Essays on the Value Relevance of Accounting Information

Leif Atle Beisland
University of Agder

Dissertation submitted to the Department of Accounting, Auditing and Law at
the Norwegian School of Economics and Business Administration, Bergen, Norway.

November 2008

Acknowledgements

I would like to thank my advisor, Professor Frøystein Gjesdal (NHH), and my two co-advisors Associate Professor Kjell Henry Knivsflå (NHH) and Professor John Christian Langli (BI), for conscientious and in-depth guidance during this Ph.D.-project. Your great competence and friendly manner have been highly appreciated! Even if we have not always fully agreed on how my research should best be conducted, you have always been patient, respectful and thorough in your work. I would also like to address a word of thanks to Agder Energi AS and The Competence Development Fund of Southern Norway for their financial support, and to Trond Bjørnenak for hiring me as a research fellow.

Two of the papers in this dissertation are joint projects with other researchers. One of the papers is written together with Mattias Hamberg from Göteborg University, Sweden, and the other one is with my co-advisor Kjell Henry Knivsflå. I have learned a lot from both of you! It has been a great inspiration for me to work with professionals within my field of interest, and I welcome possible joint projects in the future as well.

I am grateful to my colleagues at the University of Agder for providing a friendly, informal and humorous working environment. Karl Robertsen, Steen Koekebakker, Andre Tofteland, Trygve Bjerkås, Theis Theisen, Geir Håland, Stine Rye Bårdsen, Gøril Hannås, and Liv Bente Friestad, among others, you have brightened up my everyday life at the university. And to the fellow Ph.D candidates situated in the basement of the H-building, Terje Berg-Utby, Roy Mersland, Joachim Thøgersen and Dennis Frestad: Your cheerful, positive and considerate attitude, combined with an incredibly poor sense of humour, has made it possible to handle the many frustrations and disappointments a Ph.D. candidate must endure. In particular, I want to thank Dennis, my good friend and colleague over several years, for being my wailing wall far too many times during the last three years.

Finally, I would like to express my profound and sincere gratitude to my family. You are always there for me, ready to lend a hand, support my choices and in every way back me up. I dedicate this dissertation to my sister, Sigrun, and my parents, Astrid and Leif.

Grimstad, November 2008

Leif Atle Beisland

Introduction and Summary

Of all the information about an individual firm which becomes available during a year, one-half or more is captured in that year's income number. Its content is therefore considerable.

(Ball & Brown, 1968, p. 176)

Modern capital market-based accounting research (CMBAR) is often considered to have originated in the 1968 study by Ray Ball and Philip Brown. In this event study, the authors investigate stock price reactions to earnings announcements. Although most of the information contained in financial reports is incorporated into stock prices before official earnings announcement dates, Ball and Brown find that there is undoubtedly an association between accounting earnings and stock prices. Accounting earnings are clearly value-relevant.

The concept of value relevance may be defined in a number of ways. For instance, Francis and Schipper (1999) discuss four different interpretations of value relevance. Consistent with their fourth interpretation, I define value relevance as the ability of financial information to capture and/or summarise information that determines firm value. Thus, value relevance is measured as the degree of statistical association between accounting information and market values or returns. Value relevance can be measured in short term event studies comparable to the one performed by Ball and Brown. However, value relevance can also be assessed in long term association studies. This dissertation focuses exclusively on long term association studies. All analyses are conducted using yearly observations.

Value relevance research is one discipline within capital market-based accounting research. Beaver (2002) splits CMBAR into five sub-categories: market efficiency, Feltham-Ohlson modelling, value relevance, analysts' behaviour, and discretionary behaviour. Kothari (2001) on the other hand, does not view value relevance research as an independent sub-category. Instead, value relevance research is included in the broader sub-category of fundamental analysis and valuation. Kothari employs tests of market efficiency and the role of accounting numbers in contracts and the political process as the other sub-categories of CMBAR. Value relevance research itself can also be categorised. This dissertation splits value relevance research into:

- Value relevance of earnings and other flow measures.
- Value relevance of equity and other stock measures.
- Value relevance over time.
- Value relevance of alternative accounting methods.
- International value relevance research.

International value relevance research is arguably not an independent sub-category. It can be seen as research within the other sub-categories performed on more than one country. However, as international value relevance comparisons are an important part of the CMBAR literature, I choose to include international value relevance research as an independent discipline. Additionally, because the value relevance research is widely dominated by studies on U.S. data, I also categorise single-country evidence from countries other than the USA as international value relevance research.

Value relevance research has been subject to extensive debate in the academic literature. For instance, Holthausen and Watts (2001) criticise value relevance literature for having a modest contribution to standard setting. According to Holthausen and Watts, the major reason is that the literature does not seek to develop a descriptive theory of accounting and standard setting. Furthermore, they claim that, even if value relevance research effectively informs about the role of accounting in providing inputs to equity valuation, the tests still ignore the other roles of accounting and the other forces that determine accounting standards in practice. The authors particularly stress the confirmatory role that places high demands on reliability of financial statements. This line of reasoning is challenged by Barth et al. (2001). They state that a primary focus of financial statements is equity investment and that other uses of financial statement information, such as contracting, do not diminish the importance of value relevance research. Thus, value relevance research provides insights into questions of interest to standard setters and other non-academic constituents. In all modesty, I hope that this dissertation is evidence that value relevance is both interesting and highly useful for standard setters and others. However, because the research generally disregards other important accounting purposes outside of providing useful information to equity investors, I acknowledge that one may not use value relevance results at face value when formulating normative policy implications.

Overall, this dissertation fits into the tradition of positive economics discussed by, for instance, Friedman (1953). The focus is on what *is* rather than what *ought to be* in accounting matters. Friedman argues that "the only relevant test of validity of a hypothesis is comparison of its predictions with experience" (Friedman, 1953, pp. 9-10). Furthermore, the critical realists' principle of falsification (Popper, 1959) constitutes an important background condition for all my research. I rigorously test the hypotheses that I propose, realising that a theory generally cannot be proven, only disproven. If a scientist makes a substantial effort to falsify his own theory and this effort is not successful, this is clearly evidence *in favour of* the proposed theory. My conclusions are based on a large number of statistical tests analysing whether the proposed hypotheses can be falsified. If the proposed hypotheses resist all falsification efforts, it would be a "damn strange coincidence" (compare Salomon's evaluation criterion discussed in for instance Meehl, 1999) if they were actually wrong. However, realising that coincidences sometimes occur, I employ cautious and non-categorical conclusions in my papers.

This dissertation consists of five independent papers that discuss value relevance issues within the CMBAR tradition. The first is ***An Introduction to the Value Relevance Literature***, a comprehensive review of high-class value relevance research published during the last couple of decades. The presented research is collected from top international accounting journals. The paper is highly descriptive. It does not intend to present an extensive *critique* of value relevance literature á la Holthausen and Watts (2001). Instead, the purpose is to give the unsophisticated reader an insight into value relevance research. For example, what are the main ideas within the field of research? What kinds of topics have been investigated? What are the vital econometric tests of the field? As value relevance research was especially "hot" during the 1990s, a large number of the quoted articles are from this decade, particularly from the latter half. Inexperienced doctoral students within the field of value relevance, or more general CMBAR, will hopefully find this paper to be a useful supplement to, for instance, Kothari (2001), Holthausen and Watts (2001), and Beaver (2002). Still, the paper is by no means an exhaustive presentation of the vast value relevance literature produced all over the world during the last few decades.

Strictly speaking, value relevance research studies the association between stock values and accounting values (compare, for instance, Francis & Schipper, 1999). However, several researchers maintain that their analysis of time-series properties of earnings and cash flow can be categorised as value relevance research: "This paper examines the value relevance of earnings by testing their ability to predict two future benefits of equity investment: earnings and cash flow from operations" (Finger, 1994, p. 210). Today's stock prices are undoubtedly a function of future cash flow/earnings. If one names research on the associations between stock prices and accounting values as *direct value relevance research*, is it possible to characterise research papers like the one conducted by Finger (1994) as *indirect value relevance research*? My second paper, ***Predictive Ability and Value Relevance of Accounting Measures***, begins by conducting an indirect value relevance study. Specifically, I investigate the ability of current earnings, split into cash flow and accruals, to predict short term future cash flow and earnings. The analysis shows that current cash flow is significantly related to both future cash flow and future earnings, while accruals only are statistically associated with future earnings. The second step of the paper investigates the variables' value relevance. It turns out that both cash flow and accruals are highly associated with stock returns. The final part of the paper discusses possible relationships between indirect and direct value relevance studies. I conclude that, if cash flow and accruals are significantly related to short term future firm performance as measured by cash flow and earnings, it is reasonable to expect that these measures also will be value relevant. However, because company value is a function of indefinite cash flows (or earnings), while indirect value relevance research tends to focus on rather short term analysis, I also conclude that there is not a one-to-one relationship between indirect and direct value relevance studies. In fact, indirect value relevance research might be poor proxies for studies of stock price association with accounting information. An earnings item might be value relevant even though it is not a relevant short term prediction.

My third paper, ***Variations in the Value Relevance of Accounting Information*****,** is a joint project with Mattias Hamberg from Gøteborg University in Sweden. The paper examines differences in value relevance between a sample of traditional, mostly manufacturing, companies, and a sample of non-traditional, typically high-tech, companies. It is a popular claim in the professional literature that the value relevance of accounting information has decreased over time (Collins, Maydew, & Weiss, 1997), and several studies present evidence of such a decrease (Brown, Kin, & Lys, 1999; Lev & Zarowin, 1999). Lev and Zarowin (1999) claim that the decrease stems from an increasing pace of change that has led to economic conditions not being adequately reflected by the current reporting system. In our sample, we find that there is no significant difference in the value relevance of accounting information between the traditional and the non-traditional sectors when controlling for the higher frequency of transitory earnings items, both positive and negative, in the latter. However, the value relevance is much more volatile in the non-traditional sector than in the traditional sector. Thus, if analysing time periods that are too short, researchers may conclude that value relevance is sector-dependent even if it is not. Our findings indicate that value relevance in the non-traditional sector is significantly more dependent on general economic conditions and stock market sentiments than value relevance in the traditional sector. We maintain that, while traditional measures of stock returns' association with accounting earnings suggest that value relevance in the two sectors is approximately equal in the long run, *the usefulness of accounting information may still be lower in the non-traditional sector*. If the association between stock prices and accounting numbers is highly sentiment dependent and volatile, this depresses the usefulness of financial reports from an investor perspective. Ex ante, investors may not be able to predict how well accounting information will represent levels of or changes in share prices in industries where the industry's value relevance is relatively more unstable.

Several CMBAR researchers argue that the value relevance of accounting earnings is surprisingly low (see, for instance, Lev, 1989). Some claim that standard regression models of stock returns on aggregate accounting earnings understate the "true" value relevance of earnings. For instance, Ohlson and Penman (1992) show that the explanatory power from return regressions increases dramatically when earnings are disaggregated into items, while Hayn (1995) presents evidence that value relevance is a non-linear function of earnings because negative earnings are far less value relevant than positive earnings. In my fourth paper, ***The Importance of Earnings Aggregation and the Sign of Earnings in Value Relevance Research***, I investigate the simultaneous consequences of disaggregating net earnings *and* accounting for the sign of earnings in traditional value relevance regressions. I find that earnings disaggregation is relatively more useful for negative earnings than for positive earnings. The paper shows that, even if negative earnings have low value relevance on an aggregate level, individual earnings items may still be highly value relevant. I also find that it is useful to account for the sign of earnings for all earnings aggregation levels, and vice versa; it is generally useful to disaggregate earnings numbers even if the sign of earnings is taken into account. There is some evidence that the sign effect dominates the aggregation effect as far as explanatory power is concerned.

My fifth and final paper compares the value relevance of two sets of accounting standards. ***Has IFRS Changed How Investors Respond to Earnings and Book Values?*** is a joint project with Kjell Henry Knivsflå from The Norwegian School of Economics and Business Administration. Firms listed on stock exchanges within the European Economic Area were required to report consolidated financial statements according to International Financial Reporting Standards (IFRS) from 2005 on. We study how two important characteristics of value relevance, the response coefficients of the book value of equity and earnings are influenced by the shift from the Norwegian GAAP (NGAAP) to the IFRS. The main difference between the NGAAP and IFRS is that the IFRS allows more recognition and measurement at fair value than does the NGAAP. We find evidence that book equity response coefficients are higher under IFRS than under NGAAP. The finding is attributed to a higher correlation between market values of shares and book equity under IFRS due to a higher number of balance sheet items recognised and/or measured at fair value according to IFRS than according to NGAAP. On the other hand, earnings response coefficients appear to be larger under NGAAP than under IFRS. This is consistent with the notion that increased use of fair values, relatively speaking, introduces a higher number of transitory one-time items into the income statement, thus making current earnings less related to future earnings. In general, earnings response coefficients are larger for permanent earnings items than for transitory earnings items (see for instance Kothari, 2001).

The empirical studies focus on Scandinavia. The analysis in Paper 3 is conducted on a Swedish sample, while the rest of the papers analyse the value relevance of Norwegian accounting information. However, most findings can probably be generalised to other parts of the industrialised world. Several findings should be both useful and relevant for academics and professionals/investors working with accounting and company valuation. For instance:

- Accounting information that is a good predictor of short term (up to three years) firm performance will generally influence stock prices.
- Accounting accruals may give provide little information about future short term cash flows. However, they are typically related to future earnings and current stock prices.

- Non-traditional high-tech companies, on average, report equally value relevant accounting information as traditional companies. However, the value relevance is more unstable for non-traditional industries.
- The value relevance in non-traditional industries is more sentiment dependent than in traditional industries.
- It is possible to construct simple measures of sustainable earnings that are incrementally value relevant to reported bottom line earnings. In a relative sense, this measure is most useful for non-traditional industries.
- Negative earnings may be highly relevant on a disaggregated level even if bottom line earnings seem unrelated to stock returns.
- The value relevance of earnings may be as much as three times higher when they are disaggregated and the sign of net earnings is taken into account.
- Even if value relevance as measured by book equity response coefficients increases as a consequence of introducing a higher number of fair values in the financial statements (as under IFRS), the value relevance measured by earnings response coefficients may actually be depressed.

All research is conducted within an investor-oriented framework, focusing on valuation of exchange-listed companies. Other uses of financial information, for instance, contracting, are not discussed in the dissertation. It is likely that such uses will moderate the consequences of the research in a standard-setting perspective.

Literature

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research, 6*(2), 159-178.

Barth, M. E., Beaver, W. H., & Landsman, W. R. (2001). The Relevance of the Value Relevance Literature for Financial Accounting Standard Setting: Another View. *Journal of Accounting and Economics, 31*(1-3), 77-104.

Beaver, W. H. (2002). Perspectives on Recent Capital Market Research. *Accounting Review, 77*(2), 453-474.

Brown, S., Kin, L., & Lys, T. (1999). Use of R^2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting & Economics, 28*(2), 83-115.

Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting & Economics, 24*(1), 39.

Finger, C. A. (1994). The Ability of Earnings to Predict Future Earnings and Cash Flow. *Journal of Accounting Research, 32*(2), 210-223.

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

Friedman, M. (1953). The Methodology of Positive Economics. *Essays in Positive Economics: University of Chicago Press*.

Hayn, C. (1995). The information content of losses. *Journal of Accounting & Economics, 20*(2), 125-153.

Holthausen, R. W., & Watts, R. L. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting & Economics, 31*(1-3), 3-75.

Kothari, S. P. (2001). Capital markets research in accounting. *Journal of Accounting & Economics, 31*(1-3), 105.

Lev, B. (1989). On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research. *Journal of Accounting Research, 27*(3), 153-192.

Lev, B., & Zarowin, P. (1999). The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research, 37*(2), 353-385.

Meehl, P. E. (1990). Appraising and Amending Theories: The Strategy of Lakatosian Defense and Two Principles that Warrant It. *Psychological Inquiry, 1*(2), 108.

Ohlson, J. A., & Penman, S. H. (1992). Disaggregated Accounting Data as Explanatory Variables for Returns. *Journal of Accounting, Auditing & Finance, 7*(4), 553-573.

Popper, K. (1959). The logic of scientific discovery. *New York: Harper & Row*.

