified that this form of earnings management reduces the value-relevance of earnings but has not impact on the value-relevance of book value. Similar to Hypothesis 2B, it was hypothesized that earnings management would increase the value-relevance of book value. Thus, Hypothesis 2C is rejected.

The Extended-Earnings-Management Model (Equation [3]) was used to test Hypothesis 3 and as a secondary test of Hypotheses 2B and 2C. Hypothesis 3 tested the differential impact of earnings management via short-term versus long-term discretionary accruals. This is possible through the inclusion of dummy variables to represent each type of earnings management. The results of the pooled regression indicated that earnings management via short-term discretionary accruals has no impact, while earnings management via long-term discretionary accruals reduces the value-relevance of earnings and increases the value-relevance of book value. This provided support for Hypothesis 2C. Furthermore, it can be concluded that earnings management via long-term discretionary accruals has a greater impact on the value relevance of earnings than earnings management via short-term discretionary accruals. A Wald test was applied to the estimated coefficients from Equation [3] in order to more formally test Hypothesis 3. These results provided support for Hypothesis 3.

Sensitivity analysis was undertaken to test the robustness of the results. The literature identifies return on equity, leverage, and negative earnings as three variables that influence the relative value-relevance of earnings and book value (Hayn 1995; Burgstahler and Dichev 1997a; Barth et al 1998; Penman 1998; Collins et al 1999). In order to identify more clearly the impact of earnings management, these variables were included in the models as control variables. The expanded models were estimated using pooled OLS and the original results of the hypothesis tests were unchanged by the inclusion of the control variables. It can therefore be concluded that it is earnings management driving the changes in the market's reliance on earnings and book value.

Sensitivity analysis also included examination of the effect of an alternative method for earnings management allocation. The models were estimated first using the upper and lower quartiles as the benchmark for discretionary accruals and then using the industry median as the benchmark. All test results are unaffected by the use of the alternative measure of earnings management, with the exception of Hypothesis 2C when tested using Equation [3]. When using the median benchmark, this hypothesis was rejected.

The final step in the sensitivity analysis involved the estimation of the models using alternative measures of earnings. The primary analysis used earnings before extraordinary items. Further analysis included earnings before abnormal items and earnings after extraordinary items. The use of earnings after extraordinary items did not alter the conclusion of the main analysis. However, the use of earnings before abnormal items results in the rejection of Hypothesis 3 and Hypothesis 2C when tested using Equation [3].

5.3 SUMMARY OF THE RESEARCH CONCLUSIONS

Table 5-1 provides a summary of the study's propositions, hypotheses and key findings.

5.3.1 Value Relevance

The results in this study provided evidence of the value-relevance of earnings and book value for Australian firms. Whilst the response coefficients for both earnings and book value were positive and significant, they were slightly higher than found in US studies. This may be due to the different time period being examined or due to different market characteristics.

The main analysis was undertaken using earnings before extraordinary items. Sensitivity analysis examined the relative value-relevance of earnings and book value for alternative definitions of earnings, including earnings before abnormal items and earnings after extraordinary items.

Table 5-1(A) Summary of Propositions, Hypotheses and Findings

Proposition	Hypothesis	Earnings before extraordinary items	Earnings before abnormal items	Earnings after extraordinary items	Earnings before extraordinary items, median allocation	Earnings before extraordinary items, control variables
P1: Earnings and book value are positively associated with firm value.	H1: Earnings and book value are value-relevant.	Do not reject	Do not reject	Do not reject	Do not reject	Do not reject
P2: Earnings management reduces the value-relevance of earnings and increases the value-relevance of book value.	H2A: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via total discretionary accruals.	Reject	Reject	Reject	Reject	Reject
	H2B: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via short-term discretionary accruals.	Reject	Reject	Reject	Reject	Reject

Table 5-2(B) Summary of Propositions, Hypotheses and Findings

Proposition	Hypothesis	Earnings before extraordinary items	Earnings before abnormal items	Earnings after extraordinary items	Earnings before extraordinary items, median allocation	Earnings before extraordinary items, control variables
	H2C: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals. (Tested using Equation [2])	Reject	Reject	Reject	Reject	Reject
	H2C: The value-relevance of earnings is reduced and the value-relevance of book value is increased when firms manage earnings via long-term discretionary accruals. (Tested using Equation [3])	Do not reject	Reject	Do not reject	Reject	Do not reject
Proposition 3: The effect of long-term discretionary accruals on the value relevance of earnings and book value is greater than the effect of short-term discretionary accruals on the value relevance of earnings and book value.	H3: Earnings management via long-term discretionary accruals has a greater impact on the value-relevance of earnings and book value than earnings management via short-term discretionary accruals.	Do not reject	Reject	Do not reject	Do not reject	Do not reject

