# VALUE RELEVANCE OF ACCOUNTING INFORMATION DURING A FINANCIAL CRISIS: AN EMPIRICAL ANALYSIS OF AUSTRALIAN COMPANIES

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#### Abstract

The value relevance research (VRR) is one of the dominant branches of the capital market research (CMR) in Accounting. One of the core concerns examined in the VRR is the decline in the association of fundamental accounting measures with firms' market value in recent times. This thesis extends the VRR by examining the changes in the value relevance of fundamental accounting measures in the unique context of a global financial crisis (GFC). This thesis examines the impact of the 2008-2009 GFC on the value relevance of book value of equity, earnings and cash flow from operations (CFO). It also examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill. If a particular accounting measure can significantly explain the cross-sectional variation in share prices and if it is significantly associated with share prices, that particular accounting measure is considered to be used by investors in stock valuation and it is value relevant. This thesis is positioned into the CMR in Accounting. Positivist epistemology and objective ontology underpin the philosophical backgrounds of this thesis.

The 2008-2009 GFC is considered to be the most severe economic downturn since the 1929 Great Depression. Major stock market indices worldwide (the USA, UK, Germany, Japan, Ireland, Portugal, Greece, Italy and many other countries) declined by about 49 per cent from June, 2007 to February, 2009. From October, 2007 to February, 2009, the Australian All Ordinaries index lost about 51.51 per cent of its value. The illiquidity in the credit market and the decrease in the economic activities during the GFC have jeopardised the going concern assumption of many Australian companies resulting in an increase in the going concern qualifications in audit reports (Xu, Carson, Fargher and Jiang, 2011). Australian Securities and Investment Commission (ASIC) also cautioned companies and their auditors to carefully evaluate and apply the going concern assumption (ASIC, 2008 and 2009).

According to the financial health hypothesis (FHH) of Barth, Beaver and Landsman (1998), the value relevance of book value of equity increases and that of earnings decreases when a firm's financial health deteriorates and the firm faces going concern risks because book value of equity represents the liquidation option. Prior studies also suggest that the value relevance of book value increases and that of earnings decreases when earnings becomes transitory (Hayn, 1995), when a firm reports losses and one time items (Collins, Maydew and Weiss, 1997) and when the present earnings loses information content (Subramanyam and Venkatachalam, 1998). Prior studies have also noted that when earnings becomes a noisy measure of firm performance, investors' reliance on alternative performance measures (such as CFO) increases. Moreover, during the economy-wide financial crisis, firms engage in aggressive earnings management because it is difficult to meet the earnings target (Chia, Lapsley and Lee, 2007; Masruki and Azizan, 2010) and earnings management reduces the value relevance of earnings (Whelan, 2004).

Due to the increase in the business risks and the going concern risk during the GFC, it is premised that the value relevance of book value of equity and CFO increases and that of earnings decreases during the GFC compared to the non-crisis period (NCP). Moreover, if book value of equity represents the liquidation option, the value relevance of tangible assets is likely to be different from that of intangible assets and goodwill. The issue of uncertainty about associated expected future cash flows, the illiquidity and the lack of separate identifiability of intangible assets and goodwill might result in different value relevance for these assets relative to tangible assets. While the value relevance of tangible assets is expected to increase, that of intangible assets and goodwill is expected to decrease during the GFC compared to the NCP.

To empirically examine these conjectures, a total of 10 hypotheses are developed. Modified Ohlson (1995) models are used as the analytical framework to develop a set of models to test the hypotheses. Ohlson (1995) model expresses firms' market value as a function of book value of equity and earnings. It also allows for the inclusion of other information variables based on the research objectives. The financial accounting data and the market value data necessary for the examination of the value relevance of book value, earnings and CFO, have been collected from the *DataStream–worldscope* database. Data required for the examination of the value relevance of tangible assets, intangible assets and goodwill has been collected from companies' annual reports accessed through the *Connect 4* database.

The findings suggest that the value relevance of book value of equity and CFO has decreased and that of earnings has increased during the GFC compared to the NCP. The increase in the value relevance of earnings during the GFC is more pronounced for firms having positive earnings, high accruals and

transitory earnings than that of firms having negative earnings, low accruals and permanent earnings. On the contrary, the decrease in the value relevance of CFO is more obvious for firms having transitory CFO, high accruals and high leverage than that of firms having permanent CFO, low accruals and low leverage. The examination of the relative value relevance of book value, earnings and CFO suggests that earnings has higher relative value relevance than that of both book value and CFO during both the GFC and the NCP.

Further analysis reveals that the value relevance of both intangible assets (and goodwill) and tangible assets has decreased during the GFC compared to the NCP. Most importantly, investors attach higher importance on intangible assets and goodwill than that on tangible assets during the NCP for stock valuation purposes. On the contrary, the valuation weight placed on tangible assets is higher than the weight placed on either intangible assets or goodwill during the GFC. This evidence may point to a link of the decrease in the value relevance of book value of equity with the decrease in the relevance of intangible assets and goodwill during the GFC.

This thesis adds to the understanding of the market perception on key accounting measures (such as book value of equity, earnings, CFO, tangible assets, intangible assets and goodwill) in determining share prices during a period of macroeconomic uncertainty. This thesis contributes to the debate on the declining value relevance of accounting measures such as book value, earnings and CFO. It also contributes to the debate on the relative value relevance of book value, earnings and CFO. It shows that during a period of economic uncertainty, investors in the Australian market increase their reliance on earnings in determining firms' market value. However, investors' reliance on book value of equity for stock valuation purposes decreases during the GFC compared to the NCP which is contrary to the FHH. An implicit underlying assumption of the FHH is that book value is a proxy for firms' liquidation value. During the GFC, although firms' earnings performances suffer and the percentage of firms with going concern qualifications increases, the FHH may not be appropriate systematically for all firms for two reasons. Firstly, it is unlikely that all firms in the economy will be faced with similar levels of difficulty appropriate for the FHH. Secondly, during the GFC, market illiquidity and credit crunch may affect firms' liquidation options and the realisable value of book value may be lower than that would be the realisable value of book value if the economy was in a good shape.

The findings also suggest that during periods of economic uncertainty, investors' reliance on earnings increases, whereas, investors' reliance on CFO decreases. The underlying reason for the increase in the value relevance of earnings may be linked to the findings of Graham, Harvey and Rajgopal (2005) that the Generally Accepted Accounting Principles (GAAP) based earnings number, primarily earnings per share, is the key metric upon which the market focuses. They argue that to reduce the cost of information processing due to information overload, investors focus on a simple benchmark upon which they can rely on to evaluate firms' performances. During the GFC, the focus on a reliable benchmark such as earnings per share may increase because the noise level increases in the information from other unregulated and uncontrolled sources during the GFC compared to the NCP (Sidhu and Tan, 2011). Moreover, the increase in the value relevance of earnings for high accruals firms and for transitory earnings firms suggests the underlying supremacy of earnings over CFO to reflect firm performances with changing circumstances.

The findings have important implications for accounting regulators. Australian accounting standards, and indeed the global accounting standards, demonstrate a paradigm shift by moving their focus from the income statement to the balance sheet. The preoccupation of the fair value measurement system in the recently adopted International Financial Reporting Standards (IFRS) has further reinforced the focus on the balance sheet. Godfrey, Hodgson, Tarca, Hamilton and Holmes (2010, p.147) argue that due to the recent shift to the fair value based IFRS, "the focus has shifted towards valuation concepts, with the balance sheet the major repository of value relevant information, and the main users of accounting information stated to be shareholders and investors." However, this study documents a decline in the value relevance of book value during the GFC compared to the NCP. Moreover, the findings suggest that earnings has greater relative value relevance than that of book value. Thus, these findings imply that investors increasingly rely on reported earnings rather than book value for stock valuation purposes. Further, the evidence in this study demonstrates that even for a country with a balance sheet focus, the value relevance of earnings increases during a GFC. Hence, it is the earnings number and the income statement, rather than the balance sheet, which should receive greater attention from accounting regulators and auditors.

# DECLARATION

To the best of my knowledge and belief, the work presented in this thesis is completely original except where due reference is made in the text. This material has not previously been submitted, in whole or in part, for a degree at this or in any other university.

Signed:

Md Khokan Bepari Dated: March 31, 2012

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# List of abbreviations used in this thesis

- AASB = Australian Accounting Standards Board
- AFC = Asian Financial Crisis
- AGAAP = Australian Generally Accepted Accounting Principles
- AOH = Abandonment Option Hypothesis
- ASIC = Australian Securities and Investments Commission
- ASX = Australian Securities Exchange
- AUASB = Australian Auditing and Assurance Standards Board
- BAR = Behavioural Accounting Research
- CFAI = Chartered Financial Analysts Institute
- CFO = Cash Flow from Operations
- CMR = Capital Market Research
- ERC = Earnings Response Coefficient
- FASB = Financial Accounting Standards Board
- FHH = Financial Health Hypothesis
- GAAP = Generally Accepted Accounting Principles
- GDP = Gross Domestic Product
- GFC = Global Financial Crisis
- IASB = International Accounting Standards Board
- IFRS = International Financial Reporting Standards
- PAT = Positive Accounting Theory
- NCP = Non-Crisis Period
- R&D = Research and Development
- RIVM = Residual Income Valuation Model
- SAC = Statement of Accounting Concept
- S&P = Standard and Poor's
- VRR = Value Relevance Research

#### CHAPTER ONE

#### **INTRODUCTION**

#### 1.1 Background

The value relevance research (VAR) represents a significant area of the capital market research (CMR) in the accounting discipline. Particular accounting information is considered as value relevant if it shows predicted association with share prices or if it can explain the cross-sectional variations in share prices.<sup>1</sup> A large number of value relevance researches have examined the association of book value of equity<sup>2</sup> and earnings with share prices or contemporaneous stock returns. Two concerns dominating the value relevance literature are: (i) the explanatory and predictive power of fundamental accounting information (Lev, 1989; Brimble, 2003) and (ii) the deterioration in the relationship of key accounting information with share prices over the past few decades (Collins, Maydew and Weiss, 1997; Francis and Schipper, 1999; Lev and Zarwin, 1999; Brimble and Hodgson, 2007). One of the primary objectives of financial reporting being helping investors in taking equity investment decision, the declining association of fundamental accounting measures such as book value, earnings and cash flow from operations (CFO) with firms' market value has raised concerns among accounting scholars and practitioners (Collins, Maydew and Weiss, 1997; Brimble and Hodgson, 2007). Against this backdrop, this thesis is comprised of three interrelated phases of the boarder issue of the value relevance of accounting information in the context of the global financial crisis (GFC) of 2008-2009 and the non-crisis period (NCP) of 2004-2007.

# **1.2** The three phases of empirical analysis and the arrangement of the thesis issues

The empirical analysis for this thesis is carried out in three interrelated phases with a number of underlying research questions under each phase.

**Under the first phase of the analysis**, this thesis debates three questions. The first question examines the overall value relevance of book value and earnings. The second question examines the impact of the GFC on the value relevance of book value with specific focus on whether the value relevance of book value increases during the GFC compared to the NCP. The third question relates to the impact of the GFC on the value relevance of earnings with

<sup>&</sup>lt;sup>1</sup>Detailed discussion on the definition of value relevance is provided in chapter three.

<sup>&</sup>lt;sup>2</sup>Hereinafter the term 'book value' is used to mean book value of equity.

specific focus on whether the value relevance of earnings decreases during the GFC compared to the NCP.

#### Overall value relevance of book value and earnings

The stock valuation role of accounting book value and earnings is well documented in the literature. Available literature provides evidence of declining value relevance of accounting information over the last four decades in different countries (for instance, Amir and Lev, 1996; Collins, Maydew and Weiss, 1997; Lev and Zarowin, 1999; Brown, Kin and Lys, 1999; Core, Guay and VanBuskirk, 2003; Goodwin and Ahmed, 2006; Brimble and Hodgson, 2007). This decline in the value relevance of accounting information has been attributed to the increase in the number of high technology firms (and the associated unaccounted for intangible assets), accountants' reluctance to account for some intangible assets, large number of negative earnings firms, increase in the one-off items and increase in noise in earnings measurement (Hayn, 1995; Amir and Lev, 1996; Collins, Maydew and Weiss, 1997). However, prior longitudinal studies have shown that the value relevance of earnings has not decreased in the Australian market after controlling for the negative earnings (Brimble and Hodgson, 2007). The first question under the first phase examines the overall value relevance of book value and earnings in the Australian market during the economy-wide exogenous shock of the GFC.

#### Impact of the GFC on the value relevance of book value and earnings

Barth, Beaver and Landsman (1998) propose the financial health hypothesis (FHH) and suggest that the relative value relevance of book value and earnings is a function of firms' financial health. The value relevance of book value increases and that of earnings decreases when a firm's financial health deteriorates because in such a situation investors focus more on the existing disposable assets and their values rather than doubtful future earnings. Existing literature also argues that investors evaluate financially distressed firms on the basis of 'abandonment option hypothesis' (AOH). The AOH postulates that the abandonment options (the flexibility to management in either keeping a company's operation in going concern or abandoning it for its salvage value) help to determine whether earnings or book value assumes a greater role for stock valuation (Yee, 2000; Lim, 2005). Burgstahler and Dichev (1997) show a complementary relationship between book value and earnings in determining firms' market value. Prior literature also suggests that under certain conditions or firm specific situations, the relative importance of book value increases and that of earnings

decreases. Financial distress, temporary earnings, noisy earnings, negative earnings and earnings management are the specific conditions when the value relevance of book value increases and that of earnings decreases (Hayn, 1995; Burgstahler and Dichev, 1997; Collins, Maydew and Weiss, 1997; Barth, Beaver and Landsman, 1998; Whelan, 2004; Marquardt and Weidman, 2004).

The GFC is considered to be the most severe economic downturn since the 1929 Great Depression. Major stock market indices worldwide (the USA, UK, Australia, Hong Kong, Germany, Japan, Ireland, Portugal, Greece, Italy and many other countries) have declined by about 49 per cent from June, 2007 to February, 2009. From October, 2007 to February, 2009, the Australian Securities Exchange (ASX) All Ordinaries index lost about 51.51 per cent of its value (detail in chapter 2 of this thesis). The GFC represents an economy-wide uncertainty. The illiquidity in the credit market and the decrease in the economic activities during the GFC have jeopardised the going concern assumption of many Australian companies resulting in an increase in the going concern qualifications in audit reports (Xu, Carson, Fargher and Jiang, 2011). Australian Securities and Investment Commission (ASIC) also cautioned companies and their auditors to carefully evaluate and apply the going concern assumption (ASIC, 2008 and 2009). An important question is whether the FHH applies during an economy-wide exogenous shock like the one of the GFC. Specifically, how the 2008-2009 GFC has impacted the value relevance of book value and earnings remains an important empirical issue.

Against this backdrop, the second and third questions examined under the first phase of analysis relate to the impact of the GFC on the value relevance of book value and earnings, with specific focus on whether the value relevance of book value increases and that of earnings decreases during the GFC compared to the NCP. The changes in the relative and incremental value relevance of book value and earnings in the Australian market in the context of the GFC and the NCP are examined in this part. These questions under the first empirical phase of this thesis are examined in chapter six.

**Under the second phase of the analysis,** this thesis debates four questions. The first question examines whether CFO has value relevance incremental to book value and earnings. The second and third questions examine the relative value relevance of earnings and CFO in the context of the GFC and the NCP with specific focus on whether earnings or CFO contains

superior information for stock valuation purposes during the GFC and the NCP. The fourth question examines the changes in the value relevance of earnings and CFO between the GFC and the NCP with specific focus on whether the value relevance of earnings decreases and the value relevance of CFO increases during the GFC.

#### Incremental value relevance of CFO

Despite the long established requirement for the cash flow statement, debate continues as to the usefulness of the information contained in CFO (Subramanyam and Venkatachalam, 2007; Kumar and Krishnan, 2008; Barton, Hansen and Pownall, 2010; Akbar, Shah and Stark, 2011). Conflicting evidence exists in the literature on whether CFO has information content for stock valuation purposes incremental to the information contained in book value and earnings. It has been suggested that the two key accounting variables such as earnings and CFO are relevant for stock valuation purposes with each of them providing incremental information to other depending on firm specific and economy-wide conditions (Charitou, Clubb and Andrew, 2000). Habib (2008) also finds incremental value relevance of earnings and CFO over each other in the New Zealand context. However, Martinez (2003) fails to find any incremental information content of CFO beyond that contained in earnings in the context of France.

The literature review also suggests that most of the prior studies examining the incremental and relative value relevance of earnings versus CFO have used return models with contemporaneous stock return as the dependent variable. However, models using stock return as the dependent variable address the timeliness issue of a particular accounting measure as against the price models which examine whether investors consider a particular accounting measure while determining share prices (Kothari, 2001; Beaver, 2002).<sup>3</sup> There has been relatively little research examining whether CFO has any incremental relevance for stock valuation purposes after controlling the effects of book value and earnings. Hence, the first question examined under the second phase contributes to this debate by examining whether CFO has incremental value relevant information over book value and earnings in the Australian market surrounding the GFC.

<sup>&</sup>lt;sup>3</sup>A detailed discussion on the differences between price models and returns models is provided in the research design chapter.

#### Superiority of earnings versus CFO

During the normal economic environment the accruals based earnings<sup>4</sup> is generally considered to be the superior performance measure to CFO because of its matching attributes [(Financial Accounting Standards Board (FASB), 1978)]. Although some academics and practitioners advocate in favour of CFO, most of the investors rely on earnings because of its inherent matching attributes as is evidenced by the Wall Street's continued fixation on earnings announcement (Sloan, 1996). However, conflicting evidences exist on the superiority of earnings or CFO over each other (Subramanyam and Venkatachalam, 2007; Barton, Hansen and Pownall, 2010). Hence, the second question under the second phase examines whether earnings has superior information content to CFO for stock valuation during the NCP.

# Impact of the GFC on the value relevance of earnings and CFO

Prior studies suggest that during the economy-wide financial crisis, firms engage in aggressive earnings management because it is difficult to meet the earnings target (Chia, Lapsley and Lee, 2007; Zalk, 2009; Masruki and Azizan, 2010). Prior studies also suggest that earnings management reduces the value relevance of earnings (Whelan, 2004; Marquardt and Weidman, 2004). Kumar and Krishnan (2008) claim that relative importance of CFO and earnings differs based on firms' investment opportunity sets suggesting that the value relevance of these two performance measures differs based on firm specific and economic circumstances. Bernard and Stober (1989) show that the value relevance of earnings and CFO varies with circumstances such as economic conditions and the quality of measurement. Moreover, financial analysts place more weight on CFO than earnings for firms with poorer financial health (DeFond and Hung, 2003). Literature also suggests that the relative value relevance of CFO increases when the firm has transitory earnings (Cheng, Liu and Schaffer, 1996; Charitou, Clubb and Andreou, 2000; Charitou, 1997; Habib, 2008) and when the firm faces economic disturbances (Christian and Jones, 2004).

The fact that firms engage in earnings management during financial crisis, the fact that the value relevance of earnings decline in the presence of earnings management, the fact that the relative and incremental value relevance of earnings and CFO are conditional on firm specific and economic circumstances, and the fact that the value relevance of earnings decreases and

<sup>&</sup>lt;sup>4</sup>Because earnings includes both accruals and CFO, the word 'accruals based earnings' is used synonymous to earnings. The word accruals based earnings has been used in a number of places in this thesis to mean earnings.

that of CFO increases in the presence of transitory components of earnings, may suggest that the relative and incremental value relevance of earnings and CFO will be different during the GFC from that observed during the NCP. Specifically it can be expected that the value relevance of CFO increases and that of earnings decreases during the GFC compared to the NCP. Moreover, it can also be expected that CFO will have information content superior to earnings during the GFC.

Hence, the third question examined under the second phase relates to whether CFO has superior information content to earnings during the GFC. The fourth question relates to whether the value relevance of earnings decreases and that of CFO increases during the GFC compared to the NCP. These questions relating to the second analytical phase of this thesis are captured in chapter seven.

Under the third phase of the analysis, this thesis examines three empirical questions. The first question asks whether intangible assets and goodwill are relevant for stock valuation purpose. The second and third questions examine the impact of the GFC on the value relevance of components of book value such as tangible assets, intangible assets and goodwill with specific focus on whether the value relevance of intangible assets and goodwill decreases and that of tangible assets increases during the GFC compared to the NCP.

#### Overall value relevance of intangible assets and goodwill

Prior studies have shown that intangible assets and goodwill are value relevant (Jennings and Henings, 1995; Kallapur and Kwan, 2004; Bugeja and Gallery, 2006; Al-Jifri and Citron, 2010; Oliveira, Rodrigues and Craig, 2010). These evidences relate to the amortisation regime when intangible assets and goodwill were systematically amortised over a period of 20 years. Accounting for intangible assets and goodwill has now been changed by the introduction of International Financial Reporting Standards (IFRS) 36 / Australian Accounting Standards Board (AASB) 136. Intangible assets and goodwill are now tested annually for impairment. Although there are debates on whether intangible assets and goodwill are assets or not (Gore and Zimmerman, 2010), whatever amounts of intangible assets and goodwill are reported in the balance sheet after the impairment review, they are assumed to be reported in the fair value. Hence, the first question examines the overall value relevance of intangible assets and goodwill.

Impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill The FHH suggests that the value relevance of book value increases when a firm's financial health deteriorates. However, if the risk of liquidation increases, it is more likely that the value relevance of intangible assets and goodwill declines during the GFC. Intangible assets and goodwill are mostly firm specific. McNeal (1939) and Chambers (1966) do not consider goodwill to be an asset because of its lack of exchangeability. Similar question was also raised during the GFC (Gore and Zimmerman, 2010). Hence, the impact of the GFC is likely to be different on the value relevance of tangible assets, from the impact on the value relevance of intangible assets and goodwill. The realisable values of intangible assets and goodwill in case of firms' liquidation are likely to be very low due to the lack of exchangeability and the firm-specificity of intangible assets and goodwill. Because the fair value measurement of intangible assets and goodwill requires the use of subjective judgement and discretions, they are considered as soft measures.<sup>5</sup> On the contrary, tangible assets may be considered as hard measures. During a financial crisis, investors may rely on 'hard measures' as opposed to 'soft measures' to determine firms' market value. The issue of uncertainty about expected future cash flows, as well as, the issue of illiquidity associated with intangible assets and goodwill may imply that the GFC will have different impact on the market perception on intangible assets and goodwill from that on the tangible assets.

Relying on the FHH, the value relevance of tangible assets is expected to increase during the GFC, whereas, pursuant to the above discussion, the value relevance of intangible assets and goodwill is expected to decrease during the GFC. Specifically, as a proxy for liquidation option, the value relevance of tangible assets is likely to increase and the value relevance of intangible assets and goodwill is likely to decrease. Hence, the second question examines the impact of the GFC on the value relevance of intangible assets and goodwill and the third question examines the impact of the GFC on the value relevance of tangible assets.

#### **1.3** Motivations and justifications of the study

There are several motivations behind the present study. First, prior literature suggests that the relative value relevance of book value, earnings and CFO varies based on different contextual factors such as transitory earnings (Hayn, 1995), firms' distressed financial health (Barth,

<sup>&</sup>lt;sup>5</sup>According to Ijiri (1975) a soft measure is one that can easily be pushed in one direction or to the other and a hard measure is one constructed in such a way that it is difficult for people to disagree. For example, cash balance is a hard measure, whereas, goodwill is a soft measure

Beaver and Landsman, 1998) and earnings management (Whelan, 2004). However, no evidence exists on how the value relevance of fundamental accounting measures changes during an economy-wide exogenous shock like the one of the GFC. Prior studies have examined the changes in the value relevance of book value and earnings in the context of the 1997 Asian financial crisis (AFC) (for example, Graham, King and Bailes, 2000; Ho, Liu and Sohn, 2001; Davis-Friday, Eng and Liu, 2006). However, the GFC is considered to be the most severe financial crisis in a century. Contrary to the GFC, the AFC was limited by regional confines and its impact was not widespread. While countries affected by the AFC recovered relatively faster, countries affected by the GFC are experiencing its prolonged impact. While the AFC had impacted Asian countries, the GFC has impacted most of the advanced economies (such as the USA, UK, Germany, Italy and Australia) and a longer period of recovery is envisaged (Shah, 2009). Therefore, examining the value relevance of fundamental accounting measures (book value, earnings and CFO) is necessary to understand how investors' reliance on the fundamental accounting information has been affected by one of the most devastating GFC in recent human history.

Second, while prior studies (Graham, King and Bailes, 2000; Choi, Kim and Lee, 2001; Davis-Friday, Eng and Liu, 2006) have examined the value relevance of book value and earnings in Asian countries in the context of the AFC, the present study examines the issue in the context of Australia. Countries such as UK, the USA and Australia with the common law orientation and the market based capitalism have relatively more developed institutional settings and enforcement backgrounds than those of East Asian countries (Leuz, Nanda and Wysocki, 2003). These countries enforce high quality and transparent financial reporting and provide greater investor protections compared to Asian countries affected by the AFC (Leuz, Nanda and Wysocki, 2003; Ball, Robin and Wu, 2003). Clinch and Wei (2011) examine the return-earnings relationship in the context of poor versus strong macroeconomic performances drawing data from Australia, China and the USA. They find no change in the value relevance of earnings in explaining security returns for Australia. However, for the USA they find that earnings is more strongly associated with security returns during both negative macroeconomic growth periods and highly positive macroeconomic growth periods. For China, the return-earnings relation is weaker during periods of both highly positive macroeconomic growth and negative macroeconomic growth than that of normal economic growth periods. The increase in the value relevance of earnings during periods of negative macro-economic performance in the US (Clinch and Wei, 2011) and the decrease in the value relevance of earnings during the AFC in the context of Thailand, Korea, Indonesia and Malaysia (Graham, King and Bailes, 2000; Ho, Liu and Sohn, 2001; Davis-Friday, Eng and Liu, 2006) may suggest that in countries with strong legal, institutional and enforcement backgrounds, earnings receives increasing importance for stock valuation purposes during periods of macroeconomic shocks. Moreover, the association of accounting measures with firms' market value may differ across different markets and the empirical evidence identified in one market may not generalise to other markets (King and Langli, 1998; Barton, Hansen and Pownall, 2010). Financial reporting quality, investor protection and market mechanisms in the developed countries are different. Hence evidences are necessary on the value relevance of accounting information during the GFC, in the context of a developed country like Australia, to fully understand the usefulness of accounting information for stock valuation purposes during the economy-wide exogenous shock like the GFC. Moreover, the economic setting that existed in the Australian market during the GFC was unique to any other developed economy. Although the Australian Securities Exchange (ASX) All Ordinaries index had declined by 51.37 per cent (discussed in Chapter Two) during the GFC, the Australian economy did not suffer as much as other developed economies due to the Australian government's economic stimulus packages. Hence, it is important to understand how investors' perception on key accounting measures was affected by the exogenous economic shock of the GFC that affected the stock market but did not affect the real economy as much as the stock market.

Third, despite the growing evidences on the decline in the usefulness of accounting information in different countries such as the USA (Collins, Maydew and Weiss, 1997; Francis and Schipper, 1999; Lev and Zarwin, 1999) and UK (King and Langli, 1998), prior studies have shown that the longitudinal value relevance of earnings has not declined in the Australian market after controlling for the effect of negative earnings (Goodwin and Ahmed, 2006; Brimble and Hodgson, 2007). Whether the value relevance of accounting information sustains during the GFC is an important empirical question. The concerns regarding the declining value relevance of accounting information in the unique economic setting of the GFC.

Fourth, the debate continues as to the superiority of earnings versus CFO for stock valuation purposes. Barton, Hansen and Pownall (2010) find that no single performance measure

dominates in its association with firms' market value across the world. Bartov, Goldberg and Kim (2001) argue that financial reporting regime and other institutional factors also play a role in determining the relative value relevance of earnings and CFO. Hence, it is important to understand the association of accounting measures with share prices in a different country context in a world characterised by the harmonised accounting standards. Moreover, it has been argued in the literature that the relative superiority of earnings versus CFO is dependent on some contextual factors (for example, Charitou, Clubb and Andreou, 2000; Bartov, Goldberg and Kim, 2001; Christian and Jones, 2004; Habib, 2008; Saeedi and Ebrahimi, 2010). The present study contributes to this debate by examining the relative and incremental value relevance of earnings and CFO in the Australian market in the context of the GFC and the NCP. While most of the prior studies have focused on the USA and UK, the present study uses a useful alternative data source (Australian data) to the much studied US data and the unique economic context of the GFC to examine the issue. Australian equity market is relatively smaller than the US equity market in terms of number of listed companies and average market capitalisation.<sup>6</sup> Ownership concentration is higher in the Australian market compared to the US market and Australian companies engage in earnings management to a greater extent than that of their US counterpart (Leuz, Nanda and Wasocki, 2003).

Fifth, the recent move towards the fair value based IFRS regime has resulted in a shift in the focus of the financial reporting from the income statement to the balance sheet. Moreover, Australian accounting standards have been shaped by a balance sheet focus. The recent move towards the fair value based International Financial Reporting Standards (IFRS) has further enhanced the focus on the balance sheet. Godfrey, Hodgson, Tarca, Hamilton and Holmes (2010, p.147) argue that due to the recent shift to the fair value based IFRS, "the focus has shifted towards valuation concepts, with the balance sheet the major repository of value relevant information, and the main users of accounting information stated to be shareholders and investors." Some authors argue that when earnings becomes transitory and noisy, investors look for an alternative performance measure for stock valuation with investors' focus shifting either to book value (Barth , Beaver and Landsman, 1998) or to CFO (Charitou, Clubb and Andreou, 2000). However, among book value, earnings and CFO,

<sup>&</sup>lt;sup>6</sup>Data in Clinch and Wei (2011) suggests that the average market capitalisation in the Australian market is approximately USD 454.30 million, whereas, the average market capitalisation of the US market is approximately USD 1758.1 million. For a sample period of 1987 to 2008 they find a total of 11619 firm-year observations for Australia compared to a total of 95985 firm-year observations for the US market for the sample period of 1971-2008.

which one of the accounting measures contains the most useful information for stock valuation purposes is yet unresolved (Akbar, Shah and Stark, 2011; Barton, Hansen and Pownall, 2010; Kumar and Krishnan, 2008; Subramanyam and Venkatachalam, 2007). Thus examining the usefulness of book value, earnings and CFO during the GFC will provide insights into this debate.

The sixth motivation relates to the lack of evidence on how the market perception changes on intangible assets and goodwill for stock valuation purposes during an economic downturn like the one of the GFC. Prior studies suggest that book value becomes more important when a firm's financial condition deteriorates (Barth, Beaver and Landsman, 1998) because book value acts as a proxy for liquidation option. Nevertheless, due to the intangibility and firm specificity, market perception on intangible assets and goodwill is likely to be different from that on tangible assets during the GFC. However, no prior study has empirically examined the issue of value relevance of tangible assets, intangible assets and goodwill in the context of an economy-wide exogenous shock like the one of the GFC. The present study fills the gap in the literature. Addressing the issue will provide insights into whether firms with high levels of intangible assets and goodwill are prone to a greater level of decline in the market value during an economy-wide exogenous shock.

Early studies have examined the value relevance of key accounting measures in different countries under normal economic conditions when investors can also use the information coming from other uncontrolled sources such as analysts' forecasts and media reports. However, the usefulness of information flowing from other uncontrolled sources such as analysts' forecasts decreases during the GFC mainly due to the increase in noise and errors in the information coming from those sources (Sidhu and Tan, 2011). On the contrary, the increasing levels of vigilance and monitoring by regulatory authorities and company auditors in the financial reporting process during a GFC (Australian Securities and Investment Commission-ASIC, 2008 & 2009) may imply that financial accounting information will be more informative during a GFC. This thesis also extends the value relevance literature by examining the changes in the value relevance of fundamental accounting measures in the unique context of a GFC. It adds to the understanding of the market perception on key accounting measures in determining share prices during a period of macroeconomic uncertainty in a develped and mature market.

## **1.4** Theoretical framework

The CMR is one of the dominant branches of accounting research. This thesis is posited in the positivist domain of the CMR. It examines the relationship between dependent and independent constructs (firms' market value as dependent variable and accounting measures as independent variables). Positivist epistemology and objective ontology underpin the theoretical backgrounds of the study. Accordingly, this thesis is positioned into the CMR under the Positive Accounting Theory (PAT). The efficient market hypothesis (EMH) is the underlying assumption.<sup>7</sup> The EMH assumes that security prices reflect all publicly available information.<sup>8</sup> Value relevance studies do not examine the cause-effect relationship; rather they examine whether different accounting measures jointly or individually can explain the variations in share prices and whether a particular accounting measure is associated with firms' share prices. Thus, the present study examines the association between accounting information (book value, earnings, CFO, tangible assets, intangible assets and goodwill) and share prices in the Australian market in the context of the 2008-2009 GFC and the NCP. The theoretical background of this thesis is discussed in detail in section 4.2 of Chapter Four.

#### **1.5** Empirical methods and data sources

This thesis applies quantitative methods to examine the research questions. Ohlson (1995) model is used as the modelling framework. Ohlson (1995) model specifies firms' market value as a function of book value and earnings. Other accounting measures can be included in the model as 'other information variable'. The research questions examined under phase one of the empirical analysis are approached by examining the relative and incremental value relevance of book value and earnings and the changes in the regression coefficient estimates

<sup>&</sup>lt;sup>7</sup>The GFC may have had impact on the EMH. Whether the EMH holds during the GFC or not is beyond the scope of the present study. Besides, prior literature has documented similar results in VRR applying models controlling for the market inefficiency and models without controlling for the market inefficiency (for example, Brimble and Hodgson, 2007). Aboody, Hughes and Liu (2002) formally evaluate how the market inefficiency causes biases in the conclusions drawn from the VRR without adjusting for the effect of market efficiency. They find that for price level regression, the difference is econometrically insignificant, whereas, for return models the difference arising out of the adjustment for market inefficiency is statistically significant. The present study uses the price model and hence it does not consider the adjustment for the market inefficiency that may have been arisen during the GFC.

<sup>&</sup>lt;sup>8</sup>There are three forms of EMH. The weak form of market efficiency assumes that security prices reflect all price related information , the semi-strong form of efficiency assumes that security prices reflect all past publicly available information and incorporate instantly new publicly available information, whereas, the strong form of efficient market hypothesis assumes that security prices reflect all publicly and privately held information. The EMH was proposed by Fama and Samuelson during 1960s and had been the dominant guiding theory for capital market based finance and accounting research until 1990s when the EMH was challenged by Behavioural Finance theory. The validity of the EMH has been questioned by critics who blame the belief in the rational markets for the GFC [see, for example, Fox Justin, (2009), *Myth of the rational market* and Nocera Joe (2009), *Poking holes in a Theory on Market*].

of book value and earnings between the GFC and the NCP. The relative and incremental value relevance of book value and earnings are examined by comparing the explanatory power (adjusted R-square) of book value and earnings in the model and the changes in their explanatory power between the GFC and the NCP. This approach is consistent with prior literature (Eston and Harris, 1997; Graham, King and Bailes, 2000; King and Langli, 1998). Chow (1960) structural break–tests are performed to examine if there was any structural break in the association of firms' market value with book value and earnings between the GFC and the NCP.

Further analysis is performed to examine the value relevance of earnings and CFO using the modified Ohlson (1995) model. Relative and incremental value relevance of earnings and CFO are examined comparing their explanatory power (adjusted R-square) applying price models.<sup>9</sup> Superiority of earnings versus CFO is examined using Vuong- Z test for comparing non-nested models. Vuong (1989) likelihood ratio test (Z-statistic) helps to identify which one of the competing models has greater explanatory power. The impact of the GFC on the value relevance of earnings and CFO is examined by comparing the changes in their coefficient estimates in the regression and the changes in their explanatory power (adjusted R-square) in the regression. Impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill is also examined using modified Ohlson (1995) models.

The financial accounting data and market value data, necessary for the examination of the value relevance of book value, earnings and CFO, have been collected from *DataStream* – *worldscope* database. Data required for the examination of the value relevance of tangible assets, intangible assets and goodwill has been collected from companies' annual reports accessed through *Connect 4* database.

# **1.6 Defining the GFC and the NCP**

The years 2008 and 2009 are considered as the GFC, whereas, the years 2004 to 2007 are considered as the NCP. The robustness of the findings is checked by changing the definition of the NCP to include 2006 to 2007. Further robustness of the results is tested by changing the definition of the GFC to include 2007-2009.<sup>10</sup>

<sup>&</sup>lt;sup>9</sup>Detail discussions on price model and return model highlighting their differences are provided in the research design chapter of this thesis. <sup>19</sup>Detailed discussions on the definition of the CEC and the NCP are precided in section 5.2.2

<sup>&</sup>lt;sup>10</sup>Detailed discussions on the definition of the GFC and the NCP are provided in section 5.3.2.

#### **1.7** Contributions and importance of the study

The expected contributions of this thesis are quite unique. The three phases of the empirical analysis in this thesis together contribute to the understanding of the market perception on key accounting measures (such as book value, earnings, CFO, tangible assets, intangible assets and goodwill) in determining share prices during a period of macroeconomic uncertainty. There are several other contributions emanating from each phase of the empirical analysis.

First, it is the first known study examining the relative importance of fundamental accounting measures such as book value, earnings and CFO in the context of an unprecedented GFC. At present evidence exists in the context of the 1997 AFC. The institutional, legal and enforcement backgrounds of the East Asian countries being different from those in Australia (Leuz, Nanda and Wysocki, 2003), the present study provides an extended understanding of the informational value of accounting information during the exogenous market crash. This thesis provides evidence on the impact of a worldwide exogenous shock on the value relevance of book value, earnings, CFO, tangible assets, intangible assets and goodwill from a relatively mature and developed country with different legal, institutional and enforcement backgrounds.

Second, prior Australian studies have focused on the longitudinal value relevance of earnings (Goodwin and Ahmed, 2006; Brimble and Hodgson, 2007) and suggested that the value relevance of earnings has not declined in the Australian market after controlling for the effects of negative earnings and temporary components of earnings. However, these earlier evidences relate to normal economic periods. The present study examines the relative and incremental value relevance of book value, earnings and CFO surrounding the GFC. Detecting and explaining the changes in the relative and incremental explanatory power of book value, earnings and CFO surrounding the GFC and the NCP are the primary focuses of the study. Findings in this thesis will help to understand the usefulness and relative importance of key accounting measures such as book value, earnings and CFO during a period of macroeconomic uncertainty.

Third, the findings of this thesis have several implications for investors and regulators. The decline in the usefulness of fundamental accounting measures (book value, earnings and

CFO) has been an increasing concern for the last few decades in the context of the USA, UK and different other countries. The evidence in this thesis will show whether the value relevance of fundamental accounting measures sustains during a period of macro-economic down-turn like the one the GFC.

Fourth, Australian accounting standards have largely been shaped by a balance sheet focus. The recent move to the fair value based IFRS has further enhanced the focus on the balance sheet. Godfrey, Hodgson, Tarca, Hamilton and Holmes (2010, p.147) argue that due to the recent shift to the fair value based IFRS, "the focus has shifted towards valuation concepts, with the balance sheet [being] the major repository of value relevant information, and the main users of accounting information stated to be the shareholders and investors." This thesis contributes to this debate by providing evidence on the relative importance of book value (stock measure) and earnings (flow measure) during a unique economic setting when firms' going concern risk has increased.<sup>11</sup>

Fifth, the findings of the present study will have important implications for the development of corporate governance and institutional enforcement mechanisms as well. Prior evidence on the decline in the value relevance of earnings during the AFC pertains to the Asian countries, where, the legal, institutional and enforcement backgrounds are weaker than those in Australia (Leuz, Nanda and Wysocki, 2003). Hence, the evidence in this study will provide an improved understanding on whether the impact of an economy-wide exogenous shock on the value relevance of accounting information differs based on country level legal, institutional and enforcement backgrounds.

Sixth, another contribution of this study lies in its examining the value relevance of intangible assets and goodwill in the context of the GFC and the NCP. While the FHH suggests that the value relevance of book value increases as the financial condition of a firm worsens, the impact of the GFC on the value relevance of tangible assets is likely to be different from that on intangible assets and goodwill. However, no evidence exists on the market perception of intangible assets and goodwill in the context of a severe financial crisis. The evidence in this thesis will help to understand whether there is a linkage between the decline in firms' market value during the GFC and firms' levels of intangible assets and goodwill.

<sup>&</sup>lt;sup>11</sup>The increase in firms' going concern risks as a result of the GFC is discussed in chapter two.

Seventh, another contribution of this thesis is that it examines whether the FHH proposed by Barth, Beaver and Landsman (1998) holds during an economy-wide exogenous shock and whether the FHH can be generalised in a country context other than the US.

Summing up, although the unique economic setting and the single country context examined limit the generalisability of the present study, its wider implication lies in its showing the sustained supremacy of earnings over book value and CFO for stock valuation purposes even during the economic uncertainty of the 2008-2009 GFC. It provides an improved understanding of how the basic accounting measures such as book value, earnings and CFO map into share prices during the period of economic contraction (the GFC) and during the period of bubble inflating economic expansion (the NCP). Thus, the applicability of the present study are informative to investors and analysts for stock valuation purposes. This thesis also has significant policy implications for accounting regulators, such as the International Accounting Standards Board (IASB) and the AASB, who are trying to promulgate accounting standards offering supremacy to the balance sheet, so that they can seriously think of changing course and develop accounting standards with the income statement focus to enhance the predictive and feedback ability of accounting information that is useful to users even in an economic downturn.

# **1.8** Organisation of the thesis

This thesis is organised into nine chapters. Chapter two explores the origin of the GFC and its implications for financial reporting and value relevance of accounting measures. Chapter three reviews the related literature. Chapter four discusses theoretical background of the present study and develops testable hypotheses. Chapter five discusses research design for testing the hypotheses. Value relevance of book value and earnings and the impact of the GFC on the value relevance of book value and earnings are examined in chapter six. Chapter seven examines whether CFO has value relevance incremental to book value and earnings and the impact of the GFC on the value relevance of earnings and CFO. Value relevance of intangible assets and goodwill and the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill are examined in chapter eight. Chapter nine concludes the thesis.

"While financial reporting issues can be daunting even in the most benign market and regulatory environments, it is fair to say that the recent financial crisis has posed nearly unprecedented challenges for us all. As regulators, we have been challenged to analyse, understand, and develop timely and measured responses to market conditions as the crisis has unfolded. As issuers, you have been challenged to keep up with, and comply with, regulatory responses and evolving accounting standards arising out of the financial crisis, while at the same time contending with operational and liquidity issues and a crisis of confidence in the financial markets." Casey, Kathleen L. (2009, 17 November).

#### **CHAPTER TWO**

## THE GLOBAL FINANCIAL CRISIS AND THE VALUE RELEVANCE OF ACCOUNTING INFORMATION

# 2.1 Introduction

Over the last few decades, world economies have experienced frequent turmoils. The frequency of financial crisis has doubled since 1970s (Elliott and Milner, 2001) and the crises are coming with ever increasing virulence. The 1929 Great Depression was the largest and the starkest economic crisis of the 20<sup>th</sup> century. Almost 5 decades had elapsed since then without any notable financial or stock market crisis. However, in 1990s it started coming almost every year. The 1987 'Black Monday' was followed by the 1990 bursting of Japanese assets price bubble. In 1992 it inflicted the Western European economies. Then it came to Mexico in 1994-1995. The 1997-1998 AFC had devastated the South East Asian economies, and then it came to Russia and Brazil in 1998-1999. The collapse of the so called dot.com companies in the USA around 2000, the globe shattering GFC in 2008 and 2009, the 2010 debt crisis in Greece, the 2011 debt crisis in the USA, and the current ongoing economic fragility of Italy, Belgium, Spain, Portugal and Ireland may be a reckoning that it is going to be a part of our future life as well.

This chapter discusses the origin of the GFC, its development into a global financial catastrophe and its impact on the global major equity markets. The impact of the recent GFC in the Australian market is also analysed. Further, the implications of the GFC on the financial reporting and accounting practices are discussed. Before concluding the chapter, the plausible impact of the GFC on the value relevance of accounting information is critically analysed.

#### 2.2 The origin of the GFC

The 2008-2009 GFC has its origin in the housing assets price bubble (inflation) in the USA. It started during August, 2007 and had its full blow on world economies during 2008. The US

Federal Reserve recognises the 7 February, 2007 as the start of the GFC. On this date, Freddie Mac<sup>12</sup> announced that it would purchase no more sub-prime (inferior quality) mortgages<sup>13</sup> from originators.

Immediately before the GFC, there was a housing assets price bubble (inflation) in the US market. The housing assets price increases were characterised by a self-reinforcing cycle with spiralling price increases. Housing assets prices across the USA have increased continuously from the mid 1990s to 2006, exceeding the fundamental values of the underlying properties. Between 1995 and the first half of 2007, house prices rose by 70 per cent after allowing for the overall rate of inflation (Morrow, 2011). The increasing prices resulted in around USD 8 trillion (40 per cent of the total housing wealth) in inflated housing wealth (Kotz, 2009: 311; Baker, 2007:2). When the level of housing asset prices moved beyond the economic fundamentals, the cycle started to work in reverse as people hurried to get rid of the assets before prices decline further.

The assets price boom was, in fact, fuelled by economy-wide lending boom. After the collapse of dot.com companies, the US Federal Reserve reduced interest rate to such a low level that after adjustment for the inflation rate, real interest rate was negative implying that for bankers, money was virtually free (Crotty, 2008:51; Morris, 2009:59). The borrowing by US financial institutions increased from 62 per cent of gross domestic product (GDP) in 1997 to 114 per cent of GDP in 2007 (Crotty, 2008:50). The availability of cheap money triggered the subprime lending boom in the housing sector. The lending was further fuelled up as financial institutions were able to parcel up and sell (securitise) their mortgages and commercial loans to other investors such as Freddie Mac. This spiral of loans creating

<sup>&</sup>lt;sup>12</sup>Freddie Mac, a government – sponsored enterprise (GSE) chartered by the US Congress, stabilises the US residential mortgage markets and expands opportunities for home ownership. Freddie Mac does not make loans directly to the home buyers. Lenders extend loans to borrowers and create assets based mortgages. Freddie Mac buys those mortgages from its approved lenders to replenish the supply of funds of the lenders. This process enables the lenders to make more mortgage loans borrowers. Detail about Freddie Mac be found on the website: to can http://www.freddiemac.com/corporate/company\_profile/faqs/.

<sup>&</sup>lt;sup>13</sup>Chomsisengphet and Pennington-Cross (2006) describe subprime mortgage as 'a relatively new and rapidly growing segment of the mortgage market that expands the pool of credit to borrowers who, for a variety of reasons, would otherwise be denied credit'. Usually borrowers with poor credit rating and without any credit rating in the conventional standard (prime) mortgage markets have greater access to credit in the subprime mortgage. They further argue that the subprime mortgages have higher level of upfront and continuing costs and thus they also have higher associated default risks. For a detailed discussion on the subprime mortgage, interested readers are advised to read Chomsisengphet and Pennington-Cross (2006).

receivables (asset) and such assets used to create further loans had resulted in USD 1 of original mortgage loan creating manifold sub-prime (substandard) extended loans in the market. Money being almost free, lending being costless, banks and financial institutions continued to lend until there was no one left to lend to (Morris, 2009:61). This attempt to expand the lending and the economy faster than that was supported by the economic fundamentals created the asset price bubble. However, when the interest rate started to rise in 2006, voluntary and involuntary loan defaults also started to rise. In other words, the bubble started to burst (Foster and Magdoff, 2009:97). People started to default on their loan payments and banks were forced to enforce the foreclosure clause and to take repossession of properties followed by a large number of fire sales. The situation was more like an upside down pyramid where the fate of huge sums of collaterised debts in the market depended on the performance of a single origin mortgage loan (Smith, 2010, p.89). When the root mortgage loan failed to perform, the pyramid had to collapse.

The collapse of the housing market in the USA was the beginning. It triggered manifold adverse impacts on the world economies. The prices of mortgage-backed securities fell rapidly resulting in the liquidation of a number of hedge funds holding those securities. The liquidation of the hedge funds further accelerated the decline in the prices of securities due to the reduced level of demand for securities. Banking and financial institutions providing loans to finance the booming housing market found themselves in trouble. The value of their financial instruments and derivative financial instruments started to decline. After the collapse of two Bear Stearns hedge funds in July 2007, a severe credit crunch inflicted the US economy (Foster and Magdoff, 2009:98). Even the financial institutions were reluctant to lend to each other because of their high levels of exposure to the toxic assets. The financial crisis spread across the globe and the GFC started. The flow of credit to the real economy soon dried up (Foley, 2009:14).

Because of the requirements of the mark-to-market accounting, these falls in the value of financial instruments and derivative financial instruments started to appear in companies' financial statements in terms of assets write-offs and fair value adjustments. Banks were heavily exposed to the mortgage-backed securities and related derivatives. Banks' lending capacity declined and they became reluctant to extend any further loan facilities. Credit dried up in the economy and in the inter-bank lending market. The reduced level of bank lending resulted in a credit crunch and economy-wide illiquidity. The credit crunch has adversely

impacted on the investment in the economy which has resulted in a historic decline of the stock markets worldwide.

The housing market problems in the USA gradually began to grow into an unprecedented economic turmoil in the US economy and in other major economies worldwide. The credit crisis resulted in the economy-wide decline in liquidity and withdrawal of investment, which in turn, triggered a massive level of job cuts. Companies' earnings performances suffered, and business risks increased significantly (Pinnuck, 2010:1).

# 2.3 Impact of the GFC on stock markets in different countries and in Australia

The global major stock indices such as the Dow Jones Industrial Index, the Standard and Poor's (S&P) 500 index and the Australian Securities Exchange (ASX) All Ordinaries index peaked on 31 October, 2007 and experienced significant declines thereafter (Sidhu and Tan, 2011). During the crux of the GFC (2008-2009), world's major stock markets had lost their value nearly USD 32 trillion compared to their peak. The loss was equal to the combined GDP of the G7<sup>14</sup> countries in 2008 (Rudd, 2009). Equity indices worldwide declined to their respective historic low point since the 1929 Great Depression. These substantial levels of decline in the stock indices imply that prices for many individual stocks also declined substantially. World's major stock markets lost about 40 per cent of their value and the Australian market also fell by the same margin (Rudd, 2009). Table 2-1 shows the movement of the major stock market indices around the world surrounding the GFC. It is apparent that stock indices across all the regions have suffered a massive decline.

What initially originated as a niche problem in the US mortgage market has gradually triggered a global economic slowdown leading to the fall of the world's most of the stock markets. Australia was no exception. Despite the Federal government's economic stimulus packages, Australia's stock market plummeted. Immediately before the GFC, Australia was experiencing a stock market boom. In June, 2006 the ASX All Ordinaries index was 5034, which soared up to 6310.6 in June, 2007 and up to 6779 in October, 2007. Thereafter, the index began to decline, dipping to 5332.9 in June, 2008 and further to 3296.9 in February, 2009. At the end of June, 2009, the index was 3947.8. If compared between October, 2007

<sup>&</sup>lt;sup>14</sup>The Group 7 (G7) is an economic forum of 7 economically advanced countries. It began in 1975 as G6 with countries such as France, Germany, Italy, Japan, United Kingdom, and the United States. Canada joined the following year. Collectively, G7 countries comprise more than 50 percent of global nominal GDP.

and February, 2009, the decline in the ASX All Ordinaries index was 51.37 per cent. At that time the index reached its 2.5 years' low (Financial Review, 26<sup>th</sup> October, 2009). The S&P/ASX 300 aggregate market to book ratio fell below 1 in March, 2009. Along with the aggregate index, individual share prices also declined to a new low. For many firms market values fell below accounting book values. For example, even after many months of the start of the recovery from the GFC, in October, 2009, many shares in the S&P/ASX 200 index were trading substantially below book value.<sup>15</sup>

The economic setting that existed in Australia during the GFC was unique to any other developed economy. Due to the Federal government's economic stimulus packages, the Australian economy was relatively less affected than other major economies. The Australian credit and money markets were more resilient than those in many other countries. The Australian banking sector held almost no 'toxic' securities. Nevertheless, the Australian economy and financial markets were not immune. The unemployment rate increased by around two per cent to reach around 5.75 per cent and the economic growth rate decreased to around half per cent (Australian Bureau of Statistics, 2010). The Australian dollar depreciated around 30 per cent from its peak. The most severe effect of the GFC was the decline in equity prices which reduced the wealth of Australian households by around 10 percent by March 2009 (Australian Bureau of Statistics, 2010). As discussed above, the ASX All Ordinaries index had declined by 51.37 per cent during the GFC from its peak. Thus although the housing sector, the financial sector, and other economic sectors in Australia performed better than those in other major economies, the decline in the Australian equity market compares well with the declines in other major equity markets as is evident in Table 2-1. Hence, it is important to understand how investors' perception on key accounting measures was affected by the exogenous economic shock of the GFC that affected the stock market but did not affect the real economy as much as the stock market.

Figure 2.1 shows the movement of the ASX All Ordinaries index during the GFC and the NCP. As is evident from Figure 2.1, the ASX All Ordinaries index was increasing up to October 2007. The impact of the GFC was not obvious in the Australian market in June or September, 2007.

<sup>&</sup>lt;sup>15</sup>The market to book value ratio of Astro Japan Property was 0.51, Australian Infrastructure Fund was 0.51, Hastings Diversified Utilities was 0.50, Straits Resources was 0.46, Transpacific was 0.45, AWB was 0.38, FKP was 0.36, PaperlinX was 0.36, Elders was 0.20, Babcock and Brown Infrastructure was 0.06. Source: Financial Review, 26<sup>th</sup> October, 2009.
Country	Index	June	June	February	June 2009	% decline	%decline
, , , , , , , , , , , , , , , , , , ,		2007	2008	2009		06/07-	06/07-
						02/09	06/09
The USA	S&P 500	1503.35	1280.00	735.090	919.320	-51.10	-38.85
	DowJones Composites	4497.86	4160.96	2434.72	2925.48	-45.87	-34.96
	Index						
	NASDAQ Composite	2603.23	2292.98	1377.84	1835.04	-47.07	-29.51
	Index						
	Wilshire 5000 Index	15210.07	13073.05	7474.00	9424.90	-50.86	-38.04
	Russell 2000 Index	833.70	689.66	389.02	508.28	-53.34	-39.03
UK	FTSE 250 Financial	11527.06	9145.80	6049.14	7414.56	-47.52	-35.68
	Times Index						
	FTSE 100 Financial	6607.90	5625.90	3830.10	4249.20	-42.04	-35.70
	Times Index						
Global	S&P Global 1200 Index	1780.68	1562.46	833.84	1076.64	-53.17	-39.54
Australia	All Ordinaries Index	6310.60	5332.90	3296.96	3947.80	-47.76	-37.44
Germany	DAX30-Deutscher	8007.32	6418.32	3843.74	4808.64	-52.00	-39.95
	Aktienindex						
Italy	MIB 30 Milan - La	42234.00	30524.00	16377.00	20571.00*	-61.22	-51.29
	Borsa Valori Italiana						
	Index	<054.0 <b>2</b>	4424.05	2702.40	21.40.44	55.05	10.12
France	CAC 40 Index	6054.93	4434.85	2702.48	3140.44	-55.37	-48.13
Greece	Athens Stock Exchange	4843.78	3439.71	1535.82	2209.99	-68.29	-54.37
G .	Composite Index	1640.40	1007.07	002.02	1016.66	50.00	20.02
Spain	Madrid General Index	1640.40	1297.87	803.92	1016.66	-50.99	-38.02
Norway	Oslo Stock Exchange All	586.86	536.94	259.06	333.08	-55.86	-43.24
Dalainan	Share Index	4620.40	2169.00	1606 59	2020.08	(2.42	56.00
Denmonly	BEL-20 (BFA) Index	4639.40	3108.22	1090.58	2030.98	-03.43	-56.22
Denmark	Exchange Index	483.69	424.30	241.48	290.70	-50.08	-39.90
The	EuroNext Amsterdam	548.21	425.93	219.81	254.71	-59.90	-53.54
Netherlands	AEX						
	General Index						
Sweden	Stockholm All Share	410.21	278.75	197.55	244.75	-51.84	-40.34
	Index	17000.07			2 40 40 40	40.00	
Turkey		47093.07	35089.50	24026.60	36949.60	-48.98	-21.54
China	Shanghai Composite	3820.70	2736.10	2082.85	2959.36	-45.49	-22.54
	Index	21552.50	22102.00	10011 50	10050 50	41.1.5	15.50
Hong Kong	Hang Seng HKSE Index	217/2.70	22102.00	12811.60	183/8./0	-41.16	-15.59
Taiwan	Taiwan Weighted Index	8883.21	7523.54	4557.15	6432.16	-48.70	-27.59
Singapore	Straits Times Index	3548.20	2947.54	1594.87	2333.14	-55.05	-34.24
India	Bombay Sensex Index	14650.5	13461.60	8891.61	14493.80	-39.31	-1.07
	S&P CNX Nifty Fifty	4318.30	4040.55	2763.65	4291.10	-36.00	-0.63
T	Villeri 225 Nilere Krieri	10120 40	12401 40	75(9.42	0059.44	59.07	45.10
Japan	Shimbun Inc Index	18138.40	15481.40	/308.42	9938.44	-38.27	-45.10
	Tokyo Topiy Index	1774 00	1220.10	756 71	020.76	57.27	17 62
Canada	S & D TSV Index	1774.00	1320.10	730.71 9122.02	929.70	-37.57	-47.02
Callaua	Composite Index	13900.00	14407.00	0123.02	10374.09	-41.39	-23.40
Brazil	Boyespa Index	54392.00	65018.00	38183.00	51465.00	29.80	5.38
Argenting	MerVal Index	2100 87	2107.87	1010 20	1587 07	-29.00	-27.50
Mexico	IPC All-Shara Inday	2170.07	20305 50	17752.29	2/368 /0	-/3 01	-21.32
Fount	The Egyptian Exchange	2733.60	23393.30	1310.23	1558 10	-43.01	-43.00
Malaysia	Kuala Lumpur Stock	1354 38	1186 57	890 76	1075 24	-34.23	-20.61
141alaysia	Exchange Composite	1557.50	1100.37	0,0.70	1075.24	57.25	-20.01
	Index						

## Table 2-1: Movement of the world's major stock market indices surrounding the GFC

\*May, 2009; Indices are in local currencies; February 2009 represents the lowest point of index during the GFC. Data source: Author's own calculation using data collected from Econostat.com: accessed 31 August, 2011



Figure 2.1: Movement of ASX All Ordinaries index from July 2004 to September 2009

# 2.4 What do the previous financial crises and the 2008-2009 GFC mean for financial reporting and accounting?

One of the articulated objectives of financial reporting is to disseminate information that users can use for decision making and for predicting firms' future cash flows (Barth, Beaver and Landsman, 2001). For financial accounting information to be relevant, it must have predictive value. Literature suggests that the usefulness of fundamental accounting measures, such as book value and earnings, has been declining over the years (Brown, Kin and Lys, 1999; Lev and Zarwin, 1999). The plausible reasons for this decline in the usefulness of accounting information are many.<sup>16</sup> One of the reasons may be the availability of information from other sources such as the media and analysts' forecasts. However, information flowing from other sources is not regulated, monitored or controlled to the same extent as the information in the financial statements. However, during a GFC, investors' reliance on these unregulated, uncontrolled and non-monitored sources of information is likely to decline. Most importantly if accounting is to retain its proclaimed information role, it should provide information that investors can resort to for investment decision during the turbulent periods of crisis. Investment perspective being the most dominant agenda of the financial accounting regulators [Chartered Financial Analysts Institute (CFAI); Statement of Accounting Concept (SAC) 3, Para 8 and 9, August, 1990].<sup>17</sup> how accounting information is processed in equity pricing during a GFC becomes an important empirical issue.

Prior research suggests that firms' earnings performances convey information aligned to the macroeconomic performances (for example, Ball, Sadka and Sadka, 2009; Barth and So, 2010) implying that macroeconomic performances affect individual firm's performance. Moreover, the recent literature has shown that the usefulness of information flowing from other non-conventional and uncontrolled sources has declined during the GFC compared to the NCP. For example, Sidhu and Tan (2011) examine the analysts' forecast performances during the GFC and the NCP in the US and Australian markets and find that the size of the forecast errors was large during the GFC. This increase in the errors in non-conventional sources of information has significant implications for financial reporting during the GFC. Accounting should provide information which investors can rely on in making equity investment decisions. In that case, accounting information will have the decision usefulness

<sup>&</sup>lt;sup>16</sup>Discussed under the literature review chapter (chapter three).

<sup>&</sup>lt;sup>17</sup>The Financial Accounting Standards Board (FASB) in its conceptual framework for financial reporting also recognises the importance of equity investment decision as an objective of financial reporting.

for stock valuation purposes. Hence, earnings related information may assume more importance in times of economic uncertainty such as the GFC (Clinch and Wei, 2011). The increasing levels of vigilance and monitoring by the regulatory authorities and company auditors in the financial reporting process during the GFC may imply that financial accounting information will be more informative and free of errors than the information from other non-conventional sources.

Godfrey, Hodgson, Tarca, Hamilton and Holmes (2010, p.147) argue that due to the recent shift to the fair value based IFRS, "the focus has shifted towards valuation concepts, with the balance sheet [being] the major repository of value relevant information, and the main users of accounting information stated to be shareholders and investors." Because of the mark-to-market accounting, the impact of the GFC on firms' financial position would have been reflected in companies' balance sheets and income statements in terms of assets write-offs and fair value adjustments. However, relatively little evidence exists on the usefulness of fundamental accounting measures such as book value, earnings and CFO for stock valuation purposes during a period of financial crisis similar to the GFC.

If financial reporting is not relevant, transparent and accurate, there will be information asymmetry. The information asymmetry will result in the loss of investors' confidence. This loss of confidence may further destabilise the market. Casey (2009) rightly points out that "financial stability depends upon market confidence; and investors' confidence in turn depends upon the transparency of the financial statement."

A financial crisis may also change managerial reporting motives with implications for the transparency of financial reporting. Because firms' performances are already depressed, managers may be motivated to take 'big bath'<sup>18</sup> earnings management to clear the deck for future earnings. Thus, the GFC provides a setting when the earnings management is expected to occur. Management may assume that earnings management during the GFC will be less transparent to investors and investors would be less apprehensive of it. Consistent with this conjecture, prior evidence on the AFC suggests that firms' earnings management had increased during the AFC period (Chia, Lapsley and Lee, 2007). Management may manage

<sup>&</sup>lt;sup>18</sup>The 'big bath' hypothesis suggests that when the management considers that the earnings target cannot be met during a particular year, the management tries to charge some future expenses against current year's income, so that the earnings target can be easily meet in future years. It is a strategy of earnings manipulation to make the poor results even worse.

earnings during a GFC for contracting purposes as well. Firms may try to attract the government support or may go for a debt re-negotiation (Ahmed, Godfrey and Saleh, 2008).

#### 2.5 Implications of the GFC on the value relevance of accounting information

The GFC has been associated with increased level of uncertainty for businesses and security investors. The illiquidity in the credit market and the decrease in the economic activities during the GFC have jeopardised the going concern assumption of many Australian companies resulting in an increase in the going concern qualifications in audit reports (Xu, Carson, Fargher and Jiang, 2011). Xu, Carson Fargher and Jiang (2011) investigate the link between increased business risks and going concern qualifications in audit reports and find that the going concern qualification in audit reports for Australian companies increased from 12 per cent in 2005-2007 to 18 per cent in 2008 and to 22 per cent in 2009. The uncertainty continued in the market in 2009 and 2010 as well. However, the financial statements reflected most of the impact of the GFC during 2008. The highest frequency and amount of assets write-offs took place in 2008 (Spear and Taylor, 2010).

One of the Big-4<sup>19</sup> audit firms, KPMG, advised its clients "that businesses face a higher risk of failure" and "heightened awareness about ensuring their entity remains a going concern" (KPMG 2009:1, cited in Xu, Carson Fargher and Jiang, 2011) is necessary. The ASIC had cautioned companies and their auditors to carefully evaluate and apply the going concern assumption (ASIC 2008, 2009 and 2010). Firms' going concern assumption was so threatened that the International Auditing and Assurance Standards Board (IAASB) and the Australian Auditing and Assurance Standards Board (AUASB) also advised auditors to carefully apply the going concern assumption for their clients (AUASB, 2009; IAASB, 2009).

The increase in the business risk resulted in the substantial increase in the number of firms receiving qualified audit reports with questionable status as going concerns. Barth, Beaver and Landsman (1998) articulate the financial health hypothesis (FHH) which states that as the

<sup>&</sup>lt;sup>19</sup>The Big-4 auditor group consists of the largest four current audit firms (Deloitte Touche Tohmatsu, Ernst & Young, KPMG and PricewaterhouseCoopers). This group was once known as the "Big-8" (until 1987), and was reduced to the "Big-6" in 1989 and then to the "Big-5" in 1998 by a series of mergers. The Big-5 became the Big-4 after the demise of Arthur Andersen in 2002.

financial condition of a firm worsens and the firm approaches possible liquidation, the relative importance of book value increases and that of earnings decreases. They empirically examine the relative usefulness of book value and earnings for a sample of firms that ultimately faced liquidation. They suggest that book value represents the liquidation value and earnings represents the unrecognised net assets (also a proxy for future abnormal earnings). When a firm faces financial difficulties, the liquidation-value effect dominates over the unrecognised net-asset-valuation (earnings valuation) effect. Thus, for stock valuation purposes, the relative importance of book value increases and that of earnings decreases when the financial position of a firm worsens.

Moreover, investors evaluate financially distressed firms on the basis of the abandonment option hypothesis (AOH). The AOH postulates that the abandonment options (the flexibility to management in either keeping a company's operations in going concern or abandoning it for its salvage value) help to determine whether earnings or book value plays a greater role in stock valuation (Yee, 2000; Lim, 2005). If the financial condition of a firm worsens, the likelihood of exercising the abandonment option increases and book value becomes more relevant than earnings for stock valuation because the book value reflects the liquidation value. Using a similar reasoning, Ashton, Cooke and Tippett (2003) expressed this relationship in terms of an Aggregation Theorem. The Aggregation Theorem expresses a firm's market value as a function of its adaptation value and recursion value. The adaptation value of equity is calculated as the value of present resources available to equity holders in their best available usage or in abandoning them to shut down the existing operation of the firm. On the contrary, the recursion value of equity is calculated as the summation of the value resources currently available to equity (the present value of future normal earnings is equal to the value of resources currently available to equity) and the present value of expected future abnormal earnings. If the firm's financial condition is very weak and if the expected future earnings are negative, then the recursion value of equity will be very small relative to the adaptation value. A firm's market value will then mainly be composed of the adaptation value or resources currently available to equity, i.e. current book value. Both the AOH and the Aggregation Theorem provide the theoretical basis for the relative value relevance of book value and earnings for financially distressed firms. Thus the AOH, the Aggregation Theorem and the FHH suggest that the relative importance of book value and earnings in explaining a firm's market value is contextual to the financial condition of the firm.

During a financial crisis, the future becomes uncertain and investors rely on firms' present resources. Future expected cash flows, future growth potential, future abnormal earnings, intangible assets and goodwill may lose their relevance in determining firms' market value.