Table of contents

	Page
Essay 1: ***An Introduction to the Value Relevance Literature***	1
Essay 2: ***Predictive Ability and Value Relevance of Accounting Measures***	77
Essay 3: ***Variations in the Value Relevance of Accounting Information***	135
Essay 4: ***The Importance of Earnings Aggregation and the Sign of Earnings in Value Relevance Research***	179
Essay 5: ***Has IFRS Changed How Investors Respond to Earnings and Book Values?***	237

Essay 1:

An Introduction to the Value Relevance Literature

Leif Atle Beisland
University of Agder

Abstract

The primary purpose of this paper is to give an introduction to modern value relevance research. The paper views empirical value relevance research as a major field within the area of capital market-based accounting research and goes through some of the main contributions from this line of research. The review focuses primarily on research on U.S. financial data but also includes a section on international evidence. The articles are generally selected from top accounting journals. With a few important exceptions, the reviewed articles were published during the last two decades. The intention with this review is not to be all-inclusive, but rather to introduce the reader to some of the most important issues within value relevance research. Value relevance research is a field in which the empirical results are sometimes mixed. This paper acknowledges this fact by including articles with somewhat contradictory conclusions. After having read this review, the reader should have a fair understanding of the most important topics that are of current interest in the field of value relevance.

1 Introduction

Empirical research on the relations between capital markets and financial statements is generally referred to as capital market-based accounting research (CMBAR). This is a broad field of research that can be categorised into several subfields. Kothari (2001) divides CMBAR into fundamental analysis and valuation, tests of market efficiency, and the role of accounting numbers in contracts and the political process. Beaver (2002) uses the sub-categories market efficiency, Feltham-Ohlson modelling, value relevance, analysts' behaviour, and discretionary behaviour. Categorisation of CMBAR is largely a matter of preference, where value relevance research can be used as an example of this. Beaver views value relevance as a field of its own. It is, however, possible to consider value relevance as being a part of both market efficiency and fundamental analysis and valuation.

The purpose of this paper is to go through some of the value relevance literature in order to give an introduction to this field of research. The literature in this area is vast, and it is by no means my intention to provide an all-embracing review of the research. Instead, I focus on a relatively moderate number of articles in order to give an *overview* of the value relevance literature. Modern CMBAR originated with the articles of Ball and Brown (1968) and Beaver (1968). Both articles can be seen as a part of the value relevance literature, although the concept of value relevance, according to Barth et al. (2001), was not launched until 1993 (Amir, Harris, & Venuti, 1993). I focus primarily on recent research, i.e., articles from the last twenty years. Many of the "modern classics" within value relevance research were actually produced during the nineties.

This paper is a descriptive study of a wide selection of value relevance research. It focuses on what the results from value relevance research *are*, and not what they *should have been* - for instance, from the perspective of the investors, the firms or society in general. It should be noted, however, that most standard setters view value relevance, along with other attributes, as an important characteristic of accounting information. Francis et al. (2004) suggest that increased value relevance is associated with lower cost of equity. This is attributed to investors perceiving value relevance as contributing to lower information risk. Lower information risk decreases imprecision in estimates of the pay-off structure to investors based on available information. Simply put, lower risk means lower company cost of equity. From a macroeconomic perspective, lower cost of capital leads to increasing levels of investment. As such, value relevance might have real consequences for an economy. It is useful to keep such normative considerations in mind, even though the remainder of this paper almost exclusively focuses on *empirical relationships*.

The discussed articles are primarily selected from the most well-known and acknowledged accounting journals such as the Journal of Accounting Research, Journal of Accounting and Economics, Contemporary Accounting Research, Accounting Review, Journal of Accounting Auditing and Finance, and Journal of Business Finance and Accounting, but I also comment on important results from other journals. No reference is made to unpublished working papers. This paper primarily focuses on research performed on U.S. data. As the U.S. financial market is by far the world's largest, it should come as no surprise that modern CMBAR originated in the USA. A very large fraction of published value relevance research is still conducted on U.S. samples. The U.S. studies include most of the pioneering research that has been performed in value relevance research.

Figure 1 outlines the structure of this paper. Section 2 defines the concept of value relevance research and describes its theoretical foundation. Section 3 discusses general empirical testing of value relevance. Sections 4 to 8 present five sub-categories of empirical value relevance research. Note that a lot of the value relevance literature cannot possibly be put into one single category. Some articles will therefore be cited several times. Section 4 describes the value relevance of earnings and other flow measures, i.e., the value relevance of elements from the income statement or cash flow statement. The value relevance of earnings can be regarded as being the primary focus of value relevance research. Hence, section 4 is the most comprehensive of this paper. Section 5 investigates the value relevance of balance sheet measures, i.e., equity and other stock measures. Section 6 analyses research on the development of value relevance over time. A very specific type of value relevance research focuses on the differing value relevance of alternative accounting methods (or standards). This kind of research is reviewed in section 7. The reader should be aware that there is a large literature on value relevance in countries other than the USA and also on differences in value relevance between countries. Such research is briefly discussed in section 8. The international evidence is typically collected from a wider range of journals than the ones listed above. Section 9 concludes the paper.

Figure 1: Value Relevance Topics

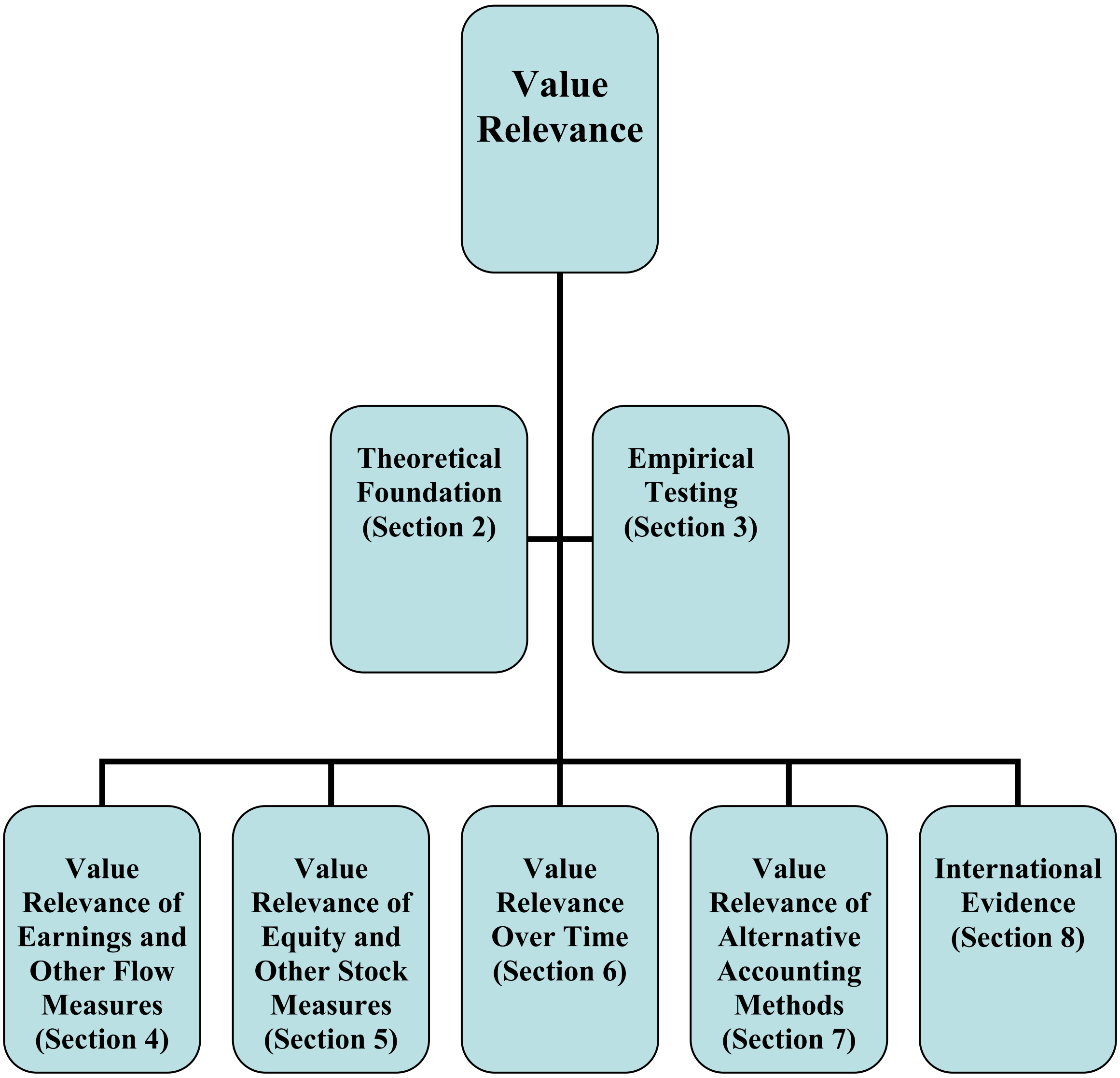

Figure 1 outlines the structure of the paper. The theoretical foundation of value relevance research is described in section 2. Section 3 discusses empirical testing within this field of research. The rest of the paper, sections 4 to 8, presents findings from five sub-categories of value relevance research.

2 Theoretical Foundation and a Definition

Financial statements have a variety of applications. Management compensation and debt contracting are examples of applications of financial statements. However, this paper is solely devoted to equity investment. Value relevance research measures *the usefulness of accounting information from the perspective of equity investors*. The empirical research is founded on traditional valuation theory. Financial theory states that the theoretical value of a company's equity, EV, is the present value of all future dividends[1] (d) or free cash flows to equity (FCE):

$$EV_0 = \sum_{t=1}^{\infty} \frac{E(d_t)}{(1+r_t)^t} = \sum_{t=1}^{\infty} \frac{E(FCE_t)}{(1+r_t)^t}$$

where

$EV = (\text{theoretical})$ equity value
$E(d_t) =$ expected dividend
$E(FCE_t) =$ expected free cash flow to equity
$r_t =$ discount rate

In this model, expected dividend is budgeted as the free cash flow to equity. Several versions of the dividend and cash flow model exist. For instance, Feltham and Ohlson (1995) show that under some fairly reasonable assumptions,[2] equity value is today's value of net financial assets plus the present value of all future free cash flow from operating activities:

$$EV_0 = NFA_0 + \sum_{t=1}^{\infty} \frac{E(CFO_t)}{(1+r_t)^t}$$

where

NFA = net financial assets (negative if debts exceed gross financial assets)

CFO = free cash flow from operating activities

[1] The dividend model is often attributed to Williams (1938).
[2] Specifically, the Financial Asset Relation (FAR) and the Financial Asset Marked-to-Market Relation (FAM) must hold. FAR says that all transfers to common equity holders are made through the financial assets, and these assets are further influenced by financial income and the free cash flows from operations. FAM says that the risk-adjusted expected financial income equals the riskless spot interest rate times the opening book value of the financial assets (P. Christensen & Feltham, 2003).

Ohlson (1995) shows that the dividend/cash flow model can be written solely as a function of accounting variables if assuming that the clean surplus relation (CSR) holds.[3] The CSR requires that book equity only changes with net income and net capital investments and withdrawals (net dividends) by owners:[4]

$$B_t = B_{t-1} + I_t - d_t$$

where

B = book value of equity
I = net income (earnings)
d = net dividends

Using this result in the dividend model, the residual income[5] model can be derived:

$$EV_0 = B_0 + \sum_{t=1}^{\infty} \frac{E\ (I_t - r_t * B_{t-1})}{(1 + r_t)^t}$$

The model says that the value of a company's equity is equal to the book value of equity plus the discounted value of future residual income. Residual (or abnormal) income is defined as the difference between accounting income and the required return on book value of equity,

---

[3] The idea of residual income valuation is, in fact, far older than the mid-nineties. The model is actually sometimes attributed to Preinrich (1938), where Edwards and Bell (1961) developed the ideas further. It was, however, not until the works of Feltham and Ohlson that the model gained its huge popularity.
[4] Change in equity that is not a result of net dividends or bottom-line earnings is referred to as "dirty surplus." Value changes, for instance revaluations or changes in derivatives values, are sometimes recorded as an equity change rather than an earnings item. The equity may also be adjusted for exchange rate changes (compare Pinto, 2005). Such direct adjustments to equity are examples of dirty surplus items. The accounting standards differ with respect to how value changes are treated. Value changes may not be recorded in the financial statements at all. Water reservoirs are an example of the latter. Even though water reservoirs may be extremely important assets for electricity producers, the value of the reservoir is not included in the financial report. The proponents of such a practice argue that water cannot be viewed as an asset when its price is equal to zero.
[5] The model is also referred to as the residual *earnings* model. Earnings and income are used interchangeably in this paper and refer both to the net accounting profit or loss reported in the financial statements.

computed using market-based company cost of capital. Note that the residual income model will always be equal to the dividend model if one assumes that the CSR holds in the future. It does not matter if the CSR has not been valid historically.

An objective with financial reporting is to assist investors in valuing equity. For financial information to be value relevant, it is a condition that accounting numbers should be related to current company value. If there is no association between accounting numbers and company value, accounting information cannot be termed value relevant and, hence, financial reports are unable to fulfil one of their primary objectives. The construct of value relevance can be defined in a number of ways. Barth et al. (2001) simply state that "Value relevance research examines the association between accounting amounts and equity market values" (Barth, Beaver et al., 2001, p. 95). In a more thorough discussion of the construct, Francis and Schipper (1999) offer four interpretations of value relevance. For instance, interpretation 1 is that financial statement information influences stock prices by capturing intrinsic share values toward which stock prices drift. Under interpretation 2, Francis and Schipper (1999) state that financial information is value relevant if it contains the variables used in a valuation model or assists in predicting those variables, while interpretations 3 and 4 are based on value relevance as indicated by a statistical association between financial information and prices or returns. Consistent with Francis and Schipper's (1999) interpretation 4, I define value relevance as *the ability of financial statement information to capture and summarise information that determines the firm's value*.

3 Empirical Testing

Section 3.1 discusses how models can be specified in order to analyse value relevance of accounting information. The typical statistical test methodology is regression analysis. There are, however, several econometric challenges related to the regression models most frequently applied in value relevance research. Some of these challenges are discussed in section 3.2. Value relevance research generally assumes that financial markets are efficient. Section 3.3 examines test methodology that may be applied if the assumption of market efficiency is *not* met.

3.1 Model Specification

The idea of value relevance research is to study the relationship between market values of equity and accounting variables, formally defined as:

(1) $$MVE = f(AI)$$

where

MVE = market value of equity

AI = accounting information

Value relevance researchers are interested in how accounting information affects market values of equity. One may for instance study if one particular piece of accounting information is significantly related to the market value of equity, or one may study how much accounting information explains the variation in equity values. Such issues are typically tested using regression analysis. The first research question can be answered by studying the significance level of individual regression coefficients, while the second issue can be analysed through a study of the explanatory power from a regression analysis.

One of the most central regression specifications used in value relevance research is the price regression. The price regression analyses the relationship between the market value of equity and the book value of equity. The regression is typically run on a per share basis:

$$(2) \qquad P = \beta_0 + \beta_1 BVS + \varepsilon$$

where

P = stock price

BVS = book value per share

The residual income framework (see section 2) shows that stock values can be estimated as a function of book value of equity and earnings. As such, earnings are often included as a second variable in the price specification:[6]

$$(3) \qquad P = \beta_0 + \beta_1 BVS + \beta_2 EPS + \varepsilon$$

where

EPS = earnings per share

Equity valuation is obviously an important exercise for all stock investors. However, once a stock or a portfolio of stocks has been invested in, the stock price per se is not necessarily of

[6] Earnings and book value multiples are frequently applied to calculate approximate equity values. Penman (1998) shows how the two multiples can be combined in equity valuation. Specifically, Penman calculates weights that combine capitalised earnings and book values into equity price. Regression specification (3) is in principle equal to Penman's valuation model.

much interest. The focus is instead on the investment return. Assuming that the clean surplus relation holds (see definition in section 2), the change in book value of equity is equal to earnings if no dividends are paid. The value relevance research devotes much attention to how the change in market value of equity is related to value creation as measured by the accounting system. This issue is typically studied by regressing the change in stock price, or specifically the stock return, on accounting earnings:[7]

(4) $$R = \beta_0 + \beta_1 E + \varepsilon$$

where

E = earnings, typically scaled by total assets or the market value of equity (see section 3.2.1)

Specification (4) can be applied to study the timeliness of bottom-line earnings. The coefficient on earnings, β_1, is often referred to as the earnings response coefficient ("the magnitude of the relation between stock returns and earnings", Kothari, 2001, p. 123). Value relevance researchers sometimes focus on unexpected return rather than the stock return itself. Unexpected return, the abnormal return, is computed by deducting expected return from raw stock return. Expected return can be estimated in several ways, for instance by using the market model or the Fama and French three-factor model (Fama & French, 1992, 1993). The unexpected stock return is regressed on unexpected earnings. Unexpected earnings are the difference between total earnings and a measure of expected earnings. Expected earnings can for instance be calculated from analysts' forecasts (see e.g., Easton & Zmijewski, 1989; Freeman & Tse, 1992) or from time-series models of earnings (see e.g., Ahmed, 1994;

[7] The return specification can also be seen as a response to scale problems in the so-called level (price) specifications; see section 3.2.1.