The explanatory power of the Value-relevance Model declined as earnings was adjusted for abnormal and extraordinary items. Specifically, the value-relevance of earnings declined as adjustments were made to earnings through abnormal and extraordinary items. However, these adjustments increased the value-relevance of book value. This implies that adjustments via abnormal and extraordinary items reduce the reliability of earnings.

As the market reacts differently to each of these measures of earnings, the individual components of earnings may be value-relevant in their own right. This can be tested by disaggregating earnings in Value-relevance Model into earnings before abnormal and extraordinary items, abnormal items, and extraordinary items. Results of this investigation are presented in Appendix 3. There is evidence that these components of earnings contain information relevant to firm valuation.

This is a concern given that the abnormal component of earnings is no longer disclosed separately for Australian companies, but rather is buried within earnings from continuing operations. The potential problem is that this value-relevant information is no longer readily available to market participants. This may be compensated for by the reclassification of items that were previously considered abnormal, as now being extraordinary. Future research could investigate changes in the incidence of extraordinary items subsequent to the elimination of abnormal items.

5.3.2 The Impact of Earnings Management

The basic Value-relevance Model (Equation [1]) has an explanatory power of 47.7%. The inclusion of the earnings management information in the Earnings-Management Model (Equation [2]) increased the R-squared to 60.8% for earnings management via

short-term discretionary accruals and to 52.5% for earnings management via long-term discretionary accruals. However, for earnings management via total discretionary accruals, the explanatory power is reduced to 46.1%. The increase in explanatory power suggests that earnings management information is relevant to firm valuation. Moreover, the decomposition of accruals into short-term and long-term discretionary accruals provides more information than the use of aggregate discretionary accruals as the indicator of earnings management.

The results of the pooled OLS regressions of the Earnings-Management Model lead to the rejection of Hypotheses 2A, 2B, and 2C. Earnings management via total discretionary accruals has no impact on the value-relevance of book value or earnings. However, earnings management via either short-term or long-term discretionary accruals reduces the value-relevance of earnings and has no impact on the value-relevance of book value.

These results are consistent with the inferences drawn from the explanatory power of the models. That is, discretionary accruals contain more information when disaggregated into its short-term and long-term components. This is due to the differential use of these components of accruals. Different circumstances motivate management to either increase or decrease earnings. The incentive to increase earnings is usually the need to meet a specific benchmark such as zero earnings, previous year's earnings, or an analyst forecast. Earnings management that decreases earnings is often aimed at reducing the tax expense or is used in conjunction with a series of "big-bath" write-offs to increase earnings in subsequent periods.

The mean short-term-discretionary accruals is positive. Similarly, the estimation of the regression equation for short-term discretionary accruals (Equation [9]) results in a positive intercept and a positive coefficient on change in revenue. This suggests that short-term discretionary accruals are used by management to increase earnings. Conversely, the mean long-term discretionary accruals for the sample is negative. The intercept and estimated coefficients are all negative in the regression equation for long-term discretionary accruals (Equation [11]). This suggests that management uses long-term accruals to reduce earnings. The insignificant results for total discretionary accruals may simply reflect positive short-term discretionary accruals being offset by negative long-term discretionary accruals.

Although earnings management via either short-term or long-term discretionary accruals impacts on the value-relevance of earnings, there is no effect on the value-relevance of book value. The decline in value-relevance of earnings in the presence of earnings management reveals that the market perceives earnings management as an indicator of low earnings reliability. The assumption underlying Proposition 2 is that the market would look to alternate sources of information when the reliability of earnings declines. The lack of impact on book value may reflect a fixation on earnings. The market may react to low reliability of earnings by discounting the earnings figure, but making no change to reliance on other sources of information. Alternatively, the lack of impact on the value-relevance of book value may simply indicate that the market looks to information other than book value to compensate for low earnings reliability.