During a GFC firms' earnings performances may suffer and the temporary components of earnings may increase. Moreover, as discussed earlier in this chapter, the business risk and firms' going concern risk may increase during a GFC. In this perspective, investors' reaction during a GFC can be explained with AOH and/or FHH. Both of the theories suggest that investors evaluate firms on the basis of the available resources for the prediction of immediate cash flows during periods of financial distress (Sin & Watts, 2000). Hence, during a GFC, instead of abnormal earnings, investors' attention may fall on firms' present realisable resources. The relative importance of book value may increase for three reasons. Firstly, instead of seeing through the gloomy crisis period to forecast future earnings and cash flows, investors may be influenced by the availability heuristic (Tversky and Kahneman, 1974).<sup>20</sup> Secondly, accounting book value is an objective and a conservative hard measure of firms' resources. Thirdly, book value, a proxy for present available resources, provides an anchor for investors to determine a firm's market value. Moreover, book value assumes a greater association with share prices for conceptually problematic firms (Hayn, 1995; Tan, 2001; Franzen and Radhakrishan, 2009) corroborating the FHH and the AOH.

As discussed earlier, firms' earnings management may increase during a GFC. Marquardt and Wiedman (2004) and Whelan (2004) find that the relative importance of book value increases and that of earnings decreases in the presence of earnings management. If the earnings management is more intense during a GFC, it can be assumed that earnings quality will decline and investors will rely more on book value than on earnings in determining firms' share prices, mainly because book value is more objective and reliable than earnings.

Moreover, earnings is usually managed by accruals manipulations because CFO cannot be manipulated. It will have implications for the relative information value and usefulness of

<sup>&</sup>lt;sup>20</sup>Availability heuristic is a judgemental bias in which a person relies upon the readily available information rather than examining alternative sources of information that are not readily available. When the reported earnings is noisy, it cannot be used as a readily available information.

accruals based earnings<sup>21</sup> and CFO. Specifically, if managers manipulate earnings, it is likely to be a nosier performance measure than CFO.

Although the value relevance of book value is expected to increase as the proxy for liquidation value during a GFC, the usefulness of the three components of book value such as tangible assets, intangible assets and goodwill is likely to be different. The realisable value of intangible assets and goodwill, in case of a firm's liquidation, is likely to be very low due to the future dependence, lack of exchangeability and firm-specificity of intangible assets and goodwill.<sup>22</sup> Hence, the value relevance of tangible assets is expected to increase, whereas, the value relevance of intangible assets and goodwill is expected to decrease during a GFC. This study will investigate these issues in the Australian market in the context of the 2008-2009 GFC.

## 2.6 Concluding remarks

In this chapter the origin of the GFC and its impact on major stock market indices have been discussed. The impact of the GFC on the Australian stock market has also been explained. The implications of a GFC for financial reporting have also been analysed. The theoretical background on the impact of a GFC on the value relevance of book value, earnings, CFO and different components of book value such as tangible assets, intangible assets and goodwill has also been highlighted. The theoretical analysis suggests that the value relevance of book value, earnings, CFO and different components of book value such as tangible assets that the value relevance of book value, earnings, CFO and different components of book value such as tangible assets, intangible assets and goodwill is likely to change differently during a GFC. The next chapter (chapter three) reviews the literature pertinent to the research questions addressed in this thesis.

<sup>&</sup>lt;sup>21</sup>Earnings includes both accruals and CFO.

<sup>&</sup>lt;sup>22</sup> Chambers (1966) and MacNeal (1939) do not consider goodwill and some intangibles as assets on this ground.

#### **CHAPTER THREE**

#### LITERATURE REVIEW

#### 3.1 Introduction

This chapter provides a critical review of the empirical researches related to this thesis. This review provides a basis for the understanding of the scope of research. It also helps in sorting out research design and in identifying variables. The value relevance research (VRR) is an established branch of the capital market research (CMR) in accounting. Kothari (2001) is a comprehensive review of CMR in accounting including the VRR. Beisland (2009) also provides a review of the VRR in accounting. Barth, Beaver and Landsman (2001) provide a detailed discussion on what the term 'value relevance' means. They also discuss the policy implications and the limitations of the VRR. Holthausen and Watts (2000) critically examine the implications of VRR for standard setting purposes<sup>23</sup> and conclude that the VRR provides little insights in this regard. On the contrary, Barth, Beaver and Landsman (2001) buttress the argument in favour of the VRR<sup>24</sup> and discuss the potential implications of the VRR for standard setting purposes.

At the beginning of this chapter, the term value relevance is introduced in section 3.2. Based on the three issues debated in this thesis (in three phases), the literature review is conducted separately for each of the three issues. Studies on the value relevance of book value and earnings and different factors affecting the relative usefulness of book value and earnings are discussed under section 3.3 and its different sub-sections. Studies on the incremental and relative value relevance of earnings and CFO and various contextual factors affecting the relative importance of earnings and CFO are discussed under section 3.4 and its different subsections. In both of the cases studies in the Australian context have been discussed separately from studies elsewhere. Early researches, on the value relevance of book value, earnings and CFO in the context of the 1997 Asian Financial Crisis (AFC) and other exogenous shocks, are discussed in section 3.5. Before concluding the review, section 3.6 discusses prior studies

<sup>&</sup>lt;sup>23</sup>Holthausen and Watts (2000) conclude that for several reasons the VRR provides little insights for standard setting. Firstly, the essential thrust of statistical association criteria used in the VRR has no accounting theory supporting it. Standard setters' objectives and accounting practices are both inconsistent with the criterion used by the VRR. Secondly, the tests used in the literature rely on valuation models that omit important factors. Thirdly, there are many econometric issues in the value relevance studies such as heteroskedasticity.

<sup>&</sup>lt;sup>24</sup>Barth, Beaver and Landsman (2001) argue that the equity investment decision is one of the prime focuses of the financial statement. Other uses of accounting such as 'contracting' do not diminish the relevance of the VRR. They also point out that the extant models are appropriate for addressing the question of value relevance. And researchers conducting the VRR address the econometric issues with available methods.

on the value relevance of different components of book value such as tangible assets, intangible assets and goodwill.

### **3.2** Defining the term 'value relevance' of accounting information

Value relevance is related to the decision usefulness approach of financial reporting. The essence of the decisional usefulness approach is that accounting system should provide information that investors can use to predict future expected cash flows. Financial statement is an important and cost effective source of information to investors. It helps investors to predict future firm performance and present and future cash flows. Relevance of accounting information plays an important role in this prediction. Accounting standard setting authorities are maintaining their increasing levels of attention on the usefulness of accounting information for equity investment purposes. Relevance is defined as:

For financial information to be relevant it must have value in terms of assisting users in making and evaluating decisions about the allocation of scarce resources and in assessing the rendering of accountability by preparers. If information is to assist users in making decisions about the allocation of scarce resources, it must assist them in making predictions about future situations and in forming expectations, and/or it must play a confirmatory role in respect of their past evaluations.

[Statement of Accounting Concept (SAC) 3, Para 8 and 9, August, 1990].

The standard setting authorities in countries with capital market based financial systems consider the equity investment perspective as the primary objective of financial reporting. For instance, Chartered Financial Analysts Institute (CFAI)<sup>25</sup> model states that:

Corporate [financial] statements and their related disclosures are fundamental to sound investment decision making. The well-being of world's financial markets, and of the millions of investors who entrust their financial present and future to those markets, depends directly on the financial statements and disclosure provided. Consequently, the quality of the information drives global financial market.

Accounting literature considers this security investment decision usefulness aspect of an accounting measure as its value relevance. The construct of value relevance is defined in accounting literature in a number of ways. Barth, Beaver and Landsman (2001) state that the VRR examines the association between reported accounting numbers and share prices or

<sup>&</sup>lt;sup>25</sup> CFAI has developed A Comprehensive Financial Reporting Model: Financial Reporting for Investors (the CFAI Model). Between 2002 and 2007 the CFAI developed the CFAI Model in consultation with its members, governmental organisations and with professionals. It is a framework for financial reporting and disclosure that meet the needs of investors, creditors and other users. It has set out 12 principles to ensure relevant, understandable, accurate and complete financial statements. Its underlying focus is to generate a broader and comprehensive business reporting that provides sufficient information so that investors can understand the wealth generating activities of a company and the results of those activities.

stock returns. An accounting measure is value relevant if it shows association with firms' market value (Barth, Beaver and Landsman, 2001). Francis and Schipper (1999) also interpret value relevance as a statistical association between financial information and share prices or stock returns.

To determine the usefulness of a particular accounting measure for stock valuation purposes, accounting literature typically interprets the explanatory power (adjusted  $R^2$ ) of a regression of share prices on that particular accounting information as a measure of value relevance (Collins, Maydew and Weiss, 1997; Brown, Kin and Lys, 1999; Francis and Schipper, 1999; Lev and Zarowin, 1999). Typically, the regressions are estimated with share price/or stock returns as the dependent variable and earnings, book value, CFO and other accounting measures (based on the research objectives) separately or all together as the independent variable(s). The value relevance of particular accounting measure, therefore, can be determined by examining the relationship between stock prices and/or stock returns of a company with that particular accounting measure (Barth, Beaver and Landsman, 2001). Many authors also consider an accounting measure to be value relevant based on the statistical significance its coefficient estimate in the regression. The underlying logic is that if the coefficient estimate for an accounting measure is significantly different from zero, it is significantly associated with firms' share prices or stock returns, it is considered to be used by investors in determining share prices and that particular accounting measure is value relevant (Barth, Beaver and Landsman, 2001). Accordingly, this study builds on the following interpretation of value-relevance:

An accounting measure is value-relevant if there is a significant statistical association between that particular accounting measure and firms' share prices. In other words, if an accounting measure can explain the cross-sectional variations in share prices, that particular accounting measure is considered as value relevant.

#### 3.3 Value relevance of book value and earnings

This section reviews notable researches on the value relevance of book value and earnings. The review is discussed in two sections. Section 3.3.1 discusses studies outside Australia, whereas, section 3.3.2 discusses studies in the context of Australia.

#### 3.3.1 Studies outside Australia

The first recognised study of the relationship between stock returns and accounting information was by Ball and Brown (1968). They modelled abnormal returns (returns include dividend and stock price changes) using changes in earnings as a surrogate for unexpected earnings. In Ball and Brown (1968) abnormal return was used as the dependent variable and the change in earnings was used as the independent variable. They documented a significant association between abnormal stock returns and changes in earnings. Similar evidence was provided by Beaver (1968). Additionally, Beaver (1968) found a significant increase in share trading in the week of earnings announcement. The magnitude of the stock price change in the week of earnings announcement was much larger than that of the non-announcement periods. Since then, many studies have examined of the relationship between accounting information and share prices or returns.

The VRR spawned based on the Positive Accounting Theory (PAT) and the efficient market hypothesis (EMH). However, for a long period of time, it was lacking an established theory that links the stock price or contemporaneous stock returns with fundamental accounting measures such as book value and earnings. Nevertheless, the information perspective of financial reporting provided the conceptual basis for this association.

After the introduction of Ohlson (1995) model and Feltham and Ohlson (1995)<sup>26</sup> model, the VRR gained momentum. The valuation theory proposed by Ohlson (1995) and Feltham and Ohlson (1995) relies on the residual income valuation model (RIVM). Ohlson (1995) demonstrates that a firm's share price is a function of book value and earnings given the clean surplus relation.<sup>27</sup> Unlike Ball and Brown (1968) model that uses stock returns as the dependent variable, Ohlson (1995) model uses firms' market value/share price as the dependent variable. Most importantly, Ohlson (1995) and Feltham and Ohlson (1995)

<sup>&</sup>lt;sup>26</sup>It can be clarified that Feltham and Ohlson (1995) expand on the Ohlson (1995) model. Feltham and Ohlson (1995) modify the provision of information dynamics to facilitate separate treatment of operating assets and financial assets which Ohlson (1995) model does not consider. They put forward the argument in favour of separating operating assets from financial assets that due to conservative accounting, residual income, and thereby, future abnormal earnings is affected proportional to the understatement of operating assets in the balance sheet. Hence, the separation is necessary to determine the true abnormal income. The Feltham and Ohlson (1995) model is preferred over Ohlson (1995) model when the issue of reliability of operating assets and financial assets is examined (Dahmash, Durand and Watson, 2009). Ohlson (1999) shows that firms' market value is a function of book value and current earnings. It does not require the separation of operating assets from financing assets form financing assets. Accordingly, studies focusing on the value relevance issue usually rely on Ohlson (1995) model and use current earnings.

<sup>&</sup>lt;sup>27</sup>Further discussions on the Ohlson (1995) model and the clean surplus relation are provided in chapter four, section 4.4.

provide a theoretical basis for the VRR. In addition to book value and earnings, Ohlson (1995) model and Feltham-Ohlson (1995) model incorporate information dynamics and specify 'other information variables'. The provision of 'other information variables' helps to study the usefulness of other accounting measures such as CFO, intangible assets and goodwill in determining share prices. Thus their models facilitate researchers to modify the models to suit the specific research objectives. Moreover, Collins, Pincus and Xie (1999) suggest that a model with only earnings as the independent variable is misspecified and adding book value in the model eliminates the misspecifications.<sup>28</sup> For these reasons, Ohlson (1995) model is widely used in the VRR in its original form or in a modified form.

#### **3.3.1.1** Decline in the value relevance of earnings

The important concern that has driven much of the VRR over the last four decades is that the information content of fundamental accounting measures is gradually declining over years. Lev (1989) first points out that accounting earnings explains only approximately 5 to 10 per cent variations of stock returns in the cross-section. For the intangible intensive cellular telephone industry, Amir and Lev (1996) show that book value, earnings and CFO are not value relevant on a stand alone basis, they become value relevant only when combined with other non-financial information. Lev and Zarowin (1999) document that the usefulness of earnings is steadily decreasing over time. Brown, Lo and Lys (1999) and Core, Guay and Van Buskirk (2003) also support the declining value relevance of earnings as measured by R-square over the last four decades.

On the contrary, Collins, Maydew and Weiss (1997) suggest that the aggregate value relevance of book value and earnings has not decreased over the 40 years. However, they document a shift in the incremental value relevance from earnings to book value. Moreover, Francis and Schipper (1999) claim that although the usefulness of earnings in explaining security returns has declined significantly over time, the usefulness of book value (on a stand alone basis or combined with earnings) in explaining share prices has not decreased.

#### 3.3.1.2 Reasons behind the decrease in the value relevance of earnings

<sup>&</sup>lt;sup>28</sup>Before Ohlson (1995) model, most of the VRR have examined the association of stock returns with earnings and changes in earnings. Finance literature also relied upon the earnings capitalisation model.

Academics and practicing accountants have forwarded different arguments on the causes of the decline in the value relevance of earnings in determining share prices. Lev (1989) identifies the noise from accounting manipulations and the increase in temporary items as the underlying causes of decrease in the usefulness of earnings. Frequent negative earnings and one-time items can also adversely affect the value-relevance of earnings (Hayn, 1995; Elliott and Hanna, 1996; Basu 1997; Collins, Maydew and Weiss, 1997).

The decrease in the usefulness of earnings has also been attributed to the changes in the business environment and to the increase in the magnitude of intangible assets. Accounting measures are less relevant in determining share prices of service oriented firms, high technology firms and knowledge intensive firms (Elliott and Jacobsen, 1991; Jenkins, 1994; Brown, Kin and Lys, 1999; Lev and Zarowin, 1999). Lev and Zarowin (1999) also suggest that the inadequate accounting treatments of intangible assets and the rapid change in the business environment are the major reasons of the decrease in the importance of accounting measures in determining share prices. Practitioners also argue that accounting practices have become so conservative that accounting no longer counts what matters to investors for stock valuation purposes (Stern Stewart, 2002). Core, Guay and VanBuskirk (2003) argue that due to the emergence of 'new-economy' in the late 1990s, the relationship between firms' market value and traditional accounting measures has changed fundamentally for both traditional firms and new economy firms. Beisland (2008) suggests that the usefulness of accounting measures in the non-traditional sector is significantly more dependent on general economic conditions and stock market sentiments than that in the traditional sectors. He argues that if the association between share prices and accounting measures is highly sensitive and volatile, this reduces the usefulness of financial reports to the investors. Ex-ante, investors may not be able to predict how well accounting information will represent levels of or changes in share prices.

The role of accounting conservatism has also been identified for the decrease in the usefulness of accounting measures (Basu, 1997; Lev and Zarowin, 1999). On the contrary, Balachandran and Mohanram (2010) fail to find evidence on the argument that increasing conservatism results in a higher decrease in the value relevance. Instead, they find that in cases where the conservatism has not increased, the decrease in the value relevance is more severe. They conclude that the decrease in the usefulness of accounting measures cannot be attributed to the increase in the conservatism.

## **3.3.1.3** Increase in the value relevance of book value: shift in the value relevance from earnings to book value

Ohlson (1995) suggests that book value is relevant as a proxy for firms' normal future earnings, whereas, earnings is relevant as a proxy for future abnormal earnings. The financial statement includes both a balance sheet (the stock measure) and an income statement (the flow measure) with each statement fulfilling separate roles or at least providing information incremental to the other (Barth, Beaver and Landsman, 1998).

Although both book value and earnings are useful in determining share prices, prior literature suggests that the relative and incremental value relevance of book value and earnings are contextual. Under certain conditions or firm specific situations, the relative importance of book value increases and that of earnings decreases. Firms' distressed financial health, temporary earnings, noisy earnings and negative earnings are the specific conditions when firms' book value has greater association than earnings with share prices (Hayn, 1995; Burgstahler and Dichev, 1997; Collins, Maydew and Weiss, 1997; Barth, Beaver and Landsman, 1998; Graham, King and Bailes, 2000).

Hayn (1995) shows that the relative importance of book value increases when the firm has current and continuing negative earnings. Burgstahler and Dichev (1997) suggest that book value and earnings play complementary roles in determining firms' market value. They argue that if the net income is high relative to book value, the importance of earnings increases and that of book value decreases in determining firms' market value. On the contrary, if the net income is too low relative to book value, the importance of earnings decreases and that of book value increases in determining firms' market value. Similarly, Barth, Beaver and Landsman (1998) suggest that when the financial condition of a firm worsens, the going concern assumption comes into question and the firm approaches bankruptcy, the explanatory power of book value increases and that of earnings decreases. Moreover, Subramanyam and Venkatachalam (1998) suggest that book value has a very restrictive direct role in stock valuation in that it is relevant as a proxy for firms' liquidation value or abandonment option. They show that for profit firms, book value contains no additional information over that provided by earnings. For firms reporting losses, book value contains significant value relevant information, while current and past earnings together assume only a marginal explanatory power. Collins, Pincus and Xie (1999) also suggest that book value is relevant as a proxy for expected future normal earnings for all firms in general, whereas, for firms with

continuing negative earnings most likely to cease operations or to liquidate, book value is relevant as a proxy for abandonment options. Yee (2000) provides theoretical supports for the relation and suggests that book value has association with firms' market value as abandonment option.

However, contrasting evidence is provided by Lim (2005). Lim (2005) examines a sample of UK firms having ex-post liquidation and finds only weak evidence on the conjecture of AOH that the relative importance of book value increases as firms approach bankruptcy. The weak evidence is not even robust to alternative model specifications. Lim (2005) concludes that other factors might be related to the differential value relevance of book value and earnings for firms approaching liquidation.

Country level legal backgrounds and accounting systems have also been linked to the superiority of book value over earnings and vice versa in explaining variations in share prices. For example, book value has higher explanatory power than earnings in Germany and Norway, while earnings has higher explanatory power than book value in UK (King and Langli, 1998).

Ou and Sepe (2002) show that the importance of earnings increases when the spread between reported actual earnings and analysts' earnings forecast decreases. On the contrary, the importance of book value increases when the difference between actual reported earnings and analysts' earnings forecast increases. Moreover, the value relevance of book value increases and that of earnings decreases when firms report vary low earnings (Burgstahler and Dichev, 1997) and extreme positive or negative earnings (Penman, 1998).

Feltham and Pae (2000), Marquardt and Wiedman (2004) and Whelan (2004) show that when firms engage in earnings management, investors' reliance on book value increases and investors' reliance on earnings decreases for determining share prices. Moreover, firms' earnings management increased during the 1997 AFC (Chia, Lapsley and Lee, 2007) implying that managers have increasing tendency of earnings management during a period of economic uncertainty.

The above review suggests that book value and earnings have value relevance. The usefulness of earnings and book value in explaining the variations in share prices or stock

returns has been declining over the last four decades (Lev, 1989; Collins, Maydew and Weiss, 1997; Lev and Zarowin, 1999). The decrease in value relevance of earnings and book value is attributed to accounting conservatism, growing levels of intangible assets, negative earnings, a shift in economy from capital intensive business to technology intensive business and growing magnitude of accounting frauds. Moreover, empirical evidences suggest that the value relevance of book value and earnings is conditional on various firm specific and economic contexts. It should be noted that these studies have examined the usefulness of earnings and book value in determining firms' market value during normal economic periods.

#### 3.3.2 Value relevance of book value and earnings in the Australian market

Although studies in the US context have shown that the value relevance of earnings has decreased over the last four decades, evidences in the Australian context are mixed. This section reviews previous Australian studies relating to the value relevance of book value and earnings. Studies during normal economic periods suggest that the importance of book value and earnings has not declined in the Australian market after controlling for the impact of negative earnings.

Goodwin and Ahmed (2006) examine the longitudinal value relevance of earnings, distinguishing firms capitalising intangible assets and firms expensing the investment in intangible assets for the period of 1975 to 1999 focusing on the inter-temporal change in the longitudinal value relevance of earnings. They find weak evidence of decline in the value relevance of earnings and attribute the decline to the large number of loss making firms. Brimble and Hodgson (2007) improve upon Goodwin and Ahmed (2006) by controlling for different contextual factors such as non-linearity, size and leverage that may otherwise produce biased results. They examine whether the value relevance of book value and earnings has decreased in the Australian market over the period of 28 years (1983 to 2001). Their findings can be summarised as: (i) from a longitudinal perspective, the value relevance of core earnings has not declined; and (ii) earnings has higher predictive power than that of book value; (iii) the explanatory power of book value in Australia is lower than that of comparable studies in the USA.

While Goodwin and Ahmed (2006) and Brimble and Hodgson (2007) examine the value relevance of accounting information in a cross-sectional context, Clout (2007) examines the

long term association (from a time series perspective) of market value with book value and earnings for thirty selected Australian firms during the period of 1950 to 2004 using a firm level dynamic modelling technique (error correction technique).<sup>29</sup> She finds a weak co-integration between market value and accounting measures for some firms but fail to find any such relationship for other firms. Clout (2007) concludes that the market-to-accounting relationship or vice-versa is more tenuous than might be expected from the CMR. The weak association found by Clout (2007) may point to the declining association of firms' market value with book value and earnings.

Prior Australian studies have also shown that firms' contextual factors and earnings quality affect the importance of book value and earnings in determining share prices. Whelan (2004) documents that earnings management affects the relative importance of book value and earnings. Habib and Azim (2008) show that the association of book value and earnings with share prices is higher for firms having strong corporate governance than that of firms having weak corporate governance. They also find that firm specific factors such as profitability, size and leverage are important determinants of the usefulness of accounting measures. They suggest that these factors should be controlled to get an unbiased estimate of the usefulness of book value and earnings in determining share prices.

Thus earlier Australian evidence suggests that investors consider both book value and earnings as useful in determining share prices. It is important to note that prior Australian studies have mainly focused on the aggregate value relevance of book value and earnings. Studies examining the relative<sup>30</sup> and incremental value relevance of book value and earnings are lacking in the Australian context. Assessing the relative importance of book value and earnings is important given the long standing balance sheet focus of Australian Generally Accepted Accounting Principles (AGAAP) (Chalmers, Clinch and Godfrey, 2011). Further, it is also important to understand whether and how the usefulness of book value and earnings has changed between the GFC and the NCP, given the prior evidence that the usefulness of fundamental accounting measures has not declined in the Australian market over the last few decades.

<sup>&</sup>lt;sup>29</sup>Clout (2007) uses individual firm data from a time series perspective to examine the relationship of market value of a particular firm with its book value and earnings over a period of 50 years.

<sup>&</sup>lt;sup>30</sup>The relative value relevance of particular accounting measure is defined as the percentage of variation in the dependent variable (market value or return) explained by that particular accounting variable alone (for example, book value alone).

Table 3-1 shows a summary of sample sizes, country contexts, dependent variables and independent variables of notable studies on the value relevance of book value and earnings.

Study	Period examined	Dependent variables	Independent variables	Findings
Hayn (1995) USA N = 85919 (number of loss observations 16814)	1962-1990	Annual returns	Earnings per share.	<ul> <li>Losses are less informative than profits about firms' future prospects.</li> <li>The relative importance of book value increases for firms reporting losses because book value acts as a proxy for liquidation option.</li> <li>The liquidation option of book value dominates also for profitable firms where the earnings is so low that the liquidation option becomes attractive.</li> </ul>
Kothari and Zimmerman (1995) USA N = 38890	1952-1989	Market value per share Annual raw returns (calculated as price relative: current year- end price /last year-end price) Change in price Earnings deflated price	Earnings per share, Earnings deflated by beginning of the year share price, Change in earnings, Reciprocal/inverse of earnings.	<ul> <li>Price models have less biased earnings response coefficient (ERC).</li> <li>Return models have less serious econometric specification and model fit related problems arising out of heteroskedasticity and scale effects.</li> <li>In some context, a combination of both price models and return models may be useful.</li> </ul>
Elliot and Hanna (1996) USA N = 2761 firms (101046 quarterly observations)	1970-1994	Market adjusted excess returns (over -1,0 days of the large write-off)	Unexpected pre-tax earnings by continuing operations deflated by market value at the end of the quarter, Pre tax special item or charge against income deflated by market value at the end of the quarter.	<ul> <li>The ERC decreases during the year of large write-offs and remains low for some periods thereafter.</li> <li>The ERC on special items declines with the increase in the frequency and amounts of special items. The ERC tends to become zero for the longer sequence of special items write-offs.</li> </ul>
Amir and Lev (1996) USA N = different sample size for different test (ranges from 186 to 1005)	1988-1993	Market adjusted return (2 days and 7 days) Market value per share at the end of the quarter	Earnings per share (level and changes), Book value per share, Earnings per share, Earnings before selling, general and admin expenses, Other (nonfinancial information such as population coverage,	<ul> <li>In a cellular industry, financial accounting information (such as book value, earnings and CFO) is largely irrelevant on a stand alone basis.</li> <li>Nonfinancial indicators such as proxy for growth and proxy for market penetration are highly value relevant.</li> </ul>

#### Table 3-1: Prior studies on the value relevance of book value and earnings

			subscriber; depreciation and amortisation expense).	When combined with nonfinancial information, earnings has significant explanatory power of variations in share prices and returns.
Collins, Maydew and Weiss (1997) USA N = 115154	1953-1993	Market value per share	Earnings per share, Book value per share, Core earnings, One time items.	<ul> <li>The combined information content of book value and earnings has not decreased during the 40 years' study period.</li> <li>The incremental value relevance of earnings has decreased.</li> <li>Incremental value relevance of book value has increased.</li> <li>The increasing frequencies of negative earnings and non-recurring items are primarily responsible for the shift in the value relevance from earnings to book value.</li> </ul>
Barth, Beaver and Landsman (1998) USA N = 396 firms that ultimately faced bankruptcy N = 17966 large sample	1974-1993 for bankrupt firms 1988-1993 All firms.	Market value per share	Book value per share, Net income per share before extraordinary items and discontinued operations, Control for industry, size, return on equity, and volatility of equity returns.	<ul> <li>The value relevance of book value increases and that of earnings decreases if the financial condition of a firm worsens and the firm approaches bankruptcy.</li> <li>Unrecognised intangible assets also have impact on the relative importance of book value and earnings in determining share prices.</li> </ul>
King and Langli (1998) UK, Germany and Norway N = 2716 (Germany) N = 922 (Norway) N = 11005 (UK)	1982-1996	Market value per share	Book value per share, Earnings per share, Earnings per share (one year lead), Earnings per share (two years lead).	<ul> <li>Book value and earnings are significantly associated with share prices in all the three countries.</li> <li>Accounting measures in German have the lowest association with share prices, whereas, accounting measures in UK have the best association with share prices. Accounting measures in Norway rank in between those of Germany and UK.</li> <li>The incremental and relative explanatory power of book value and earnings are not constant over time and across countries.</li> <li>Book value has a greater explanatory power</li> </ul>

Lipe, Bryant and Widener (1998) USA	1985 Q 1-1995 Q 4	Cumulative abnormal returns	Unexpected quarterly earnings.	<ul> <li>than earnings in Germany and Norway, whereas, earnings has a greater explanatory power than book value in UK.</li> <li>Future earnings has no incremental explanatory power of variations in share prices over the explanatory power of present earnings and book value.</li> <li>Using non-linear models, separations of profit and loss firms and controlling for firm specific factors improve the explanatory</li> </ul>
N = 78544 (62242 profit observations)				power of earnings.
Subramanyam and Venkatachalam (1998) USA N = 67143	1967-1996	Market value per share	Earnings per share (current earnings, last years' earnings, earnings two years ago, earnings three years ago) Book value per share.	<ul> <li>Past earnings has incremental explanatory power beyond that provided by current earnings.</li> <li>A model with current earnings and past earnings as independent variables has superior explanatory power to a model with current earnings and book value as independent variables.</li> <li>For firms with positive earnings, book value has no incremental information content over that provided by current earnings and past earnings.</li> <li>For firms reporting losses, book value assumes a high explanatory power.</li> <li>Thus book value has a restrictive direct role in stock valuation because it represents firms' abandonment or liquidation value.</li> </ul>
Collins, Pincus and Xie (1999) USA N = 69577 (15843 negative earnings and 53734 positive earnings)	1974-1993	Cum dividend share price	Earnings per share, Beginning of the year book value per share, Expected future normal earnings, Firms' exit value.	<ul> <li>Provides an explanation of why negative earnings has negative coefficients in stock valuation model.</li> <li>If book value is included in the model as an independent variable, the negative coefficient of negative earnings disappears.</li> <li>Models with only earnings as the independent</li> </ul>

				<ul> <li>variable are misspecified and the negative coefficient on negative earnings arises due to this misspecification.</li> <li>Book value is relevant as a proxy for future expected normal earnings for all firms in general, whereas, for firms with continuing negative earnings most likely to cease operations or to liquidate, book value is relevant as a proxy for abandonment option.</li> </ul>
Brown, Kin and Lys (1999) USA N = 112134	1958-1996	Market value per share Adjusted R-square	Earnings per share, Book value per share, Time (year).	• The usefulness of book value and earnings as measured by the R-square has decreased over the last four decades after controlling for the scale effect.
Lev and Zarowin (1999) USA N = 75744	1977-1996	Annual return Market value per share	<ul> <li>Earnings before extra ordinary items (level and changes),</li> <li>CFO (level and changes),</li> <li>Accruals ((level and changes) [accruals is defined as reported earnings minus CFO],</li> <li>Earnings per share, Book value per share.</li> </ul>	<ul> <li>The usefulness of financial accounting information such as book value, earnings and CFO has decreased over the study period.</li> <li>Inadequate accounting treatments of the rapid changes in the business environment and intangible intensity are the two primary reasons for the decrease in the usefulness of accounting measures.</li> </ul>
Francis and Schipper (1999) USA N = 97386	1952-1994	Market adjusted annual returns Market value per share	Earnings per share (level and changes), Book value per share, Book value of total assets per share, Book value of liabilities per share.	<ul> <li>The usefulness of earnings in explaining security returns has significantly decreased over time.</li> <li>The usefulness of book value of assets and liabilities (on a stand alone basis or combined with earnings) in explaining equity market values has not declined.</li> </ul>
Ou and Sepe (2002) USA N=7632	1985-1983	Market value per share	Earnings per share, Book value per share, Variance in prior ten years' earnings, Absolute value of the	<ul> <li>The value relevance of earnings increases when the spread between current reported earnings and analysts' earnings forecast decreases.</li> <li>The importance of book value increases when</li> </ul>

			difference between the		the difference between current reported
			consensus analysts' forecast		earnings and analysts' earnings forecast
			of one-year ahead earnings		increases.
			and reported current		
			earnings.		
Core, Guay and VanBuskirk (2003)	1975-2000	Market value per share	Book value per share,	•	Due to the emergence of the 'new-economy'
USA		-	Earnings per share,		in the late 1990s, the relationship between
N = 108493		Market value per share	Advertising expenditure,		firms' market value and traditional accounting
		deflated by book value	Capital expenditure,		measures has changed fundamentally for both
		per share	Change in sales.		the traditional firms and the new economy
		F			firms
			Repeat the model with all the		11110.
			variables deflated by book		
			value.		
Marquardt and Wiedman (2004)	1984-1991	Market value per share	Earnings per share.	•	When firms manage earnings the value
USA	Firms with	F	Book value per share.		relevance of earnings is impaired
	secondary equity		Control variables for size	•	Book value plays a greater role in explaining
	offering		leverage growth loss and	•	share prices when earnings management
	onening		vear dummy		impairs the information contant of carnings
			year aanniy.		and when earnings management is associated
					with high information asymmetry
Whalan (2004)	1007 2001	Markat valua par shara	Farnings par shara		Estimate management via disputiences
Australia	1997-2001	Warket value per share	Pools volue per share	•	Earnings management via discretionary
Australia $N = 2000$			Lateraction of dummy		accruais reduces the value relevance of
N = 2900			unichle (for cornings		earnings and increases the value relevance of
			wanable (for earnings		book value.
			management) with book		
Lim (2005)	1075 2000	Marlast scalars war shows	Value and earnings.		
Lim (2005)	1975-2000	Market value per share	Book value,	•	There is weak evidence on AOH in UK.
UK			Net income before	•	However, robustness tests suggest that the
N = 247			extraordinary items,		weak evidence in favour of AOH arises due to
			Research and Development		research design factor.
			expenditure,	•	The findings suggest that other factors might
			Dividend,		be related to the difference in the relative
			Dummy variables for		importance of book value and earnings of
			negative earnings and		book value and earnings for firms
			negative book value,		approaching liquidation.
			Dummy variables for small		
	1		firms and large firms,		

Goodwin and Ahmed (2006) Australia N = 12918	1975-1999	Market value per share at the end of the year Annual buy and hold raw returns	Dummy variables for manufacturing and non- manufacturing firms. Earnings per share, Book value per share, Earnings per share (level and change).	<ul> <li>There is weak evidence on the decrease in the usefulness of earnings for stock valuation.</li> <li>The decline in the value relevance is driven by firms reporting losses.</li> <li>For firms capitalising intangible assets, the value relevance of earnings has increased over</li> </ul>
Brimble and Hodgson (2007) Australia N = 3563	1973 -2001	Market value per share Dividend adjusted annual returns	Book value per share, Earnings per share, Earnings per share (level and change), Non-linear terms for earnings (level and change).	<ul> <li>time.</li> <li>The value relevance of core earnings has not decreased over time.</li> <li>Book value does not have as high predictive power as earnings.</li> <li>The relative usefulness of book value is lower than that of the comparable US studies.</li> <li>The use of nonlinear regressions reveals that conventional accounting information has not become less value relevant.</li> </ul>
Habib and Azim (2008) Australia N = 1289	2001-2003	Market value per share at the end of the year	Earnings per share, Book value per share Different corporate governance variables, Different contextual variables such as size, leverage, growth options and profitability.	<ul> <li>For firms having strong corporate governance, the association of book value and earnings with share prices is higher.</li> <li>Firm specific factors such as profitability, size, leverage and growth options also influence the value relevance of accounting measures.</li> </ul>
Jenkins, Kane and Velury (2009) USA N = 120070	1980-2003	Annual buy and hold stock return	Annual earnings before extraordinary items both level and change (deflated by beginning market value of equity), Expected future earnings, Expected future returns, Dummy variable for economic cycle 'expansion'.	<ul> <li>The conservatism in current earnings increases during periods of economic contraction.</li> <li>Due to the increase in the conservatism in current earnings during economic contraction, the value relevance of earnings increases.</li> <li>On the contrary, during economic expansion when the conservatism decreases, the association between accounting information and future growth opportunities weakens.</li> </ul>

Balachandran	and	Mohanram	1975-2004	Market value per share	Book value per share,	• The evidence does not support the conjecture
(2010)					Earnings per share,	that increase in the conservatism results in a
					Dummy variables for	greater decline in the value relevance of
USA					industry and loss and their	accounting measures.
					interaction with earnings and	• The results show a more severe decrease in
N = 100984					book value,	the usefulness of accounting measures where
						the conservatism has not increased.
				Annual returns	Earnings per share (level and	• The conservatism is not driving the decline in
				compounded monthly	change),	the value relevance of accounting measures.
					Dummy variables for	
					industry and loss and their	
					interaction with earnings	
					(level and change).	

## **3.4** Incremental and relative value relevance of earnings and cash flow from operations (CFO)

Both earnings and CFO are flow measures. Earnings consists of accruals and CFO. Earnings is subject to different accruals adjustments and management discretions. On the contrary, CFO is not subject to discretionary accounting adjustments. Besides the value relevance of book value and earnings, another concern in the VRR has been whether CFO has incremental value relevance over and above book value and earnings. Despite the established requirement for the cash flow statement, debate continues as to the usefulness of the information contained in the cash flow statement (Subramanyam and Venkatachalam, 2007; Kumar and Krishnan, 2008; Barton, Hansen and Pownall, 2010; Akbar, Shah and Stark, 2011). Two concerns have dominated the focus of the study on the value relevance of CFO. Firstly, whether CFO has additional explanatory power of cross-sectional variations in the stock prices (returns) once the effect of book value and earnings (earning) is controlled for. Secondly, there have also been debates on whether CFO or earnings contain superior value relevant information. In addition to these two questions, prior studies suggest that the value relevance of earnings and CFO are conditional on different firm specific factors and economic conditions (for example, Charitou, Clubb and Andreou, 2000; Bartov, Goldberg and Kim, 2001; Christian and Jones, 2004; Habib, 2008; Saeedi and Ebrahimi, 2010). The contextual factors identified in previous studies are noise in the earnings or earnings management, temporary and permanent components or the extremity in earnings and CFO, firms' financial health and economic conditions, firms' size, firms' leverage position, firms' accruals level and firms' growth opportunities. For convenience, the review in this section is conducted separately for studies in countries other than Australia and for studies in the context of Australia.

#### 3.4.1 Studies outside Australia

This section revisits notable prior studies that have examined the relative and incremental value relevance of earnings and CFO and the impact of different contextual factors affecting the relative and incremental value relevance of earnings and CFO.

### 3.4.1.1 Incremental value relevance of earnings and CFO

The debate on the importance of CFO in firm valuation can be traced back to Lee (1974) who argued that the accruals based earnings is ineffective in firm valuation. Earnings is considered to be ill-defined and many sided. It suffers from flexible accounting techniques and earnings

manipulation. On the contrary, CFO is not subject to managerial manipulation, and CFO portrays the ability of the organisation to survive. Bowen, Burgstahler and Daley (1987) find CFO to be more strongly associated with stock returns than accruals based earnings. They suggest that cash flow should be added as an explanatory variable in addition to earnings. They also argue that both earnings and CFO may be incrementally and/or individually important in explaining security returns. Barth, Beaver, Hands and Landsman (1999) also find that CFO has explanatory power of equity market value incremental to book value and abnormal earnings. Similar evidence is found by Habib (2008) in the New Zealand context. Moreover, Kumar and Krishnan (2008) suggest that CFO is related to a firm's future investment potential.

Contrasting results have also been reported. Rayburn (1986) finds no difference in value relevance of earnings and CFO. Charitou, Clubb and Andreou (2001) fail to find any incremental value relevance of CFO in UK if different contextual factors are not considered. Martinez (2003) also fails to find any additional information content of CFO beyond that contained in earnings in the context of France. Similarly, Saeedi and Ebrahimi (2010) do not find statistically significant incremental information content of earnings or CFO in the Iranian context. Hence, evidences on the incremental value relevance of earnings and CFO are mixed.

## **3.4.1.2** Relative superiority of earnings versus CFO and the effects of different contextual factors on the relative usefulness of earnings and CFO

The longstanding debate continues as to the superiority of earnings and CFO over each other. The recent evidence on the issue has re-sparked the debate. Bartov, Goldberg and Kim (2001) claim that when a performance measure captures information about a firm's performance more directly and more timely, it becomes more value relevant. They also argue that financial reporting regime and other institutional factors play a role in determining the relative value relevance of earnings and CFO. Similarly, Barton, Hansen and Pownall (2010) find that no single performance measure dominates in its association with firms' market value across the world.

Prior studies provide mixed evidences of the superiority of earnings versus CFO. Cotter (1996) finds that the association of stock returns with the accruals based earnings is higher than the association of stock returns with total cash flows. Similarly, Subramanyam and

Venkatachalam (2007) find that accruals based earnings dominates over CFO in association with firms' intrinsic value.<sup>31</sup> Yoon and Miller (2003) also document the superiority of earnings over CFO in the Korean context. However, when they examine the decomposed earnings, CFO shows stronger association with stock returns.

In the US context, Sloan (1996) finds that in assessing the earnings potential of current operations, accruals components of earnings are less informative than CFO is. Similarly, Kwon (2009) finds that CFO has greater value relevance than earnings in Korea.

Earlier studies have also identified different contextual factors affecting the relative superiority of earnings versus CFO. Evidences on the effects of different contextual factors on the relative value relevance of earnings and CFO are critically reviewed in the following sub-sections.

3.4.1.2.1 Effect of firms' profitability: firms reporting profits and firms reporting losses

Hayn (1995) points to the fact that the information content of profit and loss is different. Similar evidences are also provided by Collins, Maydew and Weiss (1997), Graham, King and Bailes (2000), Goodwin and Ahmed (2006) and Brimble and Hodgson (2007). Negative earnings cannot continue for long time because firms have liquidation options (Hayn, 1995; Burgstahler and Dichev, 1997). During the economy-wide financial crisis the likelihood of a firm reporting losses increases (Graham, King and Bailes, 2000; Davis-Friday, Eng and Liu, 2006). As the value relevance of earnings decreases due to negative earnings, investors rely on alternative performance measures for stock valuation purposes (Charitou, Clubb and Andreou, 2001).

3.4.1.2.2 Effect of the transitory and the permanent components of earnings

Available evidence suggests that the value relevance of CFO increases when earnings becomes transitory. Transitory earnings components may pertain to large amount of discretionary items and accruals such as restructuring losses. These transitory components

 $<sup>^{31}</sup>$ Instead of using stock price, stock returns or expected cash flows, Subramanyam and Venkatachalam (2007) use the expost intrinsic value of equity as the dependent variable. They determine the ex-post intrinsic value of equity by adopting both the discounted dividend and residual income models with ex-post (future) realisations of dividends/residual income over three – and - five year horizons as input. They rationalise the use of intrinsic value by arguing that it is not tainted by investors' fixation on earnings measure (Sloan, 1996). Moreover, it is a comprehensive measure of firms' underlying equity value.

may have limited information content for stock valuation. Cheng, Liu and Schaffer (1996) show that CFO plays a more important role in explaining returns as earnings becomes transitory. Charitou (1997) and Charitou, Clubb and Andreou (2000) also find similar evidences in the context of UK and Japan respectively. Ho, Liu and Sohn (2001) claim that when earnings becomes transitory (negative) in Korea, investors consider CFO as a significant determinant of share prices. Similarly, Habib (2008) shows that the usefulness of earnings decreases in the New Zealand market when earnings is transitory, however, the value relevance of CFO does not increase in such a situation.

Freeman and Tse (1992), and Chandra and Ro (2008) point to the fact that a linear regression with a constant marginal response coefficient does not capture the true relationship of firms' market value /return with earnings. This is because investors place different valuation weights on the transitory component of earnings and the permanent/persistent component of earnings. A large one off change in the earning is not sustainable (Brooks and Buckmaster, 1976). A large one time change in the earnings will have negative correlation with earnings persistence (Hodgson and Stevenson-Clarke, 2000).<sup>32</sup> Thus, the transitory component of earnings will have a relatively lower coefficient estimate than the persistent component of earnings.

### 3.4.1.2.3 CFO permanence

While many studies have examined the effect of earnings permanence on the relative importance of earnings and CFO, a few studies have also considered the issue of CFO permanence (for example, Ali, 1994; Cheng and Yang, 2003). CFO can also have transitory components and permanent components. The value relevance of CFO for firms having transitory CFO is lower than that of firms having permanent CFO. Ali (1994) suggests that moderate cash flow is more informative than extreme cash flow. Cheng and Yang (2003) also find that both earnings extremity and CFO extremity affect the value relevance of earnings and CFO. Moreover, Cheng and Yang (2003) add to the literature in three important ways. Firstly, only moderate CFO has incremental information content over earnings. Secondly, only moderate earnings has incremental information over CFO. Thirdly, when CFO is moderate and earnings is extreme, CFO assumes the primary importance in stock valuation.

<sup>&</sup>lt;sup>32</sup>Earnings persistence is defined as the ability of current earnings to predict future earnings or CFO.

#### 3.4.1.2.4 Magnitude of accruals

Dechow (1994) and Charitou (1997) show that the importance of CFO increases in explaining security returns for firms having low levels of accruals compared to firms having high levels of accruals. When firms' accruals levels are high and firms' operating environment is not in a stable condition, the relative importance of CFO decreases due to the increasing timing and matching problems. On the contrary, the timing and matching problems are relatively less for firms having low levels of accruals. Jenkins, Kane and Velury (2009) suggest that the conservatism in current earnings increases during periods of economic contraction implying that due to the increase in the conservatism in current earnings, the timing and matching problems are likely to increase during periods of macroeconomic shocks.

#### 3.4.1.2.5 Economic disturbance by structural change such as merger

The structural change caused by economic disturbance such as merger may also result in an increase in the relative importance of CFO and a decrease in the importance of earnings. Christian and Jones (2004) argue that the earnings quality will be low during the year of merger due merger related accounting adjustments and economic uncertainties. They examine the association of earnings and CFO with stock returns in the year of merger for a sample of firms undergoing mergers. Their findings suggest that in the year of merger, CFO assumes a greater role in stock valuation because of the severe difficulties in estimating earnings due to firms' structural change.

#### 3.4.1.2.6 Firm size

Prior research has shown that firm size influences the relationship between accounting measures and firms' market value or return (Atiase, 1985; Hodgson and Stevenson-Clarke, 2000; Charitou, Clubb and Andreou, 2001; Brimble and Hodgson, 2007). On the contrary, Habib (2008) fails to find any significant effect of firm size on the relative usefulness of earnings versus CFO in the context of New Zealand. Usually, two arguments are found on the effect of firm size on the value relevance of earnings.

One argument suggests that the differential effect of firm size on the value relevance of earnings arises because earnings reported by small firms contains more transitory components than that of large firms (Ismail and Choi, 1996). Additionally, small firms' earnings tends to be more volatile and less predictable than that of large firms (Freeman and

Tse, 1992). Moreover, small firms have a tendency to run less efficiently than large firms (Chan and Chen, 1991). Small firms are more likely to incur losses and are more vulnerable to the bankruptcy risks (Hayn, 1995; Keenan, Yu and Mogili, 2004). Hence, earnings of large firms are more informative than that of small firms.

Anther argument links firm size to the information asymmetry (Hodgson and Stevenson-Clarke, 2000). Large firms are followed by larger number of analysts than small firms. Large firms have greater level of information disclosure than small firms (Vermaelen, 1981). Large firms are subject to higher level of political regulation and monitoring than small firms (political cost hypothesis of Watts and Zimmerman, 1986). Small firms are likely to be start up firms and they disclose relatively less information to the market. Based on this information asymmetry argument, it is suggested that earnings releases by small firms bring more value relevant information to the market than earnings releases by large firms (Hodgson and Stevenson-Clarke, 2000).

#### 3.4.1.2.7 Leverage

Leverage influences the degree to which earnings is permanent or transitory (Kim, Chen, and Nance, 1992). Firms' leverage position affects firms' systematic risks. The present value of future expected CFO is also affected by the systematic risks (Mrtikainen, 1997). Moreover, highly levered firms have high tendency to manage earnings in an effort to avoid breaching debt covenants (Defond and Jiambalvo, 1994; Dichev and Skinner, 2002). For firms having high levels of leverage, the relative importance of CFO should be greater than that of earnings because CFO portrays firms' loan re-payment ability. However, in the context of New Zealand, Habib (2008) does not find evidence supporting the argument that the relative importance of CFO increases and that of earnings decreases when firms have high levels of leverage.

## 3.4.1.2.8 Earnings growth

The value relevance of earnings and CFO has been found to vary based on firms' growth options. For firms with high growth options, the value relevance of earnings and CFO is expected to be greater than that of firms with low growth options. Ohlson's (1995) proposition implies that firms' market value is a function of firms' book value and the present value of future abnormal earnings. Firms experiencing positive unexpected earnings in recent

years will have high market value to book value (MTBV) ratios. On the contrary, firms experiencing negative unexpected earnings in recent years will have low MTBV ratios. If investors consider the growth opportunities to persist then the value relevance of earnings is likely to increase. Moreover, a high MTBV is related to investment opportunities with positive net present value (Collins and Kothari, 1989; Charitou, Clubb and Andreou, 2001). Charitou, Clubb and Andreou (2001) examine if firms' growth opportunities (proxied by MTBV ratios) affect the value relevance of earnings and CFO drawing on UK data. They find that the incremental value relevance of CFO is very little for high growth firms having extreme earnings. They also find that high growth firms have higher ERCs than low growth firms. However, they do not find any conclusive evidence on the effect of firms' growth options on the relative usefulness of CFO.

#### 3.4.1.2.9 Institutional and legal backgrounds

The institutional and legal differences among countries also have implications for the differences in the value relevance of earnings and CFO. Ali and Hwang (2000) examine the relative superiority of earnings versus CFO in 16 countries and find that earnings in 'code law' countries is more conservative and less timely than earnings in 'common law' countries. Hence, the return-earnings association is lower in countries with code law than in countries with common law. Bartov, Goldberg and Kim (2001) investigate the relative superiority of earnings versus CFO for stock valuation in the context of the USA, UK, Canada, Germany and Japan. Their findings suggest that for the three countries with capital market based financing (the USA, UK and Canada), earnings has greater explanatory power than CFO. Conversely, for the two countries with bank based financing (Japan and Germany), CFO has greater explanatory power than earnings. They conclude that country level accounting regime and institutional settings influence the relative superiority of earnings versus CFO. However, examining the value relevance of earnings and CFO in the context of two common law countries (UK and the USA) and one code law country (France), Charitou, Charitou, Lois and Vlittis (2010) provide contrasting evidence. In France, earnings is more conservative than that in the USA and UK, where managers enjoy more discretion to manipulate earnings. Their findings suggest that in France, earnings is more important than CFO, whereas, in the USA and UK, CFO is more important than earnings.

3.4.1.2.10 Firms' financial health and economic condition

The value relevance of CFO may increase when a firm's financial health deteriorates. The usefulness of earnings and CFO is also influenced by the overall state of the economy. Bernard and Stober (1989) argue that the importance of CFO and earnings in stock valuation varies based on economic conditions and quality of measurements. CFO is a traditional measure used to evaluate firms' solvency and liquidity and firms' bankruptcy risks (Previts, Bricker, Robinson and Young, 1994). Moreover, for firms having poor financial health, financial analysts assign higher weight on CFO than earnings (DeFond and Hung, 2003). Kumar and Krishnan (2008) show that the relative importance of CFO and earnings differs based on firms' investment opportunity sets.

Jenkins, Kane and Velury (2009) find that during economic contraction, conservatism in the earnings increases and investors rely on present earnings and during economic expansion, investors rely on future expected earnings to determine firms' value. However, the conservatism may arise due to the volatility in firms' operating environment, or due to firms' aggressive earnings management. When the conservatism arises due to the income reducing earnings management, the usefulness of earnings may decrease. Prior studies suggest that during the economy-wide financial crisis, firms engage in income reducing earnings management because it is difficult to meet the earnings target (Chia, Lapsley and Lee, 2007; Zalk, 2009; Masruki and Azizan, 2010). Prior studies also suggest that the usefulness of earnings decreases when firms manage earnings, whereas, the decrease in the usefulness is more pronounced for the discretionary (accruals) portion of earnings (Marquardt and Wiedman, 2004) implying that the value relevance of CFO may not be affected if firms engage in earnings management.

Eng, Nabar and Chng (2005) examine the association of earnings and CFO with one year lead returns and contemporaneous returns in the context of the 1997 AFC using data from Hong Kong, Malaysia, Singapore and Thailand. They find a positive and significant association of earnings with one year lead returns before the crisis (1994-1996). They also find a positive and significant association of CFO and accruals with <sup>33</sup> one year lead returns. However, during the crisis period (1997-1998) they find negative association of earnings with one year lead returns. During the same period, the association of accruals was also negative and significant. On the contrary, the association of CFO was not significant. These evidences

<sup>&</sup>lt;sup>33</sup> Accruals is defined as earnings minus CFO.

imply that investors' reliance on earnings, accruals and CFO has decreased during the 1997 AFC. Moreover, Vichitsarawong, Eng and Meek (2010) examine the conservatism and timeliness of earnings surrounding the 1997 AFC in the context of Hong Kong, Malaysia, Singapore and Thailand. Their findings suggest that the conservatism and timeliness of earnings are low during the financial crisis. This evidence may imply that the reported earnings became noisy during the AFC. These two evidences in the context of the AFC are in contrast to the findings of Jenkins, Kane and Velury (2009).

Although it is beyond the scope of this thesis to examine the effects of these contextual factors on the value relevance of earnings and CFO, these contextual factors have important implications for the research questions examined under phase two of the empirical analysis of this thesis. Firms' accruals levels are likely to increase during the GFC due to large amounts of impairment charges and holding losses. The increase in the accruals levels also imply that the number of firms with transitory earnings will increase during the GFC. Similarly, the number of firms reporting losses is likely to increase during the GFC. Earnings of large firms should be less affected by the GFC because large firms have greater flexibility and more accounting choices than those of small firms to report smooth earnings series. Moreover, small firms should be more vulnerable to the macroeconomic shock than large firms. Usually earnings, rather than the CFO, is tied to debt covenants. Hence, the likelihood of earnings manipulation to avoid debt covenants violation will increase during the GFC. On the contrary, CFO indicates the debt repayment capacity of the firm. Also CFO cannot be easily manipulated. Hence, for firms with high levels of leverage, CFO should be more value relevant than earnings. Thus all these contextual factors may have implications for the differences in the usefulness of earnings versus CFO during the GFC. Accordingly, if the effects of these contextual factors are not controlled in the empirical analysis, the results may be biased.

#### **3.4.2** Studies in the Australian context

A few studies have examined the usefulness of earnings, aggregate amounts of cash flows and different components of cash flows in the Australian context under normal economic condition. Cotter (1996) compares the value relevance of accruals based earnings and components of total CFO. The findings suggest that the association of returns with earnings is greater in magnitude than the association of returns with total cash flows. Hodgson and Stevenson- Clarke (2000, 2000a) examine the impacts of different contextual factors on the relative importance of earnings and CFO in explaining security returns. Specifically, Hodgson and Stevenson-Clarke (2000) examine whether separately considering permanent components and transitory components of earnings and CFO improves the explanatory power of the model. Moreover, they examine whether firm size (large firms and small firms) affects the relative and incremental value relevance of earnings and CFO. Their findings suggest that controlling for the non-linearity associated with transitory components improves the explanatory power of both earnings and CFO. Moreover, small firms have more transitory earnings components than large firms. Nevertheless, CFO assumes significant incremental information content only for large firms. They argue that large firms may engage in greater levels of income smoothing than small firms resulting in a decrease in the usefulness of earnings for large firms. Hodgson and Stevenson-Clarke (2000a) evaluate the effect of leverage on the value relevance of earnings and CFO. Their findings suggest that for firms with high levels of leverage, earnings contains a greater level of transitory components specifically when the firm size is small. Moreover, when earnings has a greater level of transitory components, CFO assumes greater incremental value relevance. They interpret their findings to imply that investors perceive earnings as less informative than CFO when the probability of failure increases and when the likelihood of earnings manipulation increases to avoid debt covenant violations.

Contrasting evidence is provided by Brimble and Hodgson (2007). They find that the value relevance of earnings for small firms has decreased in the Australian market in the last few decades compared to large firms. Habib (2010) extends earlier studies by examining the relative value relevance of seven alternative performance measures and find that earnings contains the most superior value relevant information. He also finds that in the Australian market, large firms have higher coefficient estimate of earnings than that of small firms in explaining security returns. Thus the results of Hodgson and Stevenson-Clarke (2000) are contradictory to the results of Brimble and Hodgson (2007) and Habib (2010). It may be noted that all these studies relate to normal economic conditions.

Table 3-2 summarises prior studies examining the incremental and relative value relevance of earnings and CFO describing the country contexts, sample sizes, dependent variables, independent variables and major findings.
Study	Period	Dependent variable/s	Main independent variables	Main findings
	examin			
<b>D</b> 1 (100 <i>C</i> )	ed	A 11 1	P	
Rayburn (1986)	1963-	Annual abnormal	Earnings,	• Both CFO and accruals are significantly associated with
USA N $= 175$	1982	returns	CFO, Chango in :	security returns.
N = 175			Working capital	• The association of different components of accruais with security returns is less consistent
			Deferred taxes.	security returns is less consistent.
			Deprecation.	
Wilson (1986)	1981-	Abnormal returns	Cash flows,	• Cash flows and accruals components of earnings have
USA	1982	determined using	Total accruals,	incremental explanatory power of security returns beyond that
N = 322		market model residuals	Earnings,	contained in aggregate earnings.
			Current and non-current accruals.	• Total accruals component of earnings has incremental
				explanatory power beyond that contained in cash flow
	1072			components of earnings.
Bowen,	1972-	Annual abnormal	Abnormal earnings,	• CFO has incremental information over earnings.
Burgstanler and Dalay (1987)	1981	returns	Abnormal working capital flow from	• CFO has incremental information in addition to that
USA			Abnormal CEO	contained in earnings and WCFO.
N = 98			Abnormal cash flows	• Boin earnings and wCFO jointly and separately nave
1, 20			Cash flows after investment.	in CEO
				• WCFO does not have incremental information content in
				addition to that contained in earnings.
Kormendi and Lipe	1947-	Annual abnormal	Unexpected earnings per share.	• No evidence is found on the hypothesis that the reactions of
(1987)	1980	returns		share prices to unexpected earnings are excessively volatile.
USA				
N = 145				
Bernard and Stober	1977-	Market adjusted returns	Unexpected CFO,	• The relative importance of earnings and CFO varies based on
(1989)	1984	Abnormal returns	Unexpected WCFO,	economic conditions and the quality of measurement.
USA N = 170		(Return window used:	Difference accruais (receivables,	• Security price relations to the release of accruals and CFO
N = 170		release of annual	payables and inventory).	they cannot be modelled persimplies by
		reports).		<ul> <li>Important uncertainties about information contained in the</li> </ul>
		T		financial statements are resolved prior to their public release.
Board, and Day	1961-	12 moths cumulative	Historical cost based rate of returns,	• Both return on investment measure and working capital based
(1989)	1977	abnormal returns	Working capital based rate of returns,	cash flow measures have explanatory power of security
UK			Quick asset based rate of returns.	returns.

Table 3-2: List of studies examining the value relevance of earnings and CFO

N = 39				<ul> <li>Net cash earnings has no incremental information content.</li> <li>Return on investment has higher explanatory power than that of either working capital based cash flows or net cash flows.</li> </ul>
Collins and Kothari (1989) USA N = 9776	1968- 1982	12 months and 15 months buy and hold raw returns	Change in earnings per share.	<ul> <li>ERC is a function of risk-free interest rate, risks, growth and persistence of earnings.</li> <li>ERC is also affected by the return interval.</li> <li>Inclusion of these factors improves the explanatory power of the model.</li> </ul>
Livnat and Zarowin (1990) USA 345	1973- 1986	Yearly buy and hold returns Market adjusted abnormal returns	Aggregate cash flows, Accruals, Cash flows from: Operating activities, Financing activities, Investing activities.	• Disaggregation of earnings into CFO and accruals does not improve the explanatory power of the models beyond the explanatory power of earnings alone indicating the superiority of earnings.
Easton and Harris (1991) USA N = 20188	1969- 1986	Annual buy raw returnsand holdAnnual returnsabnormal	Level and change of earnings.	<ul> <li>Both earnings and earnings changes have significant explanatory power of security returns.</li> </ul>
Ali and Zarowin (1992) USA N = 58	1969- 1985	Annual abnormal returns	Operating earnings (level and changes).	• Using earnings changes as a proxy for unexpected earnings results in an understatement of ERCs.
Freeman, and Tse (1992) USA N = 12381	1984- 1987	Daily abnormal returns (3 days after the prior quarter's earnings announcement through to 2 days after the current quarter's earnings announcement.	Unexpected earnings, Non-linear model.	<ul> <li>Marginal response of share price to unexpected earnings decreases as the absolute magnitude of unexpected earnings increases.</li> <li>Use of non-linear modelling techniques to distinguish between permanent components and transitory components of earnings significantly improves the explanatory power.</li> </ul>
Dechow (1994) USA N = 30489	1960- 1989	Abnormal returns (quarterly, annually and four yearly.	Earnings, CFO.	<ul> <li>The explanatory power of earnings increases with the increase in the volatility of firms' working capital requirement, investing activities and financing activities.</li> <li>Under these circumstances, the explanatory power of CFO suffers adversely because of the timing and mismatching problems.</li> </ul>
Ali (1994) USA	1974- 1988	Annual raw returns	Change in earnings, Change WCFO,	• All the three variables (earnings, WCFO and CFO) have incremental value relevant information.

N = 8820			Change in CFO.	• The incremental explanatory power of these three variables decreases as the absolute values of their changes increase.
Cheng, Liu, and Schaffer (1996) USA N = 1479	1988- 1992	Annual abnormal returns	Operating earnings (level and change), CFO (level and change).	• When earnings becomes transitory, the incremental explanatory power of earnings decreases and that of CFO increases.
Cotter (1996) Australia 62 firms for each year	1975- 1985	1, 2, 5 and 10 year buy and hold returns	Earnings, Current accruals, Non-current accruals, CFO, Cash flow from investing activities, Cash flow from financing activities, Non-operating accruals.	<ul> <li>The disaggregated earning model (CFO, current accruals, non-current accruals, non operating accruals) has higher explanatory power than cash flow model (CFO, cash flow from financing activities and cash flows from investing activities).</li> <li>The disaggregated earnings model is more useful in explaining returns than aggregate earnings model.</li> <li>CFO has incremental explanatory power of variations in returns.</li> </ul>
Sloan (1996) USA N = 40679	1962 to 1991	1 year lead earnings	Current earnings, Accruals, Cash flows.	• Investors fail to fully appreciate the information contained in the accruals and cash flows components of current earnings. Moreover, investors fixate at current earnings implying that reported earnings is the premier source of information.
Charitou (1997) UK N = 2894	1985- 1992	Dividend adjusted annual returns	Operating earnings (level and change), CFO (level and change).	<ul> <li>CFO has greater explanatory power than earnings in explaining returns.</li> <li>However, firms' accruals levels influence the relative importance of earnings and CFO. In the presence of high accruals, the importance of CFO decreases due to the timing and mismatching problems.</li> </ul>
Barth, Beaver, Hands and Landsman (1999) USA N = 15405	1987 - 1996	Abnormal income Total Accruals Book value Market value of equity Abnormal income CFO Book value Market value of equity	Abnormal earnings, lagged accruals and lagged book value; Lagged accruals and lagged book value; Lagged book value; Book value, abnormal accruals and total accruals; Lagged abnormal income, lagged CFO, lagged book value; Lagged CFO, lagged book value; Lagged book value; Book value, abnormal income and	• CFO has explanatory power of variations in share prices incremental to book value and earnings.

			CEO	
Charitou and Clubb (1999) UK N = 692 to 3258	1985- 92	Security returns for different intervals (1, 2 and 4 years).	Earnings, Cash earnings, CFO (level and change), Cash investment, Loan capital.	• The explanatory power of the model is significantly improved if cash flow related variables are added with earnings as the independent variables.
Ali and Hwang (2000) 16 countries N = 6400	1986- 1995	Portfolio adjusted abnormal returns (15 months)	Operating earnings (level and change); CFO (level and change); Operating earnings (level).	<ul> <li>The return-earnings relation is low in countries with code law compared to countries with common law.</li> <li>In countries with code law earnings is more conservative and less timely than earnings in countries with common law.</li> </ul>
Charitou, Clubb and Andreou (2000) Japan N = 6662	1984- 93	Dividend adjusted annual returns	Operating earnings (level and change), CFO (level and change).	<ul> <li>CFO (earnings) has information content beyond earnings (CFO) in explaining security returns.</li> <li>CFO (earnings) plays a more (less) important role in the marketplace when earnings is transitory.</li> </ul>
Hodgson and Stevenson-Clarke (2000) Australia N = 744	1989- 1996	Dividend adjusted annual returns.	Operating earnings (level and change), CFO (level and change).	<ul> <li>Both earnings and CFO have incremental value relevant information.</li> <li>Controlling for the separate effects of permanent components and transitory components of earnings and CFO improves the explanatory power of models.</li> <li>Small firms have more transitory earnings components than large firms.</li> <li>CFO has greater incremental explanatory power for large firms than small firms.</li> </ul>
Charitou, Clubb and Andreou (2001) UK N = 3364	1985- 1993	Dividend adjusted annual returns	Operating earnings (level and change), CFO (level and change).	<ul> <li>In general, earnings has incremental information content over CFO, but CFO does not have incremental information content over earnings.</li> <li>Weak evidence exists that the incremental information content of CFO may be higher for firms with high earnings growth.</li> </ul>
Black (2003) USA N = 13523	1980- 1999	Market value of equity per share	Operating earnings, CFO, Cash flows from financing activities, Cash flows from investing activities.	<ul> <li>Uses price model instead of return model to examine the incremental and relative value relevance of earnings and CFO.</li> <li>Earnings does not provide significant information for valuation of start-ups firms.</li> <li>Earnings becomes incrementally value relevant as firms move to the growth stage.</li> <li>Different cash flow measures are relatively more value</li> </ul>

				relevant than earnings for firms in the early stages of life- cycle.
Cheng and Yang (2003) USA N = 25993	1989- 1997	Annual value weighted market adjusted returns	Operating earnings (level and change), CFO (level and change).	<ul> <li>CFO shows a higher association with returns when earnings is extreme.</li> <li>Only moderate CFO serves a supplementary role when the earnings is extreme.</li> <li>Investors primarily focus on earnings and view the CFO as a supplementary/ secondary source of information.</li> <li>Extreme earnings has less explanatory power of security returns than moderate CFO does.</li> </ul>
Christian, and Jones (2004) USA N = 417	1992- 1998 (firms having merger)	Annual market adjusted buy and hold returns.	Operating earnings (level and change), CFO (level and change).	<ul> <li>In the year of merger, CFO provides value relevant information beyond earnings.</li> <li>CFO assumes a greater importance in explaining security reruns in the year of merger due to the difficulty in estimating the merged firms' earnings.</li> </ul>
Watson and Weills (2005) Australia N = 6275	1992- 2003	Yearly buy and hold returns	Different measures of earnings and cash flows.	<ul> <li>For firms with positive earnings, earnings related performance measures are more closely related to returns than cash flow related measures.</li> <li>For firms with positive accruals, earnings related measures better reflect firm performances than CFO related measures.</li> <li>For firms with negative earnings and negative accruals, both earnings and CFO weakly associate with returns.</li> </ul>
Subramanyam, and Venkatachalam (2007) USA N = 38590	1988- 1996	Intrinsic value of share.	Earnings before tax, CFO.	• Earnings is superior to CFO in explaining the ex-post intrinsic value of share.
Habib (2008) New Zealand N = 705	1994- 2004	Annual buy and hold raw returns.	Operating earnings (level and change), CFO (level and change).	<ul> <li>Earnings has superior explanatory power to CFO, although the difference is not statistically significant.</li> <li>Both earnings and CFO have incremental information content in explaining security returns.</li> <li>The importance of earnings and CFO is moderated by contextual factors such as growth, leverage and size.</li> </ul>
Kwon (2009) Korea N = 4865	1994- 2005	Market value of equity three months after the year-end	Book value at the year-end, Earnings, CFO.	<ul> <li>CFO has greater explanatory power than earnings.</li> <li>The combined explanatory power of book value and CFO is higher than that of book value and earnings.</li> </ul>
Charitou, Lois and	1998-	Dividend adjusted	Operating earnings (level and change),	• The relative value relevance of earnings versus CFO is

Vlittis (2010) USA, UK and France N = 41000	2006	annual returns	CFO (level and change).	<ul> <li>country specific.</li> <li>Earnings has superior information to CFO in France and CFO has superior information to earnings in the USA and UK.</li> <li>There are significant differences in market perceptions on earnings and CFO in the USA, UK and France.</li> </ul>
Barton, Hansen and Pownall (2010) 46 countries N = 117,474	1996- 2005	Annual buy and hold stock returns net of median stock return for the individual country.	Sales, Operating earnings before interest, income taxes, depreciation and amortisation, Operating income before income taxes, Income before income taxes, Income before extraordinary items and discontinued operations, Net income, Total comprehensive income, CFO.	• No single performance measure dominates in value relevance for firms across the world.
Saeedi and Ebrahimi (2010) Iran N = 708	1998- 2008	Annual buy and hold raw returns.	Operating earnings (level and change), CFO (level and change).	<ul> <li>Earnings and CFO are not significantly associated with security returns.</li> <li>Neither earnings, nor CFO has any incremental information content over other in explaining security returns.</li> </ul>
Habib (2010) Australia N = 8330	1992- 2005	Market adjusted annual stock returns	Total revenue, Earnings before interest, taxes , depreciation and amortisation, Operating income, Earnings before tax, Net profit before tax but after abnormal items, Net profit after tax, CFO.	<ul> <li>The combined explanatory power of earnings and revenue has not declined in the Australian market.</li> <li>Among the seven alternative performance measures examined, earnings has the highest explanatory power of security returns.</li> </ul>
Akbar, Shah and Stark (2011) UK N = Not reported	1993- 2007	Market value of equity	CFO, Current accruals, Non-current accruals.	CFO has value relevance incremental to earnings.

