VOLATILITY, VALUE RELEVANCE AND PREDICTIVE POWER OF COMPREHENSIVE INCOME

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Shahwali Khan

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ABSTRACT

Despite analysts' demands for (and standard setters' preferences for) a single statement of comprehensive income, both the IASB and the FASB have not been able to achieve this objective. Proponents of a single statement presentation argue that comprehensive income brings discipline to managers and analysts as it requires them to consider *all* factors affecting owners' wealth. Opponents argue that other comprehensive income items are transitory in nature, including them with core business earnings increases the volatility and reduces the predictive power of earnings. Thus, this thesis examines the volatility, value relevance and predictive power of comprehensive income relative to net income. Motivated by the concerns that the volatility of comprehensive income leads to the perception of increased risk, this thesis investigates the volatility and risk relevance of comprehensive income for a sample of non-financial United States (US) and New Zealand (NZ) firms. The findings show that comprehensive income is more volatile than net income. The findings also show that comprehensive income volatility is associated with market-based measures of risk (volatility of stock returns and beta). However, the incremental volatility of comprehensive income (over net income) is not associated with market risk and is not priced. Prior literature documents mixed evidence on the pricing of comprehensive income. The mixed results are attributed to the use of *as if* measures of comprehensive income, which introduces measurement error. This thesis uses *as reported* data from US and NZ firms and shows that comprehensive income is more value relevant compared to net income. However, net income is a better measure for predicting future operating cash flows and future net income. These results have important implications for the FASB/IASB in deciding whether to report comprehensive income in a single statement of performance.

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LIST OF ABBREVIATIONS

AAA	-	American Accounting Association
AICPA	-	American Institute of Certified Public Accountants
APB	-	Accounting Principles Board
ARB	-	Accounting Research Bulletin
ASRB	-	Accounting Standards Review Board
ASU	-	Accounting Standard Update
CAP	-	Committee on Accounting Procedure
EAA	-	European Accounting Association
FASB	-	Financial Accounting Standards Board
FRS	-	Financial Reporting Standard
FRSB	-	Financial Reporting Standards Board
GAAP	-	Generally Accepted Accounting Practice
IAS	-	International Accounting Standards
IASB	-	International Accounting Standards Board
IFRS	-	International Financial Reporting Standards
NZ IAS	-	New Zealand Equivalents to IAS
NZ	-	New Zealand
SFAC	-	Statement of Financial Accounting Concept
SFAS	-	Statement of Financial Accounting Standard
UK	-	United Kingdom
US	-	United States

CHAPTER 1: INTRODUCTION

1.1 Thesis Overview

This thesis draws on the value relevance literature and investigates one of the most debated issues of accounting, income reporting. Despite having a preference for 'all inclusive' income and a single statement of comprehensive income, both the International Accounting Standards Board (IASB) and the Financial Accounting Standard Board (FASB) have not been able to achieve this objective. The FASB's Exposure Draft: *Reporting Comprehensive Income* requires a clear display of comprehensive income and its components in a statement of performance (FASB, 1996).[1] However, Statement of Financial Accounting Standard No. 130 (SFAS 130): *Reporting Comprehensive Income* does not specify the statement in which comprehensive income must be displayed.

Accounting Standards Update (ASU) No. 2011-05, *Comprehensive Income (Topic 220): Presentation of Comprehensive Income,* eliminates the reporting of comprehensive income in the statement of changes in equity (FASB, 2011). However, the option of a single statement of performance or two statements of performance is retained.[2] Similarly, the IASB allows a one or two statement option in International Accounting Standard No. 1 (IAS 1): *Presentation of Financial Statements* for the reporting of comprehensive income (IASB, 2007).

[1] Comprehensive income is the sum of net income and other comprehensive income components.

[2] A single statement must present the components of net income and total net income, the components of other comprehensive income and total other comprehensive income, and a total for comprehensive income. In a two-statement approach, an entity must present the components of net income and total net income in the first statement. That statement must be immediately followed by a financial statement that presents the components of other comprehensive income, a total for other comprehensive income, and a total for comprehensive income.

This thesis investigates three attributes of comprehensive income: volatility, value relevance and predictive power.

1.2 Motivation for the Volatility Study

An output of the IASB/FASB joint project 'Financial Statement Presentation' is a discussion paper: *Preliminary Views on Financial Statement Presentation* (IASB, 2008). This discussion paper proposes that net income and other comprehensive income be reported in a single statement.[3] Comment letters to the discussion paper are split on whether an entity should present comprehensive income in a single statement or in two separate statements (IASB, 2009, para. 39). Respondents that disagree with a single statement presentation, argue that the inclusion of other comprehensive income items along with core business results will confuse users of financial statements. Moreover, a single statement will lead to significant misinterpretations of an entity's performance (IASB, 2009, para. 40).[4]

Experimental research provides evidence that a single statement will not confuse users of financial statements (see Hirst and Hopkins, 1998; Maines and McDaniel, 2000; Hunton et al., 2006; Chambers et al., 2007; Tarca et al., 2008). Comprehensive income ought to play an important role in performance measurement, even if another measure

[3] Other comprehensive income comprises items of income and expense that an entity does not immediately recognize in profit or loss or net income as required or permitted by IFRSs and US GAAP. Other comprehensive income items include: unrealized holding gain/loss from available-for-sale securities, foreign currency translation adjustments, excess of additional pension liability over unrecognized prior service costs and derivative securities adjustments.

[4] Respondents that agree with a single statement of comprehensive income think that it will enhance transparency, consistency and comparability (IASB, 2009, para. 39).

(e.g., net income) is the primary measure.[5] Nevertheless, the misinterpretation of comprehensive income is an important issue and is most likely to relate to the perceived volatility of comprehensive income, which in turn implies a perception of increased risk. Most of the prior research related to the volatility of comprehensive income examines the risk implications of fair value accounting in the banking industry (e.g., Barth, 1994; Barth et al., 1996; Hodder et al., 2006). These studies attempt to measure the association of the volatilities of different income measures with firm fundamental risk factors. However, there is little empirical evidence on the volatility of comprehensive income and its consequences.

1.3 Research Questions for the Volatility Study

The first objective of this thesis is to provide evidence on the volatility of comprehensive income. This thesis also examines the risk relevance of comprehensive income by investigating the correlation of the volatility of comprehensive income with market-based risk measures. Further, this thesis examines whether this volatility is priced by the capital market. The purpose is to see how well the volatility of comprehensive income represents a firm's risk in contrast to the volatility of conventional net income. The study samples United States (US) non-financial firms for the period 2005-2010 and New Zealand (NZ) non-financial firms for the period 2001-2010. The standard deviation of net income and comprehensive income is calculated to estimate volatility.

[5] As the IASB/FASB mention in the discussion paper '*[T]he boards reasoned that their proposed format for the statement of comprehensive income would allow users to become familiar with the notion of comprehensive income, while still retaining the touchstone of profit or loss or net income* (IASB, 2008, para 3.35).'

This thesis addresses three research questions. First, is comprehensive income more volatile than net income? Second, is the incremental volatility of comprehensive income (over the volatility of net income) associated with market risk? Third, is the incremental volatility of comprehensive income capitalized into share prices?

1.4 Main Findings of the Volatility Study

With regard to the first research question, the study assesses the relative volatility of comprehensive income compared to net income by reporting the standard deviation ratio (i.e., the standard deviation of comprehensive income/standard deviation of net income). The results show that comprehensive income is more volatile than net income. To address the second research question, the association of the income volatility measures with two market-based risk measures (i.e., volatility of stock returns and beta) is examined. The results show that the income volatility measures exhibit strong positive correlation with the volatility of stock returns. Further, the incremental volatility of comprehensive income (beyond the volatility of net income) is not significantly positively associated with market-based risk measures.

With regard to the third research question, if the income volatility measures capture elements of risk that are priced by the capital market, then higher volatility should be associated with greater risk. This would imply higher expected returns and decreased share prices if everything else is held constant.[6] The results show that the volatility of the income measures significantly mitigates the capitalization of abnormal earnings in

[6] Due to lack of analyst forecast data, which is required for the calculation of cost of equity capital, this thesis cannot test the higher expected returns.

share prices. However, the volatility of comprehensive income does not capture incremental factors that are associated with the market's assessment of share price risk, beyond the risk factors represented by volatility of net income.

1.5 Motivation for the Value Relevance and Predictive Power Studies

Barth et al. (2001) argue that value relevance research not only attracts academicians' attention but also non-academics such as standard setters. They note that such research is often motivated by an aspect of a broad question raised by the non-academic constituents. The joint FASB/IASB discussion paper (IASB, 2008) proposes a format for presenting financial information that integrates the entity's financial position, financial performance and cash flows. The purpose is to provide information that is useful in predicting future cash flows by disaggregating it into homogeneous groups of items on the basis of their function and nature (see IASB, 2008, paras. 2.1-2.13; paras. 3.24-3.69). The boards believe that presenting a single statement of comprehensive income will improve comparability of financial statements as all entities will present the components of comprehensive income in the same financial statement. Further, users can easily understand and use the information related to all nonowner changes in an entity's net assets in their analyses by looking at only one statement.[7] The proposed format promotes clean surplus accounting and does not allow any items to bypass the income statement.[8] In forming this opinion, the boards relied solely on academic research that uses US data (IASB, 2008, para. 3.31). Thus, the proposed format needs to

[7] For example, the statement of comprehensive income will provide information about both realized and unrealized changes in fair values in one place (IASB, 2008, para. 3.29).

[8] In clean surplus accounting, all non-owner changes in wealth must flow through the income statement while in dirty surplus accounting items bypass the income statement and are directly reported in equity.

be substantiated by further research from non-US regimes.

Dechow and Schrand (2004) argue that a high-quality earnings number (1) is one that accurately reflects the company's current operating performance, (2) is a good indicator of future operating performance and (3) is a useful summary measure for assessing firm value. Theoretical support for comprehensive income comes from excess earnings approaches to valuation, including the traditional residual income model (Preinrich, 1938; Peasnell, 1982; Ohlson 1995; Feltham and Ohlson, 1995). If comprehensive income is a more complete summary income measure, it should be more strongly related to the value of a firm and have better predictive power compared to other summary income measures (e.g., net income). However, prior empirical research investigating the usefulness of comprehensive income documents mixed results (see Hirst and Hopkins, 1998; Dhaliwal et al., 1999; O'Hanlon and Pope, 1999; Biddle and Choi, 2006; Choi and Zang, 2006; Choi et al., 2007; Chambers et al., 2007; Kanagaretnam et al., 2009; Pronobis and Zülch, 2010; Goncharov and Hodgson, 2011). These mixed results can be partially attributed to the use of the *as if* estimation technique to derive an *ex ante* measure of other comprehensive income in the pre-SFAS 130 period, which introduces measurement error (Chambers et al., 2007).

Many studies examine the usefulness of comprehensive income using constructed *as if* measures (e.g., Cheng et al., 1993; Dhaliwal et al., 1999; Kubota et al., 2009; Goncharov and Hodgson, 2011). Studies using *as reported* measures of comprehensive income (e.g., Chambers et al., 2007; Kanagaretnam et al., 2009) rely on small samples. The evidence on the value relevance and predictive power of comprehensive income disclosures remains mixed and inconclusive to date. Further empirical evidence on the

value relevance and predictive power of comprehensive income and its components is warranted.

This thesis provides evidence using an extensive sample of *as reported* measures of comprehensive income and its components.

1.6 Research Questions for the Value Relevance and Predictive Power Studies

The second and third objective of this thesis is to examine the value relevance and predictive power of comprehensive income and other comprehensive income components over the traditional net income. This thesis builds upon Kanagaretnam et al. (2009) and examines the association of comprehensive income and its components with stock price and market returns, using the reported figures rather than *as if* estimates. This thesis includes both returns and price models to investigate the usefulness of comprehensive income and its components.[9] The use of both price and returns models potentially provide more convincing evidence of the value relevance of these items (Kothari and Zimmerman, 1995). The study uses both US and NZ data.

This thesis examines whether each individual component of comprehensive income has incremental value relevance and whether comprehensive income is more value relevant than net income.

[9] As pointed out by Kanagaretnam et al. (2009), Dhaliwal et al. (1999) use the price model in their Table 5 but only to examine the effect of comprehensive income. They do not analyse the association between price and the components of comprehensive income.

With respect to the predictive power, the study examines the ability of comprehensive income compared to net income to predict future operating cash flows and future net income. The study also examines the predictive ability of individual other comprehensive income components over and above net income to predict future operating cash flow and future net income.

1.7 Main Findings of the Value Relevance and Predictive Power Studies

1.7.1 Value Relevance Study Findings

This thesis examines the relative value relevance of comprehensive income and the incremental value relevance of other comprehensive income. The results show that comprehensive income is more value relevant compared to net income in both price and returns models. The results show that the individual components of other comprehensive income are also value relevant in the US, suggesting that in the post-SFAS 130 period, comprehensive income and other comprehensive income have become more value relevant in the US. Asset revaluation reserves and available-for-sale securities are the only components of other comprehensive income that have incremental value relevance for NZ firms. In NZ, the higher explanatory power of comprehensive income compared to net income is mostly driven by asset revaluation reserves.

1.7.2 Predictive Power Study Findings

This thesis finds that comprehensive income is not a better proxy for predicting future operating cash flows and future net income compared to net income in the US. However, contrary to prior research (e.g., Dhaliwal et al., 1999; Kanagaretnam et al., 2009; Pronobis and Zülch, 2010; Goncharov and Hodgson, 2011), this thesis provides evidence using NZ data that comprehensive income better predicts future operating cash flows and future net income compared to net income. Thus, comprehensive income dominates net income as a decision-relevant metric for investors in NZ when used for valuation, information and prediction. The better predictive power of comprehensive income is driven by the asset revaluation reserve component of other comprehensive income.

1.8 Contribution of this Thesis

This thesis makes several contributions to the literature. First, it provides the IASB/FASB project, *Financial Statement Presentation,* with empirical evidence on the impact of moving to a single statement of comprehensive income for samples drawn from both a US and a non-US regime. Second, most prior research investigating the volatility of comprehensive income and fair value changes focuses on financial institutions and banks (e.g., Barth, 1994; Barth et al., 1995; Barth et al., 1996 and Hodder et al., 2006). This thesis contributes to the literature by providing evidence from a sample of non-financial firms. Third, this thesis uses reported figures of comprehensive income and other comprehensive income rather than *as if* constructed measures. Therefore, the inferences drawn do not suffer from measurement error

contained in studies using constructed comprehensive income estimates.

Fourth, the study uses an extensive sample. Fifth, in recommending a single statement of comprehensive income, the IASB/FASB in the discussion paper relied solely on research studies done in the US (IASB, 2008, para. 3.31). This thesis provides evidence on the various attributes of comprehensive income (volatility, value relevance and predictive power) from a non-US regime. Sixth, as asset revaluations are voluntary under IAS 16 *Property, Plant and Equipment*, this thesis examines the impact on the volatility of comprehensive income, with and without the effect of revaluations.

1.9 Framework of this Thesis

The remaining thesis is organized as follows. Chapter 2 provides the background information on the reporting of comprehensive income. Chapter 3 provides the literature review for the volatility study. Chapter 4 explains the sample, research methods and results for the volatility study. Chapter 5 provides the literature for the value relevance and predictive power studies. Chapter 6 explains the sample, research methods and results for the value relevance and predictive power studies. Chapter 7 concludes this thesis.

CHAPTER 2: BACKGROUND

2.1. The Debate over All-Inclusive and Current Operating Performance

The issue of income reporting has been controversial in the accounting profession since the 1930s. It is broadly related to the choices for reporting income either via the all-inclusive or current operating performance concept (i.e., clean surplus or dirty surplus accounting respectively). As Brief and Peasnell (1996, p. x) state:

"The first discussions of clean surplus as an accounting issue seem to have taken place after the turn of the century when questions about the purpose of the income statement were debated, e.g., Dickinson (1908, 1914)."

The American Institute of Accountants (now known as the American Institute of Certified Public Accountants (AICPA)) formed the Committee on Accounting Procedure (CAP) in 1939, which had the task of setting accounting standards in the United States. The CAP issued Accounting Research Bulletin (ARB) No. 32: *Income and Earned Surplus* in December 1947, where all-inclusive income is defined as:

"[n]et income is defined according to a strict proprietary concept by which it is presumed to be determined by the inclusion of all items affecting the net increase in proprietorship during the period except dividend distributions and capital transactions" (ARB No. 32, p. 260).

Similarly, the concept of current operating performance is defined as:

"[p]rincipal emphasis upon the relationship of items to the operations, and to the year, excluding from the determination of net income any material extraordinary items which are not so related or which, if included, would impair the significance of net income so that misleading inferences might be drawn therefrom" (ARB No. 32, p. 260).

Under the all-inclusive concept, there is complete articulation of the income statement and balance sheet. All changes in equity other than owners' investments are reported as income, which includes all recurring and non-recurring revenues, expenses, gains and losses, whether extraordinary or otherwise. While the current operating performance concept, requires that only recurring items be reported as income and all other nonrecurring and extraordinary revenues, expenses, gains and losses be excluded from income.

2.1.1. Proponents of All-Inclusive Income

According to ARB No. 32, proponents of the all-inclusive income concept argue that annual income statements over the life of an enterprise should, when added together, represent total net income. The proponents believe there is a chance that annual earnings may be manipulated if material extraordinary items are omitted in the determination of income. They also argue that over a period of years, net extraordinary events tend to be negative, and their omission results in indicating a greater earning performance than the corporation actually has. They believe that an income statement prepared on all-inclusive basis is simple to prepare and easy to understand. Further, such a statement is

not affected by judgmental treatment of individual items (ARB No. 32, para. 7; ARB No. 43, Ch. 8, para. 7).

Proponents of the all-inclusive concept argue that comprehensive income measures firm performance better than other summary income measures as it includes all non-owner changes in equity during a period. Financial statements prepared using the all-inclusive concept reveal to a greater extent the underlying earnings strength of the firm, provide investors and creditors with clear insights into the future prospects of the firm and improve the predictive ability of its future earnings and cash flows. For example, the American Accounting Association (AAA) Financial Accounting Standards Committee (1997) argues that analysts' forecasts can be used to value a firm's stock only if it is a forecast of comprehensive income. Moreover, for reported income to be useful for equity valuation, it has to be comprehensive. Excess earnings valuation models (Preinrich, 1938; Peasnell, 1982; Ohlson 1995; Feltham and Ohlson, 1995) also rely on the clean surplus framework to derive the relation between the basic dividend discount model and earnings.

2.1.2. Proponents of Current Operating Performance

Proponents of the current operating performance argue that a substantial number of financial statement users, in particular, equity investors, rely to a great extent on the income statement. Although some users can analyse and eliminate the extraordinary items from income as these tend to distort information for their purposes, many users cannot do so as they do not have the expertise (ARB No. 32, para. 9). Further, it is difficult to determine the amount of information required to provide to unsophisticated

users who can then make a considered classification. Proponents assert that management and auditors can make better decisions as to what are unusual and extraordinary items which, if included in net income, may lead to misleading inferences with respect to operating performance. Proponents maintain that the current year's net income should reflect performance under the current conditions in order to compare performance with prior years and industry (ARB No. 32, para. 9; ARB No. 43, Ch. 8, para. 7).

Proponents of the current operating performance argue that the inclusion of nonrecurring and extraordinary items with core business results lead to significant misinterpretations of an entity's performance. Since these items are transitory in nature, including them with core business earnings increases the volatility and reduces the predictive power of earnings. For example, Black (1993, p. 5) states:

"[i]f we want to maximize the information about value in the earnings figure, and minimize the noise, we can choose accounting rules that make earnings look more like value and less like change in value. In other words, we can choose rules that minimize transitory components of earnings, while leaving the permanent components."

A counter argument is that exclusion of these significant value changes from earnings reduces the quality of earnings and impairs their significance as key inputs for valuation and contracting (Kanagaretnam et al., 2009). Doing so may allow managers to manage earnings opportunistically, which may lead accounting information users to draw misleading inferences (Watts and Zimmerman 1986; AIMR, 1993; Beaver, 1998; O'Hanlon and Pope, 1999).

2.2 Comprehensive Income Reporting

2.2.1 Comprehensive Income Reporting in the US

In December 1980 the FASB introduced the term 'Comprehensive income' in Statement of Financial Accounting Concept No. 3 (SFAC 3): *Elements of Financial Statements of Business Enterprises*, which was superseded by SFAC 6: *Elements of Financial Statements* in 1985. Comprehensive income was defined as:

"Comprehensive income is the change in equity of a business enterprise during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners" (SFAC 3, para. 56; SFAC 6, para. 70).

The broad definition of comprehensive income in the Concepts Statements was consistent with the all-inclusive income concept (Johnson et al., 1995). For instance, to highlight the significance of reporting comprehensive income, FASB states:

"*[T]he sources of comprehensive income are therefore significant to those attempting to use financial statements to help them with investment, credit, and similar decisions about the enterprise, especially since various sources may differ from each other in stability, risk, and predictability. Users' desire for information about those sources underlies the distinctions between revenues, expenses, gains, and losses as well as other components of comprehensive income that result from combining revenues, expenses, gains, and losses in various ways* (SFAC 6, para. 216)."

The board reserved the word "earnings" for an income measure somewhat narrower than comprehensive income (SFAC 3, para. 58), leaving the door open for also reporting an income measure more in keeping with the current operating performance concept (Johnson et al., 1995).

The creation of the all-inclusive term, comprehensive income, results from a desire to incorporate in one final figure all nonowner changes in equity for a period (Robinson, 1991, p. 108). Robinson (1991) argued that the increasing complexity of business, the controversial nature of the items on the FASB's agenda, and the sophistication of the user community all argued for a full, comprehensive income presentation. Sutton and Johnson (1993) urged the creation of a new statement that would link the income statement and the balance sheet. It would accommodate fair value measures in a balance sheet without having to report changes in those fair values in an income statement.

Although the FASB generally adopted the all-inclusive income approach, it did not require the reporting of comprehensive income (Johnson et al., 1995; Cope et al., 1996). The Association for Investment Management and Research (AIMR), one of the largest users of financial statement information, specifically urged that the concept of comprehensive income be put into practice (SFAS 130, para. 40; Johnson et al., 1995). The AIMR (1993) was very sceptical about some of the exceptions that were kept by the FASB in standards that allowed certain items to bypass the income statement and go directly to the equity section of the balance sheet (e.g., SFAS 52: *Foreign Currency Translation* and SFAS 115: *Accounting for Certain Investments in Debt and Equity Securities*). The AIMR (1993) argued that if the FASB adopts the all-inclusive approach as the foundation for reporting all changes in equity in a period from sources other than

transactions with owners, then it should apply the concept consistently in its standards. Allowing certain components of comprehensive income to bypass the income statement and directly reporting them in equity was gradually eroding that foundation. Further, there was no conceptual basis for the board's decisions to bypass the income statement and take certain items directly to equity. Those items were recognized components of comprehensive income and were not included in a statement that reported income or financial performance.

The AIMR (1993) argued that putting an end to such practices would restore a sound conceptual basis to the reporting of components of comprehensive income by reporting them on a basis that is representationally faithful in a statement of income or financial performance. Further, adherence to that conceptual basis would also help in imposing discipline upon the board in making future decisions about the treatment of components of comprehensive income. Another benefit identified for returning to the all-inclusive income concept for reporting comprehensive income was the enhanced transparency of items that were not presently reported in the income statement.

Besides external factors, there was internal motivation for the board to undertake a project on comprehensive income, which stemmed from the board's financial instruments project, particularly the portion dealing with derivatives and hedging (SFAS 130, para. 45; Cope et al., 1996). Many financial instruments were off-balance sheet and as a part of the board's financial instruments project, the board was considering the recognition of some of those in the financial statements (Johnson et al., 1995). The board members publicly favoured the recognition and measurement of financial instruments at fair value and revealed the board's tentative decision in the derivative

and hedging project to recognize and measure all derivative instruments at fair value (SFAS 130, para. 46; Johnson et al., 1995; Cope et al., 1996).

Recognition at fair value would have dramatic effects on the financial statements. Some board members were of the opinion that recognizing and measuring the financial instruments at fair value was essential if the reporting was to be relevant, others believed that to do so would induce volatility in earnings. Reporting of comprehensive income offered a way to reduce the tension (SFAS 130, para. 47; Johnson et al., 1995; Cope et al., 1996).

In response to the concerns raised by financial statements users for the all-inclusive income measure, the FASB issued the Exposure Draft: *Reporting Comprehensive Income* in June 1996. The exposure draft proposed that companies should display all changes in equity other than those resulting from transactions with owners in their capacity as owners in a statement of performance (FASB, 1996). The main aim of the draft was to streamline the flow of components of comprehensive income and make them go through a statement of performance (Smith and Reither, 1996).

The FASB issued SFAS 130, *Reporting Comprehensive Income* in June, 1997. The provisions of this statement were effective for fiscal years beginning after December 15, 1997. SFAS 130 requires the reporting of comprehensive income and its components in the set of primary financial statements. SFAS 130 (para. 39) identifies the items that previously qualified as components of comprehensive income, but bypass the statement of income and are reported in equity. SFAS 130 amends Statements 52, 80, 87, and 115 to require that changes in the balances of items that under those statements are reported

directly in a separate component of equity in a statement of financial position be reported in a financial statement that is displayed as prominently as other financial statements. Other comprehensive income items are classified into foreign currency items, minimum pension liability adjustments and unrealized gains and losses on certain investments in debt and equity securities (SFAS 130, para. 17). The net gain or loss on derivative instruments designated and qualifying as cash flow hedging instruments are also now a part of other comprehensive income (SFAS 133, para. 46).

The exposure draft required a clear display of comprehensive income and its components in a statement of performance (FASB, 1996). In its deliberations leading to the exposure draft, the FASB noted that including comprehensive income and its components in a statement of financial performance was under the all-inclusive income concept (SFAS 130, para. 58). However, the standard SFAS 130 does not specify the statement in which comprehensive income must be displayed (see Appendix 1 for the different presentation formats).[10]

Chambers et al. (2007) note that comprehensive income, as defined by the FASB, is not an all-inclusive income measure. It does not satisfy the clean surplus relation as certain non-owner changes in equity, not specifically mentioned in SFAS 130 and SFAS 133, need not be reported as components of other comprehensive income. For example, Accounting Principle Board (APB) Opinion No. 25: *Accounting for Stock Issued to Employees*, AICPA Statements of Position No. 93-6 (SOP 93-6): *Employers' Accounting for Employee Stock Ownership Plans* and SOP 90-7: *Financial Reporting*

[10] Accounting Standards Update (ASU) No. 2011-05, *Comprehensive Income (Topic 220): Presentation of Comprehensive Income, eliminates the reporting of comprehensive income in the statement of changes in equity (FASB, 2011).* However, the option of a single statement of performance or two statements of performance is retained.

by Entities in Reorganization Under the Bankruptcy Code (SFAS 130, paras. 108-119).

2.2.2 Comprehensive Income Reporting in NZ

In NZ, Financial Reporting Standard No. 2 (FRS 2): *Presentation of Financial Reports*, issued in 1994 (applicable to all financial periods beginning on or after January 1, 1995) made it obligatory to disclose a form of comprehensive income (total recognised revenues and expenses) as part of a separate statement of changes in equity, known as the Statement of Movements in Equity. FRS 7: *Extraordinary Items and Fundamental Errors* (para. 5.1), required all recognised gains and expenses arising in a period, unless required by any reporting standard to be incorporated in the statement of movements in equity, to be reported in net surplus for the period.

On 21 October 2002, the Accounting Standards Review Board (ASRB) proposed that listed issuers in NZ should adopt International Financial Reporting Standards (IFRS). Subsequently, on 19 December 2002, the board announced that adoption of IFRS was to be mandatory for reporting entities in NZ for the periods beginning on or after 1 January 2007. However, the ASRB allowed early adoption for periods beginning on or after 1 January 2005 (Bradbury and Van Zijl, 2006).

At present, NZIAS 1 requires entities to present all items of income and expense recognized in a period either in a single statement of comprehensive income or in two statements (See Appendix 2 for the single or two statement presentation formats). The two statement option requires a statement displaying components of profit or loss (separate income statement) and a second statement beginning with profit or loss and

displaying components of other comprehensive income (statement of comprehensive income).

Figure 1 provides the components of comprehensive income and other comprehensive income as per the relevant US and NZ standards.

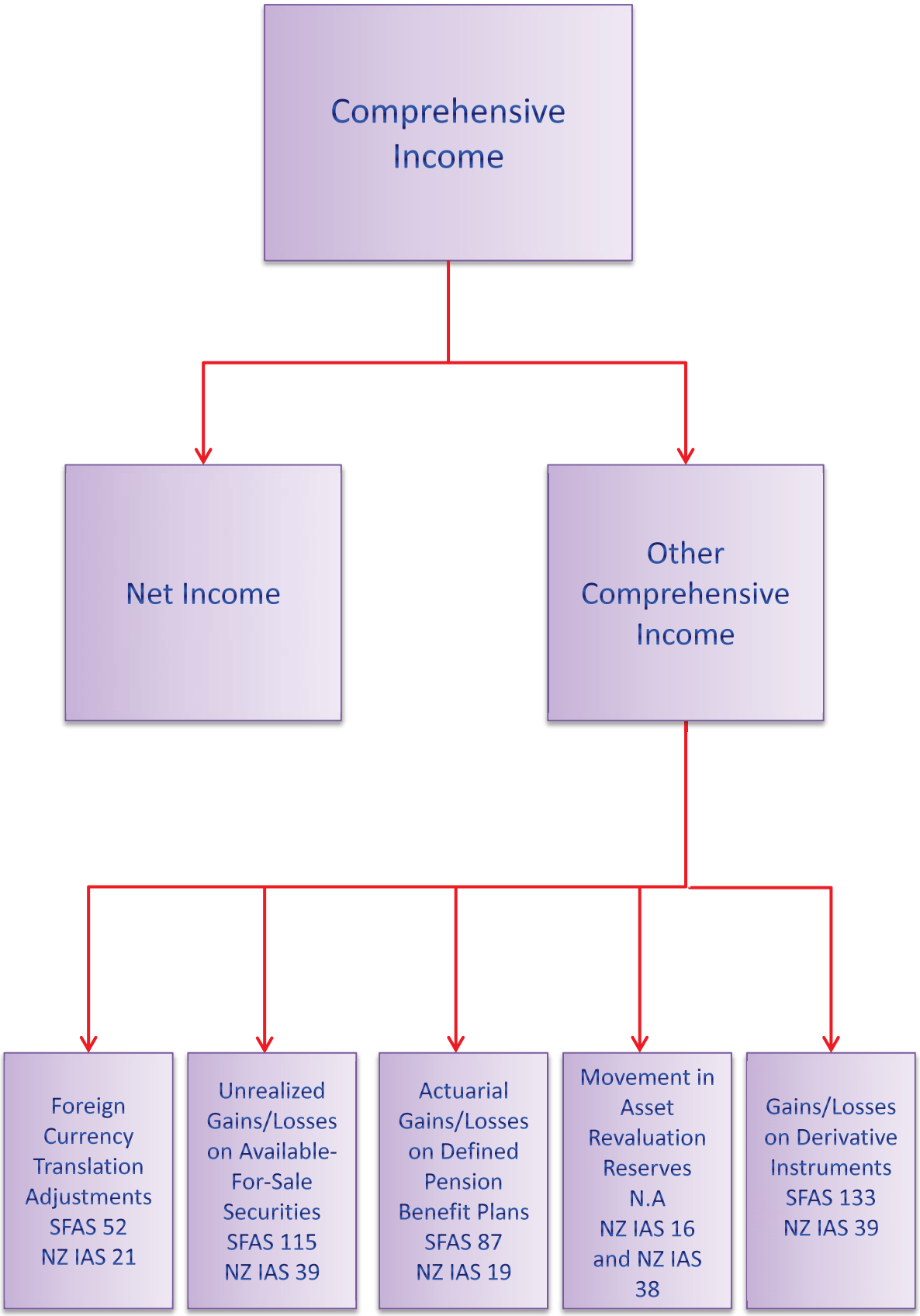
2.3 Chapter Summary

This chapter began with the discussion of a long standing debate in the accounting literature between the all-inclusive and the current operating performance concepts of reporting income. The chapter presents the arguments proposed by the proponents of the two concepts. The next section of the chapter presents some detail about the reporting of comprehensive income in the US and NZ.