Kormendi & Lipe, 1987). The following regression is then run:

(5) $$AR = \beta_0 + \beta_1 UE + \varepsilon$$

where

AR = abnormal return, i.e., stock return minus expected return

UE = unexpected earnings[8]

Note that there is no rigid definition of the earnings response coefficient. The coefficient β_1 from specification (5) is often referred to as the earnings response coefficient as well.

The regression specifications so far have implicitly assumed that aggregate accounting numbers like bottom-line earnings and book equity are the metrics of interest. However, these aggregated measures are sometimes disaggregated into components (see sections 4.3 and 5.1). Note also that value relevance can be analysed for financial statement information that is not a part of the income statement or balance sheet. Such information includes for instance information from the notes or numbers from the cash flow statement. Value relevance research includes both time-series analysis and cross-sectional analysis (and both at the same time; i.e., panel data analysis).

The relationship between stock values or returns and accounting numbers can be examined for different horizons. Research on stock price reactions over short windows of time is referred to as event studies, while analyses of long term relationships are called association studies. Event studies typically analyse stock price behaviour centred around announcement dates, where the time window may be as short as a day or two. Association studies are not that

[8] In their simplest form, unexpected earnings can be estimated as the change in earnings, ΔE.

concerned with how fast the market reacts to new information, and the horizon ranges from 3-4 months to several years. This paper concentrates on association studies, though the distinction between the two in many cases is somewhat blurred.

3.2 Econometric Issues

Section 3.2.1 evaluates econometric challenges related to the price and the return regression, respectively. Section 3.2.2 discusses why researchers in some cases must be careful when applying explanatory power, R^2, as a measure of value relevance.

3.2.1 Return vs. level specification

Misspecified models can cause researchers to draw the wrong conclusions from their analyses. Econometric issues can therefore be an important challenge in much empirical research. As for value relevance research and CMBAR in general, these issues have achieved quite a lot of attention. An important and ongoing debate is connected to the difference between a price level specification (specifications (2) and (3)) and a price change/return specification (specifications (4) and (5)) when investigating the relationship between market values of stocks and accounting values. This issue is thoroughly analysed by Landsman and Magliolo (1988). They present evidence that there is no single correct answer as to what is the "best" model specification. Instead, they argue that the decision of whether to select a price level or a price change (return) specification is a joint function of (1) the economic model of equilibrium that is assumed, and (2) the nature of the econometric properties of the data that cause ordinary least squares (OLS) assumptions to be violated.

The market model often provides the basis for the return specification. Landsman and Magliolo offer three advantages for the use of market model designs:

1. The market model design appears to incorporate uncertainty in a rigorous fashion. Specifically, it can be interpreted in terms of the capital asset pricing model (CAPM).
2. Heteroskedasticity is often a serious problem in OLS-estimation. In cross-sectional studies, the problem arises because the observations from large firms are aggregated with those from small firms.[9] The market model design presents a solution to the "deflation problem" inherent in levels-based models.
3. Omitted variables in the OLS-specification create biased estimates. The value of equity is likely to be a function of several more variables than the ones researchers are investigating (for instance income). In differenced form, the firms' equity value in the previous period provides a control for the variables omitted from the specification. One is, to a certain extent, "eliminating the omitted variables."

Still, Landsman and Magliolo maintain that there are situations in which level specifications will outperform the return specification. They provide three examples to illustrate that the decision to estimate a cross-sectional relation in levels or changes is driven by the set of economic and econometric assumptions that form the maintained hypotheses. Landsman and Magliolo conclude that the advantages of one approach over the other are largely dictated by what the researcher wishes to assume. As for economic motivation, Barth et al. (2001) offer the following instructive definition on the differences between the two models: "The key distinction between value relevance studies examining price levels and those examining price

[9] Landsman and Magliolo (1988) discuss CMBAR in a cross-sectional setting. Heteroskedasticity is, however, often a problem in time-series analysis as well. This is due to the *growth effect* often present in time-series analysis (i.e., accounting numbers and market data are generally larger in absolute magnitude today than fifty years ago).

changes, is that the former are interested in determining what is reflected in firm value and the latter are interested in determining what is reflected in changes in value over a specific period of time" (Barth, Beaver et al., 2001, p. 95).

Kothari and Zimmerman (1995) also conclude that both price level specifications and return specifications have their advantages and disadvantages. They claim that, economically speaking, price models are better specified in that the estimated slope coefficients from price models, but not return models, are unbiased. Return models, however, suffer from less serious econometric problems than price models. One example illustrates this. Current earnings include both a surprise component and an expected component. The latter is referred to as a stale component by Kothari and Zimmerman. They maintain that this stale component is irrelevant in explaining current return and thus constitutes an error in the independent variable. This results in the slope coefficient in the return specification being biased towards zero. The price specification does not suffer from this problem because the stock price reflects the cumulative information content of both components. Current earnings are, however, uncorrelated with the information about *future* earnings contained in the current stock price (see also Liu and Thomas, 2000). This does not bias the estimated slope coefficient, but the price model has an uncorrelated omitted variable that reduces explanatory power. In addition, price models more frequently reject tests of heteroskedasticity. An important implication from these drawbacks is that researchers using price models must exercise more care in drawing statistical inferences. One must also be aware that price models do not measure information arrival over a period. Kothari and Zimmerman recommend using both functional forms (see Easton and Harris (1991) in section 4.1.2). This will also help ensure that the study's inferences are not sensitive to the choice of functional form. Kothari and Zimmerman point out that in the presence of value-irrelevant noise in earnings, both specifications yield downward-biased coefficient estimates.

Kothari and Sloan (1992) acknowledge that ERCs from return specifications are biased downwards (see Beaver, Lambert, & Ryan, 1987; Daniel W. Collins, Kothari, Shanken, & Sloan, 1994; Kormendi & Lipe, 1987). While stock returns over a period reflect the market's revisions in expectations of future earnings, accounting earnings do not. Kothari and Sloan offer a solution to this problem. They reduce the bias by using a return measurement interval that includes a leading time period in addition to the current time period. On the other hand, Christie (1987) observes a very important problem with level models. He claims that any variable correlated with size will be significant in regressions of equity values on accounting variables. The return specification controls for this scale effect by deflating all variables with the market value of equity. However, the market value of equity is not the only deflator used in capital market-based accounting research. Actually, when per share values are used for analysis, the total number of outstanding shares can be seen as a deflation factor or scale factor. In addition, a lot of studies use the accounting value of assets as the deflation factor (see for instance Barth, Cram, & Nelson, 2001; Francis & Smith, 2005; Sloan, 1996).

Barth and Kallapur (1996) do not recommend deflation as a remedy for handling scale effects. They claim that including a scale proxy as an independent variable in the regressions is more effective in both reducing heteroskedasticity and mitigating coefficient bias. Easton and Sommers (2003) do not agree and recommend market capitalisation as the most appropriate deflation factor. In other words, they recommend using a return specification. Easton and Sommers claim that the search for alternative scale proxies is unnecessary. Their analyses are based on the idea that market capitalisation is more than just a possible scale factor – rather it *is* scale. They argue that the scale of a firm with $1 billion capitalisation is simply 1,000 times the scale of a firm with $1 million capitalisation.

3.2.2 The use of R^2

In regression analysis, the coefficient of variation (the explanatory power or simply R^2) measures the proportion of the variance in the dependent variable explained by the independent variable(s). If stock price or returns are regressed on accounting variables, R^2 is a measure of how much of the variation in stock prices/returns is explained by the accounting variables analysed. Hence, explanatory power is a measure of value relevance. The explanatory power from different samples is often compared to study if value relevance differs between the samples. For instance, when analysing the development in value relevance over time, such comparisons are very common (see section 6). R^2 s of samples from different industries, accounting standards, or across countries are also frequently compared. Brown et al. (1999) state that there are severe problems connected to between sample comparisons of R^2-levels. According to Brown et al., these comparisons may be invalid. Specifically, scale effects present in price regressions increase R^2, and this effect increases in the scale factor's coefficient of variation. Thus, differences in R^2, for instance from samples drawn in different time periods, may in part be driven by differences in the coefficient of variation in the scale factor. Brown et al. control for the scale effect by running deflated regressions. They acknowledge that several scale proxies could have been chosen, but argue that price at time t-1 is the preferable choice. As such, they recommend using a version of the return regression.

Gu (2007) states that scale effects are not the only reason why explanatory power is incomparable across samples. He shows that cross-sectional variation in the independent variable affects R^2. Specifically, if two samples have exactly the same regression coefficient and residual variance, the R^2 of the samples will differ if the variance of the independent variable is different in the two samples. Gu maintains that "…the R^2 s could be different even though the economic relation is entirely intact for each and every observation in two samples" (Gu, 2007, p. 1076). Gu's criticism applies to both the price and the return regression. He also shows that the behaviour of the explanatory power is even more complicated in a multivariate setting. The explanatory power is then affected by the variance-covariance matrix of all the independent variables. Gu recommends using residual dispersion as an alternative measure of value relevance. However, the residuals are subject to scaling and must therefore be adjusted for scale. According to Gu, several possible adjustments exist. A relatively easy scale adjustment is to divide the estimated residual standard deviation by $\overline{|\hat{y}|}$, the mean absolute fitted values of the dependent variable y.

3.3 Value Relevance and Market Efficiency

It should be noted that value relevance research is related to market efficiency research. When asking whether accounting information is value relevant, one is also asking whether stock investors use accounting numbers as an input for valuation. One does not ask, however, if the investors' use of accounting information is *optimal*. This is CMBAR on market efficiency, a subject that is not covered in this paper (see Piotroski, 2000, for a nice example of this kind of research[10]). Aboody et al. (2002) do, however, combine the two lines of research, value relevance and market efficiency, in their study. They claim that even though value relevance researchers implicitly seem to draw the conclusion that the stock market is efficient in the

[10] Piotroski's study suggests that it is possible to earn abnormal returns based on a simple strategy of investing in financially strong high book-to-market firms.

semi-strong form, substantial evidence suggests that the market may not be completely efficient in its processing of public information. The purpose of their study is to analyse how possible market inefficiencies may influence conclusions drawn from value relevance research.

Aboody et al. analytically evaluate how market inefficiency effects cause biases in inferences drawn from traditional value relevance studies. They then offer an adjustment procedure that corrects for the bias and adjusts for delayed market reactions in the stock market. Specifically, they multiply stock prices with the ratio of one plus the actual stock return to one plus the required rate of stock return, both measured in the future period τ. In their empirical analysis, where τ is set to 12, 24 and 36 months, Aboody et al. find that regression coefficients on both earnings and book values of equity increase significantly compared to the traditional method with no adjustment. This is also the case when earnings are replaced by residual income. The result holds for both level and return regressions. The magnitude of differences in coefficient estimates is largest for return regressions. For the level regressions, the differences are small in magnitude and not likely to be significant in an *economic* sense. The adjustment procedure of Aboody et al. has, however, not become standard in the value relevance literature. Still, it is sometimes applied to test the robustness of empirical findings (see for instance Hann et al., 2007; Subramanyam & Venkatachalam, 2007).

4 The Value Relevance of Earnings and Other Flow Measures

The majority of the value relevance literature is concerned with how accounting measures influence the *change* in market value of equity, i.e., the stock return. The metric of interest is generally bottom-line earnings. Section 4.1 describes some general research on the value relevance of earnings and includes a brief review of the groundbreaking empirical research from the late sixties. The coefficient describing the relationship between earnings and stock prices is, as outlined in section 3, referred to as the earnings response coefficient (ERC). A lot of research on the determinants of ERCs has been performed in the two last decades. A review of this research is included in section 4.2. Section 4.2 also shows that value relevance is not necessarily constant across all earnings levels. Several studies suggest that the return-earnings association is non-linear. Section 4.3 documents that various earnings components may have different value relevance. In fact, a large amount of empirical research finds that the valuation implication of earnings differs across earnings items. Section 4.4 acknowledges that earnings may potentially be manipulated by the management. This section studies how such earnings management can affect the value relevance of earnings numbers.

4.1 Earnings

Section 4.1.1 briefly reviews the classical studies of Ball and Brown (1968) and Beaver (1968). Section 4.1.2 presents an overview of studies on the value relevance of bottom line earnings. The section discusses why stock returns' association with aggregate earnings is often weaker than one can expect from a theoretical perspective.

4.1.1 The breakthroughs

The article of Ball and Brown (1968) is often viewed as the origin of modern CMBAR. This paper is an event study in which Ball and Brown look at abnormal returns in the months before and after earnings announcement dates. They conclude that income is an informative number, capturing one half or more of all the information about an individual company that becomes available during a year. However, the annual income report is not a very timely medium, since most of its content (85%-90%) is captured before the earnings announcement date.[11] Ball and Brown report that the earnings announcements do not appear to cause any unusual jumps in stock prices. Still, the study suggests a certain underreaction in stock price movements at the time of the announcement. This underreaction creates a post earnings announcement drift that appears to be most pronounced in cases of negative income surprises.

The conclusions of Ball and Brown are in general supported by another seminal article in CMBAR. Beaver (1968) concludes that the information content of income is significant. His evidence indicates a dramatic increase in the trade volume of stocks in the week of earnings announcements. In addition, the magnitude of the stock price changes in the week of announcements is much larger than the average during the non-report period. Both results suggest that earnings announcements lead to a change in investors' probability distribution of future returns, and hence the earnings report has information content.

4.1.2 Some important results from more recent research

The value relevance of earnings is typically studied by regressing stock return on accounting earnings (4) or abnormal stock return on unexpected earnings (5). The ERC measures the stock price's earnings sensitivity. However, specifications (4) and (5) are not equivalent. The first specification tests the general sensitivity of stock prices to the magnitude of reported earnings. The second specification focuses on the unexpected or unusual parts of stock price changes and earnings.[12] The latter specification is inspired by the CAPM framework, and the

---

[11] The immediate response of stock prices to earnings announcements is a research issue that never goes out of fashion. For instance, Caylor et al. (2007) study whether the value relevance of earnings is conditional on the *timing* of earnings information.

[12] One may argue that the concept of earnings response coefficient only should be used when raw stock return and total earnings are studied. Even if the unexpected portion of either stock return or earnings is equal to zero, there may still be a statistical association between stock returns and earnings. As such, the stock price is earnings sensitive, and the earnings response coefficient is larger than zero.

empirical counterpart of CAPM, the market model, is often used to estimate abnormal returns. Since unexpected earnings are non-observable variables in the financial markets, one has to use proxies for this figure. The yearly change in earnings is sometimes applied as a proxy for unexpected earnings; compare earnings as a random walk (Basu, 1997; D. W. Collins & Kothari, 1989; Kormendi & Lipe, 1987).

As shown in section 2, the theoretical background for this kind of empirical research is the valuation models from finance theory. The value of a company is assumed to be the present value of future dividends or cash flows. If one conducts a level regression using stock price changes as the dependent variable and earnings innovations as the right-side variable, one would expect the ERC to equal 1+1/r if the earnings change is regarded as permanent and if one assumes that there is a one to one relationship between earnings innovations and net cash flow innovations. In this case r is the company cost of capital. According to valuation theory, one permanent extra dollar in earnings should increase the value of the stock by one dollar–the effect of an extra dollar this year–plus the present value of one dollar in all future years.[13] If the company cost of capital is for instance 10%, the ERC should theoretically equal 11. If, however, the earnings innovation is regarded as transitory, an ERC of 1 would be expected.