While most of the studies discussed above have applied return models using stock returns as the dependent variable, Kwon (2009) and Black (2003) apply price models to examine the relative and incremental value relevance of earnings ad CFO. Ho, Liu and Sohn (2001) have used price models to examine the impact of the 1997 AFC (discussed later in section 3.5 in this chapter) on the value relevance of book value, earnings and CFO. Banker, Huang and Natarajan (2009) also determine the importance of earnings and CFO applying price models. As suggested by Collins, Pincus and Xie (1999), the simple earnings capitalisation model is misspecified which can be eliminated by including book value (stock measure) as an independent variable in the model. Because this thesis applies price models instead of return models to examine the incremental and relative value relevance of earnings and CFO, the differences between price models and return models are discussed in detail in the research design chapter (chapter five).

#### 3.5 Value relevance of accounting information during prior financial crises

A few studies have examined the impact of the 1997 AFC and the 1994 Mexican currency crisis on the value relevance of accounting information. Graham, King and Bailes (2000) investigate the impact of the AFC on the value relevance of earnings and book value in the context of Thailand. Contrary to the conjectures of the financial health hypothesis (FHH) and the abandonment option hypothesis (AOH), they find a decline in the value relavence of both book value and earnings following Thai Baht devaluation. In another related study, Ho, Liu and Sohn (2001) examine the impact of the AFC on the value relevance of book value, earnings and CFO in the Korean context. They find a decrease in the value relevance of earnings which was replaced by the increase in the value relevance of CFO as opposed to book value. Moreover, the value relevance of book value did not change significantly. They also find similar results after controlling for the foreign exchange translation gains and losses that were included in the book value and earnings.

Davis-Friday, Eng and Liu (2006) examine whether the FHH of Barth, Beaver and Landsman (1998) applies in the context of a financial crisis. They examine the effect of the 1997 AFC on the value relevance of book value and earnings in Indonesia, Malaysia, South Korea and Thailand. For Indonesia and Thailand (countries with relatively strong corporate governance mechanisms) they find that the value relevance of book value increased and that of earnings decreased. For Malaysia (a country having relatively weak corporate governance) they find

that the value relevance of both book value and earnings decreased. For Korea, they do not find any significant change in the value relevance of either book value or earnings. They further claim that the value relevance of book value is affected by country level corporate governance but the value relevance of earnings is unaffected by country level of corporate governance. However, Bauwhede (2006) in a commentary on the paper raises question that an extension of Barth, Beaver and Landsman (1998) proposition from the US context to the Asian context is not straight forward because of the institutional differences between the USA and Asian countries. Bauwhede (2006) calls for further research on the impact of macroeconomic shocks on the value relevance of fundamental accounting measures.

Similarly, Davis-Friday and Gordon (2005) investigate the value relevance of book value and earnings in the context of the Mexican currency crisis of 1994. They do not find any change in the value relevance of book value. However, they find a decrease in the value relevance of earnings during the currency crisis. They attribute the decline in the valuation of earnings to negative earnings.

Thus, whatever limited empirical evidences are available they are inconclusive and their contexts relate to country specific currency crises. Evidence in the context of the GFC is lacking. Given the magnitudes of shocks of the GFC on the global economies, it is important to examine the information role of fundamental accounting measures in determining share prices during the GFC.

Table 3-3 shows the list of studies that have examined the value relevance of accounting information in the context of the 1997 AFC and the 1994 Mexican currency crisis.

Study	Period examined and context	Dependent variable	Independent variables	Main findings
Graham, King and Bailes (2000) (Thailand) N = 437 firms; 8166 firm quarters	1992-1998. Context: AFC	Market value per share	Book value per share, Earnings per share.	• The value relevance of both book value and earnings has decreased during the AFC.
Ho, Liu and Sohn (2001) (South Korea) N = Missing	1995-1998 crisis period Context: AFC	Market value per share	Book value, Earnings, CFO.	<ul> <li>The value relevance of earnings has decreased during the AFC.</li> <li>The declining importance of earnings, however, was not replaced by the corresponding increase in the value relevance of book value.</li> <li>CFO became more value relevant during the AFC.</li> <li>Control for the amounts of foreign exchange translation gains or losses do not change the results.</li> </ul>
Davis-Friday and Gordon (2005) (Mexico) N = 31 firms	1992-1997 Context: Mexican currency crisis	Market value per share	Book value, Earnings, CFO, Total accruals, Foreign currency revaluation reserves.	• The value relevance of book value did not change during the crisis period while the value relevance of earnings decreased during the crisis period. The decrease in the valuation of earnings, however, was attributed to firms reporting negative earnings.
Davis-Friday, Eng and Liu (2006) (Indonesia, South Korea, Malaysia and Thailand) N = 1035 observations	1996-1997. Context: AFC	Market value per share	Book value, Earnings, Crisis year dummy, Accounting system dummy (tax based versus IAS <sup>34</sup> based), Score of country level corporate governance.	<ul> <li>The FHH is supported in Indonesia and Thailand. The value relevance of earnings decreased and that of book value increased during the AFC.</li> <li>The value relevance of both earnings and book value decreased during the AFC in Malaysia.</li> <li>In Korea, the value relevance has not changed either for book value or for earnings.</li> <li>The value relevance of book value decreased in countries where corporate governance is weak.</li> </ul>

Table 3-3: Studies on the value relevance of accounting information during financial and currency crisis

<sup>&</sup>lt;sup>34</sup>International Accounting Standards (IASs) are the forerunner of International Financial Reputing Standards (IFRSs). The IASs were issued by the International Accounting Standards Committee (IASC) from 1973 to 2001. The IFRS are issued by the International Accounting Standards Board (IASB), starting from 2001. During the establishment of the IASB in 2001, it was agreed that all IAS will be adopted and any future standards will be named as IFRS. The IASB is the successor for IASC.

#### 3.6 Value relevance of tangible assets, intangible assets and goodwill

Prior studies have shown that investors consider intangible assets and goodwill in determining share prices. Because the number of studies on the value relevance of intangible assets and goodwill is relatively small, the review is combined into one section including studies in the Austrian context and studies in other country contexts. Without going for a comprehensive review of the studies on the value relevance of intangible assets and goodwill, the review in this section focuses on evidences pertinent to the research question relating to the impact of the economic shock on the value relevance of tangible assets, intangible assets and goodwill.

The early evidences on the value relevance of intangible assets and goodwill come from Jennings, Robinson, Thompson and Duvall (1996), Abrahams and Sidhu (1998), Henning, Lewis and Shaw (2000), Godfrey and Koh (2001), Shahwan (2004), Bugeja and Gallery (2006), Dahmash, Durand and Watson (2009), Al-Jifri and Citron (2009) and Oliveira, Rodrigues and Craig (2010). These studies relate to the USA, Australia, UK and Portugal. All these studies suggest that investors consider the aggregate amounts of intangible assets and goodwill in determining share prices.

In addition to examining the aggregate amounts of intangible assets and goodwill, a few studies have examined value relevance of individual intangible assets. In the US market, Barth, Clement, Foster and Kasznik (1998) find that brand asset has value relevance incremental to other accounting measures. Kallapur and Kwan (2004) provide similar evidence in the context of UK. However, Oliveira, Rodrigues and Craig (2010) do not find intellectual property and capitalised research and development (R&D) to be value relevant in the context of Portugal.

In the Australian context, Abrahams and Sidhu (1998) examine a sample of 167 observations drawn from industries typically involving high levels of capitalised R&D. They find that investors consider capitalised R&D expenditure in determining share prices. Godfrey and Koh (2001) find that the aggregate amount intangible asset is value relevant. In disaggregated form, both identifiable intangible assets and goodwill are value relevant. However, capitalised R&D is not value relevant. Moreover, Godfrey and Koh (2001) find that investors

attach greater importance on intangible assets and goodwill than on other assets. Their sample consists of 172 observations drawn from 500 large capitalisation Australian companies during 1999. Similar result is reported by Shahwan (2004) examining a sample of 993 observations for the period of 1997 to 2000.

Although the result of Godfrey and Koh (2001) for capitalised R&D contrasts with the results of Abrahams and Sidhu (1998), a follow up study by Ke, Pham and Fargher (2004), for an extensive sample of R&D intensive firms, supports the results of Abrahams and Sidhu (1998) suggesting that that capitalised R&D is value relevant. Similar evidences are reported by Smith, Percy and Richardson (2001) and Ahmed and Falk (2006). In a relatively recent study, Ji and Lu (2010) examine the usefulness of intangible assets in determining firms' market value in the pre-adoption and post-adoption periods of IFRS. They find that the value relevance of intangible assets has decreased in the post-adoption periods of IFRS. Summing up, it turns out that prior Australian studies provide evidence that intangible assets and goodwill are value relevant.

Although intangible assets and goodwill have been found to be value relevant in different jurisdictions, the extent of their coefficient estimates have been found to be different from that of tangible assets in different markets. For example, Jennings, Robinson, Thompson and Duvall (1996) analysing the US data for the period of 1982 to 1988 claim that goodwill is value relevant although the coefficient estimate of goodwill was lower than that of other tangible assets implying that investors attach higher importance to tangible assets than to goodwill in determining share prices. Contrastingly, Godfrey and Koh (2001) and Dahmash, Durand and Watson (2009) provide evidence from the Australian market that the coefficient estimates of intangible assets and goodwill are higher than that of tangible assets implying that investors attach higher than that of tangible assets implying that investors attach higher than that of tangible assets implying that investors attach higher than that of tangible assets implying that investors attach higher than that of tangible assets implying that investors attach higher than that of tangible assets implying that investors attach higher importance to intangible assets and goodwill than the tangible assets during normal economic periods.

Although, the valuation weight placed on goodwill is higher than any other assets, there has been a longstanding controversy around whether goodwill is an asset or not. For example, McNeal (1939) and Chambers (1966) argue that goodwill does not have exchangeability and it is not an asset. Decline in firms' market value during an economic slump is usually attributed to the decline in the value of intangible assets and goodwill (Penman, 2009). Penman (2009, p. 359) articulates In the speculative 1990s, accounting 'for industrial age' came under challenge, accused of failing to adopt to the 'information age'....With the bursting of the 1990s bubble and the erosion of market value attributed to intangible assets, 'industrial age' accounting now looks sensible.

The downward revisions in firms' market value during the GFC, has exerted immense pressure to the value of intangible assets and goodwill triggering impairment testing.<sup>35</sup> Because of this decline in firms' market value, the question of whether goodwill is an asset has once again come to surface during the GFC (Gore and Zimmerman, 2010). Gore and Zimmerman (2010) argue that "even though it cannot be separately identified, goodwill exists as an asset is analogous to an astrophysicist verifying the existence of a black hole through the gravitational effect on surrounding objects." However, Gore and Zimmerman (2010) show that goodwill intensive firms have recorded unprecedented amounts of goodwill impairment charges as a reflection of the decline in firms' market value during the GFC.

Because of the lack of separate identifiability, the value of goodwill is usually calculated using a residual value approach (Bloom, 2009). Jones and Dean argue in the editorial of Abacus (2009) that intangibles are generally regarded as "soft" assets, and credit analysts and lenders tend to ignore intangibles in their analysis. Moreover, in Australia, debt contracts usually exclude intangible assets from the measure of leverage (Whittred and Zimmer, 1986). Goodwill is excluded from assets to determine debt ratio for debt covenant purpose (Godfrey, Tarca, Hamilton and Holmes, 2010, p. 232). If credit analysts and lenders ignore intangible assets and goodwill during normal economic periods, does the investors' valuation of intangible assets and goodwill sustain during the GFC? Market valuation of intangible assets and goodwill may fall dramatically during the GFC and so their relevance in stock valuation may also decline during the GFC compared to the NCP.

Intangibles assets are associated with higher uncertainty and less liquidity than the tangible assets (Barth, Beaver and Landsman, 2001; Eckstein, 2004; Shukor, Ibrahim, Kaur and Md-Nor, 2005). Shukor, Ibrahim, Kaur and Md-Nor (2005) examine the market perceptions on tangible assets and intangible assets during the 1997 AFC for a sample of Malaysian firms. They claim that the information content was higher for tangible assets compared to the

<sup>&</sup>lt;sup>35</sup> IFRS 36/ AASB 136 mandate a substantial decline in firms' market value as a trigger event for goodwill impairment testing.

intangible assets during the AFC. They interpret their findings to imply that in predicting expected CFO during a financial crisis, tangible assets are more reliable than intangible assets.

Different models have been used to examine the value relevance intangible assets and goodwill. Some studies have used balance sheet models (for example, Godfrey and Koh, 2001). On the contrary, some studies have used modified Ohlson (1995) model (Bugeja and Gallery, 2006; Al-Jifri and Citrion, 2009; Oliveira, Rodrigues and Craig; 2010). The superiority of modified Ohlson (1995) model lies in its incorporating earnings. The methodological issues in this regard are discussed in the research design chapter (chapter five, section 5.6).

#### 3.7 Gaps in the literature

The review in this chapter suggests that although there have been many studies examining the value relevance of accounting information, relatively little evidence exists on the information role of key accounting measures such as book value, earnings and CFO in the context of economy-wide exogenous shocks. Moreover, no evidence exists on the relative importance of earnings versus CFO in the context of the economic disturbances caused by the financial crisis. Evidence is also lacking on how the market perception changes on intangible assets and goodwill during a financial crisis. Evidence in this regard is necessary because the noise level increases in the information flowing from uncontrolled and non-monitored sources such as analyst forecasts (Sidhu and Tan, 2011) and many firms faces bankruptcy risks during a financial crisis (as discussed in chapter two). From the review in this chapter, three issues can be identified worth examination. These three issues are summarised below relating them to the research questions examined in this thesis.

1. The GFC has been characterised as the most severe and prolonged financial crisis since the 1929 Great Depression. While most of the currency crisis and financial crisis during the last three decades were confined to particular regions, the GFC has impacted major economies worldwide. It has unfolded over a longer time period. However, there has been no study on the information value of key accounting measures such as book value, earnings and CFO in the context of the GFC. No evidence exists on how the GFC has changed the market perception on fundamental accounting measures such as book value, earnings and CFO. Addressing this question will enhance our understanding of the information value of accounting measurements in stock valuation during a GFC.

- 2. Prior studies in the context of the AFC find that the value relevance of earnings decreased during the AFC. However, the issue of whether investors' reliance on CFO increases corresponding to the decrease in the value relevance of earnings has not been examined. The GFC represents a fundamental change in the business environment. It also introduces volatility in firms' operating environment. Moreover, the GFC represents an opportunity to managers for earnings manipulations. Given that prior studies have shown that the relative and incremental value relevance of earnings and CFO are contingent on firm specific contextual factors, how the relative and incremental value relevance of earnings and CFO change between the GFC and the NCP is an important empirical issue.
- 3. There is also a lack of research on the changes in the value relevance of intangible assets and goodwill in the context of economy-wide exogenous shocks like the one of the GFC. Although prior studies have shown that intangible assets and goodwill are value relevant, whether intangible assets and goodwill retain their value relevance during the economy-wide exogenous shock like the one of the GFC is an important empirical issue. Although the value relevance of tangible assets is likely to increase as a proxy for liquidation option, due to the firm specificity and intangibility, intangible assets and goodwill may lose their value relevance in firm valuation during the GFC. However, this proposition has not been previously examined.

The above deficiencies in the VRR have led to the conduct of the present study. This thesis investigates these issues in the Australian market in the context of the GFC.

#### 3.8 Conclusions

This chapter revisits notable studies on the value relevance of accounting information such as book value, earnings, CFO, tangible assets, intangible assets and goodwill. From the literature review, it is evident that most of the studies on value relevance have used the Ohlson (1995) valuation model to link accounting information with firms' market value. Findings of the previous studies support that accounting information such as book value and earnings are value relevant, although, the value relevance is declining over years. The literature review also reveals that no study has been conducted on the value relevance of accounting information during the 2008-2009 GFC. Currently evidence exists on Asian countries in the context of the AFC. The results of these studies are inconclusive. Based on these research gaps identified throughout this chapter, the next chapter (chapter four) discusses theoretical backgrounds and develops testable hypotheses for this thesis.

#### **CHAPTER FOUR**

#### THEORY AND HYPOTHESES

#### 4.1 Introduction

Value relevance literature pertinent to the present study has been reviewed in chapter three. A number of related research issues and levels of analyses were identified from the literature review for examination in this thesis. This chapter discusses the philosophical, ontological and epistemological backgrounds of the study. Philosophical, ontological and epistemological backgrounds determine the course of action undertaken for the research. The philosophical background also informs readers about the worldview of the researcher. Following the theoretical grounding, hypotheses are developed consistent with the research questions.

Figure 4.1 depicts the framework used for the hypothesis development and for empirical testing of the hypotheses. The empirical part of this thesis comprises of three phases discussed in three chapters. The first phase examines the relative and incremental value relevance of book value and earnings and the impact of the GFC on the value relevance of book value and earnings (chapter six). The second phase examines the relative superiority of earnings versus CFO in explaining share prices during the GFC and the NCP and the impact of the GFC on the value relevance of earnings and CFO (chapter seven). The third phase examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill (chapter eight).



Figure 4.1: Framework used for hypotheses development

#### 4.2 Philosophical foundation of the study

This study is grounded on the positivist epistemology. Positivist studies are premised on the existence of a priori relationship within the broader social phenomenon. The researcher investigates this phenomenon with structured instruments. A unidirectional relationship is identified and tested using a hypothetic-deductive logical analysis. Ontologically speaking positivism assumes an objective social world (Dyson and Brown, 2006; Guba and Lincoln, 1994). Understanding the phenomenon is thus a problem of modelling, measurement and construction of appropriate sets of constructs and instruments to capture the essence of the phenomenon. It is assumed that there is a correspondence between researcher's constructs and observed social objects. This thesis fits into the domain of positive economics advocated by Friedman (1953). He suggests that "the only relevant test of validity of a hypothesis is comparison of its predictions with experience" (Friedman, 1953; pp. 9-10). Moreover, this thesis accepts Karl Popper's view of falsification that a theory usually cannot be proved, it can only be disproved (Popper, 1959). After making rigorous efforts to falsify a theory, if a researcher fails to falsify the theory that is clearly evidence in favour of the theory. However, the failure to falsify a proposed theory may not always lead to the appropriate conclusion. When it happens, although the chance is minimal, it is a coincidence. This caveat applies to the conclusions drawn in this thesis.

The research in this thesis is conducted within an investor-oriented framework (Beisland, 2008) focusing on the implications of accounting information for stock valuation. Other uses of accounting information such as debt valuation and contracting are beyond the scope of this thesis. Accordingly, the conclusions drawn from this thesis may not apply to other valuation purposes.

In accounting literature, positivist epistemology and objective ontology form the philosophical basis of the Positive Accounting Theory (PAT) (Watts and Zimmerman, 1986). Under the PAT, researchers assume and examine a prevailing phenomenon. 'What should be' is not the concern of the researcher rather the concern is 'what is'.<sup>36</sup> This theory does not challenge the status quo, rather it models the status quo using a set of instruments and constructs. The PAT has been used as one of the dominant accounting research theories throughout the last three decades. The PAT is descriptive in focus rather than prescriptive. The principal reason for the PAT to be popularised is that Watts and Zimmerman (1986) view the accounting theory as a science (Kabir, 2010). The PAT seeks to explain economics-based accounting literature and incorporates both accounting choice studies and capital market based accounting researches.<sup>37</sup> Watts and Zimmerman (1990, p. 148) articulate

"we adopt the label 'positive' from economics where it was used to distinguish research aimed at explanation and prediction from research whose objective was prediction."

This thesis is positioned on the capital market based accounting research under the PAT.

Initially the PAT-based researches used to examine some assumptions underlying the normative accounting theory. For example, Ball and Brown (1968), Beaver (1968) and Grant

<sup>&</sup>lt;sup>36</sup>Before the introduction of the PAT by Watts and Zimmerman (1986), normative accounting theory had been the dominant theory behind accounting research. Accounting principles occupied the essence of normative accounting theory, the primary concerns for researchers being the recognition and measurement issues in accounting. A major concern of the influential accounting scholars (McNeal, 1939; Patton and Littleton, 1940; Littleton, 1953; Chambers, 1966; and Ijiri 1975) advocating normative accounting theory was which cost basis (historical cost or market value) to use. The dominant question in normative accounting theory is "should" type, whereas, the PAT is more concerned with "what is" type question. For example, one of the most asking questions in the PAT-based accounting research is 'whether a particular accounting information is useful to the stock market investors in determining firms' market value'. Another dominant research question under the PAT-based research is 'which basis of the accounting measurement (historical cost basis or current cost basis) should be used and why'. Watts and Zimmerman (1986) legitimise the PAT, branding it analogous to sciences. However, the PAT has not been free of criticisms. Most notable criticisms of the PAT are Whittington (1987), Sterling (1990), Chambers (1993), Deegan (1997), Neu (1997), and Milne (2002).

<sup>&</sup>lt;sup>37</sup>Watts and Zimmerman (1986) recognise the contribution of Ball and Brown (1968) in popularising the positive research in accounting. Kabir (2010) provides a succinct critique of the PAT and identifies some methodological issues in the PAT.

(1980) examine the relationship between firms' earnings and share prices/returns. These studies did not focus on the cause and effect relationship; rather they focused on the association between the reported accounting earnings and stock returns. Subsequent value relevance studies have also focused on the association between accounting measures and firms' share prices or stock returns. Those studies have found that earnings is significantly associated with share prices or returns and thus earnings reflects firms' underlying performances. In order to legitimise the PAT, Watts and Zimmerman (1986) undermine the claim of normative school of thought that earnings is meaningless because it incorporates multiple valuation bases and human judgements (Kabir, 2010).

The PAT-based capital market research (CMR) relies on the efficient market hypothesis (EMH). Relying on the EMH, a relationship between accounting information and firm's market value/return is assumed to be pre-existent. Under the EMH, firms' market value is considered as perfectly reflecting investors' consensus belief about firms' fundamental value. The relevance of a particular accounting measure (such as, book value, earnings, CFO, tangible assets, intangible assets and goodwill) is then assessed by examining the association of that accounting measure with firms' market value. The choice of a particular accounting measure in the study depends on the specific research question being investigated. Researcher's choice of the model specification and interpretation of the findings also depend on the specific research question. Applying the abovementioned predictive approach, this study examines the value relevance of accounting information (specifically, book value, earnings, CFO, tangible assets, intangible assets and goodwill) in determining firms' market value during the GFC. The focus is on the change in the value relevance of book value, earnings, CFO, tangible assets, intangible assets and goodwill between the GFC and the NCP.

#### 4.3 Existing perspectives of value relevance research

The important underlying assumption of the CMR is the EMH (Lev and Ohlson, 1982). Fama (1965) states that if the market is efficient, information relevant to a firm would be rapidly reflected in share prices. As the financial statement information is publicly available, accounting researchers consider the existence of semi-strong form of efficient market, which postulates that all publicly available information is instantly impounded in share prices or returns. If financial statement information is not reflected in share prices, assuming a semi-

strong form of market efficiency, the usefulness of financial reporting for investment purposes is questioned.

The VRR postulates that in making investment decisions, investors need firm-specific information. Investors derive firm-specific information from various sources. Three of the important sources of information are financial statements, analysts' forecasts and media reports (Frankel and Xu, 2004). Among these three sources of information, information contained in financial statements is the most regulated, controlled and monitored. Accounting regulatory authorities also recognise the information role of financial statements. A primary objective of financial reporting is to assist investors in valuing equity (Statement of Financial Accounting Concepts- SFAC 1, Para. 34, 1978). This stock valuation perspective of accounting information is further maintained in the recent implementation of IFRS. If financial statement information is not associated with firms' market value or returns, accounting information is unable to fulfil this primary objective. This should not be the case because it is claimed that the financial statement represents a true and fair picture of reality. This thesis builds upon this existing perspective of the CMR. It examines the impact of the GFC on the value relevance of fundamental accounting measurement such as book value, earnings, CFO, tangible assets, intangible assets and goodwill.

### 4.4 Ohlson (1995) valuation model: linkage of book value and earnings with firms' market value

Finance literature suggests that a firm's market value is a function of future expected dividends or future expected earnings (Gordon, 1959). The challenges in the dividend based valuation models are that they require estimation of the growth rates and expected future dividends or earnings. Under certain assumptions, <sup>38</sup> Ohlson's (1995) residual income valuation model (RIVM) provides a framework in which a firm's share price is expressed as a function of its book value and earnings. Bernard (1995, p.733) argues that

<sup>&</sup>lt;sup>38</sup>These assumptions are (i) residual income valuation - which rests on a single assumption- security prices represent the present value of all future dividends. (ii) the accounting system satisfies a clean surplus relation:  $b_i = b_{t-1}+x_t-d_t$ .  $b_t$  represents book value at date t and  $x_t$  represents the earnings for the period ending at date t. (iii) The book value grows at a rate that is less than the required rate of return, (iv) residual earnings follows an auto regressive process with time series behaviour. The implications of these assumptions are straight forward-stock price is a liner function of book value and expected abnormal earnings.

"the Ohlson (1995) and Feltham and Ohlson (1995) stand among the most important developments in the capital markets research in the last several decades. They provide a foundation for redefining the appropriate objective of [valuation] research."

Lundholm (1995) argues that "Feltham and Ohlson (1995) present us with a very crisp yet descriptive representation of the accounting and valuation process."<sup>39</sup> The Ohlson (1995) model has also spawned policy relevant researches. For example, the Accounting Advisory Committee (1997) of Coopers and Lybrand suggests that Ohlson (1995) model is the best available method in conducting researches to evaluate the financial reporting standards promulgated by standard setting bodies (Hand and Landsman, 1998).

Based on the theoretical underpinning of this model, firms' market value should be related to book value and earnings given the clean surplus relation. Ohlson (1995) model modifies dividend-discounting model to avoid the estimation of future expected dividend as an input in the valuation. The strength of the Ohlson (1995) model is that under certain assumptions, it expresses firms' share price as a function of past-realised accounting measures such as book value and earnings. The original Ohlson (1995) model expresses firms' market value as a function of firms' concurrent book value and discounted present value of firms' future expected abnormal or residual earnings. Here, book value represents the present value of all future normal earnings.

$$P_{t} = bv_{it} + \sum_{i=1}^{\infty} R_{f}^{-i} E_{t}[x_{t+i}^{a}]$$

Where,  $P_t$  denotes share price at time t,  $bv_t$  denotes the book value per share at time t,  $E_t$  represents the expectation operators,  $x_{t+i}^{\alpha}$  represents the abnormal earnings per share for period t+i and  $R_f$  is 1+ risk free rate of returns.

This model requires the specification of firm specific appropriate discount rates and estimates of abnormal future earnings. In order to remove this problem, Ohlson (1999) amends the basic RIVM in terms of a weighted average of book value and current earnings (Ahmed and Falk, 2006). In addition to book value and earnings, Ohlson (1995) model recognises the role of other information variables, which follow an autoregressive process. Usually most of the value relevance studies draw on Ohlson (1995) model and adjust to circumstances based on

<sup>&</sup>lt;sup>39</sup> A detailed discussion on the contribution of Ohlson (1995) in the valuation theory and researches, its limitation and its empirical application can be found in Lo and Lys (2000).

research objectives. Following prior literature, this thesis uses Ohlson (1995) model as the modelling framework.<sup>40</sup> The model has been modified in keeping with the research questions (discussed later in the research design chapter).

### 4.5 Value relevance of book value and earnings and the impact of the GFC on the value relevance of book value and earnings

One of the primary objectives of financial reporting is to provide information to investors to help in investment decision. Investors use the two key accounting measures (book value and earnings) for their investment decision and to determine share prices. Accordingly, prior literature shows that both book value and earnings are value relevant (Barth, Beaver and Landsman, 1998; Collins, Pincus and Xie, 1999; Goodwin and Ahmed, 2006; Brimble and Hodgson, 2007).

The association of book value with firms' market value has been explained from two perspectives. The first perspective explains book value to be a relevant input in stock valuation because it acts as the proxy for firms' expected future normal earnings. According to Ohlson (1995), book value is a proxy for expected future normal earnings. This explanation holds when the firm is evaluated as a going concern.

The second interpretation links book value to firms' liquidation option. When the going concern assumption of a firm is in jeopardy, book value serves as a proxy for liquidation options (Collins, Maydew and Weiss, 1997; Barth Beaver and Landsman, 1998; Subramanyam and Venkatachalam, 1998; Collins, Pincus and Xie, 1999). Moreover, Yee (2000) and Lim (2005) suggest that book value has association with firms' market value as the abandonment option.

Earnings can also explain the cross-sectional variation of share prices. Earnings is a key input in stock valuation model. According to Ohlson (1995) current reported earnings is a proxy for expected future abnormal earnings. Moreover, current earnings can be used to predict future earnings and CFO which are important inputs in stock valuation (Farshadfar, Chew and Brimble, 2008).

<sup>&</sup>lt;sup>40</sup>Significant departures from Ohlson (1995) model occur when only book value or only earnings is used as the independent variable for the purpose of examining the relative value relevance of book value and earnings separately. However, all these departures from Ohlson (1995) model are based on the existing literature and are not at odds with current literature.

Be it as a proxy for future normal earnings, or as a proxy for liquidation options, prior studies suggest that both book value and earnings have incremental explanatory power of variations in share prices (Collins, Maydew and Weiss, 1997; Barth Beaver and Landsman, 1998; Subramanyam and Venkatachalam, 1998; Collins, Pincus and Xie, 1999). Prior Australian studies also suggest that book value and earnings are value relevant (Goodwin and Ahmed, 2006; Brimble and Hodgson, 2007). All these evidences relate to normal economic conditions. As discussed in chapter two, if accounting is to retain its proclaimed information role, the two key accounting measures such as book value and earnings should be useful to investors in taking investment decision during periods of macroeconomic uncertainty. Hence, the first hypothesis of the study is:

#### Hypothesis 1(a)

Book value and earnings are value relevant.

It is quite logical that book-value and earnings of a business should be relevant for the valuation of the business. However, literature suggests that the value relevance of book value and earnings is declining over years (Collins, Maydew and Weiss, 1997; Barth, Beaver and Landsman, 1998). Prior literature also suggests that under certain conditions or firm specific situations, the value relevance of book value increases and that of earnings decreases. Firms' distressed financial health, temporary earnings, noise in earnings, negative earnings, economic conditions and non-financial information have been linked to the shift of value relevance from earnings to book value (Hayn, 1995; Burgstahler and Dichev, 1997; Collins, Maydew and Weiss, 1997; Barth, Beaver and Landsman, 1998).

During a financial crisis (e.g., the 2008-2009 GFC), almost all firms experience a systematic decline in earnings and a large number of firms experience losses. Earnings numbers become transitory and noisy. Investors may revise their future earnings expectations as the future becomes quite hazy and blurred. Moreover, during a GFC, the likelihood of a firm receiving a questionable going concern status increases compared to the NCP (Xu, Carson Fargher and Jiang, 2011).

If the value relevance of book value and earnings is dependent on economic conditions and firm specific situations and if firms' distressed financial health, temporary earnings, noisy earnings and negative earnings are the specific conditions when firms' book value assumes greater importance than earnings in determining share prices, then there may be a systemic shift in the value relevance from earnings to book value during a GFC.

During a GFC future becomes uncertain, and so become future normal earnings and abnormal earnings. Excessive caution by investors may turn their attitudes and actions to coincide with that of creditors and bondholders. Instead of future expectations, present realisable resources may become important in firm valuations. Hence, during a GFC, investors may focus on what is in the balance sheet instead of focusing on the earnings for various reasons. Firstly, book value, a proxy for presently available resources for shareholders, provides an anchor for investors to determine firms' market value (Ohlson, 1995, Barth, Beaver and Landsman 1998). Fluctuations in share prices take place surrounding book value, because investors consider book value as an anchor (Ohlson, 1995). Secondly, instead of seeing through the gloomy crisis period to forecast future earnings, investors may be influenced by the availability heuristic (Tversky and Kahneman, 1974) and pay more attention to existing assets. Moreover, for a distressed firm, book value is considered as a proxy for its liquidation options (Burgstahler and Dichev, 1997).

Hayn (1995) provides empirical evidence that the value relevance of book value increases and that of earnings decreases when firms report negative earnings. Burgstahler and Dichev (1997) show a complementary relationship between book value and earnings in determining firms' market value. Barth, Beaver and Landsman (1998) show that book value becomes more value relevant than earnings when a firm's financial health deteriorates. Yee (2000) is a theoretical explanation of the complementary role of book value and earnings in determining share prices. Moreover, the value relevance of book value increases and that of earnings decreases in the presence of extreme positive or negative earnings (Penman, 1998) and during a financial crisis (Davis-Friday, Eng and Liu, 2001).

In addition to the deterioration in the financial health of individual firms, firm level earnings management may increase during a GFC. Chia, Lapsley and Lee (2007) find that firms engaged in greater levels of earnings management during the 1997 Asian Financial Crisis (AFC). Feltham and Pae (2000) claim that the value relevance of earnings decreases when firms manage earnings. Marquardt and Wiedman (2004) and Whelan (2004) also find that the value relevance of book value increases and that of earnings decreases in the presence of earnings management.

Ou and Sepe (2002) show that the value relevance of earnings increases when the difference between analysts' earnings forecasts and current period's reported earnings decreases. The value relevance of book value increases as the difference between actual reported earnings and the earnings forecasts made by the analyst increases. Sidhu and Tan (2011) examine the analysts' forecast performances during the GFC and the NCP in the US and Australian market. They find that the size of the forecast errors was large during the GFC relative to the NCP. If the findings of Ou and Sepe (2002) and the findings of Sidhu and Tan (2011) are interpreted together, it can be expected that investors' reliance on earnings may decrease during a GFC.

Table 4.1 presents a summary of different contextual factors under which the value relevance of book value increases and that of earnings decreases:

Studies	Specific situations when the value relevance of book
	value increases and that of earnings decreases
Whelan (2004)	Earnings management
Marquardt and Wiedman (2004)	Earnings management; when the earnings management
	is associated with information asymmetry
Ou and Sepe (2002)	Increase in the difference between the reported earnings
	of current period and the earnings forecasts made by
	analysts
Davis-Friday, Eng and Liu (2001)	Financial crisis (for Indonesia and Thailand)
Collins, Pincus and Xie (1999)	Losses, increased risks of firms' liquidation
Barth, Beaver and Landsman (1998)	Deterioration in firms' financial health/when firms
	approach bankruptcy
Penman (1998)	Extreme return on equity (ROE) (positive or negative)
Burgstahler and Dichev (1997)	Low ROE
Hayn (1995)	Losses

Table 4-1: Studies documenting greater value relevance of book value relative to earnings

Hence, empirical evidences lead to the conclusion that the value relevance of book value and earnings is conditional on economic and firm specific situations. The increase in investors' uncertainty, the increase in firms' going concern risks, the deterioration of firm performances, the probability of increasing level of earnings management and the increase in the spread between reported actual earrings and analysts' earnings forecasts during a GFC may imply that the information content of fundamental accounting information such as book value and earnings will be different during a GFC from the NCP. Thus, in keeping with the research

questions, the next two hypotheses of this study relate to the impact of the GFC on the value relevance of book value and earnings in the Australian market and can be stated as (in the alternative form):

#### Hypothesis 1(b)

*The value relevance of book value increases during a global financial crisis (GFC) compared to the non-crisis period (NCP).* 

#### Hypothesis 1(c)

The value relevance of earnings decreases during a global financial crisis (GFC) compared to the non-crisis period (NCP).

## 4.6 Value relevance of cash flow from operations (CFO) incremental to book value and earnings

The debate on the importance of CFO in firm valuation can be traced back to Lee (1974) who argued that the accruals based earnings is ineffective in firm valuation. Earnings is considered to be ill-defined and many sided. It suffers from flexible accounting techniques and earnings manipulation. On the contrary, CFO is not subject to managerial manipulations, and CFO portrays the ability of the organisation to survive. Bowen, Burgstahler and Daley (1987) find CFO to be more strongly associated with stock returns than earnings. They suggest that cash flow should be added as an explanatory variable in addition to earnings. They also argue that both earnings and CFO may be incrementally and/or individually important in explaining security returns. Barth, Beaver, Hands and Landsman (1999) also find that both accruals based earnings and CFO have incremental value relevance over book value. Similar evidence is found by Habib (2008) in the New Zealand context. Moreover, Kumar and Krishnan (2008) suggest that CFO is related to a firm's future investment potential. Regulatory bodies in the USA, UK, Australia, Canada and the IASB also support the notion that CFO contains value relevant information in assessing share prices (Charitou, Clubb and Andreou, 2000).

Contrasting results have also been reported. Rayburn (1986) finds no difference in value relevance of earnings and CFO. Charitou, Clubb and Andreou (2001) fail to find any incremental value relevance of CFO in UK if different contextual factors are not taken into consideration. Martinez (2003) also fails to find any additional information content of CFO beyond that contained in earnings in the context of France. Similarly, Saeedi and Ebrahimi (2010) do not find statistically significant incremental information content for earnings or

CFO in the Iranian context. Capturing the essence of the above discussions, the related hypothesis is stated as:

#### Hypothesis 2(a)

*Cash flow from operations (CFO) has value relevance incremental to book value and earnings.* 

### 4.7 Relative superiority of earnings versus CFO and the impact of the GFC on the value relevance of earnings and CFO

In accounting literature, there is a debate on whether earnings or the CFO contains greater value relevant information. The Financial Accounting Standards Board (FASB) asserts that financial reporting should primarily focus on earnings rather than CFO because "earnings based on accruals accounting generally provides a better indication of an enterprise's present and continuing ability to generate favourable CFO than the information limited to the financial aspects of cash receipts and payments" (FASB, 1978, ix). Lev (1989) suggests that accruals based earnings is the premier information item provided in the financial statements. Moreover, earnings is superior to CFO as a measure of firms' performance because of its matching and timing attributes (Dechow, 1994).

However, one school of thought argues that CFO rather than earnings is the primary source of information used in determining share prices. For example, Lee (1974) contends that cash flow measurement is the most useful information to investors because it enables the company to survive, it is not biased by measurement discretions and errors; and it can be used to predict firms' future dividends and to evaluate loan repayment capacity.

Recent evidence on the issue has sparked the debate (Subramanyam and Venkatachalam, 2007; Kumar and Krishnan, 2008; Barton, Hansen and Pownall, 2010; Akbar, Shah and Stark, 2011). Cotter (1996) finds that accruals based earnings has higher association with stock returns than that of cash flows. Bartov, Goldberg and Kim (2001) claim that when a performance measure captures information about a firm's performance more directly and more timely, it becomes more value relevant. They also argue that financial reporting regime and other institutional factors also play a role in determining the relative value relevance of earnings and CFO. Yoon and Miller (2003) document the superiority of earnings over CFO in Korean context, whereas, Kwon (2009) finds that CFO has greater value relevance than

earnings in Korea. On the contrary, Subramanyam and Venkatachalam (2007) claim that accruals based earnings dominates over CFO in association with firms' intrinsic value.<sup>41</sup> Barton, Hansen and Pownall (2010) also find that no single performance measure dominates in its association with firms' market value across the world. Habib (2010) compares the information content of seven alternative performance measures in the Australian context and finds that earnings has the most superior information content.

Accruals based earnings contains timely information to reflect the underlying changes in firms' performances due to the matching attribute of accruals earnings. On the contrary, due to the inherent limitations of CFO in terms of matching revenues with expenses and losses, CFO lacks timely information to reflect firms' underlying performances. Dechow (1994) suggests that the explanatory power of CFO may be limited because of the timing and the mismatching problems. Moreover, Graham, Harvey and Rajgopal (2005) suggest that the Generally Accepted Accounting Principles (GAAP) based earnings number, primarily earnings per share, is the key metric upon which the market focuses. They argue that to reduce the cost of information processing due to information overload, investors focus on a simple benchmark upon which they can rely on to evaluate firms' performances. Capturing the essence of prior empirical evidences and the conjecture of the regulatory bodies, it can be expected that earnings is superior to CFO in explaining the variations in share prices during the NCP. Accordingly the related hypothesis is:

#### Hypothesis 2(b)

The value relevance of earnings is higher than that of cash flow from operations (CFO) during the non-crisis period (NCP).

As discussed under the literature review, prior studies suggest that the value relevance of earnings and CFO is conditional on different firm specific factors and economic conditions. Different contextual factors examined in the earlier literature include transitory earnings components (Charitou, Clubb and Andrew, 2000), firms' lifecycle stage (Black, 2003), magnitude of accruals (Charitou, 1997), measurement interval (Charitou and Clubb, 1999), economic disturbance by merger (Christian and Jones, 2004), firm size (Hodgson and Stevenson-Clarke, 2000), earnings growth (Charitou, Clubb and Andrew, 2001), country level institutional and legal backgrounds (Bartov, Goldberg and Kim, 2001; Charitou,

<sup>&</sup>lt;sup>41</sup>The concept of intrinsic value has been elaborated under foot note 30 in the literature review chapter (chapter three).

Charitou, Lois and Vlittis, 2010), leverage (Hodgson and Stevenson-Clarke, 2000a), and firms' financial health (DeFond and Hung, 2003). The economic disturbance caused by the GFC may also be one such contextual factor rendering earnings less informative and less value relevant than CFO.

Bernard and Stober (1989) argue that the value relevance of CFO and earnings differs based on different circumstances such as economic conditions and quality of measurements. CFO provides information about firms' solvency and liquidity, and it is a traditional accounting measure used to evaluate firms' credit and bankruptcy risks (Previts, Bricker, Robinson and Young, 1994). For this reason, the value relevance of CFO may increase when a firm's financial health deteriorates. Moreover, as the financial health of a firm becomes poor, financial analysts place more weight on CFO than earnings (DeFond and Hung, 2003). Kumar and Krishnan (2008) claim that the relative value relevance of earnings and CFO differs based on firms' investment opportunity sets. All these evidences imply that the value relevance of CFO and earnings could differ based on firm specific and economic circumstances.

Moreover, the findings of Christian and Jones (2004) that the importance of CFO increases for stock valuation purposes when the difficulties in estimating earnings are more severe may imply that investors will attach higher importance to CFO than to earnings for stock valuation purposes due to the difficulties in measuring earnings during the GFC. The difficulties in measuring earnings may arise due to future economic uncertainty, declines in assets' values and associated impairment write-offs. Moreover, the conclusion of Hodgson and Stevenson-Clarke (2000a) that investors perceive earnings as less informative when the probability of failure increases and the likelihood of earnings manipulation increases to avoid covenant violations may also imply that CFO will assume higher importance than earnings for stock valuation during the GFC, because the GFC has caused an increase in the going concern qualifications and risk of business failures (Xu, Carson, Fargher and Jiang, 2011).

The economy-wide downturn during a GFC may imply that the reported earnings contains temporary elements in the form of assets write-downs and impairments and the reported earnings becomes a noisy performance measure. The transitory elements in reported earnings may increase during a GFC due to large number of discretionary impairment charges and write-offs. Prior studies suggest that during the economy-wide financial crisis, firms engage

in aggressive earnings management because it is difficult to meet the target (Chia, Lapsley and Lee, 2007; Zalk, 2009; Masruki and Azizan, 2010). Prior studies also suggest that the value relevance of earnings decreases when the firm engages in earnings management (Whelan, 2004). Moreover, the decrease in the value relevance is more pronounced for the discretionary portion of earnings (Marquardt and Wiedman, 2004) implying that the value relevance of the cash component of earnings is not affected by the earnings management.

During a GFC earnings becomes a noisy measure of firm performance for several reasons. Firstly, significant economic uncertainty may render the reported earnings number unreliable as a proxy for future abnormal earnings. Secondly, during a GFC a large number of transitory items may transform the earnings to a noisy measure of firms' performance. Thirdly, because most of the firms experience a systematic downturn, managers may be motivated to manage earnings and to take income decreasing earnings management through 'big-bath'. For example, Spear and Taylor (2011) show that under-performing firms tend to take larger write-downs during a GFC than other firms. They conclude that the evidence may indicate the opportunistic "big bath" earnings management by those firms. Fourthly, the number of firms reporting negative earnings may lose its information content during the GFC. On the contrary, as discussed earlier, CFO is not subject to managerial manipulations, it is not contaminated by discretionary accounting adjustments and write-offs and it helps in evaluating the survival capacity of the organisation.

The fact that firms engage in earnings management during a financial crisis, the fact that the value relevance of earnings declines when firms engage in earnings management, the fact that the relative and incremental value relevance of earnings and CFO are conditional on firm specific and economic circumstances and the fact that the value relevance of CFO increases and that of earnings decreases when earnings is transitory may suggest that the relative and incremental value relevance of earnings and CFO will be different during a GFC from that observed during the NCP. Specifically, it can be expected that the association and explanatory power of CFO with share prices will increase and the association and explanatory power of earnings with share prices and the conjecture made above, it can be expected that CFO is superior to earnings in explaining the variations in share prices during a GFC. Thus, the related hypotheses are:

#### Hypothesis 2(c)

The value relevance of cash flow from operations (CFO) is higher than that of earnings during a global financial crisis (GFC).

#### Hypothesis 2(d)

The value relevance of earnings decreases and the value relevance of cash flow from operations (CFO) increases during a global financial crisis (GFC) compared to the non-crisis period (NCP).

# **4.8** Value relevance of intangible assets and goodwill and the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill

Book value of equity is represented by reported tangible assets, intangible assets and goodwill. Under the financial distress, if equity book value is relevant for stock valuation purposes as a proxy for liquidation option, the importance of some non-exchangeable intangible assets and goodwill will be minimal and they may not be value relevant. Moreover, due to measurement difficulties and lack of exchangeability, there is a debate on whether some intangible assets and goodwill are assets or not. McNeal (1939) and Chambers (1966) do not consider non-exchangeable intangible assets and goodwill are assets or not. McNeal (assets because of their lack of exchangeability. This debate as to whether some intangible assets and goodwill are assets or not, has once again, come to surface due to large amounts of impairment write-offs of intangible assets and goodwill during the 2008-2009 GFC (Gore and Zimmerman, 2010).

On the contrary, if equity book value is considered as a proxy for firms' future normal earnings, reported intangible assets and goodwill should be value relevant because of their earnings generating capacity. Accordingly, prior studies suggest that intangible assets and goodwill are value relevant (Jennings, Robinson, Thompson and Duvall, 1996; Barth and Clinch, 1996; Godfrey and Koh, 2001; Bugeja and Gallery, 2006; Dahmash, Durand and Watson, 2009). These evidences relate to the amortisation regime when intangible assets and goodwill were systematically amortised over a period of 20 years. Accounting for goodwill and other intangible assets has now been changed by the introduction of IFRS 36 / AASB 136 *Impairment of Assets*. Intangible assets and goodwill are reported in the balance sheet after the impairment review, they are assumed to be reported in fair values that are supported by their underlying future cash generating abilities. Hence, it may be expected that intangible

assets and goodwill reported under fair value based impairment regime will help mangers to report intangible assets and goodwill that are aligned to the underlying economic fundamental of the firm. Drawing on the above discussions and earlier evidences, the related hypothesis is:

#### Hypothesis 3 (a)

Reported intangible assets and goodwill are value relevant.

Prior empirical evidences show that goodwill is value relevant in the year of acquisition but the value relevance fades away thereafter (Jennings, Robinson, Thompson and Duvall, 1996; Li and Meeks, 2006; Bugeja and Gallery, 2006). On the contrary, Godfrey and Koh (2001) and Dahmash, Durand and Watson (2009) provide evidence from the Australian market that investors attach greater importance to goodwill than to other balance sheet assets. However, Finch (2006) suggests that firms are taking a very conservative (creative) approach to goodwill impairments, with goodwill impairment charges of just 0.02 per cent of the reported goodwill. This conservative approach to impairment might have inflated book value and earnings during the NCP, which might have in turn, inflated firms' market value. The boom period market over-valuation may evaporate during a GFC. Market perception on intangible assets and goodwill may change and the value relevance of those assets may decline substantially during a GFC compared to the NCP.

Equity book value is value relevant as a proxy for firms' liquidation value. Nevertheless, the impact of a GFC on value relevance of tangible assets is likely to be different from that on the value relevance of intangible assets and goodwill. Although the value relevance of tangible assets is expected to increase during a GFC, that of intangible assets and goodwill is likely to decrease during a GFC compared to the NCP. The realisable value of intangible assets and goodwill in case of firms' liquidation is likely to be very low due to the lack of exchangeability and the firm-specificity of intangible assets and goodwill. <sup>42</sup> Because goodwill measurement requires the use of subjective judgements and discretions, goodwill is considered as a soft measure. On the contrary, tangible assets may be considered as hard measures. During a financial crisis, investors may rely on 'hard measures' (Ijiri, 1975) as opposed to 'soft measures' to determine firms' market value.

<sup>&</sup>lt;sup>42</sup>Chambers (1966) and MacNeal (1939) do not consider goodwill and some intangible as assets on this ground.

Jones and Dean argue in the editorial of Abacus (2009) that intangibles are generally regarded as "soft" assets, and credit analysts and lenders tend to ignore intangibles in their analysis. If credit analysts and lenders ignore intangible assets during normal economic periods, does the investors' valuation of intangible assets and goodwill sustain during a GFC? Market valuation of intangible assets and goodwill may fall dramatically during a GFC and so their relevance in stock valuation may also decline during a GFC compared to the NCP.

Recent studies provide empirical evidences that investors have priced different classes of assets differently during the 2008-2009 GFC based on the levels of fair value measurement (Kolev, 2008; Goh, Ng and Ow Young, 2009; Magnan, 2009; Song, Thomas and Yi, 2010).<sup>43</sup> Although the perspective of their studies was fair value measurement of financial assets in banking companies, it may also apply to reported intangible assets and goodwill. Moreover, the residual approach taken to calculate the value of goodwill (Bloom, 2009) implies that the decline in firms' market value during a GFC directly reduces the value of goodwill with implications for the value relevance of goodwill.

Decline in firms' market value during the period of economic contraction is usually attributed to the decline in the value of intangible assets and goodwill (Penman, 2009). Accordingly Shukor, Ibrahim, Kaur and Md-Nor (2005) claim that the information content was higher for tangible assets than that of intangible assets during the 1997 AFC. They argue that tangible assets are more reliable than intangible assets to predict expected future CFO during a financial crisis. Intangibles assets and goodwill are associated with higher uncertainty and less liquidity than tangible assets (Barth, Beaver and Landsman, 2001; Eckstein, 2004; Shukor, Ibrahim, Kaur and Md-Nor., 2005) and they are expected to be more uncertain during the GFC. The issue of uncertainty about expected future CFO, as well as, the issue of illiquidity associated with intangible assets might result in different value relevance for these assets from tangible assets during a GFC, whereas, the value relevance of tangible assets is expected to increase during a GFC, whereas, the value relevance of

<sup>&</sup>lt;sup>43</sup>The fair values of assets and liabilities are categorised into three levels of measurement based on the levels of judgement and subjectivity required to measure the value of assets and liabilities. Assets and liabilities subject to Level 1 measurement are reported in the balance sheet at their market value typically derived from the quoted price of identical assets or liabilities in an active market. Assets and liabilities subject to level 2 measurement are not traded in an active market. However, the inputs required for their valuation are either directly or indirectly observable in an active market. Assets and liabilities subject to level 3 measurement are measured by the reporting entity on the basis of numerous judgements and assumptions regarding economic conditions and firm performances. A detailed discussion can be found in Magnan (2009).

intangible assets and goodwill is expected to decrease during a GFC compared to the NCP.

Thus the related two hypotheses are:

#### Hypothesis 3(b)

The value relevance of intangible assets and goodwill decreases during a global financial crisis (GFC) compared to the non-crisis period (NCP).

#### Hypothesis 3(c)

The value relevance of tangible assets increases during a global financial crisis (GFC) compared to the non-crisis period (NCP).

A list of hypotheses developed in this chapter is shown in Table 4.2.

Hypothesis I(a)	Book value and earnings are value relevant.
Hypothesis 1(b)	The value relevance of book value increases during a global financial
	crisis (GFC) compared to the non-crisis period (NCP).
Hypothesis 1(c)	The value relevance of earnings decreases during a global financial crisis
	(GFC) compared to the non-crisis period (NCP).
Hypothesis 2(a)	Cash flow from operations (CFO) has value relevance incremental to
	book value and earnings.
Hypothesis 2(b)	The value relevance of earnings is higher than that of cash flow from
	operations (CFO) during the non-crisis period (NCP).
Hypothesis 2(c)	The value relevance of cash flow from operations (CFO) is higher than
	that of earnings during a global financial crisis (GFC).
Hypothesis 2(d)	The value relevance of earnings decreases and the value relevance of
	cash flow from operations (CFO) increases during a global financial
	crisis (GFC) compared to the non-crisis period (NCP).
Hypothesis 3(a)	Reported intangible assets and goodwill are value relevant.
Hypothesis 3(b)	The value relevance of intangible assets and goodwill decreases during a
	global financial crisis (GFC) compared to the non-crisis period (NCP).
Hypothesis 3(c)	The value relevance of tangible assets increases during a global financial
	crisis (GFC) compared to the non-crisis period (NCP).

Table 4-2: List of hypotheses tested in the thesis

#### 4.9 Conclusions

Three sets of hypotheses have been developed in this chapter to address the research questions. The first set of hypotheses deals with the value relevance of book value and earnings in the Australian market and the changes in the value relevance of book value and earnings between a GFC and the NCP. The second set of hypotheses examines the relative and incremental value relevance of earnings and CFO and the changes in the value relevance of earnings and CFO between a GFC and the NCP. The third set of hypotheses relates to the value relevance of intangible assets and goodwill and the impact of a GFC on the value relevance of tangible assets, intangible assets and goodwill. The next chapter (chapter 5) discusses the research design used to test the three sets of hypotheses developed in this chapter.

#### **CHAPTER FIVE**

#### **RESEARCH DESIGN**

#### 5.1 Introduction

A set of relevant and testable hypotheses is developed in chapter four. This chapter discusses the research design issues and methodologies used to empirically test those hypotheses. Sources of data and sample periods are specified. The GFC and the NCP are defined. Sample selection procedures are discussed next. A set of models used for testing the hypotheses is developed and discussed. Constructs for the dependent variable, independent variables and various control variables are defined. The chapter ends with a discussion on various diagnostic tests relating to econometric specification issues.

#### 5.2 Overview of the research design

The value relevance research (VRR) investigates the association of particular accounting measures (for example, book value, earnings, CFO, tangible assets, intangible assets and goodwill) with firms' market value or stock returns. Usually the VRR uses regression analysis to document the relationship between the dependent and independent variables and consider a particular accounting measure as value relevant when its coefficient estimate in the regression is statistically significant and when it can explain the cross-sectional variations in share prices. The review of literature in chapter three and the background discussions in chapter four suggest that most of the value relevant researches use modified Ohlson (1995) model because of its provision to incorporate other variables and because of its ability to express firms' market value as a function of firms' book value and earnings. The empirical specification of Ohlson (1995) requires the estimation of abnormal earnings and discount rates representing the costs of equity capital. To avoid these estimation difficulties, Ohlson (1999) amends the basic residual income valuation model (RIVM) and expresses firms' market value as a function of book value and current earnings (Ahmed and Falk, 2006). The coefficient estimate of book value represents future normal earnings and the coefficient estimate of current earnings reflects expected future abnormal (residual) earnings. Most of the value relevance researches apply Ohlson (1995) model and modify it to suit particular research objectives. The present study also uses modified Ohlson (1995) model.

#### 5.3 Data and sample selection

#### 5.3.1 Data sources

Financial accounting data and market value data used in this thesis have been collected from *DataStream- Worldscope* databases. The value relevance of book value, earnings and CFO and the changes in the value relevance of book value, earnings and CFO (hypotheses under phase one and phase two of the empirical analysis of this thesis) are examined with data derived from these sources. Data required to examine the value relevance of tangible assets, intangible assets and goodwill (hypotheses under phase three) has been drawn manually from companies' annual reports collected from the *Connect 4* database.

#### 5.3.2 Definition of the GFC and the NCP

It has remained unclear exactly when the GFC started. Different countries have been affected by the 2008-2009 GFC at different time periods. Many European countries and the US are still dealing with the GFC. Thus, it is difficult to draw an exact line between the GFC and the NCP. The most important consideration in this regard is whether 2007 should be included with the GFC or with the NCP. This thesis defines the GFC and the NCP based on existing literature (Xu, Carson Fargher and Jiang, 2011; Sidhu and Tan, 2011; Spear and Taylor, 2011) and the movement in the ASX All Ordinaries index.

Although the GFC began in the USA in the mid 2007, its impact was felt across the global markets from mid 2008. The global major stock indices like the S&P 500 index, Dow Jones Industrial Index and the ASX All Ordinaries index had peaked during October, 2007 and showed significant declines thereafter (Sidhu and Tan, 2011). By the year 2008, the GFC became a global phenomenon. Grosse (2010) suggests that the US financial crisis began to develop into a GFC from 2008, and the first major event indicating the spill over effect was the failure of the country-wide financial systems in January, 2008.

The ASX All Ordinaries Index was 3546.10 on 30th June, 2004, which increased to 4346.70 in June, 2005 and to 5034 in June, 2006. It soared up to 6310.6 in June, 2007 and increased further up to 6779 in October, 2007. Thereafter, the index began to decline, dipping to 5332.9 in June, 2008 and further to 3296.9 in February, 2009. At the end of June, 2009, the index

was 3947.8.<sup>44</sup> Thus, although the GFC started in the USA from mid-2007, the Australian stock index was soaring to its highest point until October, 2007. In October, 2007, the index reached its highest point which implies that the impact of the GFC was not felt in the Australian stock market until October, 2007. If compared between October, 2007 and February, 2009, the decline in the ASX All Ordinaries index was 51.37 per cent. In February, 2009, the index had reached its lowest point in 2.5 years (Financial Review, 26<sup>th</sup> October, 2009).

The S&P/ASX 300 aggregate market to book ratio fell below 1 in March, 2009. Along with the aggregate index, individual stock prices also declined to a new low. For some firms market value came closer to or below equity book value. Prices of many assets have fallen a long way in the one year period from November, 2007 to October, 2008. As discussed in chapter two, world's major stock markets also lost about 40 per cent of their market capitalisation and the Australian stock market also experienced a similar decline.

Moreover, the Australian stock market reflected little impact of the US sub-prime mortgage crisis during 2007 (Xu, Carson Fargher and Jiang, 2010). In Australia, the unemployment rate dramatically began to rise from October, 2007. The Reserve Bank of Australia successively cut interest rates from 7.25 per cent in September, 2008 to 3 per cent in 2009.

Considering these issues, 2007 is included in the definition of the non-crisis period (NCP). The period 2008 to 2009 is considered as the GFC period, whereas, the period 2004 to 2007 is considered as the NCP. Spear and Taylor (2011) also consider 2002 to 2007 as the NCP and 2008 as the GFC period in the US context.<sup>45</sup> Mahmood, Xinping, Shahid and Usman (2010) also consider 2004 to 2007 as the NCP and 2008 to 2009 as the GFC period to examine the impact of the GFC on the efficiency of the Chinese stock market.

Brown and Davis (2008) claim that the symptom of the impact of the GFC on the Australian market was evident in August, 2007. Nevertheless, Australian market may have perceived the ensuing crisis before August, 2007. In that case, the inclusion of 2007 in the definition of the

<sup>&</sup>lt;sup>44</sup>Source: Yahoo finance: ASX All Ordinaries Index.

<sup>&</sup>lt;sup>45</sup>Spear and Taylor (2011) examine the assets write-down for a sample of the US firms and find that both the total volume and frequencies of assets write-downs have increased significantly during the GFC compared to the NCP. They suggest that assets write-downs can track economic condition.
GFC period might have been appropriate. Lim and Lu (2011) show that the impact of the GFC on the value relevance of components of earnings is sensitive to the alternative definitions of the GFC and the NCP.

Accordingly, as a sensitivity test, alternative time periods have been considered to define the GFC and the NCP. The robustness of the findings is checked by changing the definition of the GFC to include 2007 to 2009. Further robustness of the results is tested by changing the definition of the NCP to include 2006 to 2007.<sup>46</sup>

# **5.3.3** Sample selection

This section describes the data and sample selection procedures relating to hypotheses 1(a) to 1(c) and hypotheses 2(a) to 2(d). Following steps have been applied in selecting the sample firms.

Firms available in the *DataStream* database are identified. Firms with missing book value, market value and other required variables are excluded. Companies in the financial, banking and insurance sectors are excluded because these firms have different regulations and reporting requirements. Firms with balance sheet date other than June are also excluded. Moreover, firms with negative book value are excluded from the sample. Finally, firms are ranked according to their total market value of equity and top and bottom 2 per cent of the observations are excluded to remove extreme observations. The final sample consists of a total of 4885 firm-year observations comprising of 599, 694, 765, 911, 940 and 976 firm-year observations for the year 2004, 2005, 2006, 2007, 2008 and 2009 respectively. The industry distributions of the sample firms are shown in Appendix A at the end of this thesis. Table 5-1 summarises the steps followed in the sample selection process. The sample selection procedures are consistent with Xu, Carson Fargher and Jiang (2011), Dahmash, Durand and Watson (2009) and Farshadfar (2008). The entire sample is spread over 21 industrial sectors. With the minimum number of firms in a particular year in a sector being 6 and the maximum

<sup>&</sup>lt;sup>46</sup>IFRS was introduced replacing AGAAP during 2005. Evidences on the impact of IFRS on the value relevance of book value and earnings are mixed. Goodwin, Ahmed and Heaney (2008) do not find any impact of the introduction of IFRS on the value relevance of book value and earnings, whereas, Chalmers, Clinch and Godfrey (2011) find evidence suggesting that the value relevance of earnings and book value has increased after the introduction of IFRS replacing AGAAP. The inclusion of 2004 and 2005 in the definition of the NCP may bias the result of the present study. Hence, as robustness tests, all the models are estimated defining the NCP as 2006 to 2007 instead of 2004 to 2007.

number being 233, the sample is widely distributed. The highest number of observations belongs to the *Industrial Metal and Mining* sector (915 observations) and the lowest number of observations belongs to the *Fixed Line Telecommunication* sector (57 observations). Chi-square test statistics suggest that although the number of firms in the sample is different in different years, the industry distributions of the sample have not changed. It will provide the confidence that any observed change in the value relevance of key accounting measures over years (if any) was not driven by the change in the sample distributions.

	-	-	-	-	-		
	2004	2005	2006	2007	2008	2009	Pool
Firms available in the <i>DataStream</i>	1323	1450	1541	1651	1825	1825	9615
database							
Firms with data problem: missing financial	334	361	400	310	385	373	2163
and/or market value data							
Less: Companies in financial, banking and	249	254	246	292	299	271	1611
insurance sectors							
Less: Firms with balance sheet date other	75	76	72	66	131	125	545
than June							
Remaining firms with 30 June balance	665	759	823	983	1010	1056	5296
sheet date							
Less: Firms with negative book value	40	35	26	32	28	32	193
Less: Outliers (top 2 % and bottom 2% of	26	30	32	40	42	48	218
market value)							
Final sample	599	694	765	911	940	976	4885

Table 5-1: Sample selection procedures and sample firms

Data and sample used to examine hypotheses 3(a) to 3(c) are discussed in section 8.2 chapter eight. To examine the value relevance of tangible assets, intangible and goodwill under phase three of the empirical analysis, there are 1199 firm-year-observations in the pooled sample covering the period of 2006 to 2009. The entire sample is spread over 17 sectors. With the minimum number of firms in a particular year in a sector being 4 and the maximum number being 63, the sample is widely distributed. Chi-square test statistics suggest that although the number of firms in the sample is different in different years, the industry distributions of the sample have not changed. It will provide the confidence that any observed change in the value relevance of tangible assets, intangible assets and goodwill over years (if any) was not driven by the change in the sample distribution.

# **5.4** Empirical models to examine the value relevance of book value, earnings and cash flow from operations

Various empirical models used to test the hypotheses are discussed in this section. These models have been drawn from existing literature and modified for the purpose of this study. Modified Ohlson (1995) model is used to examine the value relevance of book value, earnings, CFO, tangible assets, intangible assets and goodwill.

# 5.4.1 Value relevance of book value and earnings: hypotheses 1(a), 1(b) and 1(c)

Hypothesis 1 (a) states that book value and earnings are value relevant. Hypothesis 1(b) states that the value relevance of book value increases during a GFC compared to the NCP. Hypothesis 1(c) states that value relevance of earnings decreases during a GFC compared to the NCP. To test these hypotheses, the following models are developed:<sup>47</sup>

Model 1:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ Model 2:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ Model 3:  $MV_{it} = \alpha_{it} + \beta_2 E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ . Model 4:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CP + \beta_4 CP^* BV_{it} + \beta_5 CP^* E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ .

Where,  $MV_{it} = Market$  value of equity per share at end of the year (30 June);

BV<sub>it</sub>= Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CP =Indicator variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007, 2006, 2005 and 2004. An indicator variable for the GFC;

 $\alpha_{it} = intercept;$ 

 $\epsilon_{it} = error term;$ 

 $\lambda_1$ .... $\lambda_n$  are indicator variables representing industry dummies.

<sup>&</sup>lt;sup>47</sup>Model 2 and Model 3 potentially lead to departure from Ohlson (1995) model resulting from correlated omitted variables because Model 2 excludes earnings and Model 3 excludes book value. However, extant researches have used similar approach to examine the relative and incremental value relevance of earnings and book value (for example, Harris, Lang and Moller, 1994; Burgstahler and Dichev, 1997; Collins, Maydew and Weiss, 1997; Barth, Beaver and Landsman, 1998; Graham, King and Bailes, 2000).

To examine the value relevance of book value and earnings and the impact of the GFC on the value relevance of book value and earnings, firms' market value per share is regressed on book value and earnings (Model 1, 2 and 3). An indicator variable is included in the model to examine the changes in the coefficient estimates of book value and earnings between the GFC and the NCP. Similar Models have been used by Graham, King and Bailes (2000) and Davis-Friday, Eng and Liu (2006) to examine the impact of the 1997 Asian Financial Crisis (AFC) on the value relevance of book value and earnings.

Hypothesis 1(a) is tested by examining the significance of the coefficient estimates of book value ( $\beta_1$ ) and earnings ( $\beta_2$ ), in Models 1, 2 and 3. Hypotheses 1(b) and 1(c) are tested by comparing the relative value relevance and incremental value relevance of book value and earnings between the 2008-2009 GFC and the NCP. Hypotheses 1(b) and 1(c) are also tested by examining the changes in the coefficient estimates of book value and earnings between the 2008-2009 GFC and the NCP. These two methods of examining the hypotheses are used as complementary to each other.

Relative value relevance of earnings is defined as the percentage of variations in share prices that can be explained if only earnings is used as an explanatory variable. Similarly relative value relevance of book value is defined as the percentage of variations in share prices that can be explained if only book value is used as an explanatory variable. The adjusted R-square (explanatory power) of Model 2 is considered as the relative value relevance of book value. The adjusted R-square (explanatory power) of Model 3 is construed as the relative value relevance of earnings. Thus comparing the adjusted R-square of Model 2 and Model 3 between the GFC and the NCP serves the purpose of examining the changes in the relative value relevance of book value and earnings between the GFC and the NCP.

To examine the incremental explanatory power (value relevance) of book value and earnings, the adjusted R-square of Models 1, 2 and 3 are compared. Total explanatory power of book value and earnings in Model 1 is decomposed into incremental and common explanatory power attributable to book value and earnings in the following ways:<sup>48</sup>

<sup>&</sup>lt;sup>48</sup>This decomposition method has been used in Eston (1985), Harris, Lang and Moller (1994), Collins, Maydew and Weiss (1997) and Graham, King and Bailes (2000). It was derived theoretically by Theil (1971).

Incremental value relevance of book value = [Adjusted R-square of Model 1 - Adjusted R-square of Model 3].

Incremental value relevance of earnings = [Adjusted R-square of Model 1 – Adjusted R-square of Model 2].

Value relevance common to book value and earnings

= [Adjusted R-square of Model 1 – Incremental value relevance of book value

- Incremental value relevance of earnings].

In all the above regressions, dummy variables are used to control for the industry specific effects.<sup>49</sup> The Chow structural-break test is used to examine if there was any structural break in the association of book value and earnings with share prices between the GFC and the NCP.<sup>50</sup>

In addition to the consideration of the explanatory power (adjusted R-square) of Models 1, 2 and 3, hypotheses 1(b) and 1(c) are also tested by examining the coefficients of the interaction terms CP\*BV ( $\beta_4$ ) and CP\*E ( $\beta_5$ ) in Model 4 and changes in the coefficient estimates of BV ( $\beta_1$ ) and E ( $\beta_2$ ) in Model 1, 2 and 3 between the GFC and the NCP. Hypotheses 1(b) and 1(c) propose that the value relevance of book value increases and that of earnings decreases during the GFC compared to the NCP. Thus the predictions are that the coefficient estimate of  $\beta_4$  will be positive and statistically significant, whereas, the coefficient estimate of  $\beta_5$  will be negative and statistically significant.

$$\frac{(R_c - (R_1 + R_2))/k}{(R_1 + R_2)/(n_1 + n_2 - 2k)}$$

<sup>&</sup>lt;sup>49</sup>Industry specific effects are controlled because share prices have been found to vary across industries and the impact of the GFC on share prices may vary across industries (Graham, King and Bailes, 2000; Ahmed and Falk, 2006).

<sup>&</sup>lt;sup>50</sup>The Chow test (1960) is used to examine whether the coefficients in two linear regressions on different data sets are equal. It is used to examine the presence of structural breaks in the relationship between the dependent variable and the independent variables in time series analysis. The total sample observations are divided into two groups and regressions are run separately for each group. Regression is also run for pooled sample with the total observations. The chow test computes an F-statistic in terms of the ratio of the mean residual sums-of squares from the pooled regression to the sum of the mean residual sum of squares from the separate regressions for two sub samples.

Let  $R_C$  be the sum of squared residuals from the regression using total observations.  $R_1$  be the sum of squared residuals from the regression of the first group of observations and  $R_2$  be the sum of squared residuals from the regression of second group of observations. k is the total number of parameters and  $n_1$  and  $n_2$  are the number of observations in the first group and second group respectively. Chow test statistic is computed as:

The chow test statistic follows the F- distribution. If the p-value on this Chow test is significant, it indicates that more errors are explained if two regressions are run separately based on the split sub-samples rather than running one pooled regression with the full sample. Significant Chow test statistic suggests differences in the explanatory power of the regressions.

## 5.4.2 Model with control variables

Prior studies suggest that different contexts such as increased risk of liquidation and firms' deteriorating financial health (Barth, Beaver and Landsman 1998), extreme return on equity (ROE) (Burgstahler and Dichev, 1997; Penman, 1998) and losses (Hayn, 1995) affect the relative value relevance of book value and earnings. In order to control for the effect of these contextual factors, prior studies have used different control variables such as return on equity (Penman, 1998), leverage (Mitton, 2002; Ahmed, Godfrey and Saleh, 2008), negative earnings (Hayn, 1995; Davis-Friday, Eng and Liu, 2006) and firm size (Ahmed and Falk, 2006).

If these contextual factors have any moderating effects on the value relevance of book value and earnings, models without controlling the effects of these contextual factors will produce biased results of the impact of the GFC on the value relevance of book value and earnings. In order to control for the effects of these contextual factors, Model 4 is extended to consider the effect of negative earnings, extreme ROE, leverage, size, and firms' deteriorating financial health (Model 4a).

Where, NEG = Dummy variable taking the value of 1 if the firm reports negative earnings during year t, 0 otherwise;

ROE = Dummy variable taking the value of 1 if the absolute value of ROE of the firm is above the median of absolute value of ROE, 0 otherwise;

LEV = Dummy variable taking the value of 1 if the firm has above median leverage, 0 otherwise. Leverage is measured as total liabilities divided by total assets;

SIZE = Dummy variable taking the value of 1 if the firm has above median firm size, 0 otherwise. Firm size is measured as firms' beginning of the year market value of equity;

CONTLOSS = Dummy variable, taking the value of 1 if the firm has negative earnings continuously for last three years, 0 otherwise. CONTLOSS is used as a proxy for firms' deteriorating financial health;

All other variables are as defined before.

The use of NEG, ROE, LEV and SIZE as control variables is self-explanatory and these variables have been used as control variables in a number of studies. Moreover, the contexts of inclusion of these variables have been discussed under the literature review. The use of CONTLOSS requires some explanations. A firm cannot continue with negative earnings because the firm may quickly approach the liquidation stage. Hayn (1995) suggests that the value relevance of book value increases in the presence of negative earnings. For firms having negative earnings continuously for three years or more, it is most likely that investors already will have considered alternative information sources to evaluate share prices. Thus the increasing importance of book value for these firms (if any) may not be a direct result of impact of the GFC, rather continuous negative earnings for a long period may be the underlying reason for the increase (if any) in the value relevance of book value for these firms. If this effect is not controlled for, the result may be biased. Accordingly, in addition to controlling for current negative earnings, an additional control variable is used to control for the effect of continuous negative earnings over at least for the previous three years.

# 5.4.3 The value relevance of CFO incremental to book value and earnings and the relative value relevance (relative superiority) of earnings versus CFO: hypotheses 2 (a), (b), (c) and (d)

Hypothesis 2(a) states that CFO has value relevance incremental to book value and earnings. Hypothesis 2(b) states that the value relevance of earnings is higher than that of CFO during the NCP. Hypothesis 2(c) states that the value relevance of CFO is higher than that of earnings during a GFC. Hypothesis 2(d) states that the value relevance of earnings decreases and the value relevance of CFO increases during a GFC compared to the NCP. To test the four hypotheses following models are used:

 $\begin{array}{l} \textbf{Model 5: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 .....\lambda n + \epsilon_{it.} \\ \textbf{Model 5a: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 .....\lambda n + \epsilon_{it.} \\ \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 .....\lambda n + \epsilon_{it} \\ \textbf{Model 6: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \beta_4 CP + \beta_5 CP^* BV_{it} + \beta_6 CP^* E_{it} \\ + \beta_7 CP^* CFO_{it} + \lambda_1 .....\lambda n + \epsilon_{it.} \end{array}$ 

CFO = Cash flow from operations per share. All other variables are as defined previously under Model 1, 2, 3 and 4.

Model 5 and Model 6 are derived from Ohlson's (1995) valuation model. The variable CFO can be interpreted as "other information" in Ohlson (1995) model. Differences in the

explanatory power between Model 5 and Model 1 represents the incremental explanatory power of CFO implying that in addition to book value and earnings, inclusion of CFO can explain more cross-sectional variations in share prices. Moreover, if the coefficient estimate of CFO in Model 5 is statistically significant, it implies that in addition to book value and earnings, investors also attach importance to CFO for stock valuation purposes. Thus hypothesis 2(a) is examined by the difference in the explanatory power between Model 5 and Model 1 and by the significance of the coefficient estimate of CFO in Model 5.

In order to examine the relative value relevance (relative superiority) of earnings [hypothesis 2(b)] and CFO [hypothesis 2(c)], Model 5a replaces earnings with CFO as an independent variable. Model 1 measures how much of the cross-sectional variations in share prices can be explained by book value and earnings, whereas, Model 5a measures how much of the cross-sectional variation in share prices can be explained by book value and CFO. Because both of these models include book value, any difference in the explanatory power between Model 1 and Model 5a represents the difference in the relative explanatory power between earnings and CFO. Thus hypothesis 2(b) and 2(c) are examined by comparing the explanatory power of Model 1 and Model 5a during the 2008-2009 GFC and the NCP. To derive the relative value relevance of earnings and CFO, Black (2003), Banker, Huang and Natarajan (2009) and Kwon (2009) have used similar models.

Model 6 is used to formally test the changes in the coefficient estimates of earnings and CFO between the 2008-2009 GFC and the NCP [hypothesis 2(d)]. To examine the impact of the GFC on the value relevance of earnings, the coefficient estimate of the interaction term CP\* E ( $\beta_6$ ) is examined. If the coefficient of  $\beta_6$  is statistically significant it implies that the value relevance of earnings is different during the GFC compared to the NCP. If the coefficient  $\beta_6$  is negative and significant, it will imply that the value relevance of earnings decreases during the GFC compared to the NCP. Similarly, the coefficient estimate of the interaction term CP\* CFO ( $\beta_7$ ) is examined. If the coefficient  $\beta_7$  is statistically significant it implies that the value relevance of CFO is different during the GFC compared to the NCP. If the coefficient  $\beta_7$  is positive and significant, it will imply that the value relevance of CFO increases during the GFC compared to the NCP. As a complementary method, the explanatory power of Model 1 and Model 5a are compared between the 2008-2009 GFC and the NCP sub-periods to examine hypothesis 2(d). Moreover, the changes in the coefficient estimates of earnings and

CFO in Model 5, 5a and 1 between the 2008-2009 GFC and the NCP are also examined as a complementary method to test hypothesis 2(d).

A summary of methods used for testing hypotheses 2(a), 2(b), 2(c) and 2(d) are shown below: Hypothesis 2(a):

- Adjusted R-square of Model 5 > adjusted R-square of Model 1;
- $\beta_3 \neq 0$  in Model 5 and Model 5a;

Hypothesis 2(b) and 2(c):

- During the GFC adjusted R-square of Model 5a > adjusted R-square of Model 1;
- During the NCP adjusted R-square of Model 1 > adjusted R-square of Model 5a.

Adjusted R-squares of Model 5a and Model 1 are compared using Vuong (1989) test for comparing non-nested models (See the following section for a discussion on Vuong test).

Hypothesis 2(d):

- $\beta_6 < 0$  and  $(\beta_2 + \beta_6) < \beta_2$  and  $\beta_7 > 0$  and  $(\beta_3 + \beta_7) > \beta_3$  in Model 6;
- Adjusted R-square of Model 5a during the GFC > adjusted R-square of Model 5a during the NCP;
- Adjusted R-square of Model 1 during the GFC < adjusted R-square of Model 1 during the NCP;
- Changes in the ratio of the adjusted R-square of Model 5a and Model 1 between the GFC and the NCP;
- β<sub>3</sub> in Model 5 and Model 5a is large during the GFC compared to the NCP;
- $\beta_2$  in Model 5 and Model 1 is small during the GFC compared to the NCP.

# 5.4.3.1 Vuong (1989) tests for comparing earnings model (Model 1) with CFO model (Model 5a)

To examine the relative superiority of the value relevance of earnings and CFO, the Vuong (1989) test is applied for comparing the competing Model 1 and Model 5a. The Vuong (1989) likelihood ratio test (Z-statistic) helps to identify which one of the competing models has greater explanatory power. Dechow (1994, Appendix 2) shows that this directional model selection technique tests the null hypothesis that the explanatory powers of the two competing models are the same against the alternative hypothesis that one of them has more explanatory power. For example, if Model A and Model B are two competing models, under

the Vuong (1989) test, Model A will be preferred over Model B if the average log likelihood of Model A is significantly higher than that of Model B and vice versa. The calculation procedures of Vuong (1989) likelihood ratio are discussed below in brief:

As a first step, the difference in the log likelihood between Model A and B is considered in the following way:

 $LR = \log [L(R_A)] - \log [L(R_B)]$ 

As a second step, an estimate of the variance of LR,  $\omega^2$  is computed in the following way:

$$\hat{\omega}^{2} = \frac{1}{n} \sum_{i=1}^{n} \left( \sum_{i=1}^{n} \left( \frac{1}{2} \log(\hat{\sigma}_{B}^{2}) - \frac{1}{2} \log(\hat{\sigma}_{A}^{2}) \right) + \frac{1}{2} \frac{(\hat{e}_{Bi})^{2}}{\hat{e}_{B}^{2}} - \frac{1}{2} \frac{(\hat{e}_{Ai})^{2}}{\hat{e}_{A}^{2}} \right) - \left( \frac{1}{n} LR \right)^{2}$$

Where  $\hat{\sigma}^2$  and *e* denote the estimates of the residual variance and the estimated residuals, respectively.

As a third step, the following equation determines Vuong Z-statistic:

$$Z = \frac{1}{\sqrt{n}} \frac{LR}{\widehat{\omega}}$$

If the Z statistic is positive and significant, Model A has a greater explanatory power than Model B. If the Z statistic is negative and significant, Model B has a greater explanatory power than Model A. If the Z statistic is not statistically significant, there is no difference in the explanatory power of the two competing models. A positive Z statistic implies that the residuals produced by Model B are larger in magnitude than those from Model A.

Pertinent to this thesis, the explanatory power (adjusted R-square) of Model 1 and Model 5a will be compared in terms of Vuong Z statistic. If the Z statistic is positive and significant, Model 1 can be said to have superior explanatory power to Model 5a. If the Z statistic is negative and significant, Model 5a can be said to have superior explanatory power to Model 1. If the Z statistic is not significant, the explanatory power of Model 1 and Model 5a are not different. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) are larger in magnitude than those from the earnings model (Model 1).

#### 5.4.3.2 Why use price models instead of return models?

Although a large number of prior studies have used return models to examine the relative and incremental value relevance of earnings and CFO, the present study uses price models to examine the hypotheses. In the return model, periodic security returns are used as the dependent variable and level and changes of earnings and/or CFO are used as the independent variables. On the contrary, in the price model, year-end share price is used as the dependent variable, whereas, book value and earnings or CFO are used as the independent variables.

There has been some controversy in the literature as to whether return models or price models capture the relationship between firms' market value and accounting measures appropriately. Kothari (2001) argues that the two types of models serve two different purposes. Price models are appropriate when the objective is to examine the long run association between firms' market value and accounting measure, whereas, the return model is more appropriate when the objective is to examine the short term association between firms' market value and accounting measures contingent upon certain events such as declaring bonus shares or declaring dividends, or impairment write-offs (Bens and Heltzer, 2004). The fundamental difference between the price model and the return model is that the former is used to examine what is reflected in firms' share prices and the later is used to examine what is reflected in the changes in share prices over a short period of time.

Price models offer a potential advantage of low measurement error bias compared to return models (Griliches and Hausman, 1986). Although Gonedes and Dopuch (1974) suggest the superiority of return model over price model when a well-developed theory of valuation is absent, Landsman and Magliolo (1988) show that price models are superior to return models when model parameters and omitted variables are not inter-temporally constant which are likely to be true in the context of the GFC and the NCP. Chen, Chen and Su (2001) argue that the price model has two advantages over the return model. Firstly, if price leads earnings, if the market anticipates the earnings and incorporates it in the beginnings stock prices, the return model will bias the coefficient of earnings towards zero. On the contrary, the price model yields unbiased coefficient of earnings because share prices incorporate the cumulative effects of earnings (Kothari and Zimmerman, 1995). Secondly, the return model allows the assessment of the value relevance of only flow measures (earnings or CFO, separately or

together). On the contrary, the price model based on Ohlson (1995) enables the researcher to assess the value relevance of both stock measure (book value) and flow measure (earnings).

Ohlson (1995) model is based on RIVM which allows for the inclusion of other information variables. As discussed in chapter three, a firm's share price is a function of its book value (stock measure) and earnings (flow measure). Return models usually exclude book value (stock measure) which may produce biased results due to omitted variable (stock measure such as book value). As suggested by Collins, Pincus and Xie (1999), the simple earnings capitalisation model is misspecified and adding book value in the model eliminates the misspecifications. Modified Ohlson Model (1995) includes both the stock measure (book value) and the flow measure/s (earnings and/or CFO). Thus the use of modified Ohlson Model (1995) eliminates the misspecification problem. Moreover, it is supported by a theoretical basis.

As mentioned earlier, the inclusion of the variable CFO in Model 5 can be explained as 'additional variable' in Ohlson (1995) model. Although Model 5a excludes earnings, it includes CFO as the flow measure.<sup>51</sup> Black (2003) uses models similar to Model 5a and Model 1 to examine the relative and incremental value relevance of earnings and different components of cash flows. Ho, Liu and Sohn (2001), Davis-Friday and Gordon (2005), Banker, Huang and Natarajan (2009) and Kwon (2009) have also used price models to examine the relative and incremental value relevance of earnings and CFO. Hence, the use of price models in the present study is not at odd with the literature.

Beaver (2002) warns that changing the form of the variables may fundamentally change the research question addressed. The return model specifically captures the timeliness notion of financial reporting (Beaver, 2002; Habib, 2010). The focus of the present study is not the timeliness notion. The research questions of the present study reflect the search for which accounting measures provide information content useful for determining share prices and how the relative importance of different accounting measures changes in determining firms' share prices between the GFC and the NCP. Because the focus of the present study is on the value relevance of book value, earnings and CFO, rather than on the timeliness of accounting

<sup>&</sup>lt;sup>51</sup> Usually, book value serves as stock measure and earnings serves as the flow measure in Ohlson (1995) model.

measures, price models are used to examine hypothesis 2(a) to 2(d). Another reason for using price models is to keep consistency with models used in testing hypotheses 1(a) to 1(c).

# 5.4.4 Controlling for the contextual factors

As the literature review suggests, the value relevance of earnings and CFO is influenced by different firm specific contextual factors such as firm size, leverage, growth opportunities, accruals levels, earnings permanence and CFO permanence. Because these contextual factors affect the relative importance of earnings and CFO in determining share prices, results obtained without controlling for these factors may be biased. Firms are separated into two equal groups based on the median value of each contextual factor to control for the effects of these contextual factors. Model 5, 5a, 1 and 6 are estimated separately for each group. This approach differs from the dummy variable approach used in Model 4a to examine the impact of the GFC on the value relevance of book value and earnings (under Phase 1). This approach is selected over the dummy variable approach because it provides a separate coefficient estimates of earnings and CFO and a separate estimate of explanatory power (adjusted R-square) for each group. These separate coefficient estimates and separate explanatory power for each group facilitate intra-group comparison of the relative superiority of earnings versus CFO between the GFC and the NCP and the impact of the GFC on the value relevance of earnings and CFO.

## 5.4.4.1 Firms size

To control for the effect of firms' size on the value relevance of earnings and CFO, firms are divided into two groups each year, on the basis of the median value of firms' beginning of the year market value of equity. This definition of size is consistent with Brimble and Hodgson (2007).

## 5.4.4.2 Leverage

To control for the effect of leverage on the value relevance of earnings and CFO, firms are split at the median value of leverage (total debt /total assets) each year. This method is consistent with Brimble and Hodgson (2007).

#### 5.4.4.3 Growth options

Consistent with Charitou, Clubb and Andreou (2001), firms' MTBV is used as the proxy for firms' growth options. Firms are separated based on the yearly median value of MTBV. Firms having above median MTBV are placed in the high growth option group and firms having below median MTBV are placed in the low growth option group.

#### 5.4.4.4 Accruals levels

To control for the effect of accruals, firms are divided into two equal groups each year on the basis of the median absolute value of firms' accruals divided by beginning of the year market value of equity (share prices). Firms lying above the median of  $|TAC/MV_{t-1}|$  are placed in high accruals group and firms lying below the median of  $|TAC/MV_{t-1}|$  are placed in the low accruals group. Accruals is defined as net income minus CFO.

# 5.4.4.5 Earnings permanence

To control for the effect of earnings permanence on the impact of the GFC on the value relevance of earnings and CFO, firms are partitioned into two groups consistent with Freeman and Tse (1992), Ali (1994) and Charitou, Clubb and Andreou (2001) based on their median of the absolute value of the change in net income divided by beginning of the year market value for each year. Firms lying below the median of  $|\Delta NI / MV_{t-1}|$  are placed in the permanent earnings group and firms lying above the median of  $|\Delta NI / MV_{t-1}|$  are placed in the transitory earnings group.

#### 5.4.4.6 CFO permanence

To control for the effect of CFO permanence on the impact of the GFC on the value relevance of earnings and CFO, firms are partitioned into two groups consistent with Freeman and Tse (1992), Ali (1994) and Charitou, Clubb and Andreou (2001) based on their median of the absolute value of the change in the CFO divided by beginning of the year market value for each year. Firms lying below the median of  $|\Delta CFO/MV_{t-1}|$  are placed in the permanent CFO group and firms lying above the median of  $|\Delta CFO/MV_{t-1}|$  are placed in the transitory CFO group.

# 5.5 Different robustness tests

Various sensitivity analyses are performed as robustness tests of the results. To examine the effect of firms' profitability, models are estimated separately for firms with positive earnings and negative earnings. Additional sensitivity analysis is performed by altering the definition of the GFC and the NCP. As discussed earlier in section 5.3.2, the definition of the GFC is changed to include 2007 to 2009 and the NCP to include 2004 to 2006.<sup>52</sup> Further robustness tests include estimating all the models using cross-sectional fixed effect panel regressions,<sup>53</sup> using undeflated variables and considering alternative date for share prices (September 30).

#### 5.5.1 Fixed effect panel regressions

Pooled cross-sectional regression using time series data may violate the assumption of independence of the observations which can be overcome by estimating panel regression. Moreover, the panel regression controls for individual heterogeneity of individual observations (Baltagi, 2005; Greene, 2008). A panel regression allows for more variability, reduces colinearity problem, increases the degrees of freedom and is more efficient. A panel regression can be estimated as fixed effect model or as random effect model. The suitability of both the fixed effect panel regression and the random effect panel regression are examined applying Hausman (1978) tests and LM tests. A high Chi-square value is indicative of the appropriateness of fixed effect model and an insignificant Chi-square is indicative of the appropriateness of a random effect model.

As robustness tests, all the models are estimated applying fixed effect unbalanced panel regression consistent with Farshadfar (2008). Model 4 and Model 6 are estimated using cross-sectional fixed effects only, because the period effects are captured by the dummy variable "CP". In the fixed effect panel regression, industry dummies are removed, because industry dummy and cross-section dummy create colinearity problem.

#### 5.5.2 Variables are undeflated

Prior literature has shown that the findings of the VRR are sensitive to the cross-sectional heteroskedasticity or cross-sectional scale effect (Kothari and Zimmerman, 1995; Eston and

<sup>&</sup>lt;sup>52</sup>This is because the GFC started in the USA from mid 2007. Although, Australian market was not affected by the GFC during 2007, its impact might have been perceived by Australian investors during 2007.

<sup>&</sup>lt;sup>53</sup>Because the period fixed effect is captured by the dummy variable 'CP', no period fixed effects are considered.

Sommer, 2003; Barth and Clinch, 2009). In order to avoid the problem of cross-sectional scale effects, different alternatives have been suggested in the literature. Barth and Clinch (2009) show that the results obtained using variables on a per share basis and using undeflated variables provide the most unbiased estimates. As a robustness test, all the models are estimated using undeflated variables.

#### 5.5.3 Alternative date for share prices (September, 30)

Some prior studies have used data three months after the June year-end (September 30) to allow sufficient time to reflect the accounting information into firms' market value (Davis-Friday, Eng and Liu 2006; Brimble and Hodgson, 2007). The main results of this thesis have been derived using the dependent variable (share prices) on June, 30. As a robustness test, all the models are estimated considering share prices at September, 30.

# 5.6 Value relevance of intangible assets and goodwill and the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill

Different methods have been used in the literature to examine the value relevance of tangible assets, intangible assets and goodwill. Some studies have used the balance sheet models (for example, Godfrey and Koh, 2001), whereas, some studies have used the modified Ohlson (1995) model (Bugeja and Gallery, 2006; Al-Jifri and Citrion, 2009; Oliveira, Rodrigues and Craig; 2010). In balance sheet models, firms' market value is used as the dependent variable and different components of total assets (such as tangible assets, intangible assets and goodwill) and liabilities are used as the independent variables (for example, Godfrey and Koh, 2001). However, the balance sheet model used by Godfrey and Koh (2001) does not include earnings. Note that both assets and liabilities are stock measures. Thus balance sheet models omit the flow measures such earnings or CFO from the model. Because, these flow measures are significant determinants of firms' market value (Ohlson, 1995; Collins Maydew and Weiss, 1997), excluding both earnings and CFO from the model may result in the model misspecification. Ohlson (1995) model eliminates such misspecifications. The beauty of modified Ohlson (1995) model is that it includes both the stock measure (book value) and the flow measure (earnings) as independent variables. Moreover, it permits to include other variables of interest in the model. For this reason, modified Ohlson (1995) model has been

widely used in the literature to examine the value relevance of different categories of assets (such as, intangible assets and goodwill).<sup>54</sup>

To examine the value relevance of intangible assets and goodwill and the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill [hypotheses 3(a) to 3(c)], book value is separated into three components (tangible assets, intangible assets and goodwill) and modified Ohlson (1995) model is used.

## 5.6.1 Value relevance of intangible assets and goodwill: hypothesis 3(a)

Hypothesis 3(a) states that reported intangible assets and goodwill are value relevant. This hypothesis is tested using Model 7:

Model 7:  $MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \lambda_1 \dots \lambda n + \epsilon$ 

Where,

 $MV_{it}$  is market value of equity per share for firm i at the end of year t;

- $BVINT_{it}$  is book value per share excluding intangible assets at the end of year t for firm i. Used to represent tangible assets per share;
- $INTG_{it}$  is intangible assets per share excluding goodwill at the end of year t for firm i. Used to represent intangible assets per share;
- $G_{it}$  is goodwill per share at the end of year t for firm i. Used to represent goodwill per share;

 $E_{it}$  is earnings per share for firm i during year t;

 $\lambda_1$ .... $\lambda_n$  are indicator variables representing the industry dummy.

Hypothesis 3(a) is examined by the statistical significance of the coefficient estimates of INTG ( $\beta_3$ ) and G ( $\beta_4$ ) in Model 7. If investors consider intangible assets and goodwill relevant in determining firms' share prices, the coefficient  $\beta_3$  and  $\beta_4$  in Model 7 will be positive and statistically significant.

# 5.6.2 Impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill: hypotheses 3(b) and (c).

<sup>&</sup>lt;sup>54</sup>For example, Kallapur and Kwan (2004), Bugeja and Gallery (2006), Lapointe-Antunes, Cormier and Magnan (2009), Al-Jifri and Citron (2010) and Oliveira, Rodrigues and Craig (2010) have used modified Ohlson (1995) model to examine the value relevance of intangible assets and goodwill.

Hypothesis 3(b) states that the value relevance of intangible assets and goodwill decreases during a GFC compared to the NCP. Hypothesis 3(c) states that the value relevance of tangible assets increases during a GFC compared to the NCP. These two hypotheses are examined using Model 8.

 $\begin{array}{l} \text{Model 8: } MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \beta_5 CP + \beta_6 CP * BVINT_{it} \\ + \beta_7 CP * INTG_{it} + \beta_8 CP * G_{it} + \lambda_1 \dots \dots \lambda n + \epsilon \end{array}$ 

Where,

 $MV_{it}$  is market value of equity per share for firm i at the end of year t;

- $BVINT_{it}$  is book value per share excluding intangible assets at the end of year t for firm i. Used to represent tangible assets per share;
- $INTG_{it}$  is intangible assets per share excluding goodwill at the end of year t for firm i. Used to represent intangible assets per share;
- $G_{it}$  is goodwill per share at the end of year t for firm i. Used to represent goodwill per share;
- $E_{it}$  is earnings per share for firm i during year t;
- *CP* is a dichotomous variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007 and 2006. Used to indicate the GFC;
- $CP * BVINT_{it}$  is the interaction term of CP and  $BVINT_{it}$ .
- $CP * INTG_{it}$  is the interaction term of CP and  $INTG_{it}$ .

 $CP * G_{it}$  is the interaction term of CP and  $G_{it}$ .

 $\lambda_1$ .... $\lambda_n$  are indicator variables representing the industry dummy.

The changes in the value relevance of tangible assets, intangible assets and goodwill between the GFC and the NCP are examined using the interaction terms CP\*BVINT ( $\beta_6$ ), CP\*INTG ( $\beta_7$ ) and CP\*G ( $\beta_8$ ). The value relevance of tangible assets, intangible assets and goodwill will be captured respectively by the coefficients  $\beta_1$ ,  $\beta_3$  and  $\beta_4$  during the NCP and by the coefficients ( $\beta_1+\beta_6$ ), ( $\beta_3+\beta_7$ ) and ( $\beta_4+\beta_8$ ) during the GFC. Statistically significant coefficient estimates of  $\beta_6$ ,  $\beta_7$  and  $\beta_8$  imply that tangible assets, intangible assets and goodwill have different value relevance during the GFC from the NCP. The expectations are that  $\beta_6$  will be positive and significant, whereas,  $\beta_7$  and  $\beta_8$  will be negative and significant. The summary of the above discussions on the expected directions of the three hypotheses testing is shown below:

	During the NCP	During the GFC
Tangible assets (BVINT)	$\beta_1 > 0$	$(\beta_1 + \beta_6) > \beta_1; \beta_6 > 0$
Intangible assets (INTG)	$\beta_3 > 0$	$(\beta_3+\beta_7) < \beta_3; \beta_7 < 0$
Goodwill (G)	$\beta_4 > 0$	$(\beta_4+\beta_8) < \beta_4; \beta_8 < 0$

#### 5.6.3 The issue of market to book value ratio

During the GFC, the equity market value of a large number of firms had dropped below book value and the market to book value ratio was less than one (MTBV<1). The value relevance of intangible assets and goodwill for firms with MTBV<1 may be different from firms having MTBV>1 because market value lower than book value is an indicator of impairments for intangible assets and goodwill subject to impairment review. <sup>55</sup> The value relevance of intangible assets and goodwill for firms with a market driven indication of impairment is expected to be different from firms without any such indication (Li and Meeks, 2006; Ramanna and Watts, 2011). The increase in the number of firms with MTBV<1 is correlated with the GFC. Hence, to examine the true impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill, the impact of MTBV ratio should be separated from the impact of the GFC. To examine whether the result is driven by firms with market indication of goodwill impairment, an indicator variable MTBV is defined, taking the value of 1 if firms' MTBV<1, and 0 if the MTBV>1. The following regression is estimated:

# $\begin{array}{l} Model \; 9: \; MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \beta_5 CP + \beta_6 CP * \; BVINT_{it} \\ & + \beta_7 CP * \; INTG_{it} + \beta_8 CP * G_{it} + \beta_9 MTBV * BVINT_{it} + \beta_{10} MTBV * INTG_{it} \\ & + \beta_{11} MTBV * G_{it} + \lambda_1 ..... \lambda n + \epsilon \end{array}$

In Model 9, the coefficients  $\beta_9$ ,  $\beta_{10}$  and  $\beta_{11}$  will capture the effect of the MTBV ratio on the value relevance of tangible assets, intangible assets and goodwill respectively. Thus, the coefficients  $\beta_6$ ,  $\beta_7$  and  $\beta_8$  will capture the impact of the GFC on the value relevance tangible assets, intangible assets and goodwill after controlling for the effect of firms' MTBV ratio. The hypothesis testing procedures are the same as outlined above under Model 8.

# 5.6.4 The issue of negative earnings

As discussed under the literature review, persistent negative earnings increases firms' liquidation option implying that the value relevance of book value increases in the presence

<sup>&</sup>lt;sup>55</sup>The decline in the market value below the book value represents a trigger event for impairment testing (AASB 136, para: 12, a).

of negative earnings. However, in case of the liquidation, the value relevance of only tangible assets is likely to increase because of the non-exchangeability of intangible assets and goodwill. Moreover, firms' earnings is a key input in the impairment testing process. Earnings is related to the present and expected future CFO. Because the underlying values of intangible assets and goodwill depend on the expected future earnings and CFO generated by those assets, market perception may be different for firms having positive earnings from firms having negative earnings.<sup>56</sup> In that case, negative earnings will be associated with a decrease in the value relevance of intangible assets (because of liquidation option) and decrease in the value relevance of intangible assets and goodwill; and if negative earnings is correlated with the GFC, the true impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill cannot be determined without controlling for the effect of negative earnings. To control for the effect of negative earnings, Model 10 is specified:

 $\begin{array}{l} \mbox{Model 10: } MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \beta_5 CP + \beta_6 CP * BVINT_{it} \\ + \beta_7 CP * INTG_{it} + \beta_8 CP * G_{it} + \beta_9 NEG * BVINT_{it} + \beta_{10} NEG * INTG_{it} \\ + \beta_{11} NEG * G_{it} + \lambda_1 ..... \lambda n + \epsilon \end{array}$ 

In Model 10, the dichotomous variable  $NEG_{it}$  is assigned the value of 1 if the firm has negative earnings during year t, 0 otherwise. The coefficients  $\beta_9$ ,  $\beta_{10}$  and  $\beta_{11}$  capture the effect of negative earnings on the value relevance of tangible assets, intangible assets and goodwill. Thus, the coefficients  $\beta_6$ ,  $\beta_7$  and  $\beta_8$  capture the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill respectively, after controlling for the effect of firms' negative earnings. The hypothesis testing procedures are the same as outlined above under Model 8.

# 5.7 Specification of variables

This section discusses the dependent variable, independent variables and control variables used in different models. The dependent variable is introduced first which is then followed by discussions on independent variables.

<sup>&</sup>lt;sup>56</sup>The value relevance of book value and earnings is different for firms having negative earnings (Hayn, 1995; Davis-Friday, Eng and Liu, 2006). Accordingly, Oliveira, Rodrigues and Craig (2010) examine if the value relevance of intangible assets and goodwill is different for firms having negative earnings from that of firms having positive earnings. They do not find any effect of negative earnings on the value relevance of intangible assets and goodwill.

#### 5.7.1 Construct of the dependent variable

The VRR is usually concerned with assessing the extent to which particular accounting item is associated with firms' market value. Consistent with other value relevance studies firms' market value per share is used as the dependent variable.

#### **5.7.1.1** Market value per share (MV)

Market value per share (MV) is used as the dependent variable in this study. MV is defined as the price per share each year at June, 30. Some studies have used the market value three months after the balance sheet date to allow sufficient time for share prices to reflect the new information. However, choosing the market value per share at June, 30 (balance sheet date) is preferred in this thesis for several reasons. Abrahams and Sidhu (1998) show that there is little difference between the coefficient estimates using share prices at the balance sheet date (June, 30) and the coefficient estimates using share prices three months after the balance sheet date balance sheet date (September, 30). Consequently, some prior studies have used share prices at the balance sheet date (for example, Abrahams and Sidhu, 1998; Goodwin and Ahmed, 2006; Ahmed and Falk, 2006).

Moreover, the Australian market has been found to be semi-strong form efficient (Groenewold and Kang, 1993; Groenewold, 1997). In the semi-strong form of market efficiency, all publicly available information is instantly reflected in share prices. So share prices in the Australian market should reflect the publicly available accounting information as soon as (sometimes before the announcement) it becomes available to the market.

Another reason for choosing the year-end (balance sheet date) share prices is that the GFC had started in the USA by September, 2007. Investors in the Australian market could have perceived the impact of the GFC by September, 2007. Because this thesis considers the year 2007 as the NCP, considering share prices at September, 30 might have altered the results.

Although the main results of the thesis have been derived using share prices at the balance sheet date, as a robustness test, all the models are estimated using share prices at September, 30.

# 5.7.2 Constructs of independent variables

This thesis examines the impact of the GFC on the value relevance of book value, earnings, CFO, tangible assets, intangible assets and goodwill. So the independent variables are book value per share (BV), earnings per share (E), CFO per share (CFO), tangible assets per share (BVINT), intangible assets per share (INTG) and goodwill per share (G). This section discusses different independent variables used in this thesis.

#### 5.7.2.1 Book value of equity per share (BV)

BV is the book value per share at the end of year t for firm i. Total book value of equity is divided by the number of shares outstanding to calculate the BV.

# 5.7.2.2 Earnings per share (E)

E is the reported earnings per share for firm i during year t. This definition of E is consistent with Brimble and Hodgson (2007).

#### 5.7.2.3 Cash flow from operations per share (CFO)

CFO is defined as the total cash flow from operations divided by the number of shares outstanding for firm i during year t. This definition of CFO is consistent with Hodgson and Stevenson- Clarke (2000), Farshadfar (2008), Habib (2008), Banker, Huang and Natarajan (2009) and Habib (2010).

#### 5.7.2.4 Dummy variable for the GFC (CP)

A dichotomous variable that takes the value of 1 for the year 2008 and 2009 and 0 for the year 2004, 2005, 2006 and 2007. In the robustness analysis, the definition of CP is changed, where; CP takes the value of 1 for the year 2007-2009 and 0 for the year 2004-2006.

## 5.7.2.5 Book value excluding intangible assets (BVINT)

Book value per share excluding intangible assets and goodwill. This variable is a proxy for tangible assets, derived as total book value minus total intangible assets including goodwill divided by the number of shares outstanding. This variable is consistent with Bugeja and Gallery (2006), Al-Jifri and Citron (2010) and Oliveira, Rodrigues and Craig (2010).

# 5.7.2.6 Intangible assets excluding goodwill (INTG)

Intangible assets per share excluding goodwill per share. This variable has been derived as total intangible assets excluding goodwill divided by the number of shares outstanding. This variable is consistent with Bugeja and Gallery (2006), Al-Jifri and Citron (2010) and Oliveira, Rodrigues and Craig (2010).

# 5.7.2.7 Goodwill (G)

Reported goodwill per share. Measured as total reported goodwill divided by the number of shares outstanding. This variable is consistent with Bugeja and Gallery (2006), Al-Jifri and Citron (2010) and Oliveira, Rodrigues and Craig (2010).

## 5.7.3 Control variables used

Various control variables used in this thesis are described in this section.

#### 5.7.3.1 Leverage (LEV)

LEV as a dummy variable assumes a value of 1 if firm i has above median leverage during year t, 0 otherwise. Leverage is measured as total liabilities divided by total assets. This variable controls for the differential effect of leverage on the value relevance of book value and earnings.

## 5.7.3.2 Size (SIZE)

The dummy variable SIZE takes a value of 1 if firm i has above median firm size during year t, 0 otherwise. Firm size is measured as the beginning of the year market value of equity. This variable controls for the differential effect of firm size on the value relevance of book value and earnings. The definition of firm size is consistent with Brimble and Hodgson (2007).

#### 5.7.3.3 Negative earnings (NEG)

A dichotomous variable that takes a value of 1 if a firm reports negative earnings during year t, 0 otherwise. This variable controls for the differential effect of negative earnings on the value relevance of book value and earnings. It is also used as a control variable to control for the effect of negative earnings on the value relevance of tangible assets, intangible assets and goodwill.

#### 5.7.3.4 Return on equity (ROE)

ROE takes a value of 1 if the absolute value of ROE of firm i is above the median of absolute value of ROE during year t, 0 otherwise. This variable controls for the differential effect of extreme ROE on the value relevance of book value and earnings.

#### 5.7.3.5 Continuing loss (CONTLOSS)

CONTLOSS is assigned a value of 1 if firm i has negative earnings continuously for last three years, 0 otherwise. CONTLOSS is used as a proxy for firms' deteriorating financial health. This variable controls for the differential effect of firms' deteriorating financial health on the value relevance of book value and earnings.

#### 5.7.3.6 Market to book value ratio (MTBV)

A dichotomous variable that takes a value of 1 if the firm has a MTBV <1, 0 otherwise. This variable is consistent with Li and Meek (2006) and Lapointe-Antunes, Cormier and Magnan (2009). This variable controls for the differential effect of firms' MTBV ratio on the value relevance of tangible assets, intangible assets and goodwill.

As discussed earlier in section 5.4.4, to control for the effects of different contextual factors on the value relevance of earnings and CFO, firms are divided into two equal groups based on the median value of each contextual factor under consideration (size, leverage, growth option, accruals levels, earnings permanence and CFO permanence). Instead of using the dummy variable approach to control for the effect of contextual factors, Model 5, 5a, 1 and 6 are estimated separately for all the context-based sub-samples.

A list of variables used in this thesis is shown below:

# List of variables used in the thesis

- MV = Market value of equity per share at June, 30;
- BV = Book value per share;
- E = Earnings per share;
- CFO = Cash flow from operations per share;
- CP = A dichotomous variable that takes a value of 1 for the year 2009 and 2008, and 0 for the year 2007 to 2004. A proxy for indicating the GFC;
- NEG = A dummy variable assigned a value of 1 if the firm reports negative earnings during year t, 0 otherwise;

- ROE = A dummy variable that assumes a the value of 1 if the absolute value of ROE of firm i is above the median of absolute value of ROE during year t, 0 otherwise;
- LEV = A dummy variable assuming a value of 1 if firm i has above median leverage during year t, 0 otherwise. Leverage is measured as total liabilities divided by total assets;
- SIZE = A dummy variable assigned a value of 1 if firm i has above median firm size during year t, 0 otherwise. Firm size is measured as firms' beginning of the year market value of equity;
- CONTLOSS = A dummy variable, assigned a value of 1 if firm i has negative earnings continuously for last three years, 0 otherwise. CONTLOSS is used as a proxy for firms' deteriorating financial health;
- BVINT = Book value per share excluding intangible assets and goodwill. A proxy for tangible assets;
- INTG = Intangible assets per share excluding goodwill;
- G = Reported goodwill per share;
- MTBV = A dichotomous variable assuming a value of 1 if the firm's market value to book value ratio is less than 1, 0 otherwise;
- $\lambda_1$ .... $\lambda_n$  are indicator variables representing industry dummies.

The above variables have been used either as individual or as interaction variables.

# 5.8 Econometric specification issues and diagnostic tests

#### 5.8.1 Issue of hetereskedasticity

Heteroskedasticity arising from cross-sectional scale differences is a real problem for the VRR in accounting. Usually heteroscedasticity occurs in cross-section regressions when the error terms have unequal variances. Discordant arguments are found in the literature on the methods of dealing with the problem of heteroskedasticity (Kothari and Zimmerman, 1995; Eston, 1998; Barth and Clinch, 2009). Specifically, the literature is silent as to how the scale differences cause inference problems in a particular setting.

Lubberink and Pope (2005) specify three ways to mitigate the problem of heteroskedasticity. The first approach is to do nothing and estimate the regressions by applying a White (1980) heteroskedasticity adjusted standard error. Hand and Landsman (2005) also supports this approach. Although this method is simple, it is not always adequate to control for the scale

effects (Lubberink and Pope, 2005). The second alternative is to introduce additional independent variables into the model as scale proxies. These scale proxies are sometimes referred to as the control variables. Barth and Kallapur (1996) and Barth and Clinch (1998) also advocate for this approach. However, Lubberink and Pope (2005) criticise this approach for introducing imperfect proxies for the unobserved scale differences. As a third approach, variables in the regressions are deflated by a scale proxy such as beginning of the year market value (Eston and Sommer, 2003), book value (Ali and Hwang, 2000; Kothari and Shanken, 2003; Core, Guay and VanBuskirk, 2003), number of shares (Davis-Friday, Eng and Liu, 2006; Oliveira, Rodrigues and Craig, 2010) and total aseets (Al-Jifri and Citron, 2009).

Barth and Clinch (2009) formally compare different alternative scale proxies and conclude that the results obtained using variables on a per share basis and the results obtained using undeflated variables are the most unbiased estimates. In this thesis variables have been used on a per share basis. Variables which are not available on a per share basis have been deflated by the number of shares outstanding at the end of the year to express them on a per share basis. In addition to expressing variables on a per share basis, regressions are estimated with White (1980) heteroskedasticity adjusted t statistic and standard errors.

Sometimes deflating variables by a scale variable creates spurious scale proxy. When the scale is spurious, it creates autocorrelation problem (Kim, 1999). To check the robustness of the result, all the regressions are also estimated using undeflated variables.

#### 5.8.2 Removing outlier observations

One of the important assumptions of the classical linear regression estimation is that each observation affects the estimation output proportionately. If the sample contains outlier observations, the estimation may be biased. Different methods have been suggested in the literature to remove outlier observations. One approach is to exclude certain percentage of data from either tail of the sample (Bugeja and Gallery, 2006). Another approach is to apply Cook's distance (D-statistic) in identifying and removing outlier observations (Wilson, 1997; Lapointe-Antunes, Cormier, and Magnan, 2009). Wilson (1997) suggests that Cook's distance is more accurate in detecting outlier observations. Cook's distance is calculated using the following formula:

$$D_i = \frac{\sum_{j=1}^n (\widehat{Y}_j - \widehat{Y}_{j(i)})^2}{pMSE}$$

Where,

 $\hat{Y}_j$  is the prediction from the full regression model for observation j;

 $\hat{Y}_{j(i)}$  is the prediction for observations *j* from a refitted regression model in which observation *i* has been omitted;

MSE is the mean square error of the regression model;

*p* is the number of fitted parameters in the model;

Observations with a Cook's D > 1 are considered outlier and should be examined closely (Wilson, 1997; Lapointe-Antunes, Cormier and Magnan, 2009).

The present study employs two methods to deal with outlier observations. Firstly, consistent with Dahmash, Durand and Watson (2008) top and bottom 2 per cent of the observations are removed based on firms' market capitalisation. This approach is applied during the sample selection process. During the regression estimation, observations with Cook's D >1 (if any) are removed. Thus the final estimation includes observations with Cook's D <1.

# 5.8.3 Issue of multicollinearity

Multicollinearity occurs when there is a linear relationship between independent variables. In the presence of multicollinearity, the contribution of each independent variable is difficult to determine. The standard errors are large, and consequently, the t-values may not be valid. Kennedy (1998, p 187) suggests the use of correlation matrix to detect multicollinearity. Kennedy (1998) suggests that a high value (about 0.80 to 0.90)<sup>57</sup> of correlation coefficient between any pair of independent variables suggests potential multicollinearity problem between the variables.<sup>58</sup> In this thesis correlation coefficients between independent variables are considered for any potential multicollinearity problem.

<sup>&</sup>lt;sup>57</sup>Gujrati (2003) suggests that if the correlation coefficient between two independent variables is above 0.80, then multicollinearity is a serious problem.

<sup>&</sup>lt;sup>58</sup>High colinearity between independent variables is not always a bad thing. If the independent variables with high correlations are significantly associated with the dependent variable, the high level of correlations should not be of concerns.

#### 5.8.4 Autocorrelation tests

Traditional linear regression assumes that the disturbances (errors) of the regression are not correlated with each other and they have equal variances (Kennedy, 1998, p. 43). When the co-variances and the correlations between different disturbances are not zero, the disturbances (error terms) are autocorrelated. Existence of auto-correlation violates the normality assumptions and may produce biased results. To test if there is significant level of autocorrelations in the data, Durbin-Watson statistic is used. Durbin–Watson statistic equal to 2.00 implies that there is no autocorrelation. A Durbin- Watson statistic greater than 2.50 or less than 1.50 implies the problem of autocorrelations. Kennedy (1998) suggests that the closer the Durbin -Watson statistic is to 2.00, the more confidence we can have that there is no autocorrelation. In this thesis, Durbin–Watson statistic is considered to examine the autocorrelation.

## 5.9 Concluding remarks

This chapter discusses the research design issues to test the hypotheses developed in chapter four. The sample selection procedure, different models and methods used for hypotheses testing have been justified. The empirical methods discussed throughout this chapter are applied for empirically testing different hypotheses developed in chapter four. Different variables are also defined. As discussed throughout the chapter, complementary approaches have been adopted in testing different hypotheses. The empirical results are discussed in chapter six, seven and eight. Chapter six examines the impact of the GFC on the value relevance of book value and earnings (Phase One). Chapter seven investigates the incremental and relative value relevance of earnings and CFO and the impact of the GFC on the value relevance of earnings and CFO (Phase Two). Chapter eight examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill (Phase Three).

# **CHAPTER SIX**

# VALUE RELEVANCE OF BOOK VALUE AND EARNINGS

#### 6.1 Introduction

A set of testable hypotheses was developed in chapter four. In chapter five, empirical models were developed to test those hypotheses. This chapter examines the hypotheses relating to the value relevance of book value and earnings and the changes thereof between the GFC and the NCP (Phase 1 of the empirical analysis). In examining the value relevance of book value and earnings, the relative and incremental value relevance of book value and earnings, and the changes in the relative and incremental value relevance of book value and earnings between the GFC and the NCP are examined.<sup>59</sup> The relative and incremental value relevance of book value and earnings are examined separately for both the positive earnings sample and negative earnings sample along with the combined sample with both positive earnings and negative earnings.<sup>60</sup> In addition to the examination of the relative and incremental value relevance of book value and earnings in terms of their explanatory power (adjusted Rsquare), the changes in the value relevance of book value and earnings are examined by the changes in their coefficients between the GFC and the NCP. Several robustness tests are performed considering alternative specifications and using a number of control variables. Test results for the three hypotheses are presented in sections 6.6, 6.7 and 6.8. Different robustness tests are presented in section 6.9. Results are summarised in section 6.10. A critical discussion on the results is presented in section 6.11.

# 6.2 Descriptive statistics: variables are on a per share basis

Table 6-1 shows the descriptive statistics of market value per share (MV), book value per share (BV), earnings per share (E) and cash flow from operations per share (CFO). The variables MV, BV and CFO are positively skewed which implies that their means are greater than their median. The variable E is negatively skewed which implies that the median of earnings is greater than the mean. Skewness and kurtosis statistics together suggest that the variables are not normally distributed even after they are expressed on a per share basis. To remove the heteroskedasticity problem arising out of the non-normal distributions,

<sup>&</sup>lt;sup>59</sup>Similar methods have been used by Graham, King and Bailes (2000), Collins, Maydew and Weiss (1997) and King and Langli (1997) to examine the relative and incremental value relevance of book value and earnings in different country contexts.

<sup>&</sup>lt;sup>60</sup>Hereinafter, the word combined sample is used to imply the total firm-year observations with both positive earnings and negative earnings firms.

regressions are estimated with White (1980) heteroskedasticity consistent standard errors and t-statistic.

Panel A: 2009							
	Ν	Minimu	Maximum	Mean Std.		Skewne	Kurtosis
		m			Deviation	SS	
MV	976	0.002	121.350	1.344	5.109	17.646	395.573
BV	976	0.020	5.430	0.639	0.966	2.584	10.299
Е	976	-4.612	1.561	0.019	0.322	-6.496	82.847
CFO	976	-3.027	3.198	0.021	0.346	2.669	40.686
			Panel B:	2008			
MV	940	0.001	120.350	1.110	5.624	15.402	286.685
BV	940	0.010	5.440	0.608	0.933	2.641	10.558
E	940	-5.421	6.342	0.011	0.420	0.436	109.404
CFO	940	-19.822	127.910	0.017	5.882	16.363	322.573
			Panel C:	2007			
MV	911	0.005	90.500	1.938	5.828	9.935	124.723
BV	911	0.010	5.280	0.598	0.922	2.540	9.648
E	911	-11.768	5.294	0.028	0.536	-11.895	222.886
CFO	911	-1.500	10.572	0.030	0.635	12.334	215.388
			Panel D:	2006			
MV	765	0.004	75.500	1.730	4.399	9.853	141.799
BV	765	0.010	4.980	0.543	0.871	2.759	10.943
E	765	-13.581	1.468	0.033	0.351	-18.105	405.489
CFO	765	-3.727	3.237	0.046	0.599	1.953	52.876
			Panel E:	2005			
MV	694	0.003	39.450	1.501	3.295	6.116	56.313
BV	694	0.010	5.290	0.590	0.956	2.566	9.607
Е	694	-10.340	1.676	0.011	0.350	-14.232	276.273
CFO	694	-1.565	3.294	0.018	0.523	4.620	35.582
			Panel F:	2004			
MV	599	0.004	24.060	1.524	2.806	3.880	22.121
BV	599	0.010	5.240	0.622	0.989	2.446	8.776
Е	599	-9.079	1.612	0.014	0.293	-11.271	189.230
CFO	599	-0.677	2.283	0.013	0.519	3.603	20.918
Panel G: Pool							
MV	4885	0.001	121.350	1.514	4.826	13.571	262.538
BV	4885	0.010	5.440	0.601	0.938	2.594	10.035
Е	4885	-13.581	6.342	0.020	0.514	-12.720	297.918
CFO	4885	-19.822	127.910	0.024	2.603	36.552	1628.497

# **Table 6-1: Descriptive statistics**

The descriptive statistics of different control variables used in Model 4a and the descriptive statistics on different contextual factors considered to examine impact of the GFC on the value relevance of earnings and CFO are presented in Appendix C at the end of this thesis.

The highest mean of market value per share was during 2007 (1.938), whereas, the lowest mean of the market value per share was during 2008 (1.110). This is consistent with the NCP

boom in 2007 in the Australian market and the subsequent decline to the lowest level during the GFC of 2008. The mean of CFO is greater than the mean of E for the pooled sample and for every year of the sample period except 2004. Moreover, the standard deviation of CFO is higher than the standard deviation of earnings. This evidence suggests that earnings is smoother than CFO.

# 6.3 Frequency distributions of positive and negative earnings and positive and negative cash flow from operations (CFO)

Table 6-2 shows the number of firms with negative earnings and negative CFO for each of the six years and for the pooled sample.

	Negative	Positive	Total				
Panel A: 2009							
Earnings per share (E)	536(54.92%)	440(45.08%)	976				
Cash flows from operations (CFO)	516(52.87%)	460(47.13%)	976				
	Panel B: 2008						
Earnings per share (E)	526(55.96 %)	414(44.04 %)	940				
Cash flows from operations (CFO)	532(56.60 %)	368(43.40 %)	940				
	Panel C: 2007						
Earnings per share (E)	471(51.70%)	440(48.30%)	911				
Cash flows from operations (CFO)	489(53.68%)	422(46.32%)	911				
Panel D: 2006							
Earnings per share (E)	400(52.29%)	365(47.71%)	765				
Cash flows from operations (CFO)	403(52.68%)	362(47.32%)	765				
	Panel E: 2005						
Earnings per share (E)	359(51.73%)	335(48.27%)	694				
Cash flows from operations (CFO)	360(51.87)	334(48.13)	694				
Panel F: 2004							
Earnings per share (E)	284(47.41%)	315(52.59%)	599				
Cash flows from operations (CFO)	263(43.91%)	336(56.09%)	599				
Panel G: Pool							
Earnings per share (E)	2576(52.73%)	2309(47.27%)	4885				
Cash flows from operations (CFO)	2563(52.47%)	2322(47.53%)	4885				

**Table 6-2**: Number of firms with negative earnings and negative cash flows

In the combined sample, 52.73 per cent of firms have negative earnings, whereas, 52.47 per cent of firms have negative CFO. Yearly break-down of the negative and positive earnings firms and negative and positive CFO firms suggests that the percentage of firms with negative earnings and negative CFO are increasing over years. The highest percentage of

firms with negative earnings was in 2009 and the highest percentage of firms with negative CFO was in 2008. The high percentage of firms with negative earnings and negative CFO is consistent with recent other Australian studies.<sup>61</sup>

# 6.4 Correlation coefficients among MV, BV, E and CFO

Table 6-3 shows the correlation coefficients among MV, BV, E and CFO for the entire sample period and for the GFC and the NCP sub-periods. Pearson correlation coefficients are shown in the upper diagonal and Spearman rank correlation coefficients are shown in the lower diagonal.

Panel A: 2009-208							
	MV	BV	E	CFO			
MV	1	.409**	.628**	.421**			
BV	.517**	1	.345**	.314**			
Е	.676***	.396**	1	.560**			
CFO	.422**	.450**	.572**	1			
	I	Panel B: 2007-2004	l .				
	MV	BV	Е	CFO			
MV	1	.542**	.593**	.520**			
BV	.573**	1	.664**	.475**			
Е	.619**	.495**	1	.714 <sup>**</sup>			
CFO	.468**	.471**	.682**	1			
Panel C: 2007-2006							
MV BV E CFO							
MV	1	$.560^{**}$	.581**	.461**			
BV	.549**	1	.373**	.388**			
E	.586**	.502**	1	$.708^{**}$			
CFO	.477***	$.488^{**}$	$.708^{**}$	1			
Panel D: Pool							
	MV	BV	E	CFO			
MV	1	.493**	.585***	.483***			
BV	.547**	1	.488***	.447**			
E	.598**	.455**	1	.658**			
CFO	.437**	.462**	.636**	1			

## Table 6-3: Correlation coefficients

\*\*. Correlation is significant at the 0.01 level (2-tailed).

For the pooled sample and for the GFC and the NCP sub-periods, BV is positively correlated with MV implying a positive association between book value and share prices. Correlation

<sup>&</sup>lt;sup>61</sup> Balkrishna, Coulton and Taylor (2007) examine the frequency and magnitude of losses among Australian firms and find that around 40 per cent of the sample observations from 1993 to 2003 have reported losses with losses being highly persistent for several consecutive years. Farshadfar (2008) also finds that 51 per cent of the sample firms have negative earnings.

coefficients between E and MV and between CFO and MV are also positive and significant implying that both E and CFO have positive association with share prices. The correlation coefficients between CFO and E are also significant and positive suggesting that E and CFO move in the same direction. It may be noted that the correlation coefficients of BV and CFO with MV have decreased during the GFC compared to the NCP, whereas, the correlation coefficient E with MV has increased during the GFC compared to the NCP which provide preliminary indication that the association of share prices with book value and CFO has decreased during the GFC compared to the NCP. Of particular note is that the correlation coefficients are not of high magnitude between any two of the independent variables to cause concern about multicollinearity problems. If the correlation coefficients between independent variables are of the magnitude of 0.80 and above, it may cause concern about multicollinearity problem in the regressions (Kennedy, 1998).

#### 6.5 Univariate test of changes in the variables between the GFC and the NCP

The univariate test results for the changes of MV, BV, E, CFO, NEG, negative cash flows (NEC)<sup>62</sup> between the GFC and the NCP are reported in Table 6-4. Although the empirical tests of hypotheses relating to the value relevance of CFO are discussed in chapter 7, as a matter of comparison, descriptive statistics and univariate test results for CFO are reported in this chapter. The comparison of mean between the GFC and the NCP by applying independent sample t-test and Mann-Whitney U test<sup>63</sup> suggest that MV, BV, E and CFO have experienced statistically significant decrease during the GFC compared to the NCP. On the contrary, number of firms with negative earnings and number of firms with negative CFO has increased significantly during the GFC compared to the NCP. These significant changes in the variables between the GFC and the NCP are consistent with the decline in share prices and the deteriorating firm performances during the GFC.

<sup>&</sup>lt;sup>62</sup> NEC is a dichotomous variable taking the value of 1 if firm i reports negative CFO during year t, 0 otherwise.

<sup>&</sup>lt;sup>63</sup>Independent sample T-test is a parametric test and Mann-Whitney U test is a non-parametric test. While parametric tests are based normality assumption of data distribution, non-parametric tests do not require any such assumption on data distribution. Although parametric tests are more powerful than non-parametric tests, results from parametric tests may be biased specifically when the data are not normally distributed.

	Mean		Standard deviation		Independent sample t - test (t-stat)	Mann- Whitney Test: Z
	GFC	NCP	GFC	NCP	GFC vs. NCP	GFC vs. NCP
MV	1.229	1.698	1.941	2.371	-7.762***	-15.066***
BV	0.623	0.586	1.045	1.060	-3.333***	265
Е	0.015	0.022	.327	.448	-1.702*	-3.977***
CFO	0.019	0.028	2.539	.493	-2.328**	816
NEG	0.554	0.509	.479	.497	5.848***	-3.478***
NEC	0.546	0.510	.487	.499	5.772***	-2.316

Table 6-4 : Differences in variables between the GFC and the NCP

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \* Significant at 10 per cent level

#### 6.6 Results of hypothesis testing: value relevance of book value and earnings

Hypothesis 1(a) states that book value and earnings are value relevant. Hypothesis 1(b) states that the value relevance of book value increases during a GFC compared to the NCP. Hypothesis 1(c) states that the value relevance of earnings decreases during a GFC compared to the NCP. To test these hypotheses, the following models have been developed and discussed in chapter five.

## 6.6.1 Value relevance of book value and earnings: hypothesis 1 (a)

Hypothesis 1 (a) is tested by examining the significance of the coefficients  $\beta_1$ ,  $\beta_2$ , in Model 1, 2 and 3. Hypothesis 1 (a) is also tested by examining the incremental value relevance of book value and earnings. To examine the incremental explanatory power of book value and earnings, total explanatory power of book value and earnings (Model 1) is decomposed into the incremental explanatory power attributable to book value, the incremental explanatory power attributable to earnings and the explanatory power common to both book value and

earnings.<sup>64</sup> The incremental explanatory power of book value (earnings) is calculated by deducting the relative explanatory of earnings (book value) from the total explanatory power (adjusted R-square) of book value and earnings (Model 1). The value relevance (explanatory power) common to both book value and earnings is derived by subtracting the incremental explanatory power of book value and earnings from the total explanatory power. Results for the combined sample, positive earnings sample and negative earnings sample are presented in Table 6-5, Panel A, B and C.

# **6.6.1.1** For the combined sample (positive and negative earnings firms together)

Table 6-5, Panel A, reports the results of Model (1), (2) and (3) separately for each year and for the pooled sample. Coefficients of BV are significant for all of the six years in yearly cross-sectional regressions and for the pooled sample in Model (1) and (2). The coefficients of earnings are also significant for all of the six years and for the pooled sample in Model (1) and (3). For the pooled sample, the coefficient of book value is 0.921 and the coefficient of earnings is 6.033 in Model 1. Thus the coefficient of earnings is 6.550 (6.033/0.921) times the coefficient of book value. It implies that 1 cent increase in earnings has 6.550 times more impact on share prices than that of 1cent increase in book value. Put it differently, when 1cent increase in earnings translates into 0.921 cent increase in share prices.

Further note that, the coefficient of BV in Model (2) and the coefficient of E in Model (3) are significant for the pooled sample and for all of the six years. The coefficient of BV is 1.242 for the pooled sample in Model 2 and the coefficient of E is 6.713 for the pooled sample in Model 3, both of the coefficients are significant at 1 per cent level. Thus if only BV is used as explanatory variable, 1 cent increase in the BV translates into 1.242 cents increase in share prices. On the contrary, if only E is used as the explanatory variable, 1 cent increase in share prices. Although the coefficients of both BV and E have experienced movement over years, they are significant for all of the six years. Hence, investors rely on both book value and earnings for stock valuation purposes.

<sup>&</sup>lt;sup>64</sup> Similar method has been applied in Graham, King and Bailes (2000), King and Langli (1998) and Collins, Maydew and Weiss (1997) to decompose the total explanatory power.

It may be noted further that both book value and earnings have explanatory power incremental to each other for the pooled sample and for individual years. For the pooled sample, about 12.04 per cent variation in share prices is explained by book value alone, whereas, 21.61 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value and earnings is 14.50 per cent. However, if the mean of the yearly regressions are considered, about 12.32 per cent variation in share prices is explained by book value alone, whereas, 22.38 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value alone, whereas, 22.38 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value alone, whereas, 22.38 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value alone, whereas, 22.38 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value alone, whereas, 22.38 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value and earnings is very small (12.78 per cent).

The significant coefficients of book value and earnings and the incremental explanatory power of both book value and earnings suggest that both book value and earnings are value relevant. Investors rely on both book value and earnings for stock valuation purposes. Hence, hypothesis 1 (a) is not rejected for the combined sample.

#### 6.6.1.2 For the sample with positive earnings

The coefficients of BV are significant for all of the six years in the yearly cross-sectional regressions and for the pooled sample in Model (1) and (2). The coefficients of earnings are also significant for all of the six years and for the pooled sample for Model (1) and (3). For the pooled sample, the coefficient of book value is 1.241 and the coefficient of earnings is 7.596 in Model 1. Thus the coefficient of earnings is 6.121 times the coefficient of book value. It implies that 1 cent increase in earnings has 6.121 times more impact on share prices than that of 1cent increase in book value. Put it other way, when 1cent increase in earnings translates into 7.596 cents increase in share prices, 1 cent increase in book value translates into 1.241 cents increase in share prices. Similar results are observed for the yearly regressions.

Further note that, the coefficients of BV in Model (2) and the coefficients of E in Model (3) are significant for the pooled sample and for all of the six years. The coefficient of BV is 1.570 for the pooled sample in Model 2 and the coefficient of E is 8.080 for the pooled sample in Model 3, both of the coefficients are significant at 1 per cent level. Thus if only BV is used as the explanatory variable, 1 cent increase in the BV translates into 1.570 cents increase in share prices. On the contrary, if only E is used as the explanatory variable, 1 cent increase in share prices. Although the coefficients of
both BV and E have experienced movement over years, they are significant for all of the six years. Hence, investors rely on both book value and earnings for stock valuation purposes.