The next chapter surveys the literature regarding comprehensive income volatility and its risk relevance. Various studies are examined to support the research questions to be investigated in this thesis.

Figure 1

Components of Comprehensive Income



CHAPTER 3: COMPREHENSIVE INCOME VOLATILITY AND RISK RELEVANCE

3.1 Prior Research on Comprehensive Income Volatility

Pressure on standard setters for the reporting of comprehensive income has come from both internal and external motivations (Johnson et al., 1995). The internal motivation arises from the boards' financial instruments project. To ease tension over the concerns that fair value increases the volatility of income, both the IASB and FASB have allowed price changes of certain financial instruments (e.g., available-for-sale securities and cash flow hedges) to bypass the income statement. However, there is concern that dirty surplus items are important to the assessment of financial performance and financial position and that the complexity of reporting financial instruments can be reduced by a single statement of performance.[11] External motivation arises because a major financial analyst association supports the reporting of comprehensive income in a single statement (AIMR, 1993; CFA, 2007).

Opponents of comprehensive income argue that it will be looked at to the detriment of other performance measures. Opponents of comprehensive income state that the volatility inherent in the components of comprehensive income will cause an increased perception of the firm's risk. Respondents to the exposure draft (FASB, 1996) argue that items identified as other comprehensive income are not performance related and including them in a performance statement would be confusing and misleading (SFAS 130, para. 60). Further, comprehensive income is volatile from period to period and this

[11] See the dissenting opinion in IAS 1 *Presentation of Financial Statements* (2007).

volatility is related to market forces beyond management control. Thirty four per cent of comment letters on the exposure draft argue that comprehensive income would be more volatile than net income, resulting from unrealized market fluctuations, which might not be representative of an entity's underlying performance (Yen et al., 2007). While large banks and insurance companies are the main complainants, 36 per cent of comment letters from the non-financial sector also negatively comment on excess volatility, and 8 per cent claim this volatility may misrepresent economic performance.

The perception of increased volatility is an important issue because it implies a perception of increased risk. Trueman and Titman (1988) argue that income smoothing allows firms to reduce perceived earnings volatility to obtain cheaper debt financing. Ronen and Saden (1981) argue that income smoothing is potentially useful as it allows managers to signal private information about the level and persistence of future earnings, without having to reveal proprietary information. Furthermore, entities suggest they will change their operations to reduce reported volatility if a single statement of comprehensive income is mandatory (Yen et al., 2007).

Barth et al. (1995) find for a sample of 137 banks over the period 1971 and 1990 that fair value based earnings are more volatile than historical cost based earnings. Hodder et al. (2006), for a sample of 202 US banks, find that the volatility of their constructed measure; full-fair-value income, is more than three times that of comprehensive income and more than five times that of net income.[12] Bamber et al. (2010) examine whether the perceived volatility of the firm's performance is associated with accounting choice. Specifically, they employ indicator variables to capture high/low reporting of various

[12] They compute their full-fair-value income by adjusting comprehensive income for unrealized gains and losses for held-to-maturity investment securities, loans, term deposits, long term financial liabilities and off derivatives.

other comprehensive income components, among other variables, to explain why comprehensive income is reported in a performance statement or a statement of change in equity. In cross-sectional descriptive statistics they show that 72.5 per cent of their sample has greater standard deviation of comprehensive income compared to net income. Hence, the volatility of comprehensive income is an important issue in resolving the decision of whether to report a single statement on comprehensive income.

Prior research investigating the volatility of comprehensive income and fair value changes focuses on financial firms and banks (Barth et al., 1995 and Hodder et al., 2006). This thesis contributes to the literature by providing evidence from a sample of non-financial firms. The first specific research question of this thesis follows:

RQ1: Is comprehensive income more volatile than net income?

3.2 Prior Research on Risk Relevance of Comprehensive Income

3.2.1 Income Volatility Measures and Market Risk Measures

The seminal paper of Beaver et al. (1970) associates accounting risk measures with risk as defined in portfolio theory. It argues that the portfolio theory specifies its risk measures solely in terms of market determined interactions (i.e., security price variables). However, a significant issue for the accounting profession is to understand the relation between accounting determined and market determined measures of risk. Beaver et al. (1970) argue that the understanding of these relations has implications for the evaluation of specific accounting measurement controversies: First, where several

accounting measures are reported, which alternative has the highest degree of association with market risk measures? Second, whether market risk measures adjust for differences in reporting methods across firms and for changes in reporting methods over time. Third, whether are there measurement controversies when a non-reported measurement alternative (e.g., the capitalization of leases) produces accounting risk measures with a higher degree of association with market risk measure?

Beaver et al. (1970) show that accounting risk measures can be viewed as surrogates for the total variability of return of a firm's common equity securities. Thus, the accounting measures reflect both the systematic and firm specific (unsystematic or idiosyncratic) risk components.[13] They regress beta on seven accounting variables (dividend payout, asset growth, financial leverage, asset size, current ratio, earnings variability and accounting beta) and find a high degree of contemporaneous association. Earnings variability seems to have the most significant relation with beta.

Other studies subsequently investigate the relation between market risk and accounting risk measures, by incorporating additional and different accounting measures of risk (e.g., Rosenberg and Mckibben, 1973; Lev, 1974). Rosenberg and Mckibben (1973) show that predictions of the probability distribution of returns can be based on accounting data of the firm and also on the previous history of stock returns. They use beta and the firm specific risk as parameters of the probability distribution of returns. They find, consistent with Beaver et al. (1970), that earnings variability is the most significant accounting variable in explaining risk. Rosenberg and Mckibben (1973) include measures of operating leverage in their analysis and find it to be insignificant.

[13] Systematic risk is the portion of the variance of firm's returns that is common to the market and cannot be diversified while unsystematic or idiosyncratic risk affects a very small number of assets and can be almost eliminated with diversification. Total risk includes both systematic and idiosyncratic components.

Lev (1974) shows that operating leverage is significant. In a comprehensive survey of risk and accounting variables research, Ryan (1997) finds that earnings variability has historically been the accounting variable most strongly related to systematic equity risk. Though he specifically looks at research that regresses beta on accounting variables, he mentions that the results of these studies are similar to a parallel literature (e.g., Rosenberg and Mckibben, 1973; Lev, 1974; Lev and Kunitzky, 1974) that regresses total returns variance on accounting variables (Ryan, 1997, p. 88).

Chambers et al. (2007) state that other comprehensive income consists largely of unrealized gains and losses relating to investments, foreign currency fluctuations and derivative hedges, generally classified as transitory items of income. Respondents to the exposure draft (FASB, 1996) argue that other comprehensive income items are transitory and including them with core earnings will make comprehensive income more volatile from period to period and the volatility will be induced by market forces that are beyond managerial control (SFAS 130, para. 60).

Other comprehensive income items are the result of changes in interest rates, exchange rates and other random walk processes (Smithson et al., 1995). Generally, the changes in fair values of certain assets and liabilities that an entity owns, lead to the creation of other comprehensive income items (Cheng and Lin, 2008). For example, changes in the fair value of available-for-sale securities create unrealized holding gains or losses. As assets and liabilities are held and not disposed, their fair values are affected by market fluctuations and not by operations of the business. Further, the changes in these fair values are unrealized, which have no immediate effect on cash flows but may contain information about the changes in the entity's fundamental risk and future cash flows.

Prior studies focusing on the banking sector (e.g., Jones et al., 1991; Bernard et al., 1995; Barth et al., 1995; Hodder et al., 2006) show that fair value accounting increases earnings variability.

If other comprehensive income items are transitory (or result from fair value accounting), then they will induce volatility in comprehensive income. An important question is whether this increased variability in comprehensive income aids risk assessment. Research does not provide direct evidence whether the increased variability associated with fair values translates into better risk assessments (Ryan, 1997). A recent study addressing this issue is Hodder et al. (2006), which examines the risk relevance of the standard deviation of three performance measures (net income, comprehensive income and a constructed full-fair-value income measure) for 202 US commercial banks from 1996 to 2004. They find their constructed measure reflects elements of risk not captured by volatility of net income or comprehensive income.

The risk relevance of comprehensive income is also an important issue in determining the usefulness of comprehensive income compared to net income. Hodder et al. (2006) provide evidence on the risk relevance of comprehensive income from US banks. This thesis contributes to the literature by providing evidence on the risk relevance of comprehensive income from a sample of US and non-US non-financial firms. The second specific research question is:

RQ2: Is the incremental volatility of comprehensive income (over the volatility of net income) associated with market risk?

3.2.2 Pricing of Income Volatility Measures

Jensen (1969) argues that investors are generally averse to risk and prefer, *ceteris paribus,* more certain to less certain income streams. He argues that investors will only accept additional risk if they are compensated for it in the form of higher expected future returns. Hence, a risky portfolio must offer a higher return than a less risky portfolio or it will not be held. This higher expected return, the equity risk premium, is the excess of the expected return on the stock market over the risk free rate and lies at the core of financial economics (Claus and Thomas, 2001).

Prior research (e.g., Litzenberger and Rao, 1971; Collins and Kothari, 1989; Easton and Zmijewski, 1989) shows that share prices reflect a risk premium associated with earnings variability. Litzenberger and Rao (1971) using a sample of 87 electric utility companies, show that investors are risk averse and the relation between the required rate of return and the standard deviation of profitability is approximately linear. Collins and Kothari (1989) show that the stock price change associated with a given unexpected earnings change, the earnings response coefficient, varies cross-sectionally and temporally. They predict and find the earnings response coefficient to be a function of riskless interest rates and the riskiness, growth and/or persistence of earnings.

Similarly, Easton and Zmijewski (1989) show that cross-sectional variation in earnings response coefficients is predictable. They argue that valuation models relating earnings to security prices predict that earnings response coefficients are positively associated with revision coefficients (coefficients relating current earnings to future earnings) and negatively associated with expected rates of return. Easton and Zmijewski (1989) use a

random coefficient regression model and provide evidence that is consistent with these predictions.

Although SFAS 115 applies to all entities, Barth et al. (1995) report that bank managers are the most outspoken critics. They report that during the FASB's public hearings, banks' representatives asserted that earnings based on fair values for investment securities are likely to be more volatile than those based on historical cost. The banks' representatives argued that financial statement users will be misled by fair value accounting as the increased volatility is not reflective of the underlying economic volatility of banks operations. As a result, investors will make inefficient capital allocation decisions, thus raising the cost of capital. Similar arguments are observed when the FASB issued the Exposure Draft: *Comprehensive Income Reporting* (SFAS 130, para. 60). More recently, respondents to the FASB/IASB discussion paper also argue that requiring a single statement of comprehensive income will confuse users and lead to significant misinterpretations of an entity's performance (IASB, 2009, para. 40).

Barth et al. (1995) examine whether the market prices the incremental volatility of fair value based earnings beyond historical cost based earnings for a sample of US banks. They find that share prices do not reflect the incremental volatility. They believe this finding could be the result of incomplete measurement of fair value in income as banks do not fully disclose unrealized fair value gains and losses from all financial instruments. Similarly, Hodder et al. (2006) argue that comprehensive income disclosure does not fully represent full-fair-value financial performance as many assets and liabilities are not valued at fair values. Using a residual income valuation model, they predict and find that the incremental volatility in their constructed measure of full-

fair-value income negatively moderates the relation between abnormal earnings and share prices. Further, the incremental volatility of full-fair-value income positively affected the expected return implicit in bank share prices.

The pricing of incremental volatility of comprehensive income will depend on whether investors view comprehensive income volatility as a better proxy for market risk than net income volatility. If the incremental volatility of comprehensive income is priced, this suggests investors will require higher returns, resulting in a higher cost of equity for firms. Prior studies investigating the pricing of risk or comprehensive income volatility primarily focus on fair values in the banking sector (e.g., Barth et al., 1995; Hodder et al., 2006). This thesis explores the pricing of comprehensive income volatility for non-financial US and non-US firms.[14] The third specific research question is:

RQ3: Is the incremental volatility of comprehensive income capitalized into share prices?

3.3 Chapter Summary

This chapter provides an overview of the prior literature relating to the volatility and risk relevance of different income measures. This overview reveals that most of the research related to the volatility and risk relevance of comprehensive income examines the risk implication of fair value accounting in the banking industry (e.g., Barth, 1994; Barth et al., 1996; Hodder et al., 2006). However, there is lack of empirical evidence on

[14] However, due to the lack of access to forecast data (e.g., I/B/E/S) this thesis does not explore the effect of comprehensive income volatility on cost of equity.

the volatility and risk relevance of comprehensive income in the non-financial sector. This lack of evidence provides the opportunity to examine the specific research questions identified in this chapter regarding the volatility and risk relevance of comprehensive income for the non-financial sector.

The next chapter explains the sample selection procedures and the methods used to investigate the research questions identified in this chapter.

CHAPTER 4: SAMPLE, RESEARCH METHODS AND RESULTS FOR THE VOLATILITY STUDY

4.1 Sample

4.1.1 US Sample

This thesis examines the volatility of comprehensive income for non-financial firms. Accounting data and other variables for the 6,479 US non-financial companies are obtained from Computstat for the period 2004 to 2010. The start year is 2004 as Compustat reports data for other comprehensive income components from this date. Due to the frequency of missing observations, the year 2004 is excluded. To be included in the sample, firms are required to have no missing observations for the required variables over the period 2005 to 2010. This criterion is required to ensure sufficient observations to measure volatility.

As each research question has different data requirements, the sample changes for each test. Table 1 describes the data requirements for each test and the number of firms sampled. For the first research question, a subset of 2,545 firms with no missing observations for the required variables is obtained. The data for income measures are winsorized by two per cent top and fifteen per cent bottom due to extreme outliers. The bottom winsorization is higher as there are few firms with large losses over the sample period, which affects the overall means for the income measures. The final sample has 15,270 firm-year observations.

Table 1

United States: Sample Determination

Data requirements and sample selection for the period 2005-2010

Total number of non-financial firms with data available on Compustat	6,479
Sample selection for research question one	
Data for NI, CI, OCI and MVE with no missing observations	
Sample for research question one - comparison of relative income volatility	2,545
Sample selection for research question two	
Data for NI, CI, SR, DTE, OCF, CL and MVE with no missing observations	
Sample for research question two - tests of association between income volatility measures and volatility of stock returns	2,646
Test of association between income volatility measures and beta	
Data for NI, CI, Beta, DTE, OCF, CL and MVE with no missing observations	
Sample for research question two - tests of association between income volatility measures and beta	2,519
Sample selection for research question three	
Data for NI, CI, P, SO, BPS and MVE with no missing observations	
Sample for research question three - tests of pricing of income volatility measures	2,580

NI is annual net income, CI is annual comprehensive income, OCI is other comprehensive income components, MVE is market value of equity at the end of the fiscal year, SR is annualised stock returns, DTE is debt-to-equity ratio, OCF is operating cash flows, CL is current liabilities, P is the actual fiscal year-end closing stock price, SO is number of shares outstanding and BPS is book value per share at the end of the fiscal year.

For the second research question, a subset of 2,646 firms with no missing observations is obtained. Due to extreme observations in the variables, the data for all variables are winsorized by two per cent top and bottom. The final sample consists of 15,876 firm-year observations. Missing betas reduces this set of observations, for part of the tests, to 2,519 firms. The final sample for tests with beta comprises 15,114 firm-year observations. For the third research question, a subset of 2,580 firms with no missing observations is obtained. The data for all variables are then winsorized by five per cent top and bottom in order to remove the effects of outliers. The final sample has 15,480 firm-year observations.

4.1.2 NZ Sample

The NZ sample is drawn from the 151 listed firms on the New Zealand Stock Exchange (NZX) as of 10/05/2011. Out of 151 firms, 127 are listed on the New Zealand Stock Market (NZSX) and 24 are listed on New Zealand Alternative Market (NZAX). A total of 12 finance and equity trust funds firms are excluded as they have different capital structures, are subject to regulatory prudential supervision and have specific financial reporting requirements. In addition, financial firms hold large amounts of financial instruments for purposes that differ from other corporate firms. Firms are also required to have data from 2001 to 2010. However, due to the lesser number of firms (71) having data for the required period, the time window is reduced by two years to 2003-2010. Dropping two years data serves as a trade-off between a larger sample and having sufficient observations to measure volatility. The final sample comprises a total of 92 firms. Table 2 reports the outcome of the sample selection procedures.

Table 2

New Zealand: Sample Determination

Effects of sample selection criteria

Number of firms listed on NZSX at 10/05/2011	127
Number of firms listed on NZAX at 10/05/2011	24
Total number of firms listed on NZX at 10/05/2011	151
Number of finance, equity trusts and funds firms excluded	(12)
Number of firms with missing data excluded	(47)
Final sample with no missing data 2003-2010	92

Data for annual net income, other comprehensive income and comprehensive income are hand-collected from annual financial statements, which are downloaded from the NZX Deep Archive database. Data is extracted from the statement of total recognised revenues and expenses and statement of movements in equity as required by FRS 2: *Presentation of Financial Reports* and statement of comprehensive income required by NZ IAS 1. The 1994 *Interpretation of FRS 2* requires disclosure of total recognised revenues and expenses, which this thesis labels as "comprehensive income". Firms with fiscal years that begin on or after 1 January 2009 are required by NZ IAS 1 to disclose comprehensive income either in a single statement or in two statements, an income statement and a statement of comprehensive income. Data for other related variables such as beta, market value of equity, book value of equity, shares outstanding, dividends, book-to-market ratio, debt to equity ratio and stock price are downloaded from DataStream International.

There are two advantages of using New Zealand data. First, New Zealand (pre-IFRS) local standards are reasonably close to IFRS. New Zealand became an associate member of the IASC in 1974, and its first accounting standard of the newly established series carried the IASC crest (Bradbury 1998).

Second, the revaluation of non-current assets is common in New Zealand. Hence, this thesis examines the volatility of comprehensive income including and excluding asset revaluations. IAS 16: *Property, Plant and Equipment* and FRS 3: *Accounting for Property, Plant and Equipment* both allow voluntary revaluation and account for this in a similar manner. As an alternative measure, comprehensive income is adjusted for the asset revaluations flowing through other comprehensive income and is termed 'Adjusted Comprehensive Income'.

4.2 Research Methods and Results

The tests corresponding to the three research questions along with results are discussed in this section.

4.2.1 Tests and Results for US Sample

Table 3 provides descriptive statistics of net income, comprehensive income and the components of other comprehensive income. All variables are scaled by the opening market value of equity.[15] Panel A contains descriptive statistics of the sample of 15,270

[15] The lagged market value of equity is used because it represents the investment base of the security at

firm-year observations for the period 2005–2010. Panel B reports the mean income measures and other comprehensive income components for each year 2005–2010.

Panel A shows that the pooled sample mean (median) of net income is 0.017 (0.038) and of comprehensive income is 0.016 (0.036). The two-sample *t-test* and the Mann-Whitney test are conducted to test whether the mean (median) differ statistically. The results (not tabulated) show that the pooled sample mean (median) are statistically indistinguishable. The mean and median values of other comprehensive income (-0.001 and 0.000, respectively) are also tested if they statistically differ from zero. The results (not tabulated) show both the mean and median are significantly different from zero.[16] Foreign currency adjustments and employee pension benefits are the major components of other comprehensive income.[17]

the beginning of the period (Beaver et al., 1970).

[16] To test whether the mean and median for OCI differ from zero, the one-sample *t-test* and one-sample sign test are used.

[17] The means and medians for other comprehensive income components are significantly different from zero (results not tabulated).

Table 3

US Sample: Descriptive Statistics of Income Measures and Other Comprehensive Income Components

Panel A: Descriptive statistics of the sample of 2,545 firms with complete data over 2005-2010, pooled across firms and years (n=15,270).
The income measures are in bold and the other comprehensive income components are in normal font. Each variable is scaled by the opening market value of equity.

Variable	Mean	Std.Dev	Min	1ST Quart	Median	3rd Quart	Max
NI	**0.017**	**0.125**	**-0.349**	**-0.052**	**0.038**	**0.070**	**0.896**
FCT	0.001	0.022	-0.223	0.000	0.000	0.001	0.199
DGL	0.000	0.007	-0.043	0.000	0.000	0.000	0.094
EPB	-0.002	0.017	-0.207	0.000	0.000	0.000	0.107
SGL	0.000	0.004	-0.036	0.000	0.000	0.000	0.057
Other	0.000	0.000	-0.002	0.000	0.000	0.000	0.004
OCI	-0.001	0.041	-0.406	-0.002	0.000	0.003	0.352
CI	**0.016**	**0.132**	**-0.377**	**-0.057**	**0.036**	**0.072**	**0.913**

Panel B: Annual means of the sample of 2,545 firms with complete data over 2005-2010, by year. The income measures are in bold and the other comprehensive income components are in normal font. Each variable is scaled by the opening market value of equity.

Variable	2005	2006	2007	2008	2009	2010
NI	**0.034**	**0.037**	**0.032**	**-0.007**	**-0.030**	**0.036**
FCT	**-0.002**	**0.003**	**0.006**	**-0.005**	**0.001**	**0.001**
DGL	0.000	0.000	-0.001	-0.001	0.002	0.000
EPB	-0.001	0.001	0.002	-0.007	-0.003	-0.001
SGL	0.000	0.000	0.000	-0.001	0.002	0.000
Other	0.000	0.000	0.000	0.000	0.000	0.000
OCI	-0.004	0.006	0.008	-0.015	0.000	0.000
CI	**0.030**	**0.042**	**0.040**	**-0.019**	**-0.032**	**0.036**

NI denotes Net Income, FCT denotes Foreign Currency Translation Adjustments, DGL denotes Derivatives Gains/Losses, EPB denotes Employee Pension Benefits, SGL denotes Securities Gains/Losses, Other denotes any other adjustments to arrive at comprehensive income, OCI denotes total other comprehensive income and CI denotes Comprehensive Income.

The most striking feature of Table 3 is that the inter-quartile range for the components of other comprehensive income is zero.[18] This indicates that over the sample period the frequency of other comprehensive income is low. Furthermore, the minimum and maximum amounts suggest that while the frequency is low the impact (relative to net income) is material. The existence of irregular, but material, components of other comprehensive income is consistent with concerns that the volatility of comprehensive income will be greater than net income. The annual means in Panel B show that comprehensive income is lower than net income in the year 2005, 2008 and 2009. The annual means of foreign currency translation adjustments and employee pension benefits show that these are the major components of other comprehensive income.

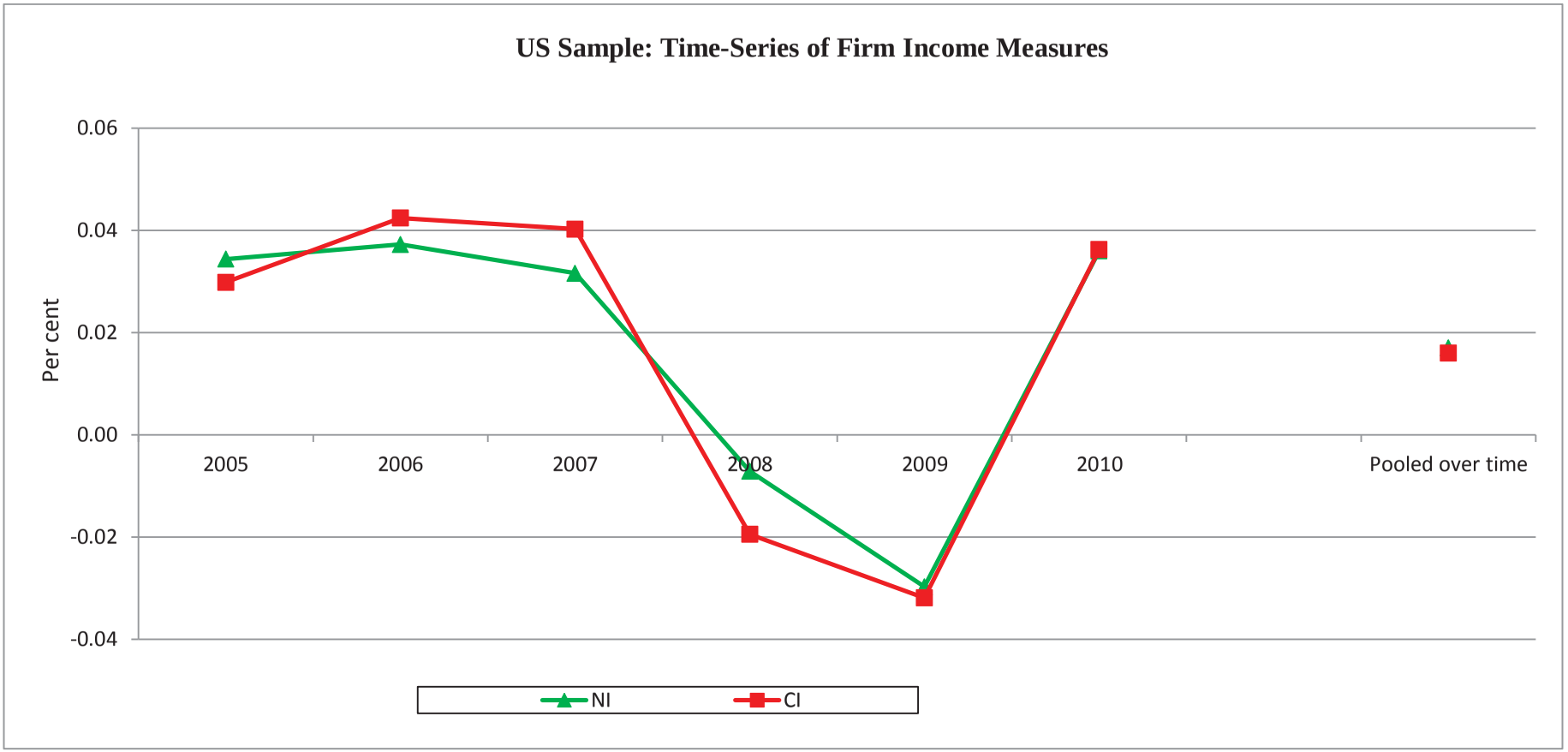
The mean net income and comprehensive income for the sample of firms each year and pooled across time, are graphically depicted in Figure 2. The trend of comprehensive income is greater than net income over 2006-2007 and lower in the years 2008-2009. The pooled sample means of the two income measures are statistically the same.

4.2.1.1 Volatility of Income Measures for US Sample

Panel A of Table 4 provides descriptive statistics of the income volatility measures, scaled by the opening value of equity, for the 2,545 sample firms over the period 2005-2010. The mean standard deviation of net income is 0.082 and comprehensive income is 0.091.

18 This is not due to scaling because the effect exists in the raw data.

Figure 2



NI = Cross-sectional mean net income scaled by opening market value of equity;
CI = Cross-sectional mean comprehensive income scaled by opening market value of equity; and
n = 2,545.

Table 4

US Sample: Descriptive Statistics and Comparative Analyses of Measures of Income Volatility

Panel A: Descriptive statistics of firm-specific measures of income volatility (i.e., standard deviation) over the period 2005-2010.

Variable	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
σ_{NI}	0.082	0.073	0.002	0.025	0.060	0.118	0.430
σ_{CI}	0.091	0.076	0.002	0.031	0.070	0.131	0.439

Panel B: Descriptive statistics of standard deviation ratio: standard deviation of comprehensive income / standard deviation of net income (σ_{CI}/ σ_{NI})

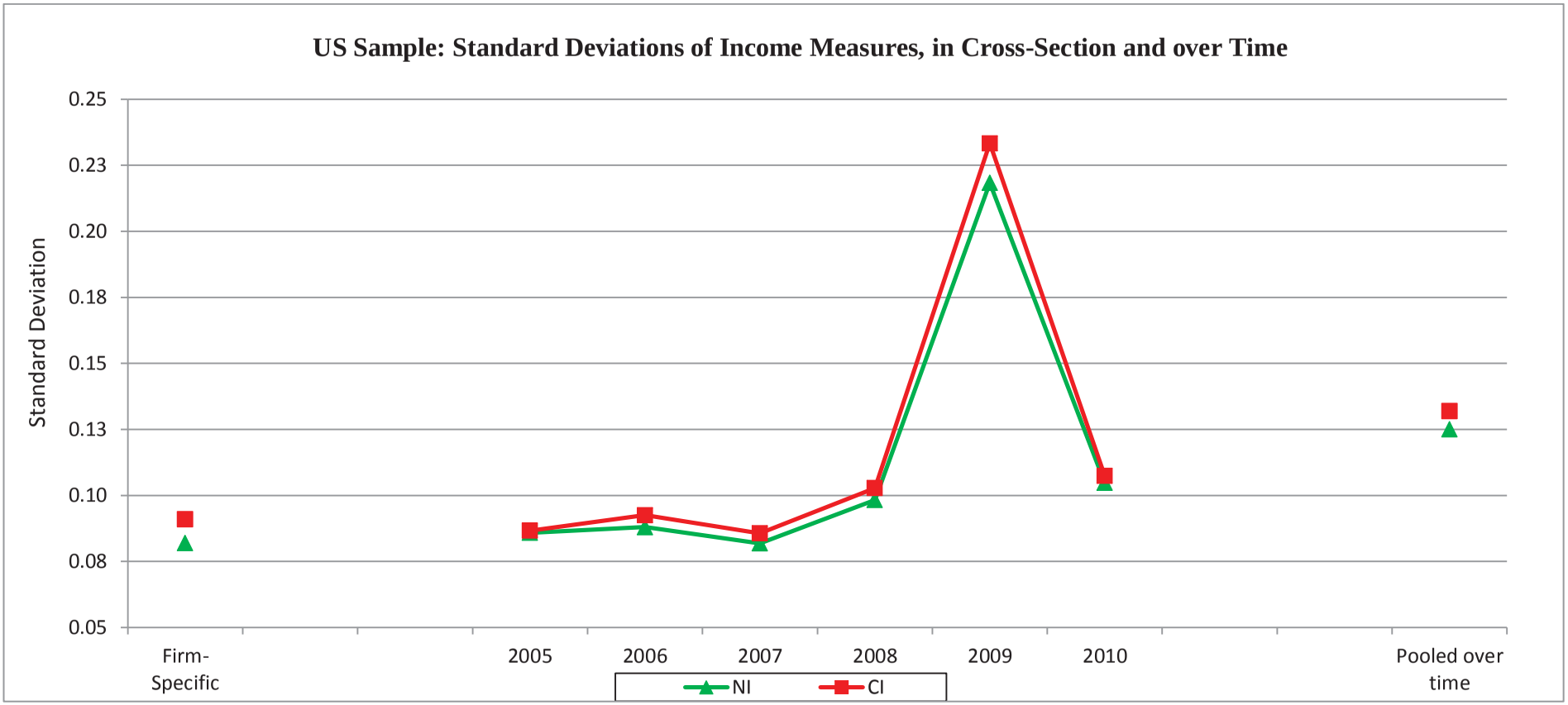
Variable	Mean	Std. Dev	Min	1ST Quart	Median	3rd Quart	Max
$\sigma_{CI} / \sigma_{NI}$	1.251	0.727	0.206	1.000	1.050	1.148	11.294

Panel C: Statistical comparisons and test of median for the ratio (σ_{CI}/ σ_{NI})

Comparisons	Count	Per cent
$\sigma_{CI}/ \sigma_{NI} >1$	1886	74.1
$\sigma_{CI}/ \sigma_{NI} =1$	0	0
$\sigma_{CI}/ \sigma_{NI} <1$	659	25.9
Wilcoxon-Signed Rank Test:		
P-Value (One-tailed)	0.000	
Estimated Median	1.068	

σ_{NI} denotes firm-specific standard deviation of net income scaled by the opening market value of equity each year over the period 2005-2010;
σ_{CI} denotes firm-specific standard deviation of comprehensive income scaled by the opening market value of equity each year over the period 2005-2010; and
n = 2,545 firms.