Hypotheses 2B and 2C are also tested using the estimated coefficients from the Extended-Earnings-Management Model (Equation [3]). The coefficients on the

interaction variables for earnings management via short-term discretionary accruals were not significant and therefore do not support Hypothesis 2B. However, the coefficients on the interaction variables for earnings management via long-term discretionary accruals were significant. Thus, there is support for Hypothesis 2C which states that earnings management via long-term discretionary accruals reduces the value-relevance of earnings and increases the value-relevance of book value. This is in contrast to the findings based on the coefficients from the Earnings-Management Model (Equation [2]) which focuses on total accruals only.

The Earnings-Management Model evaluates the impact of only one source of earnings management at a time, whereas the Extended-Earnings-Management Model incorporates variables to represent both sources of earnings management. The impact of earnings management via long-term discretionary accruals may become significant only when earnings management via short-term discretionary accruals is controlled for.

Sensitivity analysis included the re-estimation of the models using the earnings management indicator based on the industry median rather than industry quartiles as the allocation benchmark. Generally, this alternate benchmark had little impact on the results of the hypothesis tests with the exception of the interaction variable for earnings via short-term discretionary accruals. Using the median benchmark, the coefficient was insignificant. Another exception, when using the median benchmark, is for the test of Hypothesis 2C using the Extended-Earnings-Management Model. Earnings management via long-term discretionary accruals only impacts to reduce the value-relevance of earnings, but has no impact on the value-relevance of book value. This is in contrast to the impact on book value that was evident when the earnings management

indicator was based on the quartile benchmarks. These changes to the results of the hypothesis tests indicate that, as intended, the quartile allocation technique provided a stricter test of earnings management, thus enhancing the power of the tests.

The effect of earnings management on the value-relevance of earnings and book value is sensitive to the definition of earnings. The primary results reported in this study are based on earnings before extraordinary items. The models were also estimated using earnings before abnormal items and earnings after extraordinary items. The different measures of earnings were used for the earnings variable in the model as well as for the estimation of total and long-term discretionary accruals. The calculation of short-term accruals is independent of the definition of earnings.

The regression results are very similar for all measures of earnings. This is not surprising for earnings before and after extraordinary items as by definition, extraordinary items are not common. For most of the firms in the sample, earnings before extraordinary items and earnings after extraordinary items are the same figure. In fact, in the sample of 2900 firm observations, only 1% had negative extraordinary items and 0.7% had positive extraordinary items. Similar to the use of extraordinary items, abnormal items were used predominantly to reduce earnings. However, the incidence of abnormal items is considerably higher than the incidence of extraordinary items. In the sample, 33.6% of firm observation had negative abnormal items whereas 12.2% had positive abnormal items.

The effect of the alternative measures of earnings on the value-relevance of earnings and book value is similar for the Earnings-Management Model (Equation [2]) to that found for the Value-relevance Model (Equation [1]). As earnings is adjusted for

abnormal and then extraordinary items, the explanatory power of the model is enhanced, the value-relevance of earnings declines, and the value-relevance of book value increases.

The impact of earnings management for the alternative definitions of earnings depends on the source of earnings management. In line with the main analysis, earnings management via total discretionary accruals has no impact on the value-relevance of earnings or book value. Therefore, regardless of the definition of earnings, Hypothesis 2A is rejected.

The impact of earnings management via short-term discretionary accruals is influenced by the definition of earnings used in the model. The impact on earnings is greatest when earnings is measured before abnormal items and least when earnings is measured after abnormal items, that is, before extraordinary items. This should be interpreted with reference to the value-relevance of earnings in the absence of earnings management which is also greatest when earnings is measured before abnormal items. However, while the adjustment for extraordinary items reduces the value relevance of earnings in the absence of earnings management, it increases the impact of earnings management. Moreover, when earnings is measured before abnormal items or after extraordinary items there is a positive impact on the value-relevance of book value. In other words, for these measures of earnings, earnings management via short-term discretionary accruals reduces the value-relevance of earnings and increases the value-relevance of book value. It should be noted that the estimated coefficients are only significant at the 10% level. These results provide some support for Hypothesis 2B.

In contrast to the findings for the short-term model, the use of alternative definitions of earnings does not alter the inferences relating to earnings management via long-term discretionary accruals. However, it is interesting to note that the impact of earnings management via long-term discretionary accruals moves in the opposite direction to that found for earnings management via short-term discretionary accruals. When earnings is adjusted for abnormal items, the impact of earnings management on earnings increases. Conversely, when earnings is adjusted for extraordinary items, the impact on earnings management on earnings declines slightly. Regardless of the measure of earnings, earnings management via long-term discretionary accruals had no impact on the value-relevance of earnings. Therefore, Hypothesis 2C is rejected for all definitions of earnings.