It may be noted further that both book value and earnings have explanatory power incremental to each other. For the pooled sample, about 12.80 per cent variation in share prices is explained by book value alone, whereas, 22.18 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value and earnings is 22.63 per cent. As a matter of comparison, if the mean of the yearly regressions are considered, about 9.67 per cent variation in share prices is explained by book value alone, whereas, 19.34 per cent variation in share prices is explained by earnings alone. The explanatory power set is explained by earnings alone. The explanatory power is explained by book value alone, whereas, 19.34 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value and earnings is 27.71 per cent.

The significant coefficients of book value and earnings and the incremental explanatory power of both book value and earnings suggest that both book value and earnings are value relevant. Hence, the results for the positive earnings sample support hypothesis 1(a).

## 6.6.1.3 For the sample with negative earnings

The coefficients of BV are significant for all of the six years and for the pooled sample in Model (1) and (2). The coefficients of earnings are also significant for all of the six years and for the pooled sample in Model (1) and (3). For the pooled sample, the coefficient of book value is 0.846 and the coefficient of earnings is -0.550 in model 1.<sup>65</sup> Thus, in terms of absolute value, the coefficient of book value is 1.53 times the coefficient of earnings. It implies that 1 cent increase in book value has 1.53 times more impact on share prices than that of 1cent increase in negative earnings. Put it other way, when 1 cent increase in negative earnings translates into 0.550 cents increase in share prices, 1 cent increase in book value

<sup>&</sup>lt;sup>65</sup>It is important to note that the coefficients of earnings for the sample of firms with negative earnings are negative for the pooled sample and for different sub-periods. The negative coefficients for the sample of firms with negative earnings are consistent with Burgstahler and Dichev (1997) and Hayn (1995) in the US context. However, the negative coefficient for negative earnings remains a mystery in the literature. Different authors have offered different explanation for the negative coefficient of the negative earnings. Collins, Pincus and Xie (1999) suggest that the negative coefficients for negative earnings in the stock valuation models arise due to model misspecifications. They suggest that inclusion of book value in the models eliminates the negative coefficients of negative earnings are a manifestation of this misspecification. However, inclusion of book value does not eliminate the negative coefficients of negative earnings in stock valuation model. Graham, King and Bailes (2000) in the context of Thailand and Papadaki and Siougle (2007) in the context of Greece find negative coefficients for negative earnings even after the inclusion of book value. Graham, King and Bailes (2000), however, offer an explanation for the negative coefficients of negative earnings. Because firms' market value cannot be negative, the coefficient of negative earnings assumes a negative sign to make the net effect positive.

translates into 0.846 cents increase in share prices. Similar results are obtained for the yearly regressions.

Further note that, the coefficient of BV in Model (2) and the coefficient of E in Model (3) are significant for the pooled sample and for all of the six years. The coefficient of BV is 0.946 for the pooled sample in Model 2 and the coefficient of E is -0.873 for the pooled sample in Model 3; both of the coefficients are significant at 1 per cent level. Thus, if only BV is used as the explanatory variable, 1 cent increase in BV translates into 0.946 cents increase in share prices. On the contrary, if only E is used as the explanatory variable, 1 cent increase in share prices. Although the coefficients of both BV and E have experienced movement over years, they are significant for all of the six years. Hence, investors rely on both book value and earnings for stock valuation purposes even for firms with negative earnings.

It may be noted further that both book value and earnings have explanatory power incremental to each other. For the pooled sample, about 8.98 per cent variation in share prices is explained by book value alone, whereas, 10.27 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value and earnings is 7.89 per cent. As a matter of comparison, if the mean of the yearly regressions are considered, about 14.22 per cent variation in share prices is explained by book value alone, whereas, 11.12 per cent variation in share prices is explained by earnings alone. The explanatory power is explained by book value alone, whereas, 11.12 per cent variation in share prices is explained by earnings alone. The explanatory power common to both book value and earnings is 6.74 per cent.

The significant coefficients of book value and earnings and the incremental explanatory power of both book value and earnings suggest that both book value and earnings are value relevant. Hence, for negative earnings sample, hypothesis 1 (a) is not rejected.

# 6.6.2 Relative value relevance of book value and relative value relevance of earnings: hypothesis 1(b) and (c)

Hypotheses 1(b) and 1(c) are tested by comparing the relative and incremental value relevance of book value and earnings between the GFC and the NCP. Model 1, 2 and 3 are used to examine the changes in the relative and incremental value relevance of BV and E between the GFC and the NCP.

Hypotheses 1(b) and 1(c) are also tested by examining the coefficients of the interaction terms CP\*BV and CP\*E in Model 4. Specifically, Model 4 is used to examine the changes in the coefficients of BV and E between the GFC and the NCP. Changes in the relative and incremental value relevance are discussed first which are then followed by the discussion on the changes in the coefficients of BV and E. These two methods are used as complementary to each other.

### **6.6.2.1** For the combined sample (positive and negative earnings firms together)

For the pooled sample, the relative explanatory power of earnings is higher than that of book value during both the GFC and the NCP. After controlling for the industry effects, 36.11 per cent variation in share prices can be explained if only earnings is used as an explanatory variable. If only book value is used as the explanatory variable, after controlling for industry effects, 26.54 per cent variation in share prices can be explained.

The mean of the yearly estimates of the explanatory power (adjusted R-square) shown in the last row (Panel A) also indicates that the relative explanatory power of book value (25.11 per cent) is lower than the relative explanatory power of earnings (35.16 per cent). It means that after controlling for the industry effects, 35.16 per cent variation in share prices can be explained if only earnings is used as an explanatory variable. If only book value is used as the explanatory variable, after controlling for the industry effects, 25.11 per cent of variation in share prices can be explained. Figure 6.1 shows the movement in the total value relevance of book value and earnings, the relative value relevance of book value and the relative value relevance of earnings for the combined sample. As is shown in Figure 6.1, the relative explanatory power of earnings exceeded the relative explanatory power of book value for the entire period. Moreover, the relative explanatory power of earnings has increased during the GFC compared to the NCP, whereas, the relative explanatory power of book value has decreased during the GFC compared to the NCP. This evidence suggests that the value relevance of earnings has increased during the GFC and the value relevance of book value has decreased during the GFC. Thus the results for the combined sample do not support either hypothesis 1(b) or hypothesis 1(c) [the potential reasons for not supporting hypotheses 1 (b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

It may be noted further that the yearly coefficients of book value in Model 1 appear to have decreased and the yearly coefficients of earnings appear to have increased during the GFC compared to the NCP. The coefficient of book value has decreased during 2008 and 2009 (to 0.771 and 0.883 respectively) from 2004, 2005, 2006 and 2007 (1.097, 0.979, 1.078, and 1.313 respectively). On the contrary, the yearly coefficient of earnings in Model 1 has increased during 2008 and 2009 (to 6.757 and 7.107 respectively) from 2004, 2005, 2006 and 2007 (5.184, 5.998, 5.945 and 6.858 respectively). Similar trends are observed for the coefficients of BV in Model 2 and for the coefficients of E in Model 3. The coefficient of BV in Model 2 has decreased from 1.527, 1.451, 1.685 and 1.599 during 2004, 2005, 2006 and 2007 to 0.933 and 0.966 during 2008 and 2009 respectively. The coefficient of E in Model 3 has increased from 5.642, 6.330, 6.409 and 7.370 during 2004, 2005, 2006 and 2007 to 7.157 and 7.706 during 2008 and 2009 respectively.

Thus the results for the combined sample, in terms of changes in the explanatory power of book value and earnings and changes in the coefficient estimates of book value and earnings between the GFC and the NCP, suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. These findings do not support either hypothesis 1(b) or hypothesis 1(c) for the combined sample [the potential reasons for not supporting hypotheses 1 (b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

To examine if the results are being influenced by the large number of negative earnings firms in the sample, firms are separated into two sub-samples (for each of the six years), one for firms with positive earnings and the other for firms with negative earnings.<sup>66</sup> Models 1, 2 and 3 are then estimated separately for both of the sub-samples. Results for the positive earnings sample are reported in Panel B, Table 6-5 and results for the negative earnings sample are reported in Panel C, Table 6-5.

<sup>&</sup>lt;sup>66</sup>As discussed in the literature review section, prior literature suggests that the value relevance of book value and earnings are different for firms reporting losses from that of firms reporting profits (Hayn, 1995; Collins Maydew and Weiss, 1997; Goodwin and Ahmed, 2006).

			Pane	el A: All firms (	both positive e	arnings and	l negative earni	ngs)				
	Intercept	BV	E	Total	BV (Model	Relative	E (Model 3)	Relative E	Increme	ental adjusted	d R –square	Relative
				value	2)	book		adjusted				BV
Year	α	$\beta_1$	$\beta_2$	relevance	$\beta_1$	value	$\beta_2$	R-square	Book value	E	Common	VS.
				(adjusted		adjusted						Relative E
				R-square)		R-						
2000	0 (55***	0.002***	7 107***	56.000/	0.066***	square	7 706***	42.010/	12 100/	26 720/	7.000/	E. DV
2009	0.655***	0.883***	/.10/***	56.00%	0.966***	19.28%	/./06***	43.81%	12.19%	36.72%	7.09%	E>B V
t-stat.	10.546	5.015	26.364	47 110/	11.41/	20, 100/	27.307	26 100/	11.010/	27.010/	0.000/	
2008	0.495***	0.//1***	6./5/***	47.11%	0.933***	20.10%	/.15/***	36.10%	11.01%	27.01%	9.09%	E>B V
t-stat.	6./96	4.182	27.398	47.100/	8.168	22.269/	23.205	22.76%	14.260/	22.76%	0.000/	E DV
2007	0.530***	1.313***	6.838***	47.12%	1.599***	23.36%	/.3/0***	32.76%	14.36%	23.76%	9.00%	E>B V
t-stat.	2.514	19.201	5.077	42 400/	21.46/	26.260	9.764	29.060/	15 420/	17.100/	10.040/	
2006	0.217	1.078***	5.945***	43.48%	1.685***	26.36%	6.409***	28.06%	15.42%	17.12%	10.94%	E>B V
t-stat.	1.430	26.127	4.196	40.120/	24.72	27 770/	7.955	24.0.60/	5 1 60/	10.250/	22 (10/	E. DV
2005	0.558***	0.9/9***	5.998***	40.12%	1.451***	21.11%	6.330***	34.96%	5.16%	12.35%	22.61%	E>B V
t-stat.	3.5//	1 007***	8.689	51.000	14.231	22 760	5.191	25.270/	15 700/	17.200/	17.070/	
2004	0.614***	1.09/***	5.184***	51.06%	1.52/***	33.76%	5.642***	35.27%	15.79%	17.30%	17.97%	E>B V
t-stat.	4.362	21.415	11.1/4	40.150/	1/.15/	26 5 40/	/.582	26 110/	12.040/	21 (10)	14.500/	
Pool	0.531***	0.921***	6.033***	48.15%	1.242***	26.54%	6./13***	36.11%	12.04%	21.61%	14.50%	E>B V
t-stat.	17.969	12.560	25.469	47 400/	9.216	25 110/	23.932	25.1.60/	12 220/	22.200/	10 700/	E DV
Mean	0.512	1.020	6.308	47.48%	1.330	25.11%	. 6./69	35.16%	12.32%	22.38%	12.78%	E>BV
2000	0.022	1 101444	0 170***	Panel	B: Firms with	22.190	rnings	<b>50 71</b> 0/	10.000/	20.010/	22.000/	E. DV
2009	-0.033	1.101***	8.1/8***	62.99%	1.459***	33.18%	8.761***	52.71%	10.28%	29.81%	22.90%	E>B V
t-stat.	-0.158	5.790	21.972	65.000/	19.6130	22.220/	36.668	52 510/	11 510/	22.000/	20.010/	
2008	-0.222	1.108***	8.254***	65.22%	1.32/***	32.32%	8.779***	53.71%	11.51%	32.90%	20.81%	E>BV
t-stat.	-1.055	6.708	15.8/5	10.270/	11.042	10 6 10/	17.729	12 110/	C 1 CO/	6.6204	26.400/	
2007	0.471	1.2/1***	8.091***	49.27%	1.869***	42.64%	8.369***	43.11%	6.16%	6.63%	36.48%	E>BV
t-stat.	1.066	6.834	7.487	50 5 (0)	13.660	10.250/	14.299	10.040/	10.000	10.410/	20.520/	
2006	0.005	1.139***	6.669***	59.76%	1.893***	40.35%	7.788***	48.94%	10.82%	19.41%	29.53%	E>BV
t-stat.	0.018	2.626	14.139		21.308	20.000/	26.541	12 0004	4.550/	<b>7 5</b> 00/	25.4404	
2005	0.787**	1.267***	7.884***	47.57%	1.7/4***	39.98%	8.082***	43.00%	4.57%	7.59%	35.41%	E>BV
t-stat.	2.419	14.438	9.586		10.838	0.5.5.5.	3.120	40.070		10 5	01 ( 01)	
2004	0.946***	1.172***	6.732***	55.50%	1.738***	35.75%	6.958***	40.85%	14.65%	19.75%	21.10%	E>BV
t-stat.	3.634	15.940	10.621		13.721		5.734					

# Table 6-5: Relative and incremental value relevance of book value and earnings: the GFC and the NCP comparison from yearly regressions

Pool	0.241	1.241***	7.596***	57.61%	1.570***	35.43%	8.080***	44.81%	12.80%	22.18%	22.63%	E>BV
t-stat.	1.392	13.630	20.813		32.859		31.393					
Mean	0.326	1.176	7.635	56.72%	1.676	37.37%	8.120	47.06%	9.67%	19.34%	27.71%	E>BV
	Panel C: Firms with negative earnings											
2009	0.356***	0.614**	-0.712***	25.76%	0.676***	11.72%	-0.926***	21.77%	3.99%	14.04%	7.73%	E>BV
t-stat.	6.118	2.134	-5.575		3.261		-5.628					
2008	0.183***	0.713*	-0.557***	21.34%	0.753***	13.03%	-0.959***	19.41%	1.93%	8.31%	11.10%	E>BV
t-stat.	6.464	1.847	-7.060		2.920		-7.118					
2007	0.358***	0.872***	-0.454**	31.40%	0.956***	20.42%	-0.652***	16.50%	14.90%	10.98%	5.52%	BV>E
t-stat.	7.502	9.104	-2.522		10.577		-6.589					
2006	0.297***	1.027***	-0.468***	38.88%	1.379***	26.76%	-1.277***	16.95%	21.93%	12.12%	4.83%	BV>E
t-stat.	5.430	11.310	-9.994		14.693		-13.707					
2005	0.319***	0.988***	-0.411	36.04%	0.951***	25.73%	-0.729***	15.20%	20.84%	10.31%	4.89%	BV>E
t-stat.	6.696	10.195	-1.538		10.821		-3.531					
2004	0.266***	1.006***	-0.261**	39.03%	1.076***	28.07%	-0.741***	17.32%	21.71%	10.96%	6.36%	BV>E
t-stat.	3.825	14.063	-2.500		16.217		-6.752					
Pool	0.228***	0.846***	-0.550***	27.14%	0.946***	16.87%	-0.873***	18.16%	8.98%	10.27%	7.89%	E>BV
t-stat.	7.279	4.701	-4.262		5.621		-6.527					
Mean	0.297	0.870	-0.480	32.08%	0.919	20.96%	-0.881	17.86%	14.22%	11.12%	6.74%	BV>E

(Table 6-5 continued)

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level.

Where,  $MV_{it} = Market$  value of equity per share at end of the year (30 June);

BV<sub>it</sub>= Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

 $\alpha_{it}$ = Intercept;

 $\varepsilon_{it.}$  =Error term;

 $\lambda_1$ ..... $\lambda$ n are indicator variables representing the industry dummy.

#### 6.6.2.2 For the sample with positive earnings

For the pooled sample, the relative explanatory power of earnings is higher than that of book value during both the GFC and the NCP. After controlling for the industry effects, 44.81 per cent variation in share prices can be explained if only earnings is used as an explanatory variable. If only book value is used as the explanatory variable, after controlling for industry effects, 35.43 per cent of variation in share prices can be explained.

The mean of the yearly estimates of the explanatory power (adjusted R-square) shown in the last row (of Panel B) also indicates that the relative explanatory power of book value (37.37 per cent) is lower than the relative explanatory power of earnings (47.06 per cent). It means that after controlling for the industry effects, 47.06 per cent variation in share prices can be explained if only earnings is used as an explanatory variable. If only book value is used as the explanatory variable, after controlling for the industry effects, 37.37 per cent variation in share prices can be explained. Figure 6.2 shows the movement in the total value relevance of book value and earnings, the relative value relevance of book value and the relative value relevance of earnings for the positive earnings has increased during the GFC compared to the NCP, the relative explanatory power of book value has decreased during the GFC compared to the NCP.

It may be noted further that the coefficient estimates of book value has decreased during the GFC compared to the NCP. The coefficient of book value has decreased during 2008 and 2009 (1.108 and 1.101 respectively) from 2004, 2005, 2006 and 2007 (1.172, 1.267, 1.139 and 1.271 respectively). On the contrary, the coefficient of earnings has increased during 2008 and 2009 (8.254 and 8.178 respectively) from 2004, 2005, 2006 and 2007 (6.732, 7.884, 6.669 and 8.091 respectively).

Similar trends are observed for the coefficients of BV in Model 2 and for the coefficients of E in Model 3. The coefficient of BV in Model 2 has decreased from 1.738, 1.774, 1.893 and 1.869 during 2004, 2005, 2006 and 2007 to 1.327 and 1.459 during 2008 and 2009 respectively. The coefficient of E in Model 3 has increased from 6.958, 8.082, 7.788 and 8.369 during 2004, 2005, 2006 and 2007 to 8.779 and 8.761 during 2008 and 2009 respectively.

Thus the results for the positive earnings sample, in terms of changes in the explanatory power of book value and earnings and changes in the coefficient estimates of book value and earnings between the GFC and the NCP, suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. These results do not support either hypothesis 1(b) or hypothesis 1(c) [the potential reasons for not supporting hypotheses 1 (b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

## 6.6.2.3 For the sample with negative earnings

In the pooled sample, after controlling for the industry effects, 18.16 per cent variation in share prices can be explained if only earnings is used as an explanatory variable. If only book value is used as the explanatory variable, after controlling for industry effects, 16.87 per cent of variation in share prices can be explained. Thus in the pooled estimation, the relative explanatory power of E is higher than that of BV.

On the contrary, the mean of the yearly estimates of the explanatory power (adjusted R-square) shown in the last row (Panel C) indicates that the relative explanatory power of book value (20.96 per cent) is higher than the relative explanatory power of earnings (17.86 per cent). It means that after controlling for the industry effects, 17.86 per cent variation in share prices can be explained if only earnings is used as the explanatory variable. If only book value is used as the explanatory variable, after controlling for the industry effects, 20.96 per cent of variation in share prices can be explained.

The relative explanatory power of book value is higher than that of earnings during the NCP. On the contrary, the relative explanatory power of earnings is higher than that of book value during the GFC. Figure 6.3 shows the movement in the total value relevance of book value and earnings, the relative value relevance of book value and the relative value relevance of earnings for the negative earnings sample. The relative explanatory power of book value has decreased during the GFC compared to the NCP. The relative explanatory power of earnings has increased during the GFC compared to the NCP. The decrease in the relative explanatory power of book value is more pronounced than the increase in the relative explanatory power of earnings for negative earnings sample.

It may be noted further that the coefficient estimate of book value has decreased during the GFC compared to the NCP. The coefficient of book value has decreased during 2008 and 2009 (0.713 and 0.614 respectively) from 2004, 2005, 2006 and 2007 (1.006, 0.988, 1.027, 0.872 respectively). On the contrary, the coefficient of earnings has increased during 2008 and 2009 (-0.557 and -0.712 and respectively) from 2004, 2005, 2006 and 2007 (-0.261, - 0.411, -0.468 and -0.454 respectively). Similar trends are observed for the coefficient of BV in Model 2 and for the coefficient of E in Model 3. The coefficient of BV in Model 2 has decreased from 1.076, 0.951, 1.379 and 0.956 during 2004, 2005, 2006 and 2007 to 0.753 and 0.676 during 2008 and 2009 respectively. The coefficient of E in Model 3 has increased from -0.741, -0.729, -0.677 and -0.625 during 2004, 2005, 2006 and 2007 to -0.959 and -0.926 during 2008 and 2009 respectively.

Thus the results for the negative earnings sample, in terms of changes in the explanatory power of book value and earnings and changes in the coefficient estimates of book value and earnings between the GFC and the NCP, suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. These results do not support either hypothesis 1(b) or hypothesis 1(c) [the potential reasons for not supporting hypotheses 1 (b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

It may be noted further that the coefficients of both book value and earnings for the sample of firms with positive earnings are relatively larger than that of the sample of firms with negative earnings. While the positive earnings sample has positive coefficients on earnings, the negative earnings sample has negative coefficients on earnings.

The lower explanatory power of the pooled regression coupled with the increase in the value relevance of earnings and the decrease in the value relevance of book value may suggest a possible structural break in the relationship of book value and earnings with share prices between the GFC and the NCP. The possible structural breaks are examined in section 6.7, estimating Model 1, 2 and 3 separately for the GFC (2008-2009) and the NCP (2004-2007) sub-periods.



Figure 6.1: Combined sample: total value relevance, relative value relevance of book value and relative value relevance of earnings

Figure 6.2: Positive earnings sample: total value relevance, relative value relevance of book value and relative value relevance of earnings



Figure 6.3: Negative earnings sample: total value relevance, relative value relevance of book value and relative value relevance of earnings





Figure 6.6: Negative earnings sample: incremental value relevance of book value, incremental value relevance of earnings and common value relevance

# 6.6.3 Changes in the incremental and common value relevance (explanatory power) of book value and earnings between the GFC and the NCP: hypothesis 1(b) and 1(c)

# **6.6.3.1** For the combined sample (positive and negative earnings firms together)

Figure 6.4 shows the yearly movement in the total value relevance of book value and earnings, the incremental value relevance of book and the incremental value relevance of earnings for the combined sample. It is apparent that earnings has greater incremental value relevance than book value during both the GFC and the NCP. The incremental value relevance of book value has decreased during the GFC (2008 and 2009) compared to the NCP (2004-2007). Conversely, the incremental explanatory power of earnings has increased during the GFC (2008-2009) compared to the NCP (2004-2007). Due to the increase in the explanatory power of earnings and the decrease in the explanatory power of book value, the common value relevance of book value and earnings has decreased during the GFC compared to the NCP.

#### 6.6.3.2 For the sample with positive earnings

Figure 6.5 shows the movement in the total value relevance of book value and earnings, the incremental value relevance of book and the incremental value relevance of earnings for the positive earnings sample. It is apparent that the incremental value relevance of book value has not changed with any obvious trend during the GFC compared to the NCP. On the contrary, the incremental value relevance of earnings has increased during the GFC compared to the NCP. Moreover, during the GFC, the incremental explanatory power of earnings is higher than that of book value. It is important to note that the common value relevance of book value and earnings is relatively high for the positive earnings sample compared to the combined sample and the negative earnings sample. Moreover, the common explanatory power has not decreased to a large extent.

#### 6.6.3.3 For the sample with negative earnings

Figure 6.6 shows the movement in the total value relevance of book value and earnings, the incremental value relevance of book and the incremental value relevance of earnings for the negative earnings sample. It is apparent that the incremental value relevance of book value has decreased during the GFC compared to the NCP, whereas, the incremental value

relevance of earnings has increased during the GFC (2009) compared to the NCP. The common explanatory power of book value and earnings is relatively low compared to the positive earnings sample.

Summing up, the results suggest that the incremental value relevance of book value has decreased and the incremental value relevance of earnings has increased during the GFC compared to the NCP. These results also do not support hypotheses 1(b) or 1(c) [the potential reasons for not supporting hypotheses 1 (b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

# 6.7 A further look at the differences in the value relevance of book value and earnings during the GFC and the NCP: hypothesis 1 (b) and 1 (c)

Further insights into the differences in the value relevance of book value and earnings during the GFC and the NCP can be gained from the sub-period analysis and from the structural break tests. The entire sample period is divided into 2004-2007, 2006 -2007 and 2008-2009 sub-periods. The results of the sub periods are presented in Table 6-6.

# 6.7.1 The relative value relevance of book value and the relative value relevance of earnings

## 6.7.1.1 For the combined sample (positive and negative earnings firms together)

Results for the combined sample are reported in Panel A, Table 6-6. The total explanatory power (adjusted R-square) of book value and earnings has increased from 41.12 per cent during the NCP to 51.21 per cent GFC. The relative explanatory power of book has decreased during the GFC compared to the NCP (from 26.52 per cent to 22.64 per cent). Conversely, the relative explanatory power of earnings has increased during the GFC compared to the NCP (relative explanatory power of earnings during the NCP is 28.59 per cent and during the GFC it is 39.31 per cent). These evidences imply that during the GFC, 22.64 per cent variation in share prices can be explained when only book value is used as the explanatory variable as against 39.31 per cent variation in share prices that can be explained if only earnings is used as the explanatory variable, after controlling for the industry effects. During the NCP, 26.52 per cent variation in share prices can be explained if only book value is used as the explanatory variable as against 28.59 per cent variation in share prices that can be explained when only book value is used as the explanatory variable as against 28.59 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable, after controlling for the industry effects.

To examine if there was any structural break in the association of book value and earnings with firms' market value between the GFC and the NCP, Chow (1960) F-tests for structural breaks are performed estimating Model 1, 2 and 3 separately for the pooled sample (2004-2009), for the NCP (2004-2007) sub-sample and for the GFC (2008-2009) sub-sample.

Chow test (1960) suggests that there was a structural break in the association of firms' market value with firms' book value and earnings between the GFC and the NCP. The structural break has resulted from the significant increase in the value relevance of earnings during the GFC compared to the NCP and a corresponding decrease in the value relevance of book value during the GFC compared to the NCP [total value relevance (Model 1), F = 31.172; relative value relevance of book value (Model 2), F = 21.219; relative value relevance of earnings (Model 3), F = 25.735; and all the F values are significant at 1 per cent level]. The significant Chow F test statistic suggests that the shift in the relative importance from book value to earnings is significant.

In Model 1, the coefficient of book value has decreased during the GFC compared to the NCP (during the GFC  $\beta_1 = 0.792$  and during the NCP  $\beta_1 = 1.005$  in Model 1). It implies that 1 cent increase in the book value translates into 0.792 cents increase in share prices during the GFC and into 1.005 cents increase in share prices during the NCP. On the contrary, the coefficient of earnings has increased during the GFC compared to the NCP (during the GFC  $\beta_2 = 6.780$  and during the NCP  $\beta_2 = 5.816$ ). It implies that 1 cent increase in earnings translates into 6.780 cents increase in share prices during the GFC and into 5.816 cents increase in share prices during the NCP. Similar results are found for the coefficients of book value in Model 2 and earnings in Model 3. The coefficient of E in Model 2 has decreased from 1.541 during the NCP to 0.950 during the GFC and the coefficient of E in Model 3 has increased from 6.342 during the NCP to 7.242 during the GFC. Thus the changes in the relative explanatory power and the changes in the association of share prices with book value and earnings suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP.

## 6.7.1.2 For the positive earnings sample

Results for the positive earnings sample are shown in Panel B, Table 6-6. The total explanatory power of book value and earnings has increased during the GFC compared to the NCP (total adjusted R-square during the GFC =63.44 per cent; total adjusted R-square during the NCP = 51.84 per cent). The relative explanatory power of book value has decreased during the GFC compared to the NCP and the relative explanatory power of earnings has increased during the GFC compared to the NCP (relative book value adjusted R-square during the GFC = 32.24 per cent, during the NCP = 37.58 per cent; relative earnings adjusted R-square during the GFC = 47.47 per cent; during the NCP =41.53 per cent). These evidences imply that during the GFC, 32.24 per cent variation in share prices can be explained when only book value is used as the explanatory variable as against 47.47 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable as against 41.53 per cent variation in share prices that can be explained if only earnings is used as an explanatory variable, after controlling for the industry effects.

Chow F test statistics suggest that there was a structural break in the association of accounting measures with firms' market value implying that the decrease in the explanatory power (changes in the R-squares) of book value and the increase in the explanatory power (changes in the R-squares) of earnings are significant [total value relevance (Model 1), F = 29.201; relative value relevance of book value (Model 2), F = 14.307; and relative value relevance of earnings (Model 3), F = 16.138; all the F-values are significant at 1 per cent level]. The significant Chow F test statistic suggests that the shift in the relative importance from book value to earnings is significant.

In Model 1, the coefficient of book value has decreased during the GFC compared to the NCP ( $\beta_1 = 0.822$  during the GFC and  $\beta_1 = 1.419$  during the NCP). It implies that 1 cent increase in the book value translates into 0.822 cents increase in share prices during the GFC and into 1.419 cents increase in share prices during the NCP. On the contrary, the coefficient of earnings has increased during the GFC compared to the NCP (during the GFC  $\beta_2 = 8.136$  and during the NCP  $\beta_2 = 7.241$ ). It implies that 1 cent increase in earnings translates into 8.136 cents increase in share prices during the GFC and into 7.241 cents increase in share

prices during the NCP. Similar results are found for book value in Model 2 and for earnings in Model 3. The coefficient of BV in Model 2 has decreased from 1.807 during the NCP to 1.372 during the GFC and the coefficient of E in Model 3 has increased from 7.763 during the NCP to 8.701 during the GFC.

Thus the changes in the relative explanatory power and the changes in the coefficient estimates of book value and earnings coupled with the structural breaks in the association of share prices with book value and earnings suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP.

### 6.7.1.3 For the negative earnings sample

The results for the negative earnings sample are shown in Panel C, Table 6-6. The total explanatory power of book value and earnings has decreased from 34.77 per cent during the NCP to 25.97 per cent during the GFC, the relative explanatory power of book value has decreased from 27.79 per cent during the NCP to 12.50 per cent during the GFC and the relative explanatory power of earnings has increased from 17.21 per cent during the NCP to 23.17 per cent during the GFC. These evidences imply that during the GFC, 12.50 per cent variation in share prices can be explained when only book value is used as the explanatory variable as against 23.17 per cent variation in share prices can be explained when only book value is used as the explanatory the NCP, 27.79 per cent variation in share prices can be explained if only earnings is used as the explanatory variable as against 17.21 per cent variation in share prices that can be explained when only book value is used as the explanatory variable as against 17.21 per cent variation in share prices that can be explained if only earnings is used as the explanatory variable as against 17.21 per cent variation in share prices that can be explained if only earnings is used as the explanatory variable as against 17.21 per cent variation in share prices that can be explained if only earnings is used as the explanatory variable as against 17.21 per cent variation in share prices that can be explained if only earnings is used as the explanatory variable after controlling for the industry effects.

Chow F test statistics suggest that there was a structural break in the association of accounting measures with firms' market value implying that the decrease in the explanatory power (changes in the R-squares) of book value and the increase in the explanatory power (changes in the R-squares) of earnings are significant [total value relevance (Model 1), F=25.174; relative book value relevance (Model 2) F = 17.041 and relative earnings value relevance (Model 3) F=14.317; all the F values are significant at 1 per cent level)]. The

significant Chow F test statistic suggests that the shift in the relative importance from book value to earnings is significant.

Furthermore, the coefficient of book value has decreased during the GFC compared to the NCP ( $\beta_1 = 0.526$  during the GFC and  $\beta_1 = 0.889$  during the NCP). It implies that 1 cent increase in book value translates into 0.526 cents increase in share prices during the GFC and into 0.889 cents increase in share prices during the NCP. On the contrary, the coefficient of earnings has increased during the GFC compared to the NCP (during the GFC  $\beta_2 = -0.742$  and during the NCP  $\beta_2 = -0.368$ ). It implies that 1 cent increase in earnings translates into 0.742 cents increase in share prices during the GFC and into 0.368 cents increase in share prices during the NCP. Similar results are obtained for the coefficients of book value in Model 2 and earnings in Model 3. The coefficient of BV in Model 2 has decreased from 1.095 during the NCP to 0.691 during the GFC. On the contrary, the coefficient of E in Model 3 has increased from -0.839 during the NCP to -0.951 during the GFC.

Thus the results obtained from the sub-periods analysis and the Chow structural break tests suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. These results do not support hypothesis 1(b) and 1(c) [the potential reasons for not supporting hypotheses 1(b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

# 6.7.2 Changes in the incremental value relevance and common value relevance of book value and earnings between the GFC and the NCP: hypothesis 1(b) and 1(c)

The incremental and the common explanatory power of book value and earnings are also shown in Table 6-6. For the combined sample, book value has incremental explanatory power of 12.04 per cent, whereas, earnings has an incremental explanatory power of 21.61 per cent. The explanatory power common to both book value and earnings is 14.50 per cent. Sub-period analysis reveals that the incremental explanatory power of book value has decreased and the incremental explanatory power of earnings has increased during the GFC compared to the NCP. The incremental explanatory power of BV has decreased from 12.53 per cent during 2004-2007 to 11.90 per cent during 2008-2009. The incremental explanatory power of earnings has increased from 14.60 per cent during 2004-2007 to 28.57 per cent during 2008-2009. The portion of variation in share prices explained commonly by both book value and

earnings has been relatively low for most of the sample periods with further decline during the GFC (13.99 per cent during 2004-2007, 14.20 per cent during 2006-2007 and 10.74 per cent during 2008-2009).

For the positive earnings sample, the incremental value relevance of book value and earnings has increased during the GFC compared to the NCP [incremental explanatory power (adjusted R-square) of book value during the GFC = 15.97 per cent, during the NCP = 10.31 per cent; incremental explanatory power (adjusted R-square) of earnings during the GFC = 31.20 per cent, during the NCP = 14.26 per cent; explanatory power (adjusted R-square) common to both book value and earnings during the GFC = 16.27 per cent, during the NCP = 27.27 per cent].

For the negative earnings sample, the incremental value relevance of book value has decreased from 17.56 per cent during the NCP to 2.80 per cent during the GFC. The incremental value relevance of earnings has increased from 6.98 per cent during the NCP to 13.47 per cent during the GFC. Value relevance common to book value and earnings has decreased from 10.23 per cent during the NCP to 9.70 per cent during the GFC.

	Intercept	BV	Е	Total value	BV		E		Incremen	ntal adjusted l	R –square	
				relevance (adjusted								
Year	α	βι	β <sub>2</sub>	R-square)	βι	Relative book value adjusted R- square	β <sub>2</sub>	Relative E adjusted R- square	Book value	E	Common	Relative Book value VS. Relative Earnings
				Pane	1 A: All firms	square						Earnings
Pooled	0.531***	0.921***	6.033***	48.15%	1.242****	26.54%	6.713***	36.11%	12.04%	21.61%	14.50%	E>BV
t-stat.	17.969	12.560	25.469		9.216		23.932	/-				
2008-09	0.996***	0.792***	6.780***	51.21%	0.950***	22.64%	7.242***	39.31%	11.90%	28.57%	10.74%	E>BV
t-stat.	4.338	16.118	7.108		29.611		4.699					
2006-07	0.406***	1.472***	6.487***	42.20%	1.662***	27.05%	6.961***	29.35%	12.85%	15.15%	14.20%	E>BV
t-stat.	3.876	17.439	6.011		22.830		8.905					
2004-07	0.620***	1.005***	5.816***	41.12%	1.541***	26.52%	6.342**	28.59%	12.53%	14.60%	13.99%	E>BV
t-stat.	10.211	10.880	5.633		4.240		2.563					
Chow test : F-statistics				31.172***		21.219***		25.735***				
				Panel B: Firms	with positive ear	nings						
Pooled	0.241	1.241***	7.596***	57.61%	1.570***	35.43%	8.080***	44.81%	12.80%	22.18%	22.63%	E>BV
t-stat.	1.392	13.630	20.813		32.859		31.393					
2008-09	-0.150***	0.822***	8.136***	63.44%	1.372***	32.24%	8.701***	47.47%	15.97%	31.20%	16.27%	E>BV
t-stat.	-2.300	14.224	4.446		8.659		3.153					
2006-07	0.264	1.435***	7.422***	53.87%	1.875***	41.89%	8.093***	44.98%	8.89%	11.98%	33.00%	E>BV
t-stat.	1.562	6.849	5.515		17.317		9.891					
2004-07	1.106***	1.419***	7.241***	51.84%	1.807***	37.58%	7.763**	41.53%	10.31%	14.26%	27.27%	E>BV
t-stat.	7.544	16.451	8.453		6.885		2.069					
Chow test : F-statistics				29.201***		14.307***		16.138***				
				Panel C: Firms	with negative ear	nings						
Pooled	0.228***	0.846***	-0.550***	27.14%	0.946***	16.87%	-0.873***	18.16%	8.98%	10.27%	7.89%	E>BV
t-stat.	7.279	4.701	-4.262		5.621		-6.527					
2008-09	0.272***	0.526**	-0.742***	25.97%	0.691***	12.50%	-0.951***	23.17%	2.80%	13.47%	9.70%	E>BV
t-stat.	8.263	2.466	-8.046		2.599		-9.338					
2006-07	0.321***	0.996***	-0.415***	34.85%	1.203***	29.26%	-0.914***	17.48%	17.37%	5.59%	11.89%	BV > E
t-stat.	8.655	14.794	-8.449		18.429		-17.591					
2004-07	0.321***	0.889***	-0.368***	34.77%	1.095***	27.79%	-0.839***	17.21%	17.56%	6.98%	10.23%	BV > E
t-stat.	11.500	21.77	-9.442		25.314		-11.913					
Chow test : F-statistics				25.174***		17.041***		14.317***				

# Table 6-6: Relative and incremental value relevance of book value and earnings: the GFC and the NCP comparison

\*\*\*Significant at 1 per cent level;\*\*Significant at 5 per cent level; \*Significant at 10 per cent level

Model 3:  $MV_{it} = \alpha + \beta_2 E_{it} + \lambda_1 \dots \lambda + \varepsilon_{it}$ 

# 6.8 Model with a dummy variable 'CP' for the GFC for the formal test of changes in the coefficients of book value and earnings between the GFC and the NCP: test of hypothesis 1(b) and 1(c)

Hypothesis 1(b) states that the value relevance of book value increases during a GFC compared to the NCP. Hypothesis 1(c) states that the value relevance of earnings decreases during a GFC compared to the NCP. In the previous sections (6.6 and 6.7) of this chapter, the changes in the relative explanatory power of book value and earnings have been discussed. The findings suggest that the relative explanatory power of book value has decreased and the relative explanatory power of earnings has increased during the GFC compared to the NCP. It has also been noted in the yearly regressions and in different sub-period analysis that the coefficient estimate of book value has decreased and that of earnings has increased during the GFC compared to the NCP. As a formal test of the changes in the coefficients of book value and earnings, results obtained for Model 4 are discussed in this section. Hypothesis 1(b) and 1(c) are tested by examining the coefficients of the interaction terms CP\*BV ( $\beta_4$ ) and CP\*E  $(\beta_5)$  in Model 4. In keeping with Hypothesis 1(b) and Hypothesis 1(c), the predictions are  $\beta_4$ >0 and  $\beta_5 < 0$ . Statistically significant coefficients for CP\*BV and CP\*E imply that the valuation weights (coefficient estimates) of BV and E have changed during the GFC compared to the NCP. Moreover, the sign of their coefficients will indicate the direction of such changes. The results are reported in Table 6 -7.

# 6.8.1 The combined sample (positive and negative earnings firms together)

The results for the combined sample are presented in Panel A. The coefficient of the dummy variable "CP" indicating the GFC is negative and significant which is consistent with the fact that share prices have decreased during the GFC compared to the NCP.

Results from Model 4 suggest that the value relevance of book value has decreased during the GFC ( $\beta_4$  = -.612 and significant at 1 per cent level) compared to the NCP. However, the value relevance of earnings has increased during the GFC ( $\beta_5$  = 3.005 and significant at 1 per cent level) compared to the NCP. Put it differently, every 1 cent of book value translates into share prices 0.612 cent less during the GFC compared to the NCP. Every 1 cent of earnings translates into share prices 3.005 cents more during the GFC compared to the NCP. Similar results are observed when the NCP is defined as 2006-2007. The coefficient  $\beta_4$  (-0.579) is negative and significant, whereas, the coefficient  $\beta_5$  (2.692) is positive and significant. Both

of the coefficients are significant at 1 per cent level. These evidences do not support hypotheses 1(b) or 1(c) for the combined sample [the potential reasons for not supporting hypotheses 1(b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

#### 6.8.2 The positive earnings sample

For the sample of firms with positive earnings, the coefficient of the interaction term BV\*CP ( $\beta_4$ ) is negative (-0.597) and significant, whereas, the coefficient of the interaction term E\*CP ( $\beta_5$ ) is positive (3.532) and significant. Hence, every 1 cent of book value translates into share prices 0.597 cent less during the GFC compared to the NCP. On the contrary, every 1 cent of earnings translates into share prices 3.532 cents more during the GFC compared to the NCP. The results are similar when the definition of the NCP is reduced to 2006-2007 ( $\beta_4$ = -0.393 and  $\beta_5$  =3.632). These results suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP for firms with positive earnings. These evidences do not support hypotheses 1(b) or 1(c) for the positive earnings sample.

# 6.8.3 The negative earnings sample

For the negative earnings sample, the coefficient of the interaction term BV\*CP ( $\beta_4$ ) is negative (-0.678) and significant. However, the coefficient of the interaction term E\*CP ( $\beta_5$ ) is also negative (-0.373) and marginally significant. Put it differently, every 1 cent of book value translates into share prices 0.678 cent less during the GFC compared to the NCP. Every 1 cent of earnings translates into share prices 0.373 cents more during the GFC compared to the NCP. The results are similar when the definition of the NCP is reduced to 2006-2007 ( $\beta_4$ =-0.785,  $\beta_5$  = -0.326; both of the coefficients are significant). Hence, for the negative earnings sample, the value relevance of book value has decreased during the GFC compared to the NCP, whereas, the value relevance of earnings has become further negative during the GFC compared to the NCP. These evidences do not support hypotheses 1(b) and 1(c) for the negative earnings sample.

It is noticeable that the adjusted R-square for the positive earnings sample is higher than those of the combined sample and the negative earnings sample. Also note that the coefficients of both book value and earnings ( $\beta_1$  and  $\beta_2$ ) and their interaction terms with CP  $(\beta_4 \text{ and } \beta_5)$  are of high magnitude for the positive earnings sample compared to the negative earnings sample. This evidence is consistent with yearly regressions using Model 1, 2 and 3.

Panel A: All firms											
	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	$\beta_5$	Adj. R <sup>2</sup>	F-stats.	Durbin-Watson		
Pooled	0.620***	1.355***	3.025***	-0.375	612***	3.005***	58.48%	568.443***	1.998		
(2004-2009)	(10.210)	(10.878)	(5.632)	(-1.581)	(-10.369)	(8.140)					
Pooled	0.406***	1.472***	6.287*	-0.590***	579***	2.692***	53.40%	520.496***	1.978		
(2006-2009)	(2.769)	(8.001)	(1.874)	(-3.429)	(-7.525)	(3.509)					
Panel B: Only positive earnings											
	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	Adj. R <sup>2</sup>	F-stats.			
Pooled	1.106***	1.419***	5.695**	-1.256***	597***	3.532***	64.53%	348.039***	1.984		
(2004-2009)	(5.825)	(9.626)	(4.947)	(-5.008)	(-4.201)	(4.566)					
Pooled	0.264	1.315**	6.795***	-0.414**	-0.393**	3.632***	61.52%	382.366***	1.295		
(2006-2009)	(0.873)	(2.242)	(2.593)	(-2.203)	(-2.756)	(2.298)					
				Panel C: Only r	negative earnings						
	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	$\beta_5$	Adj. R <sup>2</sup>	F-stats.			
Pooled	0.321***	1.189***	-0.368**	-0.048*	-0.678***	-0.373*	34.82%	168.669***	2.043		
(2004-2009)	(10.059)	(5.582)	(-2.310)	(-2.113)	(-5.493)	(-1.907)					
Pooled	0.321***	1.126***	-0.415*	-0.048*	-0.785***	-0.326*	31.81%	101.970***	2.060		
(2006-2009)	(7.714)	(5.132)	(-1.939)	(-1.946)	(-5.070)	(-1.925)					

Table 6-7: Value relevance of book value and earnings: test of changes in the coefficient of book value and earnings between the GFC and the NCP

\*\*\*Significant at 1 per cent level; \*Significant at 5 per cent level; \*Significant at 10 per cent level. (t-statistics in the parenthesis).

Model 4:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CP + \beta_4 CP + BV_{it} + \beta_5 CP + E_{it} + \lambda_1 \dots \lambda_n + \varepsilon_{it} \dots (4)$ 

Where,  $MV_{it} = Market$  value of equity per share at end of the year (30 June);

 $BV_{it}$  = Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CP =Indicator variable for the GFC, taking the value of 1 for year 2009 and 2008, and 0 for year 2007, 2006, 2005 and 2004;

 $\alpha_{it} = Intercept;$ 

 $\varepsilon_{it.}$  =Error term;

 $\lambda_1$ .... $\lambda$ n are indicator variables representing the industry dummy.

### 6.9 Robustness test for hypothesis 1(a), hypothesis 1(b) and hypothesis 1(c)

Different robustness tests are performed corroborating the findings relating to hypotheses 1(a), 1(b) and 1(c). Results are obtained estimating the models using cross-sectional fixed effect, considering alternative date for share prices (September 30) and using undeflated variables. In addition to these robustness tests, Model 4 is also estimated considering alternative definition of the GFC and the NCP. Moreover, Model 4 is extended using control variables identified as contextual factors affecting the value relevance of book value and earnings. The rationale for the inclusion of these control variables has been discussed in the research design chapter (chapter five). The results of these robustness tests are briefly presented in the following sub-sections.

### 6.9.1 Value relevance of book value and earnings: hypothesis 1(a)

Results presented in Table 6-8 suggest that the coefficients of both BV and E are significant across different alternative specifications. These results support hypothesis 1(a) which states that both book value and earnings are value relevant.

# 6.9.2 Relative value relevance and incremental value relevance: hypothesis 1(b) and 1(c)

Results presented in Table 6-8 suggest that in case of all robustness tests, the relative value relevance of book value (explanatory power/adjusted R-square of Model 2) has decreased during the GFC compared to the NCP. On the other hand, in case of all the alternative specifications, the relative value relevance of earnings (explanatory power/adjusted R-square of Model 3) has increased during the GFC compared to the NCP. It is also important to note that incremental value relevance of book value has decreased during the GFC compared to the NCP across all the alternative specifications. Conversely, the incremental value relevance of earnings has increased across all the sub-samples. Also note that the coefficient estimate of BV has decreased and the coefficient estimate of E has increased during the GFC compared to the NCP in case of all alternative specifications.

These findings are not consistent with hypothesis 1(b) which states that the value relevance of book value increases during a GFC compared to the NCP. The results are also not consistent

with hypothesis 1(c) which states that the value relevance of earnings decreases during a GFC compared to the NCP. Hence, the results are robust to different alternative specifications.

	Intercept	BV	E	Total	BV		E		Increme	ental adjusted	R –square	
Year	α	β1	$\beta_2$	value	β1	Relative	$\beta_2$	Relative E	Book	E	Common	Relative
				relevan		book value		adjusted R-	value			Book value
				ce		adjusted R-		square				VS.
				(adjust		square						Relative
				ed R-								Earnings
				square)								
				Panel A: Un	deflated variab	les						
Pooled	51947.31***	1.612***	5.351***	71.81%	2.794***	48.86%	8.873***	61.79%	10.02%	22.95%	38.84%	E>BV
t-stat.	2.765	59.202	48.598		187.148		171.068					
2008-09	-53862.64	1.228***	8.811***	73.26%	1.636***	42.41%	9.653***	63.55%	8.71%	29.85%	33.70%	E>BV
t-stat.	-1.893	54.111	20.520		135.50		88.621					
2006-07	147724.1***	1.804***	5.311***	71.40%	3.370***	52.28%	9.559***	59.57%	14.83%	22.12%	37.45%	E>BV
t-stat.	4.857	24.815	39.305		119.945		139.421					
2004-07	108902.1***	1.380***	5.134***	71.63%	3.186***	51.78%	7.019***	58.72%	15.91%	22.85%	35.87%	E>BV
t-stat.	5.470	37.376	56.490		152.478		180.103					
Chow test : F-statistics				34.241***		21.527***		18.097***				
Panel B: Cross-section fixed effect model												
Pooled	1.184***	1.514***	3.663***	77.04%	1.329***	64.32%	3.332***	66.16%	10.88%	1.84%	53.44%	E>BV
t-stat.	6.178	5.616	25.861		19.602		12.011					
2008-09	1.023***	0.864***	3.917***	85.76%	0.830**	54.01%	4.740***	74.06%	11.70%	31.75%	42.31%	E>BV
t-stat.	3.54E+12	3.39E+11	37.736		2.351		2.897					
2006-07	0.217***	1.785***	3.736***	84.10%	2.120***	67.44%	3.589***	69.19%	14.91%	16.66%	52.53%	E>BV
t-stat.	5.42E+11	3.90E+12	42.715		8.729		5.408					
2004-07	0.970***	1.358***	3.441***	75.74%	1.448***	66.10%	3.175***	65.65%	10.09%	9.64%	56.01%	BV>E
t-stat.	13.235	15.981	13.482		17.839		3.625					
Chow test : F-statistics				26.124***		17.380***		15.007***				
	•		Pa	nel C: Alternativ	ve date for share	e prices (Septen	ber, 30)			•		•
Pooled	0.748***	1.189***	4.453***	37.57%	1.292***	16.50%	3.816***	28.08%	9.49%	21.07%	7.01%	E>BV
t-stat.	12.394	44.426	12.939		37.729		14.728					
2008-09	0.239***	.921***	4.878***	43.39%	1.101***	11.35%	5.128***	32.03%	11.36%	32.04%	-0.01%	E>BV
t-stat.	3.945	47.058	20.087		50.995		25.174					
2006-07	0.713***	1 813***	4.209***	39.58%	1.959***	22.35%	4.762***	28.80%	10.78%	17.23%	11.57%	E>BV
t-stat	5.356	27.209	4.147	07.0070	27.358	22.0070	7.559	2010070	101/0/0	17.2070	1110770	2,2,
2004-07	1.102***	1.579***	4 597***	36.61%	1.677***	20.03%	3 577***	27.34%	9.27%	16.58%	10.76%	E>BV
t-stat.	11.935	26.129	8.333	00.0170	21.176	20.0270	9.108	27.0 . / 0	2.27.70	10.0075	10.7070	2, 2,
Chow test : F-statistics				19.138***		16.027***		12.728***				

#### Table 6-8: Robustness test on hypothesis 1(a), 1(b) and 1(c): the GFC and the NCP comparison of the relative and incremental value relevance of book value and earnings

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*\*\*Significant at 10 per cent level

 $Model 1: MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 ... .. \lambda n + \epsilon_{it}.$ 

Model 2:  $MV_{it} = \alpha + \beta_1 BV_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ 

Model 3:  $MV_{it} = \alpha + \beta_2 E_{it} + \lambda_1 \dots \lambda_n + \varepsilon$ 

# 6.9.3 Robustness test of changes in the coefficient estimates of book value and earnings between the GFC and the NCP (Model 4)

## 6.9.3.1 Fixed effect models

The results of Model 4 estimated using cross-sectional fixed effects panel regression are presented in Table 6-9, Panel A. As is apparent, the coefficient of the interaction term CP\*BV ( $\beta_4$ ) is negative and significant, whereas, the coefficient of the interaction term CP\*E ( $\beta_5$ ) is positive and significant. Similar results are obtained when the definition of the NCP is reduced to 2006-2007. These results suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP.

# 6.9.3.2 Variables are undeflated

Result of the regression of Model 4 using undeflated variables are presented in Table 6-9, Panel B. Model using undeflated variables has higher explanatory power than the estimation using deflated variables. This is consistent with the existing literature (for example, Dahmash, Durand and Watson, 2009). The basic findings are similar to the results obtained by using variables deflated by number of shares. The coefficient of  $\beta_4$ = -0.448 and the coefficient of  $\beta_5$  = 2.822 and both of the coefficients are significant at 1 per cent level. Similar results are obtained by changing the definition of the NCP to include 2006-2007. Thus the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP.

#### 6.9.3.3 Alternative date for share prices (September, 30)

As discussed under section 5.7.1.1 in the research design chapter, some studies have used the dependent variable (share prices) at 30 September to allow sufficient time for share prices to reflect the accounting information. The main analysis of this thesis has been conducted using share prices at June 30. As a robustness test, Model 4 is estimated considering share prices at September 30. The results are reported in Table 6-9, Panel C. The results are similar to the results obtained using firms' market value at June 30. The coefficient of  $\beta_4$ = -0.541 and the coefficient of  $\beta_5$  = 2.019 and both of the coefficients are significant at 1 per cent level. Similar results are obtained by changing the definition of the NCP to include 2006-2007. The

value relevance of earnings has increased during the GFC compared to the NCP, whereas, the value relevance of book value has decreased during the GFC compared to the NCP.

Hence, the results obtained based on various robustness tests do not support hypothesis 1(b) which states that the value relevance of book value increases during a GFC compared to the NCP. The results also do not support hypothesis 1(c) which states that the value relevance of earnings decreases during a GFC compared to the NCP [the potential reasons for not supporting hypotheses 1(b) and 1(c) are discussed in sub-sections 6.11.3 and 6.11.4].

	Panel A: Fixed effect panel regression										
	α	$\beta_1$	β <sub>2</sub>	β <sub>3</sub>	β <sub>4</sub>	β <sub>5</sub>	Adj. R <sup>2</sup>	F-stats.			
Pooled (2004-	1.397***	1.353***	4.178***	-0.133	-0.521***	1.540**	81.52%	28.703***			
2009)	(7.352)	(6.174)	(4.638)	(-1.128)	(-2.926)	(2.055)					
Pooled (2006-	1.650***	1.466***	3.021***	-0.230**	-0.637***	1.137***	83.41%	44.568***			
2009)	(8.891)	(11.133)	(3.076)	(-1.989)	(-4.428)	(3.197)					
Panel B: Variables are undeflated											
	α	$\beta_1$	β <sub>2</sub>	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	Adj. R <sup>2</sup>	F-stats.			
Pooled (2004-	108902.1***	1.380***	3.134***	-162764.7***	-0.448***	2.822***	75.29%	14384.87***			
2009)	(5.104)	(36.677)	(52.714)	(-4.839)	(9.205)	(24.594)					
Pooled (2006-	147724.1***	1.404***	3.911***	-201586.8***	-0.424***	2.600***	77.91%	10002.55***			
2009)	(4.782)	(24.428)	(36.794)	(-4.829)	(6.380)	(18.422)					
	•		Panel C: Alternativ	e date for share pric	es (September, 30)						
	α	$\beta_1$	β <sub>2</sub>	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	Adj. R <sup>2</sup>	F-stats.			
Pooled (2004-	1.102***	1.379***	5.482***	-0.863***	-0.541***	2.019***	58.19%	526.893***			
2009)	(14.188)	(31.060)	(9.905)	(-7.198)	(-9.348)	(10.427)					
Pooled (2006-	0.713***	1.113***	4.361***	-0.474***	-0.292***	2.141***	60.14%	601.476***			
2009)	(6.974)	(35.427)	(5.399)	(-3.496)	(-4.187)	(11.001)					

Table 6-9: Robustness test of changes in the coefficient estimates of book value and earnings between the GFC and the NCP: fixed effect panel regression, variables are undeflated and alternative date (30 September) for share prices

\*\*\*Significant at 1 per cent level, \*\*Significant at 5 per cent level.

Model 4:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CP + \beta_4 CP * BV_{it} + \beta_5 CP * E_{it} + \varepsilon_{it}$  (For cross-section fixed effect panel regression)

Model 4:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CP + \beta_4 CP * BV_{it} + \beta_5 CP * E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$  (For least square regressions)

Where,  $MV_{it} = Market$  value of equity per share at end of the year (30 June);

 $BV_{it}$ = Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CP =Indicator variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007, 2006, 2005 and 2004. An indicator variable for the GFC;

 $\alpha_{it} = intercept;$ 

 $\varepsilon_{it} = error term;$ 

 $\lambda_1$ ..... $\lambda$ n are indicator variables representing industry dummies.

## 6.9.4 Alternative definition of the GFC and the NCP

To examine whether the results are sensitive to the alternative definition of the GFC and the NCP, the period of 2004-2006 is defined as the NCP and the period of 2007-2009 is defined as the GFC.<sup>67</sup> Model 4 is then estimated with this alternative definition of the GFC and the NCP. Results are reported in Table 6-10.

The results suggest that the coefficient  $\beta_4$  is negative and statistically significant for the combined sample, the positive earnings sample and the negative earnings sample. The coefficient  $\beta_5$  is positive and significant for the combined sample and for the positive earnings sample. On the contrary, the coefficient  $\beta_5$  is negative but not significant for the sample of firms reporting losses. Thus, the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC under the alternative definition of the GFC. Therefore, the results are not sensitive to the alternative definition of the GFC. However, it may be noted that the coefficient estimates of both  $\beta_4$  and  $\beta_5$  are smaller under this alternative definition of the GFC and the NCP than the coefficient estimates of  $\beta_4$  and  $\beta_5$  obtained considering the years 2008 and 2009 as the GFC (Table 6-7). These evidences justify the definition of the GFC and the NCP used in this thesis.

<sup>&</sup>lt;sup>67</sup>Detailed discussions on the alternative definition of the GFC and the NCP is provided in chapter five (Research Design Chapter).

	α	$\beta_1$	β <sub>2</sub>	β <sub>3</sub>	β4	β <sub>5</sub>	Adj. R <sup>2</sup>	F-stats.		
			Panel	A: Combined S	ample					
Pooled	0.624***	1.784***	4.055***	-0.663***	-0.309***	2.124***	50.70%	403.885***		
(2004-2009)	(6.109)	(28.076)	(12.368)	(-5.171)	(-24.683)	(31.358)				
			Panel B:	Positive earning	gs sample					
Pooled	1.042***	1.279***	3.801***	-0.954***	252***	2.367***	63.38%	421.830***		
(2004-2009)	(5.433)	(22.078)	(13.181)	(-3.803)	(-9.743)	(22.023)				
	Panel C: Negative earnings sample									
Pooled	0.301***	0.766***	-0.479***	0.054	-0.394***	-0.005	32.62%	149.533***		
(2004-2009)	(8.704)	(19.040)	(-9.587)	(1.235)	(-18.645)	(-0.077)				

Table 6-10: Robustness test of the results using alternative definition of the GFC and the NCP (GFC =2007-2009; NCP = 2004-2006)

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level.

Model 4:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CP + \beta_4 CP * BV_{it} + \beta_5 CP * E_{it} + \lambda_1 \dots \lambda_n + \varepsilon_{it}$ .

Where,  $MV_{it} = Market$  value of equity per share at end of the year (30 June);

BV<sub>it</sub>= Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CP =Indicator variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007, 2006, 2005 and 2004. An indicator variable for the GFC;

 $\alpha_{it} = intercept;$ 

 $\varepsilon_{it} = error term;$ 

 $\lambda_1$ .... $\lambda$ n are indicator variables representing industry dummies.

# 6.9.5 Model with control variables

As discussed under the literature review, the value relevance of book value and earnings may be impacted by different contextual factors such as negative earnings, extreme return on equity (ROE), firm size, leverage and firms' deteriorating financial health (detailed discussion provided in the literature review chapter). To control for the effect of these contextual factors, Model 4 is extended by controlling for the effects of negative earnings, extreme ROE, leverage, size and continuing negative earnings (as a proxy for firms' deteriorating financial health). Results are reported in Table 6-11.

controlling for the cheet	s of negative cut migs,	gs, extreme itol, ieverage, size and continuing 1055						
		Pooled (2004-2009)	Pooled (2006-2009)					
	α	0.874*** (8.696)	0.207* (1.831)					
BV <sub>it</sub>	$\beta_1$	1.124*** (25.361)	1.024*** (19.100)					
E <sub>it</sub>	$\beta_2$	3.143*** (17.989)	3.675*** (11.469)					
СР	β <sub>3</sub>	-0.687*** (-3.504)	-0.786*** (-3.275)					
CP*BV <sub>it</sub>	β <sub>4</sub>	-0.318*** (-3.349)	-0.394*** (-3.134)					
CP*E <sub>it</sub>	β <sub>5</sub>	2.381*** (11.409)	2.598*** (17.115)					
NEG*BV <sub>it</sub>	$\beta_6$	0.342*** (4.443)	0.218** (2.453)					
NEG*E <sub>it</sub>	β <sub>7</sub>	-0.374*** (-3.264)	-0.730*** (-12.884)					
ROE*BV <sub>it</sub>	β <sub>8</sub>	0.054 (1.444)	0.074** (2.446)					
ROE*E <sub>it</sub>	β9	-0.042 (-1.352)	-0.068*** (-3.784)					
LEV*BV <sub>it</sub>	$\beta_{10}$	0.342*** (4.443)	0.218** (2.453)					
LEV*E <sub>it</sub>	β <sub>11</sub>	0.515*** 12.803)	0.474*** (8.446)					
SIZE*BV <sub>it</sub>	β <sub>12</sub>	0.369* (1.859)	381*** (11.409)					
SIZE*E <sub>it</sub>	β <sub>13</sub>	-0.475** (-2.163)	-0.837*** (-17.427)					
CONTLOSS*BV <sub>it</sub>	β <sub>14</sub>	-0.219*** (-5.053)	-0.165** (-2.531)					
CONTLOSS*E <sub>it</sub>	β <sub>15</sub>	-0.492*** (-13.013)	-0.314*** (-8.045)					
Adj. R <sup>2</sup>		79.51%	75.74%					
F-stats.		713.035***	658.327***					
Durbin Watson statistics		2.351	2.146					

Table 6-11: Impact of the GFC on the value relevance of book value and earnings after controlling for the effects of negative earnings, extreme ROE, leverage, size and continuing loss

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level.

**Model 4a:**  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CP + \beta_4 CP^* BV_{it} + \beta_5 CP^* E_{it} + \beta_6 NEG^* BV_{it} + \beta_7 NEG^* E_{it} + \beta_8 ROE^* BV_{it} + \beta_9 ROE^* E_{it} + \beta_{10} LEV^* BV_{it} + \beta_{11} LEV^* E_{it} + \beta_{12} SIZE^* BV_{it} + \beta_{13} SIZE^* E_{it} + \beta_{14} CONTLOSS^* BV_{it} + \beta_{15} CONTLOSS^* E_{it} + \lambda_1 \dots \lambda_n + \varepsilon_{it}.$ 

Where,

 $MV_{it}$  = Market value of equity per share at end of the year (30 June);

BV<sub>it</sub>= Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CP =Indicator variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007, 2006, 2005 and 2004. An indicator variable for the GFC;

- NEG = Dummy variable taking the value of 1 if the firm reports negative earnings during year t, 0 otherwise;
- ROE = Dummy variable taking the value of 1 if the absolute value of ROE of the firm is above the median of absolute value of ROE, 0 otherwise;
- LEV = Dummy variable taking the value of 1 if the firm has above median leverage, 0 otherwise. Leverage is measured as total liabilities divided by total assets;
- SIZE = Dummy variable taking the value of 1 if the firm has above median firm size, 0 otherwise. Firm size is measured as firms' beginning of the year market value of equity;
- CONTLOSS = Dummy variable, taking the value of 1 if the firm has negative earnings continuously for last three years, 0 otherwise. CONTLOSS is used as a proxy for firms' deteriorating financial health.

All other variables are as defined before.

Consistent with the results obtained earlier, the coefficient of the interaction term CP\*BV ( $\beta_4$ ) is negative and significant, whereas, the coefficient of the interaction term CP\*E ( $\beta_5$ ) is positive and significant. These results suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP even after controlling for the effects of different contextual factors such as negative earnings, extreme ROE, firm size, leverage and firms' deteriorating financial health.

Among the control variables, value relevance of book value increases for firms having negative earnings, extreme ROE, above median leverage and above median size. On the contrary, the value relevance of book value decreases in the presence of continuing loss. Value relevance of earnings decreases for firms having negative earnings, extreme ROE, above median size and continuing losses. However, the value relevance of earnings increases for high leverage firms.

# 6.10 Summary of the findings

This chapter investigates three hypotheses. Hypothesis 1(a) states that book value and earnings are value relevant. Hypothesis 1(b) states that the value relevance of book value increases during a GFC compared to the NCP. Hypothesis 1(c) states that the value relevance of earnings decreases during a GFC compared to the NCP. Table 6-12 summarises the findings on these hypotheses discussed throughout this chapter. It is evident that hypothesis 1(a) is not rejected for both book value and earnings across all alternative specifications. Hypothesis 1(b) and 1(c) are rejected for all alternative specifications.

Thus the findings suggest that both book value and earnings are value relevant in the Australian market. The value relevance of both the book value and earnings is different during the GFC compared to the NCP. The value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. The decrease in the value relevance of book value is mainly driven by the decrease in the value relevance of book value for negative earnings sample. Moreover, the increase in the value relevance of earnings is mainly driven by the increase in the value relevance of earnings for the positive earnings sample.

Another important thing to notice is that the relative value relevance of earnings is higher than the relative value relevance of book value during both the GFC and the NCP for both the combined sample and the positive earnings sample. For negative earnings sample, the relative value relevance of book value is higher than that of earnings during the NCP, whereas, the relative value relevance of earnings is higher than that of book value during the GFC.

		Hypothesis 1(a)	Hypothesis 1(b)	Hypothesis 1(c)	
Main analysis		Do not reject	Reject	Reject	
	Robus	stness tests			
Firm profitability	Positive earnings firms	Do not reject	Reject	Reject	
	Negative earnings firms	Do not reject	Reject	Reject	
Fixed effect model	NA	Do not reject	Reject	Reject	
Variables are undefl	ated	Do not reject	Reject	Reject	
30 September year-e	end	Do not reject	Reject	Reject	
Alternative definition	on of the GFC	Do not reject	Reject	Reject	
Models with control	variables	Do not reject	Reject	Reject	

Table 6-12: Summary results of hypotheses testing

## 6.11 Discussions on the findings

Barth, Beaver and Landsman (1998) propose the financial health hypothesis (FHH) which states that investors' reliance on book value increases and that on earnings decreases when a firm's financial health deteriorates and when there is significant going concern risks. Similar conjecture is pronounced in the abandonment option hypothesis (AOH) as well. The GFC represents an economy-wide uncertainty. As discussed in chapter two of this thesis, firms' going concern risk has increased significantly during the GFC. The illiquidity in the credit market and the decline in the economic activities during the GFC have also put many

Australian companies at a greater risk with respect to continuing as a going concern (Xu, Carson Fargher and Jiang, 2011). Xu, Carson Fargher and Jiang (2011) find that the going concern qualification in audit reports for Australian companies increased from 12 per cent in 2005-2007 to 18 per cent in 2008 and to 22 per cent in 2009. Hence, the GFC was also associated with significant going concern qualification in audit reports. These economic uncertainties associated with the increasing levels of going concern risks during the GFC are supposed to have impacted the relative importance of book value and earnings for stock valuation purposes. Drawing on the FHH and the AOH, the value relevance of book value is expected to increase and the value relevance of earnings is expected to decrease during a GFC compared to the NCP. Hence, this thesis hypothesises that the value relevance of book value increases and the value relevance of earnings decreases during a GFC compared to the NCP.