Figure 3



This figure reflects the standard deviations of net income (NI) and comprehensive income (CI), scaled by the opening market value of equity and computed over the sample period of 2005-2010. The left side of the figure reflects the means of the firm-specific standard deviations while the remainder of the figure represent the cross-sectional average standard deviations in each sample year and pooled over all sample years.
n = 2,545.

Figure 3 graphically depicts the volatility of income measures, in cross-section and over time. To the left of the Figure are the means of the firm-specific income volatility measures (from Table 4, Panel A). The right of the Figure shows the pooled cross-sectional means of income volatility measures (from Table 3, Panel A) and the middle shows the annual cross-sectional means of income volatility measures (from Table 3, Panel B). The firm-specific and pooled cross-sectional volatility of comprehensive income is greater than net income. The volatility of comprehensive income in each year, 2005 through 2010, is also greater than net income.

To assess the relative volatility of comprehensive income compared to net income, the standard deviation ratio (i.e., the standard deviation of comprehensive income / standard deviation of net income) is estimated. Panel B of Table 4 provides descriptive statistics of the standard deviation ratio. The mean standard deviation ratio of comprehensive income to net income indicates that comprehensive income is 25 per cent more volatile than net income. However, this volatility is the result of an extreme outlier. The median value is 1.050.

Panel C of Table 4 shows that comprehensive income volatility is greater than net income volatility for 1886 observations (74.1 per cent) and lower for 659 observations (25.9 per cent). There are no observations where the volatilities of the two income measures are the same. This shows that all sample firms report other comprehensive income components. The different mean and median for the ratio suggests the use of non-parametric statistics. Therefore, the Wilcoxon-signed rank test is used to test if the median is statistically greater than 1. The result (Panel C) shows that the volatility of comprehensive income is significantly greater than the volatility of net income.

Unwinsorized data were also used to examine volatility and the results still hold (see Appendix 3).

4.2.1.2 Association between Income Volatility Measures and Market-Based Risk Measures for US Sample

To determine whether the volatility of the two income measures captures market-based risk factors, this thesis assesses the association of income volatility measures with market-based risk measures (i.e., volatility of stock returns and beta). The correlation between the income volatility measures and two measures of market-based risk is estimated. A correlation between the income volatility measures and risk measures will be positive if it captures elements of market-based risks. Further, income volatility measures that are more complete measures of market risk should have higher correlations with market-based risk measures.

Volatility of the two income measures (scaled by the opening market value of equity) is estimated using the standard deviation calculated over the period 2005-2010. The volatility of stock returns is used as a proxy for total risk and beta is used as a proxy for systematic risk. To estimate the volatility of stock returns, the standard deviation of annual raw returns is computed over the period 2005-2010.

To control for the impact of other accounting variables on market risk, two accounting-based risk measures: debt-to-equity and operating cash flow-to-current liabilities ratios are included. These accounting measures are estimated each year and averaged over the same period that earnings volatility is measured. The selection of accounting variables

is based on prior research that has examined the relation between accounting-based risk measures and beta (e.g., Beaver et al., 1970; Hamada, 1972; Bowman, 1979; Goh and Emanuel, 1981).

Modigliani and Miller (1958) show that with the introduction of debt, the earnings stream attributable to common stockholders becomes more volatile. Hamada (1972) shows that systematic risk is positively correlated with leverage. Bowman (1979) provides the theoretical relation between a firm's systematic risk and its leverage. Therefore, the leverage ratio can be used as a measure of risk induced by the capital structure (Beaver et al., 1970). The debt-to-equity ratio is used as a proxy for default risk. Beaver et al. (1970) argue that liquid or current assets have a less volatile return than noncurrent assets.[19] Hence, the liquidity ratio is used as a proxy for liquidity risk. The operating cash flow-to-current liabilities ratio is computed to measure liquidity.

Table 5, Panel A contains descriptive statistics of the market-based risk measures and the accounting-based risk measures. The mean (median) volatility of stock returns (σ_{SR}) is 0.648 (0.473). The mean (median) beta is 1.387 (1.290), which is statistically greater than the market-wide average of 1.[20] The high mean (median) beta suggests the sample firms have, on average, more systematic risk than the market over the sample period. The mean debt-to-equity ratio (DTE) is 0.421, however, the median of 0.179 shows that the mean is driven by outliers. The mean (median) operating cash flow-to-current liabilities ratio (CF) is 0.348 (0.400).

[19] Beaver et al. (1970) believe the differential riskiness among firms is better explained by the differential riskiness in their noncurrent assets than it is by the fraction of noncurrent assets they hold.
[20] The one-sample *t-test* and one-sample sign test are used to test whether the mean and median beta are greater than 1.

Table 5

US Sample: Descriptive Statistics and Correlation Matrix of Market-Based Risk Measures and Accounting-Based Risk Measures

Panel A: Descriptive statistics of the market-based risk measures and accounting-based risk measures across sample firms with complete financial statement information for the period 2005-2010. (n= 2,646 firms for all the variables except for Beta, where n= 2,519)

Variables	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
σ_{SR}	0.648	0.566	0.131	0.309	0.473	0.759	3.130
Beta	1.387	0.686	0.333	0.885	1.290	1.763	3.410
DTE	0.421	1.021	-2.526	0.002	0.179	0.598	4.750
CF	0.348	1.368	-4.263	0.130	0.400	0.732	5.805

Panel B: Pearson (above diagonal) and Spearman (below diagonal) correlations among and between the income volatility measures, market-based risk measures and accounting-based risk measures across firms with complete financial statement information for the period 2005-2010.
(n= 2,646 firms for all the variables except for Beta, where n= 2,519)

	σ_{NI}	σ_{CI}	σ_{SR}	Beta	DTE	CF
σ_{NI}		0.988***	0.456***	0.275***	-0.044**	-0.210***
σ_{CI}	0.965***		0.456***	0.271***	-0.037*	-0.206***
σ_{SR}	0.576***	0.544***		0.366***	-0.043**	-0.189***
Beta	0.415***	0.392***	0.482***		-0.056***	-0.152***
DTE	-0.116***	-0.071***	-0.169***	-0.131***		0.115***
CF	-0.454***	-0.457***	-0.291***	-0.232***	0.196***	

(Continued on next page)

Table 5 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.
σ_{SR} denotes firm-specific standard deviation of average annual stock returns, measured over the period 2005-2010.
Beta denotes a firm's beta and is calculated for a 5-year (60 months) time period, obtained from Compustat over the period 2005-2010.
σ_{NI} and σ_{CI} denote firm-specific standard deviation of annual net income and comprehensive income, scaled by the opening market value of equity. The standard deviations are measured over the period 2005-2010.
DTE denotes the debt-to-equity ratio, measured over the period 2005-2010.
CF denotes the operating cash flow-to-current liabilities ratio. This ratio is measured over the period 2005-2010.

Table 5, Panel B reports Pearson and Spearman correlation statistics among the two income volatility measures, market-based risk measures and the accounting-based risk measures pooled across the years 2005-2010. The income volatility measures exhibit positive and significant correlation with the standard deviation of stock returns and beta, suggesting they capture risk factors that relate to market-based risk measures.

The correlation between the market-based risk measures and the debt-to-equity ratio is negative, which is not consistent with prior research. The correlation between the market-based risk measures and the operating cash flow-to-current liabilities ratio is negative and significant.

To find whether the two income volatility measures provide any incremental risk relevant information, two tests are conducted. First, I examine whether the two income volatility measures provide any risk relevant information beyond the accounting-based risk measures. Second, whether the incremental volatility of comprehensive income provides any risk relevant information beyond the volatility of net income while controlling for debt-to-equity and operating cash flow-to-current liabilities ratios.

This thesis adopts the Hodder et al. (2006) model and denotes each risk measure as a market risk proxy (MRP). The following regression models are estimated through a pooled regression over the period 2005-2010:

$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \varepsilon_j \quad (1)$$

$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{CIj} + \varepsilon_j \quad (2)$$

$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \alpha_4 (\sigma_{CIj} - \sigma_{NIj}) + \varepsilon_j \quad (3)$$

DTE denotes the debt-to-equity ratio for firm j; CF denotes the operating cash flow-to-current liabilities ratio for firm j; σ_{NI} denotes the standard deviation of net income for firm j, and σ_{CI} denotes the standard deviation of comprehensive income for firm j. Models (1) and (2) test if either of the income volatility measures provide risk relevant information beyond the debt-to-equity ratio and the operating cash flow-to-current liabilities ratio. If so, then α_3 should be positive and significant. Model (3) is used to test whether the incremental volatility of comprehensive income provides any risk relevant information beyond the volatility of net income. If so, then α_4 should be positive and significant.

Table 6 reports the estimated coefficients of the regression models. Panel A reports the regression results of firms' volatility of stock returns on income volatility measures and accounting-based risk measures. Panel B reports the regression results of beta on income volatility measures and accounting-based risk measures. The results from Model (1a), (2a), (1b) and (2b) suggest that there is a positive and significant relation between the two income volatility measures and the market-based risk measures, α_3 for all the four models is positive and significant. However, the models with net income volatility have the highest R^2s, i.e., 0.339 for model (1a) and 0.166 for Model (1b). With respect to Model (3a) and (3b), the incremental volatility of comprehensive income does not provide any risk relevant information beyond net income.

The debt-to-equity ratio is negative and significant in all the four models with volatility of stock returns and beta, inconsistent with prior research but may be observed (Goh and Emanuel, 1981). A possible reason for this unexpected result is that the debt-to-equity ratio data is right skewed (skewness=1.68, kurtosis=7.68) while the data for market risk measures is fairly normal (e.g., beta skewness=0.86 and kurtosis=0.59),

which may be leading to spurious results. The operating cash flow-to-current liabilities ratio is consistently significantly negatively associated with the volatility of stock returns and beta in the four models.

4.2.1.3 Association between Income Volatility Measures and Firm Stock Price for US Sample

To address the final research question, whether income volatility is an element of risk that decreases share prices, this thesis adopts the Hodder et al. (2006) model, which is a simplified version of the residual income model (Ohlson, 1995).

Following Hodder et al. (2006), Model (4) is used as a benchmark model before introducing any income volatility measures, on a pooled sample over 2005-2010:

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \varepsilon_j \quad (4)$$

Where P denotes the fiscal year end price per share for firm j; BVE denotes the fiscal year end book value of equity per share for firm j; and AE denotes the abnormal earnings per share for firm j, which is used as a proxy for expected future abnormal earnings. Abnormal earnings are calculated using current period earnings (scaled by the number of shares outstanding) less the product of the risk-free rate of return at the beginning of year t times book value per share at the beginning of year t. The use of the risk free rate for this calculation allows coefficient estimates to capture the effects of risk (Hodder et al., 2006).

Table 6

US Sample: Association between Firms' Income Volatility Measures and Market-Based Risk Measures

Panel A: Coefficients from regression of firms' volatility of stock returns on income volatility measures and accounting-based risk measures pooled over the period 2005-2010 (n= 2,646; t-statistics in parentheses)

Variable	Model	Intercept	DTE	CF	σ_{NI}	σ_{CI}	σ_{CI}- σ_{NI}	F-Value	R^2
σ_{SR}	M (1a)	0.366	-0.138	-0.065	0.280			452.31***	0.339
		(3.43)***	(-2.32)**	(-2.15)**	(34.50)***				
	M (2a)	0.421	-0.172	-0.087		0.281		399.73***	0.311
		(3.87)***	(-2.83)***	(-2.81)***		(32.24)***			
	M (3a)	0.365	-0.141	-0.067	0.279		0.526	339.69***	0.339
		(3.42)***	(-2.35)**	(-2.20)**	(34.20)***		(1.24)		

(Continued on next page)

Table 6 (continued)

Panel B: Coefficients from regression of firms' beta on income volatility measures and accounting-based risk measures pooled over the period 2005-2010 (n= 2,519; t-statistics in parentheses)

Variable	Model	Intercept	DTE	CF	σ_{NI}	σ_{CI}	σ_{CI}- σ_{NI}	F-Value	R^2
Beta	M (1b)	1.533	-0.290	-0.118	0.147			168.02***	0.166
		(5.43)***	(-2.69)***	(-1.71)*	(20.73)***				
	M (2b)	1.664	-0.326	-0.147		0.147		151.49***	0.152
		(5.86)***	(-3.01)***	(-2.10)**		(19.53)***			
	M (3b)	1.531	-0.289	-0.118	0.147		-0.063	125.97***	0.166
		(5.42)***	(-2.68)***	(-1.70)*	(20.63)***		(-0.17)		

(Continued on next page)

Table 6 (continued)

*, **, *** denote $p < 0.10$, $p < 0.05$ and $p < 0.01$ respectively.
σ_{SR} denotes firm-specific standard deviation of average annual stock returns, measured over the period 2005-2010.
Beta denotes a firm's beta and is calculated for a 5-year (60 months) time period, obtained from Compustat over the period 2005-2010.
σ_{NI} and σ_{CI} denote firm-specific standard deviation of annual net income and comprehensive income, scaled by the opening market value of equity. The standard deviations are measured over the period 2005-2010.
DTE denotes the debt-to-equity ratio, measured over the period 2005-2010.
CF denotes the operating cash flow-to-current liabilities ratio. This ratio is measured over the period 2005-2010.

Panel A and B report regression analysis of two market-based risk proxies, σ_{SR} and Beta (each denoted MRP in the general model below) on the income volatility measures and accounting-based risk proxies (DTE and CF) pooled over the period 2005-2010.

$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \varepsilon_j \quad (1)$$
$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{CIj} + \varepsilon_j \quad (2)$$
$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \alpha_4 (\sigma_{CIj} - \sigma_{NIj}) + \varepsilon_j \quad (3)$$

The coefficient of BVE is expected to be equal to 1, as predicted by theory and a positive coefficient for AE suggests that the market prices abnormal earnings.[21]

To examine whether the market prices the income volatility measures, the measures are interacted with the abnormal earnings variable and estimate the following models:

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \varepsilon_j \quad (5)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{CIj} \times AE_j) + \varepsilon_j \quad (6)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \gamma_6 [(\sigma_{CIj} - \sigma_{NIj}) \times AE_j] + \varepsilon_j \quad (7)$$

Where P, BVE, AE, DTE, CF, σ_{NI} and σ_{CI} are as defined above.

The debt-to-equity ratio is interacted with abnormal earnings and a negative γ_3 is predicted, which would suggest the market assigns a lower capitalization multiple to the abnormal earnings of firms with debt financing. For the interaction of the operating cash flow-to-current liabilities ratio with abnormal earnings, no prediction is made. The market may assign a higher capitalization multiple to abnormal earnings of firms with positive or better liquidity. Alternatively, the market may assign a lower capitalization multiple to abnormal earnings of firms with negative or poor liquidity. As no differentiation is made between positive or negative operating cash flow-to-current liabilities ratio, no expectations are formed.

[21] To avoid the unrealistic assumption of negative abnormal earnings in perpetuity, the study sets abnormal earnings for those firm-years equal to that firm's time-series mean abnormal earnings. For firms with negative time-series mean abnormal earnings, negative abnormal earnings for year t are set to equal to 0.01. This is the approach used by Hodder et al. (2006).

Negative coefficients are predicted for the interaction of income volatility measures and abnormal earnings in Model (5) and (6). A negative and significant coefficient for these interactions would suggest these income volatility measures capture elements of risk that are priced by the capital market. Model (7) is used to examine whether the incremental volatility of comprehensive income is priced over and above the volatility of net income by the capital market. A negative and significant γ_6 means the incremental volatility of comprehensive income is priced beyond the volatility of net income.

Table 7, Panel A contains descriptive statistics of the price, book value of equity, abnormal earnings and the interaction terms. The mean (median) price (P) is 20.149 (16.396). The mean (median) book value of equity (BVE) is 8.811 (6.791). Results for the regression Models (4) to (7) are reported in Table 7, Panel B. As predicted the coefficient for BVE is almost 1 and significantly positive in Model (4) through (7). AE is also significant and positive in Model (4) through (7). The coefficients of the income volatility measures interacted with abnormal earnings (i.e., σ_{NI} x AE and σ_{CI} x AE) are significant and negative in Model (5) and (6), suggesting that the volatility of these income measures is priced by the capital market. In Model (7), the insignificant γ_6 [i.e., $(\sigma_{CIj} - \sigma_{NIj}) \times AE_j$] suggests that the incremental volatility of comprehensive income is not priced. The interaction of the debt-to-equity ratio with abnormal earnings is negative and significant in all the models except for Model (6). The negative association is consistent with expectations. The interaction of the operating cash flow-to-current liabilities ratio with abnormal earnings is positive and significant in Model (5) through (7).

General linear model estimations require the inclusion of main effects variables when interaction terms are introduced in the analysis unless it can be determined that the main effects variables will have differencing effects. This thesis adopts the Hodder et al. (2006) model, which excludes the main effect variables. For completeness, the models are re-estimated with main effects included and no qualitative differences are observed.

4.2.2 Tests and Results for NZ Sample

Table 8 provides descriptive statistics of net income, comprehensive income, adjusted comprehensive income and the components of comprehensive income.[22] All variables are scaled by the market value of equity. Panel A contains descriptive statistics of the full sample of 92 firms over 2003–2010. Panel B reports the annual means of the full sample for each year 2003–2010.

The statistics in Panel A indicate that the pooled mean of comprehensive income is 0.032 and of net income is 0.015. It shows that other comprehensive income components are mostly positive for the sample firms. Asset revaluation reserves are the major component of other comprehensive income. The other comprehensive income mean (0.018) is mostly driven by asset revaluation reserves, which are almost 89 per cent of the total other comprehensive income.

[22] The pension adjustments component of other comprehensive income is dropped from the NZ sample analysis as there were too few observations.

Table 7

US Sample: Association between Stock Price, Book Value, Abnormal Earnings, Risk Proxies and Income Volatility Measures

Panel A: Descriptive statistics of the regression variables (n=2,580)

Variable	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
P	20.149	15.876	1.508	6.362	16.396	31.275	52.460
BVE	8.811	7.589	0.037	2.367	6.791	13.701	24.795
AE	0.897	0.922	0.010	0.111	0.568	1.444	2.941
DTE x AE	0.467	0.741	0.000	0.000	0.059	0.641	2.439
CF x AE	0.237	0.397	-0.121	0.000	0.064	0.295	1.336
σ_{NI} x AE	0.066	0.090	0.001	0.009	0.027	0.077	0.315
σ_{CI} x AE	0.078	0.104	0.001	0.010	0.033	0.095	0.362

(Continued on next page)

Table 7 (continued)

Panel B: Parameter estimates: (n=2,580; t-statistics in parentheses).

Model	**Intercept**	**BVE**	**AE**	**DTE × AE**	**CF × AE**	**σ_{NI} × AE**	**σ_{CI} × AE**	**(σ_{CI} - σ_{NI}) ×AE**	**F-Value**	**R^2**
M (4)	4.322	0.763	10.154						4432.89***	0.773
	(18.78)***	(28.68)***	(46.40)***							
M (5)	5.048	0.762	11.824	-0.706	1.251	-33.002			2106.04***	0.802
	(22.11)***	(30.61)***	(46.50)***	(-2.20)**	(2.67)***	(-19.02)***				
M (6)	4.938	0.766	11.967	-0.490	1.041		-29.271		2090.80***	0.800
	(21.66)***	(30.70)***	(46.52)***	(-1.52)	(2.22)**		(-18.57)***			
M (7)	5.046	0.764	11.865	-0.638	1.188	-32.852		-9.562	1755.35***	0.802
	(22.10)***	(30.59)***	(46.14)***	(-1.95)**	(2.52)***	(-18.88)***		(-1.08)		

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Table 7 (continued)

*, **, *** denote $p < 0.10$, $p < 0.05$ and $p < 0.01$ respectively.
P denotes price per share, which is measured over the period 2005-2010.
BVE denotes book value of equity per share, which is measured over the period 2005-2010.
AE denotes abnormal earnings per share, which is computed as reported earnings per share for the year *t* minus the risk-free rate of return at the beginning of year *t* times the book value of equity per share at the beginning of year *t*. This variable is measured over the period 2005-2010.
DTE denotes the debt-to-equity ratio, which is measured over the period 2005-2010.
CF denotes the operating cash flow-to-current liabilities ratio, which is measured over the period 2005-2010.
M denotes model, σ_{NI}, and σ_{CI} denote firm-specific standard deviation of annual net income and comprehensive income, scaled by the opening market value of equity. These standard deviations are measured over the period 2005-2010.

Panel B reports regression analysis of firms' stock price on the book value of equity, abnormal earnings, interaction of accounting risk measures (i.e., DTE and CF) with abnormal earnings and interaction of income volatility measures with abnormal earnings pooled over the period 2005-2010.

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \varepsilon_j \quad (4)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \varepsilon_j \quad (5)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{CIj} \times AE_j) + \varepsilon_j \quad (6)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \gamma_6 [(\sigma_{CIj} - \sigma_{NIj}) \times AE_j] + \varepsilon_j \quad (7)$$

Table 8

NZ Sample: Descriptive Statistics of Income Measures and Other Comprehensive Income Components

Panel A: Descriptive statistics of the sample of 92 firms with complete data over 2003-2010, pooled across firms and years (n=736).

Variable	Mean	Std.Dev	Min	1ST Quart	Median	3rd Quart	Max
NI	**0.015**	**0.202**	**-0.965**	**-0.007**	**0.058**	**0.091**	**1.998**
FCT	0.002	0.059	-0.151	0.000	0.000	0.000	1.539
AR	0.016	0.075	-0.407	0.000	0.000	0.000	1.166
SGL	0.001	0.042	-0.345	0.000	0.000	0.000	0.864
DGL	-0.001	0.019	-0.230	0.000	0.000	0.000	0.165
OCI	0.018	0.104	-0.450	-0.001	0.000	0.007	1.540
CI	**0.032**	**0.224**	**-0.965**	**-0.008**	**0.063**	**0.113**	**1.996**
ACI	**0.016**	**0.214**	**-0.965**	**-0.010**	**0.056**	**0.090**	**2.000**

Panel B: Annual means of the sample of 92 firms with complete data over 2003-2010, by year (n=736).

Variable	2003	2004	2005	2006	2007	2008	2009	2010
NI	**0.027**	**0.008**	**0.032**	**0.051**	**0.035**	**0.021**	**-0.023**	**-0.036**
FCT	-0.001	-0.002	0.015	0.005	-0.003	0.005	0.001	-0.004
AR	0.015	0.044	0.019	0.024	0.023	0.006	0.001	0.000
SGL	0.000	0.000	0.000	0.000	0.010	-0.003	-0.002	0.004
DGL	0.000	0.000	0.000	0.000	-0.003	0.001	-0.011	0.005
OCI	0.012	0.041	0.032	0.029	0.026	0.005	-0.007	0.009
CI	**0.039**	**0.048**	**0.065**	**0.080**	**0.062**	**0.024**	**-0.030**	**-0.028**
ACI	**0.024**	**0.005**	**0.046**	**0.056**	**0.039**	**0.018**	**-0.031**	**-0.028**

NI denotes Annual Net Income, FCT denotes Foreign Currency Translation Adjustments, AR denotes Assets Revaluation Reserves, SGL denotes Securities Gains/Losses, DGL denotes Derivatives Gains/Losses, OCI denotes total other comprehensive income, CI denotes Comprehensive Income and ACI denotes adjusted comprehensive income. The income measures are in bold and the other comprehensive income components are in normal font. All variables are scaled by the opening market value of equity.

The mean adjusted comprehensive income (0.016) is very close to the mean net income (0.015), which again shows that asset revaluation reserves are the major component of other comprehensive income. Panel B, reporting the annual means, displays a similar pattern. For the period 2003-2010, asset revaluation reserves and foreign current translation adjustments are the most dominant component of other comprehensive income.

The mean net income, comprehensive income and adjusted comprehensive income (scaled by the opening value of equity) for the sample of firms each year and pooled across time, are graphically depicted in Figure 4. The trend of comprehensive income is greater than net income over the sample period except in 2009. The trend of adjusted comprehensive income is greater than net income in 2005-2007 and lower in the year 2003-2004. The pooled means of net income and adjusted comprehensive income are indistinguishable, while comprehensive income is clearly greater than net income. The year 2009 shows higher comprehensive loss and adjusted comprehensive loss compared to net loss. However, in the year 2010, net loss is higher than both comprehensive loss and adjusted comprehensive loss.

4.2.2.1 Volatility of Income Measures for NZ Sample

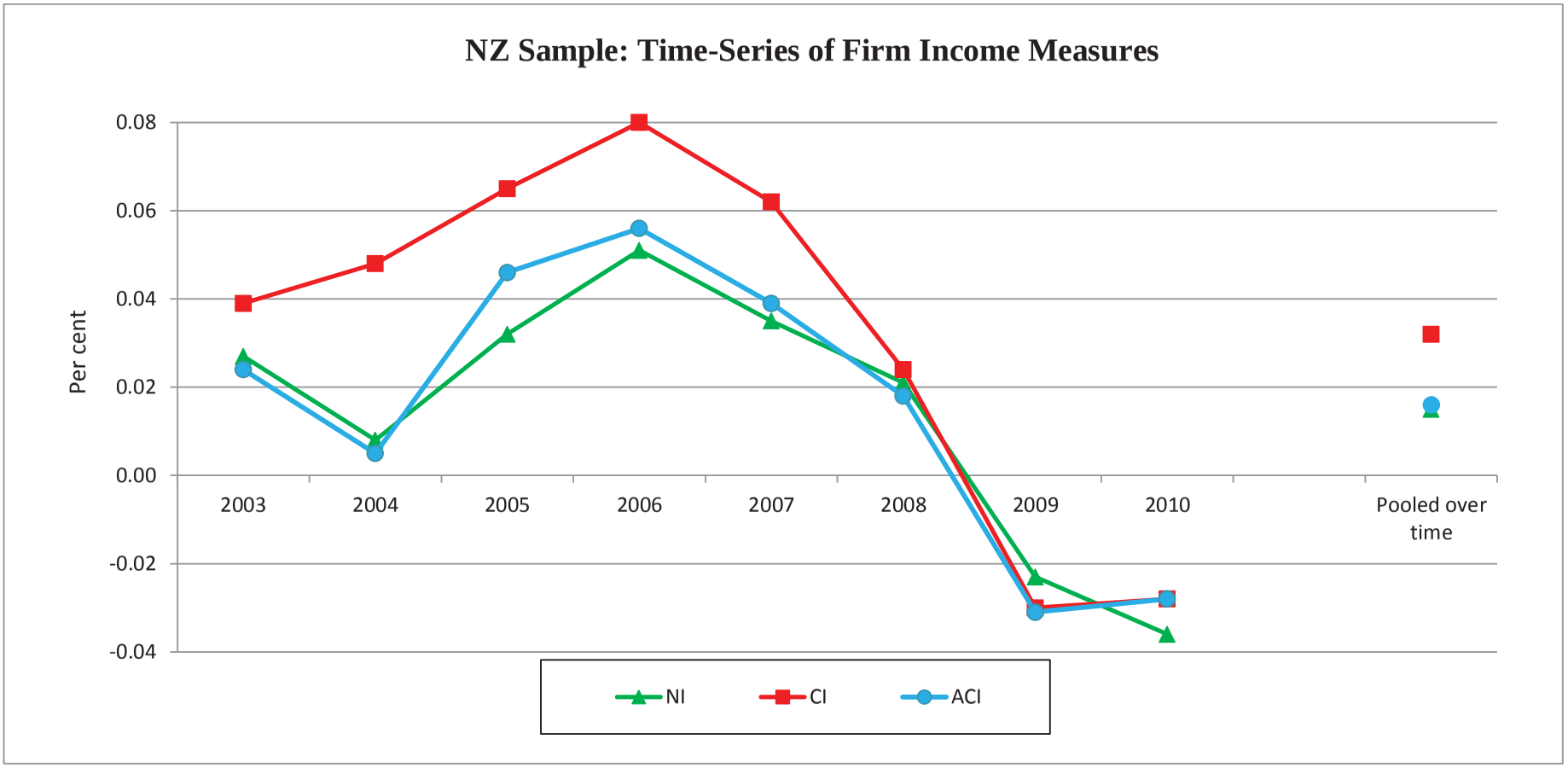
Panel A of Table 9 provides descriptive statistics of the income volatility measures across the 92 sample firms over the years 2003–2010. The average volatility of net (comprehensive) income is 0.118 (0.143). NZ firms show a higher volatility of net income and comprehensive income compared to US, mean net (comprehensive) income volatility of 0.082 (0.091). The average volatility of adjusted comprehensive income is

0.126. The different means (medians) of 0.069 (0.118), 0.099 (0.143), and 0.072 (0.126) for net income, comprehensive income and adjusted comprehensive income, respectively, indicate that the data are skewed.