The size of the ERC is a matter that has been subject to extensive research. Some researchers claim that earnings seem to be a worse predictor of returns than one would expect. This conclusion is drawn from low empirical estimates of the ERC and low R^2 from regressions of earnings on stock returns (Lev, 1989). A lot of explanations for this phenomenon are put forward in prior research (although the list is not exhaustive): low earnings persistence (Dechow & Ge, 2006; Kormendi & Lipe, 1987), lack of timeliness of earnings due to strict

[13] ERCs can also be compared with price/earnings ratios.

requirements regarding objectivity and verifiability of accounting numbers (Daniel W. Collins et al., 1994), conservative accounting (Basu, 1997; Penman & Xiao-Jun, 2002), misspecification of statistical models (W. H. Beaver, McAnally, & Stinson, 1997; Easton & Harris, 1991; Freeman & Tse, 1992; Hayn, 1995; Jing Liu & Thomas, 2000), too short measurement intervals for returns and earnings (Easton, Harris, & Ohlson, 1992), aggregation of earnings items (Barth, Cram, & Nelson, 2001; Ohlson & Penman, 1992; Ramakrishnan & Thomas, 1998; Rayburn, 1986; Thomas, 1999), and so on. Poor return-earnings associations and small ERCs due to lack of earnings persistence is a matter investigated by, among others, Kormendi and Lipe (1987). Their conclusion is that current earnings innovations contain information about future as well as current equity benefits. In accordance with other research, however, they do not find that stock returns are excessively sensitive to earnings innovations. Kothari and Sloan (1992) suggest that since stock returns contain information about revisions in future earnings,[14] including leading period returns in the regression specification will increase ERCs significantly (see also Collins et al., 1994).

A lack of timeliness for accounting numbers can also be an explanation for the low contemporaneous return-earnings association. Timeliness can be defined as the extent to which current period accounting income incorporates current period economic income (Ball, Kothari, & Robin, 2000). To provide timely information for equity investors is not the sole purpose of accounting figures. For instance, most accounting standards have strict requirements regarding objectivity and verifiability of accounting numbers. Such factors may reduce the timeliness of earnings and hence reduce the association between earnings and stock return. This hypothesis is supported by Collins et al. (1994). They find that current and future

[14] Finger (1994) concludes that earnings are a significant predictor of future earnings one through eight years ahead. Earnings are also a significant predictor of future cash flows, but cash flow is a better short term predictor of future cash flows than earnings.

earnings adjusted for "expectational error"[15] explain 3-6 times as much of the annual return variation as current earnings alone. Collins et al. also investigate if pure noise is a primary reason for a poor contemporaneous return-earnings association. The explanatory power of models using aggregate and disaggregate levels of data (i.e., industry level or economy level) are approximately similar. One would expect that aggregation of data reduces noise in the data through a "diversification" effect. Similar explanatory power for different levels of aggregations suggests that noise cannot explain a poor return-earnings association.

Easton et al. (1992) also investigate the effects of data aggregation. They hypothesise that although a lack of timeliness may be the case in the short run, the correlation between return and earnings will increase if one looks at long term data. Easton et al. find that if return intervals are expanded and earnings are aggregated over these longer time intervals, the return-earnings association improves dramatically. They conclude that for a ten-year return period, most of the returns can be explained. Hayn (1995) states that the result of the accumulation can be attributed to losses being almost absent as earnings are aggregated over several years; see section 4.2.

Beaver et al. (1997) claim that low ERCs are due to earnings and prices behaving as if they were both endogenously determined.[16] They state that price changes and earnings changes are

[15] Collins et al. (1994) state that "expectational error" is a result of expected future cash flows from new investments, advertising, research and development expenditures, changing market conditions, etc. being only partially reflected in current earnings. Collins et al. include the earnings-to-price ratio, growth in investment and future returns in the return-earnings regression to mitigate this error. They also include three future years' earnings in their analysis.

[16] Note that the return specification presented in section 3 is sometimes reversed, i.e., stock returns are used as the explanatory variable and earnings are used as the dependent variable (see Beaver, Lambert, & Morse, 1980; Beaver et al., 1987). The purpose of such studies is to reverse the familiar price-earnings relation and extract information from a price-based variable in order to predict earnings. Beaver et al. (1980) claim that earnings exhibit a lagged response to information in prices. This is just another way of saying that prices lead earnings in the stock market. These studies confirm the lack of timeliness for accounting numbers. Still, Beaver et al. conclude that their evidence indicates security prices behaving as if earnings were perceived to be dramatically different from a simple random walk process.

jointly influenced by a set of informational variables that are difficult to specify explicitly. They use a simultaneous equations approach to mitigate this bias and obtain sensitivity coefficients that are larger than those obtained from single equation approaches. Liu and Thomas (2000) also maintain that low coefficients and disappointing explanatory power is a matter of model specification. They emphasise what they claim is a misspecification in return-earnings regressions. The misspecification is due to the omission of currently available information about future earnings. It is claimed that this misspecification creates biased estimators. Liu and Thomas develop a multiple regression model where regressors reflecting the information contained in forecast revisions and discount rate changes occurring during the year are included in the analysis. Relative to simple regression models, the multiple regressions significantly improve explanatory power and increase the estimated ERCs.

As mentioned in the beginning of this section, research on value relevance of earnings varies with respect to what type of earnings measure is used as the independent variable. Easton and Harris (1991) compare the use of earnings and the use of *change* in earnings as explanatory variables for stock returns. They first run single regressions for the two measures and then use both in a multivariate regression analysis. Each variable is significant in the single regressions. In their multivariate specification, the coefficient on the level of earnings is significant in all of the 19 analysed years, while the coefficient on the change of earnings is significant in 8 of the 19 years. This result suggests that both earnings levels and earnings changes play a role in stock valuation. The Easton and Harris framework is extensively applied in recent value relevance research (see e.g., Elgers, Porter, & Emily Xu, 2008; Francis, Schipper, & Vincent, 2003; Monahan, 2005).

4.2 Factors Influencing Earnings Response Coefficients

There are numerous papers describing the relationship between earnings and stock returns. Still, it is impossible to give a general answer to how sensitive stock returns are to earnings or changes in earnings. This sensitivity, the ERC, is dependent upon a lot of factors. At the end of this section, evidence will be presented that the ERC may in fact be a function of the *level* of earnings. However, the early studies that analyse the determinants of ERCs typically disregard this possible non-linearity in the returns-earnings association. For instance, Collins and Kothari (1989) study the inter-temporal and cross-sectional determinants of ERCs. They present evidence that the ERCs are a function of the riskless interest rates (inter-temporal determinant) and the level of risk, growth and/or persistence of earnings (cross-sectional determinants). Firms' cost of capital increases with the interest rate and the level of risk. Not surprisingly, Collins and Kothari find that the risk-free interest rate and systematic risk is negatively correlated with the ERCs. The ERCs, however, vary positively with growth prospects and earnings persistence (see also Kormedi & Lipe, 1987; Freeman & Tse, 1992). This result is in accordance with their hypothesis. An income growth that signals a further increase in future income is, of course, highly appreciated, and one extra dollar in earnings is obviously more valuable if the earnings increase is expected to be permanent. It should be noted, however, that growth and persistence are to a certain extent related. Collins and Kothari can therefore not disregard that the proxies used for these variables can reflect the effect of both variables. Collins and Kothari also demonstrate that the return-earnings relation varies with firm size. They do, however, view size as a proxy for information environment differences. Once these differences are controlled for, they find little evidence that price changes covary with earnings changes across firm size. The authors also emphasise that if size is correlated with risk, growth and persistence, this variable may turn out as a significant explanatory variable for the ERCs even if it is not actually significant.

Easton and Zmijevski (1989) present evidence that is consistent with that of Collins and Kothari (1989). Their cross-sectional study indicates that ERCs are positively associated with revision coefficients and negatively associated with expected rates of return. The revision coefficients measure the extent to which the information in earnings announcements results in revisions in expected earnings. In other words, it is the coefficient relating current earnings to future earnings. Thus, it is a measure of what Collins and Kothari referred to as earnings persistence. Easton and Zmijevski document a weak positive association between ERCs and firm size, and a weak negative association between ERCs and systematic risk.

Biddle and Seow (1991) perform cross-industry comparisons of ERCs. They claim that there are several advantages connected to estimating ERCs by industry. First, industry membership naturally captures characteristic attributes for the different industries. Second, within-industry estimation controls for omitted variables that may differ considerably by industry. Biddle and Seow's results confirm that ERCs differ substantially across industries. According to their study, the differences are related to industry entry barriers, product type, growth, financial leverage, and operating leverage. The ERCs seem negatively related to financial and operating leverage and positively related to industry entry barriers, product durability and growth. The underlying hypotheses are relatively straightforward. Note that financial leverage is measured as the ratio of debt to market value of equity. Higher financial leverage suggests higher risk. Risk is assumed to be negatively related to ERCs. An equivalent argument is used for operating leverage. Operating leverage is defined as the ratio of fixed to variable expenses. Prior research has shown that operating leverage is positively related to beta (systematic) risk (Lev, 1974).

Contrary to several other studies within this area, Ahmed (1994) finds that growth is not a significant explanatory variable for ERCs. In other words, his study suggests that accounting earnings are not very informative about firms' growth opportunities. Ahmed maintains that this is due to accountants not attempting to incorporate changes in the value of growth options into financial statements. Note that his diverging conclusion may be due to his choice of growth proxies; see for example Frank (2002),[17] who presents evidence that coefficients are sensitive to the choice of proxy for growth. Ahmed does not use market-based proxies for growth, claiming that these growth proxies also proxy for expected return and firms' ability to earn economic rents. Moreover, Ahmed reports several findings that contradict other research. His results on cost structure effects are opposite to the ones of Biddle and Seow (1991). Ahmed finds that the ratio of fixed to total costs is *positively* related to ERCs. He argues that the greater the ratio of fixed to total cost, the greater is the sensitivity of future rents to revisions in output associated with a surprise in earnings. And hence, the higher is the ERC. He claims that these cost structure effects via revisions in future rents offset the negative risk effect hypothesised by Biddle and Seow. Ahmed's final finding, that competition in the firms' product market is negatively related to ERCs, is less controversial. His general conclusion that accounting earnings reflect information about future economic rents generated by firms' assets-in-place is also in line with prior research.

Research on determinants of ERCs suggests that there is a large number of factors influencing this sensitivity. Teets and Wasley (1996) point out that if the hypothesis of equality for firm-

[17] Frank's (2002) main test is, however, not equivalent to the other ones referred to. Frank sorts companies into five different growth categories. She then measures value relevance as the *explanatory power* (R^2) – not the magnitude of response coefficients – of multiple regressions of stock prices on both earnings and book value of equity. Her conclusion is that the value relevance of accounting data is significantly higher for low-growth firms relative to high-growth firms. Frank concludes that the accounting data of high-growth firms seems to capture fewer value relevant events compared to the accounting data of low-growth firms. In general, she maintains that the improper pooling of firms may result in the significance of fundamental explanatory variables being offset against each other across types of firms and thus disregarded.

specific ERCs is rejected, firm-specific estimation should be used instead of pooled estimation. This is also the case if there is correlation between firms-specific unexpected earnings variances and ERCs. In their empirical study, Teets and Wasley find that the mean firm-specific ERC is 13 times larger than the corresponding coefficient estimated with a pooled cross-sectional regression methodology. The difference is due to *both* variation in coefficients and unexpected earnings variances *and* a negative relation between firm-specific unexpected earnings variances and ERCs. Teets and Wasley conclude that using pooled estimation may lead to incorrect inferences about the magnitude of estimated coefficients and/or incorrect inferences about differences in coefficient behaviour between groups of firms.

ERCs may also be incorrectly estimated if the functional form of the returns-earnings association differs from what is assumed in the regression analyses. It has been common in the value relevance literature to assume that the relationship is linear. However, during the last couple of decades, a relatively large amount of studies document that this is not necessarily the case (e.g., Basu, 1997; Freeman & Tse, 1992; Hayn, 1995). These studies suggest that the ERC is actually a function of the earnings level. In other words, the returns-earnings association can be non-linear. The non-linearity is often assumed to be caused by differences in earnings persistence, for instance due to conservatism or investors' liquidation option.

As mentioned before, accounting numbers might lack timeliness due to requirements of objectivity and verifiability. This strict demand for objectivity and verifiability creates conservatism in accounting in general. Conservatism is referring to the fact that losses are generally recognised before positive earnings in the income statement. There is a clear tendency in accounting to require a higher degree of verification for recognising "good news" than "bad news" in financial statements. Basu (1997) interprets conservatism as resulting in earnings reflecting bad news more quickly than good news. This conservatism has consequences both for timeliness and persistence of earnings. Basu predicts and finds that negative earnings changes are less persistent than positive earnings changes. Consistent with this asymmetric persistence, he finds that ERCs are higher for positive earnings changes than for negative (see also Collins et al., 1997). As for timeliness, bad news earnings are timelier than good news earnings, since accountants typically report the capitalised value of bad news as losses. Basu reports that there seems to have been a substantial increase in conservatism since the creation of the FASB. This view is supported by empirical studies of for instance Holthausen and Watts (2001) and Givoly and Hayn (2000). Penman and Zhang (2002) state that conservative accounting combined with investment growth depresses earnings and accounting rates of return and creates unrecorded reserves. Their empirical study suggests that the stock market does not penetrate the quality of earnings of firms with conservative accounting. Hayn (1995) concludes that losses are less informative than earnings. She maintains that this is due to the liquidation option that investors have. Losses are not expected to perpetuate, and they are perceived by investors as temporary. Shareholders can always liquidate the firm rather than suffer from indefinite losses.[18] Dechow and Ge (2006) show that earnings persistence is affected by the sign and magnitude of accruals. Consistent with Hayn's finding, they report that the low earnings persistence of low accruals firms is primarily driven by special items.

A study of Darrough and Ye (2007) to a certain extent contrasts Hayn's conclusion that losses

[18] Jenkins (2003) acknowledges that the transitory nature of losses diminishes the relation between earnings and value. He develops a sales-based model of future normal earnings that is shown to be incrementally value relevant.

must be expected to be temporary. Darrough and Ye show that companies can sustain relatively long term losses but still remain in business for many years. These firms typically invest in activities that add value to the firm in the future. However, the value of the investments is not fully reflected in current equity or earnings values, since they are often expensed based on GAAP accounting; see for instance R&D expenditures (see section 7.2). Darrough and Ye highlight the importance of "hidden assets" or intangibles for loss firms. In the case of losses, Joos and Plesko (2005) find that investors separately value the R&D component as an asset and the non-R&D component as if it were a *transitory* loss.

In general, the non-linear association between stock returns and earnings does not have to be a function of only the sign of earnings. Freeman and Tse (1992) support the idea of non-linearity but suggest a rather complex relationship between earnings changes and returns. Their model rests on the assumption that the absolute value of unexpected earnings is negatively correlated with earnings persistence. Specifically, they suggest an S-shaped returns-earnings relation; i.e., convex for bad news and concave for good news. They obtain a substantially higher explanatory power for their non-linear model than for the traditional linear model. According to Elgers et al. (2008), this non-linearity implies that a linear specification of the returns–earnings relation imparts a downward bias to estimated earnings response coefficients. The downward bias in the coefficient estimate is greater for the firm-specific component of earnings changes than for the industry component.

The non-linear relationship between returns and earnings is generally attributed to varying earnings persistence. Note that the ability of earnings (and cash flow) to forecast themselves is a popular subject to investigate within CMBAR. Although market values or market returns are not necessarily studied in these papers, the papers can *indirectly* be regarded as being part of the value relevance literature. Since firm value is the present value of future cash flows or earnings, current cash flows and earnings should be regarded as value relevant if they are able to predict future values of cash flows and/or earnings. For example, see Finger (1994), who "examines the value relevance of earnings by testing their ability to predict two future benefits of equity investment: earnings and cash flow from operations" (Finger, 1994, p. 210). Several of the studies reviewed in this paper are in fact studies of time series properties of accounting numbers, i.e., studies that look at the predictive ability of cash flow and/or earnings (see for instance Barth, Beaver, Hand, & Landsman, 2005; Barth, Cram, & Nelson, 2001; Dechow & Ge, 2006; Dechow, Kothari, & Watts, 1998; Finger, 1994).

4.3 Disaggregation of Earnings

The research presented so far generally assumes that all earnings components have identical associations with stock return. A large amount of research shows that this is not necessarily the case. Section 4.3.1 discusses how the value relevance may differ across earnings items. Section 4.3.2 investigates the value relevance of earnings relative to that of cash flow. Cash flow is a particularly interesting component of earnings. While the accrual component of earnings is a function of accounting standards and subjective judgement of management and accountants, cash flow is regarded as the objective component of earnings. Cash flows are also input data in a lot of valuation models. Earnings can also be disaggregated into a normal component and an abnormal, or residual, component. The value relevance of residual earnings is analysed in section 4.3.3.