5.3.3 Short-term versus Long-term Discretionary Accruals

The Extended-Earnings-Management Model (Equation [3]) includes an earnings management interaction variable for both earnings management via short-term discretionary accruals and for earnings management via long-term discretionary accruals. The estimated coefficients were significant for earnings management via long-term discretionary accruals but insignificant for earnings management via short-term discretionary accruals. This may indicate that while the market can identify and react to earnings management via long-term discretionary accruals, it is fooled by earnings management via short-term discretionary accruals. However, this is unlikely to be the case, as earnings management via short-term discretionary accruals proved to have a significant impact on value-relevance when it was examined in isolation in the Earnings-Management Model (Equation [2]).

A Wald test was applied to the estimated coefficients to formally assess the differential impact of these two forms of earnings management. It was found the earnings management via long-term discretionary accruals had a significantly greater impact on the value-relevance of earnings and book value than did earnings management via short-term discretionary accruals. The differential impact indicates that the market is able to distinguish between short-term and long-term accrual choices.

There are a number of possible reasons why the market reacts more strongly to earnings management via long-term discretionary accruals than earnings management via short-term discretionary accruals. One possible reason, that the market is fooled by the use of short-term discretionary accruals, has already been dismissed. The nature of the two types of discretionary accruals may provide some insight. As previously discussed, short-term discretionary accruals are on average positive whereas long-term discretionary accruals tend to be negative. The market may look less favorably on the use of accruals to decrease earnings than those used to increase earnings, and thus react more strongly. Additionally, the market may be less concerned about short-term discretionary accruals as they expect these accruals to reverse next period. The long-term discretionary accruals may have an impact on earnings over a longer time horizon and therefore are of greater concern to the market.

The results from the main analysis are robust for the inclusion of the control variables and the use of the industry median as the earnings management allocation benchmark. However, when earnings were measured before abnormal items, there was no impact on the value-relevance of earnings or book value from either source of earnings management. This suggests that the market perceives this earnings measure to be

reliable. While earnings before abnormal items undoubtedly contain discretionary accruals, the market may view these accruals as an informative signal rather than an indication of opportunistic behavior by management. The significance of the impact of earnings management when earnings are adjusted for abnormal or extraordinary items implies that the market may perceive these items as containing discretionary accruals that have been used opportunistically by management. Accordingly, the conflicting results for the alternative definitions of earnings may provide some insight into the source of earnings management and be of interest for future research.

5.4 LIMITATIONS OF THE RESEARCH

Possible limitations of the research must be acknowledged when interpreting the results of this study. These limitations relate primarily to threats to the validity of the research. Campbell and Stanley (1963) provide guidance to the evaluation of the general threats to validity. They classify these as threats to internal and external validity. Cook and Campbell (1979) extend the classification to include threats to statistical conclusion validity and construct validity, although these threats are often presented as internal validity issues.

5.4.1 Threats to Internal Validity

Internal validity relates to the certainty with which statements can be made about the relationships between the variables as measured in the research. As this study is not an experiment, many of the traditional threats to internal validity are not present.

The general threats to internal validity have been minimized through the use of control variables in the regression models. These variables were included to control for known determinants of the relative value-relevance of earnings and book value.

Mortality is a threat to internal validity that is an issue in this study, but not in the traditional sense. There is a temptation to include only firms that have data available for all 5 years of the analysis. However, when considering the research question it becomes evident that this would not be appropriate. It is possible that the firms most actively engaging in earnings management are doing so in order to conceal poor financial performance. Such firms may fail during the study period and would be excluded due to missing data. Alternately, new firms may be motivated to manage earnings in an attempt to attract investors. Exclusion of these firms from the analysis may remove the very firms that are the target of the research question and result in what is known as survivorship bias.

Sample size is also a concern in terms of statistical conclusion validity which relates to the probability that the statistical results are representative of the actual relationships within the data set. The problem of low statistical power due to small sample size is addressed in this study by pooling the data. Due to the small number of firms listed on the Australian Stock Exchange, all firms were considered for the original sample. Firms were then removed on the basis of missing data. This highlights the limitation of using an existing database as the data source. As reported by SIRCA, the firms missing data are primarily smaller firms that are not covered by the database. Although the initial selection of firms is based on convenience, random sampling was not used as it would have further reduced an already small sample size.