Figure 5 graphically depicts the volatility of income measures, in cross-section and over time. To the left of the Figure are the means of the firm-specific income volatility measures (from Table 9, Panel A). The right of the Figure shows the pooled cross-sectional means of income volatility measures (from Table 8, Panel A) and the middle shows the annual cross-sectional means of income volatility measures (from Table 8, Panel B). The firm-specific and pooled cross-sectional volatility of comprehensive income is greater than net income. The volatility of comprehensive income is greater than net income in each year as well except 2010. Adjusted comprehensive income volatility shows a similar pattern and is consistently greater than net income volatility.

To assess the relative volatility of comprehensive income or adjusted comprehensive income compared to net income, the standard deviation ratios are reported (i.e., the standard deviation of comprehensive income / standard deviation of net income and standard deviation of adjusted comprehensive income / standard deviation of net income).

Figure 4



NI = Cross-sectional mean net income scaled by opening market value of equity;
CI = Cross-sectional mean comprehensive income scaled by opening market value of equity;
ACI = Cross-sectional mean adjusted comprehensive income scaled by opening market value of equity; and
n = 92.

Table 9

NZ Sample: Descriptive Statistics and Comparative Analyses of Measures of Income Volatility

Panel A: Descriptive statistics of firm-specific measures of income volatility

Variable	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
σ_{NI}	0.118	0.128	0.007	0.027	0.069	0.149	0.689
σ_{CI}	0.143	0.136	0.010	0.054	0.099	0.184	0.687
σ_{ACI}	0.126	0.141	0.008	0.026	0.072	0.159	0.688

Panel B: Descriptive statistics of standard deviation ratios:
standard deviation of comprehensive income / standard deviation of net income (σ_{CI}/ σ_{NI})
standard deviation of adjusted comprehensive income / standard deviation of net income ($\sigma_{ACI}/ \sigma_{NI}$)

Variable	Mean	Std. Dev	Min	1ST Quart	Median	3rd Quart	Max
$\sigma_{CI} / \sigma_{NI}$	1.986	3.014	0.267	1.000	1.052	1.450	22.578
$\sigma_{ACI} / \sigma_{NI}$	1.118	0.437	0.267	0.999	1.005	1.112	3.861

(Continued on next page)

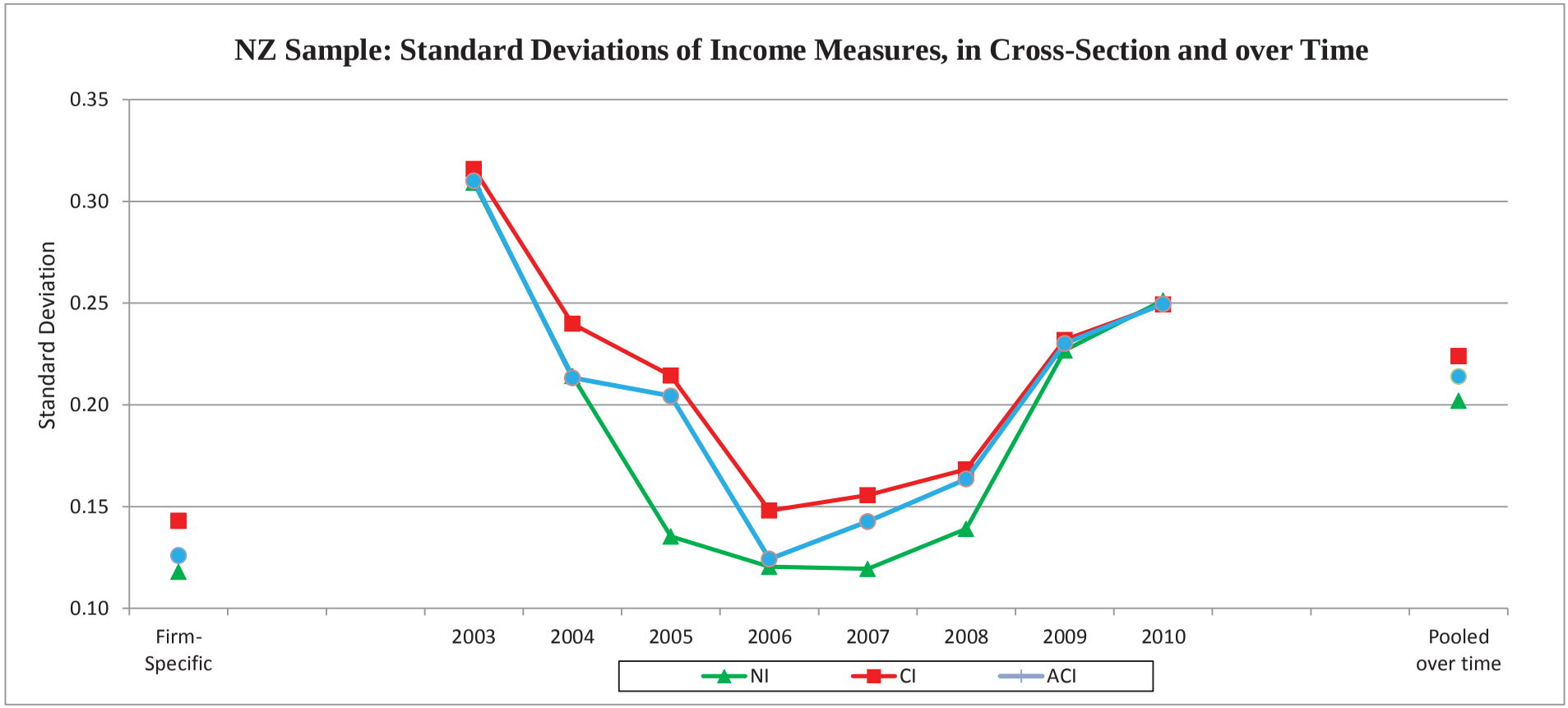
Table 9 (continued)

Panel C: Statistical comparisons and test of median for the ratio ($\sigma_{CI}/\ \sigma_{NI}$).

Comparisons	Count	Per cent
$\sigma_{CI}/\ \sigma_{NI} > 1$	62	67.39
$\sigma_{CI}/\ \sigma_{NI} = 1$	10	10.87
$\sigma_{CI}/\ \sigma_{NI} < 1$	20	21.74
$\sigma_{ACI}/\ \sigma_{NI} > 1$	53	57.61
$\sigma_{ACI}/\ \sigma_{NI} = 1$	14	15.22
$\sigma_{ACI}/\ \sigma_{NI} < 1$	25	27.17
Wilcoxon-Signed Rank Test:		
$\sigma_{CI}/\ \sigma_{NI}$		
P-Value (One-tailed)	0.000	
Estimated Median	1.150	
$\sigma_{ACI}/\ \sigma_{NI}$		
P-Value (One-tailed)	0.001	
Estimated Median	1.031	

σ_{NI} denotes firm-specific standard deviation of net income scaled by the opening market value of equity each year over the period 2003-2010.
σ_{CI} denotes firm-specific standard deviation of comprehensive income scaled by the opening market value of equity each year over the period 2003-2010.
σ_{ACI} denotes firm-specific standard deviation of adjusted comprehensive income scaled by the opening market value of equity each year over the period 2003-2010.
n = 92.

Figure 5



This figure reflects the standard deviations of net income (NI), comprehensive income (CI) and adjusted comprehensive income (ACI), scaled by the opening market value of equity and computed over the sample period of 2003-2010. The left side of the figure reflects the means of the firm-specific standard deviations while the remainder of the figure represent the cross-sectional average standard deviations in each sample year and pooled over all sample years. n = 92.

Panel B of table 9 provides descriptive statistics of the standard deviation ratios. The mean standard deviation ratio of comprehensive income to net income is 1.986, indicating that comprehensive income is almost twice as volatile as net income. However, this volatility is the result of an extreme outlier. The median standard deviation ratio of comprehensive income to net income indicates that comprehensive income is 5.2 per cent more volatile than net income. The mean standard deviation ratio for adjusted comprehensive income to net income is 1.118. The median standard deviation of adjusted comprehensive income is greater than the standard deviation of net income by 0.5 per cent.

Panel C indicates that the volatility of comprehensive income is greater than the volatility of net income for 62 observations (67.4 per cent) and lower for 20 observations (21.7 per cent). There are 10 observations (10.8 per cent) where there are no differences between net income and comprehensive income volatilities. As comprehensive income is adjusted for asset revaluations the number of 'no difference' firms increases to 14 (15.2 per cent).

The different means and medians for the data suggest the use of non-parametric statistics. Therefore, the Wilcoxon-signed rank test is used to test the medians if they statistically differ than 1. The results show that volatility of comprehensive income is significantly greater than volatility of net income at the 0.01 level. Furthermore, the volatility of adjusted comprehensive income is also significantly greater than volatility of net income. This indicates that other comprehensive income components less asset revaluation reserves are still more volatile than net income, and make comprehensive income more volatile than net income.

During the sample period, NZ adopted IFRS for fiscal periods beginning on or after 1 January, 2007. Therefore, I test whether the move to IFRS has a moderating effect on the comprehensive income volatility. The sample is divided into two groups 2003-2006 and 2007-2010. The standard deviations for the income measures are calculated over the sample periods and then compared using the paired *t-test*. The results show no significant differences in the means of the two groups.[23]

4.2.2.2 Association between Income Volatility Measures and Market-Based Risk Measures for NZ Sample

Similar to the US sample, I examine the association of the income volatility measures with market-based risk measures (i.e., volatility of stock returns and beta) and firms' measures of accounting-based risk (i.e., leverage and liquidity ratios). The correlations between the income volatility measures and risk measures are anticipated to be positive if they capture elements of market-based risk. Further, income volatility measures that are more complete measures of market risk should correlate more positively with market-based risk measures.

To conduct the analysis, the standard deviations of three income measures are calculated over a period of eight years. The standard deviation of raw returns is computed to be used as a proxy for total risk and beta is used as a proxy for systematic risk. The debt-to-equity ratio is used as a proxy for default risk and the operating cash flow-to-current liabilities ratio is used as a proxy for liquidity risk.

[23] This analysis in an approximate estimation and may be biased towards the number of firms in the pre and post groups as early adoption is allowed in NZ for fiscal year beginning on or after 1 January 2005. However, Stent et al. (2010) note only 48 early adopting firms in their sample of 161 firms.

Table 10 provides descriptive statistics of the market-based and accounting-based risk measures, the correlation between the income volatility measures and risk measures and report the regression results. Table 10, Panel A shows the mean (median) standard deviation of raw returns (σ_{SR}) is 0.398 (0.350). The mean (median) beta is 0.884 (0.743). The mean (median) debt-to-equity ratio (DTE) is 0.441 (0.356) and the mean (median) for operating cash flow-to-current liabilities ratio (CF) is 0.406 (0.496).

Table 10, Panel B contains Pearson and Spearman correlations among the income volatility measures, market-based risk measures and accounting-based risk measures pooled across the years 2003–2010. The income volatility measures and the standard deviation of stock returns exhibit positive and significant correlation, which is consistent with the US results. The volatility of comprehensive income has the lowest correlation, although significant. There is no evidence that the income volatility measures correlate significantly with beta, inconsistent with the US results. The correlation between the market-based risk measures and the debt-to-equity ratio is insignificant except for the low Spearman correlation which shows a negative relation at the 10 per cent significance level. The negative sign is inconsistent with expectations, but may be observed (Goh and Emanuel, 1981). The correlation between market-based risk measures and operating cash flow-to-current liabilities ratio is negative and significant and consistent with expectations.

To test whether the three income volatility measures provide any incremental risk relevant information, the same methods are adopted as discussed the US sample. However, in the regressions, an additional variable, adjusted comprehensive income is introduced into the models estimated.

Panel C of Table 10 reports the coefficients of the regression models. The results from Model (1a), (2a) and (3a) indicate that there is a positive and significant relation between the three income volatility measures and the volatility of stock returns. The coefficients for the three income volatility measures are positive and significant in the stock returns models, however, the model with net income has the highest R^2 (0.218). These results are consistent with the US results. The association between beta and volatility of income measures in panel C is not significant. This result is inconsistent with the US results.

The Results for Model (4) and (5) show that the incremental volatility of comprehensive income and adjusted comprehensive income do not provide any risk relevant information. The debt-to-equity ratio is insignificant in all the models, however, the positive sign is consistent with expectations expect for Model (4a). The operating cash flow-to-current liabilities ratio is consistently significantly negatively associated with volatility of stock returns and beta in all the models. This result is consistent with the US results.

Table 10

NZ Sample: Association between Firms' Income Volatility Measures and Market-Based Risk Measures

Panel A: Descriptive statistics for the market-based risk measures and accounting-based risk measures across 92 sample firms with complete financial statement information for the period 2003-2010.

Variables	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
σ_{SR}	0.398	0.271	0.052	0.210	0.350	0.502	1.504
Beta	0.884	0.683	0.071	0.495	0.743	1.121	4.497
DTE	0.441	0.563	-0.518	0.123	0.356	0.546	4.232
CF	0.406	1.617	-6.995	0.140	0.496	1.214	3.671

Panel B: Pearson (above diagonal) and Spearman (below diagonal) correlations among and between standard deviations of income metrics, market-based risk measures and accounting-based risk measures across 92 firms with complete financial statement information for the period 2003-2010.

	σ_{NI}	σ_{CI}	σ_{ACI}	σ_{SR}	Beta	DTE	CF
σ_{NI}		0.914***	0.953***	0.405***	0.035	0.143	-0.308***
σ_{CI}	0.808***		0.956***	0.299***	-0.041	0.111	-0.226**
σ_{ACI}	0.967***	0.837***		0.366***	0.015	0.121	-0.299***
σ_{SR}	0.439***	0.269***	0.434***		0.397***	0.012	-0.394***
Beta	0.127	0.022	0.124	0.242**		-0.009	-0.320***
DTE	-0.063	-0.057	-0.048	-0.192*	0.025		0.124
CF	-0.466***	-0.303***	-0.455***	-0.550***	-0.414***	0.102	

(Continued on next page)

Table 10 (continued)

Panel C: Coefficients from regression of firms' market-based risk measures on income volatility measures and accounting-based risk measures pooled over the period 2003-2010 (n= 92; t-statistics in parentheses)

Variable	Model	Intercept	DTE	CF	σ_{NI}	σ_{CI}	σ_{ACI}	σ_{CI}- σ_{NI}	σ_{ACI}- σ_{NI}	F-Value	R^2
σ_{SR}	M (1a)	0.340	0.002	-0.050	0.661					9.46***	0.218
		(8.60)***	(0.05)	(-3.01)***	(3.15)***						
	M (2a)	0.354	0.015	-0.058		0.432				7.45***	0.175
		(8.34)***	(0.32)	(-3.52)***		(2.20)**					
	M (3a)	0.350	0.009	-0.053			0.519			8.41***	0.196
		(8.79)***	(0.20)	(-3.16)***			(2.69)***				
	M (4a)	0.357	-0.003	-0.046	0.659			-0.675		7.73***	0.228
		(8.71)***	(-0.06)	(-2.77)***	(3.16)***			(1.24)			
	M (5a)	0.342	0.000	-0.050	0.682				-0.469	7.22***	0.215
		(8.61)***	(0.01)	(-3.01)***	(3.22)***				(-0.79)		

(Continued on next page)

Table 10 (continued)

Variable	Model	Intercept	DTE	CF	σ_{NI}	σ_{CI}	σ_{ACI}	σ_{CI}- σ_{NI}	σ_{ACI}- σ_{NI}	F-Value	R^2
Beta	M (1b)	0.968	0.056	-0.148	-0.421					3.58**	0.078
		(8.97)***	(0.45)	(-3.25)***	(0.73)						
	M (2b)	1.008	0.060	-0.150		-0.634				3.93**	0.088
		(8.98)***	(0.49)	(-3.41)***		(-1.22)					
	M (3b)	0.978	0.057	-0.150			-0.468			3.68**	0.081
		(9.12)***	(0.46)	(-3.32)***			(-0.90)				
	M (4b)	1.012	0.043	-0.138	-0.425			-1.654		3.14**	0.086
		(9.00)***	(0.35)	(-3.02)***	(-0.74)			(-1.32)			
	M (5b)	0.973	0.052	-0.148	-0.373				-1.039	2.77**	0.072
		(8.96)***	(0.41)	(-3.25)***	(-0.64)				(-0.64)		

(Continued on next page)

Table 10 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.
σ_{SR} denotes firm-specific standard deviation of average annual stock returns, measured over the period 2003-2010.
Beta denotes a firm's beta and is calculated for a 3-year (36 months) time period, obtained from DataStream International over the period 2003-2010.
σ_{NI}, σ_{CI} and σ_{ACI} denote firm-specific standard deviation of annual net income, comprehensive income and adjusted comprehensive income, scaled by the opening market value of equity. These standard deviations are measured over the period 2003-2010.
DTE denotes the debt-to-equity ratio, measured over the period 2003-2010.
CF denotes the operating cash flow-to-current liabilities ratio. This ratio is measured over the period 2003-2010.

Panel C reports regression analysis of two market-based risk proxies, Beta and σ_{SR} (each denoted MRP in the general model below) on the income volatility measures and accounting-based risk proxies (DTE and CF) pooled over the period 2003-2010.

$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \varepsilon_j \quad (1)$$
$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{CIj} + \varepsilon_j \quad (2)$$
$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{ACIj} + \varepsilon_j \quad (3)$$
$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \alpha_4 (\sigma_{CIj} - \sigma_{NIj}) + \varepsilon_j \quad (4)$$
$$MRP_j = \alpha_0 + \alpha_1 DTE_j + \alpha_2 CF_j + \alpha_3 \sigma_{NIj} + \alpha_4 (\sigma_{ACIj} - \sigma_{NIj}) + \varepsilon_j \quad (5)$$

4.2.2.3 Association between Income Volatility Measures and Firm Stock Price for NZ Sample

To test whether volatility of income is an element of risk that decreases share prices, the same methods are used as discussed in the US sample. However, an additional variable introduced in the regression models is adjusted comprehensive income. While estimating the regression models for the NZ sample, the only deviation from the US sample is the calculation of abnormal earnings. Abnormal earnings are calculated using current period earnings (scaled by the number of shares outstanding) less the product of the risk-free rate of return at the beginning of year times book value per share at the beginning of year. Following Chay et al. (1993), the study uses the yield to maturity on long-term NZ government bonds as the risk-free rate.

Table 11, Panel A contains descriptive statistics of the price, book value of equity, abnormal earnings and the interaction terms. The mean (median) price (P) is 2.011 (1.516). The mean (median) book value of equity (BVE) is 1.327 (0.989).

Results for the regression models are reported in Panel B of Table 11. The coefficient for BVE is almost 1 and significantly positive in Model (6) through (11). AE is also significant and positive in all the models. The coefficients of the income volatility measures interacted with abnormal earnings (i.e., NI x AE, CI x AE and ACI x AE) are significant and negative in Model (7), (8) and (9), which indicates that the volatility of these income measures is priced by the capital market. The result for Model (10) and (11) show that the incremental volatility of comprehensive income or adjusted comprehensive income is not priced. The interaction of the debt-to-equity ratio with

abnormal earnings (i.e., DTE x AE) is positive and significant in Model (7) through (11), which is inconsistent with expectations and with the US results. The interaction of the operating cash flow-to-current liabilities ratio (i.e., CF x AE) with abnormal earnings is insignificant in Models (7) through (11). The results for models with interaction terms are robust to the inclusion of main effects variables.

4.3 Additional Tests

To test the robustness of results, different tests are performed. The Levene's test of equal variance is conducted to see if the variances of the income volatility measures (i.e., the volatility of net income and the volatility of comprehensive income) are equal. The results of the test are significant at the 5 per cent level and the null hypothesis of equal variance is rejected.

For the US sample, regressions are estimated for a subset of the sample. First, a sensitivity test is performed by increasing the number of years and reducing the number of firms. The year 2004 is included and those firms that have no missing data for the required variables from 2004-2010 are included in the sample. The sample consists of 1,372 firms. The results (untabulated) are similar to Table 6 and Table 7 and the inferences remain unchanged.

Table 11

NZ Sample: Association between Stock Price, Book Value, Abnormal Earnings, Risk Proxies and Income Volatility Measures

Panel A: Descriptive statistics of the regression variables (n=92)

Variable	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
P	2.011	1.759	0.020	0.611	1.516	3.159	7.594
BVE	1.327	1.280	-0.004	0.393	0.989	1.811	5.407
AE	0.103	0.161	0.009	0.016	0.046	0.110	1.060
DTE x AE	0.189	1.410	-0.005	0.003	0.015	0.045	13.543
CF x AE	0.073	0.114	-0.098	0.004	0.035	0.010	0.549
NI x AE	0.026	0.143	0.000	0.001	0.003	0.006	1.301
CI x AE	0.028	0.144	0.000	0.002	0.004	0.009	1.317
ACI x AE	0.027	0.143	0.000	0.001	0.003	0.007	1.301

(Continued on next page)

Table 11 (continued)

Panel B: Parameter estimates: (n=92; t-statistics in parentheses).

Variable	M 6	M 7	M 8	M 9	M 10	M 11
Intercept	0.536	0.510	0.506	0.506	0.543	0.502
	(3.19)***	(3.32)***	(3.26)***	(3.29)***	(3.58)***	(3.23)***
BVE	0.932	0.823	0.844	0.827	0.711	0.833
	(9.50)***	(8.75)***	(8.97)***	(8.83)***	(6.73)***	(8.64)***
AE	2.327	4.964	4.865	5.141	4.658	5.317
	(2.98)***	(3.66)***	(3.54)***	(3.73)***	(3.48)***	(3.48)***
DTE × AE		1.034	1.006	1.051	0.899	1.061
		(3.86)***	(3.67)***	(3.90)***	(3.33)***	(3.87)***
CF × AE		0.455	0.460	0.299	0.756	0.131
		(0.29)	(0.29)	(0.19)	(0.48)	(0.08)
σ_{NI} × AE		-12.556			-11.875	-12.917
		(-4.30)***			(-4.13)***	(-4.28)***
σ_{CI} × AE			-12.095			
			(-4.09)***			
σ_{ACI} × AE				-12.769		
				(-4.33)***		
(σ_{CI} - σ_{NI}) ×AE					77.37	
					(2.15)**	
(σ_{ACI} - σ_{NI}) ×AE						-27.32
						(-0.51)
F-Value	72.21***	38.50***	37.53***	38.62***	34.19***	31.85***
R^2	0.610	0.673	0.667	0.703	0.686	0.670

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Table 11 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.
P denotes price per share, we measure this variable over the period 2003-2010.
BVE denotes book value of equity per share, which is measured over the period 2003-2010.
AE denotes abnormal earnings per share, which is computed as reported earnings per share for the year *t* minus the risk-free rate of return at the beginning of year *t* times the book value of equity per share at the beginning of year *t*. This variable is measured over the period 2003-2010.
DTE denotes the debt-to-equity ratio, which is measured over the period 2003-2010.
CF denotes the operating cash flow-to-current liabilities ratio, which is measured over the period 2003-2010.
M denotes model, σ_{NI}, σ_{CI} and σ_{ACI} denote firm-specific standard deviation of annual net income, comprehensive income and adjusted comprehensive income, scaled by the opening market value of equity. These standard deviations are measured over the period 2003-2010.

Panel B reports regression analysis of firms' stock price on the book value of equity, abnormal earnings, interaction of accounting risk measures (i.e., DTE and CF) with abnormal earnings and interaction of income volatility measures with abnormal earnings pooled over the period 2003-2010.

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \varepsilon_j \quad (6)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \varepsilon_j \quad (7)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{CIj} \times AE_j) + \varepsilon_j \quad (8)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{ACIj} \times AE_j) + \varepsilon_j \quad (9)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \gamma_6 [(\sigma_{CIj} - \sigma_{NIj}) \times AE_j] + \varepsilon_j \quad (10)$$

$$P_j = \gamma_0 + \gamma_1 BVE_j + \gamma_2 AE_j + \gamma_3 (DTE_j \times AE_j) + \gamma_4 (CF_j \times AE_j) + \gamma_5 (\sigma_{NIj} \times AE_j) + \gamma_6 [(\sigma_{ACIj} - \sigma_{NIj}) \times AE_j] + \varepsilon_j \quad (11)$$

Second, following Hodder et al. (2006), the volatility of the income measures is estimated using the standard deviation calculated over two rolling five-year periods ending with year 2009 and 2010 with similar results.[24] Third, the regressions are estimated for a sample of firms drawn from the whole US market, including the financial firms. The final sample comprises of 1,986 firms out of 9,807 firms with no missing observations for the period 2004-2010. Results are similar to those tabulated. Finally, the standard deviations of the income measures are computed by deflating income by average total assets. These standard deviations are then used in the regression models and yield qualitatively similar results to the tabulated results.

For the NZ sample, similar sensitivity tests are conducted. The time window is increased from eight years to 10 years. However, the number of companies reduces from 92 to 71. First, to see if comprehensive income or adjusted comprehensive is more volatile than net income, the standard deviation ratios are calculated. Then the Wilcoxon-signed rank is performed to see if the results hold. The results (untabulated) are highly significant and show that both comprehensive income and adjusted comprehensive income are more volatile than net income.

Further tests reveal that results (untabulated) for the test of association of income volatility measures with market-based risk measures are qualitatively same to those reported in Table 10. The results (untabulated) of association of income volatility measures with share prices are also similar to Table 11. Finally, the results (untabulated) are robust to scaling of income volatility measures by total assets.

[24] With nine years of data, Hodder et al. (2006), use five rolling five-year periods. They do so to allow income volatility and market-based risk factors to vary over time, relaxing the restriction that income volatility and market-based risk is stationary.

4.4 Chapter Summary

This chapter explains the sample and tests conducted to answer the three research questions related to the volatility and risk relevance of comprehensive income. The sample includes US non-financial firms (data obtained from Compustat) and NZ non-financial firms (hand collected data) listed on the NZX. Results for the US sample show that comprehensive income is more volatile than net income. For the NZ data, three income measures; net income, comprehensive income and a constructed measure of adjusted comprehensive income are used. Results show that both comprehensive income and adjusted comprehensive income are more volatile than net income.

With respect to the risk relevance of comprehensive income, the tests conducted investigate the association between income volatility measures and market-based risk measures (i.e., volatility of stock returns and beta). Results for the US sample show a positive correlation of the income volatility measures with market-based risk measures. However, net income is more strongly correlated with market-based risk measures. The incremental volatility of comprehensive income does not provide market-risk relevant information beyond net income. For the NZ sample, the results show a positive correlation of the three income volatility measures with the volatility of stock returns. However, net income is more strongly correlated. There is no evidence that the income volatility measures have any significant association with beta.

With respect to the tests investigating the association between income volatility measures and share prices, results for the US and NZ samples suggest that the

incremental effect of the volatility of comprehensive income is not priced.

The next chapter surveys the literature regarding the value relevance and predictive power of comprehensive income and develops the related research questions.

CHAPTER 5: COMPREHENSIVE INCOME VALUE RELEVANCE AND PREDICTIVE POWER

5.1 Comprehensive Income Value Relevance Research

5.1.1 Theoretical Approach

From a theoretical standpoint, comprehensive income is consistent with the Ohlson (1995) residual income valuation model, in which firm value is explained by book value and abnormal earnings under clean surplus accounting. The clean surplus relation can be expressed as:

$$BVE_t = BVE_{t-1} + NI_t - DIV_t \quad \text{(a)}$$

According to Equation (a), the book value of equity at the end of period t, BVE_t, is equal to the book value of equity at the beginning of the period plus net income for the period t, NI_t minus any dividend (net of shareholders contribution) paid for the period t, DIV_t. An assumption for the above equation to hold true is that all non-owner changes in equity must flow through the income statement. Hence, Equation (a) can be rearranged and net income as per the clean surplus relation can be expressed as:

$$NI_t = BVE_t - BVE_{t-1} + DIV_t \quad \text{(b)}$$

Prior to the mandatory reporting of comprehensive income (e.g., SFAS 130; IAS 1), many non-owner changes in equity bypassed the income statement (e.g., SFAS 52: *Foreign Currency Translation*, SFAS 115: *Accounting for Certain Investments in Debt and Equity Securities*). Reporting of income was not, and is still not, necessarily equal to clean surplus income as firms may book some items directly to equity.

These dirty surplus flows can be expressed as:

$$DS_t = BVE_t - BVE_{t-1} + DIV_t - NI_t \quad \text{(c)}$$

Dirty surplus flows for the period t, DS_t, equals the book value at the end of the period t, BVE_t, minus the book value at start of period t, BVE_{t-1}, adjusted for dividends (net of shareholders contribution) minus reported net income for the period t, NI_t. Consequently, the clean surplus income (CI_t) can be then expressed as:

$$CI_t = NI_t + DS_t \quad \text{(d)}$$

The AAA (1997) argue that clean surplus income is a summary performance measure under the clean surplus relation, and is a measure that could effectively compete with reported income of the firm for both equity valuation and contracting purposes. The significance of clean surplus income is its use in the valuation of the firm and because it provides a conceptual link between market and book values (European Accounting Association (EAA) Financial Reporting Standards Committee, 2006).

Proponents of dirty surplus income argue that these flows are transitory in nature, and from an informational perspective, are information irrelevant to the capital market. Therefore, including them in bottom line earnings is unnecessary (Black, 1993; Stark, 1997; Ohlson, 1999). Excluding them from earnings reduces noise and potentially enhances the quality of reported earnings as earnings only include persistent and recurring items. The valuation perspective requires complete articulation of the income statement and balance sheet (Ohlson, 1995). Income should be calculated on a clean surplus basis and should include all non-owner changes. It is argued that exclusion of these significant value changes from earnings reduces the quality of earnings and

impairs its significance as the key input for valuation and contracting (Kanagaretnam et al., 2009). The exclusion of such information from primary financial statements hinders investors' ability to extract it in a timely and precise manner (O'Hanlon and Pope, 1999).

Pope and Wang (2005) show that only the core earnings can be used for valuation and that they may capture all the value relevant information. They distinguish between core earnings and transitory (value irrelevant) earnings. However, Maines and McDaniel (2000) argue that the other comprehensive income items excluded from net income may be related to the core business activities and relevant for investors' decision making.

The EAA (2006) argue that comprehensive income links directly to the full balance sheet (excluding changes resulting from transactions with owners in their capacity as owners) in contrast to other income measures (e.g., net income). The presumption is that subsets of income such as net income, earnings before interest and taxes, earnings before non-recurring or unusual items, and other earnings components, all lead to the non-articulation of financial statements. As a result, these subsets cannot be used to reconstruct firm value without making adjustments to the balance sheet numbers, which is a subtle exercise.

5.1.2 Prior Studies

Value relevance implies that a particular piece of accounting information is associated (statistically correlated) with market prices or market returns (EAA, 2006). Francis and Shipper (1999) suggest that the statistical association between accounting information

and market values (or market returns) means that the accounting information is correlated with information used by investors. Association studies commonly measure either the relative or the incremental effect of accounting information. For example, they measure the power of comprehensive income relative to net income in explaining market prices (or returns) or the incremental power of other comprehensive income components beyond net income in explaining market prices (or returns).