4.3.1 Detailed earnings items

When analysing accounting earnings' relation with stock prices or stock returns, one normally looks at net earnings, change in net earnings or unexpected net earnings. Some researchers have, however, used more detailed data to describe this relationship. Ramakrishnan and Thomas (1998) separate net income into permanent, transitory and price-irrelevant components of unexpected earnings. They claim that the price-earnings link is better described when multiplying each earnings component by a different earnings coefficient than when applying one single ERC to aggregated unexpected earnings. Unsurprisingly, their result suggests that different components of earnings have different valuation implications. Several papers suggest that extraordinary and special items are less value relevant than other earnings items (for instance Landsman, Miller, & Yeh, 2007). As a response to the lacking value relevance of some GAAP earnings items, analysts have increasingly started to focus on "Street" earnings numbers (Bradshaw & Sloan, 2002). Street earnings are pro-forma earnings numbers that typically exclude special items and non-cash items.[19] In general, if earnings components do not aggregate to a fully informative bottom line number, then information from income statement line items can help improve the accuracy of intrinsic value estimates (Pope, 2005).[20]

Ohlson and Penman (1992) acknowledge that the different line items of earnings may have different valuation implications. They claim this is due to investors perceiving differential measurement errors. Ohlson and Penman empirically analyse how disaggregated accounting data explains return. They run regressions using various components of earnings as explanatory variables. These components include gross margin, operating expenses, depreciation expense, tax expense, other income/expense items, and extraordinary/unusual line items. Ohlson and Penman find that the disaggregation of income data increases the explanatory power of their regressions (comparable results are reported by Carnes, 2006).

[19] There is no common definition of Street earnings. In fact, Cornell and Landsman (2003) report that none of the pro-forma earnings measures released by companies are specifically defined.

They also find that although the estimated coefficients of the various line items vary in the short run, they have approximately the same magnitudes over long return intervals (10 years). They state that their empirical evidence is remarkably consistent with the idea of economic equivalence in line items. In the short run, however, the coefficients associated with income components that are considered difficult to measure (in particular depreciation and tax expenses) are lower than the coefficients of less problematic components. Dhaliwal et al. (1999) construct a measure of comprehensive income by adding dirty surplus items to net income. They find no clear evidence that comprehensive income is more strongly associated with returns than is net income. In addition, their results suggest that comprehensive income is less associated with market value of equity than reported net income.

Recent research has also disaggregated income data into foreign and domestic income and investigated the value relevance of each measure. Thomas' (1999) empirical study indicates that investors understate foreign earnings' persistence. In other words, foreign earnings have a very low ERC compared to domestic earnings. Thomas maintains that this makes it possible to construct a zero-investment hedge portfolio that consistently earns positive returns over years. He acknowledges that the abnormal returns may be due to misspecification of risk, but claims that further analyses show that this is probably not the case. According to Thomas, the market corrects fully for its possible mispricing in the long run – abnormal returns do not persist for more than a year. The results within this area of research are, however, mixed. Contrary to Thomas (1999), Bodnar and Weintrop (1997) find that investors place a higher weight on foreign earnings than on domestic earnings when valuing companies. They explain their result partly by the higher growth opportunities in foreign markets. Hope and Kang

[20] Sometimes non-GAAP measures are claimed to be the preferred performance metrics; for instance, take revenue per passenger mile (airline industry), value of new orders (homebuilding industry), and same-store sales (retail restaurants) (Francis, Schipper, & Vincent, 2003).

(2005) suggest that the results of Bodnar and Weintrop may be due to a misspecification of their model. When excluding what Hope and Kang call "other information", the regression specification might suffer from an omitted variables problem. "Other information" is defined as relevant information other than current earnings in pricing securities. Hope and Kang regard information contained in revisions of analysts' forecast of future earnings and terminal values as an important source of "other information." When using their "other information" variable, the explanatory power of the return-earnings regressions increases. The bias from excluding "other information" has a greater effect on foreign earnings than domestic earnings, and foreign earnings are no longer incrementally value relevant when controlling for "other information." Callen et al. (2005) do, however, document that domestic earnings contribute significantly more to unexpected stock price *variability* than do foreign earnings.

In general, accounting information can be disaggregated in order to measure sensitivities of a vast number of variables to stock returns. Anthony and Ramesh (1992) look at the response coefficients of sales growth and capital investment. They present theoretical evidence that acquisition of market share and capital capacity is highly valued in early life cycle stages. Hence, they hypothesise that both variables are a function of the life cycle stage. Anthony and Ramesh claim that it is reasonable to expect a higher stock price reaction to unexpected sales growth and unexpected capital expenditure in the early life cycle stages. Using dividend payout, sales growth and firm age as indicators of life cycle stage, the hypothesis is confirmed in their empirical study. The authors conclude that there is a monotonic decline in the response coefficients of unexpected sales growth and unexpected capital investment from the growth to the stagnant stages. Their result on capital expenditure is supported by Kerstein and Kim (1995), who find that unexpected capital expenditure changes are strongly and positively associated with excess returns. They conclude that these expenditures yield information about future earnings that is not captured by current earnings. Chen and Zhang (2007) introduce a theoretical model where stock returns are related to the earnings yield, capital investment, changes in profitability and growth opportunities, as well as to changes in the discount rate. They also present empirical support for their model.

4.3.2 Earnings versus cash flows

The majority of the value relevance research focuses on the value relevance of earnings and the determinants of ERCs. However, as the ultimate return of every investment is the cash flow generated by the investment, the value relevance of cash flows is often used as a benchmark for assessing accounting values' usefulness for stock investors. According to the FASB (see for instance the FASB's Objective of Financial Reporting by Business Enterprises (1978)), accounting accruals make earnings more highly associated with future cash flow and company value than does current cash flow. The FASB assertion is frequently studied in value relevance research.

Earnings equal cash flow plus accruals. Rayburn (1986) investigates the separate value relevance of cash flow and accruals. She finds both variables to be associated with stock returns. Still, her results indicate that only cash flow and changes in working capital have significant explanatory power. The coefficients of both depreciation and changes in deferred taxes are insignificant. This result is consistent with current accruals having information content, while long term accruals do not. Barth et al. (2001) report that accruals items are both significantly predictive of future cash flow and significantly related to stock return (see also Ball & Shivakumar, 2006; Barth et al., 2005). The conclusion holds for both long term and short term accruals. Dechow (1994) finds that earnings are more strongly associated with stock returns than is realised cash flow. This conclusion is supported by Subramanyam and

Venkatachalam (2007), who state that earnings dominate operating cash flows as a summary indicator for ex post intrinsic equity value.[21] Still, Dechow also finds that the ability of realised cash flows to measure firm performance improves relative to earnings as the measurement interval is increased, a finding consistent with Rayburn's results. Another important conclusion from Dechow's article is that earnings are more associated with stock returns than cash flows for firms experiencing large changes in their working capital requirements and their investment and financing activities. Under such conditions, realised cash flows are less able to reflect firm performance due to severe timing and matching problems. The return-earnings association also increases with the length of firms' operating cycles. Basu (1997) extends Dechow's study by showing that earnings are timelier than cash flows in reflecting "bad news" (see section 4.2). His results are consistent with conservatism being reflected in accruals and not in cash flow. The result also indicates that accruals do not improve the timeliness with which "good news" is reported in earnings relative to cash flow.

In a much cited study, Sloan (1996) investigates the persistence of the cash flow and the accrual components of earnings. His results indicate that earnings performance attributable to the accrual component of earnings exhibits lower persistence than earnings performance attributable to the cash flow component of earnings. In fact, Chan et al. (2004) report that aggregate future earnings will decrease by \$0.046 and \$0.096 in the next one and three years, respectively, for a \$1 increase in current accruals. Sloan claims that this fact is not well appreciated by the average investor (see Bernard & Stober, 1989; Daniel W. Collins & Hribar, 2000). His study suggests that investors fail to distinguish fully between the different properties of the accrual and cash flow components of earnings. As a result, firms with

[21] Ex post intrinsic equity value is the discounted value of dividends over a three-year horizon plus the discounted market value at the end of the forecast horizon (the terminal value).

relatively high levels of accruals experience negative future abnormal stock returns. The opposite is true for firms with low accruals levels. The abnormal returns are clustered around future earnings announcement dates. The conclusion of Sloan's article that investors do not distinguish between the accrual and cash flow components of earnings contradicts the results of an earlier study by Wilson (1986). He finds evidence that for a given amount of earnings, the stock market reacts more favourably to a larger cash flow component of earnings. However, Lev and Nissim (2006) show that the so-called accrual anomaly documented by Sloan still exists and that its magnitude has not decreased over time. Institutions shy away from extreme-accruals firms because their attributes, such as small size, low profitability, and high risk stand in stark contrast to those preferred by most institutions. Individual investors are generally unable to profit from trading on accruals information due to the high information and transaction costs associated with implementing a consistently profitable accruals strategy.

Bowen et al. (1986) show that the persistence of earnings relative to cash flows is a matter of what cash flow measure one uses; there are several alternatives. Livnat and Zarowin (1990) present evidence that the disaggregation of financing and operating cash flows into their components significantly improves the degree of association with security returns. They do not, however, find evidence of differential associations across components of investing cash flows. Livnat and Zarowin support Bernard and Stober (1989) in that disaggregating net income into cash flow and accruals might not contribute to increased associations with returns.

In general, when comparing the explanatory power of different accounting measures, it is important to distinguish between incremental and relative information content. This issue is well illustrated in an article of Biddle et al. (1995), who offer the following definition of the difference: “Incremental comparisons ask whether one accounting measure provides information content beyond that provided by another, and apply when one measure is viewed as given and an assessment is desired regarding the incremental contribution of the other (e.g., a supplemental disclosure). Relative comparisons ask which measure has greater information content, and apply when making mutually exclusive choices among alternatives, or when rankings by information content is desired (e.g., when comparing alternative disclosures)” (Biddle et al., 1995, p. 17). Biddle et al. perform an empirical study in which the difference is illustrated. The information content of net income, net sales and cash flow is compared. Incremental information content tests indicate that in pairwise comparisons, each measure provides incremental information content beyond each of the others. As for relative information content, their results suggest that net income provides significantly greater relative information content than net sales and cash flows, and net sales provide significantly greater relative information content than cash flows. Their results are supported by Francis et al. (2003), who find that earnings dominate EBITDA and CFO in explaining stock returns.[22] Callen and Segal (2004) perform a variance decomposition analysis to test the value relevance of cash flow and accruals. Accrual earnings news and cash flow earnings news are found to drive firm-level stock returns equally. Regarding relative value relevance, Xu and Cai (2005) find that sales revenue outperformed earnings and cash flow for high-tech companies in the nineties (compare A. K. Davis, 2002; Monahan, 2002). Kim et al. (2008) report that an earnings change supported by sales is generally valued as more important by the market than an earnings change from other means.

[22] In a study of multiples-based equity valuation, Liu et al. (2007) find that earnings multiples generally outperform operating cash flow multiples.

This section cannot be complete without quoting some important results from Hribar and Collins (2002). As has already been noted, the difference between cash flows and earnings is accruals. Accruals can be measured either as the change in balance sheet accounts or directly from the statement of cash flows. Hribar and Collins find that studies using a balance sheet approach are potentially contaminated by measurement error in accruals estimates.[23] Accurate accruals data has been available in the statement of cash flows since 1988 in the U.S. Still, according to Hribar and Collins, some of the more recent studies in CMBAR have chosen to use the indirect balance sheet approach. This choice of method may have affected some studies' conclusions on the difference in value relevance between cash flows and earnings.

4.3.3 Residual income

The works of Ohlson (1995) and Feltham and Ohlson (1995) triggered a vast empirical research on the residual income model (see section 2). Since residual income cannot be observed either in the financial markets or in financial reports, it has to be estimated by researchers or analysts. Using different estimates for residual income, several studies conclude that their measure is a value relevant number (Aboody et al., 2002; Biddle, Bowen, & Wallace, 1997; S. Chen & Dodd, 2001; Dechow, Hutton, & Sloan, 1999).

Economic value added (EVA) is a concept closely related to residual income. EVA is Stern Steward's trademarked variant of residual income. The basic ideas are the same as in the residual income model, but Stern Steward makes certain adjustments to accounting income and accounting equity before computing company value. Biddle et al. (1997)[24] compare the

[23] The difference between the two methods is due to the fact that a portion of the changes in balance sheet working capital accounts relates to non-operating events. Hribar and Collins (2002) refer to these non-operating events as non-articulation events and claim that these will lead to erroneous estimation of accruals under the balance sheet approach. Examples of non-articulation events include mergers and acquisitions, divestitures and foreign currency translations.

[24] Note that Biddle et al. (1997) provide a thorough description of the EVA-model.

value relevance of earnings to that of residual income and EVA. Their relative information content tests reveal earnings to be more highly associated with returns than EVA and residual income. In addition, tests of incremental information content suggest EVA/residual income components add only marginally to information content beyond earnings. Biddle et al. conclude that there is little evidence to support the claim that EVA and residual income are superior measures to earnings in their association with stock returns or firm value. Note that Biddle et al. use *current realisations*, not future flows, of each performance measure. This can be one explanation for the seemingly poor value relevance of EVA/residual earnings: "Equity valuation is ultimately the discounted present value of future equity cash flow (or dividends or residual income or EVA)" (Biddle et al., 1997, p. 332).

The conclusions of Biddle et al. are in general supported by Chen and Dodd (2001). They compare the value relevance of operating income, residual income and EVA. They conclude that operating income regressions tend to show higher R^2 than the residual income regressions, which in turn have higher R^2 than the EVA regressions. Chen and Dodd do, however, find that residual income measures contain significant incremental information that is not available in operating income measures.

4.4 Value Relevance and Earnings Management

As mentioned earlier, cash flows are regarded as the objective component in earnings. The size of the accruals, on the other hand, is to an extent the result of subjective judgements by accountants and managers. Accruals can potentially be manipulated. In "The Effect of Earnings Management on the Value Relevance of Accounting Information" (Marquardt & Wiedman, 2004), the authors combine two important lines of research within the field of CMBAR, namely earnings management and value relevance. They point out that prior research on value relevance has assumed that accounting figures are free of reporting biases. General CMBAR has, however, shown that earnings management occasionally occurs (see for instance Barua, Legoria, & Moffitt, 2006; Burgstahler & Dichev, 1997; Degeorge, Patel, & Zeckhauser, 1999). Marquardt and Wiedman examine the value relevance of earnings for a sample of firms for which there is reasonable ex ante expectation as well as ex post evidence of earnings management. Specifically, they investigate whether opportunistic earnings management impairs the value relevance of earnings for a sample of firms issuing secondary stock. Prior research has, according to Marquardt and Wiedman, identified this as a situation where managers may have both the incentives and opportunity to manage earnings. This is particularly true when the managers themselves participate in secondary equity issues by selling shares of their own stock.

Marquardt and Wiedman's study supports their hypotheses. For the subset of firms in which managers sell their stock through a secondary offering (called the MGMT-group), discretionary accruals are significantly positive in the year of the offering. In addition, discretionary accruals are significantly more positive in the year of the offering for this group than for firms whose managers did not participate in a secondary offering (the NON-group). When regressing market price on earnings, Marquadt and Wiedman find a significant decrease in the estimated coefficient on net income and a decrease in R^2 in the year of the offering for the MGMT-group. They interpret this as evidence of a decrease in the value relevance of net income when earnings management is present.[25] In general, the conclusions of Marquadt and Wiedman are supported by Christensen et al. (1999), who find that the greater managers' incentives for earnings management, the less informative are the earnings announcements to investors. Note that incentives are important in this kind of research; the use of subjectivity in estimating accounting figures is not necessarily negative as far as value relevance is concerned. Discretionary accruals can help managers produce a reliable and timelier measure of firm performance. This is the performance measure hypothesis (see for instance Guay et al., 1996). Ben-Hsien and Da-Hsien (2004) report that income smoothing may increase the value relevance of earnings. Earnings stability can be seen as one property of high-quality earnings.[26]

5 The Value Relevance of Equity and Other Stock Measures

Most of the value relevance research is performed on flow measures. This can possibly be attributed to investors being more interested in stock *returns* than in the absolute value of companies. Book values of assets and liabilities are normally quite stable. Value relevance research is often *change-oriented*, and one asks the question of what influence accounting numbers have on stock price increases and decreases. Whether the stock price is $1 or $ 1.000 is not necessarily of great interest. Such issues are studied in the field of valuation and fundamental analysis, in which one computes fundamental (or intrinsic) values of companies and compares these with the market value of stocks using valuation methods like the dividend model and residual income model (for an example of such a paper, see Dechow et al., 1999). Although this research is to a certain extent related to value relevance research, it is not the subject of this paper. Analysis of balance sheet measures is also an important part of other types of CMBAR. This is the case in earnings management research, in which management

---

[25] Marquadt and Wiedman also find that book values play a greater role in equity valuation when earnings management impairs the value relevance of net income.