Contrary to the hypotheses, the findings do not support the FHH which states that as the financial condition of a firm worsens, the value relevance of book value increases and that of earnings decreases. The findings suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. However, the decrease in the value relevance of book value is more pronounced for the sample of firms with negative earnings and the increase in the value relevance of earnings is more pronounced for the sample of firms with positive earnings.

According to the FHH, investors' reliance on equity book is assumed to increase when a firm's financial health deteriorates because book value is a proxy for firms' liquidation value. Moreover, Hayn (1995), Burgstahler and Dichev (1997), Collins, Maydew and Weiss (1997), Collins, Pincus and Xie (1999) and Graham, King and Bailes (2000) suggest that when the earnings becomes transitory, the cross-sectional value relevance of earnings decreases. As negative earnings and transitory earnings cannot persist for long time, shareholders are more likely to value a firm based on book value because book value provides a liquation value option. Hence, transitory earnings imply a greater reliance on book value in firm valuation. Based on this conjecture this thesis hypothesised that the value relevance of book value increases and the value relevance of earnings increases during a GFC compared to the NCP. However, the decrease in the value relevance of book value during the GFC undermines the relevance of book value as a proxy for liquidation options and runs counter to hypothesis 1(b). Similarly, the increase in the value relevance of earnings during the GFC compared to the

NCP does not support the conjecture of this thesis that the value relevance of earnings decreases under the economic uncertainty of the GFC.

The anomalous findings raise several questions that need to be explained further. For example, how do these findings compare with prior studies on the 1997 Asian Financial Crisis (AFC) and other crisis contexts? How do these findings compare with previous Australian studies? Why does the value relevance of book value decrease? And why does the value relevance of earnings increase? These issues are discussed in the following sub-sections.

# 6.11.1 How do these findings compare with previous studies on value relevance of accounting information during other financial crises?

Although no similar study exists in the context of the GFC, there have been some similar studies in the context of the 1997 AFC. This section synthesises the findings of the present study with prior similar studies in the context of the 1997 AFC and other crisis.

Graham, King and Bailes (2000) examine the value relevance of both book value and earnings in Thailand surrounding the 1997 AFC and find a decline in the value relevance of both book value and earnings. Similarly, Ho, Liu and Sohn (2001) find that the value relevance of earnings decreased significantly in the Korean market during the 1997-1998 AFC. The declining value relevance of earnings was not replaced by the increase in the value relevance of book value, rather the value relevance of CFO increased significantly. In the context of the 1997-98 AFC, Davis-Friday, Eng and Liu (2006) document a significant increase in the value relevance of book value and a significant decrease in the value relevance of earnings during the AFC for Indonesia and Thailand. For Malaysia, they document a significant decrease in the value relevance of book value and earnings, whereas, for Korea, they do not find any change in the value relevance of either book value or earnings. In the context of the 1994 Mexican currency crisis, Davis-Friday and Gordon (2005) find a decrease in the value relevance of earnings but no change in the value relevance of book value. They attribute the decrease in the value relevance of earnings to the firms reporting losses.

Considering the prior evidences discussed above, the findings of the present study are partially consistent with Graham, King and Bailes (2000) and Davis-Friday, Eng and Liu
(2006) in that they also document a decrease in the value relevance of book value. Contrary to Graham, King and Bailes (2000) and Davis-Friday, Eng and Liu (2006), who document a decrease in the value relevance of earnings during the AFC, the present study documents an increase in the value relevance of earnings during the GFC in the Australian market. The findings of the present study are also inconsistent with Ho, Liu and Sohn (2001) for Korea and Davis-Friday and Gordon (2005) for Mexico. Ho, Liu and Sohn (2001) and Davis-Friday and Gordon (2005) document a decrease in the value relevance of earnings but no significant change in the value relevance of book value.

### 6.11.2 How do these findings compare with the previous Australian value relevance studies?

The findings of the present study are consistent with prior Australian studies by Goodwin and Ahmed (2006), Brimble and Hodgson (2007) and Habib (2010) during non-crisis periods. Both Goodwin and Ahmed (2006) and Brimble and Hodgson (2007) conclude that the longitudinal value relevance of earnings has not declined in the Australian market after controlling for the effect of negative earnings. Brimble and Hodgson (2007) also find that the relative value relevance of earnings is higher than that of book value in the Australian market. Moreover, Habib (2010) considers seven alternative performance measures and finds that investors attach the highest importance on earnings for stock valuation purposes in the Australian market.

The findings of the present study are consistent with these earlier Australian studies. The present study documents that the combined value relevance of book value and earnings has not declined in the Australian market during the GFC rather the combined value relevance of book value and earnings has increased in the Australian market during the GFC compared to the NCP. There were changes in the relative and incremental value relevance of book value and earnings between the GFC and the NCP. The value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. However, the decline in the value relevance of book value was mainly driven by the decline in the value relevance of book value of firms reporting losses. On the contrary, the increase in the value relevance of earnings during the GFC was mainly driven by the increase in the value relevance of earnings of firms reporting profits. The increase in the value relevance of earnings of firms reporting profits. The increase in the value relevance of earnings earlier Australian evidences highlighting the sustained

importance of earnings for stock valuation purposes in the Australian market. Moreover, the relative explanatory power of earnings exceeded the relative explanatory power of book value for the entire period for the pooled sample and for the positive earnings sample. The relative explanatory power of earnings greater than that of book value in the Australian market is consistent with Brimble and Hodgson (2007).

Although the finding of the present study in terms of the increase in the value relevance of earnings does not match the findings in Korea and Malaysia in the context of the 1997 AFC, it is consistent with Clinch and Wei (2011) in the contexts of Australia and the USA.<sup>68</sup> The results of the present study are not directly comparable with the results obtained by Clinch and Wei (2011). While the present study examines the association of firms' market value with book value and earnings (using price models), Clinch and Wei (2011) examine the return earnings association (using return models).<sup>69</sup> However, the finding that the value relevance of earnings increases during the GFC in the Australian market is consistent with the evidence obtained by Clinch and Wei (2011) in the USA in the context of poor macroeconomic performances. Moreover, the increase in the value relevance of earnings, more pronounced for firms reporting profits, is also consistent with Clinch and Wei (2011).

#### 6.11.3 Why does the value relevance of book value decrease during the GFC?

Perhaps the most important finding of this thesis that warrants further explanation is that the value relevance of book value has decreased during the GFC compared to the NCP. In simple words, investors' reliance on book value for stock valuation purposes has decreased during the GFC compared to the NCP. Thus the findings of the present study do not support the prior US findings that the value relevance of book value and earnings is a function of firms' financial health (Barth, Beaver and Landsman, 1998). Therefore, the results of the US studies on firms with financial distress do not seem to apply to other economic settings and to an economy-wide exogenous shock like the one of the 2008-2009 GFC.

<sup>&</sup>lt;sup>68</sup>Clinch and Wei (2011) examine the return earnings relationship in the context of poor versus strong macroeconomic performances drawing data from Australia, China and the USA. They define the macroeconomic performances in terms of positive and negative GDP growth, and positive and negative stock market growth. They find no change in the value relevance of earnings for Australia in explaining security returns. However, for the USA they find that the earnings are more strongly associated with security returns during both negative macroeconomic growth and highly positive macroeconomic growth and negative macroeconomic growth. Finally, Clinch and Wei (2011) conclude that the increase in the value relevance of earnings is driven by firms reporting profits. For firms reporting losses, they do not find any significant change in the return earnings association in the context of the USA.

<sup>&</sup>lt;sup>69</sup>Differences between price models and return models have been discussed in the Research Design Chapter.

The increasing levels of business risks and uncertainty during the GFC (as discussed in Chapter Two of this thesis) and the transitory changes in the earnings should have resulted in an increase in the value relevance of book value. The findings suggest the opposite. The question is why investors would rely less on book value for stock valuation purposes during the GFC compared to the NCP? As an ex-post rationalisation of the findings the following explanation is offered for the decrease in the value relevance of book value for stock value during the GFC.

According to Barth, Beaver and Landsman (1998), the value relevance of book value increases and that of earnings decreases as the financial condition of a firm worsens. As discussed under the hypothesis development, investors' reliance on book value is likely to increase when firms' chances of liquidation increase or when the earnings measures are noisy. For a firm with a deteriorating financial health and increasing levels of going concern risks, investors' reliance on book value increases because, book value acts as a liquidation option. On the contrary, for firms with no going concern risk, book value is relevant because it acts as a proxy for future normal earnings. If the economic uncertainty associated with the GCF results in a deterioration of the financial health of firms, investors' reliance on book value is likely to increase and the relevance of earnings in stock valuation is likely to decrease. However, an implicit underlying assumption of the FHH of Barth, Beaver and Landsman (1998) is that book value is a proxy for firms' liquidation value. Moreover, all the firms examined by Barth, Beaver and Landsman (1998) ultimately faced bankruptcy. Hence, another underlying assumption of both the AOH and the FHH is that firms face liquidation under financial distress. For firms facing bankruptcy, the liquidation option should matter more than the future abnormal earnings. Accordingly, if investors value a firm based on its liquidation value, the value relevance of book value is likely to increase and that of earnings is likely to decrease. The FHH and the AOH (1998) rely on this conjecture.

However, their findings relate to a period when there was no macroeconomic shock. Although firms' earnings performances suffer and percentage of firms with going concerns qualification increases during the GFC (as discussed in chapter two), the FHH and the AOH may not be appropriate systematically for all firms for three reasons. Firstly, it is unlikely that all firms in the economy will be faced with similar levels of difficulty appropriate for the FHH and AOH. Secondly, the economic setting that existed in Australia during the GFC was unique to any other developed economy. Although the ASX All Ordinaries index declined by about 51.37 per cent during the GFC, the Australian real economy did not suffer as much as

other developed economies due to the Australian government's economic stimulus packages (discussed in Chapter Two, section 2.3). Because of the government's economic stimulus packages, inventors' confidence might not have been affected to the extent appropriate for the FHH. Hence, instead of weighting the liquidation option in determining share prices, investors might have evaluated firms based on the forward looking earnings measure. Accordingly, investors' reliance on book value has decreased during the GFC. The decline in firms' market value might have resulted from investors' revised estimates of future earnings due to the depressed economic condition. Thirdly, during the GFC, economy-wide illiquidity due to the credit crunch may undermine the relevance of book value as a liquidation option. The worth of book value as a liquidation option, particularly for distressed firms, in an economy, otherwise in a good condition will be different from the book value as a liquidation option for distressed firms during an economy-wide (in fact, worldwide) exogenous shock. During the economy-wide exogenous shock like the one of the 2008-2009 GFC, the market illiquidity may affect firms' liquidation option and the realisable value of book value may be lower than that would be the realisable value of book value when the economy is in a good shape in the NCP.

This explanation seems more sensible if we consider the decline in the value relevance of book value for the negative earnings sample and that of the positive earnings sample. The likelihood of investors considering liquidation value should be more for firms with negative earnings given that negative earnings is a persistent phenomena for these firms. In that case the relevance of book value is likely to increase more for negative earnings sample. Contrastingly, this thesis finds that investors' reliance on book value has decreased more for firms in the negative earnings sample. This finding may suggest a link of the decline in the importance of book value to the issue of illiquidity.

Another reason for the decline in the value relevance of book value may be associated with intangible assets and goodwill. If a firm is to be valued based on liquidation options, the importance of intangible assets and goodwill is likely to decline substantially because of the low levels of exchangeability and high levels of illiquidity associated with these assets. Hence, the decline in the value relevance of book value may relate only to intangible assets and goodwill. This proposition is examined in chapter eight.

#### 6.11.4 Why does the value relevance of earnings increase during the GFC?

According to Ohlson (1995) model earnings is value relevant as a proxy for future abnormal earnings. During the GFC, although firms' earnings performances are adversely affected, firms are unlikely to face bankruptcy risks similar to that experienced by the sample of firms used in Barth, Beaver and Landsman (1998). During periods of economy-wide uncertainty, investors' expectations regarding future CFO become more sensitive to new information arriving at the market (Veronesi, 1999). Prior research suggests that firm' earnings performances convey information aligned to the performances of the macro economy (for example, Ball, Sadka and Sadka, 2009; Barth and So, 2010). Moreover, during the GFC, the information from unregulated sources such as media reports and analysts' forecasts may be noisier than the conventional, largely regulated and monitored accounting information. Sidhu and Tan (2011) examine the analysts' forecast performances during the GFC and the NCP in the US and Australian markets. They find that the size of the forecast errors were large during the GFC relative to the NCP. Hence, investors' reliance on earnings may increase in times of economic uncertainty such as the GFC for stock valuation purposes. Firms' earnings may contain information content on firms' capacity to go through the hardship, more so, because the noise level increases in the information coming from other unregulated and uncontrolled sources during the GFC compared to the NCP (Sidhu and Tan, 2011).

During the GFC, the focus for a reliable benchmark such as earnings per share may increase due to the increase in the levels of noise in other sources of information. Moreover, the decline in the value relevance of book value may imply that investors will attach increasing levels of importance to alternative sources of information for stock valuation purposes. Because the reported earnings is largely regulated by accounting standards and monitored by auditors, investors' reliance on earnings may increase during the GFC. Moreover, the present earnings is related to the present and future cash flows. For these reasons, the value relevance of earnings may increase during the GFC.

A recent evidence in the Behavioural Accounting Research (BAR) by Graham, Harvey and Rajgopal (2005) supports the above arguments on the increase in the value relevance of earnings during the GFC compared to NCP. Graham, Harvey and Rajgopal (2005) survey a sample of chief financial officers in the USA and find that the GAAP based earnings number, primarily the earnings per share, is the key metric upon which the market focuses. They argue

that to reduce the cost of information processing due to the information overload, investors focus on a simple benchmark upon which they can rely on to evaluate firms' performances. During the GFC, the focus on a reliable benchmark such as the earnings per share may increase due to the increase in the level of noise in other sources of information (Sidhu and Tan, 2011).

The increase in the value relevance of earnings can also be related to the findings of Jenkins, Kane and Velury (2009). They find that during periods of economic contraction, the conservatism and the value relevance of reported current earnings increases. The increase in the conservatism enhances the persistence of current earnings, which in turn, increases the relevance of current earnings as a proxy for future earnings. On the contrary, during periods of economic expansion, the conservatism decreases resulting in the decrease in the persistence and the value relevance of current earnings.

#### 6.12 Conclusions:

Three research questions have been examined in this chapter. The first question examines the value relevance accounting book value and earnings in the Australian context surrounding the 2008-2009 GFC. The second question examines whether the value relevance of book value increases during the GFC compared to the NCP. The third question examines whether the value relevance of earnings decreases during the GFC compared to the NCP.

The findings suggest that both book value and earnings are value relevant. The value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. The decline in the value relevance of book value is more pronounced for firms reporting losses and the increase in the value relevance of earnings is more pronounced for firms reporting profits. There was a structural break in the association of accounting book value and earnings with firms' market value during the GFC from the association that existed during the NCP. The results are robust to the consideration of positive and negative earnings, fixed effect panel estimations, alternative date for share prices, undeflated variables and alternative definition of the GFC and the NCP. The results are also robust to the control of the effects of current negative earnings, extreme ROE, firm size, leverage and firms' deteriorating financial health (proxied by continuing negative earnings).

The findings in this chapter directly lead to other research issues examined in this thesis. Prior literature has documented greater levels of earnings manipulations during the AFC (Chia, Lapsley and Lee, 2007). Prior literature also suggests that the value relevance of CFO increases when earnings becomes transitory and noisy. There is also a longstanding debate on the relative importance of earnings and CFO for stock valuation purposes. As discussed in the literature review chapter, investors attach higher importance on CFO than earnings under certain conditions. One of the objectives of this thesis is to examine whether the economic uncertainty resulting from the 2008-2009 GFC represents such a contextual factor when investors' reliance on CFO increases compared to earnings for stock valuation purposes. This issue is examined in chapter seven.

Finally, the decrease in the value relevance of book value raises question as to the book value as a proxy for the liquidation value. Specifically, the decrease in the value relevance of book value raises question on the value relevance of intangible assets and goodwill during the GFC. Due to the firm specificity, inseparability and lack of exchangeability associated with intangible assets and goodwill, the decrease in the value relevance of book value during the GFC may be due to the decrease in the relevance of intangible assets and goodwill. Usually the decline in firms' market value during periods of economic downturn is attributed to the decrease in the value of intangible assets and goodwill. Penman (2009, p. 359) articulates

In the speculative 1990s, accounting 'for industrial age' came under challenge, accused of failing to adopt to the 'information age'....With the bursting of the 1990s bubble and the erosion of market value attributed to intangible assets, 'industrial age' accounting now looks sensible.

If the point made by Penman (2009) is maintained, it can be argued that the value relevance of intangible assets and goodwill experiences a greater decrease during the GFC than that of tangible assets. This proposition is examined in chapter eight. Specifically, chapter eight examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill.

#### **CHAPTER SEVEN**

### INCREMENATAL AND RELATIVE VALUE RELEVANCE OF EARNINGS AND CASH FLOW FROM OPERATIONS

#### 7.1 Introduction

The relative and incremental value relevance of book value and earnings have been examined in chapter six. The impact of the 2008-2009 GFC on the value relevance of book value and earnings has also been examined in chapter six. The findings suggest that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. Although earnings and CFO are two separate performance measures mandatory to be reported in the financial statement, earnings consists of accruals and CFO. Earnings and CFO are different in terms of their timing and matching attributes. Earnings and CFO are also different in terms of management's flexibility to manage or alter them. Accruals based earnings is considered to be ill-defined and many sided. It suffers from flexible accounting techniques and manipulation due to the flexibility in accounting standards. On the contrary, CFO is not subject to managerial manipulation, and CFO portrays the ability of the organisation to survive. As discussed under literature review, there is also a debate as to the superiority of earnings versus CFO. Moreover, the relative importance of earnings and CFO varies based on different contextual factors. Accordingly, it is important to understand the impact of the GFC on the value relevance of earnings and CFO and on the relative superiority of earnings versus CFO. Given that the results in chapter six suggest that the value relevance of earnings has increased, it is also important to understand which one component of earnings (accruals versus CFO) has driven the increase in the value relevance of earnings. This chapter examines hypothesis 2 (a), 2(b), 2(c) and 2(d). The essential thrust of the present chapter is to examine if CFO contains incremental value relevant information given book value and earnings; and whether earnings or CFO has superior information content in explaining firms' share prices. This chapter also examines the impact of the 2008-2009 GFC on the value relevance of earnings and CFO with specific focus on whether the value relevance of earnings has decreased and that of CFO has increased during the 2008-2009 GFC compared to the NCP.

## 7.2 Value relevance of cash flow from operations (CFO) incremental to book value and earnings: test of hypothesis 2(a)

Hypothesis 2(a) states that CFO has value relevance incremental to book value and earnings. To test this hypothesis, firms' market value per share is regressed against firms' book value, earnings and CFO per share (Model 5). If the coefficient estimate of CFO in Model 5 is statistically significant, it implies that CFO has additional/incremental value relevant information given book value and earnings. The explanatory power (adjusted R-square) of Model 5 is also compared to the explanatory power (adjusted R-square) of Model 5 has explanatory power higher than the explanatory power of Model 1, it implies that the inclusion of CFO as an additional independent variable can explain cross-sectional variations in share prices additional to that explained by book value and earnings. Table 7-1 shows the results of Model 5 for different sub-periods.

For the combined sample (both positive and negative earnings firms), the coefficient of CFO is positive and significant for all the sub-periods. The coefficient of CFO ( $\beta_3$ ) equals 1.719 in Model 5 which implies that after controlling for the effect of book value and earnings, 1 cent increase in CFO contributes to 1.719 cents increase in the share price. Thus CFO has incremental value relevance given book value and earnings.

The results for the positive earnings firms (Panel B, Table 7-1) are similar to the results of the combined sample. Specifically, the coefficient  $\beta_3$  is positive and significant for all the subperiods. The coefficient of CFO ( $\beta_3$ ) equals 2.406 in Model 5 which implies that after controlling for the effect of book value and earnings, 1 cent increase in CFO contributes to 2.406 cents increase in the share price.

Similar results are obtained for the negative earnings sample (Panel C, Table 7-1). The coefficient of CFO ( $\beta_3$ ) is positive and significant. The coefficient of CFO ( $\beta_3$ ) equals 0.976 in Model 5 which implies that after controlling for the effect of book value and earnings, 1 cent increase in CFO contributes to 0.976 cents increase in the share price.

<sup>&</sup>lt;sup>70</sup>Difference in the adjusted R-square between Model 5 and Model 1 is examined instead of Partial F-test because only one variable is added to Model 5 over Model 1. Partial F-test is required if more than one variables are added.

Further evidence on the incremental value relevance of CFO is reported in Table 7-2. Incremental value relevance of CFO has been determined by deducting the total explanatory power (adjusted R-square) of Model 1 from the total explanatory power (adjusted R-square) of Model 5. The adjusted R-squares for Model 5 (including CFO along with BV and E) are higher than the adjusted R-squares for Model 1 (excluding CFO as an independent variable) for all the sub-samples (combined sample, positive earnings sample and negative earnings sample) and for all the sub-periods (Table 7-2, Panel A, B and C).

For example, for the combined sample, 48.15 per cent variation in share prices can be explained by book value and earnings together (adjusted R-square of Model 1 = 48.15), whereas, 54.11 per cent variation in share prices can be explained by book value, earnings and CFO together (adjusted R-square of Model 5 = 54.11). Thus 5.96 per cent more variation in share prices can be explained if CFO is added as an additional explanatory variable with book value and earnings.

For the positive earnings sample, 57.61 per cent variation in share prices can be explained by book value and earnings together (adjusted R-square of Model 1 = 57.61 per cent), whereas, 61.46 per cent variation in share prices can be explained by book value, earnings and CFO together (adjusted R-square of Model 5 = 61.46 per cent). Thus the inclusion of CFO as an additional explanatory variable with book value and earnings helps in explaining 3.85 per cent more variation in share prices.

For the negative earnings sample, 27.14 per cent variation in share prices can be explained by book value and earnings together (adjusted R-square of Model 1 = 27.14 per cent), whereas, 32.05 per cent variations in share prices can be explained when CFO is included as an explanatory variable along with book value and earnings. Thus the inclusion of CFO as an independent variable in addition to BV and E helps in explaining 4.91 per cent more variations in share prices.

Thus the inclusion of CFO as additional explanatory variable along with book value and earnings increases the explanatory power by 5.96 per cent for the combined sample, 3.85 per cent for the positive earnings sample and 4.91 per cent for the negative earnings sample. Similar results are obtained for different sub-periods for the combined sample, for the positive earnings sample and for the negative earnings sample.

The increase in the explanatory power (adjusted R-square) in Model 5 over Model 1 (Table 7-2, Panel A, B and C) suggests that the inclusion of CFO as other information variable in the Ohlson (1995) model improves the explanatory power of the model and CFO contains incremental value relevant information over and above book value and earnings. Moreover, the significant coefficient estimates of CFO ( $\beta_3$ ) for all the sub-samples and for all the sub-periods suggest that investors consider CFO in determining share prices. These evidences support hypothesis 2(a) which states that CFO is incrementally value relevant given book value and earnings.

	Model 5					Model 1				Model 5a			
	α	β1	β <sub>2</sub>	β <sub>3</sub>	Adj. R <sup>2</sup>	α	β1	β <sub>2</sub>	Adj. R <sup>2</sup>	α	β1	β <sub>3</sub>	Adj. R <sup>2</sup>
						F	anel A: Comb	ined sample					
Pooled	1.175***	1.096***	3.839***	1.719***	54.11%	0.531***	0.921***	6.033***	48.15%	1.159***	0.855***	3.394***	38.91%
	(18.309)	(12.577)	(13.889)	(32.990)		(17.969)	(12.560)	(25.469)		(17.668)	(16.688)	(34.171)	
2009-	0.904***	0.884***	4.575***	1.395***	59.07%	0.996***	0.792***	6.780***	51.21%	0.902***	0.719***	2.813***	37.24%
2008	(10.863)	(6.156)	(23.646)	(10.365)		(4.338)	(16.118)	(7.108)		(9.451)	(7.636)	(14.073)	
2007-	0.445***	1.274***	3.500***	2.169***	56.44%	0.406***	1.472***	6.487***	42.20%	0.339***	1.178***	3.957***	40.64%
2006	(3.980)	(25.215)	(9.554)	(13.502)		(3.876)	(17.439)	(6.011)		(2.955)	(31.435)	(22.209)	
2004-	0.501***	1.142***	3.319***	2.532***	52.38%	0.620***	1.005***	5.816***	41.12%	0.763***	1.046***	3.816***	38.87%
2007	(16.338)	(5.298)	(6.106)	(3.918)		(10.211)	(10.880)	(5.633)		(9.575)	(31.506)	(11.804)	
Panel B: Positive earnings sample													
Pooled	0.641***	1.276***	4.922***	2.406***	61.46%	0.241	1.241***	7.596***	57.61%	0.894***	1.289***	4.539***	44.44%
	(4.770)	(26.217)	(8.533)	(17.062)		(1.392)	(13.630)	(20.813)		(6.691)	(28.097)	(17.781)	
2009-	-0.114	0.851***	5.321***	2.184***	69.94%	-0.150***	0.822***	8.136***	63.44%	0.034***	.897***	3.826***	42.60%
2008	(-0.654)	(10.627)	(15.314)	(1.004)		(-2.300)	(14.224)	(4.446)		(0.171)	(21.796)	(15.008)	
2007-	0.172***	1.251***	5.152***	2.761***	58.77%	0.264	1.435***	7.425***	53.87%	0.491**	1.422***	6.620***	46.34%
2006	(0.753)	(9.863)	(11.845)	(7.577)		(1.562)	(6.849)	(5.515)		(1.964)	(20.927)	(10.520)	
2004-	0.716***	1.169***	4.491***	3.231***	57.98%	1.106***	1.419***	7.241***	51.84%	1.302***	1.364***	4.485***	45.76%
2007	(4.210)	(21.996)	(11.229)	(17.282)		(7.544)	(16.451)	(8.453)		(7.641)	(20.624)	(18.493)	
						Pane	C : Negative	earnings sample					
Pooled	0.410***	0.818***	-0.644***	0.976***	32.05%	0.228***	0.846**	-0.550***	27.14%	0.478***	0.820***	0.674***	26.33%
	(17.088)	(4.052)	(-12.087)	(6.308)		(7.279)	(4.701)	(-4.262)		(19.896)	(4.447)	(6.095)	
2009-	0.279***	0.503**	-0.733***	0.599***	26.78%	0.272***	0.526**	-0.742***	25.97%	0.353***	0.516**	0.411***	18.42%
2008	(8.253)	(2.364)	(-7.894)	(4.691)		(8.263)	(2.466)	(-8.046)		(10.556)	(2.492)	(4.671)	
2007-	0.347***	0.816***	-0.201**	1.164**	37.87%	0.321***	0.996***	-0.415***	34.85%	0.357***	1.052***	0.619***	31.83%
2006	(8.298)	(14.330)	(-2.242)	(2.326)		(8.655)	(14.794)	(-8.449)		(8.563)	(15.218)	(0.236)	
2004-	0.371***	0.860***	-0.238***	1.286***	38.72%	0.321***	0.889***	-0.368***	34.77%	0.382***	0.810***	1.171***	31.92%
2007	(11.979)	(19.773)	(-3.948)	(4.062)		(11.500)	(21.77)	(-9.442)		(12.332)	(22.131)	(3.692)	

#### Table 7-1: Relative and incremental value relevance of earnings and CFO: the GFC and the NCP comparison.

\*\*\*Significant at 1 per cent level;\*\*Significant at 5 per cent level.\*Significant at 1 per cent level

 $\mathbf{Model 5:} \ \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \beta_3 \mathbf{CFO}_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it,:} \mathbf{Model 1:} \ \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \lambda_1 \dots \dots \lambda n + \varepsilon_{it,:} \mathbf{Model 5a} : \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_3 \mathbf{CFO}_{it} + \lambda_1 \dots \dots \lambda n + \varepsilon_{it,:} \mathbf{Model 5a} : \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \lambda_1 \dots \dots \lambda n + \varepsilon_{it,:} \mathbf{Model 5a} : \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \lambda_1 \dots \dots \lambda n + \varepsilon_{it,:} \mathbf{Model 5a} : \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \lambda_1 \dots \dots \lambda n + \varepsilon_{it,:} \mathbf{Model 5a} : \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \beta_2 \mathbf{E}_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{B}_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{B}_{it} + \beta_1$ 

 $MV_{it}$  = Market value of equity per share at end of the year (30 June);

BV<sub>it</sub>= Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CFO = Cash flow from operations per share;

 $\alpha_{it} = intercept;$ 

 $\epsilon_{it} = error term;$ 

 $\lambda_1$ ..... $\lambda$ n are indicator variables representing industry dummies.

# 7.3 Relative value relevance of earnings and CFO: test of hypothesis 2 (b) and 2(c)

Hypothesis 2(b) states that the value relevance of earnings is higher than that of CFO during the NCP. Hypothesis 2(c) states that the value relevance of CFO is higher than that of earnings during a GFC. To test these hypotheses, the relative value relevance of earnings (adjusted R-square of Model 1) is compared to the relative value relevance of CFO (adjusted R-square of Model 5a). Results are reported in Table 7-2, Panel A for the combined sample, Panel B for the positive earnings sample and Panel C for the negative earnings sample.

For the combined sample, book value and earnings together explain 48.15 per cent variation in share prices (adjusted R-square of Model 1 is 48.15 per cent), whereas, book value and CFO together explain 38.91 per cent variations in share prices (adjusted R-square of Model 5a is 38.91 per cent). Thus the relative explanatory power of earnings model (Model 1) is 9.24 per cent higher than that of CFO model (Model 5a). Statistically significant and positive Vuong Z statistics suggest that earnings model (Model 1) is superior to CFO model (Model 5a). A positive Vuong Z statistic implies that residuals of CFO model are larger in magnitude than those of earnings model. Hence, earnings model is preferred over CFO model.

For the positive earnings sample, book value and earnings together explain 57.61 per cent variation in share prices (adjusted R-square of Model 1 is 57.61 per cent), whereas, book value and CFO together can explain 44.44 per cent variation in share prices (adjusted R-square of Model 5a is 44.44 per cent). Thus the relative explanatory power of earnings model (Model 1) is 13.17 per cent higher than that of CFO model (Model 5a). Statistically significant and positive Vuong Z statistics suggest that earning model (Model 1) is superior to CFO model (Model 5a). A positive Vuong Z statistic implies that residuals of CFO model are larger in magnitude than those of earnings model. Hence, earnings model is preferred over CFO model.

For the negative earnings sample, book value and earnings together explain 27.14 per cent variation in share prices (adjusted R-square of Model 1 is 27.14 per cent), whereas, book value and CFO together explain 26.33 per cent variation in share prices (adjusted R-square of Model 5a is 26.33 per cent). Thus the relative explanatory power of earnings model (Model 1) is 0.81 per cent higher than that of CFO model (Model 5a). Statistically significant and

positive Vuong Z statistics suggest that earning model (Model 1) is superior to CFO model (Model 5a). A positive Vuong Z statistic implies that residuals of CFO model are larger in magnitude than those of earnings model. Hence, earnings model is preferred over CFO model.

It may be noted further that the relative explanatory power of earnings has increased, whereas, the relative explanatory power of CFO has decreased during the GFC compared to the NCP. For example, for the combined sample, 41.12 per cent variation in share prices is explained by book value and earnings together during the NCP which increases to 51.21 per cent during the GFC. On the contrary, 38.87 per cent variation in share prices is explained by book value and CFO together during the NCP, which decreases to 37.24 per cent during the GFC.

For the positive earnings sample, 51.84 per cent variation in share prices is explained by book value and earnings together during the NCP which increases to 63.44 per cent during the GFC. On the contrary, 45.76 per cent variation in share prices is explained by book value and CFO together during the NCP, which decreases to 42.60 per cent during the GFC. For the negative earnings sample, 34.77 per cent variation in share prices is explained by book value and earnings together during the NCP which decreases to 25.97 per cent during the GFC. On the contrary, 31.92 per cent variation in share prices is explained by book value and CFO together during the NCP, which decreases to 18.42 per cent during the GFC.

These evidences suggest that the relative explanatory power of the earnings model (Model 1) is higher than that of the CFO model (Model 5a) during both the GFC and the NCP. Given that BV is common to both the earnings model and the CFO model; the differences in the explanatory power of these two models can be construed as the difference in the explanatory power of E and CFO. Hence, the relative explanatory power of earnings exceeded the relative explanatory power of CFO during both the GFC and the NCP for the combined sample, for the positive earnings sample and for the negative earnings sample. The significant and positive Vuong Z statistics for all the sub-periods suggest that earnings model is superior to CFO model. Moreover, the ratio of the GFC and the NCP suggests that earning has superior explanatory power to CFO during both the GFC and the NCP.

These findings support hypothesis 2(b) which states that the value relevance of earnings is higher than that of CFO during the NCP. However, the findings do not support hypothesis

2(c) which states that the value relevance of CFO is higher than that of earnings during a GFC [the potential reasons for not supporting hypotheses 2(c) are discussed in the subsection 7.9.1]. In fact, earnings has higher relative explanatory power than that of CFO during both the GFC and the NCP. Of particular note is the decline in the relative value relevance of both earnings and CFO for the negative earnings sample during the GFC. However, earnings retained the superior explanatory power to CFO.

Year	Total value	Total value	Total value	Incremental value	Incremental value	Relative val	lue relevanc	e of E and	Vuong (1989)				
	relevance	relevance	relevance	relevance of CFO	relevance of E	CFO			Z-statistics				
	(adjusted R-	(adjusted R-	(adjusted R-	(Adjusted R <sup>2</sup> Model	[Adjusted R <sup>2</sup>	(Adjusted	Relative	(Adj.	Model 1 versus				
	square)	square)	square)	5 - Adjusted R <sup>2</sup>	Model 5 -	R <sup>2</sup> Model	E versus	$R^2_{CFO}/$	Model 5a				
	BV, E and CFO	BV, E	BV, CFO	Model 1)	Adjusted R <sup>2</sup>	1 -	Relative	$Adj.R_{E}^{2}$	(Earnings model				
	[Model 5]	[Model 1]	[Model 5a]		Model 5a]	Adjusted	CFO		versus CFO				
						R <sup>2</sup> Model			model)				
						5a)							
Panel A: All firms													
Pooled	54.11%	48.15%	38.91%	5.96%	15.20%	9.24%	E>CFO	0.83	8.31***				
2008-09	59.07%	51.21%	37.24%	7.86%	21.83%	13.97%	E>CFO	0.73	18.307***				
2006-07	56.44%	42.20%	40.64%	14.24%	15.80%	1.56%	E>CFO	0.96	2.05**				
2004-07	52.38%	41.12%	38.87%	11.26%	13.51%	2.25%	E>CFO	0.95	3.987**				
Chow test : F-statistics	38.183***	31.172***	21.373***										
			Panel B: Fi	rms with positive earnin	gs								
Pooled	61.46%	57.61%	44.44%	3.85%	17.02%	13.17%	E>CFO	0.77	17.26***				
2008-09	69.94%	63.44%	42.60%	6.50%	27.34%	20.84%	E>CFO	0.67	21.91***				
2006-07	58.77%	53.87%	46.34%	4.90%	12.43%	7.53%	E>CFO	0.86	6.09***				
2004-07	57.98%	51.84%	45.76%	6.14%	12.22%	6.08%	E>CFO	0.88	5.99**				
Chow test : F-statistics	31.387***	29.201***	17.946***										
			Panel C: Fin	rms with negative earnin	igs			<u> </u>					
Pooled	32.05%	27.14%	26.33%	4.91%	5.72%	0.81%	E>CFO	0.97	1.72*				
2008-09	26.78%	25.97%	18.42%	0.81%	8.36%	7.55%	E>CFO	0.71	9.18***				
2006-07	37.87%	34.85%	31.83%	3.22%	6.04%	2.82%	E>CFO	0.92	4.03***				
2004-07	38.72%	34.77%	31.92%	3.95%	6.80%	2.85%	E>CFO	0.92	5.37***				
Chow test : F-statistics	27.017***	25.174***	22.318***										

#### Table 7-2: Changes in the relative and incremental value relevance of earnings and CFO between the GFC and the NCP and Vuong-Z statistics

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level

**Model 5**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 1**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ , **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \beta_4 E_{it} + \beta$ 

Incremental value relevance of CFO = Adjusted R-square of Model 5 – Adjusted R-square of Model 1; Incremental value relevance of earnings = Adjusted R-square of Model 5 – Adjusted R-square of Model 5a; Relative value relevance of earnings = Adjusted R-square of Model 1. The definition of the relative value relevance of CFO and earnings is consistent with Black (2003).

 $(Adj. R^{2}_{CFO} / Adj. R^{2}_{E}) = Relative explanatory power of CFO model (Model 5a) divided by relative explanatory power of earnings model (Model 1).$ 

Vuong (1989) Z-statistics compares earnings model (Model 1) and CFO model (Model 5a) as competing non-nested models. A positive and significant Z statistic implies that CFO model is rejected in favour of earnings model. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) is larger in magnitude than those of earnings model (Model 1). Levels of significance of the Z-statistics are determined based on a two tailed tests of probability distribution.

## 7.4 Impact of the GFC on the value relevance of earnings and CFO: test of hypothesis 2(d)

Hypothesis 2(d) states that the value relevance of earnings decreases and the value relevance of CFO increases during a GFC compared to the NCP. This hypothesis is approached in two ways. The first approach examines the changes in the coefficient estimates of earnings and CFO between the 2008-2009 GFC and the NCP. The second approach examines the changes in the relative explanatory power of earnings (earnings model) and CFO (CFO model) between the 2008-2009 GFC and the NCP. Because the impact of the GFC on the value relevance of earnings has been discussed in chapter six, the impact of the GFC on the value relevance of CFO is discussed first in this chapter. Results on earnings are discussed after the discussion on the results on CFO.

Table 7-3 shows the results of Model 6 with a dummy variable for the GFC. The results are shown separately for the combined sample (Panel A), for the positive earnings sample (Panel B) and for the negative earnings sample (Panel C).

For the combined sample, for the positive earnings sample and for the negative earnings sample, the coefficient estimates of the interaction term CFO\*CP ( $\beta_7$ ) in Model 6 are significant and negative. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is -1.136 for the combined sample, -1.046 for the positive earnings sample and -0.587 for the negative earnings sample. Hence, the coefficient estimate of CFO has decreased during the GFC by -1.136 for the combined sample, by -1.046 for the positive earnings sample and by -0.587 for the negative earnings sample. To interpret it differently, for the combined sample, 1 cent increase in CFO results into 2.332 cents increase in share prices during the NCP. On the contrary, 1 cent increase in the CFO translates into 1.196 (2.332 -1.136) cents increase in share prices during the GFC. For the positive earnings sample, 1 cent increase in CFO results in 2.231 cents increase in share prices during the NCP. On the contrary, 1 cent increase in the CFO translates into 1.185 (2.231 - 1.046) cents increase in share prices during the GFC. For the negative earnings sample, 1 cent increase in CFO results in 1.286 cents increase in share prices during the NCP. On the contrary, 1 cent increase in CFO translates into 0.699 (1.286 – 0.587) cents increase in share prices during the GFC. Thus the negative and significant coefficient estimates of CP\*CFO ( $\beta_7$ ) suggest that the value relevance of CFO has decreased during the GFC compared to the NCP.

Also, the changes in the coefficient of CFO ( $\beta_3$ ) in Model 5 between the GFC and the NCP reported in Table 7-1. The coefficient estimate of CFO ( $\beta_3$ ) has decreased during the GFC compared to NCP for the combined sample, for the positive earnings sample and for the negative earnings sample. For the combined sample, the coefficient of CFO ( $\beta_3$ ) has decreased from 2.532 during the NCP to 1.395 during the GFC. For the positive earnings sample, the coefficient of CFO ( $\beta_3$ ) has decreased from 3.231 during the NCP to 2.184 during the GFC. For the negative earnings sample, the coefficient of CFO ( $\beta_3$ ) has decreased from 1.286 during the NCP to 0.599 during the GFC. The results are essentially similar when the NCP is defined as 2006-2007.

Also note the changes in the coefficient estimates of CFO ( $\beta_3$ ) in Model 5a between the GFC and the NCP reported in Table 7-1. The coefficient estimate of CFO ( $\beta_3$ ) has decreased during the GFC compared to NCP for the combined sample, for the positive earnings sample and for the negative earnings sample. For the combined sample, the coefficient of CFO ( $\beta_3$ ) has decreased from 3.816 during the NCP to 2.813 during the GFC. For the positive earnings sample, the coefficient of CFO ( $\beta_3$ ) has decreased from 4.485 during the NCP to 3.826 during the GFC. For the negative earnings sample, the coefficient of CFO ( $\beta_3$ ) has decreased from 1.171 during the NCP to 0.411 during the GFC.

Corroborating evidence is also obtained if we compare the relative explanatory power of Model 5a (reported in Table 7-2, Panel A, B and C) between the GFC and the NCP. Of particular note is that the relative explanatory power of CFO (Adjusted R-square of Model 5a) has decreased during the GFC compared to the NCP for the combined sample, for the positive earnings sample and for the negative earnings sample.

For the combined sample, the explanatory power of CFO (Model 5a) has decreased from 38.87 per cent during the NCP to 37.24 per cent during the GFC. It means that 38.87 per cent variations in share prices is explained by book value and CFO together during the NCP, whereas, during the GFC, book value and CFO together explain 37.24 per cent variations in share prices. The ratio of the relative explanatory power of CFO to the relative explanatory power of earnings has decreased from 0.95 during the NCP to 0.73 during the GFC.

For the positive earnings sample, 45.76 per cent variation in share prices can be explained by book value and CFO during the NCP which declines to 42.60 per cent during the GFC. The

ratio of the relative explanatory power of CFO to the relative explanatory power of earnings has decreased from 0.88 during the NCP to 0.67 during the GFC.

For the negative earnings sample, 31.92 per cent variation in share prices can be explained by book value and CFO during the NCP which declines to 18.42 per cent during the GFC. The ratio of the relative explanatory power of CFO to the relative explanatory power of earnings has decreased from 0.92 during the NCP to 0.71 during the GFC.

It may be noted further that the results obtained for earnings are similar to those obtained in chapter six. Both the explanatory power and coefficient estimate of earnings have increased during the GFC compared to the NCP. The coefficient of the interaction term CP\*E ( $\beta_6$ ) in Model 6 is 2.495 for the combined sample, 2.740 for the positive earnings sample and -0.494 for the negative earnings sample. Hence, the coefficient estimate of E has increased during the GFC by 2.495 for the combined sample, and by 2.740 for the positive earnings sample. For the negative earnings sample, both the coefficient estimates of E ( $\beta_2$ ) and CP\*E ( $\beta_6$ ) are negative. Thus, the coefficient estimate of earnings for negative earnings has negatively increased during the GFC compared to the NCP.

To interpret it differently, for the combined sample, 1 cent increase in earnings translates into 2.919 cents increase in share prices during the NCP and to 5.414 (2.919+2.495) cents increase in share prices during the GFC. For the positive earnings sample, 1 cent increase in earnings translates in 4.419 cents increase in share prices during the NCP and to 7.159 (4.419 + 2.740) cents increase in share prices during the GFC. For the negative earnings sample, 1 cent increase in earnings translates in 0.238 cents increase in share prices during the NCP and to 0.723 (0.238+ 0.494) cents increase in share prices during the GFC. The results are essentially similar when the NCP is defined as 2006-2007. Thus, the positive and significant coefficient estimate of CP\*E ( $\beta_6$ ) for the combined sample and for the positive earnings sample implies that the value relevance of earnings has increased during the GFC compared to the NCP.

Also note the changes in the coefficients of earnings ( $\beta_2$ ) in Model 5 between the GFC and the NCP reported in Table 7-1. The coefficient estimate of earnings ( $\beta_2$ ) has increased during the GFC compared to the NCP, for the combined sample, for the positive earnings sample and for the negative earnings sample. For the combined sample, the coefficient of earnings ( $\beta_2$ ) has increased from 3.319 during the NCP to 4.575 during the GFC. For the positive earnings sample, the coefficient of earnings ( $\beta_2$ ) has increased from 4.491 during the NCP to 5.321 during the GFC. For the negative earnings sample, the coefficient of earnings ( $\beta_2$ ) has increased from -0.238 during the NCP to -0.733 during the GFC. These findings regarding earnings are consistent with the results obtained in chapter six that the value relevance of earnings has increased during the GFC compared to the NCP. Similar changes are observed for the coefficient estimates of earnings ( $\beta_2$ ) in Model 1[discussions are not repeated because changes in the coefficient estimates of earnings ( $\beta_2$ ) in Model 1 have been discussed in chapter six].

It may be noted further that the relative explanatory power of earnings (Model 1) has increased during the GFC compared to the NCP. For example, for the combined sample, 41.12 per cent variation in share prices is explained by book value and earnings together during the NCP which increases to 51.21 per cent during the GFC. For the positive earnings sample, 51.84 per cent variation in share prices is explained by book value and earnings together during the NCP which increases to 63.44 per cent during the GFC. However, for the negative earnings sample, 34.77 per cent variation in share prices is explained by book value and earnings together during the NCP which increases to 63.44 per cent during the GFC. However, for the negative earnings sample, 34.77 per cent variation in share prices is explained by book value and earnings together during the NCP which decreases to 25.97 per cent during the GFC.

As reported in Table 7-2, all the F–values from the Chow-F tests for structural breaks are significant at 1 per cent level. The significant F-values (in Model 5, Model 1 and Model 5a) from Chow-F tests suggest that there were structural breaks in the association of share prices with book value, earnings and CFO between the GFC and the NCP.

Thus the changes in the relative explanatory power of Model 5a between the GFC and the NCP, the negative and significant coefficient estimates of CFO\*CP ( $\beta_7$ ) in Model 6, the decrease in the coefficient estimate of CFO ( $\beta_3$ ) between the GFC and the NCP in Model 5 and Model 5a suggest that the value relevance of CFO has decreased during the GFC compared to the NCP. Similarly, the changes in the relative explanatory power of Model 1 between the GFC and the NCP, the positive and significant coefficient estimates of E\*CP ( $\beta_6$ ) in Model 6, the increase in the coefficient estimate of earnings ( $\beta_2$ ) between the GFC and the NCP in Model 1 suggest that the value relevance of earnings has increased during the GFC compared to the NCP.

These findings do not support hypothesis 2(d) which states that the value relevance of earnings decreases and the value relevance of CFO increases during a GFC compared to the NCP [the potential reasons for not supporting hypotheses 2(c) and 2(d) are discussed in the sub-section 7.9.1].

					Panel A: All fir	ms							
	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	$\beta_6$	β <sub>7</sub>	Adj. R <sup>2</sup>	F-stats.			
Pooled	0.501***	1.442***	2.919***	2.332***	-0.403***	758***	2.495***	-1.136***	61.271%	563.936***			
(2004-2009)	(6.326)	(31.762)	(12.288)	(27.111)	(-3.470)	(-29.081)	(25.971)	(-11.272)					
Pooled	0.445***	1.374***	2.500***	2.169***	-0.459***	790***	2.075***	-0.774***	57.48%	447.912***			
(2006-2009)	(4.183)	(26.505)	(10.043)	(14.193)	(-3.339)	(-24.809)	(6.472)	(-3.728)					
Panel B : Positive earnings													
	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	$\beta_6$	β <sub>7</sub>	Adj. R <sup>2</sup>	F-stats.			
Pooled	0.716***	1.269***	4.419***	2.231***	-0.830***	317***	2.740***	-1.046***	65.03%	333.247***			
(2004-2009)	(4.491)	(23.465)	(11.979)	(18.436)	(-3.265)	(-9.025)	(16.00)	(-11.178)					
Pooled	0.172	1.251***	5.752***	1.661***	-0.286	-0.399***	1.431*	776***	62.43%	307.755			
(2006-2009)	(0.829)	(10.860)	(13.043)	(8.343)	(-1.005)	(-2.736)	(1.902)	(-5.160)					
				Pane	el C: Negative e	arnings							
	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	$\beta_6$	$\beta_7$	Adj. $R^2$	F-stats.			
Pooled	0.371***	0.760***	-0.238***	1.286***	-0.091**	-0.350***	-0.494	-0.587***	37.11%	95.707***			
(2004-2009)	(11.738)	(19.375)	(-3.869)	(3.980)	(-1.992)	(-19.003)	(-1.119)	(-2.319)					
Pooled	0.347***	1.016***	-0.201**	0.564**	-0.067	405***	-0.532	-0.334**	34.02%	49.682***			
(2006-2009)	(7.958)	(13.743)	(-2.151)	(2.313)	(-1.238)	(-13.582)	(-1.089)	(-2.226)					

Table 7-3: Impact of the GFC on the value relevance of earnings and CFO

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \* Significant at 10 per cent level.

 $\textbf{Model 6: } \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \beta_3 \mathbf{CFO}_{it} + \beta_4 \mathbf{CP} + \beta_5 \mathbf{CP}^* \mathbf{BV}_{it} + \beta_6 \mathbf{CP}^* \mathbf{E}_{it} + \beta_7 \mathbf{CP}^* \mathbf{CFO}_{it} + \lambda_1 \dots \dots \lambda n + \varepsilon_{it}.$ 

 $MV_{it}$  = Market value of equity per share at end of the year (30 June);

 $BV_{it}$ = Book value per share at the end of year (30 June);

 $E_{it}$ = Net income per share for the year;

CFO = Cash flow from operations per share;

CP = Indicator variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007, 2006, 2005 and 2004. An indicator variable for the GFC;

 $\alpha_{it} = intercept;$ 

 $\epsilon_{it} = error term;$ 

 $\lambda_1$ ..... $\lambda$ n are indicator variables representing industry dummies.

#### 7.5 Control for different contextual factors: hypothesis 2(a), 2(b) and 2(c)

As discussed in the literature review chapter, the relative superiority of earnings versus CFO is dependent on different contextual factors such as firm size, leverage, growth options, accruals levels, earnings permanence and CFO permanence. The scope of phase two (of this thesis) pertains to the impact of the GFC on the value relevance of earnings and CFO. However, the impact of the GFC on the value relevance of earnings and CFO might have been impacted by these contextual factors. Without controlling for the effect of these contextual factors, results on the impact of the GFC on the value relevance of earnings and CFO may be biased. To control for the moderating effects of these contextual factors, firms are separated into two equal sub-samples based on the median value of each of these contextual factors. Model 5, 1, 5a and 6 are estimated separately for each of the context based sub-samples. Results for hypotheses 2(a), 2(b) and 2(c) on separate context based sub-samples are presented in Table 7-4, Panel A to L.

#### 7.5.1 Effect of firm size: large firms versus small firms

Results for the two size based sample are presented in Table 7-4, Panel A and Panel B. As is evident, CFO has incremental explanatory power over book value and earnings for both large firms and small firms which supports hypothesis 2(a). Moreover, the explanatory power of earnings (Model 1) is greater than that of CFO (Model 5a) during both the GFC and the NCP for both large firms and small firms. The significant and positive Vuong Z statistics and the ratio of the relative explanatory power of CFO to the relative explanatory power of earnings less than one suggest that earnings has superior explanatory power to CFO during both the GFC and the NCP. Thus the results support hypothesis 2(b). However, the results do not support hypothesis 2(c).

#### 7.5.2 Effect of leverage: high leverage versus low leverage

Results for the two leverage based samples are presented in Table 7-4, Panel C and Panel D. As is evident, CFO has incremental explanatory power over book value and earnings for both high leverage firms and low leverage firms which supports hypothesis 2(a). Moreover, the explanatory power of earnings (Model 1) is greater than that of CFO (Model 5a) during both the GFC and the NCP for both high leverage firms and low leverage firms. The significant and positive Vuong Z statistics and the ratio of the relative explanatory power of CFO to the

relative explanatory power of earnings less than one suggest that earnings has superior explanatory power to CFO during both the GFC and the NCP. Thus the results support hypothesis 2(b). However, the results do not support hypothesis 2(c).

#### 7.5.3 Effect of growth options: high growth versus low growth

Results for high growth firms and low growth firms are presented in Table 7-4, Panel E and Panel F. As is evident, CFO has incremental explanatory power over book value and earnings for both high growth firms and low growth firms which supports hypothesis 2(a). Moreover, the explanatory power of earnings (Model 1) is greater than that of CFO (Model 5a) during both the GFC and the NCP for both high growth firms and low growth firms. The significant and positive Vuong Z statistics and the ratio of the relative explanatory power of CFO to the relative explanatory power of earnings less than one suggest that earnings has superior explanatory power to CFO during both the GFC and the NCP. Thus the results support hypothesis 2(b). However, the results do not support hypothesis 2(c).

#### 7.5.4 Effect of accruals levels: high accruals versus low accruals

Results for high accruals firms and low accruals firms are presented in Table 7-4, Panel G and Panel H. As is evident, CFO has incremental explanatory power over book value and earnings for both high accruals firms and low accruals firms which supports hypothesis 2(a). The explanatory power of earnings (Model 1) is greater than that of CFO (Model 5a) during both the GFC and the NCP for both high accruals firms and low accruals firms. The significant and positive Vuong Z statistics and the ratio of the relative explanatory power of CFO to the relative explanatory power of earnings less than one suggest that earnings has superior explanatory power to CFO during both the GFC and the NCP. Thus the results support hypothesis 2(b). However, the results do not support hypothesis 2(c).

### 7.5.5 Effect of earnings permanence: permanent earnings versus transitory earnings

As discussed under the literature review (chapter three), the value relevance of earnings decreases and that of CFO increases when a large portion of the reported earnings is transitory. During the GFC, if transitory the component of earnings increases, the value relevance of earnings may be impacted due to the transitory component of earnings. However, market perception on the permanent component of earnings may not be impacted by the GFC.

Hence, the value relevance of earnings may decrease and that of CFO may increase for firms having transitory earnings, whereas, the value relevance of earnings may not change for firms having permanent earnings.

Results for the permanent earnings firms and transitory earnings firms are presented in Table 7-4, Panel I and Panel J. As is evident, CFO has incremental explanatory power over book value and earnings for both permanent earnings firms and transitory earnings firms which supports hypothesis 2(a). Moreover, the explanatory power of earnings (Model 1) is greater than that of CFO (Model 5a) during both the GFC and the NCP for both permanent earnings firms and transitory earnings firms. The significant and positive Vuong Z statistics and the ratio of the relative explanatory power of CFO to the relative explanatory power of earnings less than one suggest that earnings has superior explanatory power to CFO during both the GFC and the NCP. Thus the results support hypothesis 2(b). However, the results do not support hypothesis 2(c).

#### 7.5.6 Effect of CFO permanence: permanent CFO versus transitory CFO

While a large number of studies have examined the impact of earnings permanence on the value relevance of earnings and CFO, a few studies have also considered the issue of CFO permanence. CFO can also have transitory component and permanent component. The conjecture that the value relevance of CFO increases in the presence of transitory earnings may not apply if the firm has transitory CFO. The impact of the GFC on the value relevance of earnings and CFO is also likely to be different for firms having transitory CFO from firms having firms permanent CFO. Specifically the value relevance of transitory CFO may not increase, whereas, the value relevance of permanent CFO is expected to increase during the GFC compared to the NCP.

Results for the permanent CFO firms and transitory CFO firms are presented in Table 7-4, Panel K and Panel L. As is evident, CFO has incremental explanatory power over book value and earnings for both permanent CFO firms and transitory CFO firms which supports hypothesis 2(a). Moreover, the explanatory power of earnings (Model 1) is greater than that of CFO (Model 5a) during both the GFC and the NCP for both permanent CFO firms and transitory CFO firms. The significant and positive Vuong Z statistics and the ratio of the relative explanatory power of CFO to the relative explanatory power of earnings less than one suggest that earnings has superior explanatory power to CFO during both the GFC and the NCP. Thus the results support hypothesis 2(b). However, the results do not support hypothesis 2(c).

Year	Mod	lel 5	Model 1	Model 5a	Total	Total	Total value	Incremental	Incremental	Relative value	e relevance o	of E and	Vuong (1989)		
					value	value	relevance	value	value		CFO		Z-statistics		
		-			relevance	relevance	(adjusted R-	relevance of	relevance of E						
	Coefficient	Coefficient	Coefficient	Coefficient	(adj. R-	(adj. R-	square)	CFO (Adj.	(Adj. R <sup>2</sup>	(Adjusted R <sup>2</sup>	Relative		Model 1 versus		
	of	of CFO	of	of CFO	square)	square)	BV, CFO	R <sup>2</sup> Model 5	Model 5 –	Model 1 -	E versus	(Adj.	Model 5a		
	Earnings	$\beta_3$	Earnings	$\beta_3$	BV, E and	BV, E	[Model 5	– Adj. R <sup>2</sup>	Adj. R <sup>2</sup>	Adjusted R <sup>2</sup>	Relative	$R_{CFO}^{2}$	(Earnings		
	$\beta_2$		$\beta_2$		CFO	[Model 1]	(a)]	Model 1)	Model	Model 5(a))	CFO	Adj.R <sup>2</sup>	model versus		
					[Model 5]				5( a))			E)	CFO model)		
	Panel A: Large firms														
Pooled	4.345***	3.107***	5.631***	4.799***	47.23%	44.91%	36.09%	2.32%	11.14%	8.82%	E>CFO	0.80	11.84***		
2008-09	4.216***	2.717***	5.249***	4.288***	44.43%	42.07%	34.23%	2.36%	10.20%	7.84%	E>CFO	0.81	9.37***		
2006-07	4.577***	3.560***	7.467***	5.444***	48.21%	45.80%	38.28%	2.41%	9.93%	7.52%	E>CFO	0.84	10.63***		
2004-07	4.422***	3.313***	5.861***	5.108***	49.82%	45.17%	36.64%	4.65%	13.18%	8.53%	E>CFO	0.81	7.73***		
Panel B: Small firms															
Pooled	2.949***	2.334***	3.874***	3.537***	57.74%	53.61%	41.96%	4.13%	15.78%	11.65%	E>CFO	0.78	14.12***		
2008-09	3.407***	2.517***	4.172***	3.605***	59.36%	56.65%	43.09%	2.71%	16.27%	13.56%	E>CFO	0.76	18.49***		
2006-07	2.694***	2.328***	3.762***	3.383***	56.04%	51.82%	41.04%	4.22%	15.00%	10.78%	E>CFO	0.79	14.63***		
2004-07	2.991***	2.018***	3.557***	3.500***	56.83%	51.06%	40.47%	5.77%	16.36%	10.59%	E>CFO	0.79	14.26***		
	•			•		Panel C:	High leverage fi	irms							
Pooled	3.779***	2.510***	4.722***	3.132***	52.74%	47.64%	35.21%	5.10%	17.53%	12.43%	E>CFO	0.74	16.03***		
2008-09	4.323***	1.961***	5.147***	2.712***	54.60%	51.90%	33.66%	2.70%	20.94%	18.24%	E>CFO	0.65	23.75***		
2006-07	3.640***	2.708***	4.519***	3.594***	53.39%	47.36%	38.02%	6.03%	15.37%	9.34%	E>CFO	0.80	14.21***		
2004-07	3.536***	2.802***	4.219***	3.303***	51.60%	44.46%	37.31%	7.14%	14.29%	7.15%	E>CFO	0.84	9.99***		
	•			•		Panel D:	Low leverage fi	rms							
Pooled	3.531***	2.316***	4.793***	3.711***	55.45%	49.78%	45.70%	5.67%	9.75%	4.08%	E>CFO	0.92	6.47***		
2008-09	4.088***	2.470***	5.235***	3.908***	58.38%	52.39%	48.25%	5.99%	10.13%	4.14%	E>CFO	0.92	5.91***		
2006-07	3.442***	2.233**	4.249*	3.604**	54.32%	48.04%	44.68%	6.28%	9.64%	3.36%	E>CFO	0.93	4.12***		
2004-07	3.405***	2.252**	4.409***	3.553***	51.41%	48.48%	44.34%	2.93%	7.07%	4.14%	E>CFO	0.91	7.09***		

### Table 7-4 : Relative and incremental value relevance of earnings and CFO after controlling for the contextual factors: the GFC and the NCP comparison (nage 1 of 4)

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level

 $\textbf{Model 5: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}$ 

Incremental value relevance of CFO = Adjusted R-square of Model 5 – Adjusted R-square of Model 1; Incremental value relevance of earnings = Adjusted R-square of Model 5 – Adjusted R-square of Model 5a; Relative value relevance of earnings = Adjusted R-square of Model 1. The definition of the relative value relevance of CFO and earnings is consistent with Black (2003).

 $(Adj. R^{2}_{CFO}/Adj. R^{2}_{E}) = Relative explanatory power of CFO model (Model 5a) divided by relative explanatory power of earnings model (Model 1).$ 

Vuong (1989) Z-statistics compares earnings model (Model 1) and CFO model (Model 5a) as competing non-nested models. A positive and significant Z statistic implies that CFO model is rejected in favour of earnings model. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) are larger in magnitude than those of earnings model (Model 1). Levels of significance of the Z-statistics are determined based on a two tailed tests of probability distribution.

Year	Moo	del 5	Model 1	Model 5a	Total	Total value	Total	Incremental	Incremental	Relative val	lue relevance	e of E and	Vuong	
					value	relevance	value	value	value		CFO		(1989) Z-	
					relevance	(adj. R-	relevance	relevance of	relevance of E				statistics	
	Coefficient	Coefficient	Coefficient	Coefficient	(adi. R-	square)	(adjusted	CFO (Adi.	(Adi. $\mathbb{R}^2$	(Adjusted	Relative		Model 1	
	of	of CFO	of	of CFO	square)	BV. E	R-square)	$R^2$ Model 5	Model 5 –	R <sup>2</sup> Model	E versus	(Adj.	versus	
	Earnings	β <sub>3</sub>	Earnings	$\beta_3$	BV. E and	[Model 1]	BV, CFO	$- Adi. R^2$	Adi. $R^2$	1 -	Relative	R <sup>2</sup> <sub>CFO</sub> /	Model 5a	
	$\beta_2$		$\beta_2$		CFO	l in j	[Model 5	Model 1)	Model	Adjusted	CFO	$Adj.R^{2}E)$	(Earnings	
					[Model 5]		(a)]		5( a))	$R^2$ Model			model versus	
					[]		()]			5(a))			CFO model)	
Panel E: High growth firms														
Pooled	4.583***	2.999***	5.421***	3.516***	46.79%	44.19%	34.68%	2.60%	12.11%	9.51%	E>CFO	0.78	14.81***	
2008-09	5.175***	2.739**	6.077***	3.196***	48.07%	46.61%	31.79%	1.46%	16.28%	14.82%	E>CFO	0.68	19.29***	
2006-07	4.692***	3.285***	5.299***	3.757***	48.56%	42.91%	35.40%	5.65%	13.16%	7.51%	E>CFO	0.82	11.35**	
2004-07	4.218***	3.161***	5.073***	3.571***	44.59%	43.74%	36.63%	0.85%	7.96%	7.11%	E>CFO	0.84	8.37**	
Panel F: Low growth firms														
Pooled	3.450***	2.700***	4.609***	2.944***	54.65%	48.06%	35.58%	6.59%	19.07%	12.48%	E>CFO	0.74	16.37***	
2008-09	3.984***	1.813***	5.213***	2.647***	56.15%	50.01%	33.03%	6.13%	23.12%	16.99%	E>CFO	0.66	23.59***	
2006-07	3.319***	3.008***	4.991***	3.609***	55.55%	48.19%	36.32%	7.36%	19.23%	11.87%	E>CFO	0.75	15.81***	
2004-07	3.243***	2.197***	4.135***	3.092***	52.08%	46.93%	37.58%	5.15%	14.50%	9.35%	E>CFO	0.80	12.76***	
						Panel G:	High accruals							
Pooled	4.894***	2.344***	5.256***	2.983***	52.92%	49.75%	38.09%	3.17%	14.83%	11.66%	E>CFO	0.77	17.93***	
2008-09	5.145***	1.983***	5.862***	2.562***	55.39%	51.92%	34.14%	3.46%	21.24%	17.78%	E>CFO	0.66	24.82***	
2006-07	4.432***	2.964***	5.160***	3.309***	54.92%	47.40%	40.04%	7.52%	14.88%	7.36%	E <cfo< td=""><td>0.84</td><td>9.39***</td></cfo<>	0.84	9.39***	
2004-07	4.832***	2.478***	4.716***	3.355***	50.43%	47.21%	41.43%	3.22%	9.00%	5.78%	E>CFO	0.88	7.71***	
						Panel H:	Low accruals							
Pooled	3.271***	2.992***	3.986***	3.254***	51.00%	45.77%	42.80%	5.23%	8.20%	2.97%	E>CFO	0.94	4.82***	
2008-09	3.500***	2.621***	3.851***	3.194***	53.38%	49.77%	41.72%	3.61%	11.66%	8.05%	E>CFO	0.84	11.56***	
2006-07	3.167***	2.947***	3.719***	3.467***	52.93%	45.68%	43.04%	7.25%	9.89%	2.64%	E>CFO	0.94	3.91***	
2004-07	3.483***	3.163***	3.965***	3.201***	48.60%	45.50%	43.29%	3.10%	5.31%	2.21%	E>CFO	0.95	3.67***	
				***Significar	nt at 1 per cent l	evel:**Significan	t at 5 per cent le	evel: *Significant	at 10 per cent level					

Table 7-4 (Continued): Robustness test of the relative and incremental value relevance of earnings and CFO after controlling for the contextual factors: the GFC and the NCP comparison (page 2 of 4)

**Model 5**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it.}$  **Model 1**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it.}$  **Model 5**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it.}$ 

Incremental value relevance of CFO = Adjusted R-square of Model 5 – Adjusted R-square of Model 1; Incremental value relevance of earnings = Adjusted R-square of Model 5 – Adjusted R-square of Model 5a; Relative value relevance of earnings = Adjusted R-square of Model 1. The definition of the relative value relevance of CFO and earnings is consistent with Black (2003).

 $(Adj. R^{2}_{CFO} / Adj. R^{2}_{E}) = Relative explanatory power of CFO model (Model 5a) divided by relative explanatory power of earnings model (Model 1).$ 

Vuong (1989) Z-statistics compares earnings model (Model 1) and CFO model (Model 5a) as competing non-nested models. A positive and significant Z statistic implies that CFO model is rejected in favour of earnings model. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) are larger in magnitude than those of earnings model (Model 1). Levels of significance of the Z-statistics are determined based on a two tailed tests of probability distribution.