Many studies attempt to assess the value relevance of comprehensive income. Table 12 provides an overview of these studies with a summary of their key findings. Using a sample of US firms over the period 1972-89, Cheng et al. (1993) find that both net income and operating income dominate comprehensive income in information content. They also examine the incremental information content of other comprehensive income components and find that those components are of marginal usefulness.

Similarly, Dhaliwal et al. (1999), with the exception of financial firms, find no evidence to conclude that comprehensive income is more strongly associated with returns/prices than net income. They focus on comprehensive income and do not directly examine the usefulness of individual components of other comprehensive income. Biddle and Choi (2006) report a higher association of aggregate comprehensive income with stock returns than net income. They find evidence to confirm that broader definitions of income are more decision useful in investing applications and narrower definitions of income are more useful in contracting applications.

O'Hanlon and Pope (1999), Cahan et al. (2000) and Isidro et al. (2004) find no incremental value relevance of other comprehensive income components. Conversely,

Kanagaretnam et al. (2009) and Kubota et al. (2009) find that other comprehensive income items are significantly associated with price and market returns and have significant information content. Similarly, Chambers et al. (2007) observe that other comprehensive income is priced on a dollar-for-dollar basis in the post-SFAS 130 period.

Chambers et al. (2007) using a sample of firms included in the S&P 500 index evaluate the usefulness of other comprehensive income components in the post-SFAS 130 period. They argue that the inconsistent pricing of other comprehensive income items in prior archival research is an artifact of research design. They attribute the power of their results to the use of post-SFAS 130 *as reported* figures rather than pre-SFAS 130 *as if* measure of other comprehensive income components.

Goncharov and Hodgson (2011) use 56,700 observations across 16 European countries to test the decision usefulness of comprehensive income by assessing its information, valuation and prediction effects on general investors and on financial analysts' forecasts. They find consistent support for the retention of net income and observe that net income dominates aggregate comprehensive income as a general decision-relevant metric.

Many of the studies that examine the usefulness of comprehensive income use *as if* measures to construct comprehensive income (e.g., Cheng et al., 1993; Dhaliwal et al., 1999; Biddle and Choi, 2006; Kubota et al., 2009; Goncharov and Hodgson, 2011), which introduce measurement error (Chambers et al., 2007). Studies that use *as reported* measures of comprehensive income (e.g., Chambers et al., 2007;

Kanagaretnam et al., 2009) rely on limited samples. This thesis provides evidence using an extensive sample of *as reported* measures of comprehensive income and its components.

The mixed evidence in the literature provides the motivation to examine whether requiring a single statement of comprehensive income is likely to increase or decrease the value relevance of accounting information. Recognizing the fact that the FASB/IASB are considering the introduction of a single statement of comprehensive income, it is timely to provide further evidence on the value relevance of comprehensive income and its components. Similar to other association studies, this thesis examines the relative and incremental effects of comprehensive income on share prices and returns. The specific research questions investigated are:

RQ1: Does each individual component of comprehensive income have incremental value relevance?

RQ2: Is comprehensive income more value relevant than net income?

Table 12

Studies Examining the Value Relevance of Comprehensive Income

Study	Journal	Country	Sample Period	Methodology	Conclusion
Cheng et al. (1993)	ABR	US	1972-1989	Association: Relative and Incremental	Comprehensive income is the least useful in explaining returns compared to net income and operating income. Other comprehensive income components have marginal usefulness.
Dhaliwal et al. (1999)	JAE	US	1994-1995	Association: Relative	Comprehensive income is not a better measure of firm performance than other summary measures. Moreover, except for marketable securities adjustments, components of other comprehensive income add noise to comprehensive income.
O'Hanlon and Pope (1999)	BAR	UK	1972-1992	Association: Incremental	Ordinary profit reported under UK GAAP is value relevant. Further, UK dirty surplus accounting flows do not have any value relevant items.
Cahan et al. (2000)	JBFA	NZ	1993-1997	Association: Relative and Incremental	Comprehensive income is more value relevant than net income. However, the individual components of dirty surplus flows are not value relevant above aggregate comprehensive income.

(Continued on next page)

Table 12 (Continued)

Study	Journal	Country	Sample Period	Methodology	Conclusion
Isidro et al. (2004)	ABR	France, Germany, UK, US	1993-2001	Association: Incremental	Omission of dirty surplus flows may cause problems as regards the accuracy of performance measures, however, it pose no significant problem as regards bias in such performance measures or in value estimates.
Biddle and Choi (2006)	JCAE	US	1994-1998	Association: Relative and Incremental	SFAS 130 comprehensive income is a better measure in explaining equity returns compared to full comprehensive income. Separate disclosure of comprehensive income components is useful.
Chambers et al. (2007)	RAS	US	1994-2003	Association: Incremental	Other comprehensive income is priced on a dollar-for-dollar basis in the post-SFAS 130 period. This result is attributed to the use of *as reported* measures of other comprehensive income rather than *as if* measures.
Kanagaretnam et al. (2009)	JAPP	Canada	1998-2003	Association: Relative and Incremental	Comprehensive income is more strongly associated with both stock price and returns compared to net income. Available-for-sale and cash flow hedges components of comprehensive income are value relevant.

(Continued on next page)

Table 12 (Continued)

Study	Journal	Country	Sample Period	Methodology	Conclusion
Kubuta et al. (2009)	SSRN	Japan	2000-2004	Association: Relative and Incremental	Net income possesses superior information content compared to comprehensive income. Other comprehensive income items possess significant information content.
Goncharov and Hodgson (2011)	JBFA	16 European countries	1991-2005	Association: Relative and Incremental	Net income dominates aggregated comprehensive income as a decision-relevant metric.

Journal Abbreviations:
ABR = Accounting and Business Research
BAR = The British Accounting Review
JAE = Journal of Accounting and Economics
JAPP = Journal of Accounting and Public Policy
JBFA = Journal of Business Finance and Accounting
JCAE = Journal of Contemporary Accounting and Economics
RAS = Review of Accounting Studies
SSRN = Social Science Research Network

5.2 Comprehensive Income Predictive Power Research

Beaver et al. (1968, p. 675) define the predictive ability criterion for the evaluation of accounting data as:

"...according to this criterion, alternative accounting measurements are evaluated in terms of their ability to predict events of interest to decision makers. The measure with the greatest predictive power with respect to a given event is considered to be the 'best' method for that particular purpose."

The predictability of earnings is defined as the ability of past earnings to predict future earnings (Lipe, 1990, p. 50). The FASB regards predictability as an element of relevance in the Conceptual Framework and is therefore a desirable attribute of earnings from the standard setters' perspective (SFAC 8, Ch. 3, QC7-8; Francis et al., 2004). The predictive power of income is an attribute that is of high relevance to analysts as it reduces forecast risk (Lee, 1999; Francis et al., 2004; Pronobis and Zülch, 2010). Examining the predictive power of earnings provides a direct relation between accounting information and future firm operating performance (Pronobis and Zülch, 2010).

The EAA (2006) argue that earnings components may have time series properties that make them useful for the prediction of future cash flows. One of the main thrusts of the FASB and the IASB in the discussion paper (IASB, 2008) is that financial statements should assist users in predicting the entity's future cash flows. This thesis examines the cash flow predictive ability of comprehensive income compared to net income.

Dhaliwal et al. (1999) use US firms' data and find net income predicts future operating cash flows and income better than comprehensive income. Biddle and Choi (2006) observe that no income definition clearly dominates in decision usefulness for the prediction of future operating income. However, Choi and Zang (2006) and Choi et al. (2007) find comprehensive income is incrementally useful in predicting subsequent period changes in net income. Similarly, Kanagaretnam et al. (2009) find that comprehensive income better predicts future operating cash flows compared to net income. They conclude that the better predictive ability of comprehensive income is driven by the presence of holding gains and losses on available-for-sale securities. However, they find that net income is a better predictor of future net income, compared to comprehensive income.

Wang (2006) observes net income generally outperforms clean surplus income in predicting future firm performance in an international comparative study. Pronobis and Zülch (2010) examine the predictive power of comprehensive income and its individual components within the institutional setting of German IFRS firms. They find no evidence that comprehensive income has superior predictive power for future firm operating performance over net income. Further, incremental predictive power of aggregated or individual components of other comprehensive income for the subsequent period's operating performance is insignificant. However, they observe other comprehensive income components seem to have incremental predictive power beyond one period. Goncharov and Hodgson (2011) find net income dominates aggregated comprehensive income in predicting future cash flows.

Table 13 provides a list of prior studies investigating predictive power of

comprehensive income and gives a brief summary of their findings. Table 13 indicates that most of the comprehensive income predictive power studies have been carried out in the US, followed by studies in the Europe. Studies mostly use data during the period 1991 to 2005. The current study uses the recent data, 2005-2010.

All of the US studies listed in Table 13 use an *as if* measure of comprehensive income. The method these studies follow to calculate the *as if* measure is introduced in Dhaliwal et al. (1999). Dhaliwal et al. (1999) state in footnote 9 that they test the accuracy of their constructed other comprehensive income (which is high for the marketable securities adjustments and foreign currency translation adjustments but low for the pension adjustments) and find it to be robust. Chambers et al. (2007) argue that the mixed results in prior literature regarding the usefulness of comprehensive income are attributed partially to the use of *as if* estimates of other comprehensive income measures, which introduce measurement error. Although some studies (e.g., Kanagaretnam et al., 2009; Pronobis and Zülch, 2010) use actual reported data, their sample sizes are small (i.e., 228 and 370 firm-year observations, respectively) and limited to a single country (i.e., Canada and Germany, respectively). This thesis uses actual reported figures for all of the comprehensive income components and comprehensive income.

The above discussion reveals that there are mixed results in the literature regarding the predictive power of comprehensive income. Thus, further evidence on the predictive power of comprehensive income is useful. Hence, the last section of this thesis explores the predictive power of comprehensive income. The specific research questions this thesis investigates are:

RQ1: Does comprehensive income have superior predictive power to predict future operating cash flow and future net income compared to net income?

RQ2: Does each component of other comprehensive income have incremental predictive power to predict future operating cash flow and future net income?

5.3 Chapter Summary

An analysis of the value relevance and predictive power literature reveals that although there is theoretical support for comprehensive income, the empirical research yields conflicting results. Chambers et al. (2007) argue that the inconsistent results in prior literature can partially be attributed to the use of *as if* constructs of comprehensive income. Prior studies that use *as reported* measures of comprehensive income and its components rely on limited samples (e.g., Chambers et al., 2007; Kanagaretnam et al., 2009). Therefore, this thesis uses an extensive sample of *as reported* data of comprehensive income and other comprehensive income to investigate the value relevance and predictive power of comprehensive income. This thesis investigates the relative and incremental value relevance and predictive power of comprehensive income.

The next chapter explains the sample selection procedures and the research design used to investigate the research questions identified in this chapter.

Table 13

Prior Studies on Predictive Power of Comprehensive Income

Study	Country	Sample Period	Sample Size	Comprehensive income	Conclusions
Dhaliwal et al. (1999)	US	1994-1995	8,893 firm-years	*As if* Measure	Net income is a better predictor of future operating cash flows and future net income compared to comprehensive income.
Biddle and Choi (2006)	US	1994-1998	23,427 firm-years	*As if* Measure	No income definition clearly dominates in decision usefulness for the prediction of future operating income.
Choi and Zang (2006)	US	1998-2003	5,237 firm-years	*As if* Measure	Comprehensive income is incrementally useful in predicting subsequent period changes in net income.
Wang (2006)	14 European countries	1993-2002	25,604 firm-years	*As if* Measure	Net income generally outperforms clean surplus income in predicting future firm performance, except in Belgium.
Choi et al. (2007)	US	1994-2003	15,977 firm-years	*As if* Measure	Comprehensive income better predicts subsequent period net income compared to current period net income.
Goncharov and Hodgson (2011)	16 European countries	1991-2005	29,489 firm-years	*As if* Measure	Net income dominates comprehensive income in predicting future operating cash flows and individual other comprehensive components have no incremental predictive power.
Kanagaretnam et al. (2009)	Canada	1998-2003	228 firm-years	*As reported* Measure	Net income is a better predictor of future net income compared to comprehensive income. However, comprehensive income better predicts future operating cash flows than net income.
Pronobis and Zülch (2010)	Germany	1998-2007	370 firm-years	*As reported* Measure	Comprehensive income has no superior power for future firm operating performance than net income. There is no incremental predictive power of aggregated or individual components of other comprehensive income.

CHAPTER 6: SAMPLE, RESEARCH DESIGN AND RESULTS FOR THE VALUE RELEVANCE AND PREDICTIVE POWER STUDIES

6.1 Sample

Accounting data and other variables for the US firms are obtained from Compustat for the period 2004-2010. The start year is 2004 as Compustat reports all components of other comprehensive income from this date. The sample consists of all 2004-2010 firm-years that have data on Compustat for the required variables. The final sample size used for the value relevance price model tests is 40,834 firm-years and 49,163 firm-years for the returns models while 28,936 firm-years for the predictive power tests. Data for all variables are winsorized between one to 5 per cent top and bottom due to extreme observations. The advantage of this data set is that it provides an extensive sample.

The criteria for the NZ sample has already been defined in the volatility study (refer to Table 2). The sample comprises of 92 firms over the period 2003-2010 and a total of 736 firm-year observations are used for both the value relevance and predictive power tests. Data for annual net income, other comprehensive income and comprehensive income are hand collected from annual financial statements. Accounting data are extracted from the statement of total recognised revenues and expenses and statement of movements in equity, required by FRS 2, and statement of comprehensive income required by NZ IAS 1.

Data for stock price, number of shares outstanding, operating cash flows, book value per share and market value of equity are obtained from DataStream International. Stock

returns are calculated by deducting previous year stock price from current year stock price divided by previous year stock price. In case of any missing observations for stock price and market value of equity, the firm's overall mean for the remaining observations is used to replace the missing observation. Actual figures are extracted from the annual reports in case of missing values of number of shares outstanding, operating cash flows and book value per share.

6.2 Research Design

6.2.1 Value Relevance

This thesis examines the association between price and the other comprehensive income components. It follows Kanagaretnam et al. (2009), who base their work on Ohlson (1995), which explains that firm value is a function of book value and abnormal or residual earnings. The empirical implications of Ohlson (1995) are applied to firms using the following valuation function:

$$MVE_{jt} = \alpha_0 + \alpha_1 BVE_{jt} + \alpha_2 NI_{jt} + \alpha_3 \upsilon_t$$

Where, MVE denotes market capitalization (price per share times number of shares outstanding) of the firm j at time t; BVE denotes the book value of equity for firm j at time t; NI denotes net income for firm j for the fiscal year ending time t and υ denotes other information about future abnormal earnings reflected in the firm's equity value but not found anywhere in the financial statements of the firm.

This thesis examines whether stock prices reflect any incremental information provided

by the other comprehensive income components over book value of equity and earnings. To do so, the following regression model is estimated, which is an expanded version of the valuation function in the above equation and is similar to those used in other value relevance studies (e.g., Barth and Clinch, 1996; Rees and Elgers, 1997; Harris and Muller, 1999).

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \alpha_3 FCT\_S_{jt} + \alpha_4 AR\_S_{jt} + \alpha_5 SGL\_S_{jt} + \alpha_6 CFH\_S_{jt} + \alpha_7 PA\_S_{jt} + \varepsilon_{jt} \quad (1)$$

Where, all variables except P are deflated by number of shares outstanding; denoted by _S.

P denotes price per share; j denotes firm; t denotes end of fiscal year; BVE_S denotes book value of common equity; NI_S denotes annual net income after taxes; FCT_S denotes the change in cumulative foreign currency translation adjustments; AR_S denotes the change in assets revaluation reserves; SGL_S denotes the gains/losses due to the change in fair value of available-for-sale securities; CFH_S_{jt} denotes the gains/losses due to the change in the fair value of cash flow hedge reserves and PA_S is the change in additional minimum pension liability in excess of unrecognized prior service costs.

Positive coefficients are expected for all variables in Model (1) except for CFH_S. For CFH_S, negative values of the change in the fair value of cash flow hedges may provide risk relevant information that could be positively associated with returns (Venkatachalam, 1996). Even losing positions of hedging activities can be viewed as a positive signal by the market and investors may think that firms are proactively managing their risk. Model (1) is modified to include GAIN (an indicator variable = 1 if the firm has a winning cash flow hedge position for that year and 0 otherwise) and an

interaction term, CFH_S_GAIN, which is defined as CFH_S*GAIN (Kanagaretnam et al., 2009).

$$P_{jt} = \alpha_0 + \alpha_1 BVE_{jt} + \alpha_2 NI\_S_{jt} + \alpha_3 FCT\_S_{jt} + \alpha_4 AR\_S_{jt} + \alpha_5 SGL\_S_{jt} + \alpha_6 CFH\_S_{jt} + \alpha_7 PA\_S_{jt} + \alpha_8 GAIN_{jt} + \alpha_9 CFH\_S\_GAIN_{jt} + \varepsilon_{jt} \quad (2)$$

If both the winning and losing hedging positions are interpreted as positive signals, then α_6 should be negative and the sum of coefficients on CFH_S and CFH_S_GAIN ($\alpha_6 + \alpha_9$) should be positive (Kanagaretnam et al., 2009).

To test the relative value relevance of comprehensive income compared to net income, the following price models are estimated:

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \varepsilon_{jt} \quad (3)$$

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI\_S_{jt} + \varepsilon_{jt} \quad (4)$$

Where, CI_S denotes annual comprehensive income after taxes and all other variables are defined above.

Following Kanagaretnam et al. (2009), who base their work on Dhaliwal et al. (1999), this thesis examines whether the addition of each individual component of other comprehensive income to net income improves the association of net income with stock price. To do so, the following model is estimated repeatedly for each individual component of other comprehensive income:

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{(FCT...PA)jt} + \varepsilon_{jt} \quad (5\text{-}8)$$

Where, CI_{FCT} denotes net income adjusted for the change in cumulative foreign currency translation adjustments for the fiscal year t;…CI_{PA} denotes net income adjusted for the change in additional minimum pension liability in excess of

unrecognized prior service costs for the fiscal year t and all other variables are defined above. All variables are scaled by the number of outstanding shares.

To test the robustness of results, the association between returns and other comprehensive income is examined. Following Kanagaretnam et al. (2009), both price and returns models are used as there are problems with both functional forms (Kothari and Zimmerman, 1995). The price models generate slope coefficients that are less biased than returns models. However, Christie (1987) and Kothari and Zimmerman (1995) argue that return models have less serious econometric problems compared to price models. Price models have more econometric problems in the form of heteroskedastic specification errors. Moreover, omitted variables have less of an effect in returns models as those often use change variables. Combined use of price and return models potentially provide more useful results (Kothari and Zimmerman, 1995).

The following model is estimated to examine the association between returns and other comprehensive income components (Dhaliwal et al., 1999; Biddle and Choi, 2006; Kanagaretnam et al., 2009).

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 FCT\_M_{jt} + b_3 AR\_M_{jt} + b_4 SGL\_M_{jt} + b_5 CFH\_M_{jt} + b_6 PA\_M_{jt} + \varepsilon_{jt} \quad (9)$$

Where, all variables are scaled by the market value of equity at the beginning of the fiscal year (denoted by _M) except RET, which denotes returns and all other variables are defined above.

Positive coefficients are expected for all variables except for CFH_M in Model (9). As already discussed in price models, both winning and losing hedge positions may be

viewed as signals by the market. Model (9) is modified to include GAIN (an indicator variable = 1 if the firm has a winning cash flow hedge position for that year and 0 otherwise) and an interaction term, CFH_M_GAIN, which is defined as CFH_M*GAIN.

$$RET_{jt} = b_0 + b_1NI\_M_{jt} + b_2FCT\_M_{jt} + b_3AR\_M_{jt} + b_4SGL\_M_{jt} + b_5CFH\_M_{jt} + b_6PA\_M_{jt} + b_7GAIN_{jt} + b_8CFH\_M\_GAIN_{jt} + \varepsilon_{jt} \quad (10)$$

Where, all variables are defined above.

Following Kanagaretnam et al. (2009) and Biddle and Choi (2006), Model (9) is run with the lagged variables of net income and other comprehensive income components for the NZ sample and the following regression is estimated:[25]

$$RET_{jt} = b_0 + b_1NI\_M_{jt} + b_2FCT\_M_{jt} + b_3AR\_M_{jt} + b_4SGL\_M_{jt} + b_5CFH\_M_{jt} + b_6PA\_M_{jt} + b_7NI\_M_{jt-1} + b_8FCT\_M_{jt-1} + b_9AR\_M_{jt-1} + b_{10}SGL\_M_{jt-1} + b_{11}CFH\_M_{jt-1} + b_{12}PA\_M_{jt-1} + \varepsilon_{jt} \quad (11)$$

Where, all variables are defined above.

Similarly, Model (10) is also estimated with the lagged variables:

$$RET_{jt} = b_0 + b_1NI\_M_{jt} + b_2FCT\_M_{jt} + b_3AR\_M_{jt} + b_4SGL\_M_{jt} + b_5CFH\_M_{jt} + b_6PA\_M_{jt} + b_7GAIN_{jt} + b_8CFH\_M\_GAIN_{jt} + b_9NI\_M_{jt-1} + b_{10}FCT\_M_{jt-1} + b_{11}AR\_M_{jt-1} + b_{12}SGL\_M_{jt-1} + b_{13}CFH\_M_{jt-1} + b_{14}PA\_M_{jt-1} + \varepsilon_{jt} \quad (12)$$

Where, all variables are defined above.

[25] The lagged variables are not used for the US sample, as firm-year observations differ in each year and due to losing too many observations, the lagged variables are avoided. For the NZ sample, data for every sample firm is available for each sample year.

The following returns models are used to test the relative value relevance of comprehensive income compared to net income:

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + \varepsilon_{jt} \quad (13)$$

$$RET_{jt} = b_0 + b_1 CI\_M_{jt} + \varepsilon_{jt} \quad (14)$$

Where, all variables are defined above and scaled by the opening market value of equity except RET.

The returns models testing the relative value relevance of comprehensive income are also run with the lagged variables of net income and comprehensive income for the NZ sample. The regression models estimated are:

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 NI\_M_{jt-1} + \varepsilon_{jt} \quad (15)$$

$$RET_{jt} = b_0 + b_1 CI\_M_{jt} + b_2 CI\_M_{jt-1} + \varepsilon_{jt} \quad (16)$$

Where, all variables are defined above.

Similar to the price models, net income is adjusted for each individual component of other comprehensive income in the returns models and the following model is estimated repeatedly for each individual component:

$$RET_{jt} = b_0 + b_1 CI_{(FCT...PA)jt} + \varepsilon_{jt} \quad (17\text{-}20)$$

Where, all variables are defined above.

6.2.2 Predictive Power

Prior literature shows that earnings reflect cash flow forecasts (e.g., Beaver, 1989; Dechow, 1994) and are more correlated with value than current cash flows (e.g., Watts, 1977; Dechow, 1994). Dechow et al. (1998) show that firm performance should be

reflected in future operating cash flows and income as well as in stock returns. Hence, if comprehensive income is a better summary performance measure, then it should be more strongly associated with future operating cash flows and income than other measures (Dhaliwal et al., 1999). In order to examine the predictive power of comprehensive income, this thesis adopts the Kanagaretnam et al. (2009) models. To assess the predictive ability of income measures, the association of net income and comprehensive income with future operating cash flows and future net income is examined:

$$CFO_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \varepsilon_{jt} \quad (21)$$

$$CFO_{jt+1} = \alpha_0 + \alpha_1 CI_{jt} + \varepsilon_{jt} \quad (22)$$

$$NI_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \varepsilon_{jt} \quad (23)$$

$$NI_{jt+1} = \alpha_0 + \alpha_1 CI_{jt} + \varepsilon_{jt} \quad (24)$$

Where, CFO_{jt+1} denotes annual operating cash flow for the fiscal year t+1 and NI_{jt+1} denotes annual net income for the fiscal year t+1. NI_{jt} and CI_{jt} are defined above.

The following models are used to examine the predictive ability of individual other comprehensive income components.

$$CFO_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \alpha_2 FCT_{jt} + \alpha_3 AR_{jt} + \alpha_4 SGL_{jt} + \alpha_5 DGL_{jt} + \alpha_6 PA_{jt} + \varepsilon_{jt} \quad (25)$$

$$NI_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \alpha_2 FCT_{jt} + \alpha_3 AR_{jt} + \alpha_4 SGL_{jt} + \alpha_5 DGL_{jt} + \alpha_6 PA_{jt} + \varepsilon_{jt} \quad (26)$$

Where, all variables are as previously defined above.

6.3 Value Relevance Results

6.3.1 Results for US Sample

Panel A of Table 14 provides descriptive statistics of the variables used to examine the association of price with the other comprehensive income components and comprehensive income. All variables are scaled by the number of outstanding shares. The descriptive statistics are for the sample of 40,834 firm-year observations over the period 2004–2010.

The mean net income of 0.687 and the mean comprehensive income of 0.445 suggests for most of the sample firms comprehensive income is lower than net income. The descriptive results are consistent with the results of the sample used for volatility analysis. The lower mean of comprehensive income is driven by the negative means of most of the other comprehensive income components.

The exposure draft (FASB, 1996) required a company to report per share amount of comprehensive income. However, SFAS 130 does not require such disclosure. The disclosure of per share amount was mainly opposed on the basis that such disclosure would give comprehensive income more prominence than net income and would result in confusion (SFAS 130, para. 76). However, the higher mean of net income per share compared to comprehensive income per share suggests that an underlying reason for opposing such disclosure could be that companies do not want to highlight a lower return per share, which is calculated on a comprehensive income basis.

Table 14

US Sample: Descriptive Statistics of Income Measures and Other Comprehensive Income Components

Panel A: Descriptive statistics for the variables used in the association of price with other comprehensive income components and comprehensive income. The sample consists of all 2004-2010 firm-years that have data on Compustat for price, book value of equity, net income, other comprehensive income components and comprehensive income. Sample size is 40,834 firm-years.

Variable	Mean	Std.Dev	Min	1ST Quart	Median	3rd Quart	Max
p	17.387	17.398	0.090	3.280	11.960	26.050	71.500
BVE_S	9.715	14.712	-0.662	1.126	5.853	12.838	144.925
NI_S	0.687	2.231	-5.976	-0.183	0.321	1.386	15.817
FCT_S	0.000	0.344	-7.545	0.000	0.000	0.000	1.638
CFH_S	-0.004	0.056	-0.537	0.000	0.000	0.000	0.260
PA_S	-0.000	0.134	-0.807	0.000	0.000	0.000	1.523
SGL_S	-0.037	0.351	-8.637	0.000	0.000	0.000	0.102
CI_S	0.445	1.689	-7.419	-0.115	0.097	1.199	4.980

(Continued on next page)

Table 14 (continued)

Panel B: Descriptive statistics for the variables used in the association of returns with other comprehensive income components and comprehensive income. The sample consists of all 2004-2010 firm-years that have data on Compustat for returns, net income, other comprehensive income components and comprehensive income. Sample size is 49,163 firm-years.

Variable	Mean	Std.Dev	Min	1ST Quart	Median	3rd Quart	Max
RET	0.087	0.685	-0.996	-0.426	0.137	0.445	3.133
NI_M	0.011	0.130	-0.331	-0.033	0.000	0.062	1.125
FCT_M	0.001	0.014	-0.136	0.000	0.000	0.000	0.136
CFH_M	-0.001	0.096	-20.411	0.000	0.000	0.000	0.071
PA_M	-0.001	0.005	-0.054	0.000	0.000	0.000	0.020
SGL_M	0.000	0.011	-0.132	0.000	0.000	0.000	0.105
CI_M	0.024	0.111	-0.196	0.000	0.000	0.056	1.325

Where in Panel A, P denotes price per share; BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes net income after tax for the fiscal year t; FCT_S denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH_S denotes the change in fair value of cash flow hedges for the fiscal year t; PA_S is the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t; SGL_S denotes securities gains/losses for the fiscal year t deflated by the number of outstanding shares and CI_S denotes comprehensive income for the fiscal year t. All variables are scaled by the number of outstanding shares except P.

In Panel B, all variables except RET are scaled by the market value of common equity at the beginning of the fiscal year. RET denotes stock returns for the fiscal year t; NI_M denotes net income for the fiscal year t; FCT_M denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH_M denotes the change in fair value of cash flow hedges for the fiscal year t; PA_M is the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t; SGL_M denotes securities gains/losses for the fiscal year t and CI_M denotes comprehensive income for the fiscal year t.

The median values are close to zero for all the four components of comprehensive income, they are tested if they statistically differ from zero.[26] The results (untabulated) show that the medians for all the four components are statistically different from zero at the 1 and 10 per cent level. The mean values of change in fair value of cash flow hedge reserves (-0.001), change in additional minimum pension liability in excess of unrecognized prior service costs (-0.000) and change in fair value of available-for-sale securities (-0.037) indicate that the majority of the other comprehensive income components are negative and small in magnitude for the sample firms.

Panel B of Table 14 provides descriptive statistics of the variables used to examine the association of market returns with the other comprehensive income components and comprehensive income. The mean stock return for the sample firms is 8.7 per cent. The mean comprehensive income (0.024) in this instance is greater than the mean of net income (0.011), though the means of change in fair value of cash flow hedge reserves and change in additional minimum pension liability in excess of unrecognized prior service costs are negative (-0.001 and -0.001, respectively). However, the means of foreign currency translation adjustments and change in fair value of available-for-sale securities are positive (0.001 and 0.000 respectively).

Table 15, panel A reports the Pearson and Spearman correlations for the variables used in the price model. Among the correlations, the book value of equity and net income are positively correlated with market value of equity, consistent with expectations. The foreign currency translation adjustment is the only component of other comprehensive income that shows consistently significant but low correlation with stock price. The Pearson correlation for pension adjustments with stock price is positive and significant

[26] The one-sample sign test is used to test whether the medians are different from zero.

but very low. However, the Spearman correlation with stock price is negative and significant. The Pearson correlations of cash flow hedges and available-for-sale securities are negatively correlated with stock price. These results are consistent with Kanagaretnam et al. (2009).

Panel B presents the Pearson and Spearman correlation statistics for the variables used in the stock returns model. The correlations between stock returns and net income are positive and significant. Foreign currency adjustments, pension adjustments and available-for-sale securities are positively correlated with stock returns. Cash flow hedge items show negative Pearson and positive Spearman correlations with stock returns. These results are consistent with Kanagaretnam et al. (2009).

6.3.1.1 The Association between Price and Other Comprehensive Income Components

Table 16 reports the results for Model (1) and Model (2). Consistent with expectations, the coefficients for the book value of equity and net income are positive and highly significant. Foreign currency adjustments, pension adjustments and available-for-sale securities items of other comprehensive income are all positive and significant at the 1 and 10 per cent level. The results show that comprehensive income components are value relevant and priced by the market.

Table 15

US Sample: Correlation Matrix

Panel A: Correlation matrix for the variables used in the association between price and other comprehensive income components over the period 2004-2010. Sample size is 40,834 firm-years.