Firms in the financial, banking and insurance industries were also removed, along with outlying observations for earnings and book value, and firms in industries with too few observations to run the regression analysis. The methods used to allocate firms as either having earnings management or not, also had an impact on the sample size. With the

use of the median as the benchmark for discretionary accruals, the total sample for the pooled regressions was 2900 firm observations. However, when the quartile benchmark was used, this number was reduced to 778 firm observations.

Construct validity relates to the degree to which a variable measures what it purports to measure. Clear operational definitions of the measures used in this study are provided in sections 3.4, 3.5, and 3.6. The issue of construct validity is of particular importance when variable measures are newly developed, as is the case in this study. Whilst the earnings, book value, and stock price variables have been used extensively in previous research, the short-term and long-term discretionary accrual measures have not. The existing literature was reviewed to provide guidance for the development of these measures.

The disaggregation of total accruals into its short-term and long-term components has been previously developed (Wilson 1986; Dechow 1994; Cotter 1996; Loftus and Sin 1997; Chia et al 1997; Guay and Sidhu 2001). Similarly, a variety of models have been developed to estimate discretionary accruals to represent earnings management (Healy 1985; DeAngelo 1986; Jones 1991; Dechow et al 1995). Drawing on these bodies of literature, a model was developed to determine the discretionary component of both short-term and long-term accruals.

Mono-operational bias is another issue that must be addressed when evaluating construct validity. Although only one approach was adopted to determine the discretionary component of the short-term and long-term accruals, two alternative methods were applied to the resulting discretionary accruals to allocate firms as either managing earnings or not. The primary analysis of the results focuses on the quartile

benchmark for allocation purposes, however, the results from the use of the median benchmark were presented as part of the sensitivity analysis. Additionally, different measures of earnings were used as the basis for calculating accruals. The results are presented for each of these alternatives.

The measure of value-relevance focuses on market perception by evaluating the relationship between the accounting information and stock price. However, it is unclear whether the market uses discretionary accruals as a measure of earnings management. The complexity of the models used to determine discretionary accruals suggests that the average investor would not be using this measure. Similarly, the market's ability to distinguish between the short-term and long-term discretionary accruals is questionable.

This research could be extended through the development of alternative models for the disaggregation of short-term and long-term accruals into the discretionary and non-discretionary components. Moreover, different measures for earnings management could be investigated.

5.4.2 Threats to External Validity

External validity relates to the generalizability of results across populations, settings and times. The representativeness of the sample firms influences the degree of the generalizability. Thus, the exclusion of firms in the financial, banking and insurance industries reduces the generalizability of results to all publicly traded firms. Similarly, the smallest industries were excluded from the study due to lack of data. This provides an opportunity for further research into the behavior of discretionary accruals in regulated or small industries.

As Australian data has been used for this study, care should be taken in generalizing the results to stock markets in other countries due to regional economic influences. The Australian market and its firms may exhibit characteristics different from international markets in terms of size, number of firms or market capitalization. For example, the New York Stock Exchange (NYSE) has twice the number of firms as the Australian Stock Exchange (ASX) but ten times the market capitalization. The largest ten firms listed on the NYSE have greater market capitalization than the entire ASX. Consequently, the NYSE would provide a richer data set with which to investigate the questions presented in this research. Nevertheless, there is a similarity in the results of this study with past research conducted in the US, thus indicating a degree of generalizability.

5.5 IMPLICATIONS OF THE RESEARCH

5.5.1 Regulatory Implications

To maintain earnings relevance in the face of financial fraud, regulators have taken action to ensure the integrity of accounting information. A primary source of accounting information for shareholders is management who theoretically should be well informed regarding the firm's activities and performance. Yet management is motivated by self-interest and incentives may exist to manipulate the information released, for example, through the manipulation of accruals to reach an earnings target. Such activity may mislead shareholders by providing accounting information that is not truly indicative of the financial position and performance of the firm.

Although earnings management may not actually be deemed fraudulent, it is indicative of opportunistic behavior by management. Regulatory bodies such as the Australian

Stock Exchange (ASX), the Australian Securities and Investment Commission (ASIC), and the Securities Exchange Commission (SEC) have a vested interest in monitoring the financial reporting process. Legislation has also acknowledged the need to monitor financial reporting (Sarbanes-Oxley Act 2002).