						-							
Year	Mod	iel 5	Model 1	Model 5a	Total	Total	Total value	Incremental	Incremental	Relative valu	e relevance	of E and	Vuong (1989) Z-
					value	value	relevance	value	value		CFO		statistics
	Coefficient	Coefficient	Coefficient	Coefficient	relevance	relevance	(adjusted R-	relevance of	relevance of	(Adjusted	Relative		Model 1 versus
	of	of CFO	of	of CFO	(adj. R-	(adj. R-	square)	CFO (Adj.	Е	R <sup>2</sup> Model	E versus	(Adj.	Model 5a
	Earnings	$\beta_3$	Earnings	β3	square)	square)	BV, CFO	$R^2$ Model 5	(Adj. R <sup>2</sup>	1 -	Relative	$R^2_{CFO}$	(Earnings model
	$\beta_2$		$\beta_2$		BV, E and	BV, E	[Model 5	– Adj. R <sup>2</sup>	Model 5	Adjusted	CFO	Adj.R <sup>2</sup>	versus CFO
					CFO	[Model 1]	(a)]	Model 1)	– Adj.	R <sup>2</sup> Model		E)	model)
					[Model 5]				$R^2$	5(a))			
									Model				
									5( a))				
Panel I: Permanent earnings													
Pooled	4.706***	2.411***	5.819***	2.884***	55.34%	50.91%	40.09%	4.43%	15.25%	10.81%	E>CFO	0.79	12.43***
2008-09	5.464***	2.301***	6.818***	2.529***	58.17%	54.29%	37.58%	3.88%	20.58%	16.70%	E>CFO	0.69	23.57***
2006-07	4.532***	2.880***	5.536***	3.142***	54.53%	51.80%	44.43%	2.73%	10.10%	7.37%	E <cfo< td=""><td>0.86</td><td>11.40***</td></cfo<>	0.86	11.40***
2004-07	4.424***	2.419***	5.261***	3.339***	52.95%	49.44%	43.70%	3.52%	9.25%	5.73%	E>CFO	0.88	8.93**
		•	•		•	Panel J: T	ransitory earnin	gs					
Pooled	3.528***	2.213***	4.147***	2.718***	53.59%	47.19%	39.52%	6.40%	14.07%	7.67%	E>CFO	0.84	12.13**
2008-09	3.954***	1.960***	4.598***	2.376***	56.26%	51.32%	37.59%	4.94%	18.67%	13.73%	E>CFO	0.73	17.32**
2006-07	3.270***	2.324***	3.801***	2.910***	50.62%	44.87%	41.05%	5.75%	9.57%	3.82%	E>CFO	0.91	5.19***
2004-07	3.330***	2.485***	3.905***	2.891***	51.08%	43.32%	39.14%	7.76%	11.94%	4.18%	E>CFO	0.90	7.01***

Table 7-4 (Continued): Robustness test of the relative and incremental value relevance of earnings and the CFO after controlling for the contextual factors: the GFC and the NCP comparison (page 3 of 4)

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level

 $\textbf{Model 5: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 \dots \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \dots \lambda n + \epsilon_{it,:} \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \dots \lambda n + \epsilon_{it,:} \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \dots \lambda n + \epsilon_{it,:} \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \dots \lambda n + \epsilon_{it,:} \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 \dots \lambda n + \epsilon_{it,:} \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 MV_{it} + \lambda_1 MV_{i$ 

Incremental value relevance of CFO = Adjusted R-square of Model 5 – Adjusted R-square of Model 1; Incremental value relevance of earnings = Adjusted R-square of Model 5 – Adjusted R-squ

 $(Adj. R^{2}_{CFO} / Adj. R^{2}_{E}) = Relative explanatory power of CFO model (Model 5a) divided by relative explanatory power of earnings model (Model 1).$ 

Vuong (1989) Z-statistics compares earnings model (Model 1) and CFO model (Model 5a) as competing non-nested models. A positive and significant Z statistic implies that CFO model is rejected in favour of earnings model. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) are larger in magnitude than those of earnings model (Model 1). Levels of significance of the Z-statistics are determined based on a two tailed tests of probability distribution.

Year	Mod	lel 5	Model 1	Model 5a	Total value	Total	Total value	Incremental	Incremental	Relative value	e relevance o	of E and	Vuong (1989) Z-		
					relevance	value	relevance	value	value	CFO		statistics			
	Coefficient	Coefficient	Coefficie	Coefficient	(adj. R-	relevance	(adjusted R-	relevance of	relevance of	(Adjusted R <sup>2</sup>	Relative		Model 1 versus		
	of	of CFO	nt of	of CFO	square)	(adj. R-	square)	CFO (Adj.	$E(Adj. R^2)$	Model 1 -	E versus	(Adj.	Model 5a		
	Earnings	β3	Earnings	β3	BV, E and	square)	BV, CFO	$R^2$ Model 5	Model 5 –	Adjusted R <sup>2</sup>	Relative	$R^2_{CFO}/$	(Earnings model		
	$\beta_2$		$\beta_2$		CFO	BV, E	[Model 5	$- \mathrm{Adj.} \mathrm{R}^2$	Adj. $\mathbb{R}^2$ Model	Model 5(a))	CFO	Adj.R <sup>2</sup>	versus CFO		
					[Model 5]	[Model 1]	(a)]	Model 1)	5( a))			E)	model)		
	Panel K: Permanent CFO														
Pooled	3.134***	2.440***	4.951***	3.480***	56.89%	49.18%	43.13%	7.71%	13.76%	6.05%	E>CFO	0.88	9.12***		
2008-09	3.692***	2.124***	5.179***	3.125***	58.27%	51.09%	41.61%	7.18%	16.66%	9.48%	E>CFO	0.81	13.67***		
2006-07	3.184***	2.501***	4.892***	3.206***	57.71%	48.41%	42.75%	9.30%	14.96%	5.66%	E <cfo< td=""><td>0.88</td><td>8.92***</td></cfo<>	0.88	8.92***		
2004-07	3.216***	2.923***	4.602***	3.689***	54.49%	47.38%	43.92%	7.11%	10.57%	3.46%	E>CFO	0.93	5.17***		
						Panel	L: Transitory Cl	FO							
Pooled	3.891***	2.113***	4.977***	2.417***	54.87%	45.24%	39.31%	9.63%	15.56%	5.93%	E>CFO	0.87	8.38***		
2008-09	4.872***	2.041***	6.197***	2.348***	52.19%	48.72%	37.26%	3.47%	14.93%	11.46%	E>CFO	0.76	17.23***		
2006-07	3.649***	2.281***	4.516***	2.562***	56.12%	43.91%	40.67%	12.21%	15.15%	2.94%	E <cfo< td=""><td>0.93</td><td>4.71***</td></cfo<>	0.93	4.71***		
2004-07	3.675***	2.142***	4.169***	2.877****	56.86%	43.37%	40.19%	13.49%	16.67%	3.18%	E>CFO	0.93	5.19***		

Table 7-4 (Continued): Robustness test of the relative and incremental value relevance of earnings and CFO after controlling for the contextual factors: the GFC and the NCP comparison (page 4 of 4)

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level

 $\textbf{Model 5: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 5(a): } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 .... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 ... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \lambda_1 ... \lambda n + \epsilon_{it}, \textbf{Model 1: } MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 CFO_{it} + \beta_2 CFO_{$ 

Incremental value relevance of CFO = Adjusted R-square of Model 5 - Adjusted R-square of Model 1; Incremental value relevance of earnings = Adjusted R-square of Model 5 - Adjusted R-square of Model 5a; Relative value relevance of CFO = Adjusted R-square of Model 5a; Relative value relevance of earnings = Adjusted R-square of Model 1.

The definition of the relative value relevance of CFO and earnings is consistent with Black (2003).

 $(Adj, R^2_{CPO}/Adj, R^2_E) = Relative explanatory power of CFO model (Model 5a) divided by relative explanatory power of earnings model (Model 1).$ 

Vuong (1989) Z-statistics compares earnings model (Model 1) and CFO model (Model 5a) as competing non-nested models. A positive and significant Z statistic implies that CFO model is rejected in favour of earnings model. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) is larger in magnitude than those of earnings model (Model 1). Levels of significance of the Z-statistics are determined based on a two tailed tests of probability distribution.

Size groups: Firms are partitioned into two groups each year, based on the median of their beginning of the year market value. Firms above the median market value are placed in the large size group and firms below the median market are placed in the small size group.

Leverage groups: Firms are split at the median value of leverage (total debt/total assets) for each year. Firms with above median leverage are placed in the high leverage group and firms with below median leverage are laced in the low leverage group.

Growth options: Firms are separated based on the yearly median market to book value ratio. Firms having above median market to book value ratio are placed in the high growth option group and firms having below median market to book value ratio are placed in the low growth option group.

Accruals groups: Firms are partitioned into two groups each year based on the median of absolute value of accruals divided by beginning of the year market value per share. Firms lying above the median of

 $|TAC/MV_{t-1}|$  are placed in high accruals group and firms having below the median of  $|TAC/MV_{t-1}|$  are placed in the low accruals group. Accruals is defined as net incomes minus CFO.

Earnings permanence groups: Firms are partitioned into two groups based on their absolute value of the change in the net income divided by the absolute value of firms' market value for each year. Firms lying below

median of  $|\Delta NI / MV_{t-1}|$  are placed in the permanent earnings group and firms lying above median of  $|\Delta NI / MV_{t-1}|$  are placed in the transitory earnings group.

 $|\Delta CFO/MV_{t-1}|$  are placed in the permanent CFO group and firms lying above median of  $|\Delta CFO/MV_{t-1}|$  are placed in the transitory CFO group.

### 7.6 Impact of the GFC on the value relevance of earnings and CFO after controlling for the effects of different contextual factors: hypothesis 2(d)

#### 7.6.1 Effect of firm size: large firms versus small firms

As discussed under the literature review (chapter three), due to the availability of different accounting choices, large firms tend to report smoother and more persistent earnings than that of small firms. Moreover, the risk associated with the GFC may be perceived more stringently by small firms than large firms. Hence, the impact of the GFC on the value relevance of earnings and CFO may be different for large firms from the small firms.

Results for Model 6 on the two size groups are reported in Table 7-5, Panel A. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative and significant for large firms and the coefficient of the interaction term CFO\*CP ( $\beta_7$ ) is positive and marginally significant (at 10 per cent level) for small firms. These results suggest that the value relevance of CFO has decreased for large firms, whereas, the value relevance of CFO has increased for small firms during the GFC compared to the NCP.

The coefficient estimate of the interaction term  $E^*CP$  ( $\beta_6$ ) is negative and marginally significant (at 10 per cent level) for large firms, whereas, the coefficient estimate of the interaction term  $E^*CP$  ( $\beta_6$ ) is positive and significant for small firms. Hence, the value relevance of earnings has increased for small firms. For large firms, the value relevance of earnings has marginally decreased.

Thus for large firms, the importance of both earnings and CFO for stock valuation purposes has decreased during the GFC compared to the NCP, whereas, for small firms the value relevance of both earnings and CFO has increased during the GFC compared to the NCP.

Similar results can be observed in Table 7-4, Panel A and Panel B from Model 1 and Model 5a. The coefficient estimates and the relative explanatory power of both earnings and CFO have increased during the GFC compared to the NCP for small firms. For large firms, the coefficient estimates and the relative explanatory power of both earnings and CFO have decreased during the GFC compared to the NCP.

Further note that the coefficient estimates of both earnings and CFO are higher for large firms than those of small firms, most plausibly due to the high persistence of earnings and CFO of large firms.<sup>71</sup> On the contrary, the explanatory power (adjusted R-square) of both earnings (Model 1) and CFO (Model 5a) are higher for small firms than those of large firms.

#### 7.6.2 Effect of leverage: high leverage firms versus low leverage firms

Leverage is likely to have an adverse impact on firm value during the GFC compared to the NCP because leverage has associated bankruptcy risks. For firms with high levels of leverage, the value relevance of CFO may increase because CFO is related to debt repayment and interest payment capacity. Moreover, firms with high levels of leverage may engage in high levels of earnings manipulation to avoid debt covenant violation. In such a situation, the value relevance of CFO may increase due to the noisiness in earnings. Hence, the value relevance of earnings and CFO may be impacted by firms' leverage position.

The results for the two leverage groups are presented in Table 7-5, Panel B. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is significant and negative for the high leverage firms. On the contrary, the coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is positive and significant for the low leverage firms. The results on earnings are similar for both high leverage firms and low leverage firms. The coefficient estimate of the interaction term CP\*E ( $\beta_6$ ) is positive and significant for both of the leverage groups.

Similar results can be observed in Table 7-4, Panel C and Panel D (from Model 1 and Model 5a). The coefficient estimates and the relative explanatory power of earnings have increased during the GFC compared to the NCP for both high leverage firms and low leverage firms. For high leverage firms, the coefficient estimates and the relative explanatory power of CFO have decreased during the GFC compared to the NCP. On the contrary, the relative explanatory power and coefficient estimates of CFO have increased for low leverage firms.

These results suggest that the value relevance of CFO has decreased for high leverage firms and the value relevance of CFO has increased for low leverage firms during the GFC compared to the NCP. However, the value relevance of earnings has increased during the

<sup>&</sup>lt;sup>71</sup>(Habib, 2010) also find larger coefficient estimates and lower explanatory power of earnings and other performance measures for large firms than those of small firms in explaining security returns in the Australian market.

GFC for both high leverage firms and low leverage firms. These findings also suggest that although firms' leverage level does not have any moderating effect on the impact the GFC on the value relevance of earnings, it has moderating effect on the impact of the GFC on the value relevance of CFO.

#### 7.6.3 Effect of growth options: high growth versus low growth

The results for the two growth samples are presented in Table 7-5, Panel C. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative and significant for both high growth firms and low growth firms. The coefficient estimate of the interaction term E\*CP ( $\beta_6$ ) is positive and significant for both high growth firms and low growth firms.

Similar results can be observed in Table 7-4, Panel E and Panel F (from Model 1 and Model 5a). The coefficient estimates and the relative explanatory power of earnings have increased during the GFC compared to the NCP for both high growth firms and low growth firms. On the contrary, the coefficient estimates and the relative explanatory power of CFO have decreased during the GFC compared to the NCP for both high growth firms and low growth firms.

These results suggest that the value relevance of earnings has increased and the value relevance of CFO has decreased for both high growth firms and low growth firms. Thus firms' growth option appears to have no effect on the impact of the GFC on the value relevance of earnings and CFO.

#### 7.6.4 Effect of accruals levels: high accruals versus low accruals

The results for the two accruals groups are presented in Table 7-5, Panel D. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative and significant for high accruals firms. On the contrary, the coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative but significant marginally (at 10 per cent level) for low accruals firms. Also note that the coefficient estimate of CFO\*CP ( $\beta_7$ ) is higher for high accruals firms than that of low accruals firms (for high accruals firms  $\beta_7 = -1.597$ , for low accruals firms  $\beta_7 = -0.573$ ).

The coefficient estimate of the interaction term CP\*E ( $\beta_6$ ) is positive for both high accruals firms and low accruals firms but significant at 1 per cent level for high accruals firms and at

10 per cent level for low accruals firms. Also note that the coefficient estimate of the interaction term E\*CP ( $\beta_6$ ) is higher for high accruals firms than that of low accruals firms (for high accruals firms  $\beta_6 = 2.827$ , for low accruals firms  $\beta_6 = 0.601$ ).

Similar results can be observed in Table 7-4, Panel G and Panel H (from Model 1 and Model 5a). The coefficient estimates and the relative explanatory power of earnings have increased during the GFC compared to the NCP for both high accruals firms and low accruals firms. On the contrary, the coefficient estimates and the relative explanatory power of CFO have decreased during the GFC compared to the NCP for both high accruals firms and low accruals firms. Further note that the coefficient estimates of earnings ( $\beta_2$ ) are larger for high accruals firms than those of low accruals firms. Moreover, the relative explanatory power of earnings (Model 1) is higher for high accruals firms than that of low accruals firms. On the contrary, the coefficient estimates of CFO ( $\beta_3$ ) are larger for low accruals firms than those of high accruals firms. Moreover, the relative explanatory power of high accruals firms than those of the text of CFO (Model 5a) is higher for high accruals firms.

Summing up, these results suggest that although the value relevance of CFO has decreased during the GFC compared to the NCP for both high accruals firms and low accruals firms, the decrease was more pronounced for high accruals firms. Moreover, although the value relevance of earnings has increased during the GFC compared to the NCP for both high accruals firms and low accruals firms, the increase was more pronounced for high accruals firms.

### 7.6.5 Effect of earnings permanence: transitory earnings versus permanent earnings

The results for the two groups based on earnings permanence are presented in Table 7-5, Panel E. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative and significant for both permanent earnings firms and transitory earnings firms. Hence, the value relevance of CFO has decreased during the GFC compared to the NCP for both permanent earnings firms and transitory earnings firms.

The coefficient estimate of the interaction term CP\*E ( $\beta_6$ ) is positive and significant for both permanent earnings firms and transitory earnings firms. Thus the value relevance of earnings has increased during the GFC compared to the NCP for both permanent earnings firms and transitory earnings firms. Of particular note is that the magnitude of the coefficient of the interaction term CP\*E ( $\beta_6$ ) is higher for transitory earnings firms than that of permanent earnings firms ( $\beta_6 = 1.514$  for permanent earnings firms;  $\beta_6 = 2.586$  for transitory earnings firms). On the contrary, the magnitude of the coefficient of earnings ( $\beta_2$ ) is lower for transitory earnings firms than that of permanent earnings firms ( $\beta_2 = 4.324$  for permanent earnings firms;  $\beta_2 = 3.837$  for transitory earnings firms). Thus although investors put less importance on transitory earnings than on permanent earnings during the NCP, the importance put on transitory earnings increases more than that of permanent earnings during the GFC.

Similar results can be observed in Table 7-4, Panel I and Panel J (from Model 1 and Model 5a). The coefficient estimates and the relative explanatory power of earnings have increased during the GFC compared to the NCP for both permanent earnings firms and transitory earnings firms. On the contrary, the coefficient estimates and the relative explanatory power of CFO have decreased during the GFC compared to the NCP for both permanent earnings firms and transitory power for both permanent earnings firms.

These results suggest that the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP for both permanent earnings firms and transitory earnings firms. However, the increase in the value relevance of earnings was more pronounced for the transitory earnings than that of permanent earnings.

#### 7.6.6 Effect of CFO permanence: transitory CFO versus permanent CFO

The results for the firms with permanent CFO and transitory CFO are presented in Table 7-5, Panel F. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is significant and negative for firms with transitory CFO. On the contrary, the coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative but marginally significant at 10 per cent level for firms with permanent CFO. Of particular note is that the magnitude of the coefficient of the interaction term CP\*CFO ( $\beta_7$ ) is higher for transitory CFO firms than that of permanent CFO firms ( $\beta_7 = -0.423$  for permanent CFO firms;  $\beta_7 = -1.061$  for transitory CFO firms). On the contrary, the magnitude of the coefficient of earnings ( $\beta_3$ ) is lower for transitory CFO firms than that of permanent CFO firms; ( $\beta_3 = 3.216$  for permanent CFO firms;  $\beta_3 = 2.816$  for transitory CFO firms). These results suggest that the value relevance of CFO has decreased during the GFC for firms with both transitory CFO and permanent CFO. However, the decrease in the value relevance of CFO was more pronounced for firms with transitory CFO.

The coefficient of the interaction term CP\*E ( $\beta_6$ ) is positive and significant for both permanent CFO firms and transitory CFO firms. Thus the value relevance of earnings has increased during the GFC compared to the NCP for both permanent CFO firms and transitory CFO firms.

Similar results can be observed in Table 7-4, Panel K and Panel L (from Model 1 and Model 5a). The coefficient estimates and the relative explanatory power of earnings have increased during the GFC compared to the NCP for both permanent CFO firms and transitory CFO firms. On the contrary, the coefficient estimates and the relative explanatory power of CFO have decreased during the GFC compared to the NCP for both permanent CFO firms and transitory CFO firms. However, the decrease in the explanatory power of CFO is more pronounced for firms with transitory CFO than that of firms with permanent CFO.

Summing up the results suggest that the value relevance of earnings has increased and the value relevance of CFO has decreased for both permanent CFO firms and transitory CFO firms. However, the decrease in the value relevance of CFO was higher for firms with transitory CFO than that of permanent CFO.
		Panel A: Firm size groups		Panel B: Leverage groups		Panel C:Growth options		Panel D:Accruals level		Panel E:Earnings		Panel F:CFO permanence	
										permanence			
		Large firms	Small firms	High	Low	High growth	Low growth	High	Low	Permanent	Transitory	Permanent	Transitory
				leverage	leverage			Accruals	Accruals	earnings	earnings	CFO	CFO
		2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009	2004-2009
	α	0.740***	0.139***	0.591***	0.384***	0.575***	0.261***	0.613***	0.427***	0.624***	0.365***	0.607**	0.353***
		(5.480)	(6.817)	(4.136)	(6.728)	(36.567)	(16.708)	(16.852)	(31.327)	(31.018)	(3.428)	(2.386)	(6.343)
BV <sub>it</sub>	$\beta_1$	1.202***	0.705***	1.168***	1.069***	1.013***	0.897***	1.252***	1.210***	1.215***	1.213***	1.173***	1.219***
		(20.869)	(34.003)	(22.467)	(19.707)	(16.985)	(12.760)	(8.608)	(15.954)	(26.811)	(27.286)	(31.494)	(23.127)
E <sub>it</sub>	$\beta_2$	4.997***	2.240***	3.136***	3.425***	4.648***	2.351***	4.238***	3.347***	4.324***	3.837***	3.583***	3.127***
		(13.621)	(10.429)	(10.623)	(3.173)	(11.142)	(9.953)	(16.437)	(7.855)	(6.103)	(4.733)	(6.557)	(13.501)
CFO <sub>it</sub>	β3	2.309***	1.330***	2.802***	1.252**	2.611***	1.976***	2.387***	2.135***	2.253***	2.312**	3.216***	2.816***
		(12.515)	(4.786)	(20.991)	(2.363)	(14.485)	(6.843)	(15.171)	(21.348)	(24.232)	(2.342)	(9.708)	(8.806)
CP	$\beta_4$	-0.556***	-0.209**	-0.604***	-0.357***	-0.222**	-0.271**	-0.424**	-0.489***	-0.310**	-0.358***	-0.403***	-0.678***
	-	(-2.692)	(2.313)	(-2.798)	(-4.361)	(-2.243)	(2.292)	(-2.613)	(-6.139)	(-2.313)	(-6.478)	(-2.977)	(-2.982)
CP*BV <sub>it</sub>	$\beta_5$	-0.473*	-0.204***	593***	-0.393***	418***	-0.273***	-0.494***	-0.587***	323***	283***	489***	-0.503*
		(-1.726)	(-33.647)	(-20.665)	(-17.904)	(-18.160)	(-14.259)	(-15.613)	(-4.584)	(-17.132)	(-24.430)	(-10.538)	(-1.780)
CP*E <sub>it</sub>	$\beta_6$	-0.412*	2.130***	3.460***	2.663***	1.343***	2.137***	2.827***	.601*	1.514***	2.586**	3.248***	2.339***
	-	(-1.713)	(4.556)	(13.649)	(30.233)	(5.916)	(6.853)	(6.508)	(1.721)	(8.768)	(31.309)	(4.743)	(18.413)
CP*	β <sub>7</sub>	-1.864***	0.826*	-1.236***	1.877***	921***	661***	-1.597***	-0.573*	-1.113***	-1.586***	-0.423*	-1.061***
CFO <sub>it</sub>		(-7.471)	(1.776)	(-8.543)	(9.202)	(-17.268)	(-23.123)	(-7.569)	(-1.654)	(-5.457)	(-19.290)	(-1.784)	(-9.273)
F-value		467.958***	511.968***	285.526***	358.482***	326.074***	341.273***	388.857***	315.494***	318.257***	304.475***	345.761***	326.173***
Adj.R <sup>2</sup>		59.50%	68.03%	66.04%	63.59%	61.38%	67.13%	68.38%	59.76%	69.83%	57.13%	64.91%	62.38%
Durbin-Wa	tson	1.836	1.834	2.11	2.116	1.726	1.772	1.645	1.823	1.645	1.823	1.772	1.726

Table 7-5: Impact of the GFC on the value relevance of earnings and CFO after controlling for the effects of different contextual factors

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level.

**Model 6**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \beta_4 CP + \beta_5 CP * BV_{it} + \beta_6 CP * E_{it} + \beta_7 CP * CFO_{it} + \lambda_1 \dots \lambda_n + \varepsilon_{it}$ 

Size groups: Firms are partitioned into two groups each year, based on the median of their beginning of the year market value. Firms above the median market value are placed in the large size group and firms below the median market are placed in the small size group.

Leverage groups: Firms are split at the median value of leverage (total debt /total assets) for each year. Firms with above median leverage are placed in the high leverage group and firms with below median leverage are laced in the low leverage group.

Growth options: Firms are separated based on the yearly median market to book value ratio. Firms having above median market to book value ratio are placed in the high growth option group and firms having below median market to book value ratio are placed in the low growth option group.

Accruals groups: Firms are partitioned into two groups each year based on the median of absolute value of accruals divided by beginning of the year market value per share. Firms lying above the median of

 $|TAC/MV_{t-1}|$  are placed in high accruals group and firms having below the median of  $|TAC/MV_{t-1}|$  are placed in the low accruals group. Accruals is defined as net incomes minus CFO.

Earnings permanence groups: Firms are partitioned into two groups based on their absolute value of the change in the net income divided by the absolute value of firms' market value for each year. Firms lying below

median of  $|\Delta NI / MV_{t-1}|$  are placed in the permanent earnings group and firms lying above median of  $|\Delta NI / MV_{t-1}|$  are placed in the transitory earnings group.

**CFO permanence groups:** Firms are partitioned into two groups based on their absolute value of the change in the CFO divided by the absolute value of firms' market value for each year. Firms lying below median of  $\left|\Delta CFO / MV_{t-1}\right|$  are placed in the permanent CFO group and firms lying above median of  $\left|\Delta CFO / MV_{t-1}\right|$  are placed in the transitory CFO group.

#### 7.7 Different robustness tests

Different robustness tests are performed to examine the sensitivity of the results obtained for hypotheses 2(a), 2(b), 2(c) and 2(d). Specifically models are estimated using cross-sectional fixed effect, considering alternative date for share prices (September, 30) and using undeflated variables. The rationale for considering these alternative specifications has been discussed in detail in the research design chapter (chapter 5).

## 7.7.1 Results of robustness test on the incremental and relative value relevance of earnings and CFO: hypotheses 2(a), 2(b) and 2(c)

Regarding hypothesis 2(a), results reported in Table 7-6 (Panel A, B and C) suggest that CFO has explanatory power of the variation in share prices, in addition to that explained by book value and earnings, for each of the alternative specifications. Specifically, inclusion of CFO as an additional independent variable with BV and E helps in explaining more variation in share prices than that can be explained by BV and E in all the alternative specifications. Moreover, the positive and statistically significant coefficient estimates of CFO ( $\beta_3$ ) in Model 5 and Model 5a across all the specifications suggests that in addition to book value and earnings, investors consider CFO in determining share prices. Thus the results are supportive of hypothesis 2(a) in different robustness tests.

Regarding hypothesis 2(b) and 2(c), the explanatory power of the earnings model (Model 1) is higher than that of the CFO model (Model 5a) for every alternative specification during both the GFC and the NCP. Thus the relative value relevance of earnings is higher than that of CFO for all the specifications during both the GFC and the NCP. The results are robust to using alternative date for share prices (the dependent variable), using undeflated variables and estimating cross-section fixed effect panel regression. These findings suggest the superiority of earnings over CFO in the Australian market during both the GFC and the NCP. Although these results support hypothesis 2(b), they do not support hypothesis 2(c).

Year	Year Model 5		Model 1	Model 5a	Total	Total	Total	Incremental	Incremental	Relative value relevance of E and		Vuong (1989) Z-	
		r			value	value	value	value	value		CFO		statistics
	Coefficient	Coefficient	Coefficient	Coefficient	relevance	relevance	relevance	relevance	relevance	(Adjusted	Relative	(Adj.	Model 1 versus
	of	of CFO	of	of CFO	(adj. R-	(adj. R-	(adjusted	of CFO	of E	R <sup>2</sup> Model	E	$R^2_{CFO}/$	Model 5a
	Earnings	β3	Earnings	β3	square)	square)	R-square)	(Adj. R <sup>2</sup>	(Adj.	1 -	versus	$Adj.R_{E}^{2}$	(Earnings model
	$\beta_2$		$\beta_2$		BV, E	BV, E	BV, CFO	Model 5 –	R <sup>2</sup>	Adjusted	Relative		versus CFO model)
					and CFO	[Model 1]	[Model	Adj. R <sup>2</sup>	Model	R <sup>2</sup> Model	CFO		
					[Model		5a)]	Model 1)	5 - 11 - 12	5a)			
					5]		/-	, , , , , , , , , , , , , , , , , , ,	Adj. R				
					_				Model				
					Danal A. A	Itomotivo do	ta fan ahana n	riaga (Cantamb	$\frac{Ja}{20}$				
D 1 1	0 (0 4****	0.000***	4 450***	0 170***	Pallel A: F		le for share p	rices (Septemb	15.000	11.070/	E CEO	0.71	10.04***
Pooled	3.604***	2.320***	4.453***	3.1/2***	42.39%	37.57%	26.50%	4.82%	15.89%	11.07%	E>CFO	0.71	12.26***
2008-09	3.892***	1.917***	4.878***	2.509***	46.97%	43.39%	24.84%	3.58%	22.13%	18.55%	E>CFO	0.57	22.12***
2006-07	3.301***	2.293***	4.209***	3.379***	41.48%	39.58%	28.88%	1.90%	12.60%	10.70%	E>CFO	0.73	13.40***
2004-07	3.515***	2.547***	4.597***	3.583***	39.64%	36.61%	27.81%	3.03%	11.83%	8.80%	E>CFO	0.76	13.97***
						Panel B:	Undeflated va	ariables					
Pooled	3.638***	2.406***	5.351***	3.975***	82.63%	71.81%	63.51%	10.82%	19.12%	8.30%	E>CFO	0.88	13.18***
2008-09	3.812***	2.139***	5.811***	3.436***	84.26%	73.26%	60.55%	11.00%	23.71%	12.71%	E>CFO	0.83	17.01***
2006-07	3.659***	2.463***	5.311***	4.291***	82.09%	71.40%	66.40%	10.69%	15.69%	5.00%	E>CFO	0.93	7.30***
2004-07	3.538***	2.676***	5.134***	4.139***	79.37%	71.63%	64.63%	7.74%	14.74%	7.00%	E>CFO	0.90	9.03***
					Pa	anel C: Cross	section fixed	effect model					
Pooled	3.271***	2.186***	3.663***	2.510***	78.74%	77.04%	63.63%	1.70%	15.11%	13.41%	E>CFO	0.83	16.74***
2008-09	3.823***	2.007***	3.917***	2.397***	86.94%	85.76%	61.08%	1.18%	25.86%	24.68%	E>CFO	0.71	29.93***
2006-07	2.646***	2.296***	3.736***	2.982***	84.36%	84.10%	66.87%	0.26%	17.49%	17.23%	E>CFO	0.80	23.40***
2004-07	3.156***	2.202***	3.441***	2.692***	77.51%	75.74%	65.28%	1.77%	12.23%	10.46%	E>CFO	0.86	12.61***

Table 7-6: Robustness test of the relative and incremental value relevance of earnings and CFO: the GFC and the NCP comparison

\*\*\*Significant at 1 per cent level;\*\*Significant at 5 per cent level; \*Significant at 10 per cent level

**Model 5**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ ; **Model 1**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ ; **Model 5a**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_3 CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ ;

Incremental value relevance of CFO = Adjusted R-square of Model 5 – Adjusted R-square of Model 1; Incremental value relevance of E = Adjusted R-square of Model 5 – Adjusted R-square of Model 5 (a); Relative value relevance of CFO = Adjusted R-square of Model 5a; Relative value relevance of E = Adjusted R-square of Model 1. The relative value relevance of CFO and earnings is consistent with Black (2003).

 $(Adj. R^{2}_{CFO} / Adj. R^{2}_{E}) = Relative explanatory power of CFO model (Model 5a) divided by relative explanatory power of earnings model (Model 1).$ 

Vuong (1989) Z-statistics compares earnings model (Model 1) and CFO model (Model 5a) as competing non-nested models. A positive and significant Z statistic implies that CFO model is rejected in favour of earnings model. A positive Z statistic implies that residuals produced by the CFO model (Model 5a) are larger in magnitude than those of earnings model (Model 1). Levels of significance of the Z-statistics are determined based on a two tailed tests of probability distribution.

## 7.7.2 Results of the robustness test on the impact of the GFC on the value relevance of earnings and CFO: hypotheses 2(d)

#### 7.7.2.1 Cross-section fixed effect panel regression

Results for the cross-section fixed effect panel regressions are shown in Panel A, Table 7-7. The coefficient estimate of the interaction terms CP\*CFO ( $\beta_7$ ) is negative and significant. Also note that the explanatory power of CFO (adjusted R-square of Model 5a; Table 7-6, Panel C) has decreased from 65.28 per cent during the NCP to 61.08 per cent during the GFC. On the contrary, the coefficient estimate of the interaction term CP\*E ( $\beta_6$ ) is positive and significant. Also note that the explanatory power of the earnings (adjusted R-square of Model 1; Table 7-6, Panel C) has increased from 75.74 per cent during the NCP to 85.76 per cent during the GFC. Thus the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP. These results do not support hypothesis 2(d).

Tuble 7 7. Robustiess test of the impact of the Of C on the value felevance of carmings and Cf O										
		Panel A: Cross	section fixed	Panel B: Variab	les are	Panel C: Alternative date for				
		effect panel regi	ression <sup>72</sup>	undeflated		share prices				
			-			(September, 30)				
		2004-2009	2006-2009	2004-2009	2006-2009	2004-2009	2006-2009			
	α	1.351***	1.602***	139288.7***	179710.3***	0.321***	0.253***			
		((24.722)	(26.077)	(6.804)	(6.069)	(10.017)	(8.038)			
BV <sub>it</sub>	$\beta_1$	0.933***	0.914***	0.980***	0.970***	0.879***	0.892***			
		((14.803)	(10.747)	(22.503)	(14.204)	(27.285)	(21.431)			
E <sub>it</sub>	β <sub>2</sub>	3.193***	3.459***	3.338***	4.659***	4.158***	5.560***			
		( (3.194)	(3.627)	(12.561)	(6.668)	(9.466)	(3.203)			
CFO <sub>it</sub>	β <sub>3</sub>	1.597***	1.376***	2.676***	2.263***	1.025***	1.085**			
		(5.923)	(4.490)	(25.060)	(21.157)	(3.508)	(2.170)			
СР	$\beta_4$	-0.134*	-0.235***	-194380.7***	-234802.3***	-0.197***	-0.129***			
		(-1.933)	(-3.819)	(-6.052)	(-5.891)	(-3.708)	(-2.937)			
CP*BV <sub>it</sub>	β <sub>5</sub>	-0.274***	-0.250***	-0.397***	-0.427***	-0.123**	-0.137**			
		(-11.441)	(-14.292)	(-17.747)	(-13.193)	(-2.180)	(-2.550)			
CP*E <sub>it</sub>	$\beta_6$	3.571***	3.422**	2.025***	3.653**	1.077***	1.231**			
		(10.903)	(2.504)	(3.123)	(2.418)	(6.424)	(2.538)			
CP* CFO <sub>it</sub>	β <sub>7</sub>	-0.478***	-0.292***	-1.672***	-1.260***	-0.334**	-0.474***			
		(-4.107)	(-3.080)	(-24.525)	(-20.871)	(-2.284)	(-2.955)			
F-value		25.246***	35.818***	11616.05***	8115.033***	190.639***	170.670***			
Adj.R <sup>2</sup>		86.03%	87.34%	83.41%	84.21%	63.31%	67.19%			
Durbin-Watson		2.637	2.771	2.013	2.169	1.673	1.536			

Table 7-7: Robustness test of the impact of the GFC on the value relevance of earnings and CFO

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \* Significant at 10 per cent level.

 $\textbf{Model 6: } \mathbf{MV}_{it} = \alpha_{it} + \beta_1 \mathbf{BV}_{it} + \beta_2 \mathbf{E}_{it} + \beta_3 \mathbf{CFO}_{it} + \beta_4 \mathbf{CP} + \beta_5 \mathbf{CP}^* \mathbf{BV}_{it} + \beta_6 \mathbf{CP}^* \mathbf{E}_{it} + \beta_7 \mathbf{CP}^* \mathbf{CFO}_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}.$ 

<sup>&</sup>lt;sup>72</sup>In estimating the cross-sectional fixed effect regression in Model 6, industry dummy variables have been dropped because, industry dummy variables and cross-section dummy variables create colinearity and singular matrix problems.

#### 7.7.2.2 Variables are undeflated

Results of the regression using undeflated variables are presented in Table 7-7, Panel B. The findings are similar to the results obtained using variables deflated by number of shares. The coefficient of the interaction term CFO\*CP is negative ( $\beta_7 = -1.672$ ) and the coefficient of the interaction term E\*CP is positive ( $\beta_6 = 2.025$ ); both of the coefficient estimates are significant at 1 per cent level.

Also note that the explanatory power of the CFO model (adjusted R-square of Model 5a; Table 7-6, Panel B) has decreased from 69.63 per cent during the NCP to 60.55 per cent during the GFC. On the contrary, the explanatory power of the earnings model (adjusted R-square of Model 1; Table 7-6, Panel B) has increased from 71.63 per cent per cent during the NCP to 73.26 per cent during the GFC. Hence, the value relevance of CFO has decreased significantly during the GFC compared to the NCP. Thus the results obtained using undeflated variables do not support hypothesis 2(d).

#### 7.7.2.3 Alternative date for share prices (September, 30)

To examine the sensitivity of the results to the alternative date for share prices, Model 6 is estimated using firms' market value (dependent variable) at September 30. The results are reported in Table 7-7, Panel C. The coefficient of the interaction term CFO\*CP is negative ( $\beta_7 = -0.334$ ) and the coefficient of the interaction term E\*CP is positive ( $\beta_6 = 1.077$ ); both of the coefficient estimates are significant at 1 per cent level. Also note that the explanatory power of the CFO model (adjusted R-square of Model 5a; Table 7-6, Panel A) has decreased from 27.81 per cent during the NCP to 24.84 per cent during the GFC. On the contrary, the explanatory power of the earnings model (adjusted R-square of Model 1; Table 7-6, Panel A) has increased from 36.61 per cent per cent during the NCP to 43.39 per cent during the GFC.

The results are similar to the results obtained using firms' market value at June 30. The value relevance of earnings has increased, whereas, the value relevance of CFO has decreased during the GFC compared to the NCP. Thus the results obtained using alternative date for share prices (September, 30) do not support hypothesis 2(d).

#### 7.7.3 Alternative definition of the GFC and the NCP

To examine whether the results are sensitive to the alternative definition of the GFC and the NCP, 2004-2006 is defined as the NCP and 2007-2009 is defined as the GFC (the rationale for the alternative definition of the GFC and the NCP has been discussed in the research design chapter). Model 6 is then estimated with this alternative definition of the GFC and the NCP. Results are presented in Table 7-8.

Results obtained from this alternative definition of the GFC and the NCP are almost similar to the results discussed in the previous sections. The coefficient estimate of the interaction term CFO\*CP ( $\beta_7$ ) is negative and significant for the combined sample, positive earnings firms and negative earnings firms. On the contrary, the coefficient estimate of the interaction term E\*CP ( $\beta_6$ ) is positive and significant for the combined sample and for the positive earnings sample. Consistent with the results obtained in chapter six, the coefficient of the interaction term E\*CP ( $\beta_6$ ) for the negative earnings sample is negative and significant.

These results suggest that the value relevance of CFO has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. Thus, the results are robust to the alternative definition of the GFC and the NCP. These findings do not support hypothesis 2(d) [the potential reasons for not supporting hypotheses 2(c) and 2(d) are discussed in the sub-section 7.9.1].

	α	$\beta_1$	$\beta_2$	β <sub>3</sub>	$\beta_4$	β <sub>5</sub>	$\beta_6$	β <sub>7</sub>	Adj. $R^2$	F-stats.
Panel A: Combined Sample										
Pooled (2004-	0.536***	1.023***	3.501***	2.966***	-0.572*	-0.489***	2.149***	-1.195***	53.85%	513.591***
2009)	(5.473)	(14.247)	(5.555)	(25.493)	(-1.684)	(-12.146)	(28.126)	(-16.310)		
Panel B: Positive earnings sample										
Pooled (2004-	0.649***	1.254***	4.789***	2.600***	-0.602**	-0.245*	2.124***	-1.784***	68.32%	380.820***
2009)	(3.426)	(10.107)	(5.221)	(17.344)	(-2.457)	(-1.709)	(17.844)	(-13.528)		
Panel C: Negative earnings sample										
Pooled (2004-	0.373***	0.723***	-0.318***	2.135***	-0.016	-0.312***	-0.200*	965***	39.97%	84.285***
2009)	(9.817)	(16.816)	(-4.116)	(5.750)	(-0.348)	(-16.472)	(-1.930)	(-4.318)		

Table 7-8: Results of robustness analysis: alternative definition of the GFC and the NCP (GFC=2007-2009; NCP = 2004-2006)

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*Significant at 10 per cent level. **Model 6**:  $MV_{it} = \alpha_{it} + \beta_1 BV_{it} + \beta_2 E_{it} + \beta_3 CFO_{it} + \beta_4 CP + \beta_5 CP * BV_{it} + \beta_6 CP * E_{it} + \beta_7 CP * CFO_{it} + \lambda_1 \dots \lambda n + \varepsilon_{it}$ .

#### 7.8 Summary of the findings

A total of four hypotheses have been examined in this chapter. Hypothesis 2(a) states that CFO has value relevance incremental to book value and earnings. Hypothesis 2(b) states that the value relevance of earnings is higher than that of CFO during the NCP. Hypothesis 2(c) states that the value relevance of CFO is higher than that of earnings during a GFC. Hypothesis 2(d) states that the value relevance of earnings decreases and the value relevance of CFO increases during a GFC compared to the NCP. The result suggests that CFO has incremental value relevance given book value and earnings which supports hypothesis 2(a). However, the relative value relevance of earnings is higher than that of CFO during both the GFC and the NCP which is consistent with hypothesis 2(b) but not consistent with hypothesis 2(c). When compared between the GFC and the NCP, the result suggests that the value relevance of earnings has increased and that of CFO has decreased during the GFC compared to the NCP which does not support hypothesis 2(d). The findings are robust to different alternative specifications. However, the impact of the GFC was different on earnings and CFO based on different firm specific contextual factors. Table 7-9 summarises the findings on hypotheses 2 (a), (b), (c) and (d) from different alternative specifications.

			,		
		Hypothesis 2(a)	Hypothesis 2(b)	Hypothesis 2(c)	Hypothesis 2(d)
Main analysi	S	Not rejected	Not rejected	Rejected	Rejected
	Cont	rol for different	contextual factor	S	
Firm	Positive earnings firms	Not rejected	Not rejected	Rejected	Rejected
profitability	Negative earnings firms	Not rejected	Not rejected	Rejected	Rejected
Firm size	Large firms	Not rejected	Not rejected	Rejected	Rejected
	Small firms	Not rejected	Not rejected	Rejected	Rejected
Leverage	High leverage	Not rejected	Not rejected	Rejected	Rejected
ratio	Low leverage	Not rejected	Not rejected	Rejected	Rejected
Growth	rowth High growth firms		Not rejected	Rejected	Rejected
options	Low growth firms	Not rejected	Not rejected	Rejected	Rejected
Accruals	High accruals firms	Not rejected	Not rejected	Rejected	Rejected
levels	Low accruals firms	Not rejected	Not rejected	Rejected	Rejected
Earnings	Permanent earnings	Not rejected	Not rejected	Rejected	Rejected
permanence	Transitory earnings	Not rejected	Not rejected	Rejected	Rejected
CFO	Permanent CFO	Not rejected	Not rejected	Rejected	Rejected
permanence	Transitory CFO	Not rejected	Not rejected	Rejected	Rejected
		Robustnes	ss tests		
Fixed effect	model	Not rejected	Not rejected	Rejected	Rejected
Variables are	e undeflated	Not rejected	Not rejected	Rejected	Rejected
Alternative d variable (30	late for the dependent September)	Not rejected	Not rejected	Rejected	Rejected
Alternative d	lefinition of the GFC	Not rejected	Not rejected	Rejected	Rejected

 Table 7-9: Summary results of hypotheses testing on the value relevance of earnings and CFO

#### 7.9 Discussions on the findings

There is a long standing debate on the superiority of earnings versus CFO in explaining security prices. Different prior studies have shown that the superiority of CFO over earnings depends on different contextual factors. When earnings becomes a noisy measure of firm performance, when there is a likelihood of earnings management and when the earnings is extremely low or high, the value relevance of CFO increases and the value relevance of earnings decreases. However, the findings from normal economic condition may not generalise to the economy-wide exogenous shock like the GFC. The GFC represents an economic disturbance. Firms' going concern risks and uncertainty have increased substantially during the GFC (discussed in chapter two of this thesis). Prior studies have also shown that firms' earnings management increases during periods of economic disturbances and earnings management reduces the value relevance of earnings. Hence, earnings may be a noisy measure of firms' performances during the GFC. Based on this conjecture, this thesis examines the relative superiority of earnings versus CFO during the GFC and the NCP. This thesis adds to the literature by examining whether earnings or CFO contain superior information to explain cross-sectional variations in share prices in the unique context of the economy-wide exogenous shock of the GFC. It also extends the literature by examining the impact of the GFC on the value relevance of earnings and CFO.

The findings suggest that CFO is value relevant and CFO contains additional information over book value and earnings for stock valuation purposes. When the relative information content of earnings and CFO is examined, the findings suggest that earnings has higher relative explanatory power of variations in share prices than that of CFO in the Australian market during both the GFC and the NCP.

The Chow F-test for structural break suggests that there was a structural break in the association of share prices with earnings and CFO between the GFC and the NCP. The structural break has resulted in the decrease in the value relevance of CFO and increase in the value relevance of earnings. The findings are robust to the control of cross-sectional fixed effects and firms' profitability (negative versus positive earnings). The findings are also robust to using undeflated variables, using alternative date for share prices (September, 30) and alternative definition of the GFC and the NCP.

Contrary to the hypothesis, the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP. Thus, accruals based earnings is considered superior to CFO for stock valuation purposes by Australian investors during both the GFC and the NCP. The superior explanatory power of earnings over CFO is consistent with prior Australian evidences in normal economic condition. Habib (2010) using return models finds earnings to be superior to six other alternative performance measures including CFO in explaining security returns in the Australian market. The present findings corroborate the superiority of earnings over CFO in the Australian market using an alternative model specification and in the unique economic setting of the GFC and the bubble inflating NCP. The higher relative value relevance of earnings than that of CFO in the Australian market, even during the GFC, also corroborates the earlier Australian evidence by Brimble and Hodgson (2007) in the normal economic context suggesting that the longitudinal value relevance of earnings has not declined in the Australian market.

The decrease in the value relevance of CFO during the GFC is consistent with recent evidence by Lim and Lu (2011) for a small sample of Australian companies drawn from the ASX 500. Lim and Lu (2011) examines the impact of the GFC on the value relevance of components of earnings (discretionary accruals, non-discretionary accruals and CFO) using return models and find a decline in the value relevance of CFO during the GFC compared to NCP. Moreover, Choi, Kim and Lee (2011) find a negative coefficient estimate for CFO during the 1997 Asian Financial Crisis (AFC) for nine East Asian countries. However, the decline in the value relevance of CFO during the AFC. They find a significant increase in the value relevance of CFO along with the decrease in the value relevance of earnings.

Further examination reveals that the impact of the GFC on the value relevance of earnings and CFO has varied based on different firm specific contextual factors such as firm size, leverage, accruals level, earning permanence and CFO permanence. For example, contrary to the overall findings, the value relevance of earnings has decreased for large firms and the value relevance of CFO has increased for small firms. Although the value relevance of CFO has decreased for high leverage firms, the value relevance of CFO has increased for low leverage firms. There was no discernible difference in the impact of the GFC on the value relevance of earnings and CFO based on firms' growth options. Interesting results are also found when firms are classified based on their accruals levels. Although the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP for both high accruals firms and low accruals firms, the increase in the value relevance of earnings and the decrease in the value relevance of CFO were more pronounced for high accruals firms than those of low accruals firms.

When firms are classified based on their earnings permanence, the results suggest that although the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP, for both permanent earnings firms and transitory earnings firms, the increase in the value relevance of earnings was more pronounced for transitory earnings firms than that of permanent earnings firms. Thus, although investors put less importance on transitory earnings has increased more than that of permanent earnings during the NCP, the importance put on transitory earnings has increased more than that of permanent earnings during the GFC. When firms are classified based on their CFO permanence, the results suggest that although the value relevance of earnings has increased and the value relevance of CFO has decreased for both permanent CFO firms and transitory CFO firms, the decrease in the value relevance of CFO was higher for firms with transitory CFO than that of firms with permanent CFO.

## **7.9.1** Why the value relevance of CFO has decreased and the value relevance of earnings has increased during the GFC compared to the NCP?

Prior studies have examined the earnings permanence hypothesis. However, similar to earnings, CFO can also be temporary. The descriptive statistics presented earlier in chapter six of this thesis suggests that there are a large number of firms in the sample with negative CFO. The negative CFO cannot continue for long time because firms have liquidation option. Accordingly, the negative CFO may be viewed by investors as transitory, which may reduce the value relevance of CFO during the GFC. If investors view the negative CFO as non-continuing and transitory like negative earnings, the value relevance of CFO should decrease. However, given that more than fifty per cent of the sample firms have reported negative CFO for the entire sample period; it is unlikely that the decline in the value relevance of CFO during the GFC has resulted from the increase in the number of firms reporting negative CFO during the GFC compared to the NCP. Other explanation might, therefore, be preferred.

One reason for the decrease in the value relevance of CFO may be that like earnings, CFO may also be a noisy measure of firm performance during the GFC. As discussed in chapter six, recent evidence in the Behavioural Accounting Research (BAR) by Graham, Harvey and Rajgopal (2005) and Roychowdhury (2006) may provide plausible other explanation for the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC compared to the NCP. Graham, Harvey and Rajgopal (2005)<sup>73</sup> conduct a questionnaire survey among 401 corporate financial executives find that managers are willing to 'burn real CFO for the sake of reporting desired accounting number'. They find that the GAAP based earnings number, primarily earnings per share, is the key metric upon which the market focuses. They argue that to reduce the cost of information processing due to information overload, investors focus on a simple benchmark upon which they can rely on to evaluate firms' performances. During the GFC, the focus on a reliable benchmark such as earnings per share may increase due to the increase in the level of noise in other sources of information (Sidhu and Tan, 2011).

Roychowdhury (2006) provides further empirical evidence of firms' engaging in real activity based earnings management with cash flow implications.<sup>74</sup> These two recent evidences may suggest that firms have engaged in real transaction based CFO management during the GFC. CFO may be managed via adjustment of real activities such as by adopting an investment strategy that expedites current year's cash inflows with negative CFO consequence for the future years. Managers may also defer some current period's cash outflows. During the GFC, firms' real activity management may dominate the accounting based earnings management because during the GFC, auditors and regulators will be cautious to the GAAP/IFRS based accounting adjustments. Real activity management with CFO implications cannot be questioned by auditors and regulators. However, the market anticipates the implications of real activity management and accordingly discounts the CFO in determining share prices.

<sup>&</sup>lt;sup>73</sup>Based on a questionnaire survey among 401 American corporate financial executives, Graham, Harvey and Rajgopal (2005) find that 80% of the surveyed financial executives report that they would prefer cutting discretionary expenses such as advertising, R&D and maintenance, 55.33% of the executives report that they would rather delay starting of a new project to meet an earnings target, whereas, 40% of the respondents report that they would book sells in the current quarter rather than in the next quarter if justified in both quarter, 22% of the respondents report that they would postpone taking an accounting charge and 20% of the respondents report that they would sell investment or assets to record gains in the current quarter. Surprisingly, less than 10 % of the executives prefer accounting adjustment to increase reported earnings.

<sup>&</sup>lt;sup>74</sup>Roychowdhury (2006) finds evidence suggesting that firms engage in price discount to temporarily increase sales, overproduction to report lower cost of goods sold, and reductions of discretionary expenses to improve reported margins.

If carefully analysed, the moderating effects of the contextual factors on the impact of the GFC on the value relevance of earnings and CFO also corroborate the above explanation pointing to real activity based CFO management. The fact that the decrease in the value relevance of CFO was more pronounced for firms with transitory CFO than that of firms with permanent CFO, the fact that the value relevance of CFO has decreased for high leverage firms as against the increase in the value relevance of CFO for low leverage firms, and the fact that the value relevance of CFO has decreased for large firms as against the increase in the value relevance of CFO for small firms may suggest that large firms and high leverage firms engage in real activity management with implications for CFO. This explanation seems plausible because large firms have more options than small firms to defer or to accelerate discretionary expenditures to engage in real activity management with implications for CFO. Moreover, CFO is more important for high leverage firms than for low leverage firms because CFO indicates the debt repayment capacity. Hence, firms with high levels of leverage will also have tendency to engage in real activity based CFO management. Due to the real activity based CFO management, CFO has become more transitory during the GFC and the value relevance of those transitory CFO has decreased more than that of permanent CFO during the GFC compared to the NCP.

Another plausible explanation for the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC compared to the NCP may be the ability of accruals based earnings to timely reflect the underlying changes in firms' performances due to the matching attribute of accruals earnings. Assets' values are likely to decline during the GFC compared to the NCP. Security prices also declines to reflect the declines in assets' value. The accruals based earnings will reflect these declines in asset values in the form of asset impairments or holding losses. However, CFO tied to these losses will not be realised until future periods. Hence, during the GFC firms' earnings more closely maps into security price changes than CFO. On the contrary, due to the inherent limitations of CFO in terms of matching revenues with expenses and losses, CFO lacks timely information to reflect firms' underlying performances. So investors' reliance on CFO decreases during the GFC compared to the NCP. This explanation is, in fact, consistent with the conclusion of Jenkins, Kane and Velury (2009) that due to the increase in conservatism in current earnings during periods of economic contraction, the value relevance of earnings increases. The above explanation is also consistent with the conclusion of Dechow (1994) that the explanatory power of accruals based earnings increases with the increase in the volatility of firms'

operating environment (working capital requirement, investing activities and financing activities). Under these circumstances, the explanatory power of CFO suffers adversely because of the timing and mismatching problems.

The results obtained examining the contextual factors corroborate these explanations. Due to the inherent limitations of CFO in terms of matching revenues with expenses and losses, investors' reliance on CFO may have decreased during the GFC compared to the NCP. On the other hand, if high levels of accruals arise due to firms' aggressive earnings management and 'big-bath' write-off, high levels of accruals should have made reported earnings a noisy measure of firm performances. In that case, the value relevance of earnings should have decreased and the value relevance of CFO should have increased during the GFC compared to the NCP. The fact that the increase in the value relevance of earnings is higher for high accruals firms than that of low accruals firms, the fact that investors put less importance on transitory earnings than on permanent earnings during the NCP, whereas, investors put more importance on transitory earnings than on permanent earnings during the GFC, may suggest that the usefulness of accruals based earnings has increased during the GFC due to its matching attributes. The fact that the decrease in the value relevance of CFO during the GFC was higher for firms with high accruals than that of firms with low accruals is also consistent with the above explanation. The higher increase in the value relevance of earnings for firms with permanent CFO than that of firms with transitory CFO further buttresses the importance of matching attributes of accruals in providing useful information to the market during periods of economic uncertainty. Hence, the findings that the value relevance of earnings has increased and that of CFO has decreased may imply that the GFC has increased the volatility in operating environment rather than the increase in firms' earnings management.

Given the above explanations for the overall increase in the value relevance of earnings and the overall decrease in the value relevance of CFO, two anomalous findings need further explanation.

Firstly, why the impact of the GFC is different on the value relevance of earnings and CFO for large firms from small firms? Large firms usually report smoother earnings series than small firms because large firms have a larger portfolio of accounting and real activity based choices to smooth earnings and CFO than those of small firms (Hodgson and Stevenson-Clarke, 2000). Thus large firms tend to report smoother and more persistent earnings and

CFO than those of small firms. Because large firms have more accounting and real activity based choices than small firms, reported earnings and CFO for large firms may have been impacted less by the GFC than those of small firms. Large firms may have been able to mask the impact of the GFC by reporting relatively stable earnings and CFO. Thus reported earnings and CFO of large firms did not reflect the underlying volatility in firm performances arising out of the GFC rendering earnings and CFO less important to investors. Hence, the value relevance of both earnings and CFO has decreased during the GFC compared to the NCP for large firms.

On the contrary, earnings and CFO for small firms are less managed because small firms have very few accounting based and real activity based options to smooth earnings and CFO. For the same reason, small firms could not mask the volatility arising out of the GFC. Small firms have reported earnings and CFO that have reflected the underlying impact of the GFC on firm performances rendering reported earnings and CFO more important to investors for stock valuation purposes. Thus the value relevance of both earnings and CFO has increased during the GFC compared to the NCP for small firms.

Moreover, as discussed under the literature review, investors of large firms have access to information about earnings and CFO from alternative sources (such as media reports and analysts' forecasts). On the contrary investors of small firms receive information about earnings and CFO once the financial statements are released. Because, small firms have higher information asymmetry than large firms, earnings and CFO of small firms contain higher information content than that of large firms. As a result of this information asymmetry, earnings and CFO of small firms convey information to investors not available from other sources. Reported earnings and CFO of small firms' present and future performances because information flows to investors from other sources are relative less on small firms than those of large firms. Thus the value relevance of both earnings and CFO has increased for small firms during the GFC compared to the NCP.

Secondly, why the impact of the GFC is different on the value relevance of CFO for high leverage firms from low leverage firms? Because CFO is tied to debt repayment capacity, highly levered firms may engage in real activity management rendering the current CFO a noisy measure of firm performance. Hence, the value relevance of CFO has decreased during

the GFC compared to the NCP for high leverage firms. For low leverage firms, the scope and tendency of real activity based CFO management should be relatively low. Hence, the value relevance of CFO has increased during the GFC compared to the NCP for low leverage firms.

#### 7.10 Conclusions

The debate on the relative superiority of earnings versus CFO is longstanding and unresolved. Although CFO is assumed to be free of managerial manipulation and noise, accruals based earnings is considered to be superior for its matching attributes. CFO suffers from timing and mismatching problems. Accruals based earnings represents the true performance measure of a firm. However, it has been claimed in the literature that the importance of earnings for stock valuation purposes decreases under different contexts when the earnings becomes a noisy measure of firm performance. In this thesis the GFC of 2008-2009 is considered as such a contextual factor when the importance of earnings is assumed to decrease and the importance of CFO is assumed to increase for stock valuation purposes. Accordingly, the current chapter of this thesis has examined the relative and incremental value relevance of earnings and CFO in explaining variation in share prices in the context of the GFC and the NCP. It contributes to the literature by showing that CFO contains incremental information useful to investors for stock valuation purposes. It also adds to the literature by showing the superiority of accruals based earnings over CFO for stock valuation purposes even during the economic uncertainty of the GFC. Moreover, the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP suggesting investors' continued reliance on accruals earnings for stock valuation purposes even during the time of economic uncertainty.

The findings have important implications for investors, regulators and auditors. The sustained value relevance of earnings and the increase therein during the GFC compared to the NCP may suggest that regulatory efforts should concentrate on the accuracy and precision of firms' reported earnings. Auditors should also pay more attention to the quality of their clients' reported earnings, since it is the key indicator upon which investors primarily rely on during the macroeconomic disturbance of the GFC. Investors and analysts may also find this evidence useful for stock valuation purposes. Specifically, analysts should focus on the accuracy of earnings forecasts, since earnings is the key accounting variable explaining the highest percentage of variations in share prices. Moreover, the increase in the value relevance

of earnings and the decrease in the value relevance of CFO should be a concern for regulators, auditors and investors. Given that there is less flexibility for manipulating CFO, it is important to understand why the value relevance of CFO has decreased during the GFC. This remains an issue for future research.

### **CHAPTER EIGHT**

### VALUE RELEVANCE OF TANGIBLE ASSETS, INTANGIBLE ASSETS AND GOODWILL

#### 8.1 Introduction

Empirical results reported in chapter six suggest that the value relevance of book value has decreased during the GFC. The decline in the value relevance of book value is contrary to the financial health hypothesis (FHH) proposed by Barth, Beaver and Landsman (1998). Given that the value relevance of book value tend to decline during a GFC, an examination of the possible reasons behind the decline in the value relevance of book value becomes important. Specifically, it is important to know whether the decline in the value relevance applies equally to tangible assets, intangible assets<sup>75</sup> and goodwill. This chapter examines the value relevance of intangible assets and goodwill and the changes in the value relevance of tangible assets, intangible assets and goodwill are firm specific, and the value of goodwill is determined based on a residual approach (Bloom, 2009), it can be expected that the value relevance of tangible assets and goodwill decreases during a GFC, whereas, the value relevance of tangible assets increases during a GFC because tangible assets represent liquidation option.

#### 8.2 Data and sample description

To examine the value relevance of tangible assets, intangible assets and goodwill, data was extracted manually from the annual reports of the S&P/ASX 500 companies. The S&P/ASX 500 companies cover more than 96 per cent market capitalisation of ASX listed companies (S&P, 2007). The sample consists of all firms in the S&P/ASX 500, having reported intangible assets or goodwill as at 30 June, 2009. Firms with registered office outside Australia and firms with reporting currency other than Australian dollar have been excluded from the sample. Firms with the balance sheet date other than June are also excluded. To qualify to be included in the sample a firm should have either reported goodwill or intangible assets. Firms with the above characteristics were identified from 2006 to 2009. For examining the value relevance of intangible assets and goodwill, the NCP is limited to 2006

<sup>&</sup>lt;sup>75</sup>Intangible assets are used to mean other intangible assets excluding goodwill.

to 2007 because there was a fundamental change in the accounting for indefinite life intangible assets and goodwill from 2005 onwards.<sup>76</sup>

The market price data has been drawn from *DataStream* database. A total of 1199 firm-year observations have reported intangible assets comprising of 311 firms reporting in 2009, 314 firms in 2008, 295 firms in 2007 and 279 firms reporting in 2006 respectively. A total of 916 firm-year observations have reported goodwill with 236 firms reporting in 2009, 246 firms in 2008, 223 firms in 2007, and 211 firms reporting in 2006 respectively.

The entire sample is spread over 17 industrial sectors. With the minimum number of firms in a particular year in a sector being 4 and the maximum number being 63, the sample is widely distributed (Appendix B).

#### 8.2.1 Descriptive statistics and correlation coefficients of the variables used

Panel A of Table 8-1 shows the descriptive statistics of the variables used. The mean market value per share is AUD 7.129, whereas, the mean book value for per share is 3.016. The mean book value excluding intangible assets per share is AUD 1.448. The mean intangible assets per share excluding goodwill is AUD 0.462 and the mean goodwill per share is AUD 1.155 which imply that the amounts of intangible assets for the sample firms were much lower than the amounts of goodwill. The skewness and kurtosis statistics suggest that even after the deflation by number of shares, variables are not normally distributed. To remove any heteroskedasticity problem arising out of the non-normal distribution, regressions are estimated with White adjusted t-statistics and standard errors.

<sup>&</sup>lt;sup>76</sup>Before the introduction of fair value based IFRS in 2005, goodwill used to be amortised systematically over a maximum of 20 years. However, since the introduction of fair value based IFRS in 2005, goodwill is no longer amortised, it is tested for impairment during every reporting interval. Similar accounting provisions are also applicable for indefinite life intangible assets. This qualitative change in the accounting for intangible assets and goodwill might have impacted their value relevance post 2005.

	Panel A: Descriptive statistics (variables are deflated by number of shares)											
		Ν		Minimu	Maximu	Mea	n		Std.	Skewnes	Kurtosis	
					m	m			D	eviation	S	
MV			119	9	.0166	64.546	7	.129		10.041	3.024	10.931
BV			119	9	290	33.731	3	3.016		3.861	2.848	11.075
BVINT			119	9	200	16.435	1	1.448		2.707	2.370	7.166
INTG			119	9	.000	7.586		.462		1.022	4.182	20.316
G			119	9	.000	28.002	1	.155		2.114	5.207	44.428
СР			119	9	.000	1.000		.521	1 498		184	-1.971
MTRV			119	9	.000	1.000		185		.389	1.625	.643
NEG		119	9	.000	1.000		154		.329	2.292	3.261	
F		119	9	-5.814	8.741	8.741			.917	2.707	19.513	
Panel B:	Correlatio	on	Coeffic	cie	nt (Pearson	correlation	coefficie	nts in	the <b>ı</b>	apper diago	onal and Sp	earman's
					rho	in the lowe	er diagona	ul)				
	MV	B	V	В	VINT	INTG	G	Е		MTBV	СР	NEG
MV	1	.6	23**	.4	$188^{**}$	.344**	.450**	.672	2**	224**	175**	166**
BV	.643**	1		.7	748 <sup>**</sup>	.382**	.704**	.692	2**	.016	.038	103**
BVINT	.429**	•	574**	1		013	.120**	.620	)**	.008	029	082*
INTG	.397**	•	493**		076*	1	.323**	.120	5**	012	.093**	.022
G	.417**		605**		.005	.485**	1	.413	3**	.019	$.076^{*}$	099**
Е	.731**	•	630**		.432**	.259**	.436**	1		163**	066	329**
MTBV	376**		.042		004	004	008	23	33**	1	.298**	.186**
СР	246**		.039		056	.099**	.059	12	27**	.298**	1	.159**
NEG	241**		112**		078*	020	191**	5.	56**	.186**	.159**	1

 Table 8-1: Descriptive statistics and correlation coefficients of the variables used

\*\*. Correlation is significant at the 0.01 level (2-tailed); \*. Correlation is significant at the 0.05 level (2-tailed).

Where,

MV = market value equity at June 30 deflated by the number of shares;

BV = book value at the end of the year deflated by the number of shares;

BVINT= book value excluding intangible assets deflated by the number of shares - represents tangible assets per share;

INTG= intangible assets excluding goodwill deflated by the number of shares – represents intangible assets per share;

G=reported goodwill at the end of the year deflated by the number of shares; CP=dichotomous variable taking the value of 1 for the year 2009 and 2008 and 0 (zero) for

the year 2007 and 2006;

- MTBV = dichotomous variable taking the value of 1 for firms having the MTBV ratio below 1, 0 for firms having the MTBV ratio above 1;
- NEG=dichotomous variable taking the value of 1 for firms having negative earnings or loss during year t, 0 for firms having positive earnings during year t; and
- E = net income during year t divided by the number of shares outstanding.

Both Pearson's correlation coefficients and Spearman's correlation coefficients among the variables used are reported in Panel B of Table 8-1. Pearson's correlation coefficients are reported in the upper diagonal and Spearman's correlation coefficients are presented in the lower diagonal. It is evident that variables entering into the same equations do not have mutual correlation coefficients beyond the conventional level of 0.80. Hence, multicollinearity is not a problem in the regressions. All the variables have significant correlations with the dependent variable (MV). Both the MTBV and the CP dummy variables have negative correlation coefficients which imply that these variables are negatively associated with firms' market value.

# 8.3 Univariate tests of differences in the variables between the GFC and the NCP

Table 8-2 shows the univariate test results for the differences in the variables between the GFC and the NCP.

	Mea	ın	Standard de	viation	Independent	Mann-
					sample t -	Whitney
					test (t-stat)	Test: Z stat
	GFC	NCP	GFC	NCP	GFC vs.	GFC vs.
					NCP	NCP
MV	6.543	7.767	6.848	8.530	-4.727***	-6.631***
BV	3.089	2.937	4.024	3.296	1.514	-1.464
BVINT	1.338	1.568	2.734	2.481	635	-1.430
INTG	0.543	0.374	1.179	.786	2.581**	-3.242***
G	1.277	1.022	2.385	1.493	2.689***	-2.831***
Е	0.450	0.611	.956	.749	-1.481	-1.828*
MTBV	0.292	0.068	.455	.236	8.483***	-8.107***
NEG	0.172	0.134	.378	.252	4.428***	-4.376

Table 8-2: Differences in the variables between the GFC and the NCP

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \* Significant at 10 per cent level.