	P	BVE_S	NI_S	FCT_S	CFH_S	PA_S	SGL_S
P		0.634***	0.580***	0.040***	-0.033***	0.076***	-0.075***
BVE_S	0.766***		0.541***	-0.019***	-0.045***	-0.040***	-0.165***
NI_S	0.643***	0.588***		-0.031***	-0.010**	0.059***	-0.038***
FCT_S	0.101***	0.065***	0.074***		0.084***	0.267***	0.129***
CFH_S	0.014***	0.005	0.009*	0.015***		0.056***	0.049***
PA_S	-0.020***	-0.030***	-0.018***	0.116***	-0.015***		0.103***
SGL_S	0.008	0.014***	-0.006	0.048***	0.023***	0.058***	

(Continued on next page)

Table 15 (continued)

Panel B: Correlation matrix for the variables used in the association between stock returns and other comprehensive income components for the sample of 92 firms with data over 2003-2010, pooled across firms and years (n=736).

	RET	NI_M	FCT_M	CFH_M	PA_M	SGL_M
RET		0.178***	0.052***	-0.016***	0.028***	0.071***
NI_M	0.247***		0.066***	0.014***	0.017***	0.023***
FCT_M	0.070***	0.077***		0.003	0.125***	0.041***
CFH_M	0.046***	0.012**	0.014***		0.003	0.003
PA_M	0.013***	-0.016***	0.105***	-0.014***		0.050***
SGL_M	0.049***	0.013***	0.050***	0.022***	0.048***	

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

P denotes price per share; BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes net income after tax for the fiscal year t; FCT_S denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH_S denotes the change in fair value of cash flow hedges for the fiscal year t; PA_S is the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and SGL_S denotes securities gains/losses for the fiscal year t deflated by the number of outstanding shares.

In Panel B, all variables except RET are scaled by the market value of common equity at the beginning of the fiscal year. RET denotes stock returns for the fiscal year t; NI_M denotes net income for the fiscal year t; FCT_M denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH_M denotes the change in fair value of cash flow hedges for the fiscal year t; PA_M is the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and SGL_M denotes securities gains/losses for the fiscal year t.

The results are consistent with Chambers et al. (2007). As noted by Chambers et al. (2007), earlier empirical evidence showing value irrelevance of other comprehensive income (e.g., Dhaliwal et al., 1999) mostly use *as if* measures and may be subject to significant measurement error. A second reason for documenting value irrelevance is that other comprehensive income items were not explicitly reported before SFAS 130. Hence, the difference in findings compared to prior evidence could be the result of lower measurement error and the improved transparency in reporting in the post-SFAS 130 period. This thesis further supports the findings of Chambers et al. (2007). However, they draw their conclusions using firms in the S&P 500, whereas this thesis uses a larger sample.

The change in fair value of cash flow hedge reserves has a negative and significant relation with price. To further examine the market valuation of cash flow hedges, Model (2) is estimated, which includes the interaction term (CFH_S_GAIN) to account for losing and winning hedge positions. An indicator variable GAIN is also included in the regression to account for differences in the intercept. The coefficient for CFH_S is negative and significant at the 5 per cent level, while the coefficient for the interaction term is positive and highly significant.

Even though, the winning position (CFH_S_GAIN) is incrementally positively related to price, the sum of the coefficients on CFH_S and CFH_S_GAIN is negative and statistically different from zero. This is consistent with a winning hedge being priced although the hedge does not perfectly offset the hedged items.

Table 16

US Sample: Association between Price and Other Comprehensive Income Components

Coefficients from regression models:

Variable	Model (1)	Model (2)
Intercept	10.406	9.710
	(140.04)***	(127.80)***
BVE_S	0.537	0.521
	(105.68)***	(103.21)***
NI_S	2.586	2.517
	(78.18)***	(77.06)***
FCT_S	1.555	1.657
	(8.25)***	(8.91)***
CFH_S	-4.207	-20.489
	(-3.81)***	(-16.13)***
PA_S	3.848	4.060
	(8.00)***	(8.55)***
SGL_S	0.330	0.512
	(1.82)*	(2.87)***
GAIN		6.443
		(26.85)***
CFH_S_GAIN		12.963
		(4.00)***
F-Value	6375.31***	5069.39***
R^2	0.484	0.498

(Continued on next page)

Table 16 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes annual net income after tax for the fiscal year t; FCT_S denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH_S denotes the change in fair value of cash flow hedges for the fiscal year t; PA_S is the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and SGL_S denotes securities gains/losses for the fiscal year t. All variables are scaled by the number of outstanding shares. An indicator variable GAIN is also introduced, which is equal to 1 if the firm has a winning cash flow hedging position for that year and equal to 0 otherwise while CFH_S_GAIN denotes an interaction variable defined as CFH_S*GAIN.

Table 16 reports coefficients of the following regression models.

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \alpha_3 FCT\_S_{jt} + \alpha_4 CFH\_S_{jt} + \alpha_5 PA\_S_{jt} + \alpha_6 SGL\_S_{jt} + \varepsilon_{jt} \quad (1)$$

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \alpha_3 FCT\_S_{jt} + \alpha_4 CFH\_S_{jt} + \alpha_5 PA\_S_{jt} + \alpha_6 SGL\_S_{jt} + \alpha_7 GAIN_{jt} + \alpha_8 CFH\_S\_GAIN_{jt} + \varepsilon_{jt} \quad (2)$$

Where P_{jt} denotes price per share at the end of the fiscal year t. All other variables are defined above.

6.3.1.2 The Association between Stock Price and Aggregate Comprehensive Income

Prior research provides mixed evidence on the usefulness of aggregate comprehensive income using *as if* constructs of comprehensive income. This thesis adds further empirical evidence on the value relevance of comprehensive income using *as reported* constructs of comprehensive income and an extensive sample.

Table 17 reports the results for the test of value relevance of comprehensive income using the price model. Panel A summarises the two models with Model (3) using net

income and Model (4) using comprehensive income. The results show that both net income and comprehensive income are value relevant. However, comprehensive income has more explanatory power as the adjusted R^2 (0.510) of the model with comprehensive income is higher than the adjusted R^2 (0.481) of the model with net income. The Vuong (1989) test indicates that the difference in adjusted R^2s is significant and favours comprehensive income.

The results of the models that examine whether the addition of each individual component of other comprehensive income to net income improves the association of net income with stock price are reported in Panel B of Table 17. The addition of foreign currency translation adjustments improves the association of net income with stock price and the adjusted R^2 increases by 0.1 per cent. A comparison of R^2s of Model (3) and Model (5) shows that although the difference in R^2s is very small, it is significant at the 1 per cent level. Similarly, the addition of pension adjustments to net income also improves the association of net income with stock prices. Comparing R^2s of Model (3) and Model (7) shows that the difference is small but significant as indicated by the Vuong (1989) test. The Z-statistic is only reported for models that show statistically significant change in R^2s. The cash flow hedge reserves item provide no additional information beyond net income while available-for-sale securities component adds noise to net income. The price model results suggest that the dominant explanatory power of aggregate comprehensive income is driven by foreign currency translation adjustments and pension adjustments.

Table 17

US Sample: Association between Price and Aggregate Comprehensive Income

Panel A: Coefficients from price models with aggregate comprehensive income.

Variable	Model (3)	Model (4)
Intercept	10.412	9.836
	(139.91)***	(136.03)***
BVE_S	0.535	0.613
	(106.76)***	(141.13)***
NI_S	2.614	
	(79.10)***	
CI_S		3.586
		(94.80)***
F-Value	18937.20***	21219.67***
R^2	0.481	0.510
Z-statistic		-11.08***

Panel B: Coefficients from price models with components of comprehensive income.

Variable	Model (5)	Model (6)	Model (7)	Model (8)
Intercept	10.394	10.416	10.421	10.397
	(139.87)***	(139.93)***	(140.18)***	(139.55)***
BVE_S	0.540	0.536	0.534	0.553
	(108.80)***	(107.02)***	(106.68)***	(112.47)***
CI_{FCT}	2.570			
	(79.85)***			
CI_{CFH}		2.608		
		(78.97)***		
CI_{PA}			2.617	
			(79.74)***	
CI_{SGL}				2.522
				(78.38)***
F-Value	19036.35***	18920.11***	19021.82***	18842.46***
R^2	0.482	0.481	0.482	0.480
Z-statistic	-2.27**		-5.18***	

(Continued on next page)

Table 17 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes net income after tax for the fiscal year t and CI_S denotes comprehensive income for the fiscal year t. CI_{FCT} denotes net income adjusted for the change in cumulative foreign currency translation adjustments for the fiscal year t; CI_{CFH} denotes net income adjusted for the change in the fair value of cash flow hedges for the fiscal year t; CI_{PA} denotes net income adjusted for the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and CI_{SGL} denotes net income adjusted for fair value gains/losses on securities for the fiscal year t. All variables are scaled by the number of outstanding shares.

The adjusted R^2s are compared using the likelihood ratio test described in Vuong (1989), which hypothesises that both models are equally distant from the true model. The Z-statistic is the Z-statistic associated with the Vuong test.

Panel A reports coefficients of the following regression models.

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \varepsilon_{jt} \quad (3)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI\_S_{jt} + \varepsilon_{jt} \quad (4)$$

Panel B reports coefficients of the following regression models.

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{FCTjt} + \varepsilon_{jt} \quad (5)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{CFHjt} + \varepsilon_{jt} \quad (6)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{PAjt} + \varepsilon_{jt} \quad (7)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{SGLjt} + \varepsilon_{jt} \quad (8)$$

Where P_{jt} denotes price per share at the end of the fiscal year t. All other variables are defined above.

6.3.1.3 The Association between Market Returns and Other Comprehensive Income Components

The regression results for the returns models are presented in Table 18. Model (9) is used to examine the association between returns and other comprehensive income components. Net income is significantly positively associated with market returns. The coefficients for the foreign currency adjustments, pension adjustments and available-for-sale items of other comprehensive income are all positively significantly associated with market returns. These results support the findings from price models and show that other comprehensive income components are value relevant.

The change in cash flow hedge reserves is significantly negatively related with returns. To be consistent with the approach in price Model (2), the negative sign of the cash flow hedge component is further examined by introducing an indicator variable, GAIN, and an interaction term, CFH_M_GAIN. The results for this regression model are reported under Model (10). The coefficient for the change in cash flow hedge reserves is negative and significant at the 1 per cent level, while the coefficient for the interaction term is positive and highly significant. The significant negative coefficient is consistent with the argument of Venkatachalam (1996) that losing hedged positions can also be viewed as a positive signal by the market as it indicates that the firms are actively managing risk. These results are similar to those documented in Kanagaretnam et al. (2009).

Table 18

US Sample: Association between Returns and Other Comprehensive Income Components

Coefficients from basic regression models:

Variable	Model (9)	Model (10)
Intercept	0.077	0.067
	(25.12)***	(21.15)***
NI_M	0.920	0.912
	(39.27)***	(38.94)***
FCT_M	1.740	1.499
	(8.10)***	(7.00)***
CFH_M	-0.136	-0.165
	(-4.30)***	(-5.21)***
PA_M	2.291	2.971
	(3.96)***	(5.15)***
SGL_M	4.014	3.671
	(14.54)***	(13.33)***
GAIN		0.019
		(1.72)*
CFH_M_GAIN		15.162
		(18.03)***
F-Value	391.41***	342.90***
R^2	0.038	0.046

(Continued on next page)

Table 18 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

NI_M denotes net income for the fiscal year t; FCT_M denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH_M denotes the change in fair value of cash flow hedges for the fiscal year t; PA_M denotes the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and SGL_M denotes securities gains/losses for the fiscal year t. All variables except RET are scaled by the market value of common equity at the beginning of the fiscal year. An interaction variable GAIN is also introduced, which is equal to 1 if the firm has a winning cash flow hedging position for that year and equal to 0 otherwise while CFH_M_GAIN denotes an interaction variable defined as CFH_M*GAIN.

Table 17 reports the coefficients of the following regression models:

$$RET_{jt} = b_0 + b_1NI\_M_{jt} + b_2FCT\_M_{jt} + b_3CFH\_M_{jt} + b_4PA\_M_{jt} + b_5SGL\_M_{jt} + \varepsilon_{jt} \quad (9)$$

$$RET_{jt} = b_0 + b_1NI\_M_{jt} + b_2FCT\_M_{jt} + b_3CFH\_M_{jt} + b_4PA\_M_{jt} + b_5SGL\_M_{jt} + b_6GAIN_{jt} + b_7CFH\_M\_GAIN_{jt} + \varepsilon_{jt} \quad (10)$$

Where RET_{jt} denotes annual stock returns for the fiscal year t. All of the other variables are defined above.

6.3.1.4 The Association between Returns and Aggregate Comprehensive Income

Panel A of Table 19 reports the regression results of the association between aggregate comprehensive income and returns. In the returns models, the adjusted R^2s of Model (13) is 0.032 and Model (14) is 0.040. The Vuong (1989) test shows the higher explanatory power of comprehensive income is significant at the 1 per cent level.

Similar to the price models, in the returns models net income is adjusted for individual components of comprehensive income to see which component improves the association of net income with returns and the results are reported in Panel B of Table 19.

Table 19

US Sample: Association between Returns and Aggregate Comprehensive Income

Panel A: Coefficients from returns models with aggregate comprehensive income.

Variable	Model (13)	Model (14)
Intercept	0.077	0.057
	(25.22)***	(18.55)***
NI_M	0.941	
	(40.13)***	
CI_M		1.238
		(45.40)***
F-Value	1610.19***	2060.79***
R^2	0.032	0.040
Z-statistic		-5.46***

Panel B: Coefficients from returns models with components of comprehensive income.

Variable	Model (17)	Model (18)	Model (19)	Model (20)
Intercept	0.076	0.082	0.077	0.077
	(24.99)***	(26.63)***	(25.37)***	(25.17)***
CI_{FCT}	0.946			
	(40.91)***			
CI_{CFH}		0.561		
		(29.72)***		
CI_{PA}			0.944	
			(40.33)***	
CI_{SGL}				0.962
				(41.29)***
F-Value	1673.83***	883.37***	1626.73***	1704.85***
R^2	0.033	0.018	0.032	0.033
Z-statistic	-3.71***		-3.91***	-10.45***

(Continued on next page)

Table 19 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

NI_M denotes net income for the fiscal year t; CI_M denotes comprehensive income for the fiscal year t; CI_{FCT} denotes net income adjusted for the change in cumulative foreign currency translation adjustments for the fiscal year t; CI_{CFH} denotes net income adjusted for the change in the fair value of cash flow hedges for the fiscal year t; CI_{PA} denotes net income adjusted for the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and CI_{SGL} denotes net income adjusted for fair value gains/losses on securities for the fiscal year t. All variables are scaled by the market value of common equity at the beginning of the fiscal year.

The adjusted R^2s are compared using the likelihood ratio test described in Vuong (1989), which hypothesises that both models are equally distant from the true model. The Z-statistic is the Z-statistic associated with the Vuong test.

Panel A reports coefficients of the following regression models.

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + \varepsilon_{jt} \quad (13)$$
$$RET_{jt} = b_0 + b_1 CI\_M_{jt} + \varepsilon_{jt} \quad (14)$$

Panel B reports coefficients of the following regression models.

$$RET_{jt} = b_0 + b_1 CI_{FCTjt} + \varepsilon_{jt} \quad (17)$$
$$RET_{jt} = b_0 + b_1 CI_{CFHjt} + \varepsilon_{jt} \quad (18)$$
$$RET_{jt} = b_0 + b_1 CI_{PAjt} + \varepsilon_{jt} \quad (19)$$
$$RET_{jt} = b_0 + b_1 CI_{SGLjt} + \varepsilon_{jt} \quad (20)$$

Where RET_{jt} denotes annual stock returns for the fiscal year t. All of the other variables are defined above.

Foreign currency translation adjustments and available-for-sale securities items improve the association of net income with returns. Comparing Model (13) with Model (17) and Model (20), the difference between R^2s is significant at the 1 per cent level. Although the R^2s for Model (13) and Model (19) are the same, the analysis show that they significantly differ and Model (19) with net income adjusted for pension adjustments is closer to the true model.[27] The Z-statistic is only reported for models that show

[27] The actual R^2 for Model (13) is 0.0317, however, due to rounding it is reported as 0.032 while the

statistically significant change in R^2s. The change in fair value of cash flow hedge reserves adds noise to net income, which is consistent with the result documented by Kanagaretnam et al. (2009). The addition of noise is not a surprising result as both winning and losing hedge positions may signal risk management. As there is no distinction between the two positions, it is hard to interpret the coefficient. These results are consistent with the price models and show that foreign currency translation adjustments, pension adjustments and gains/losses on available-for-sale securities components of comprehensive income add valuable information.

The results of Table 17 and Table 19 coupled with the results of Table 16 and Table 18 show that comprehensive income and other comprehensive income components are value relevant. Comparing these results with results documented in prior research, it appears in the post-SFAS 130 period, comprehensive income and other comprehensive income components have become more value relevant.

6.3.2 Results for NZ Sample

Panel A of Table 20 provides descriptive statistics of the variables used in the price tests. All variables are scaled by the number of outstanding shares expect price. The descriptive statistics are for the sample of 92 firms over the period 2003–2010.

actual R^2 for model (19) is 0.0320.

Table 20

NZ Sample: Descriptive Statistics of Income Measures and Other Comprehensive Income Components

Panel A: Descriptive statistics for the variables used in the association of price with the other comprehensive income components and comprehensive income for the sample of 92 firms with data over 2003-2010, pooled across firms and years (n=736).

Variable	Mean	Std.Dev	Min	1ST Quart	Median	3rd Quart	Max
P	1.999	1.943	0.000	0.550	1.365	2.778	11.300
BVE_S	1.319	1.350	-0.107	0.383	0.979	1.723	6.986
NI_S	0.125	0.236	-0.478	0.000	0.082	0.202	0.960
FCT_S	-0.001	0.015	-0.073	0.000	0.000	0.000	0.043
AR_S	0.025	0.088	-0.127	0.000	0.000	0.000	0.403
SGL_S	-0.000	0.001	-0.006	0.000	0.000	0.000	0.000
CFH_S	-0.001	0.015	-0.086	0.000	0.000	0.000	0.033
OCI_S	0.028	0.098	-0.071	-0.001	0.000	0.009	0.425
CI_S	0.145	0.234	-0.213	-0.001	0.088	0.232	0.790

(Continued on next page)

Table 20 (continued)

Panel B: Descriptive statistics for the variables used in the association of returns with the other comprehensive income components and comprehensive income for the sample of 92 firms with data over 2003-2010, pooled across firms and years (n=736).

Variable	Mean	Std.Dev	Min	1ST Quart	Median	3rd Quart	Max
RET	0.055	0.455	-0.900	-0208	0.000	0.236	3.846
NI_M	0.014	0.178	-0.881	-0.004	0.058	0.090	0.389
FCT_M	-0.000	0.011	-0.050	0.000	0.000	0.000	0.062
AR_M	0.015	0.053	-0.051	0.000	0.000	0.000	0.346
SGL_M	-0.000	0.001	-0.007	0.000	0.000	0.000	0.000
CFH_M	-0.001	0.019	-0.230	0.000	0.000	0.000	0.165
OCI_M	0.012	0.047	-0.097	-0.001	0.000	0.007	0.177
CI_M	0.031	0.193	-0.863	-0.007	0.063	0.113	0.524

Where in Panel A, P denotes price per share; BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes net income after tax for the fiscal year t; FCT_S denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR_S denotes change in annual assets revaluation reserves for the fiscal year t; SGL_S denotes securities gains/losses for the fiscal year t; CFH_S denotes the change in fair value of cash flow hedges for the fiscal year t; OCI_S denotes total other comprehensive income for the fiscal year t and CI_S denotes comprehensive income for the fiscal year t. All variables are scaled by the number of outstanding shares except P.

In Panel B, all variables except RET are scaled by the market value of common equity at the beginning of the fiscal year. RET denotes stock returns for the fiscal year t; NI_M denotes net income for the fiscal year t; FCT_M denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR_M denotes change in annual assets revaluation reserves for the fiscal year t; SGL_M denotes securities gains/losses for the fiscal year t; CFH_M denotes the change in fair value of cash flow hedges for the fiscal year t; OCI_M denotes total other comprehensive income for the fiscal year t and CI_M denotes comprehensive income for the fiscal year t.

The mean of net income is 0.125 and the mean of comprehensive income is 0.145. This is opposite of the US result. The mean (median) other comprehensive income 0.028 (0.000) is tested if it statistically differs from zero. The results (untabulated) are significant at the 1 per cent and 10 per cent level for both mean and median.[28] Similarly all other comprehensive income components statistically differ from zero.

The means of foreign currency translations (-0.001), change in fair value of available-for-sale securities (-0.000) and change in fair value of cash flow hedge reserves (-0.001) suggest that the majority of the other comprehensive income components are negative and small in magnitude. The change in asset revaluation reserves, with a mean of 0.025, dominates the other comprehensive income components and has a positive value.

Panel B of Table 20 provides descriptive statistics of the variables used in the price tests. All variables except returns are scaled by the opening market value of equity. The mean stock return for the sample firms is 5.5 per cent, which is lower than the US return of 8.7 per cent. The mean comprehensive income (0.031) is higher than the mean net income (0.014). The mean of change in asset revaluation reserves (0.015) seems to dominate other comprehensive income with a mean of (0.012).

Table 21, Panel A reports Pearson and Spearman correlation statistics for the variables used in the price model. Among the correlations, the book value of equity and net income are positively correlated with the market value of equity, consistent with expectations. The foreign currency translation adjustments and the change in asset revaluation reserves components of other comprehensive income also show significant

[28] The one-sample *t-test* and one-sample sign test are used to test whether the mean and median for other comprehensive income differ from zero.

correlation with stock price. However, the negative sign with foreign currency translation adjustments is inconsistent with expectations. Panel B presents the Pearson and Spearman correlation statistics for the variables used in the stock returns model. The Pearson and Spearman correlations between stock returns and net income are positive and significant. The Pearson correlation of stock returns with change in asset revaluation reserves and change in fair value of available-for-sale securities is significant. However, the foreign currency translation adjustments component is not significant with stock returns but the negative sign is consistent with the price model.

6.3.2.1 The Association between Price and Other Comprehensive Income Components

Table 22 reports the results for the test of association of price with other comprehensive income components. Similar to the US results and consistent with expectations, the coefficients for the book value of equity and net income are both positive and highly significant. As observed in the correlation matrix, foreign currency translation adjustments have a negative and highly significant relation with price. Cahan et al. (2000) document a negative but insignificant relation of foreign currency translation adjustments with price. The change in asset revaluation reserves and the change in fair value of available-for-sale securities also exhibit a positive relation with price at the 1 and 5 per cent significance level, respectively. The change in fair value of cash flow hedge reserves has a negative but insignificant relation with price. The high adjusted R^2 (0.544) is the result of book value of equity in the regression model.

Table 21

NZ Sample: Correlation Matrix

Panel A: Correlation matrix for the variables used in the association between price and other comprehensive income components for the sample of 92 firms with data over 2003-2010, pooled across firms and years (n=736).

	P	BVE_S	NI_S	FCT_S	AR_S	SGL_S	CFH_S
P		0.700***	0.522***	-0.097***	0.278***	0.031	-0.053
BVE_S	0.747***		0.487***	-0.019	0.316***	-0.053	-0.026
NI_S	0.679***	0.634***		-0.075**	0.107***	0.011	0.009
FCT_S	-0.101***	-0.047	-0.052		0.043	-0.071**	-0.017
AR_S	0.172***	0.245***	0.140***	0.028*		0.010	-0.033
SGL_S	0.010	-0.034	-0.014	-0.036	0.008		-0.007
CFH_S	0.016	0.002	0.028	-0.034	0.008	0.016	

(Continued on next page)

Table 21 (continued)

Panel B: Correlation matrix for the variables used in the association between stock returns and other comprehensive income components for the sample of 92 firms with data over 2003-2010, pooled across firms and years (n=736).

	RET	NI_M	FCT_M	AR_M	SGL_M	CFH_M
RET		0.146***	-0.030	0.081**	0.062*	-0.030
NI_M	0.296***		-0.009	0.025	0.010	-0.003
FCT_M	-0.053	-0.036		0.040	0.053	0.009
AR_M	0.097***	0.084**	0.035		0.020	-0.030
SGL_M	0.071**	0.015	-0.022	0.011		0.018
CFH_M	0.005	0.012	-0.033	0.008	0.019	

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.
P denotes price per share; BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes net income after tax for the fiscal year t; FCT_S denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR_S denotes change in annual assets revaluation reserves for the fiscal year t; SGL_S denotes securities gains/losses for the fiscal year t and CFH_S denotes the change in fair value of cash flow hedges for the fiscal year t.

In Panel B, all variables except RET are scaled by the market value of common equity at the beginning of the fiscal year. RET denotes stock returns for the fiscal year t; NI_M denotes net income for the fiscal year t; FCT_M denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR_M denotes change in annual assets revaluation reserves for the fiscal year t; SGL_M denotes securities gains/losses for the fiscal year t and CFH_M denotes the change in fair value of cash flow hedges for the fiscal year t.

Table 22

NZ Sample: Association between Price and Other Comprehensive Income Components

Coefficients from regression models:

Variable	Model (1)	Model (2)
Intercept	0.644	0.633
	(9.49)***	(9.22)***
BVE_S	0.810	0.792
	(18.76)***	(17.86)***
NI_S	1.925	1.891
	(8.16)***	(8.02)***
FCT_S	-9.106	-9.418
	(-2.76)***	(-2.86)***
AR_S	1.686	1.804
	(2.89)***	(3.08)***
SGL_S	148.15	147.82
	(2.09)**	(2.09)**
CFH_S	-4.725	-9.279
	(-1.50)	(-2.51)**
GAIN		-0.144
		(-0.59)
CFH_S_GAIN		24.33
		(2.04)**
F-Value	147.29***	111.71***
R^2	0.544	0.546

(Continued on next page)

Table 22 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes annual net income after tax for the fiscal year t; FCT_S denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR_S denotes change in annual assets revaluation reserves for the fiscal year t; SGL_S denotes securities gains/losses for the fiscal year t and CFH_S denotes the change in fair value of cash flow hedges for the fiscal year t. All variables are scaled by the number of outstanding shares. An indicator variable GAIN is also introduced, which is equal to 1 if the firm has a winning cash flow hedging position for that year and equal to 0 otherwise while CFH_S_GAIN denotes an interaction variable defined as CFH_S*GAIN.

Table 22 reports coefficients of the following regression models.

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \alpha_3 FCT\_S_{jt} + \alpha_4 AR\_S_{jt} + \alpha_5 SGL\_S_{jt} + \alpha_6 CFH\_S_{jt} + \varepsilon_{jt} \quad (1)$$

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \alpha_3 FCT\_S_{jt} + \alpha_4 AR\_S_{jt} + \alpha_5 SGL\_S_{jt} + \alpha_6 CFH\_S_{jt} + \alpha_7 GAIN_{jt} + \alpha_8 CFH\_S\_GAIN_{jt} + \varepsilon_{jt} \quad (2)$$

Where P_{jt} denotes price per share at the end of the fiscal year t. All other variables are defined above.

To further examine the market valuation of cash flow hedges, the regression is estimated with the interaction term (CFH_S_GAIN) to account for losing and winning hedging positions. An indicator variable, GAIN, is included in the regression to account for differences in the intercept. The results are presented as Model (2) in Table 22. The coefficient for CFH_S is negative and significant at the 5 per cent level, while the coefficient for the interaction term is positive and significant at the 5 per cent level. Even though, CFH_S_GAIN is incrementally positively related to price, the sum of the coefficients on CFH_S and CFH_S_GAIN is positive but not statistically different from zero.

6.3.2.2 The Association between Stock Price and Aggregate Comprehensive Income

Results for tests examining the association between aggregate comprehensive income and stock price are reported in Table 23. Panel A summarises the two models with Model (3) using net income and Model (4) using comprehensive income as the experimental variables. The results show that both net income and comprehensive income are value relevant. Comprehensive income has more explanatory power as the adjusted R^2 (0.534) of the model with comprehensive income is higher than the adjusted R^2 (0.532) of the model with net income. The Clarke (2001) test shows that the difference in adjusted R^2s is significant and favours comprehensive income (consistent with the US result).[29]

Similar to the US analysis, it is examined whether the addition of each individual component of other comprehensive income to net income improves the association between net income and stock price. The results with the price models are reported in Panel B of Table 23. Similar to the results documented by Kanagaretnam et al. (2009), the addition of foreign currency translation adjustments and change in cash flow hedge reserves seems to be adding noise to net income. The Clarke (2001) test (untabulated) favours Model (3) with net income when compared to Model (5) and Model (8). As both the winning and losing hedging positions may signal risk management, it is difficult to interpret the coefficient of change in cash flow hedge reserves when there is no distinction between the two positions (Kanagaretnam et al., 2009).

[29] The Vuong test has lower power than the Clarke test when the sample size is small and when the observation log likelihood ratios have a peaked distribution (Clarke, 2007). The Vuong test favours comprehensive income. However, the Z-statistic (-1.759) is insignificant (untabulated).

Table 23

NZ Sample: Association between Price and Aggregate Comprehensive Income

Panel A: Coefficients from price models with aggregate comprehensive income.

Variable	Model (3)	Model (4)
Intercept	0.645	0.639
	(9.40)***	(9.33)***
BVE_S	0.843	0.796
	(20.26)***	(17.98)***
NI_S	1.947	
	(8.19)***	
CI_S		2.133
		(8.37)***
F-Value	418.99***	421.90***
R^2	0.532	0.534
M-statistic		-106.00***

Panel B: Coefficients from price models with components of comprehensive income.

Variable	Model (5)	Model (6)	Model (7)	Model (8)
Intercept	0.647	0.649	0.645	0.647
	(9.41)***	(9.52)***	(9.40)***	(9.42)***
BVE_S	0.846	0.803	0.842	0.847
	(20.32)***	(18.59)***	(20.27)***	(20.37)***
CI_{FCT}	1.901			
	(7.96)***			
CI_{AR}		1.945		
		(8.70)***		
CI_{SGL}			1.949	
			(8.20)***	
CI_{CFH}				1.905
				(8.04)***
F-Value	415.27***	427.35***	419.13***	416.53***
R^2	0.530	0.537	0.532	0.531
M-statistic		-124.00***	-212.00***	

(Continued on next page)

Table 23 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively, all two tailed.

BVE_S denotes book value of equity at the end of the fiscal year t; NI_S denotes annual net income after tax for the fiscal year t and CI_S denotes annual comprehensive income for the fiscal year t. CI_{FCT} denotes net income adjusted for the change in cumulative foreign currency translation adjustments for the fiscal year t; CI_{AR} denotes net income adjusted for change in assets revaluation reserves for the fiscal year t; CI_{SGL} denotes net income adjusted for fair value gains/losses on securities for the fiscal year t and CI_{CFH} denotes net income adjusted for the change in the fair value of cash flow hedges for the fiscal year t. All variables are scaled by the number of outstanding shares. These variables are measured over the period 2003-2010.