[26] Earnings quality can be evaluated along the following earnings attributes (see for instance Francis et al., 2004): accrual quality (the degree to which earnings map closely into cash flow), persistence, predictability, smoothness, value relevance, timeliness, and conservatism.

discretion in accounting valuation, of for instance accruals, is a major topic. Balance sheet measures can also be of great interest in studies of mispricing and market efficiency.

Section 5.1 reviews some of the more general studies on the value relevance of balance sheet measures. However, much of the value relevance literature on such stock measures is rather specialised. Examples of this specialised research are presented in section 5.2.

5.1 General Value Relevance Research on Balance Sheet Measures

A vast amount of research papers document that book values of equity are highly associated with stock prices (see for instance Ayers, 1998; Barth, Beaver, & Landsman, 1998; Daniel W. Collins, Maydew, & Weiss, 1997; Dechow et al., 1999; Dontoh, Radhakrishnan, & Ronen, 2004; Ohlson & Penman, 1992). The statistical association between stock prices and book equity is typically stronger than the association between stock returns and earnings. However, the value relevance of balance sheet measures is sensitive to the valuation principles applied to the various asset and debt components. Some empirical studies of balance sheet items compare the value relevance of historical cost estimates with that of fair value estimates. Several conclude that fair value estimates are more value relevant (Barth, Beaver, & Landsman, 1996; Carroll, Linsmeier, & Petroni, 2003; Khurana & Myung-Sun, 2003). However, Khurana and Kim (2003) also find that for small bank holding companies and those with no analysts following, historical cost measures of loans and deposits are more informative than fair values. They conclude that their findings are consistent with the notion that fair value is generally less value relevant when objective market-determined fair value measures are not available. Note that while fair value accounting may increase the value relevance of balance sheet measures, the value relevance of earnings might actually be depressed compared to historical cost estimates. This feature is attributed to a higher portion of unexpected earnings under fair value accounting, for instance transitory gains and losses (Hann, Heflin, & Subramanayam, 2007).

Barth et al. (1998) study how value relevance of the balance sheet is related to financial health. They find that the sensitivity of equity book value to equity market value increases as financial health decreases. The opposite is true for earnings; the incremental explanatory power of earnings is positively related to financial health. This means that as a firm's financial health deteriorates, the book value of equity becomes a relatively more important explanatory variable for stock prices than earnings. Barth et al. claim that the balance sheet's distinctive role is to provide information on liquidation values to facilitate loan decisions and monitoring of debt contracts. Liquidation values obviously become more relevant as the probability of default increases. Hence, it is not surprising that the balance sheet is more value relevant for distressed companies. The value relevance of book equity is also a function of differences relating to the extent and accounting measurement of unrecognised intangible assets. One would expect that a high level of unrecognised intangible assets lead to net income having a higher explanatory power than equity book value, and vice versa. The study of Barth et al. confirms this hypothesis. Overall, Barth et al. conclude that their study provides support for the contention that the balance sheet and income statement fulfil different roles. In addition, their analysis shows that both equity book value and net income are priced. Barth et al. maintain that omitting one or the other potentially leads to model misspecification. Their conclusion is supported by Dechow et al. (1999), who also find that book values of equity convey additional information over earnings in explaining contemporaneous stock prices. Ayers (1999) finds that firm assets and liabilities in general are value relevant. In addition, he documents that net pension liability and other post-retirement liability amounts are significantly associated with the market value of equity.

Lev and Thiagarajan (1993) identify a set of financial variables (fundamentals) that are claimed by analysts to be useful in security valuation, and they examine the claims by estimating the incremental value relevance of these variables over earnings. Several variables are investigated, among them three balance sheet items: inventories, accounts receivable and provision for doubtful receivables. According to Lev and Thiagarajan, disproportionate increases in inventories and accounts receivable often convey a negative signal, as they suggest difficulties in selling a firm's products. Regarding provisions for doubtful receivables, decreasing values are perceived as a negative signal. Since the provision is largely discretionary, unusual changes are considered suspect by analysts. Lev and Thiagarajan's hypotheses on inventories and accounts receivable are confirmed in their empirical study. They do not get significant results with regard to provisions for doubtful receivables. There is, however, little doubt that the degree of conservatism in accounting in general affects the value relevance of balance sheet figures (see for instance Penman & Xiao-Jun, 2002). Ohlson and Penman (1992) also study the value relevance of disaggregated balance sheet data. They conclude that the disaggregation of book value into balance sheet components does not improve their model's explanatory power. Note that this result is in sharp contrast to the disaggregation of income data explained in section 4.3.1.

5.2 Examples of More Specialised Research

A substantial part of the value relevance research is performed on earnings, cash flows and the coefficients of these flow measures. The research is often on a wide selection of firms, and it is common to pool data of different industries, company size, accounting standards, etc. into one large sample. As mentioned in the last section, a lot of the research on balance sheet measures is rather specialised. Some of the studies are from different industries. For instance, Petroni and Whalen (1995) investigate property-liability insurers, Harris and Ohlson (1990) the oil and gas sector, and Barth (1994) banks. It is also popular to look at the value relevance of different accounting methods, for instance:

- Purchase versus pooling accounting (Davis, 1990; Vincent, 1997).
- The equity method (Graham Jr, Lefanowicz, & Petroni, 2003).
- Revaluation (Barth & Clinch, 1998).
- Deferred tax liability (Amir, Kirschenheiter, & Willard, 1997; Ayers, 1998; Givoly & Hayn, 1992).
- Capitalisation versus expensing of research and development costs (Lev and Sougiannis, 1996, Aboody and Lev, 1998).
- Value relevance of asset write-downs (D. Collins & Henning, 2004; Francis, Hanna, & Vincent, 1996).
- Pension accounting (Barth, Beaver, & Landsman, 1992; Hann et al., 2007).
- LIFO inventory accounting (Biddle & Lindahl, 1982).

Some of these articles are reviewed in section 7, which looks at the value relevance of different accounting standards. Note that the different methods for valuing balance sheet items also affect the income statement.

It is quite common to measure the combined value relevance of flow measures, for instance earnings, and balance sheet measures, for instance book value of equity; see specification (3). Barth et al. (1998) provide an excellent example of such a study. The next section will demonstrate that this methodology can also be used in other settings.

6 Value Relevance over Time

During the last decades, most parts of the Western world have experienced a shift from industrialised economies to high-tech, service-oriented economies. The rate of change in these economies is higher than ever before. How are these changes affecting the value relevance of the traditional, historical cost-based financial statements? This is a question that has been analysed by several researchers in recent years.

Collins et al. (1997) investigate the value relevance of earnings and book values of equity over time using the valuation framework provided by Ohlson (1995) (the price regression; see specification (3)). R^2 is used as the primary metric of value relevance. The explanatory power of earnings and book values are decomposed into three elements: (1) the incremental explanatory power of earnings, (2) the incremental explanatory power of book values, and (3) the explanatory power common to both earnings and book values. Collins et al. conclude that while the incremental value relevance of earnings has declined[27] over the last 40 years, it has been replaced by an increased value relevance of book values. Overall, they conclude that the combined value relevance of earnings and book values has increased slightly in this period. The conclusion contrasts the in some sense popular view that the last decades' changes must have led to accounting measures becoming *less* relevant. Collins et al. explain the shift in value relevance from earnings to book values by the increasing frequency and magnitude of one-time items, the increasing frequency of negative earnings, and changes in average firm size and intangible intensity across time.

[27] Ely and Waymire (1999) find little evidence that earnings relevance is higher following (1) empowerment of the Committee on Accounting Procedure (CAP) as the first U.S. accounting standard-setting body in 1939, and (2) subsequent reorganisations of the standard-setting process leading to the creation of the Accounting Principles Board (APB) in 1959 and the Financial Accounting Standards Board (FASB) in 1973.

Francis and Schipper (1999) report similar conclusions when using tests equivalent to the ones of Collins et al. In contrast, Brown et al. (1999) find that value relevance, as measured by R^2, has declined significantly when controlling for scale effects (see section 3.2.2). They also present evidence that the increased R^2 reported in Collins et al. (1997) and Francis and Schipper (1999) is largely attributable to the increase in scale effect having more than offset the decrease in explanatory power in the underlying relations. Francis and Schipper do, however, perform one additional test that is fundamentally different. They use the total return that could be earned from foreknowledge of financial statement information as a measure of value relevance. Contrary to tests on explanatory power, this test controls both for scale increases and changes in the volatility of market returns over time. Francis and Schipper point out that if the absolute amount of value relevant information in financial statements is constant over time, but the volatility of market returns is increasing for reasons that cannot be traced to information sources, the explanatory power tests will be biased toward the result that value relevance is decreasing over time. In fact, their study does suggest that the variability of market returns has been increasing over the sample period. Francis and Schipper find that returns to perfect foresight trading strategies based on accounting earnings and book value of equity have decreased over their sample period. However, returns based on cash flow strategies have not changed significantly over time. Their overall conclusion is that their study provides mixed evidence as to whether value relevance has changed during the last decades. It should also be noted that Francis and Schipper do not find support for the common belief that high-technology firms have experienced a greater decline in value relevance than low-technology firms.

The ambiguity of the results within this line of research is even more apparent when looking at a study by Lev and Zarowin (1999). This study suggests that the value relevance of reported earnings, cash flows and book equity have deteriorated over the past 20 years. The decrease is less pronounced for cash flows than for earnings. Lev and Zarowin maintain that the deterioration in value relevance of accounting numbers is due to change. They document that the rate of change experienced by U.S. companies has increased during the two last decades. It is argued that the increasing rate of change distorts the fundamental accounting measurement process of periodically matching costs with revenues. Specifically, Lev and Zarowin state that it is in the accounting for intangibles that the present system most seriously fails to reflect enterprise value and performance. For instance, restructuring costs and research and development expenditures are immediately expensed, while the benefits of change are recorded later. They claim that the capitalisation of intangible assets will improve the value relevance of financial information. This conclusion is supported by Aboody and Lev (1998).

The claim of Francis and Schipper (1999) that increased volatility of market returns might result in statistical analyses showing a decrease in value relevance when this is not the case is further investigated by Dontoh et al. (2004). Dontoh et al. basically confirm Francis' and Schipper's claim, showing that when non-information based trading activities increase, the R^2 from a regression of stock prices on accounting information declines. This is due to non-information based trading injecting noise into stock prices. Dontoh et al. document that reported decreases in the association between stock prices and accounting information may be due, at least partly, to increased non-information based trading activities. Interestingly, they find that this effect is particularly strong for highly intangible-intensive firms. According to Dontoh et al., this result suggests that a possible decrease in R^2 for such firms is attributable to a large extent to non-information based trading rather than to the inadequacy of accounting information.

This paper focuses mainly on what can be termed direct value relevance research, i.e., how accounting variables are associated with stock prices and stock returns. However, CMBAR also devotes considerable attention towards accounting measures' ability to forecast future firm performance, as measured by future earnings or cash flow (see section 4.2). Since today's stock price is the present value of future cash flow/earnings, this line of research can be denoted as indirect value relevance research. Kim and Kross (2006) use the methodology of Collins et al. (1997) to study how the ability of earnings to predict future cash flow has developed over time. They find that the relationship between current earnings and future operating cash flow has increased over time. Still, the same sample reports a decreasing contemporaneous association between stock prices and earnings. One possible explanation for this seemingly paradoxical finding is that the authors analyse only one-year-ahead cash flows, while stock prices undoubtedly are a function of all future company cash flows. Note also that their finding is consistent with market inefficiency. Nevertheless, Kim and Kross conclude that they are unable to reconcile the increasing ability of current earnings to predict future cash flows with the decreasing ability of current earnings and cash flows to explain prices.

7 The Value Relevance of Alternative Accounting Methods

Different accounting standards will in general have different informational value for stock investors. One possible accounting standard may produce significantly more timely accounting measures than another, competing standard. Information on varying value relevance between accounting standards (or more generally, accounting methods) is useful for standard setters all over the world, although timeliness is only one of several objectives of accounting numbers. Section 5.2 showed some examples of value relevance research on different accounting standards. This section gives a more thorough introduction to the subject.

Section 7.1 presents some typical studies within this field of research. The section particularly emphasises the value relevance effects of increased disclosure. Section 7.2 discusses the accounting treatment of intangibles. Specifically, the question of whether capitalisation or expensing renders intangible assets more value relevant has been heavily investigated in recent years. Section 7.3 focuses primarily on a paper by Holthausen and Watts (2001). Holthausen and Watts initiate a serious academic discussion, as they criticise the value relevance research for having a limited contribution to accounting standard setting.

7.1 Some New Accounting Standards' Influence on Value Relevance

Ayers (1998) performs a very typical study within this field of research. His study is a comparison of Statement of Financial Accounting Standards No. 109 Accounting for Income Taxes and Accounting Principles Board Opinion No. 11 Accounting for Income Taxes. He investigates whether the net deferred tax liabilities under SFAS No. 109 produces additional value relevant information over the disclosure required by APB No. 11. His evidence suggests that the former provides value relevant information above and beyond the latter. The changes induced by SFAS No. 109 include the separate recognition of deferred tax assets, the creation of valuation allowances for deferred tax assets, and the adjustment of deferred tax accounts for enacted tax rate changes. Ayers (1998) finds that all the three changes are associated with firm value.

Barth et al. (1996) study the value relevance of banks' fair value disclosures under SFAS No. 107. Their analysis suggests that disclosed fair value estimates under SFAS No. 107 provide significant explanatory power for bank stock prices beyond that provided by book values.

Specifically, they document that differences between fair values and book values of securities, loans and long term debt are value relevant. However, fair values of deposits and off-balance sheet items do not seem significantly value relevant. The effect of increased disclosure is also investigated by Hope et al. (2008). SFAS No. 131 introduced quite extensive changes in the disclosure of information related to geographic segments and therefore foreign earnings. Hope et al. find strong support for the hypothesis that increased disclosure is positively related to the foreign earnings response coefficient. Their analysis shows that the foreign earnings response coefficient is increasing in (1) the introduction of SFAS No. 131, (2) an increase in the number of geographic segments disclosed, and (3) the inclusion of performance measures in geographic segments. In the previously discussed article by Thomas (1999), it is suggested that poor disclosure may have been one of the reasons why investors discounted the value of foreign earnings for U.S. multinationals. The results of Hope et al. are, to a large extent, a support for this view. Ettredge et al. (2005) also investigate firms' adoption of SFAS No. 131 segment disclosure rules and analyse possible changes in the stock market's ability to predict firms' earnings. They find that single segment firms that began disclosing multiple segments experienced an increase in the forward earnings response coefficient, namely the association between current-year returns and next-year earnings. Analogous to Hope et al. (2008), Ettredge et al. conclude that SFAS No. 131 provides more information to the market. Consistent with this assertion, Hossain (2008) reports that the value relevance of quarterly foreign sales data increases after the firms adopt SFAS 131.

Disclosure does not have to be mandatory in order to have value relevance effects. Lajili and Zeghal (2005) examine the value relevance of labour cost voluntary disclosures. They find that the relationship between equity market values and labour cost disclosures is positive and significant. Lajili and Zeghal suggest that investors view labour costs as a proxy for human capital investments and incorporate this information into their firm valuation processes. They conclude that this result might encourage further human capital disclosure in the future. In principle, the value relevance of several voluntary disclosures may be investigated (see also non-U.S. evidence in section 8.2). For instance, Chee Yeow and Mui-Siang (2007) report that the disclosure of quantitative value-at-risk (VaR) is related to stock return (compare FRR No. 48).