This research provides further evidence of the existence of earnings management and its impact on the market. Consequently it provides support for ongoing regulatory activity aimed at effectively monitoring management in order to improve the integrity of the financial reporting process. Additionally, the models developed in this study will assist in the identification of earnings management with insights into the differential impact of short-term and long-term discretionary accruals. This distinction in the timing difference of discretionary accruals suggests a possible need for additional disclosure requirements.

These findings may also provide further support for a principles-based approach to standard setting. A rule-based approach enables creative engineering of transactions which adhere to the rules whilst evading the intent of the standards. In recent years this has resulted in continuing refinements to the accounting standards to limit future manipulations. A principles-based approach requires a broader application of the principles thus reducing the likelihood of exceptions. Earnings management, as defined in this study, is the excessive use of discretionary accruals to manipulate the earnings figure. It should be noted that the intent of principles-based standard setting is not to eliminate the use of discretionary accruals but rather to ensure that such use is within the intent of the standards. Ideally, this would result in accruals that enhance the

information content of earnings thus improving the ability of market participants to make informed decisions about the allocation of capital resources.

5.5.2 Practical Implications

This research provides two key insights for market participants including investors, analysts, accounting and auditing professionals. These insights relate to the role of earnings management information in firm valuation and the market's perception of accrual choices.

Firstly, the results demonstrate that earnings management affects not only the informativeness of earnings but also of book value. This highlights the potential valuation error that may arise from a fixation on earnings, particularly if the reliability of the earnings figure has been compromised. The results indicate a shift away from earnings and toward book value as the basis for valuation in the presence of earnings management via long-term discretionary accruals. Thus a firm's propensity to manage earnings is value relevant information that should be considered in the valuation process.

Another contribution of this study is the evidence that the use of short-term or long-term discretionary accruals as the earnings management tool has a differential effect on the value-relevance of accounting information. Thus, practitioners must be cognizant of the market's potential reaction to the accrual choices. Moreover, the models developed to distinguish between short-term and long-term discretionary accruals may provide market participants with guidance in the detection of different forms of earnings management.

5.5.3 Educational Implications

With earnings management becoming the focus of regulator, standard setters and market participants, its integration into accounting education is essential. The analysis of financial statements is an important component of accounting courses at all levels. However, the results of this study are most relevant for financial statement analysis courses.

Recent corporate collapses have led to the inclusion of corporate governance as a necessary topic in courses aimed at the evaluation of financial statements. This acknowledges the potential lack of reliability of accounting information. Earnings management is addressed in financial statement analysis textbooks in the context of the reliability of financial information. Much of the discussion of earnings management centers on the use of specific accruals to manage earnings. However, few texts address the issue of the detection of earnings management. Furthermore, no distinction is made between earnings management via short-term discretionary accruals and long-term discretionary accruals. The models developed in this study provide a tool for identifying whether or not a firm manages earnings and what type of accruals are used. This would be useful as a preliminary tool to assess the integrity of the financial statements.

Earnings based models are typically the focus of firm valuation in financial statement analysis courses. This study provides further evidence of the role of book value. Furthermore, the results demonstrate the impact of earnings management on the value-relevance of earnings and book value. This provides a significant link between the integrity of the accounting information and the usefulness of the information to market participants.

5.5.4 Research Implications

This research provides a link between valuation and earnings management research. In this study, earnings management was used as an indicator of the reliability of earnings. The results provide evidence that low reliability of information reduces its value-relevance. Further research could investigate other indicators of reliability that may influence the relative value-relevance of earnings and book value. For example, recent activities in the corporate world clearly indicate that managers may behave opportunistically and require monitoring. This issue has been addressed through the introduction of corporate governance guidelines and regulations. Therefore, it would be of interest to examine the role of corporate governance in enhancing the reliability of information.

The models that have been commonly used to detect earnings management primarily have a short-term focus. A major contribution of this study is the extension of these models to enable the estimation of short-term and long-term discretionary accruals.

Most of the existing studies examining the role of short-term and long-term accruals focus on the direct value-relevance of these components. In contrast, this study investigates the moderating effect on the value-relevance of accounting information. Additionally, this study decomposed total accruals in order to examine the impact of the discretionary component rather than accruals as a whole. The results clearly demonstrate that the long-term component of discretionary accruals has a greater impact on the value-relevance of earnings and book value than short-term discretionary accruals.