The adjusted R^2s are compared using the likelihood ratio test described in Clarke (2001), which hypothesises that both models are equally distant from the true model. The M-statistic is the M-statistic associated with the Clarke test.

Panel A reports coefficients of the following regression models.

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 NI\_S_{jt} + \varepsilon_{jt} \quad (3)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI\_S_{jt} + \varepsilon_{jt} \quad (4)$$

Panel B reports coefficients of the following regression models.

$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{FCTjt} + \varepsilon_{jt} \quad (5)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{ARjt} + \varepsilon_{jt} \quad (6)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{SGLjt} + \varepsilon_{jt} \quad (7)$$
$$P_{jt} = \alpha_0 + \alpha_1 BVE\_S_{jt} + \alpha_2 CI_{CFHjt} + \varepsilon_{jt} \quad (8)$$

Where P_{jt} denotes price per share at the end of the fiscal year t. All other variables are defined above.

Including the change in asset revaluation reserves with net income results in the highest adjusted R^2 (0.537). The difference between the adjusted R^2s of Model (3) and Model (6) is significant at the 1 per cent level and favours the model with net income adjusted for asset revaluation reserves. Similarly the comparison of Model (3) and Model (7) shows that when net income is adjusted for the available-for-sale securities component

of comprehensive income, it improves its association with stock price.[30] The higher explanatory power of comprehensive income compared to net income is driven by asset revaluation reserves and available-for-sale securities components of other comprehensive income.

6.3.2.3 The Association between Returns and Other Comprehensive Income Components

Model (9) is used without lagged variables and Model (11) with lagged variables to examine the association between returns and other comprehensive income components. The results for these regression models are presented in Panel A of Table 24. Net income is significantly positively associated with market returns in both models. The coefficients for the change in asset revaluation reserves and the change in fair value of available-for-sale securities are positive and significant at the 5 per cent and 10 per cent significance level, respectively in both the models. The coefficient for foreign currency translation adjustments is not significant but the negative sign is at least consistent with the price models.

To be consistent with the approach in price Model (2), the negative sign of CFH_M is further examined by introducing an interaction term, CFH_M_GAIN, and an indicator variable, GAIN, in Model (9) and (11). The regressions are estimated without lagged variables and reported under Model (10) and with lagged variables reported under Model (12). The results are reported in Panel B of Table 24. The coefficients for net income, change in asset revaluation reserves, and change in the fair value of available-

[30] The adjusted R^2s for Model (3) and Model (7) appear to be the same (0.532) due to rounding.

for-sale securities are positive and significant in both the models at the 1, 5 and 10 per cent level respectively. The change in fair value of cash flow hedges is not significant in any of the four models with returns.

6.3.2.4 The Association between Returns and Aggregate Comprehensive Income

Panel A of Table 25 reports the results for the test of value relevance of comprehensive income using the returns models. Model (13) uses net income and Model (14) uses comprehensive income. Model (15) uses net income with a lagged net income variable and Model (16) uses comprehensive income with a lagged comprehensive income variable. A comparison of adjusted R^2s of Model (13) and Model (14) shows comprehensive income has more explanatory power. The Clarke's M-statistic is significant and in favour of comprehensive income. Similarly, R^2s from Model (15) and Model (16), show that comprehensive income is more value relevant compared to net income.

In Panel B, the change in asset revaluation reserves when added to net income improves its association with returns. The difference in R^2s for Model (13) and Model (18) is significant at the 1 per cent level. The addition of change in fair value of available-for-sale securities to net income also improves its association with returns and the Clarke's M-statistic favours Model (19) with net income adjusted for available-for-sale securities components compared to Model (13) with net income only. The M-statistic is only reported for models that show statistically significant change in R^2s. These results are consistent with the findings of price models.

Table 24

NZ Sample: Association between Returns and Other Comprehensive Income Components

Panel A: Coefficients from basic regression models without and with lagged variables.

Variable	Model (9)	Model (11)
Intercept	0.045	0.048
	(2.57)**	(2.65)***
NI_M	0.369	0.388
	(3.95)***	(3.66)***
FCT_M	-1.479	-1.718
	(-1.01)	(-1.15)
AR_M	0.654	0.689
	(2.11)**	(2.15)**
SGL_M	34.20	34.77
	(1.68)*	(1.70)*
CFH_M	-1.250	-0.014
	(-0.77)	(-0.01)
NI_M_{t-1}		-0.016
		(-0.26)
FCT_M_{t-1}		-0.101
		(-0.39)
AR_M_{t-1}		-0.161
		(-0.53)
SGL_M_{t-1}		4.975
		(0.87)
CFH_M_{t-1}		-3.158
		(-0.45)
F-Value	4.99***	2.70***
R^2	0.026	0.023

(Continued on next page)

Table 24 (continued)

Panel B: Coefficients from basic and lagged regression models while controlling for winning versus losing hedge positions:

Variable	Model (10)	Model (12)
Intercept	0.064	0.066
	(3.32)***	(3.32)***
NI_M	0.390	0.403
	(4.17)***	(3.80)***
FCT_M	-1.441	-1.572
	(-0.99)	(-1.05)
AR_M	0.628	0.672
	(2.03)**	(2.10)**
SGL_M	35.38	35.60
	(1.74)*	(1.75)*
CFH_M	8.153	10.521
	(1.31)	(1.54)
GAIN	-0.110	-0.099
	(-1.76)*	(-1.66)*
CFH_M_GAIN	-8.370	-10.654
	(-1.28)	(-1.43)
NI_M_{t-1}		-0.011
		(-0.17)
FCT_M_{t-1}		-0.077
		(-0.30)
AR_M_{t-1}		-0.166
		(-0.55)
SGL_M_{t-1}		0.257
		(0.04)
CFH_M_{t-1}		2.944
		(0.37)
F-Value	4.35***	2.68***
R^2	0.031	0.027

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Table 24 (continued)

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

NI_M denotes annual net income for the fiscal year t; FCT_M denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR_M denotes change in annual assets revaluation reserves for the fiscal year t; SGL_M denotes securities gains/losses for the fiscal year t and CFH_M denotes the change in fair value of cash flow hedges for the fiscal year t. NI_M_{t-1} denotes value of NI_M at t-1; FCT_M_{t-1} denotes FCT_M at t-1; AR_M_{t-1} denotes AR_M at t-1; SGL_M_{t-1} denotes SGL_M at t-1 and CFH_M_{t-1} denotes CFH_M at t-1. All variables except RET are scaled by the market value of common equity at the beginning of the fiscal year. An interaction variable GAIN is also introduced, which is equal to 1 if the firm has a winning cash flow hedging position for that year and equal to 0 otherwise while CFH_M_GAIN denotes an interaction variable defined as CFH_M*GAIN.

Panel A and Panel B report the coefficients of the following regression models:

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 FCT\_M_{jt} + b_3 AR\_M_{jt} + b_4 SGL\_M_{jt} + b_5 CFH\_M_{jt} + \varepsilon_{jt} \quad (9)$$

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 FCT\_M_{jt} + b_3 AR\_M_{jt} + b_4 SGL\_M_{jt} + b_5 CFH\_M_{jt} + b_6 NI\_M_{jt-1} + b_7 FCT\_M_{jt-1} + b_8 AR\_M_{jt-1} + b_9 SGL\_M_{jt-1} + b_{10} CFH\_M_{jt-1} + \varepsilon_{jt} \quad (11)$$

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 FCT\_M_{jt} + b_3 AR\_M_{jt} + b_4 SGL\_M_{jt} + b_5 CFH\_M_{jt} + b_6 GAIN_{jt} + b_7 CFH\_M\_GAIN_{jt} + \varepsilon_{jt} \quad (10)$$

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 FCT\_M_{jt} + b_3 AR\_M_{jt} + b_4 SGL\_M_{jt} + b_5 CFH\_M_{jt} + b_6 GAIN_{jt} + b_7 CFH\_M\_GAIN_{jt} + b_8 NI\_M_{jt-1} + b_9 FCT\_M_{jt-1} + b_{10} AR\_M_{jt-1} + b_{11} SGL\_M_{jt-1} + b_{12} CFH\_M_{jt-1} + \varepsilon_{jt} \quad (12)$$

Where RET_{jt} denotes annual stock returns for the fiscal year t. All of the other variables are defined above.

Table 25

NZ Sample: Association between Returns and Aggregate Comprehensive Income

Panel A: Coefficients from returns models with aggregate comprehensive income.

Variable	Model (13)	Model (14)	Model (15)	Model (16)
Intercept	0.050	0.043	0.050	0.043
	(3.00)***	(2.58)**	(2.99)***	(2.57)**
NI_M	0.375		0.393	
	(4.01)***		(3.76)***	
CI_M		0.391		0.415
		(4.55)***		(4.48)***
NI_M_{t-1}			-0.024	
			(-0.39)	
CI_M_{t-1}				-0.038
				(-0.71)
F-Value	16.05***	20.70***	8.09***	10.59***
R^2	0.020	0.026	0.019	0.025
M-statistic		-121.00***		-109.00***

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Table 25 (continued)

Panel B: Coefficients from returns models with components of comprehensive income.

Variable	Model (17)	Model (18)	Model (19)	Model (20)
Intercept	0.050	0.044	0.050	0.050
	(3.01)***	(2.61)***	(3.00)***	(3.02)***
CI_{FCT}	0.368			
	(9.94)***			
CI_{AR}		0.395		
		(4.46)***		
CI_{SGL}			0.375	
			(4.01)***	
CI_{CFH}				0.374
				(4.02)***
F-Value	15.54***	19.86***	16.11***	16.12***
R^2	0.019	0.025	0.020	0.020
M-statistic		-132.00***	-193.00***	

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

NI_M denotes net income for the fiscal year t; NI_M_{t-1} denotes value of NI_M at t-1; CI_M denotes comprehensive income for the fiscal year t and CI_M_{t-1} denotes vale of CI_M at t-1. CI_{FCT} denotes net income adjusted for the change in cumulative foreign currency translation adjustments for the fiscal year t; CI_{AR} denotes net income adjusted for change in assets revaluation reserves for the fiscal year t; CI_{SGL} denotes net income adjusted for fair value gains/losses on securities for the fiscal year t and CI_{CFH} denotes the change in fair value of cash flow hedge reserves for the fiscal year t. All variables are scaled by the market value of common equity at the beginning of the fiscal year.

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Table 25 (continued)

The adjusted R^2s are compared using the likelihood ratio test described in Clarke (2001), which hypothesises that both models are equally distant from the true model. The M-statistic is the M-statistic associated with the Clarke test.

Panel A reports coefficients of the following regression models.

$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + \varepsilon_{jt} \quad (13)$$
$$RET_{jt} = b_0 + b_1 CI\_M_{jt} + \varepsilon_{jt} \quad (14)$$
$$RET_{jt} = b_0 + b_1 NI\_M_{jt} + b_2 NI\_M_{jt-1} + \varepsilon_{jt} \quad (15)$$
$$RET_{jt} = b_0 + b_1 CI\_M_{jt} + b_2 CI\_M_{jt-1} + \varepsilon_{jt} \quad (16)$$

Panel B reports coefficients of the following regression models.

$$RET_{jt} = b_0 + b_1 CI_{FCTjt} + \varepsilon_{jt} \quad (17)$$
$$RET_{jt} = b_0 + b_1 CI_{ARjt} + \varepsilon_{jt} \quad (18)$$
$$RET_{jt} = b_0 + b_1 CI_{SGLjt} + \varepsilon_{jt} \quad (19)$$
$$RET_{jt} = b_0 + b_1 CI_{CFHjt} + \varepsilon_{jt} \quad (20)$$

Where RET_{jt} denotes annual stock returns for the fiscal year t. All of the other variables are defined above.

The addition of change in fair value of cash flow hedge reserves to net income does not make any significant change and the Clarke (2001) test (untabulated) favours Model (13) with net income only.

The findings in this section support the inference that comprehensive income is more value relevant compared to net income. Investors include this information in their price and returns assessments.

6.4 Predictive Power Results

6.4.1 Results for US Sample

Panel A of Table 26 examines the ability of net income (Model 21) and aggregate comprehensive income (Model 22) to predict future operating cash flows. The results show that both net income and comprehensive income have the ability to predict future operating cash flows. However, the adjusted R^2 (0.094) for Model (21) with net income is higher compared to the adjusted R^2 (0.055) for Model (22) with comprehensive income. The difference in the adjusted R^2s is significant at the 1 per cent significance level and the Vuong (1989) test favours net income. Net income proves to be a better measure of predicting future operating cash flows compared to comprehensive income. The results are consistent with prior literature (e.g., Dhalwal et al., 1999; Goncharov and Hodgson, 2011). Model (25) shows that none of the individual components of other comprehensive income have the ability to predict future operating cash flows beyond net income except pension adjustments.

Panel B of Table 26 examines the ability of net income (Model 23) and aggregate comprehensive income (Model 24) to predict future net income. Net income dominates comprehensive income in predicting future net income. The adjusted R^2 (0.171) for Model (23) with net income is higher than the adjusted R^2 (0.128) for Model (24) with comprehensive income, the Vuong Z-statistic is significant in favour of net income.

Table 26

US Sample: Predictive Power of Aggregate Comprehensive Income and its Components

Panel A: Predictability of future operating cash flow.

Variable	Model (21)	Model (22)	Model (25)
Intercept	0.196	0.190	0.196
	(79.93)***	(76.08)***	(79.42)***
NI	0.853		0.855
	(54.65)***		(54.65)***
CI		0.689	
		(41.22)***	
FCT			-0.052
			(-0.43)
CFH			-0.167
			(-0.50)
PA			-1.362
			(-5.01)***
SGL			0.146
			(0.95)
F-Value	2986.19***	1699.01***	603.15***
R^2	0.094	0.055	0.094
Z-statistic	20.05***		

(Continued on next page)

Table 26 (continued)

Panel B: Predictability of future net income.

Variable	Model (23)	Model (24)	Model (26)
Intercept	-0.015	-0.018	-0.016
	(-15.67)***	(-18.50)***	(-16.02)***
NI	0.478		0.480
	(77.25)***		(77.39)***
CI		0.435	
		(65.11)***	
FCT			-0.108
			(-2.21)**
CFH			0.798
			(6.00)***
PA			-0.546
			(-5.07)***
SGL			0.407
			(6.69)***
F-Value	5967.70***	4239.32***	1220.80***
R^2	0.171	0.128	0.174
Z-statistic	16.92***		

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

NI denotes annual net income for the fiscal year t; CI denotes annual comprehensive income for the fiscal year t; FCT denotes change in cumulative foreign currency translation adjustments for the fiscal year t; CFH denotes change in the fair value of cash flow hedges for the fiscal year t; PA denotes the change in additional minimum pension liability in excess of unrecognized prior service costs for the fiscal year t and SGL denotes securities gains/losses for the fiscal year t. All variables are scaled by the market value of common equity at the beginning of the fiscal year.

(Continued on next page)

Table 26 (continued)

The adjusted R^2s are compared using the likelihood ratio test described in Vuong (2001), which hypothesises that both models are equally distant from the true model. The Z-statistic is the Z-statistic associated with the Vuong test.

Panel A reports the coefficients of the following regression models.

$$CFO_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \varepsilon_{jt} \quad (21)$$
$$CFO_{jt+1} = \alpha_0 + \alpha_1 CI_{jt} + \varepsilon_{jt} \quad (22)$$
$$CFO_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \alpha_2 FCT_{jt} + \alpha_3 CFH_{jt} + \alpha_4 PA_{jt} + \alpha_5 SGL_{jt} + \varepsilon_{jt} \quad (25)$$

Panel B reports the coefficients of the following regression models.

$$NI_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \varepsilon_{jt} \quad (23)$$
$$NI_{jt+1} = \alpha_0 + \alpha_1 CI_{jt} + \varepsilon_{jt} \quad (24)$$
$$NI_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \alpha_2 FCT_{jt} + \alpha_3 CFH_{jt} + \alpha_4 PA_{jt} + \alpha_5 SGL_{jt} + \varepsilon_{jt} \quad (26)$$

Where, CFO_{jt+1} denotes annual operating cash flow for the fiscal year t+1 and NI_{jt+1} denotes annual net income for the fiscal year t+1. All of the other variables are defined above.

Results for Model (26) show that other comprehensive income components have incremental predictive power. The negative sign of the coefficient for foreign currency translation adjustments is consistent with results documented by Kanagaretnam et al. (2009).

6.4.2 Results for NZ Sample

Panel A of Table 27 examines the ability of net income (Model 21) and aggregate comprehensive income (Model 22) to predict future operating cash flows. Unlike prior research (e.g., Dhalwal et al., 1999; Goncharov and Hodgson, 2011), this thesis finds evidence that aggregate comprehensive income is a better predictor of future operating cash flows compared to net income. The adjusted R^2 (0.104) for Model (22) with comprehensive income is higher than the adjusted R^2 (0.101) for Model (21) with net

income, the difference is significant and the Clarke (2001) test favours comprehensive income. Model (25) shows this higher predictive power is driven by foreign currency translation adjustments as that is the only component of other comprehensive income having incremental predictive power.

Panel B of Table 27 examines the ability of net income (Model 23) and aggregate comprehensive income (Model 24) to predict future net income. Unlike prior research (e.g., Dhaliwal et al., 1999; Kanagaretnam et al., 2009), the results show that comprehensive income is a better predictor of future net income. The adjusted R^2 for Model (24) with comprehensive income is higher than the adjusted R^2 for Model (23) with net income and the Clarke (2001) test favours comprehensive income. Model (26) shows the predictive power of individual other comprehensive income components. Foreign currency translation adjustments and the change in asset revaluation reserves have significant incremental predictive power over and above net income. The adjusted R^2s (0.123 and 0.221, respectively) are the highest for Model (25) (Panel A) and Model (26) (Panel B) with the individual components. This result supports the disclosure of individual components of comprehensive income.

The better predictive power of comprehensive income is investigated further. As an additional test, comprehensive income is estimated without the asset revaluation reserves component of other comprehensive income. The results (untabulated) show that comprehensive income without the asset revaluation reserves is not a better predictor of future operating cash flows and future net income compared to net income.

Table 27

NZ Sample: Predictive Power of Aggregate Comprehensive Income and its Components

Panel A: Predictability of future operating cash flow.

Variable	Model (21)	Model (22)	Model (25)
Intercept	0.091	0.085	0.089
	(11.46)***	(10.62)***	(10.76)***
NI	0.314		0.359
	(9.16)***		(10.19)***
CI		0.325	
		(9.30)***	
FCT			-0.557
			(-4.64)***
AR			-0.039
			(-0.29)
SGL			1.280
			(0.13)
CFH			-0.289
			(-0.61)
F-Value	83.83***	86.44***	21.58***
R^2	0.101	0.104	0.123
M-statistic		-75.00***	

(Continued on next page)

Table 27 (continued)

Panel B: Predictability of future net income.

Variable	Model (23)	Model (24)	Model (26)
Intercept	0.011	0.003	0.005
	(1.81)*	(0.60)	(0.90)
NI	0.336		0.372
	(13.19)***		(14.25)***
CI		0.368	
		(14.38)***	
FCT			-0.462
			(-5.20)***
AR			0.219
			(2.15)**
SGL			6.102
			(0.81)
CFH			-0.150
			(-0.43)
F-Value	173.99***	206.84***	42.61***
R^2	0.191	0.219	0.221
M-statistic		-178.00***	

*, **, *** denote p <0.10, p <0.05 and p <0.01 respectively.

NI denotes annual net income for the fiscal year t; CI denotes annual comprehensive income for the fiscal year t; FCT denotes change in cumulative foreign currency translation adjustments for the fiscal year t; AR denotes change in annual assets revaluation reserves for the fiscal year t; SGL denotes securities gains/losses for the fiscal year t and CFH denotes change in the fair value of cash flow hedges for the fiscal year t. All variables are scaled by the market value of common equity at the beginning of the fiscal year.

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Table 27 (continued)

The adjusted R^2s are compared using the likelihood ratio test described in Clarke (2001), which hypothesises that both models are equally distant from the true model. The M-statistic is the M-statistic associated with the Clarke test.

Panel A reports the coefficients of the following regression models.

$$CFO_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \varepsilon_{jt} \quad (21)$$
$$CFO_{jt+1} = \alpha_0 + \alpha_1 CI_{jt} + \varepsilon_{jt} \quad (22)$$
$$CFO_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \alpha_2 FCT_{jt} + \alpha_3 AR_{jt} + \alpha_4 SGL_{jt} + \alpha_5 CFH_{jt} + \varepsilon_{jt} \quad (25)$$

Panel B reports the coefficients of the following regression models.

$$NI_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \varepsilon_{jt} \quad (23)$$
$$NI_{jt+1} = \alpha_0 + \alpha_1 CI_{jt} + \varepsilon_{jt} \quad (24)$$
$$NI_{jt+1} = \alpha_0 + \alpha_1 NI_{jt} + \alpha_2 FCT_{jt} + \alpha_3 AR_{jt} + \alpha_4 SGL_{jt} + \alpha_5 CFH_{jt} + \varepsilon_{jt} \quad (26)$$

Where, CFO_{jt+1} denotes annual operating cash flow for the fiscal year t+1 and NI_{jt+1} denotes annual net income for the fiscal year t+1. All of the other variables are defined above.

6.5 Chapter Summary

The analyses conducted in this chapter provide further evidence on the value relevance and predictive power of comprehensive income. The results for the value relevance tests are consistent with recent research (e.g., Chambers et al., 2007; Kanagaretnam et al., 2009). Comprehensive income is more strongly associated with stock price and returns. Further, the individual components of other comprehensive income have incremental value relevance. With respect to predictive power, the results for the US sample show that comprehensive income is not a better measure compared to net income for predicting future operating cash flows and future net income. However, the individual components of other comprehensive income have some incremental predictive power

for predicting future operating cash flows and future net income. The results are consistent with prior research (e.g., Dhaliwal et al., 1999; Kanagaretnam et al., 2009; Goncharov and Hodgson, 2011). Contrary to earlier evidence (e.g., Dhaliwal et al., 1999; Pronobis and Zülch (2010); Goncharov and Hodgson, 2011), comprehensive income proves to be a better measure compared to net income for predicting future operating cash flows and future net income for the NZ sample. The higher predictive power of comprehensive income is driven by asset revaluation reserves.

The next chapter summarizes this thesis and presents the main conclusions and implications arising from the research.

CHAPTER 7: CONCLUSION

7.1 Summary of this Thesis

This thesis provides empirical evidence on the volatility, value relevance and predictive power of comprehensive income relative to net income. In the literature review provided in Chapter 3, it is observed that most of the prior research related to the volatility of comprehensive income examines fair value accounting in the banking sector (Barth, 1994; Barth et al., 1995; Barth et al., 1996; and Hodder et al., 2006). Therefore, this thesis provides empirical evidence on the volatility of comprehensive income for non-financial firms. It also examines whether that volatility is related to market risk. Evidence on the risk relevance of comprehensive income is provided by examining the correlation of the income volatility measures (i.e., net income and comprehensive income) with two market-based risk measures (i.e., volatility of stock returns and beta). Further, this thesis explores the pricing of these income volatility measures.

This thesis samples non-financial US and NZ firms for the volatility study. The empirical results derived from the statistical testing of data (obtained from Compustat for US and from 92 firms' annual reports for NZ) are presented in Chapter 4. The results show that comprehensive income is more volatile than net income for the non-financial firms sampled in both the countries. As asset revaluations are allowed under NZ IAS 16 and 38 (but not under US GAAP), this thesis uses a constructed measure of adjusted comprehensive income (i.e., comprehensive income less asset revaluations). The results show that this constructed measure of comprehensive income is more

volatile than net income.

The income volatility measures exhibit strong positive correlation with beta and the volatility of stock returns in the US. However, in NZ, the correlation is significant with the volatility of stock returns but not with beta. The incremental volatility of comprehensive income is not significantly associated with the standard deviation of stock returns or beta in either country. Further, this thesis measures the extent to which incremental components of the income volatility measures mitigate share price. The results show that when interacted with abnormal earnings, these income volatility measures mitigate price. Furthermore, the volatility of comprehensive income does not capture incremental factors that are associated with the market's assessment of share price risk, beyond the risk factors represented by the volatility of net income.

These findings are consistent with the assertions made by opponents of comprehensive income that the addition of other comprehensive income components to net income increases volatility. However, this increased variability of comprehensive income does not translate into higher association with market risk compared to net income. The findings are not consistent with the assertions that investors will misinterpret performance because of their inability to determine which measure of performance (i.e., net income or comprehensive income) is appropriate for investment decisions, credit decisions, or allocations.

Prior empirical research investigating the value relevance and predictive power of comprehensive income is reviewed in Chapter 5. It is observed that the evidence to date

on the usefulness of comprehensive income is mixed and inconclusive (see Hirst and Hopkins, 1998; Dhaliwal et al., 1999; O'Hanlon and Pope, 1999; Biddle and Choi, 2006; Choi and Zang, 2006; Choi et al., 2007; Chambers et al., 2007; Kanagaretnam et al., 2009; Pronobis and Zülch, 2010; Goncharov and Hodgson, 2011). A plausible explanation for these mixed results is partially attributed to the use of *as if* estimation techniques to derive an *ex ante* measure of other comprehensive income in the pre-SFAS 130 period, which introduces measurement error (Chambers et al., 2007).

The sample and methods used to examine the usefulness of comprehensive income are presented in Chapter 6. Using US and NZ data, this thesis finds that comprehensive income is more value relevant compared to net income in regard to stock price and returns. The higher explanatory power of comprehensive income in the US is driven by foreign currency translation adjustments, pension adjustments, and to some extent the available-for-sale securities component of other comprehensive income. In NZ, the higher explanatory power of comprehensive income is the result of asset revaluation reserves and the available-for-sale securities component of other comprehensive income. This thesis also finds that the individual components of other comprehensive income are value relevant. These findings suggest that in the post-SFAS 130 period, comprehensive income and other comprehensive income have become more value relevant.

With respect to predictive power, this thesis finds that comprehensive income is not a better predictor of future operating cash flows and future net income compared to net income in the US. However, contrary to prior research (e.g., Dhaliwal et al., 1999; Kanagaretnam et al., 2009; Pronobis and Zulch, 2010; Goncharov and Hodgson, 2011),

this thesis finds that comprehensive income dominates net income in predicting future operating cash flows and future net income in NZ. The better predictive power of comprehensive income is driven by the asset revaluation reserve component of other comprehensive income.

To sum up, this thesis finds that comprehensive income is more volatile than net income. However, the volatility of comprehensive income does not explain the market risk assessments of non-financial firms better than the volatility of net income. Moreover, the volatility of comprehensive income does not demonstrate a stronger association with share prices than the volatility of net income. The findings of value relevance tests indicate that comprehensive income is value relevant. The predictive power tests show that comprehensive income is not a better predictor of future firm performance as reflected in future operating cash flows and future net income in the US. This finding can be attributed to the transitory nature of other comprehensive income components. The better predictive power of comprehensive income in NZ could be due to the higher level of information intermediaries in the US versus NZ.

7.2 Policy Implications for Standards Setters

Despite analysts' demands and standard setters' preferences for a single statement of comprehensive income, neither the IASB nor the FASB has been able to achieve this objective. The exposure draft (FASB, 1996) requires a clear display of comprehensive income and its components in a statement of performance. However, due to submissions on the exposure draft, SFAS 130 does not specify the statement in which comprehensive income must be displayed. Similarly, as a result of the comment letters

the IASB allows a one or two statement option in IAS 1 for the reporting of comprehensive income (see Basis for Conclusion BC7 to BC54 and the Dissenting Opinions). A recent discussion paper issued by the IASB/FASB joint project, suggests the reporting of comprehensive income in a single statement of financial performance (IASB, 2008).

The findings of this thesis have implications for standard setters. The findings support the reporting of other comprehensive income in a performance statement as these components are value relevant. Reporting these value relevant items in the equity statement is not the preferred treatment. Moreover, as comprehensive income is more volatile than net income, it should be reported with prominence so that investors can make more informed decisions. The incremental volatility of comprehensive income is not priced by the market. Therefore, an entity's performance should not be misinterpreted on the basis of comprehensive income being more volatile compared to net income. The results of this thesis support a single statement of comprehensive income.

Aggregating all events and presenting them with equal prominence in a single statement may provide a better measure of performance as investors will induce the incremental information in their decisions. However, aggregation is also an issue. Imhoff et al. (1995) and Libby et al. (2002) observe that the aggregation and the reporting location can affect investors' perceptions. This may even cause investors to stray away from rational decision models and rely on simple heuristics such as price earnings ratios and earning per share for valuation purposes (Bradshaw 2004). Sloan (1996) shows that investors 'fixate' on earnings and fail to decompose income into accrual and cash flow

components while making investment decisions. Furthermore, individual investors might weigh the aggregated information more heavily in investment decisions if it has a stamp of importance, for instance, approval by the standard setters (Sanbonmatsu et al., 1997; Maines and McDaniel, 2000). As comprehensive income has poor predictive power in the US compared to net income, perhaps it may be better to keep it separate from the income statement and a two statement option be allowed.

7.3 Future Research Areas

This thesis highlights several prospective areas for future research. First, since 2009, comprehensive income is to be reported in the statement of performance in NZ as per NZ IAS 1. Thus, an extension of this thesis would be to observe the pre and post effects on valuation of mandatory reporting of comprehensive income in a performance statement. A similar study can be conducted for the US as ASU No. 2011-05 eliminates the option of reporting comprehensive income in the statement of changes in equity for fiscal year beginning 15 December, 2011. Taking a sample of firms that opt for reporting comprehensive income in the statement of changes in equity before the ASU No. 2011-05 effects on valuation of mandatory reporting of comprehensive income in the performance statement after ASU No. 2011-05 can be observed. This would lead to better insights on the motives underlying management's reporting choices for comprehensive income.

Second, a limitation of this thesis is the lack of access to analyst forecast data, which restricts this thesis to assess the relation of comprehensive income with cost of equity. A future objective would be to acquire access to such data and examine the relation of

comprehensive income with cost of equity. However, as not all the firms are followed by analysts, there might be a potential decrease in the sample size, which may bias the results.

Third, comprehensive income studies are mostly conducted in developed markets (e.g., US, UK, Australia and Europe). There is not much literature that looks at the usefulness of comprehensive income in developing economies (e.g., Pakistan). Prior literature identifies various institutional differences in developed and developing or underdeveloped countries. For instance, there are major institutional differences between the US and Pakistan. Ashraf and Ghani (2005) argue that poor investor protection (minority rights protection, insider-trading protection), ineffective judicial system, and weak enforcement are critical factors in describing the state of accounting in Pakistan. Taking a developing country such as Pakistan and comparing it with a developed market like the US, might lead to contrasting results.

Fourth, an important aspect, which the existing literature somewhat ignores, is the impact of IFRS adoption on comprehensive income. Again an important comparison would be the impact of IFRS on comprehensive income usefulness in countries with strong institutional settings (e.g., US, UK etc) and weak institutional settings (e.g., Pakistan).