7.2 Capitalisation or Expensing: The Case of Intangible Assets

The treatment of intangible assets is an area that is heavily debated among accountants. Several papers look at the value relevance of alternative accounting methods. Lev and Sougiannis (1996) analyse research and development costs (R&D). U.S. GAAP mandates full expensing of R&D in financial statements. Lev and Sougiannis compute firm-specific R&D capital for a large number of public companies and adjust reported earnings and equity book values to reflect the capitalisation of R&D. They find that these adjustments are strongly associated with stock prices and returns and conclude that this suggests that R&D capitalisation yields value relevant information to investors. They also find that R&D capital is associated with subsequent stock returns and claim that R&D capital does not seem to be fully reflected in contemporaneous stock prices. According to Lev and Sougiannis, this result indicates either a systematic underpricing of R&D-intensive firms or that the excess returns are compensation for an extra market risk factor associated with R&D. The absence of a relation between R&D expenditures and subsequent benefits was a major reason for the FASB's decision to require the full expensing of R&D outlays[28]. Lev and Sougiannis maintain that this argument can be questioned.

[28] Value relevance was not the only reason why expensing of R&D was chosen. The standard setters were also concerned with the reliability and objectivity of the estimates required for R&D capitalisation.

The conclusions of Lev and Sougiannis are, in general, supported by Aboody and Lev (1998). They look at the specific case of capitalisation of software development costs.[29] Similarly to Lev and Sougiannis, Aboody and Lev find that capitalised development costs are positively associated with stock returns. As for balance sheet measures, they find that the cumulative capitalised software costs are associated with stock prices. Aboody and Lev conclude that capitalisation is value relevant for investors. This conclusion is also supported by their finding that software capitalisation is associated with subsequent reported earnings. However, Callen and Morel (2005) find weaker results than those reported by Lev and Sougiannis and Aboddy and Lev. When running firm-specific instead of pooled regressions, they find that no more than 25% of the companies have significant associations between market values and R&D. Monahan (2005) demonstrates that the conservative treatment of R&D affects the returns-earnings relation only for firms that experience high growth in R&D during the return interval of interest.

7.3 Contribution to Standard Setting

Holthausen and Watts (2001) claim that the existing value relevance literature's contribution to standard setting in general seems modest. Even though the literature is large, they claim that it does not seek to develop a descriptive theory of accounting and standard setting. They also state that even if the value relevance literature's tests effectively inform us about accounting's role in providing inputs to equity valuation, those tests still ignore the other roles of accounting and other forces that determine accounting standards and practice. In a response to Holthausen and Watts, Barth et al. (2001) maintain that value relevance research assesses how well accounting amounts reflect information used by equity investors and provides insight into questions of interest to standard setters. They argue that since a primary focus of financial statements is equity investment, the relation between equity prices and returns is of great interest. Barth et al. conclude that other uses of financial statement information, such as contracting, do no diminish the importance of value relevance research.

8 International evidence

This section presents empirical evidence from countries other than the USA. Section 8.1 discusses multinational studies of value relevance, while section 8.2 outlines a selection of country-specific value relevance studies.

8.1 Multinational Comparisons

A typical study in international value relevance research is one conducted by Ali and Lee-Seok (2000). Using data from manufacturing firms in 16 countries, they investigate relations between measures of value relevance and country specific characteristics. They find that value relevance is lower in bank oriented financial systems, i.e., in countries where a few banks supply much of the capital needs of businesses, and in countries where private sector bodies are not involved in the standard setting process. Ali and Lee-Seok also document lower value relevance in countries characterised by a Continental accounting model[30] (as opposed to a British-American model) and in countries where tax rules influence accounting measurement.

[29] Note that software capitalisation is, according to SFAS No. 86, the exception from the full expensing rule of R&D. Software capitalisation pertains to the development component of R&D. SFAS No. 86 offers flexibility, allowing those who wish to expense to do so.

[30] The Continental model is characterised by higher statutory control, uniformity, conservatism, and uncertainty avoidance, while the British-American model has higher professionalism, flexibility, and transparency (Othman & Zeghal, 2006).

On the other hand, value relevance appears to be higher when more is spent on external auditing services. Ball et al. (2000) investigate the value relevance of earnings in seven countries and find that common-law accounting earnings exhibit significantly greater timeliness than code-law accounting earnings, but that this is due entirely to greater sensitivity to economic losses (income conservatism). They characterise code law as accounting systems with high political influence and common law as systems in which accounting practices are determined primarily in the private sector.

Mingyi (2000) finds that a higher use of accrual accounting (as opposed to cash flow accounting) negatively impacts the value relevance in countries with weak shareholder protection, whereas she finds no negative association between accrual accounting and value relevance when shareholder protection is high. She maintains that her findings are consistent with the view that shareholder protection improves the effectiveness of accrual accounting. Pincus et al. (2007) consider stock markets in 20 countries to examine the accrual anomaly (see section 4.3.2). Consistent with, for instance, Sloan (1996), Pincus et al. find that stock prices overweight the accrual component in general. When using country level data, they report that the anomaly is more likely to occur in countries having a common law tradition than in code law countries. The accrual anomaly is also more likely to occur in countries allowing extensive use of accrual accounting as well as in countries having a lower concentration of share ownership. Pincus et al. state that earnings management and barriers to arbitrage best explain the anomaly.

Ball et al. (2008) apply international data to study if financial reporting is shaped by equity markets or by debt markets. An analysis of 78,949 annual earnings observations from 22 countries supports the hypothesis that important properties of financial reporting originate in the reporting demands of debt markets, but not of equity markets. They claim that these results are inconsistent with the basic premise of what they refer to as the value relevance school of accounting thought, in which financial reporting exists primarily to inform equity markets. In contrast, the results are consistent with the hypothesis that the debt market exerts a substantial impact on accounting practice. The debt markets create a demand for financial reporting that scores highly on traditional association study metrics (i.e., explanatory power and ERCs). The findings are attributed to debt markets' high demand for timeliness and conservatism.

Brown et al. (2006) study the effect of conditional conservatism on value relevance in 20 countries. They state that conditional conservatism can be defined as the asymmetric recognition of economic losses vs. gains, and it arises from efficient contracting needs. Conditional conservatism impounds a negative bias in accounting income as a measure for contemporaneous economic income. Brown et al. find that the association of conditional conservatism with the value relevance of accounting earnings depends on the country-specific level of accrual intensity. Specifically, they document that, in countries with higher accrual intensity, conditional conservatism is positively associated with the value relevance of earnings. Brown et al. conclude that their empirical results are consistent with conditional conservatism serving as an efficient contracting role to reduce managers' opportunistic behaviour in the use of accruals. King and Langli (1998) apply samples from Norway, Germany and the UK to study the value relevance effect of conservatism and countries' adherence to clean surplus accounting. They report that differences in relative and incremental information content of book value and earnings per share do not conform to simple stories based on conservatism and clean surplus violations.

Barth et al. (2008) examine whether the application of International Accounting Standards (IAS) is associated with higher accounting quality. They conclude that firms applying IAS exhibit less earnings smoothing, less managing of earnings towards a target, more timely recognition of losses, and a higher association of accounting amounts with share prices and returns. Regarding value relevance, they document a significantly larger R^2 for IAS firms when running regressions of price on net income and equity book value. Their analyses are based on comparisons of accounting quality metrics for a broad sample of firms in 21 countries that adopted IAS between 1994 and 2003.

International value relevance research does not have to focus on country specific results and comparisons between countries. Osmundsen et al. (2006) apply international data to investigate the value relevance of accounting data for a specific *industry*. Specifically, they study the value relevance of accounting information in the oil industry. Oil and gas producers from several countries are analysed. Osmundsen et al. claim that there is a general perception that RoACE (return on average capital employed[31]) is an important valuation metric in the oil and gas industry. However, they find that the variation in company valuations is mainly explained by the oil price, oil and gas production, and not by variations in RoACE.

In general, empirical data can be collected from several sources when value relevance studies are to be performed. Lara et al. (2006) investigate whether or not empirical findings are influenced by the choice of source. They examine accounting data for 14 EU states, for which data is collected from seven widely used databases. Possible differences among databases are tested by running a regression of stock price on book value and earnings per share. They conclude that differences between databases exist and lead to differences in the results of even a rather simple empirical study using key accounting variables. The results are mainly attributable to heterogeneous firm-coverage across databases. Lara et al. find that by focusing on the common observations across all databases, the differences disappear almost completely. Overall, the study of Lara et al. suggests that the conclusions from value relevance research may be sensitive to the choice of database.

8.2 Single Country Studies

This section describes a selection of value relevance studies conducted on non-US data. A wide range of topics is briefly discussed. For instance, Bettman (2007) uses an Australian sample to investigate the inclusion of technical factors in value relevance research. She incorporates three measures of historical price movements into the Ohlson (1995) model, namely lagged price and two dummy variables representing extreme movements in past price performance (momentum). Ohlson (1995) argues that price is also a function of an undefined vector of "other" value relevant information not captured in current financial statements, and studies like Bettman (2007) seek to identify variables forming part of this vector. She documents that the inclusion of both fundamental and technical factors within the valuation framework yields a model of greater explanatory power in comparison to models that only consider fundamental or technical measures in isolation. For instance, she finds that shares exhibiting positive (negative) past return performance will continue to experience similar positive (negative) performance in the subsequent period. In an Australian study of value relevance over time, Brimble and Hodgson (2007) conclude that the value relevance of core accounting earnings has not significantly declined over time. Their empirical study controls

---

[31] RoACE is defined as net income adjusted for minority interests and net financial items (after tax), divided by average capital employed.

for transitory items[32] using nonlinear regressions and adjusts for possible stock market inefficiencies (see Aboody et al., 2002, in section 3.3). They state that the nature of earnings' relationship with stock prices has changed such that a linear model does not fully abstract the association, and that researchers need to utilise nonlinear models and adjust for potential market inefficiencies in their research design. Brimble and Hodgson also find that book values do not have as high an association with stock prices as do earnings. In fact, book values' relation with stock prices is lower than in comparable studies in the USA.

Switzerland's financial reporting system provides managers with extensive discretion in corporate disclosure, and there are important variations in the level of information provided in the annual reports (Lapointe-Antunes, Cormier, Magnan, & Gay-Angers, 2006). Lapointe-Antunes et al. (2006) investigate how this flexibility affects earnings smoothing and value relevance of earnings. Lapointe-Antunes et al. report that the use of discretionary accruals to smooth earnings is negatively related to voluntary disclosure by Swiss firms. They also find that investors put a significantly lower valuation weight on discretionary accruals reported by high disclosing firms than low disclosing firms, and they interpret this as evidence that investors are in a better position to detect discretionary accruals when the firm voluntarily discloses more information in its annual report. In Denmark, Banghøj and Plenborg (2008) find that more voluntary disclosure does not improve the association between current returns and future earnings. These results contrast the study of Lapointe-Antunes et al., as Banghøj and Plenborg suggest that investors might not be capable of incorporating voluntary information into the firm value estimates.

[32] Balkrishna et al. (2007) report that the loss incidence in Australia is particularly frequent.

In Korea, Bae and Jeong (2007) find that the value relevance of earnings and book value is significantly smaller for firms affiliated with business groups known as *chaebols*. A typical characteristic of cheabols is that controlling power is heavily concentrated in an individual or a single family. Bae and Jeoung report that cross equity ownership negatively affects value relevance, while foreign equity ownership positively affects value relevance, and they state that their finding is consistent with the view that the poor quality of earnings and book value provided by chaebol affiliated firms is due to the inherently poor governance structure of chaebols. Jianwei and Chunjiao (2007) use a Chinese data sample to study the value relevance of accounting information in different stock market segments. They report that accounting information is value relevant in all the A-, B-, and H-share markets, but accounting information in the B- and H-share markets is more value relevant than that in the A-share market is.

Within the research tradition of studying value relevance of different accounting standards, Cazavan-Jeny and Jeanjean (2006) test the value relevance effect of different treatments of R&D expenditures. The study is performed on a French sample, and the authors argue that the French context provides an interesting field for R&D value relevance studies because both accounting treatments of R&D costs (expensing and capitalisation) are allowed. They document that the firms choosing to capitalise R&D are smaller, more highly leveraged, less profitable and with less growth opportunities. In contrast to Aboody and Lev (1998) and Lev and Sougiannis (1996), Cazavan-Jeny and Jeanjean find that capitalised R&D is *negatively* associated with stock prices and returns. In other words, investors react negatively to the capitalisation of R&D expenses. In Norway, Hope (1999) investigates the effects of introducing deferred tax accounting. He concludes that this change in the accounting legislation significantly increased the value relevance of earnings.

Section 4.3.1 discussed the value relevance of pro-forma ("Street"), non-GAAP earnings. Choi et al. (2007) apply a UK sample to investigate the value relevance of non-GAAP earnings reported by management. They state that non-GAAP earnings disclosures often conform precisely to sustainable earnings proxies derived by analysts and other sophisticated financial statement users. Their incremental value and forecasting relevance tests suggest that the majority of management specific adjustments reflect appropriate classification of earnings components by insiders. However, they also find some evidence consistent with strategic disclosure, but such cases represent less than 20% of their non-GAAP disclosure sample. In a Greek study, Kyriazis and Anastassis (2007) find that net and operating income appear to be more value relevant than economic value added (EVA). Equivalent findings are reported by Tsuji (2006) in a Japanese study. Both studies are consistent with previously reported results from the US market (e.g., Biddle et al., 1997). Danbolt and Rees (2008) apply the British real estate and investment fund industries to compare the value relevance of historic cost and fair value accounting. These industries are chosen because they both have the majority of assets marked to market, and the difference between the two accounting systems is therefore profound. Danbolt and Rees find that fair value income is considerably more value relevant than historic cost income. However, they document that in the presence of changes in fair value balance sheet values, income measures become largely irrelevant. They conclude there is no obvious advantage to adopting fair value income accounting if fair value balance sheet values are available to the user.[33]

European law required that all companies listed on a European regulated stock exchange must prepare their consolidated financial statements based upon International Financial Reporting

[33] Using a sample of UK life insurers, Horton (2007) finds that supplementary information on what she refers to as "realistic reporting" (i.e., fair value) appears to be value relevant.

Standards (IFRS) from 2005 and onwards. The value relevance effect of introducing IFRS in European countries is a popular research topic. For instance, Floros (2007) find that the introduction of International Accounting Standards (IAS) has a negative–but not significant–effect on Greek stock market volatility. Using a German sample, Hung and Subramanyam (2007) find that book value and earnings are no more value relevant under IAS than under German GAAP. On the other hand, Jermakowizc et al. (2007) report increased value relevance of earnings after adoption of the IFRS for the German DAX-30 companies (the thirty German companies with the largest market capitalisation and turnover listed on the Deutsche Börse). In Finland, Niskanen et al. (2000) report that the reconciliation of Finnish GAAP to IAS earnings does not provide significant value relevance.

Giner and Reverte (2006) use a Spanish sample to investigate one specific attribute of value relevance, namely the risk relevance of accounting information. Specifically, their paper analyses the relevance of accounting fundamentals to inform about equity risk as measured by the cost of equity capital. Their findings suggest that the use of time series of the firms' unrecorded goodwill and the firms' accounting profitability provide estimations of the firms' cost of equity capital that appear to be reasonable. They conclude that their study confirms the role of fundamental analysis for equity valuation. Hassel et al. (2005) find that in the quarterly financial statements of Swedish listed companies, both book value of equity and net income provide value relevant information to investors. However, their main contribution is to prove that environmental performance (measured by an index developed for Swedish institutional investors) has an incremental explanatory power. Hassel et al. state that the environmental performance variable is used as a proxy for other value relevant information in the model. Nevertheless, the *negative* relationship between environmental performance and the market value of equity indicates that firms rated highly in terms of environmental performance are not, ceteris paribus, highly valued by investors. Hassel et al. suggest that the findings are due to high environmental performance being costly and thus having a negative impact on expected earnings and market values.

Hellstrøm (2006) investigates the value relevance of accounting information in a transition economy. Her analyses are conducted on a sample from the Czech Republic from 1994-2001. She states that the objective of the study is to investigate the validity of the value relevance methodology by finding an accounting setting in which the results of value relevance tests might be predicted unambiguously, and that a transition economy represented by the Czech Republic provides such an institutional and accounting setting. As assumed, she finds that value relevance is lower in a transitional economy than in a well-developed market economy (she applies Sweden as her benchmark), but that the value relevance increases over time as a result of the progress in transition. Hellstrøm concludes that as the results of the study confirm the predicted results, they thus provide supportive evidence of the validity of the value relevance methodology. Kirch et al. (2007) apply a sample of Brazilian firms cross-listed in Brazil and the USA to study the stock price effects of earnings releases. Their findings show that there are no surprises in the market during earnings releases. This conclusion holds independently of the accounting principles followed in order to generate the information.