The significant results in this study indicate that the discretionary accruals measures developed for short-term and long-term accruals contain information that is relevant to capital markets. Much of the existing research focuses on the effect of earnings management in contractual settings rather than capital markets. However, practitioners may be more interested in capital market incentives.

The use of Australian data in this study contributes to both the valuation and earnings management literature. The similarity of results with previous research using US data demonstrates the generalizability of the findings to different markets. Replication of this research using data from other international stock exchanges may provide insight into market response to earnings management and its impact on firm valuation.

5.6 SUMMARY

This chapter discussed the limitations of the research by addressing the common threats to research validity. Furthermore, it presented the major contributions of the research in terms of regulatory, practical, educational, and research implications. The study links the valuation and earnings management literature by demonstrating the impact of earnings management on the relative value-relevance of earnings and book value.

A further contribution of this study is the development of a model to determine the short-term and long-term components of discretionary accruals in order to examine the differential impact of these sources of earnings management. The results demonstrate a greater impact on value-relevance for earnings management via long-term discretionary accruals than for earnings management via short-term discretionary accruals. This suggests that the market is able to distinguish between short-term and long-term accruals choices.

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APPENDIX 1

Table A1-1
ASX Industry Sectors

ASX Sector	Description
1	Gold
2	Other metals
3	Diversified Resources
4	Energy
5	Infrastructure and Utilities
6	Developers and Contractors
7	Building Materials
8	Alcohol and Tobacco
9	Food and Household
10	Chemicals
11	Engineering
12	Paper and Packaging
13	Retail
14	Transport
15	Media
16	Banks and Finance
17	Insurance
18	Telecommunications
19	Investment and Financial Services
20	Property Trusts
21	Healthcare and Biotechnology
22	Miscellaneous Industrials
23	Diversified Industrials
24	Tourism and Leisure

APPENDIX 2

The following tables present the results of the regressions used to estimate total, short-term, and long-term accruals for ASX Industry Sector 22 (Miscellaneous Industrials).

Table A2-1
Estimation of Total Accruals Model for Industry 22 – Miscellaneous Industrials

Equation [7]: $ACC_t = \varphi_1 + \varphi_2 \Delta REV_t + \varphi_3 PPE_t + \varepsilon$

	Adj R ²	φ_1	φ_2	φ_3	n
Pooled	0.780 (727.31)***	1,008,602.880 (46.58)***	0.016 (1.22)	-0.109 (5.78)***	611
1997	0.245 (11.77)***	-445,656.279 (6.45)***	0.087 (4.22)***	0.065 (2.87)***	98
1998	0.145 (6.95)***	-434,136.860 (4.00)***	0.003 (0.09)	-0.033 (1.18)	104
1999	0.244 (13.66)***	330,601.631 (4.22)***	0.028 (2.26)***	0.027 (0.41)	116
2000	0.937 (810.66)***	1,128,423.709 (48.82)***	-0.024 (2.85)***	-0.024 (7.74)***	145
2001	-0.201 (-7.28)	-201,537.935 (2.65)***	0.196 (1.42)	0.196 (1.04)	148

Table A2-2
Estimation of Short-term Accruals Model for Industry 22 – Miscellaneous Industrials

Equation [9]: $STACC_t = \gamma_1 + \gamma_2 \Delta REV_t + \varepsilon$

	Adj R ²	γ_1	γ_2	n
Pooled	0.743 (888.91)***	1,157,033.308 (28.85)***	0.150 (12.25)***	611
1997	0.000 (1.00)	-253,127.746 (1.12)	0.104 (1.47)	98
1998	0.925 (743.31)***	163,667.165 (1.02)	0.407 (38.72)***	104
1999	0.567 (78.58)***	436,341.894 (9.27)***	0.083 (8.38)***	116
2000	0.954 (1752.11)***	1297083.466 (59.43)***	-0.024 (1.74)*	145
2001	0.485 (71.51)***	-54,229.047 (1.27)	0.193 (11.88)***	148

Table A2-3
Estimation of Long-term Accruals Model for Industry 22 – Miscellaneous
Industrials