References

Accounting Standards Review Board. (1994). *Financial Reporting Standard No. 2: Presentation of Financial Reports*. Accounting Standards Review Board, Wellington.

Accounting Standards Review Board. (1994). *Financial Reporting Standard No. 7: Extraordinary Items and Fundamental Errors*. Accounting Standards Review Board, Wellington.

Accounting Standards Review Board. (2001). *Financial Reporting Standard No. 3: Accounting for Property, Plant and Equipment*. Accounting Standards Review Board, Wellington.

Accounting Standards Review Board. (2007). *New Zealand Equivalent to International Accounting Standard 1: Presentation of Financial Statements,* Accounting Standards Review Board, Wellington.

American Accounting Association, Financial Accounting Standards Committee. (1997). An Issues Paper on Comprehensive Income. *Accounting Horizons, 11*(2), 120-126.

American Institute of Certified Public Accountants, Committee on Accounting Procedure. (1947). *Bulletin No. 32, Income and Earned Surplus*. New York.

American Institute of Certified Public Accountants, Committee on Accounting Procedure. (1953). *Bulletin No. 43, Restatement and Revision of Accounting Research Bulletins*. New York.

Ashraf, J., and Ghani, W. I. (2005). Accounting in a Country: The Case of Pakistan. Centre for Management and Economic Research, Working paper.

Association for Investment Management and Research. (1993). *Financial Reporting in the 1990s and Beyond.* Association for Investment Management and Research, Charlottesville, VA.

Bamber, L. S., Jiang, J., Petroni, K. R., and Wang, I. Y. (2010). Comprehensive Income: Who's Afraid of Performance Reporting?. *The Accounting Review, 85*(1), 97-126.

Barth, M. E. (1994). Fair Value Accounting: Evidence from Investment Securities and the Market Valuation of Banks. *The Accounting Review, 69*(1), 1-25.

Barth, M. E., and Clinch, G. (1996). International Accounting Differences and their Relation to Share Prices: Evidence from UK, Australia and Canadian Firms.

Contemporary Accounting Research, 13, 135-170.

Barth, M. E., Beaver, W., and Landsman, W. R. (1996). Value-Relevance of Banks' Fair Value Disclosures under SFAS No. 107. *The Accounting Review, 71*(4), 513-537.

Barth, M. E., Beaver, W. H., and Landsman, W. R. (2001). The Relevance of the Value Relevance Literature for Financial Accounting Standard Setting: Another View. *Journal of Accounting and Economics, 31*, 77-104.

Barth, M. E., Landsman, W. R., and Wahlen, J. M. (1995). Fair Value Accounting: Effects on Banks' Earnings Volatility, Regulatory Capital, and Value of Contractual Cash Flows. *Journal of Banking, 19*, 577-605.

Beaver, W. H. (1989). *Financial Accounting: An Accounting Revolution*. Prentice Hall, Englewood Cliffs, NJ.

Beaver, W. H. (1998). *Financial Reporting: An Accounting Revolution*. Prentice Hall, Englewood Cliffs, NJ.

Beaver, W. H., Kennelly, J. W., and Voss, W. M. (1968). Predictive Ability as a Criterion for the Evaluation of Accounting Data. *The Accounting Review, 43*(4), 675-683.

Beaver, W. H., Kettler, P., and Scholes, M. (1970). The Association between Market-Determined and Accounting-Determined Measures of Risk. *The Accounting Review, 45*(4), 654-682.

Bernard, V. L., Robert, C. M., and Krishna, G. P. (1995). Mark-to-Market Accounting for Banks and Thrifts: Lessons from the Danish Experience. *Journal of Accounting Research, 33*(1), 1-32.

Biddle, G. C., and Choi, J. H. (2006). Is Comprehensive Income Useful?. *Journal of Contemporary Accounting and Economics, 2*(1), 1-32.

Black, F. (1993). Choosing Accounting Rules. *Accounting Horizons, 7*(4), 1-17.

Bowman, R. G. (1979). The Theoretical Relationship between Systematic Risk and Financial (Accounting) Variables. *The Journal of Finance, 34*(3), 617-630.

Bradbury, M. (1998). Harmonising with Overseas Accounting Standards: a New Zealand Perspective. *Australian Accounting Review, 8*(16), 18-23.

Bradbury, M., and Van Zijl, T. (2006). Due Process and the Adoption of IFRS in New Zealand. *Australian Accounting Review, 16*(39), 86-94.

Bradshaw, M. T. (2002). The Use of Target Prices to Justify Sell-Side Analysts' Stock Recommendations. *Accounting Horizons*, *16*(1), 775-810.

Brief, R. P., and Peasnell, K. V. (1996). *Clean Surplus: A Link Between Accounting and Finance*. New York, NY: Garland Publishing.

Cahan, S. F., Courtenay, S. M., Gronewoller, P. L., and Upton, D. R. (2000). Value Relevance of Mandated Comprehensive Income Disclosures. *Journal of Business Finance and Accounting, 27*(9) & (10), 1273-1301.

CFA Institute. (2007). *A Comprehensive Business Reporting Model*. Charlottesville, Va.

Chambers, D., Linsmeier, T. J., Shakespeare, C., and Sougiannis, T. (2007). An Evaluation of SFAS No. 130 Comprehensive Income Disclosures. *Review of Accounting Studies, 12*, 557-593.

Chay, J. B., Marsden, A., and Stubbs, R. (1993). Historical Rates of Return to Equities, Bond, and the Equity Risk Premium: New Zealand Evidence. *Pacific Accounting Review, 5*(1), 27-46.

Cheng, C. S. A., Cheung, J. K., and Gopalakrishnan, V. (1993). On the Usefulness of Operating Income, Net Income and Comprehensive Income in Explaining Securities Returns. *Accounting and Business Research, 23*(91), 195-203.

Cheng, C. S. A., and Stephen, L. (2008). Comprehensive Income and Cost of Equity Capital: Working Paper.

Choi, J., and Zang, Y. (2006). Implications of Comprehensive Income Disclosure for Future Earning and Analysts' Forecasts. *Seoul Journal of Business, 12*(2), 77-109.

Choi, J., Das, S., and Zang, Y. (2007). Comprehensive Income, Future Earnings and Market Mispricing: Working Paper.

Christie, A. A. (1987). On Cross-Sectional Analysis in Accounting Research. *Journal of Accounting and Economics, 9*, 231-258.

Clarke, K. A. (2001). Testing Nonnested Models of International Relations: Revaluating Realism. *American Journal of Political Science, 45*(3), 724-744.

Clarke, K. A. (2007). A Simple Distribution-Free Test for Nonnested Hypotheses. *Political Analysis*, 15(3), 347-363.

Claus, J., and Thomas, J. (2001). Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets. *The Journal of Finance, 56*(5), 1629-1666.

Collins, D. W., and Kothari, S. P. (1989). An analysis of Intertemporal and Cross-Secitonal Determinants of Earnings Response Coefficients. J*ournal of Accounting and Economics, 11*, 143-181.

Cope, A. T., Johnson, L. T., and Reither, C. L. (1996). The Call for Reporting Comprehensive Income. *Financial Analysts Journal, 52*(2), 7-12.

Dechow, P. M. (1994). Accounting Earnings and Cash Flows as Measures of Firm Performance: The Role of Accounting Accruals. *Journal of Accounting and Economics, 18,* 3-42.

Dechow, P. M., Kothari, S. P., and Watts, R. L. (1998). The Relation between Earnings and Cash Flows. *Journal of Accounting and Economics, 25,* 133-168.

Dechow, P. M., and Schrand, C. M. (2004). Earnings Quality. Charlotteville.

Dhaliwal, D., Subramanyam, K. R., and Trezevant, R. (1999). Is Comprehensive Income Superior to Net Income as a Measure of Firm Performance?. *Journal of Accounting and Economics, 26,* 43-67.

Easton, E., and Zmijewski, M. (1989). Cross-Sectional Variation in the Stock Market Response to the Announcement of Accounting Earnings. *Journal of Accounting and Economics, 11,* 117-142.

European Accounting Association, Financial Reporting Standards Committee. (2006). Performance Reporting- The IASB's Proposed Formats of Financial Statements in the Exposure Draft of IAS 1. *Accounting in Europe, 3,* 35-63.

Feltham, G. A., and Ohlson, J. A. (1995). Valuation and Clean Surplus Accounting for Operating and Financial Activities. *Contemporary Accounting Research, 11*(2), 689-731.

Financial Accounting Standards Board. (1980). *Statement of Financial Accounting Concept No. 3: Elements of Financial Statements of Business Enterprises*. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1981). *Statement of Financial Accounting Standard No. 52: Foreign Currency Translation*. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1981). *Statement of Financial Accounting Standard No. 87: Employers' Accounting for Pensions*. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1985). *Statement of Financial Accounting Concept No. 6: Elements of Financial Statements*. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1993). *Statement of Financial Accounting Standard No. 115: Accounting for Certain Investments in Debt and Equity*

Securities. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1996). *Exposure draft: Reporting comprehensive income*. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1997). *Statement of Financial Accounting Standard No. 130: Reporting comprehensive income.* Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (1998). *Statement of Financial Accounting Standard No. 133: Accounting for Derivative Instruments and Hedging Activities*. Norwalk, CT: Financial Accounting Foundation.

Financial Accounting Standards Board. (2011). *FASB Issues Accounting Standards Update to Improve Presentation of Comprehensive Income.* Retrieved from http://www.fasb.org/cs/ContentServer?site=FASB&c=FASBContent_C&pagename=FASB%2FFASBContent_C%2FNewsPage&cid=1176158617999

Francis, J., and Schipper, K. (1999). Have Financial Statements Lost their Relevance?. *Journal of Accounting Research, 37*(2), 319-352.

Francis, J., LaFond, R., Olsson, M. P., and Schipper, K. (2004). Cost of Equity and Earnings Attributes. *The Accounting Review, 79*(4), 967-1010.

Goh, P. L., and Emanuel, D. M. (1981). Accounting Determined and Market Determined Risk Measures: Some Tests of Association and Predictive Ability. *Accounting & Finance, 21*(1), 1-13.

Goncharov, I., and Hodgson, A. (2011). Measuring and Reporting Income in Europe. *Journal of International Accounting Research, 10*(1), 27-59

Hamada, R. S. (1972). The Effects of the Firm's Capital Structure on the Systematic Risk of Common Stocks. *Journal of Finance, 1*(17), 435-452.

Harris, M. S., and Muller III, K. A. (1999). The Market Valuation of IAS Versus US-GAAP Accounting Measures Using Form 20-F Reconciliations. *Journal of Accounting and Economics, 26*, 285-312.

Hirst, D. E., and Hopkins, P. (1998). Comprehensive Income Reporting and Analysts' Valuation Judgments. *Journal of Accounting Research, 36*, 47-75.

Hodder, L. D., Hopkins, P. E., and Wahlen, J. M. (2006). Risk relevance of fair value income measures for commercial banks, *The Accounting Review, 81*(2), 337-375.

Hunton, J. E., Libby, R., and Mazza, C. L. (2006). Financial Reporting Transparency and Earnings Management. *The Accounting Review, 81*(1), 135-157.

Imhoff, E., Lipe, R., and Wright, W. (1995). Is Note Disclosure an Adequate Alternative to Financial Statement Recognition? *Journal of Financial Statement Analysis, 1*(1), 70-81.

International Accounting Standards Board. (2007). *Revised IAS 1: Presentation of Financial Statements.* IASB, London.

International Accounting Standards Board. (2008). *Discussion Paper: Preliminary Views on Financial Statement Presentation.* International Accounting Standards Board, London.

International Accounting Standards Board. (2009). Comment Letter Summary, IASB/FASB Meeting July, IASB agenda reference: 17C. International Accounting Standards Board, London.

International Accounting Standards Board. (2010). *Exposure Draft: Presentation of Items of Other Comprehensive Income. Proposed Amendments to IAS 1*. International Accounting Standards Board, London.

Isidro, H., O'Hanlon, J. F., and Young, S. (2004). Dirty Surplus Accounting Flows: International Evidence. *Accounting and Business Research, 34*(4), 383-410.

Jensen, M. C. (1969). Risk, The Pricing of Capital Assets, and The Evaluation of Investment Portfolios. *The Journal of Business, 42*(2), 167-247.

Jhonson, L. T., Reither, C. L., and Swieringa, R. J. (1995). Toward Reporting Comprehensive Income. *Accounting Horizons, 9*(4), 128-137.

Jones, J., Nachtmann, and Phillips-Patrick, F. (1991). Market Value Accounting and Bank Income Volatility: Some Evidence from the Investment Account. Office of Economic Analysis, U.S. Securities and Exchange Commission, Washington, D.C, Working Paper.

Kanagaretnam, K., Mathieu, R., and Shehata, M. (2009). Usefulness of Comprehensive Income Reporting in Canada. *Journal of Accounting and Public Policy, 28*(4), 349-365.

Kothari, S. P., and Zimmerman, J. L. (1995). Price and Return Models. *Journal of Accounting and Economics, 20,* 155-192.

Kubota, K., Suda, K., and Takehara, H. (2009). Information Content of Other Comprehensive Income and Net Income: Evidence for Japanese Firms. Retrieved from SSRN http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1393746

Lee, C. (1999). Accounting-Based Valuation: Impact on Business Practices and

Research. *Accounting Horizons, 13*(4), 413-425.

Lev, B. (1974). On the Association between Operating Leverage and Risk. *Journal of Financial and Quantitative Analysis, 9*(4), 627-640.

Lev, B., and Kunitzky, S. (1974). On the Association between Smoothing Measures and the Risk of Common Stocks. *The Accounting Review, 49*(2), 259-270.

Libby, R., Bloomfield, R., and Nelson, M. W. (2002). Experimental Research in Financial Accounting. *Accounting, Organizations and Society, 27*(8), 775-810.

Lipe, R. (1990). The Relation between Stock Returns and Accounting Earnings given Alternative Information. *The Accounting Review, 65*(1), 49-71.

Litzenberger, R. H., and Rao, C. U. (1971). Estimates of the Marginal Rate of Time Preference and Average Risk Aversion of Investors in Electric Utility Shares. *Bell Journal of Economics and Management Science, 2*(1), 265-277.

Maines, L., and McDaniel, L. (2000). Effects of Comprehensive-Income Characteristics on Nonprofessional Investors' Judgments: The Role of Financial-Statement Presentation Format. *The Accounting Review, 77*(2), 179-207.

Modigliani, F., and Miller, M. H. (1958). The Cost of Capital, Corporation Finance, and the Theory of Investments. *American Economic Review, 48*(3), 261-297.

O'Hanlon, J. F., and Pope, P. F. (1999). The Value-Relevance of UK Dirty Surplus Accounting Flows. *The British Accounting Review, 31*(4), 459-482.

Ohlson, J. A. (1995). Earnings, Book Values, and Dividends in Equity Valuation. *Contemporary Accounting Research, 11*(2), 661-687.

Ohlson, J. A. (1999). On Transitory Earnings. *Review of Accountancy Studies, 4*, 145-162.

Peasnell, K. (1982). Some Formal Connections between Economic Values and Yields and Accounting Numbers. *Journal of Business Finance and Accounting, 9*, 361-381.

Pope, P. F., and Wang, P. (2005). Earnings Components, Accounting Bias and Equity Valuation. *Review of Accounting Studies, 10*, 387-407.

Preinrich, G. (1938). Annual Survey of Economic Theory: The Theory of Depreciation. *Econometrica, 6*, 219-241.

Pronobis, P., and Zülch, H. (2010). The Predictive Power of Comprehensive Income and its Individual Components under IFRS. Retrieved from http://ssrn.com/abstract=1576384

Rees, L., and Elgers, P. (1997). The Market's Valuation of Non-Reported Accounting

Measures: Retrospective Reconciliations of Non-US and US-GAAP. *Journal of Accounting Research 35*, 115-127.

Robinson, L. E. (1991). The Time Has Come to Report Comprehensive Income. *Accounting Horizons*, June, 107-112.

Ronen, J. and Sadan, S. (1981). *Smoothing income numbers: Objectives, means and implications*, Addison-Wesley, Readings, Mass.

Rosenberg, B., and McEabben, W. (1973). The Prediction of Systematic and Specific Risk in Common Stock. *Journal of Financial and Quantitative Analysis, 8*(2), 317-333.

Ryan, S. (1997). A Survey of Research Relating Accounting Numbers to Systematic Equity Risk, with Implications for Risk Disclosure Policy and Future Research. *Accounting Horizons*, *11*(2), 82-95.

Sanbonmatsu, D. M., Kardes, F. R., Posavac, S. S., and Houghton, D. S. (1997). Contextual Influences on Judgment Based on Limited Information. *Organization Behaviour and Human Decision Processes, 69*(3), 251-264.

Sloan, R. G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings? *The Accounting Review*, *19*(3), 289-315.

Smith, P. A., and Reither, C. L. (1996). Comprehensive Income and the Effect of Reporting It. *Financial Analysts Journal*, 14-19.

Smithson, C., Smith, C., and Wilford, D. (1995). *Managing Financial Risk: A Guide to Derivatives Products, Financial Engineering and Value Maximization*. New York: Irwin Professional Publishing.

Stark, A. (1997). Linear Information Dynamics, Dividend Irrelevance, Corporate Valuation, and the Clean Surplus Relationship. *Accounting and Business Research*, *27*(3), 219-228.

Stent, W., Bradbury, M., and Hooks, J. (2010). IFRS in New Zealand: Effects on Financial Statements and Ratios. *Pacific Accounting Review, 22*(2), 92-107.

Sutton, M., and Johnson, J. (1993). Current Values: Finding a Way Forward. *Financial Executive, 9*, 39-43.

Tarca, A., Brown, P., Hancock, P., Woodliff, D., Bradbury, M.E., and van Zijl, T. (2008). Identifying Decision Useful Information with the Matrix Format Income Statement. *Journal of International Financial Management and Accounting, 19*(2), 185-218.

Trueman, B., and Titman, S. (1988). An Explanation for Accounting Income

Smoothing. *Journal of Accounting Research, 26*, 127-139.

Venkatachalam, M. (1996). Value Relevance of Banks' Derivative Disclosures. *Journal of Accounting and Economics, 22*, 327-355.

Vuong, Q. H. (1989). Likelihood Ratio Tests for Model Selection and Non-nested Hypotheses. *Econometrica, 57*(2), 307-333.

Wang, Y. (2006, May). The Magnitude and Relevance of Dirty Surplus Accounting Flows in EU Countries. Paper Presented at the EAA Congress, Gothnburg, Sweden.

Watts, R. L., and Zimmerman, J. L. (1986). *Positive Accounting Theory*. Prentice-Hall, Englewood Cliffs, NJ.

Watts, R. L. (1977). Corporate Financial Statements, a Product of Market and Political Process. *Australian Journal of Management, 2*, 53-75.

Yen, A. C., E. Hirst, and P. E. Hopkins, (2007). A Content Analysis of the Comprehensive Income Exposure Draft Comment Letters. *Research in Accounting Regulation, 19*, 53-79.

Appendix 1

Display of Comprehensive Income and its Components as required by SFAS 130

Format A: One-Statement Approach

Enterprise
Statement of Income and Comprehensive Income
Year Ended December 31, 19X9

Revenues		$140,000
Expenses		(25,000)
Other gains and losses		8,000
Gain on sale of securities		2,000
Income from operations before tax		125,000
Income tax expense		(31,250)
Income before extraordinary item and cumulative effect of accounting change		93,750
Extraordinary item, net of tax		(28,000)
Income before cumulative effect of accounting change		65,750
Cumulative effect of accounting change, net of tax		(2,500)
[Net income		**63,250]**
Other comprehensive income, net of tax:		
Foreign currency translation adjustments[a]		8,000
Unrealized gains on securities:[b]		
Unrealized holding gains arising during period	$13,000	
Less: reclassification adjustment for gains included in net income	(1,500)	11,500
Minimum pension liability adjustment[c]		(2,500)
Other comprehensive income		17,000
[Comprehensive income		**$ 80,250]**
Alternatively, components of other comprehensive income could be displayed before tax with one amount shown for the aggregate income tax expense or benefit:		
Other comprehensive income, before tax:		
Foreign currency translation adjustments[a]		$ 10,666
Unrealized gains on securities:[b]		
Unrealized holding gains arising during period	$17,333	
Less: reclassification adjustment for gains included in net income	(2,000)	15,333
Minimum pension liability adjustment[c]		(3,333)
Other comprehensive income, before tax		22,666
[Income tax expense related to items of other comprehensive income		(5,666)**]**
Other comprehensive income, net of tax		$ 17,000

(Continued on next page)

[a] It is assumed that there was no sale or liquidation of an investment in a foreign entity. Therefore, there is no reclassification adjustment for this period.

[b] This illustrates the gross display. Alternatively, a net display can be used, with disclosure of the gross amounts.

[c] This illustrates the required net display for this reclassification.

Format B: Two-Statement Approach

Enterprise
Statement of Income
Year Ended December 31, 19X9

Revenues	$140,000
Expenses	(25,000)
Other gains and losses	8,000
Gain on sale of securities	2,000
Income from operations before tax	125,000
Income tax expense	(31,250)
Income before extraordinary item and cumulative effect of accounting change	93,750
Extraordinary item, net of tax	(28,000)
Income before cumulative effect of accounting change	65,750
Cumulative effect of accounting change, net of tax	(2,500)
[Net income	**63,250]**

Enterprise
Statement of Comprehensive Income
Year Ended December 31, 19X9

[Net income		**63,250]**
Other comprehensive income, net of tax:		
Foreign currency translation adjustments[a]		8,000
Unrealized gains on securities:[b]		
Unrealized holding gains arising during period	$13,000	
Less: reclassification adjustment for gains included in net income	(1,500)	11,500
Minimum pension liability adjustment[c]		(2,500)
Other comprehensive income		17,000
[Comprehensive income		**$ 80,250]**

Alternatively, components of other comprehensive income could be displayed before tax with one amount shown for the aggregate income tax expense or benefit:

(Continued on next page)

[a] It is assumed that there was no sale or liquidation of an investment in a foreign entity. Therefore, there is no reclassification adjustment for this period.
[b] This illustrates the gross display. Alternatively, a net display can be used, with disclosure of the gross amounts.
[c] This illustrates the required net display for this reclassification.

Format C: Statement-of-Changes-in-Equity Approach (Alternative 1)
Enterprise
Statement of Changes in Equity
Year Ended December 31, 19X9

	Total	Comprehensive Income[a]	Retained Earnings	Accumulated Other Comprehensive Income	Common Stock	Paid-in Capital
Beginning balance	$563,500		$88,500	$25,000	$150,000	$300,000
Comprehensive income						
Net income	63,250	[$63,250]	63,250			
Other comprehensive income, net of tax						
Unrealized gains on securities, net of reclassification adjustment (see disclosure)	11,500	11,500				
Foreign currency translation adjustments	8,000	8,000				
Minimum pension liability adjustment	(2,500)	(2,500)				
Other comprehensive income		17,000		17,000		
Comprehensive income		[$80,250]				
Common stock issued	150,000				50,000	100,000
Dividends declared on common stock	(10,000)		(10,000)			
Ending balance	$783,750		$141,750	$42,000	$200,000	$400,000
Disclosure of reclassification amount:[b]						
Unrealized holding gains arising during period		$13,000				
Less: reclassification adjustment for gains included in net income		(1,500)				
Net unrealized gains on securities		$11,500				

(Continued on next page)

[a] Alternatively, an enterprise can omit the separate column labeled "Comprehensive Income" by displaying an aggregate amount for comprehensive income ($80,250) in the "Total" column.

[b] It is assumed that there was no sale or liquidation of an investment in a foreign entity. Therefore, there is no reclassification adjustment for this period.

Format D: Statement-of-Changes-in-Equity Approach (Alternative 2)

Enterprise
Statement of Changes in Equity
Year Ended December 31, 19X9

Retained earnings		
Balance at January 1	$88,500	
Net income	63,250	**[**$63,250**]**
Dividends declared on common stock	(10,000)	
Balance at December 31	141,750	
Accumulated other comprehensive income[a]		
Balance at January 1	25,000	
Unrealized gains on securities, net of reclassification adjustment (see disclosure)		11,500
Foreign currency translation adjustments		8,000
Minimum pension liability adjustment		(2,500)
Other comprehensive income	17,000	17,000
Comprehensive income		**[**$ 80,250**]**
Balance at December 31	42,000	
Common stock		
Balance at January 1	150,000	
Shares issued	50,000	
Balance at December 31	200,000	
Paid-in capital		
Balance at January 1	300,000	
Common stock issued	100,000	
Balance at December 31	400,000	
Total equity	$783,750	

Disclosure of reclassification amount:[b]

Unrealized holding gains arising during period	$ 13,000
Less: reclassification adjustment for gains included in net income	(1,500)
Net unrealized gains on securities	$ 11,500

Source: SFAS 130

[a] All items of other comprehensive income are displayed net of tax.
[b] It is assumed that there was no sale or liquidation of an investment in a foreign entity. Therefore, there is no reclassification adjustment for this period.

Appendix 2

Display of Comprehensive Income and its Components as required by NZIAS 1

Format A: One-Statement Approach

XYZ Group
Statement of Comprehensive Income
For the Year Ended 31 December, 20X7

(in thousands of currency units)	**20X7**	**20X6**
Revenue	390,000	355,000
Cost of sales	(245,000)	(230,000)
Gross Profit	145,000	125,000
Other Income	20,667	11,300
Distribution costs	(9,000)	(8,700)
Administrative expenses	(20,000)	(21,000)
Other expenses	(2,100)	(1,200)
Finance costs	(8,000)	(7,500)
Share of profit of associates	35,100	30,100
Profit before tax	161,667	128,000
Income tax expense	(40,417)	(32,000)
Profit for the year from continuing operations	121,250	96,000
Loss for the year from discontinued operations	-	(30,500)
Profit for the year	121,250	65,500
Other comprehensive income:		
Exchange differences on translating foreign operations	5,334	10,667
Available-for-sale financial assets	(24,000)	26,667
Cash flow hedges	(667)	(4,000)
Gains on property revaluation	933	3,367
Actuarial gains (losses) on defined benefits pension plans	(667)	1,333
Share of other comprehensive income of associates	400	(700)
Income tax relating to components of other comprehensive income	4,667	(9334)
Other comprehensive income for the year, net of tax	(14,000)	28,000
Total comprehensive income for the year	107,250	93,500
Profit attributable to:		
Owners of the parent	97,000	52,400
Minority interest	24,250	13,100
	121,250	65,600
Total comprehensive income attributable to:		
Owners of the parent	85,800	74,800
Minority	21,450	18,700
	107,250	93,500
Earnings per share (in currency units)		
Basic and diluted	0.46	0.30

(Continued on next page)

Alternatively, components of other comprehensive income could be presented in the statement of comprehensive income net of tax:

Other comprehensive income for the year, after tax:	**20X7**	**20X6**
Exchange differences on translating foreign operations	4,000	8,000
Available-for-sale financial assets	(18,000)	20,000
Cash flow hedges	(500)	(3,000)
Gains on property revaluation	600	2,700
Actuarial gains (losses) on defined benefits pension plans	(500)	1,000
Share of other comprehensive income of associates	400	(700)
Other comprehensive income for the year, net of tax	(14,000)	28,000

(Continued on next page)

Appendix 2 (continued)

Format B: Two-Statement Approach

XYZ Group
Income Statement
For the Year Ended 31 December, 20X7

(in thousands of currency units)	**20X7**	**20X6**
Revenue	390,000	355,000
Other Income	20,667	11,300
Changes in inventories of finished goods and work in progress	(115,100)	(107,900)
Work performed by the entity and capitalised	16,000	15,000
Raw material and consumables used	(96,000)	(92,000)
Employees benefits expense	(45,000)	(43,000)
Depreciation and amortization expense	(19,000)	(17,200)
Impairment of property, plant and equipment	(4,000)	-
Other expenses	6,000	5,500
Finance costs	(15,000)	(18,000)
Share of profit of associates	35,100	30,100
Profit before tax	161,667	128,000
Income tax expense	(40,417)	(32,000)
Profit for the year from continuing operations	121,250	96,000
Loss for the year from discontinued operations	-	(30,500)
Profit for the year	121,250	65,500
Profit attributable to:		
Owners of the parent	97,000	52,400
Minority interest	24,250	13,100
	121,250	65,600
Earnings per share (in currency units)		
Basic and diluted	0.46	0.30

XYZ Group
Statement of Comprehensive Income
For the Year Ended 31 December, 20X7

(in thousands of currency units)	**20X7**	**20X6**
Profit for the year	121,250	65,500
Other comprehensive income:		
Exchange differences on translating foreign operations	5,334	10,667
Available-for-sale financial assets	(24,000)	26,667
Cash flow hedges	(667)	(4,000)
Gains on property revaluation	933	3,367
Actuarial gains (losses) on defined benefits pension plans	(667)	1,333
Share of other comprehensive income of associates	400	(700)
Income tax relating to components of other comprehensive income	4,667	(9334)
Other comprehensive income for the year, net of tax	(14,000)	28,000
Total comprehensive income for the year	107,250	93,500
Total comprehensive income attributable to:		
Owners of the parent	85,800	74,800
Minority	21,450	18,700
	107,250	93,500

Alternatively, components of other comprehensive income could be presented in the statement of comprehensive income net of tax

Source: NZIAS 1

Appendix 3

Descriptive Statistics and Comparative Analyses of Measures of Income Volatility (US Sample Unwinsorized)

Panel A: Descriptive statistics of firm-specific measures of income volatility (i.e., standard deviation over the period 2005-2010)

Variable	Mean	Std. Dev	Min	1st Quart	Median	3rd Quart	Max
σ_{NI}	0.515	7.850	0.002	0.026	0.070	0.212	351.550
σ_{CI}	0.529	7.717	0.002	0.032	0.079	0.221	351.550

Panel B: Descriptive statistics of standard deviation ratio: standard deviation of comprehensive income / standard deviation of net income (σ_{CI}/ σ_{NI})

Variable	Mean	Std. Dev	Min	1ST Quart	Median	3rd Quart	Max
$\sigma_{CI} / \sigma_{NI}$	1.239	0.736	0.199	0.995	1.004	1.152	11.294

Panel C: Statistical comparisons and test of median for the ratio (σ_{CI}/ σ_{NI})

Comparisons	Count	Percent
$\sigma_{CI}/ \sigma_{NI} >1$	1583	62.2
$\sigma_{CI}/ \sigma_{NI} =1$	0	0
$\sigma_{CI}/ \sigma_{NI} <1$	962	37.8
Wilcoxon-Signed Rank Test:		
P-Value (One-tailed)	0.000	
Estimated Median	1.045	

σ_{NI} denotes firm-specific standard deviation of net income scaled by the opening market value of equity each year over the period 2005-2010;
σ_{CI} denotes firm-specific standard deviation of comprehensive income scaled by the opening market value of equity each year over the period 2005-2010; and
n = 2545.