Mean of market value (MV) per share, tangible assets per share (BVINT) and earnings per share (E) have decreased during the GFC compared to the NCP. On the contrary, mean of book value per share (BV), intangible assets (INTG), goodwill (G), number of firms with MTBV ratio below one (MTBV) and number of firms with negative earnings (NEG) have increased during the GFC compared to the NCP. These results suggest that although firms' market value has declined substantially during the GFC, firms' book value per share has increased during the GFC. The increase in the book value per share might have been driven

by the increase in recorded intangible assets and increase in the recorded goodwill. Moreover, during the GFC, percentage of firms with MTBV less than one (1.0) has increased significantly. During the NCP, 6.80 per cent of the sample firms had MTBV less than one (1), whereas, during the GFC, percentage of firms with MTBV less than one (1) has increased to 29.20 per cent. Similarly, percentage of firms with negative earnings has also increased during the GFC (17.20 per cent) compared to the NCP (13.4 per cent). Independent sample t test and Mann-Whitney test suggest that there has been no significant change of book value per share and tangible assets per share between the GFC and the NCP. Changes in all other variables were statistically significant.

#### 8.4 Test of hypothesis: multivariate regression results

Hypothesis 3(a) states that reported intangible assets and goodwill are value relevant. Hypothesis 3(b) states that the value relevance of intangible assets and goodwill decreases during a GFC compared to the NCP. Hypothesis 3(c) states that the value relevance of tangible assets increases during a GFC compared to the NCP.

#### 8.4.1 Test of hypothesis 3(a), 3(b) and 3(c)

Table 8-3 shows the results for the hypothesis testing. Model 7 is estimated for testing hypothesis 3 (a). Model 8 is estimated for testing hypotheses 3(b) and 3(c). Model 1 is estimated to confirm the findings in chapter six that book value and earnings are value relevant for the sample firms.

Model 1 examines the association of market value with book value and earnings. The coefficient estimates of book value and earnings are significant and positive which suggest that both book value and earnings are significantly associated with firms' market value. Thus both book value and earnings are value relevant. These results are consistent with the results obtained in chapter six. The coefficient estimate of book value is 1.104 and the coefficient estimate of earnings is 6.602.

#### 8.4.1.1 Test of hypothesis 3(a)

Hypothesis 3(a) states that intangible assets and goodwill are value relevant. Model 7 partitions book value into three components such as tangible assets (BVINT), intangible

assets (INTG) and goodwill (G). The coefficient estimates of the BVINT, INTG and G are positive and significant suggesting that tangible assets, intangible assets and goodwill are value relevant. The coefficient estimate of goodwill (1.224) is greater than the coefficient estimates of tangible assets (0.926) and intangible assets (1.168). Hence, every 1 cent increase in reported goodwill translates into 1.224 cents increase in share prices, every 1 cent increase in tangible assets results in 0.926 cents increase in share prices and every 1 cent increase in intangible assets yields 1.168 cents increase in share prices. These results support hypothesis 3(a) which states that reported intangible assets and goodwill are value relevant. Theses results also suggest that the coefficient estimates of intangible assets and goodwill are higher than the coefficient estimate of tangible assets. Therefore, hypothesis 3(a) is not rejected.

#### 8.4.1.2 Test of hypothesis 3 (b) and 3(c)

Hypothesis 3(b) states that the value relevance of intangible assets and goodwill decreases during a GFC compared to the NCP, whereas, hypothesis 3(c) states that the value relevance of tangible assets increases during a GFC compared to the NCP. Model 8 examines the value relevance tangible assets, intangible assets and goodwill in the context of the GFC and the NCP. Based on the hypothesis, the expectation is that the coefficient estimate of BVINT\*CP is positive and significant, whereas, the coefficient estimates of both INTG\*CP and G\*CP are negative and significant.

The coefficient estimates of the interaction terms INTG\*CP and G\*CP are negative and significant, which suggest that the value relevance of intangible assets and goodwill has decreased during the GFC. Every 1 cent increase in intangible assets generates 1.278 cents increase in share prices during the NCP which declines to 0.675 cents during the GFC. Every 1 cent increase in goodwill generates 1.343 cents increase in the share prices during the NCP which declines to 0.686 cents during the GFC. These evidences support hypothesis 3(b) which states that the value relevance of intangible assets and goodwill decreases during a GFC compared to the NCP.

The coefficient of the interaction term BVINT\*CP is also negative and significant which suggests that the value relevance of tangible assets has decreased during the GFC compared to the NCP. While every 1 cent movement in tangible assets generates 0.971 cents movement

in share prices during the NCP, every 1 cent movement in tangible asset translates into 0.781 cents movement in share prices during the GFC. That is, tangible assets show higher value relevance during the NCP than a crisis period. This evidence does not support hypothesis 3(c) which states that the value relevance of tangible assets increases during a GFC compared to the NCP.

Interesting results can be seen when the coefficient estimates of tangible assets, intangible assets and goodwill are compared between the GFC and the NCP. Wald test for the equality of the coefficient estimates of tangible assets, intangible assets and goodwill ( $\beta_1 = \beta_3 = \beta_4$ ) during the NCP suggests that the coefficient estimates of tangible assets, intangible assets and goodwill are not equal during the NCP (Chi-square =11.074, significant at 1 per cent level). Further Wald test for the equality of the coefficient estimates of intangible assets and goodwill ( $\beta_3 = \beta_4$ ) suggests that the coefficient estimates of intangible assets and goodwill ( $\beta_3 = \beta_4$ ) suggests that the coefficient estimates of intangible assets and goodwill are not significantly different from each other during the NCP. However, the coefficient estimate of tangible assets ( $\beta_1$ ) is smaller than the coefficient estimates of intangible assets ( $\beta_3$ ) and goodwill ( $\beta_4$ ) during the NCP. Together, these evidences imply that investors put higher weight on intangible assets and goodwill than on tangible assets for stock valuation purposes during the NCP.

Similarly, Wald test for the equality of the coefficient estimates of tangible assets, intangible assets and goodwill  $[(\beta_1 + \beta_6) = (\beta_3 + \beta_7) = (\beta_4 + \beta_8)]$  during the GFC suggests that the coefficient estimates of tangible assets, intangible assets and goodwill are not equal during the GFC (Chi-square = 13.139, significant at 1 per cent level. Further Wald test for the equality of the coefficient estimates of intangible assets and goodwill  $[(\beta_3 + \beta_7) = (\beta_4 + \beta_8)]$  suggests that the coefficient estimates of intangible assets and goodwill are not significantly different from each other during the GFC. However, the coefficient estimate of tangible assets  $(\beta_1 + \beta_6)$  is larger than the coefficient estimates of intangible assets ( $\beta_1 + \beta_6$ ) is larger than the coefficient estimates of intangible assets ( $\beta_4 + \beta_8$ ) during the GFC. Together, these evidences imply that investors put lower weight on intangible assets and goodwill than tangible assets for stock valuation purposes during the GFC. Hence, the decrease in the value relevance of intangible assets during the GFC. Although the value relevance of all the three categories of assets has decreased during the GFC compared to the NCP, the decrease in the value relevance of intangible assets and goodwill is higher than that of tangible assets.

	Expect ed sign	Model 1	Model 7	Model 8
С	?	1.807***(5.762)	2.187***(6.018)	3.197***(6.059)
BV	+	1.104***(77.514)		
Е	+	6.602***(17.054)	6.447***(17.683)	6.171***(14.739)
BVINT	+		0.926***(3.209)	0.971***(4.595)
INTG	+		1.168** (2.310)	1.278*** (2.968)
G	+		1.224***(17.810)	1.343***(16.112)
СР	-			-1.822**(-2.526)
BVINT*CP	+			-0.190* (-1.765)
INTG*CP	+			-0.603**(-2.136)
G*CP	-			-0.657**(-2.975)
BVINT+ BVINT*CP	$(\beta_1 + \beta_6)$			0.781***(3.110)
INTG+ INTG*CP	$(\beta_3 + \beta_7)$			0.675**(2.127)
G+G*CP	$(\beta_4 + \beta_8)$			0.686** (2.239)
		Wald test for coeffic	eient difference	
$\beta_1 = \beta_3 = \beta_4$				Chi-square = 11.074***
$\beta_1 = \beta_3$				Chi-square = 4.973***
$\beta_1 = \beta_4$				Chi-square =5.694***
$\beta_3 = \beta_4$				Chi-square = 1.381
$(\beta_1 + \beta_6) = (\beta_3 + \beta_7) = (\beta_4 + \beta_3)$	8)			Chi-square = 13.139***
$(\beta_1 + \beta_6) = (\beta_3 + \beta_7)$				Chi-square = 7.139***
$(\beta_1 + \beta_6) = (\beta_4 + \beta_8)$				Chi-square = 8.139***
$(\beta_3 + \beta_7) = (\beta_4 + \beta_8)$				Chi-square $= 1.139$
Adjusted R <sup>2</sup>		73.89%	76.06%	77.63%
F- statistics		15204.4***	36939.91***	40571.11***
Durbin Watson		1.788	1.836	1.726

Table 8-3: Value relevance of tangible assets, intangible assets and goodwill

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*\*\* Significant at 10 per cent level.

Model 1:  $MV_{it} = \alpha + \beta_1 BV_{it} + \beta_2 E_{it} + \lambda_1 \dots \lambda n + \varepsilon$ 

Model 7:  $MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \lambda_1 \dots \lambda n + \epsilon$ 

Model 8:  $MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \beta_5 CP + \beta_6 CP * BVINT_{it} + \beta_7 CP * INTG_{it} + \beta_8 CP * G_{it} + \lambda_1 \dots \lambda_n + \varepsilon$ 

Where,

 $MV_{it}$  is market value of equity per share for firm i at the end of year t;

- $BVINT_{it}$  is book value per share excluding intangible assets at the end of year t for firm i. Used to represent tangible assets per share;
- $INTG_{it}$  is intangible assets per share excluding goodwill at the end of year t for firm i. Used to represent intangible assets per share;
- $G_{it}$  is goodwill per share at the end of year t for firm i. Used to represent goodwill per share;
- $E_{it}$  is earnings per share for firm i during year t;
- *CP* is a dichotomous variable taking the value of 1 for the year 2009 and 2008, and 0 for the year 2007 and 2006;
- $CP * BVINT_{it}$  is the interaction term of CP and  $BVINT_{it}$ .

 $CP * INTG_{it}$  is the interaction term of CP and  $INTG_{it}$ .

 $CP * G_{it}$  is the interaction term of CP and  $G_{it}$ .

 $\lambda_1$ ..... $\lambda$ n are indicator variables representing the industry dummy.

When interpreted together, these evidences suggest that investors' reliance for stock valuation has decreased during the GFC for all the three categories of assets—tangible assets, intangible assets and goodwill. However, investors' reliance on tangible assets for stock valuation purposes has decreased to a lesser extent than that on intangible assets and goodwill. The decrease in the value relevance of intangible assets and goodwill is consistent with hypothesis 3(b), whereas, the decrease in the value relevance of tangible assets is not consistent with hypothesis 3(c) [the potential reasons for not supporting hypothesis 3(c) are discussed in the sub-section 8.5]. Nevertheless the decrease in the value relevance of tangible assets and goodwill during the GFC is consistent with the evidence obtained in chapter six where it was documented that the value relevance of book value has decreased during the GFC compared to the NCP.

#### 8.4.2 Robustness test: hypothesis 3(b) and 3(c)

To examine the robustness of the results, two contextual factors are considered. The first issue considered is firms' MTBV ratio. The second issue considered is firms' profitability in terms of positive earnings and negative earnings. Results obtained from these robustness tests are described in the following sub-sections. The results of these robustness tests are reported in Table 8-4.

#### 8.4.2.1 MTBV <1 and MTBV>1

It was observed that during the study period a large number of firms had a MTBV ratio lower than 1.0 (MTBV<1.0).<sup>77</sup> AASB 136 *Impairment of Assets*, para-12(a) specifies the condition of MTBV<1 as a trigger event for impairment testing of intangible assets and goodwill. Li and Meeks (2006) and Lapointe-Antunes, Cormier and Magnan (2008) have examined the information content of goodwill impairment in the presence of MTBV<1. They argue that the MTBV< 1 is an indication that the value of goodwill has declined. Moreover, the value of goodwill is usually determined using a residual approach (Bloom, 2009). Hence, the impact

<sup>&</sup>lt;sup>77</sup>As shown in Table 8-2, about 29.20 per cent of the observations had MTBV<1 during the GFC, whereas, 6.80 per cent of the observations had MTBV<1 during the NCP.

of the GFC on the value relevance of intangible assets and goodwill may be different for firms with MTBV>1 from firms with MTBV<1.<sup>78</sup> Specifically, the value relevance of intangible assets and goodwill is like to be different for firms with MTBV <1, from firms with MTBV >1. It is important to examine the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill after controlling for the impact of the MTBV ratio.

Model 9 examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill after controlling for the effect of MTBV ratio. The coefficients of the interaction term BVINT\*CP, CP\*INTG G\*CP are negative and significant, which suggest that the value relevance has decreased during the GFC compared to the NCP for all the three categories of assets.

During the NCP, after controlling for the effect of firms' MTBV ratio, every 1 cent increase in tangible assets, intangible assets and goodwill result in the increase in share prices by 0.976 cents, 1.191 cents and 1.264 cents respectively. Once the contrary, after controlling for the effect of firms' MTBV ratio, 1 cent increase in tangible assets, intangible assets and goodwill translates into 0.787 cents, 0.660 cents and 0.649 cents increase in share prices respectively during the GFC. Thus the market valuation has decreased for all the three categories of assets during the GFC. Thus the result supports hypothesis 3(b). However, the result does not support hypothesis 3(c) [the potential reasons for not supporting hypothesis 3(c) are discussed in the sub-section 8.5].

Interesting results can be seen when the coefficient estimates of tangible assets, intangible assets and goodwill are compared between the GFC and the NCP. The significant Wald test statistic (Chi-square = 12.371) for the equality of the coefficient estimates of tangible assets, intangible assets and goodwill ( $\beta_1 = \beta_3 = \beta_4$ ) suggest that investors do not attach equal importance to tangible assets, intangible assets and goodwill for stock valuation purposes during the NCP. Specifically, the coefficient estimates of intangible assets and goodwill are larger than the coefficient estimate of tangible assets during the NCP ( $\beta_3 > \beta_1$ , Chi-square =

 $<sup>^{78}</sup>$ It can be argued that percentage of firms having MTBV >1 is correlated with the GFC. For example, the percentage of firms with MTBV>1 has increased significantly during the GFC compared to the NCP. However, the focus of the present study is on the impact of the GFC on the value relevance of intangible assets and goodwill intangible assets and goodwill.

4.731 and  $\beta_4 > \beta_1$ ; Chi-square = 5.815). However, investors attach equal weight on intangible assets and goodwill during the NCP ( $\beta_3 = \beta_4$ , Chi-square = 1.443).

	Expected sign	Model 9	Model 10
С	?	3.322***(6.354)	2.989***(5.740)
E	+	5.755***(13.428)	7.270***(15.761)
BVINT	+	0.976***(5.148)	0.981***(4.923)
INTG	+	1.191*** (3.935)	1.198*** (3.120)
G	+	1.264***(16.661)	1.279***(13.539)
СР	-	-2.067***(-2.890)	-1.964***(-2.753)
BVINT*CP	+	-0.189***(-2.763)	-0.202***(-2.946)
INTG*CP	-	-0.531** (-2.036)	-0.617** (-2.315)
G*CP	-	-0.615*** (-3.206)	-0.687*** (-3.970)
MTBV*BVINT	-	-0.128 (-0.757)	
MTBV*INTG	-	-0.234*** (-3.877)	
MTBV*G	-	-0.494*** (-3.660)	
NEG*BVINT	+		.317***(4.562)
NEG*INTG	-		-0.223**(-2.452)
NEG*G	-		-0.296***(-2.991)
BVINT+ BVINT*CP	$(\beta_1 + \beta_6)$	0.787***(3.174)	0.779***(3.937)
INTG+ INTG*CP	$(\beta_3 + \beta_7)$	0.660**(2.164)	0.581**(2.209)
G+G*CP	$(\beta_4 + \beta_8)$	0.649***(7.912)	0.592***(5.471)
	Wald test f	for coefficient difference	
$\beta_1 = \beta_3 = \beta_4$		Chi-square = 12.371***	Chi-square = 14.410***
$\beta_1 = \beta_3$		Chi-square = 4.731***	Chi-square = 5.101***
$\beta_1 = \beta_4$		Chi-square = 5.815***	Chi-square = 5.943***
$\beta_3 = \beta_4$		Chi-square = 1.443	Chi-square =1.525
$(\beta_1 + \beta_6) = (\beta_3 + \beta_7) = (\beta_4 + \beta_7)$	β <sub>8</sub> )	Chi-square = 14.512***	Chi-square = 19.731***
$(\beta_1 + \beta_6) = (\beta_3 + \beta_7)$		Chi-square = 9.352***	Chi-square = 9.358***
$(\beta_1 + \beta_6) = (\beta_4 + \beta_8)$		Chi-square = 10.763***	Chi-square = 12.804***
$(\beta_3 + \beta_7) = (\beta_4 + \beta_8)$		Chi-square = 1.294	Chi-square = 1.407
Adjusted R <sup>2</sup>		77.80%	75.82%
F- statistics		30187.87***	30467.61***
Durbin Watson		1.685	1.744

 Table 8-4 : Value relevance of tangible assets, intangible assets and goodwill: after controlling for the effects of MTBV ratio and negative earnings

\*\*\*Significant at 1 per cent level; \*\*Significant at 5 per cent level; \*\*\* Significant at 10 per cent level

$$\begin{split} \text{Model 9: } MV_{it} = \alpha + \beta_1 BVINT_{it} + \beta_2 E_{it} + \beta_3 INTG_{it} + \beta_4 G_{it} + \beta_5 CP + \beta_6 CP * BVINT_{it} \\ + \beta_7 CP * INTG_{it} + \beta_8 CP * G_{it} + \beta_9 MTBV * BVINT_{it} + \beta_{10} MTBV * INTG_{it} \\ + \beta_{11} MTBV * G_{it} + \lambda_1 ..... \lambda n + \epsilon \end{split}$$

 $\begin{array}{l} \text{Model 10: } \text{MV}_{it} = \alpha + \beta_1 \text{BVINT}_{it} + \beta_2 \text{E}_{it} + \beta_3 \text{INTG}_{it} + \beta_4 \text{G}_{it} + \beta_5 \text{CP} + \beta_6 \text{CP} * \text{BVINT}_{it} \\ + \beta_7 \text{CP} * \text{INTG}_{it} + \beta_8 \text{CP} * \text{G}_{it} + \beta_9 \text{NEG} * \text{BVINT}_{it} + \beta_{10} \text{NEG} * \text{INTG}_{it} \\ + \beta_{11} \text{NEG} * \text{G}_{it} + \lambda_1 \dots \dots \lambda n + \epsilon \end{array}$ 

Where,

- NEG = A dummy variable assigned a value of 1 if the firm reports negative earnings during year t, 0 otherwise;
- MTBV = A dichotomous variable assuming a value of 1 if the firm's market value to book value ratio is lower than 1, 0 otherwise;

All other variables are as defined before.

Similarly, significant Wald test statistic (Chi-square =  $14.512^{***}$ ) for the equality of the coefficient estimates of tangible assets, intangible assets and goodwill  $[(\beta_1 + \beta_6) = (\beta_3 + \beta_7) = (\beta_4 + \beta_8)]$  suggests that investors' do not attach equal importance to these three classes of assets for stock valuation purposes during the GFC. To be more specific, investors attach higher importance on tangible assets than on intangible assets or goodwill during the GFC  $[(\beta_1 + \beta_6) > (\beta_3 + \beta_7), \text{Chi-square} = 9.352; \text{ and } (\beta_1 + \beta_6) > (\beta_4 + \beta_8), \text{Chi-square} = 10.763].$  However, investors attach equal weight on intangible assets and goodwill  $[(\beta_3 + \beta_7) = (\beta_4 + \beta_8), \text{Chi-square} = 1.294]$  during the GFC.

These results suggest that the value relevance of tangible assets, intangible assets and goodwill has decreased during the GFC compared to the NCP after controlling for the effect of MTBV<1. However, the decrease in the value relevance of intangible assets and goodwill is more pronounced than that of tangible assets.

It may be noted further that the coefficient estimates of the interaction terms G\*MTBV and INTG\*MTBV are negative and statistically significant, which imply that when firms have MTBV<1, the market valuation of intangible assets goodwill has decreased significantly. On the contrary, the coefficient estimate of the interaction term BVINT\*MTBV is negative but not significant. This evidence suggests that the value relevance of tangible assets has not decreased in the presence of a MTBV ratio of less than unity (MTBV<1) once the impact of the GFC has been controlled.

#### 8.4.2.2 Negative earnings versus positive earnings

Firms' earnings is a key input in the impairment testing process. Earnings is related to present and expected future CFO. Because the underlying values of intangible assets and goodwill depend on the expected future earnings and CFO generated by those assets, market perception on intangible assets and goodwill may be different for firms having positive earnings from firms having negative earnings. Specifically, negative earnings may be associated with a decrease in the value relevance of intangible assets and goodwill. If negative earnings is associated with increase in the value relevance of tangible assets because of the liquidation option (as suggested by Hayn, 1995) and decrease in the value relevance of intangible assets and goodwill; and if the GFC is correlated with negative earnings, the true impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill cannot be determined without controlling for the effect of negative earnings. Model 10 examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill after controlling for the differential effect of positive earnings and negative earnings. Results for Model 10 are reported in Table 8-4.

The coefficients of the interaction term BVINT\*CP, CP\*INTG G\*CP are negative and significant. After controlling for the effect of negative earnings, every 1 cent increase in tangible assets, intangible assets and goodwill results in the increase in share prices by 0.981 cents, 1.198 cents and 1.279 cents respectively during the NCP. On the contrary, every 1 cent increase in tangible assets, intangible assets and goodwill respectively translates into 0.779 cents, 0.581 cents and 0.592 cents increase in share prices during the GFC. Thus the value relevance of all the three classes of assets has decreased during the GFC. Thus the result supports hypothesis 3(b). However, the result does not support hypothesis 3(c) [the potential reasons for not supporting hypothesis 3(c) are discussed in the sub-section 8.5].

Interesting results can be seen when the coefficient estimates of tangible assets, intangible assets and goodwill are compared between the GFC and the NCP. The significant Wald test statistic for the equality of coefficients ( $\beta_1 = \beta_3 = \beta_4$ ) suggest that the coefficient estimates of tangible assets, intangible assets and goodwill are not equal (Chi-square =14.410) during the NCP. Specifically, the coefficient estimates of intangible assets and goodwill are larger than the coefficient estimate of tangible assets during the NCP ( $\beta_3 > \beta_1$ , Chi-square = 5.101 and  $\beta_4 > \beta_1$ ; Chi-square = 5.943). However, investors attach equal weight on intangible assets and goodwill during the NCP ( $\beta_3 = \beta_4$ , Chi-square = 1.525).

Similarly, significant Wald test statistic (Chi-square =  $19.731^{***}$ ) for the equality of the coefficients of tangible assets, intangible assets and goodwill  $[(\beta_1 + \beta_6) = (\beta_3 + \beta_7) = (\beta_4 + \beta_8)]$  suggests that investors do not attach equal importance on these three assets classes for stock valuation purposes during the GFC. To be more specific, investors attach higher importance

on tangible assets than on intangible assets or goodwill during the GFC  $[(\beta_1 + \beta_6) > (\beta_3 + \beta_7),$ Chi-square = 9.358 and  $(\beta_1 + \beta_6) > (\beta_4 + \beta_8)$ , Chi-square = 12.804]. On the contrary, the coefficient estimates of intangible assets and goodwill are not significantly different even during the GFC  $[(\beta_3 + \beta_7) = (\beta_4 + \beta_8),$  Chi-square = 1.407]. Thus the value relevance of tangible assets, intangible assets and goodwill has decreased during the GFC compared to the NCP after controlling for the effect of negative earnings. However, the decrease in the value relevance of intangible assets and goodwill is more pronounced than that of tangible assets.

It may be noted further that the coefficient estimate of the interaction term BVINT\*NEG is positive and significant which implies that in the presence of negative earnings, the value relevance of tangible assets increases. On the contrary, the coefficient estimates of the interaction terms INTG\*NEG and G\*NEG are negative and significant implying that the value relevance intangible assets and goodwill declines in the presence of negative earnings.

#### **8.5** Discussions on the results

Barth, Beaver and Landsman (1998) propose the FHH which states that investors' reliance on book value increases when a firm's financial health deteriorates and when there is significant going concern risks because book value is a proxy for firms' liquidation option. A GFC represents an economy wide uncertainty. As discussed in chapter two of this thesis, firms' going concern risk has increased significantly during the GFC. Accordingly, relying on the FHH, this thesis hypothesises that the value relevance of book value increases during a GFC. However, empirical evidence in chapter six suggests that the value relevance of book value has decreased during the GFC compared to the NCP. The decrease in the value relevance of book value is contrary to the FHH. One of the underlying reasons for the decrease in the value relevance of book value may be the decrease in the value relevance of intangible assets and goodwill during the GFC. If book value is viewed as a proxy for liquidation option, the value relevance of tangible assets is likely to be different from that of intangible assets and goodwill. The issue of uncertainty about expected future cash flows, the illiquidity and the lack of separate identifiability associated with intangible assets and goodwill might result in different value relevance for intangible assets and goodwill relative to tangible assets. While the value relevance of tangible assets is expected to increase, that of intangible assets and goodwill is expected to decrease during the GFC compared to the NCP. Against this backdrop, this chapter investigates three research questions.

(i) Whether intangible assets and goodwill are value relevant in general;

- (ii) Whether the value relevance of intangible assets and goodwill decreases during a GFC compared to the NCP;
- (iii) Whether the value relevance of tangible assets increases during a GFC compared to the NCP.

The findings suggest that intangible assets and goodwill are value relevant in general, which support hypothesis 3(a). This evidence implies that investors attach importance to intangible assets and goodwill for stock valuation purposes. Further analysis reveals that value relevance of tangible assets, intangible assets and goodwill has decreased during the GFC. Thus, not only the value relevance of intangible assets and goodwill but also the value relevance of tangible assets has decreased during the GFC. These findings support hypothesis 3(b) which states that the value relevance of intangible assets and goodwill decreases during a GFC compared to the NCP. However, the finding does not support hypothesis 3(c) which states that the value relevance of tangible assets increases during a GFC compared to the NCP.

These results are consistent with the results obtained in chapter six, where it was found that the value relevance of book value has decreased during the GFC. The decrease in the value relevance of tangible assets, intangible assets and goodwill suggests that the GFC has adversely impacted investors' reliance on all the three classes of assets-tangible assets, intangible assets and goodwill for stock valuation purposes. This evidence is contrary to the FHH proposed by Barth, Beaver and Landsman (1998). The FHH states that the value relevance of book value increases as the financial condition of a firm worsens. Nevertheless, the decrease in the value relevance of intangible assets and goodwill is expected due to their firm specificity and intangibility. However, the decrease in the value relevance of tangible assets undermines the relevance of book value as a liquidation option during a GFC. The economy-wide illiquidity and credit crunch might be one reason for the decrease in the value relevance of tangible assets, intangible assets and goodwill may be, as spelled out in chapter six, the economy-wide illiquidity and the credit crunch. During a GFC, market-wide illiquidity may affect firms' liquidation option and the realisable value of tangible assets may be lower than that would be the realisable value if the economy was in a good shape. Hence, the value relevance of tangible assets has decreased during the GFC contrary to the prediction of the FHH and contrary to hypothesis 3(c).

Investors seem to attach higher importance on intangible assets and goodwill than that on tangible assets for stock valuation purposes during the NCP. On the contrary, investors seem to attach higher importance on tangible assets than those on intangible assets or goodwill during the GFC. Thus the value relevance of intangible assets and goodwill is higher than that of tangible assets during the NCP. On the contrary, the value relevance of tangible assets is higher than that of intangible assets and goodwill during the GFC. Of particular significance is the fact that the decrease in the value relevance of intangible assets and goodwill is higher than the decrease in the value relevance of tangible assets during the decrease in the value relevance of book value and the decrease in the value relevance of book value and the decrease in the value relevance of intangible assets and goodwill during a GFC. This finding suggests an issue for future research as to whether firms with high levels of intangible and goodwill intensity.

These findings have important implications for investors, practitioners and regulators. It has been argued that the recent Australian accounting standards have been developed with a balance sheet focus (Godfrey, Hodgson, Tarca, Hamilton and Holmes, 2010, p.147). Yet the findings in the present chapter (and chapter six) suggest that investors' reliance on book value has declined during the GFC. The significant decrease in investors' reliance on tangible assets, intangible assets and goodwill for stock valuation purposes also raises questions as to whether there have been appropriate levels of impairment write-downs of different assets at individual firm level during and in the aftermath of the GFC.

#### 8.6 Concluding remarks

This chapter examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill. Intangible assets and goodwill being 'soft assets' market perception on intangible assets and goodwill is also likely to be different from that on tangible assets during the GFC. Because of the lack of separate identifiability and associated illiquidity, the value relevance of intangible assets and goodwill is supposed to decrease during the GFC. According to the FHH, tangible assets are supposed to proxy for the liquidation option and their value relevance is expected to increase during the GFC.

The findings suggest that tangible assets, intangible assets and goodwill are value relevant. Investors attach higher importance on intangible assets and goodwill than on tangible assets during the NCP for stock valuation purposes. The value relevance of all the three categories of assets has decreased during the GFC. However, the decline in the value relevance of intangible assets and goodwill is more pronounced than the decline in the value relevance of tangible assets. These findings provide useful insights into the relative importance of tangible assets, intangible assets and goodwill for stock valuation purposes during the GFC and the NCP. The findings in this chapter also corroborate the earlier results discussed in chapter six (under phase one).

### CHAPTER NINE SUMMARY AND CONCLUSIONS

#### 9.1 Introduction

Value relevance research (VRR) is one of the dominant branches of the capital market research (CMR). One of the core concerns arising out of the long standing debate of the VRR is the decline in the association of fundamental accounting measures with firms' market value. The objective of this thesis is to extend the VRR by examining the changes in the value relevance of fundamental accounting measures such as book value, earnings, cash flow from operations (CFO), tangible assets, intangible assets and goodwill) in the unique context of a global financial crisis (GFC). As discussed in chapter two of this thesis, the 2008-2009 GFC represents a fundamental change in the business environment with increase in the going concern risks.

It has also been discussed in chapter two that when the going concern assumption of the firm is in question, the fundamental relationship of firms' market value with different accounting measures changes with investors' focus shifting from expected future earnings to present realisable resources. According to the financial health hypothesis (FHH) of Barth, Beaver and Landsman (1998), the value relevance of book value increases and that of earnings decreases when a firm's financial health deteriorates and the firm faces going concern risks. Prior studies also suggest that the value relevance of book value increases and that of earnings decreases when earnings becomes transitory (Hayn, 1995), when a firm reports losses and one time items (Collins, Maydew and Weiss, 1997) and when the present earnings loses information content (Subramanyam and Venkatachalam, 1998). Prior studies have also noted that when earnings becomes a noisy measure of firm performance, investors' reliance on alternative performance measures (such as CFO) increases.

Due to the increase in the business risks and the going concern risk during the GFC, it is premised that the value relevance of book value and CFO increases and that of earnings decreases during the GFC compared to the non-crisis period (NCP). Moreover, if book value of equity represents the liquidation option, the value relevance of tangible assets is likely to be different from that of intangible assets and goodwill. The issue of uncertainty about associated expected future cash flows, the illiquidity and the lack of separate identifiability of intangible assets and goodwill might result in different value relevance for these assets relative to tangible assets. While the value relevance of tangible assets is expected to increase, the value relevance of intangible assets and goodwill is expected to decrease during the GFC compared to the NCP.

The empirical part of the thesis is divided into three phases to examine three interrelated issues. Chapter six examines the value relevance of book value and earnings and the impact of the GFC on the value relevance of book value and earnings. Chapter seven examines the value relevance of CFO incremental to book value and earnings, relative value relevance (superiority) of earnings versus CFO and the impact of the GFC on the value relevance of earnings and CFO. Chapter eight examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill. A total of ten hypotheses have been developed. Modified Ohlson (1995) model has been used as the analytical framework. A set of regressions is estimated taking firms' market value per share as the dependent variable and the accounting measures as the independent variables. Value relevance of a particular accounting measure is examined in terms of its explanatory power (adjusted R-square from the regression) of the variation in share prices and in terms of the significance of its coefficient estimates in the regression. The impact of the GFC on the value relevance of a particular accounting measure is determined by the changes in its explanatory power (adjusted R-square) and the changes in its coefficient estimates between the GFC and the NCP.

This chapter summarises major findings in relation to the three interrelated issues examined in three phases. Because a critical analysis of the results on each issue has been included at the end of the respective chapter (chapter six, chapter seven and chapter eight), this chapter presents only a summary discussion on the results. Various importance and implications of the findings are also noted. Perceived limitations of the study and some directions for future research are also discussed in this chapter. The final section of this chapter concludes the thesis.

#### 9.2 Summary of the findings

**Chapter six** examines the relative and incremental value relevance of book value and earnings with specific focus on the changes in the value relevance of book value and earnings
between the NCP and the GFC. Given the widespread concerns among the accounting scholars and accounting regulators of a decline in the value relevance of accounting information, this part of the thesis examines how the value relevance of the fundamental accounting measures such as book value and earnings has changed during the GFC compared to the NCP.

The findings suggest that both book value and earnings are value relevant implying that investors consider both book value and earnings in determining share prices. However, it is observed that the value relevance of book value has decreased and the value relevance of earnings has increased during the GFC compared to the NCP. There was a structural break in the relationship (association) of firms' market value with book value and earnings during the GFC from the association that existed during the NCP. The results are robust to different alternative specifications.

Most importantly the findings of this study are contrary to the prior findings in the USA that the value relevance of book value and earnings is a function of firms' financial health. The results of this study do not support the FHH of Barth, Beaver and Landsman (1998) and the abandonment option hypothesis (AOH) of Yee (2000) and Lim (2005) that the value relevance of book value increases and that of earnings decreases when a firm's financial health deteriorates. A critical analysis on these results has been provided in chapter six, rationalising why the usefulness of book value has decreased and the usefulness of earnings has increased during the GFC.

**Chapter seven** of this thesis examines whether CFO has value relevance incremental to book value and earnings. It also examines the impact of the GFC on the value relevance of earnings and CFO with specific focus on whether the value relevance of earnings decreases and the value relevance of CFO increases during the GFC compared to the NCP.

The findings suggest that CFO contains incremental value relevant information in explaining share prices over and above book value and earnings. The relative value relevance of earnings is higher than that of CFO during both the GFC and the NCP. Further examination reveals that the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC compared to the NCP. Chow F-test for a structural break suggests that there was a structural break in the association of share prices with earnings and CFO

between the GFC and the NCP resulting in increase in the value relevance of earnings and decrease in the value relevance of CFO. The findings are robust to different alternative specifications.

Further examination reveals that the impact of the GFC on the value relevance of earnings and CFO has varied based on different firm specific contextual factors such as firm size, leverage, accruals level, earnings permanence and CFO permanence. For example, contrary to the overall findings, the value relevance of earnings has decreased for large firms and that of CFO has increased for small firms. Although the value relevance of CFO has decreased for high leverage firms, the value relevance of CFO has increased for low leverage firms. Interesting results are also found when firms are classified based on their accruals levels. Although the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC for both high accruals firms and low accruals firms, the increase in the value relevance of earnings and the decrease in the value relevance of CFO were more pronounced for high accruals firms than those of low accruals firms.

When firms are classified based on their earnings permanence, the results suggest that although the value relevance of earnings has increased and the value relevance of CFO has decreased during the GFC for both permanent earnings firms and transitory earnings firms, the increase in the value relevance of earnings was more pronounced for transitory earnings firms than that of permanent earnings firms. Thus, although investors put less importance on transitory earnings than on permanent earnings during the NCP, the importance placed on transitory earnings has increased more than that of permanent earnings during the GFC. When firms are classified based on their CFO permanence, the results suggest that although the value relevance of earnings has increased and that of CFO has decreased for both permanent CFO firms and transitory CFO firms, the decrease in the value relevance of CFO was greater in magnitude for firms with transitory CFO than that of firms with permanent CFO.

The relative superiority of earnings over CFO, the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC in the Australian market are consistent with the prior Australian studies that have documented the superiority of earnings over CFO (for example, Hodgson and Stevenson-Clarke, 2000; Habib, 2010). Hodgson and Stevenson-Clarke (2000) compare the relative and incremental value relevance of earnings

and CFO. They document the superiority of earnings over CFO. Habib (2010) compares seven alternative performance measures in explaining security returns and concludes that earnings has the best explanatory power of security returns among the seven performance measures considered. This thesis documents the relative superiority of earnings over CFO in explaining variations in share prices even during a period of macroeconomic shock. The decrease in the value relevance of CFO during the GFC is also consistent with the evidence of Choi, Kim and Lee (2011) in the context of the 1997 Asian financial crisis (AFC). They have also documented negative coefficients for CFO in nine East Asian countries.<sup>79</sup>

One reason for the decrease in the value relevance of CFO may be that like earnings, CFO may also be a noisy measure of firm performance during the GFC. Recent evidences in the Behavioural Accounting Research (BAR) by Graham, Harvey and Rajgopal (2005) and Roychowdhury (2006) may provide plausible other explanation for the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC compared to the NCP. Graham, Harvey and Rajgopal (2005) conduct a questionnaire survey among 401 corporate financial executives from the USA. Their findings suggest that managers are willing to 'burn (damage) real CFO for the sake of reporting desired accounting earnings number'. They claim that 80 per cent of the surveyed financial executives report that they would prefer cutting discretionary expenses such as advertising, R&D and maintenance, 55 per cent of the executives report their preference to start a new project in delay to meet the current earnings target, whereas, 40 per cent of the respondents report that they would record sells in the current quarter rather than in the next quarter if justified in both quarter, 22 per cent of the respondents report that they would postpone taking an accounting charge and 20 per cent of the respondents report that they would sell investment or assets to record gains in the current quarter. Surprisingly, less than 10 per cent of the respondents preferred accounting adjustment to increase reported earnings. Graham, Harvey and Rajgopal (2005) find that the Generally Accepted Accounting Principles (GAAP) based earnings number, primarily the earnings per share, is the key metric upon which the market focuses. They argue that to reduce the cost of information processing due to the information overload, investors focus on a simple benchmark upon which they can rely on to evaluate firms' performances. During the GFC, the focus on a reliable benchmark such as the earnings per share may

<sup>&</sup>lt;sup>79</sup>In their first stage analysis, although they find negative but insignificant coefficient for CFO, when they interact CFO with the proxy for firm level information asymmetry and the AFC, they find a negative and significant coefficient implying that the value relevance of CFO has decreased during the AFC and the magnitude of the decrease in the value relevance of CFO was positively associated with firm level information asymmetry.

increase due to the increase in the level of noise in other sources of information (Sidhu and Tan, 2011). Moreover, Roychowdhury (2006) provides further empirical evidence of firms' engaging in real activity based earnings management with cash flow implications.

The findings of the present study and the findings of Graham, Harvey and Rajgopal (2005), Roychowdhury (2006) and Lim and Lu (2011) together may suggest that managers engage in some real transactions management with direct cash flow implications. CFO may be managed via adjustment to some real activities such as by adopting an investment strategy that expedites current year's CFO. Managers may also defer some current period's cash outflows. During the GFC, firms' real activity management may dominate over accounting based earnings management because during the GFC, auditors and regulators will be more cautious to accounting adjustments.<sup>80</sup> However, neither the auditor, nor the regulator can question a real activity management, for example, deferring the advertising expenditure. Investors might have understood the managerial actions relating to the real activity management with adverse implications for CFO. In a relatively mature and developed market like Australia, investors will see through the managerial adjustments to report boosted CFO number and discount the CFO for stock valuation purposes. Accordingly, investors might have discounted the reported CFO resulting in a decrease in the value relevance of CFO during the GFC.

Another plausible reason for the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC compared to the NCP may be the ability of accruals based earnings to timely reflect the underlying changes in firms' performances due to the matching attribute of accruals earnings. On the contrary, due to the inherent limitations of CFO in terms of matching revenues with expenses and losses, CFO lacks timely information to reflect firms' underlying performances. The above explanation is also consistent with the conclusion of Dechow (1994) that the explanatory power of accruals based earnings increases with the increase in the volatility of firms' operating environment (working capital requirement, investing activities and financing activities). As discussed in chapter two of this thesis, the GFC represents a fundamental change in firms' business and operating environment. As suggested by Dechow (1994), under these circumstances, the explanatory power of CFO suffers adversely because of the timing and mismatching

<sup>&</sup>lt;sup>80</sup> Xu, Carson Fargher and Jiang (2011) show that auditors' modification of audit reports on the ground of "going concern qualification" has increased substantially during the GFC compared to the NCP in the Australian market. Similar evidence is provided by Cheffers, Whalen and Thrun (2010) in the US context.

problems. Further critical analysis on these results has been provided in chapter seven, rationalising why the usefulness of earnings has increased and why the usefulness of CFO has decreased during the GFC.

**Chapter eight** of this thesis examines the impact of the GFC on the value relevance of tangible assets, intangible assets and goodwill. Given that under phase one of the empirical analysis of this thesis (chapter six), it has been documented that the value relevance of book value has decreased during the GFC compared to the NCP; chapter eight attempts to determine the source of the decrease in the value relevance of book value.

Due to the decline in firms' market value during the GFC, the question of whether goodwill is an asset or not, has once again, come to surface during the GFC (Gore and Zimmerman, 2010). If book value is viewed as a proxy for liquidation option, the value relevance of tangible assets is likely to be different from that of intangible assets and goodwill. The issue of uncertainty about expected future cash flows, the lack of liquidity and separate identifiability associated with intangible assets and goodwill might result in different value relevance of tangible assets is expected to that of tangible assets. While the value relevance of tangible assets is expected to increase, that of intangible assets and goodwill is expected to decrease during the GFC.

The findings suggest that intangible assets and goodwill are value relevant implying that investors consider these assets in determining share prices. Further analysis reveals that the value relevance of tangible assets, intangible and goodwill has decreased during the GFC. Thus, not only the value relevance of intangible assets and goodwill but also the value relevance of tangible assets has decreased during the GFC. However, the magnitude of decrease in the value relevance of intangible assets and goodwill is higher than that of tangible assets.

Hence, the GFC has adversely affected the value relevance of both tangible assets and intangible assets. This evidence is contrary to the proposition of the FHH. The FHH states that the value relevance of book value increases as the financial condition of a firm worsens. Nevertheless, the decrease in the value relevance of intangible assets and goodwill is expected. However, the decrease in the value relevance of tangible assets undermines the

relevance of book value as a liquidation option in the Australian market during the GFC. A critical analysis on these results has been provided in chapter eight.

### **9.3** Importance and implications of the findings

The findings of this study have several implications for equity investors, analysts, auditors and regulators. The three phases of the empirical analysis in this thesis together contribute to the understanding of the market perception on key accounting measures (such as book value, earnings, CFO, tangible assets, intangible assets and goodwill) in determining share prices during a period of macroeconomic uncertainty. There are several other contributions emanating from each phase of the empirical analysis.

- 1. The decrease in the value relevance of earnings has been an increasing concern for the last few decades in the USA, UK and many other countries. Prior studies have also shown that the value relevance of earnings decreased during the 1997 AFC (Graham, King and Bailes, 2000; Ho, Liu and Sohn, 2001; Davis-Friday, Eng and Liu, 2006). Moreover, Barth, Beaver and Landsman (1998) show that the value relevance of book value and earnings is a function of firms' financial health, where, the value relevance of book value increases and that of earnings decreases as the financial health of the firm deteriorates. On the contrary, prior Australian studies have shown that the longitudinal value relevance of earnings. The present study shows that the value relevance of earnings has increased in the Australian market during the GFC compared to the NCP. This evidence suggests the continued importance of earnings in determining share prices even during an economy-wide uncertainty like the one of the GFC.
- 2. The findings of this study also have important implications for accounting regulators. Australian accounting standards have been shaped by a balance sheet focus. The recent move towards the fair value based International Financial Reporting Standards (IFRS) has further enhanced the focus on the balance sheet. Godfrey, Hodgson, Tarca, Hamilton and Holmes (2010, p.147) argue that due to the recent shift to the fair value based IFRS, "the focus has shifted towards valuation concepts, with the balance sheet the major repository of value relevant information, and the main users of accounting information stated to be shareholders and investors." Nevertheless, the present study documents a decline in the value relevance of book value during the GFC compared to the NCP. Moreover, the

findings of the study suggest that earnings has greater relative value relevance than that of book value which is consistent with prior Australian evidence by Brimble and Hodgson (2007). Thus, these findings imply that investors increasingly rely on reported earnings rather than book value for stock valuation purposes. Further, the evidence in the present study demonstrates that even for a country with a balance sheet focus, the value relevance of earnings increases during a GFC. Hence, it is the earnings number, rather than the balance sheet, which should receive greater attention from accounting regulators. Accounting regulators should focus on the accuracy and fairness of the reported earnings number rather than the balance sheet.

- 3. The findings of this study do not support the FHH of Barth, Beaver and Landsman (1998). Under the FHH, book value is a proxy for firms' liquidation value. However, the worth of book value as a liquidation option particularly for distressed firms, in an economy, otherwise in a good condition will be different from the book value as a liquidation option for distressed firms during an economy-wide exogenous shock like the one of the 2008-2009 GFC. During a GFC, market-wide illiquidity may affect firms' liquidation option and the realisable value of book value may be lower than that would be the realisable value of book value if the economy was in a good shape. Hence, the value relevance of book value has decreased during the GFC contrary to the prediction of the FHH.
- 4. The increase in the value relevance of earning corroborates the recent US evidence by Graham, Harvey and Rajgopal (2005) who find that earnings per share is the key information investors focus on in an effort to reduce information overload and information processing costs. The findings of this study reinforce the importance of earnings for the purpose of stock valuation in the Australian market. During a GFC, the focus on a reliable benchmark such as earnings per share may increase because, earnings may contain information on firms' capacity to go through the hardship of the GFC, more so, because the noise level increases in the information emanating from other unregulated and uncontrolled sources (such as media reports and analysts' forecasts) during a GFC (Sidhu and Tan, 2011).<sup>81</sup> If that is the case, regulators and auditors should focus more on the precision and accuracy of firms' reported earnings.

<sup>&</sup>lt;sup>81</sup>Sidhu and Tan (2011) examine analysts' forecast error between the GFC and the NCP and find an increase in the forecast error during the GFC compared to the NCP.

5. The findings of this study also have important implications for the development of corporate governance and institutional enforcement mechanisms. Prior findings on the decline in the value relevance of earnings during the 1997 AFC pertain to Asian countries, where, the legal, institutional and enforcement backgrounds are weaker than those of Australia (Leuz, Nanda and Wysocki, 2003). The fact that this study finds an increase in the value relevance of earnings during the GFC in Australia may suggest that the impact of the economic shock (the 2008-2009 GFC) on the value relevance of accounting information will be different based on the country's legal, institutional and enforcement backgrounds.<sup>82</sup> In fact, recent evidence by Clinch and Wei (2011) corroborates this argument. Clinch and Wei (2011) examine the return-earnings relationship in the context of poor versus strong macroeconomic performances drawing data from Australia, China and the USA. They find no change in the value relevance of earnings in explaining security returns for Australia. However, for the USA they find that earnings is more strongly associated with security returns during both negative macroeconomic growth periods and highly positive macroeconomic growth periods. For China, the return earnings relation is weaker during periods of both highly positive macroeconomic growth and negative macroeconomic growth than that of normal economic growth periods.

The fact that the value relevance of earnings increases during a GFC in the Australian context (present study) and during periods of negative macro-economic performance in the US (Clinch and Wei, 2011), while the value relevance of earnings has decreased during the AFC in the context of Thailand, Korea, Indonesia and Malaysia (Graham, King and Bailes, 2000; Ho, Liu and Sohn, 2001; Davis-Friday, Eng and Liu, 2006) may suggest that in countries with strong legal, institutional and enforcement backgrounds, earnings receives increasing importance for stock valuation during periods of macroeconomic shock.

6. Another important contribution of this thesis is that it shows the sustained superiority of earnings over CFO for stock valuation purposes even during a GFC. Moreover, the value relevance of CFO decreases and that of earnings increases during a GFC. These findings may point to the ability of accruals based earnings to timely reflect the underlying

<sup>&</sup>lt;sup>82</sup>David-Friday, Eng and Liu (2006) do not find any impact of the level of corporate governance on the extent of changes in the value relevance of earnings. However, they find a greater decline in the value relevance of book value in countries with weaker levels of corporate governance in the context of the 1997 AFC.

changes in firms' performances due to the matching attribute of earnings. Assets' values are likely to decline during a GFC. Share prices also decrease to reflect the declines in assets' value. The accruals based earnings reflects these declines in asset values in the form of asset impairments or holding losses. However, CFO tied to those losses will not be realised until future periods. Hence, during a GFC, firms' earnings may more closely map into share prices than CFO. On the contrary, due to the inherent limitations of CFO in terms of matching revenues with expenses and losses, CFO lacks timely information to reflect firms' underlying performances. So investors' reliance on CFO decreases during a GFC.

The results obtained examining the contextual factors corroborate these explanations. The fact that the increase in the value relevance of earnings is higher for high accruals firms than that of low accruals firms, and the fact that investors put less importance on transitory earnings than on permanent earnings during the NCP, whereas, investors put more importance on transitory earnings than on permanent earnings during the GFC, may suggest that the usefulness of accruals based earnings has increased during the GFC due to its matching attributes. Thus the findings buttress the importance of the matching attribute of accruals based earnings in providing useful information to the market. The results also highlight the limitations of CFO in providing useful information to the market reflecting firms' performances during periods of economic uncertainty.

7. The decline in the value relevance of tangible assets, intangible assets and goodwill suggests that the GFC has adversely impacted investors' reliance on all the three categories of assets for stock valuation purposes which is contradictory to the FHH. Of particular note in this regard is that investors attach greater importance on intangible assets and goodwill than that on tangible assets during the NCP for stock valuation purposes. The underlying reason of this finding may be that during normal economic periods, investors generally attach higher importance on potential future earnings, and therefore, on intangible assets and goodwill than the decrease in the value relevance of intangible assets and goodwill is greater and more pronounced than the decrease in the value relevance of tangible assets is higher than the weight placed on either intangible assets or goodwill during the GFC. This evidence may suggest a link between the decline in the value relevance of aggregate

book value with the decline in the value relevance of intangible assets and goodwill during a GFC. This finding may also imply that firms with high levels of intangible assets and goodwill have higher sensitivity to macro-economic shocks than firms with low levels of intangible assets and goodwill.

## 9.4 Limitations of the study

Like other studies, this thesis has some limitations. In this section those limitations are identified.

- 1. One of the important limitations of this study is that it examines only Australian companies. Compared to other developed countries (such as the USA, UK, Germany, Italy, Japan), Australia was relatively less affected by the 2008-2009 GFC. Hence, the findings documented in the Australian context may not generalise to other countries, more severely affected by the GFC. The results may also be different in countries with different legal and institutional backgrounds. Davis-Friday, Eng and Liu (2006) show that the impact of the 1997 AFC on the value relevance of accounting information varied in relation to the country level corporate governance and country level accounting systems. Hence, the impact of the GFC on the value relevance of accounting information may be different in different countries.
- 2. Another limitation of the present study is that it has not examined the value relevance of accounting information in the post-GFC environment. Particularly, it would be interesting to examine whether the value relevance of book value, earnings and CFO returns to the pre-crisis level in the post-crisis period, or whether there is any discernible change during the post-GFC period compared to the GFC and the pre-crisis period. One reason for leaving the post-GFC period is that when this study started, the GFC was not over. The GFC was unfolding and countries after countries were falling into it. There were still a cloud of second round of crisis and a European meltdown. For, these reasons, it was not possible to incorporate data from the post-GFC period. However, this thesis recognises that it remains a potential area for future research.
- 3. The decline in the value relevance of intangible assets has been examined for the aggregate amount of intangible assets. Prior studies have shown that the value

relevance of different categories of intangible assets is different (Godfrey and Koh, 2001). Moreover, the sample is drawn from the large capitalisation Australian companies. Although, this sample covers almost 96 per cent of the market capitalisation of the Australian stock market, the value relevance of intangible assets and goodwill may be different between small firms and large firms.

- 4. The research in this thesis is conducted within an investor-oriented framework (Beisland, 2008) focusing on the implications of accounting information for stock valuation purposes. Other uses of accounting information such as debt valuation and contracting are beyond the scope of this thesis. Accordingly, the conclusions drawn in this thesis may not apply to other valuation purposes and to other uses of accounting information.
- 5. It may be noted, however, that all industry sectors in the economy may not have been affected similarly by the GFC. This study has controlled for the industry effects by including industry dummies in the models. The results obtained in this study may not apply equally to all industry sectors of the economy.

## 9.5 Directions for future research

Several opportunities arise for future research out of the issues raised in this thesis. The future research issues are outlined below:

- 1. The association of accounting measures and firms' market value may differ across different markets and the empirical evidence identified in one market may not generalise to other markets. Accordingly, future studies can focus on other countries with different legal, institutional and enforcement backgrounds to truly comprehend the impact of a GFC on the value relevance of fundamental accounting information such as book value, earnings and CFO. Specifically, cross-country analysis will be of interest to investors, analysts and regulators.
- 2. The findings of this thesis run counter to the hypotheses of this thesis. This thesis has attempted to ex-post rationalise the findings that the value relevance of book value and CFO has decreased and the value relevance of earnings has increased during the GFC by extending explanation on the plausible underlying reasons. Future research is warranted to truly understand the reasons for the decreases in the value relevance of

book value. Future research is also needed to understand why the value relevance of earnings has increased and that of CFO has decreased during the GFC compared to the NCP. The results obtained by examining the contextual factors may provide an indication that the value relevance of earnings has increased due to its matching attributes, whereas, the value relevance of CFO has decreased due to its lack of matching attributes. Future studies can focus on these issues to find out the real causes of the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC.

- 3. Another potential area for future study is to examine whether the changes in the value relevance of book value, earnings, and CFO during the GFC are different for cross-section of firms in a single country context considering the impact of firm level corporate governance on the value relevance of accounting information. Such evidences will provide insights into the importance of firm level corporate governance in improving the usefulness of accounting information during adverse economic periods. Results from such a study will be of interest to the regulators and shareholders.
- 4. This thesis has examined the usefulness of accounting information using share prices as the dependent variable. Share prices may be a noisy measure of firm value, specifically during the GFC, due to the herding behaviour<sup>83</sup> by investors. Future research can replicate the present study in Australia or in other countries using intrinsic value of equity as the dependent variable, consistent with Subramanyam and Venkatachalam (2007), to examine the changes in the value relevance of fundamental accounting information during the GFC.
- 5. Different sectors of the economy may have been affected differently by the GFC. This study has controlled for the industry effects by including industry dummies in the models. Future studies can perform the analysis separately for different industry sectors to examine whether the impact of the GFC on the value relevance of key accounting measures was different for different industries.

<sup>&</sup>lt;sup>83</sup>Herding behaviour implies that risk averse investors are highly exposed to risks in down market and they off load their stock holdings quickly in herding pushing the market further down the fundamental value.

- 6. The present study has examined the value relevance of aggregate amount of intangible assets. Future studies can examine the changes in the value relevance of individual item of intangible assets between the GFC and the NCP. Future studies can also examine the value relevance of intangibles assets and goodwill for small firms.
- 7. The findings suggest that investors attach higher importance on intangible assets and goodwill than that on tangible assets during normal economic condition, whereas, investors attach lower importance on intangible assets and goodwill than that on tangible assets during the GFC. It remains an issue for future research as to whether the decline in firms' market value during the GFC is associated with firms' intangible intensity.
- 8. The significant decrease in investors' reliance on tangible assets, intangible assets and goodwill for stock valuation purposes during the GFC also raises questions as to whether there have been appropriate amounts of impairment write-downs of different assets at individual firm level during the GFC and in the aftermath of the GFC. This remains an important issue for future research.

## 9.6 Conclusions

One of the articulated objectives of financial reporting is to provide information in the financial statement that helps investor to estimate and to predict present and future cash flows to facilitate investment decisions. The recent move towards the fair value based IFRS also underpins the importance of equity investment perspective as the primary focus of financial reporting and regulations. The Financial Accounting Standards Board (FASB) in its conceptual frameworks for financial reporting also recognises the importance of security investment decision as an objective of financial reporting.

Capital market based VRR in accounting examines to what extent fundamental accounting measures such as book value, earnings and CFO are associated with firms' share prices. Prior empirical studies show that the value relevance of fundamental accounting information such as book value, earnings and CFO has been declining over the last few decades. The decrease in the value relevance of earnings has been attributed to a large number of loss making firms, non-capitalisation of intangible assets and changes in the business from manufacturing to service oriented functions. Whatever may be the reasons for the decrease in the value

relevance of accounting information, it has generated concerns among accounting scholars, practitioners, regulators and investors.

Against this backdrop, this thesis examines the value relevance of book value, earnings and CFO surrounding the 2008-2009 GFC. It also examines the value relevance of tangible assets, intangible and goodwill during the GFC and the NCP. The findings suggest that the value relevance of book value and CFO has decreased during the GFC compared to the NCP. On the contrary, the value relevance of earnings has increased during the GFC compared to the NCP. These results hold for different robustness checks. The findings of the present study are not consistent with the FHH of Barth, Beaver and Landsman (1998) which states that the value relevance of book value increases and that of earnings decreases as the financial condition of a firm worsens. Moreover, the findings suggest the relative superiority of earnings over book value and CFO in explaining variations in share prices in the Australian market.

This study extends the literature corroborating prior the Australian evidence on the sustained usefulness of earnings in explaining firms' market value during a GFC. The fact that the value relevance of earnings has increased during the GFC may ease the perennial concerns of accounting practitioners and regulators on the declining value relevance of financial statement information specifically earnings. Moreover, the increase in the value relevance of earnings and the decrease in the value relevance of CFO during the GFC underpin the superiority of earnings over CFO for stock valuation purposes during a time of severe economic uncertainty when information from unregulated and uncontrolled sources (such as analysts' forecasts and media reports) becomes unreliable.

The findings of the thesis will provide important insights to academics, auditors, investors, practitioners and regulators on the usefulness and contemporary changes in the value relevance of accounting information during a period of severe economic uncertainty. This thesis also has policy implications for accounting regulators who are trying to promulgate accounting standards with a balance sheet focus, in any move to change the accounting standards to enhance the predictive and feedback ability of accounting information.

Industry	2009	2008	2007	2006	2005	2004	Total
Beverage	15	15	15	12	10	10	77
Chemical	15	15	13	12	12	9	76
Construction	42	42	43	38	34	32	231
Electronic And Electrical Equipment	21	20	20	20	16	16	113
Fixed Line Telecommunication	11	11	11	10	8	6	57
Food Producers	37	37	35	33	29	28	199
General Retailer	35	30	33	28	28	23	177
Healthcare Equipment	57	58	56	51	48	42	312
Household Goods And Home Constructions	16	15	15	15	15	14	90
Industrial Metal And Mining	233	216	196	113	95	62	915
Industrial Engineering	24	24	24	22	19	17	130
Industrial Transportation	17	17	16	14	12	12	88
Media	35	33	34	33	32	29	196
Mobile Telecommunication	14	13	13	9	8	9	66
Oil and Gas producers	117	116	108	96	85	72	594
Pharmaceuticals	67	58	66	60	58	50	359
Real Estate Investment Services	39	40	40	37	37	33	226
Software and Computer services	60	59	60	55	51	47	332
Support Services	73	73	66	61	57	51	381
Technology and Hardware	14	13	13	13	13	13	79
Travel and Leisure Goods	34	35	34	33	27	24	187
Total	976	940	911	765	694	599	4885

Appendix A: Industry distribution of the sample firms used to examine the value relevance of book value, earnings and CFO

# Appendix B:

Descriptive statistics and industry distribution of the sample used to examine the value relevance of tangible assets, intangible assets and goodwill

Panel A: Overview of the research sample (amounts are in million AUD)								
	2009	2008	2007	2006	Total			
No. of firms having reported goodwill	236	246	223	211	916			
Goodwill as per cent of total assets (total goodwill of the sample firms/total assets of the sample firms)	3.98%	3.30%	3.19%	3.69%	3.98%			
Mean of goodwill as percentage of total assets (mean of percentage of goodwill for individual firms)	19.40%	19.73%	18.15%	14.44%	18.23%			
Minimum of goodwill as a per cent of total assets	0.02%	0.01%	0.01%	0.05%	0.01%			
Maximum of goodwill as a per cent of total assets	76.56%	76.60%	69.57%	68.77%	76.60%			
No. of firms having reported intangible assets (include exploration and evaluation costs)	311	314	295	279	1199			
Intangible assets as per cent of total assets (total intangible assets of the sample firms/total assets of the sample firms)	2.17%	2.09%	1.51%	1.14%	1.72%			
Mean of intangible assets as per cent of total assets(mean of percentage of for individual firms)	8.73%	7.99%	7.57%	6.13%	7.67%			
Minimum of intangible assets as a per cent of total assets	0.02%	0.01%	0.01%	0.01%	0.01%			
Maximum of intangible assets as a per cent of total assets	85.72%	73.81%	92.83%	68.43%	92.83%			
Panel B:Industry distribution- number of firms in particular year with reported intangible assets and goodwill								
	2009	2008	2007	2006	Total			
Capital Goods	38	38	37	35	148			
Commercial Services and Supplies	30	30	30	28	118			
Consumer Services and Durable	20	19	18	16	73			
Banks and Diversified Financials	22	25	22	21	90			
Energy	8	8	6	5	27			
Food Beverage and Staple Retailing	22	20	18	18	78			
Healthcare Equipment and Services	11	9	9	9	38			
Insurance	9	7	7	7	30			
Materials	56	63	59	57	235			
Media	12	13	13	13	51			
Pharmaceuticals and Biotechnology	6	5	5	4	20			
Real Estate	16	16	15	15	62			
Retailing	20	18	19	17	74			
Software Services, Technology and Hardware etc.	20	20	19	18	77			
Telecommunications Services	5	6	5	4	20			
Transportation, Automobiles and Components	10	11	9	8	38			
Utilities	6	6	4	4	20			
Total	311	314	295	279	1199			

Appendix C: Descriptive statistics of different control variables used to examine the impact of the GFC on the value relevance of book value and earnings; and different contextual factors considered to examine the impact of the GFC on the value relevance of earnings and CFO

Control variable or contextual factors considered	Overall							
	Mean	Median	Standard dev.	Skewness	Kurtosis	25 percentile	75 percentile	
SIZE (AUD, 000)	610790	28430	4539990	20.74	536.55	9000	132440	
LEV	0.40	0.27	.25	30.91	1388.78	0.07	0.52	
ROE	41.39	13.61	30.60	32.51	1187.69	4.17	33.71	
CONTLOSS	.40	NA	NA	NA	NA	NA	NA	
Growth options (market to book value ratio)	3.68	1.50	47.30	21.70	1127.13	0.83	3.03	
Accruals level	0.25	0.05	3.56	56.82	3321.06	0.02	0.16	
Earnings permanence	0.49	0.06	3.16	17.77	389.90	0.02	0.22	
CFO permanence	0.22	0.05	1.41	30.86	1161.74	0.02	0.15	
	During the GFC (2008-2009)							
SIZE (AUD, 000)	528666	20325	4480309	22	588	6502	100202	
LEV	.34	.24	.63	18.74	529.11	.06	.49	
ROE	48.91	17.46	31.69	42.87	2194.37	8.42	41.25	
CONTLOSS	.40	NA	NA	NA	NA	NA	NA	
Growth options (market to book value ratio)	3.13	1.08	48.28	35.26	1360.44	.58	2.37	
Accruals level	.49	.05	3.75	25.99	804.61	.001	.23	
Earnings permanence	.656	.08	3.789	15.903	311.752	.023	.327	
CFO permanence	.27	.059	1.620	30.58	1096.29	.018	.19	
	During the NCP (2004-2007)							
SIZE (AUD, 000)	667332	34100	4580585	20	505	11510	152880	
LEV	.45	.31	1.27	28.33	1089.45	.09	.55	
ROE	35.78	13.91	15.48	25.15	773.12	4.93	32.40	
CONTLOSS	.40	NA	NA	NA	NA	NA	NA	
Growth options (market to book value ratio)	4.03	1.80	46.65	12.07	956.21	1.02	3.35	
Accruals level	.13	.02	.595	22.62	748.33	.002	.087	
Earnings permanence	.301	.043	2.249	19.833	443.308	.014	.138	
CFO permanence	.15	.034	1.098	27.69	889.40	.009	.101	

### Control variables used in Model 4a to examine the impact of the GFC on the value relevance of book value and earnings

ROE = Dummy variable taking the value of 1 if the absolute value of ROE of the firm is above the median of absolute value of ROE, 0 otherwise. Statistics relate to the absolute values of ROE.

LEV = Dummy variable taking the value of 1 if the firm has above median leverage, 0 otherwise. Leverage is measured as total liabilities divided by total assets.

SIZE = Dummy variable taking the value of 1 if the firm has above median firm size, 0 otherwise. Firm size is measured as firms' beginning of the year market value of equity.

CONTLOSS = Dummy variable, taking the value of 1 if the firm has negative earnings continuously for last three years, 0 otherwise. CONTLOSS is used as a proxy for firms' deteriorating financial health.

#### Contextual factors considered to examine the impact of the GFC on the value relevance of earnings and CFO

Size group: Firms are partitioned into two groups each year, based on the median of their beginning of the year market value. Firms above the median market value are placed in the large size group and firms below the median market are placed in the small size group.

Leverage groups: Firms are split at the median value of leverage (total debt /total assets) for each year. Firms with above median leverage are placed in the high leverage group and firms with below median leverage are laced in the low leverage group.

Growth options: Firms are separated based on the yearly median market to book value ratio. Firms having above median market to book value ratio are placed in the high growth option group and firms having below median market to book value ratio are placed in the low growth option group.

Accruals groups: Firms are partitioned into two groups each year based on the median of absolute value of accruals divided by beginning of the year market value per share. Firms lying above the median of  $|TAC / MV_{t-1}|$  are placed in high accruals group and firms having below the median of  $|TAC / MV_{t-1}|$  are placed in the low accruals group. Accruals is defined as net incomes minus CFO.

**Earnings permanence groups:** Firms are partitioned into two groups based on their absolute value of the change in the net income divided by the absolute value of firms' market value for each year. Firms lying below median of  $|\Delta NI / MV_{t-1}|$  are placed in the permanent earnings group and firms lying above median of  $|\Delta NI / MV_{t-1}|$  are placed in the transitory earnings group.

**CFO permanence groups:** Firms are partitioned into two groups based on their absolute value of the change in the CFO divided by the absolute value of firms' market value for each year. Firms lying below median of  $|\Delta CFO/MV_{t-1}|$  are placed in the permanent CFO group and firms lying above median of  $|\Delta CFO/MV_{t-1}|$  are placed in the transitory CFO group.

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