Equation [11]: $LTACC_t = \eta_1 + \eta_2 PPE_t + \eta_3 INT_t + \eta_4 NCPT + \varepsilon$						
	Adj R ²	η_1	η_2	η_3	η_4	n
Pooled	0.682 (335.86)***	-109,917.267 (3.44)***	-0.324 (15.20)***	-0.014 (1.07)	-0.688 (3.07)***	611
1997	0.768 (85.90)***	477,328.240 (5.01)***	-0.590 (15.65)***	-0.164 (1.73)*	0.674 (1.92)*	98
1998	0.959 (813.35)***	-412,249.514 (3.43)***	-0.394 (9.12)***	-0.061 (0.71)	-0.284 (0.77)	104
1999	-0.034 (0.05)	82,884.819 (1.24)	-0.223 (3.98)***	0.101 (1.91)*	-0.137 (0.42)	116
2000	0.365 (22.09)***	-238,911.689 (5.17)***	-0.155 (2.86)***	0.030 (1.67)*	0.519 (0.62)	145
2001	0.064 (3.55)***	-63,504.651 (0.71)	-0.426 (5.39)***	-0.101 (2.13)**	1.188 (1.56)	148

APPENDIX 3

The Value-relevance Model (Equation [1]) examines the value relevance of earnings and book value by examining the response coefficients from the regression estimation. Hypothesis 1 was tested using three alternative definitions of earnings; (1) Earnings before abnormal items, (2) Earnings before extraordinary items, and (3) Earnings after extraordinary items. The results revealed that the market reacts differently to each of these measures of earnings.

Table A3-1 presents the results of regression estimations in which earnings is decomposed into three components. These components are earnings before both abnormal and extraordinary items, abnormal items, and extraordinary items. The purpose of this disaggregation is to examine the individual value-relevance of each component of earnings.

The first model includes all three earnings components and book value as the explanatory variables. The results demonstrate the value-relevance of earnings before abnormal and extraordinary items, abnormal items, and book value. The extraordinary component of earnings is not value relevant in its own right.

In the second model, the three earnings components are replaced with earnings before extraordinary items and extraordinary items per share. Earnings before extraordinary items and book value are both value-relevant at the 1% level. The coefficient on extraordinary items per share is significant at the 10% level, indicating weak support for the value-relevance of this component.

The third model uses earnings after extraordinary items in place of the three components. Both earnings and book value are value-relevant in this model.

The change in the response coefficients and the explanatory power of the models demonstrate the impact of the disaggregation of earnings on its value-relevance and on the value-relevance of book value. The explanatory power of the model increases as earnings is disaggregated into its components. Similarly, there is an increase in the magnitude of the coefficients on the earnings components. Conversely, the response coefficient for book value declines as earnings is disaggregated. These results indicate that there is information content in the components of earnings.

Table A3-1
Value-relevance of Earnings Components and Book Value

$P_t = \lambda_0 + \lambda_1 \text{EBAX}_t + \lambda_2 \text{ABN}_t + \lambda_3 \text{XT}_t + \lambda_4 \text{BV}_t + \varepsilon$					
Adj R ²	λ_1	λ_2	λ_3	λ_4	n
0.495	7.22 (6.29)***	0.89 (2.45)**	0.24 (0.89)	0.99 (6.14)***	2900
$P_t = \psi_0 + \psi_1 \text{EBX}_t + \psi_2 \text{XT}_t + \psi_3 \text{BV}_t + \varepsilon$					
Adj R ²	ψ_1	ψ_2	ψ_3		n
0.477	5.01 (6.47)***	0.45 (1.66)*	1.22 (9.23)***		2900
$P_t = \delta_0 + \delta_1 \text{E} + \delta_2 \text{BV}_t + \varepsilon$					
Adj R ²	δ_1	δ_2			n
0.474	4.66 (6.19)***	1.26 (9.63)***			2900

Notes:

*, **, *** Significant at 10%, 5%, 1%, two-tailed respectively.

t-statistics based on White heteroscedasticity-consistent standard errors

P_t - Stock price per share at time $t + 3$ months

EBAX_t - Earnings before Abnormal and Extraordinary Items per share at time t

EBX_t - Earnings after Abnormal and before Extraordinary Items per share at time t

E_t - Earnings after Abnormal and Extraordinary Items per share at time t

ABN_t - Abnormal Items per share at time t

XT_t - Extraordinary Items per share at time t

BV_t - Book value per share at time t