9 Concluding Remarks

There is a large number of articles investigating value relevance subjects, and this paper reviews only a small percentage of these. Even though a lot of the reviewed articles are examples of state-of-the-art value relevance research, there are numerous excellent articles that are not commented on in this paper. The purpose of this paper is not to give an all-inclusive description of value relevance research, but rather to give the reader an introduction to and understanding of this line of research. This paper places value relevance research in perspective within capital market-based accounting research. Hopefully, it provides the reader with a fair knowledge of some of the most important conclusions resulting from value relevance research.

Literature

Aboody, D., Hughes, J., & Liu, J. (2002). Measuring Value Relevance in a (Possibly) Inefficient Market. *Journal of Accounting Research, 40*(4), 965-986.

Aboody, D., & Lev, B. (1998). The Value Relevance of Intangibles: The Case of Software Capitalization. *Journal of Accounting Research, 36*(3), 161-191.

Ahmed, A. S. (1994). Accounting earnings and future economic rents. *Journal of Accounting & Economics, 17*(3), 377-400.

Ali, A., & Lee-Seok, H. (2000). Country-Specific Factors Related to Financial Reporting and the Value Relevance of Accounting Data. *Journal of Accounting Research, 38*(1), 1-21.

Amir, E., Harris, T. S., & Venuti, E. K. (1993). A Comparison of the Value-Relevance of U.S. versus Non-U.S. GAAP Accounting Measures Using Form 20-F Reconciliations. *Journal of Accounting Research, 31*(3), 230-264.

Anthony, J. H., & Ramesh, K. (1992). Association between accounting performance measures and stock prices. *Journal of Accounting & Economics, 15*(2/3), 203-227.

Ayers, B. C. (1998). Deferred Tax Accounting Under SFAS No. 109: An Empirical Investigation of its Incremental Value-Relevance Relative to APB No. 11. *Accounting Review, 73*(2), 195.

Bae, K.-H., & Jeong, S. W. (2007). The Value-relevance of Earnings and Book Value, Ownership Structure, and Business Group Affiliation: Evidence From Korean Business Groups. *Journal of Business Finance & Accounting, 34*(5/6), 740-766.

Balkrishna, H., Coulton, J. J., & Taylor, S. L. (2007). Accounting losses and earnings conservatism: evidence from Australian Generally Accepted Accounting Principles. *Accounting and Finance, 47*.

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research, 6*(2), 159-178.

Ball, R., Kothari, S. P., & Robin, A. (2000). The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting & Economics, 29*(1), 1-51.

Ball, R., Robin, A., & Sadka, G. (2008). Is financial reporting shaped by equity markets or by debt markets? An international study of timeliness and conservatism. *Review of Accounting Studies, 13*(2/3), 168-205.

Banghøj, J., & Plenborg, T. (2008). Value relevance of voluntary disclosure in the annual report. *Accounting & Finance, 48*(2), 159-180.

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

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

Barth, M. E., Beaver, W. H., & Landsman, W. R. (1998). Relative valuation roles of equity book value and net income as a function of financial health. *Journal of Accounting & Economics, 25*(1), 1-34.

Barth, M. E., Beaver, W. H., & Landsman, W. R. (2001). The Relevance of the Value Relevance Literature for Financial Accounting Standard Setting: Another View. *Journal of Accounting and Economics, 31*(1-3), 77-104.

Barth, M. E., & Clinch, G. (1998). Revalued Financial, Tangible, and Intangible Assets: Associations with Share Prices and Non-Market-Based Value Estimates. *Journal of Accounting Research, 36*(3), 199-233.

Barth, M. E., Cram, D. P., & Nelson, K. K. (2001). Accruals and the Prediction of Future Cash Flows. *The Accounting Review, 76*(1), 27-58.

Barth, M. E., & Kallapur, S. (1996). The Effects of Cross-Sectional Scale Differences on Regression Results in Empirical Accounting Research. *Contemporary Accounting Research, 13*(2), 527-567.
Barth, M. E., Landsman, W. R., & Lang, M. H. (2008). International Accounting Standards and Accounting Quality. *Journal of Accounting Research, 46*(3), 467-498.
Barua, A., Legoria, J., & Moffitt, J. S. (2006). Accruals Management to Achieve Earnings Benchmarks: A Comparison of Pre-managed Profit and Loss Firms. *Journal of Business Finance & Accounting, 33*(5 & 6).
Basu, S. (1997). The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting & Economics, 24*(1), 3.
Beaver, W. H. (1968). The Information Content of Annual Earnings Announcements. *Journal of Accounting Research, 6*(3), 67-92.
Beaver, W. H. (2002). Perspectives on Recent Capital Market Research. *Accounting Review, 77*(2), 453-474.
Beaver, W. H., Lambert, R., & Morse, D. (1980). The Information Content of Security Prices. *Journal of Accounting & Economics, 2*(1), 3.
Beaver, W. H., Lambert, R. A., & Ryan, S. G. (1987). The Information Content of Security Prices: A Second Look. *Journal of Accounting and Economics, 9*(2), 139-157.
Beaver, W. H., McAnally, M. L., & Stinson, C. H. (1997). The information content of earnings and prices: A simultaneous equations approach. *Journal of Accounting & Economics, 23*(1), 53-81.
Ben-Hsien, B., & Da-Hsien, B. (2004). Income Smoothing, Earnings Quality and Firm Valuation. *Journal of Business Finance & Accounting, 31*(9/10), 1525-1557.
Bernard, V. L., & Stober, T. L. (1989). The Nature and Amount of Information in Cash Flows and Accruals. *Accounting Review, 64*(4), 624.
Bettman, J. L. (2007). Australian Evidence Regarding the Value-Relevance of Technical Information. *Australian Journal of Management, 32*(1), 57-71.
Biddle, G. C., Bowen, R. M., & Wallace, J. S. (1997). Does EVA® beat earnings? Evidence on associations with stock returns and firm values. *Journal of Accounting & Economics, 24*(3), 301-336.
Biddle, G. C., & Lindahl, F. W. (1982). Stock Price Reactions to LIFO Adoptions: The Association between Excess Returns and LIFO Tax Savings. *Journal of Accounting Research, 20*(2), 551-588.
Biddle, G. C., & Seow, G. S. (1991). The Estimation and Determinants of Associations Between Returns and Earnings: Evidence from Cross-industry Comparisons. *Journal of Accounting, Auditing & Finance, 6*(2), 183-232.
Biddle, G. C., Seow, G. S., & Siegel, A. F. (1995). Relative versus Incremental Information Content. *Contemporary Accounting Research, 12*(1), 1-23.
Bodnar, G. M., & Weintrop, J. (1997). The valuation of the foreign income of US multinational firms: a growth opportunities perspective. *Journal of Accounting & Economics, 24*(1), 69-97.
Bowen, R. M., Burgstahler, D., & Daley, L. A. (1986). Evidence on the Relationships Between Earnings and Various Measures of Cash Flow. *Accounting Review, 61*(4), 713.
Bradshaw, M. T., & Sloan, R. G. (2002). GAAP versus The Street: An Empirical Assessment of Two Alternative Definitions of Earnings. *Journal of Accounting Research, 40*(1), 41-66.
Brimble, M., & Hodgson, A. (2007). On the intertemporal value relevance of conventional financial accounting in Australia. *Accounting & Finance, 47*(4), 599-622.

Brown, S., Kin, L., & Lys, T. (1999). Use of R^2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting & Economics, 28*(2), 83-115.
Brown, W. D., He, H., & Teitel, K. (2006). Conditional Conservatism and the Value Relevance of Accounting Earnings: An International Study. *European Accounting Review, 15*(4), 605-626.
Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting & Economics, 24*.
Callen, J. L., Hope, O.-K., & Segal, D. (2005). Domestic and Foreign Earnings, Stock Return Variability, and the Impact of Investor Sophistication. *Journal of Accounting Research, 43*(3), 377-412.
Callen, J. L., & Morel, M. (2005). The Valuation Relevance of R&D Expenditures: Time Series Evidence. *International Review of Financial Analysis, 14*(3), 304-325.
Callen, J. L., & Segal, D. (2004). Do Accruals Drive Firm-Level Stock Returns? A Variance Decomposition Analysis. *Journal of Accounting Research, 42*(3), 527-560.
Carnes, T. A. (2006). Unexpected Changes in Quarterly Financial-Statement Line Items and Their Relationship to Stock Prices. *Academy of Accounting and Financial Studies Journal, 10*(3).
Carroll, T. J., Linsmeier, T. J., & Petroni, K. R. (2003). The Reliability of Fair Value versus Historical Cost Information: Evidence from Closed-End Mutual Funds. *Journal of Accounting, Auditing & Finance, 18*(1), 1-23.
Caylor, M. L., Lopez, T. J., & Rees, L. (2007). Is the value relevance of earnings conditional on the timing of earnings information? *Journal of Accounting & Public Policy, 26*(1), 62-95.
Cazavan-Jeny, A., & Jeanjean, T. (2006). The Negative Impact of R&D Capitalization: A Value Relevance Approach. *European Accounting Review, 15*(1), 37-61.
Chee Yeow, L., & Patricia Mui-Siang, T. (2007). Value relevance of value-at-risk disclosure. *Review of Quantitative Finance & Accounting, 29*(4), 353-370.
Chen, P., & Zhang, G. (2007). How do accounting variables explain stock price movements? Theory and evidence. *Journal of Accounting & Economics, 43*(2/3), 219-244.
Chen, S., & Dodd, J. L. (2001). Operating Income, Residual Income And EVA(TM): Which Metric Is More Value Relevant? *Journal of Managerial Issues, 13*(1), 65.
Choi, Y.-S., Lin, S., Walker, M., & Young, S. (2007). Disagreement over the persistence of earnings components: evidence on the properties of management-specific adjustments to GAAP earnings. *Review of Accounting Studies, 12*(4), 595-622.
Christensen, P., & Feltham, G. A. (2003). Economics of Accounting, Volume I: Information in Markets. *Springer*.
Christensen, T. E., Hoyt, R. E., & Paterson, J. S. (1999). Ex Ante Incentives for Earnings Management and the Informativeness of Earnings. *Journal of Business Finance & Accounting, 26*(7/8), 807-832.
Christie, A. A. (1987). On Cross-Sectional Analysis in Accounting Research. *Journal of Accounting and Economics, 9*(3), 231-258.
Collins, D. W., & Hribar, P. (2000). Earning-based and accrual -based market anomalies: one effect or two? *Journal of Accounting & Economics, 29*(1), 101-123.
Collins, D. W., & Kothari, S. P. (1989). An Analysis of Intertemporal and Cross-Sectional Determinants of Earnings Response Coefficients. *Journal of Accounting & Economics, 11*(2-3), 143-181.
Collins, D. W., Kothari, S. P., Shanken, J., & Sloan, R. G. (1994). Lack of Timeliness and Noise as Explanations for the Low Contemporaneous Return-Earnings Association. *Journal of Accounting and Economics, 18*(3), 289-324.

Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting & Economics, 24*(1), 39.
Cornell, B., & Landsman, W. R. (2003). Accounting Valuation: Is Earnings Quality an Issue? *Financial Analysts Journal*.
Danbolt, J., & Rees, W. (2008). An Experiment in Fair Value Accounting: UK Investment Vehicles *European Accounting Review, 17*(2).
Darrough, M., & Ye, J. (2007). Valuation of loss firms in a knowledge-based economy. *Review of Accounting Studies, 12*.
Davis, M. L. (1990). Differential Market Reaction to Pooling and Purchase Methods. *Accounting Review, 65*(3), 696-709.
Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting & Economics, 18*(1), 3-42.
Dechow, P. M., & Ge, W. (2006). The persistence of earnings and cash flows and the role of special items: Implications for the accrual anomaly. *Review of Accounting Studies, 11*.
Dechow, P. M., Hutton, A. P., & Sloan, R. G. (1999). An empirical assessment of the residual income valuation model. *Journal of Accounting & Economics, 26*(1-3), 1-34.
Degeorge, F., Patel, J., & Zeckhauser, R. (1999). Earnings management to exceed thresholds. *Journal of Business, 72*.
Dhaliwal, D., Subramanyam, K. R., & Trezevant, R. (1999). Is comprehensive income superior to net income as a measure of firm performance? *Journal of Accounting & Economics, 26*(1-3), 43-67.
Dontoh, A., Radhakrishnan, S., & Ronen, J. (2004). The Declining Value-relevance of Accounting Information and Non-information-based Trading: An Empirical Analysis. *Contemporary Accounting Research, 21*(4), 795-812.
Easton, P. D., & Harris, T. S. (1991). Earnings as an Explanatory Variable for Returns. *Journal of Accounting Research, 29*(1), 19-36.
Easton, P. D., Harris, T. S., & Ohlson, J. A. (1992). Aggregate accounting earnings can explain most of security returns. *Journal of Accounting & Economics, 15*(2/3), 119-142.
Easton, P. D., & Sommers, G. A. (2003). Scale and the Scale Effect in Market-based Accounting Research. *Journal of Business Finance & Accounting, 30*(1/2), 25-55.
Easton, P. D., & Zmijewski, M. E. (1989). Cross-Sectional Variation in the Stock Market Response to Accounting Earnings Announcements. *Journal of Accounting & Economics, 11*(2/3), 117-141.
Edwards, E. O., & Bell, P. W. (1961). The Theory and Measurement of Business Income *University of California Press*
Elgers, P. T., Porter, S. L., & Emily Xu, L. (2008). The timing of industry and firm earnings information in security prices: A re-evaluation. *Journal of Accounting & Economics, 45*(1), 78-93.
Ely, K., & Waymire, G. (1999). Accounting Standard-Setting Organizations and Earnings Relevance: Longitudinal Evidence From NYSE Common Stocks, 1927-93. *Journal of Accounting Research, 37*(2), 293-317.
Ettredge, M. L., Soo Young, K., Smith, D. B., & Zarowin, P. A. (2005). The Impact of SFAS No. 131 Business Segment Data on the Market's Ability to Anticipate Future Earnings. *Accounting Review, 80*(3), 773-804.
Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *Journal of Finance, 47*(2), 427-465.
Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3-56.

FASB. (1978). Financial Accounting Standards Board. Objectives of Financial Reporting by Business Enterprises. *Statement of Financial Accounting Concepts No. 1*.

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

Finger, C. A. (1994). The Ability of Earnings to Predict Future Earnings and Cash Flow. *Journal of Accounting Research, 32*(2), 210-223.

Floros, C. (2007). The Effects of International Accounting Standards on Stock Market Volatility: The Case of Greece. *Investment Management & Financial Innovations, 4*(1), 61-72.

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

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

Francis, J., Schipper, K., & Vincent, L. (2003). The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns. *Contemporary Accounting Research, 20*(1), 121-164.

Francis, J., & Smith, M. (2005). A Reexamination of the Persistence of Accruals and Cash Flows. *Journal of Accounting Research, 43*(3), 413-451.

Frank, K. (2002). The effect of growth on the value relevance of accounting data. *Journal of Business Research, 55*(1), 69-78.

Freeman, R. N., & Tse, S. Y. (1992). A Nonlinear Model of Security Price Responses to Unexpected Earnings. *Journal of Accounting Research, 30*(2), 185-209.

Giner, B., & Reverte, C. (2006). The Risk-Relevance of Accounting Data: Evidence from the Spanish Stock Market. *Journal of International Financial Management & Accounting, 17*(3), 175-207.

Givoly, D., & Hayn, C. (2000). The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? *Journal of Accounting & Economics, 29*(3), 287-320.

Graham Jr, R. C., Lefanowicz, C. E., & Petroni, K. R. (2003). The Value Relevance of Equity Method Fair Value Disclosures. *Journal of Business Finance & Accounting, 30*(7/8), 1065-1088.

Gu, Z. (2007). Across-Sample Incomparability of R2s and Additional Evidence on Value Relevance Changes Over Time *Journal of Business Finance & Accounting, 34*.

Guay, W. R., Kothari, S. P., & Watts, R. L. (1996). A Market-Based Evaluation of Discretionary Accrual Models. *Journal of Accounting Research, 34*(3), 83-105.

Hann, R. N., Heflin, F., & Subramanayam, K. R. (2007). Fair-value pension accounting. *Journal of Accounting & Economics, 44*(3), 328-358.

Harris, T. S., & Ohlson, J. A. (1990). Accounting Disclosures and the Market's Valuation of Oil and Gas Properties: Evaluation of Market Efficiency and Functional Fixation. *Accounting Review, 65*(4), 764-780.

Hassel, L., Nilsson, H., & Nyquist, S. (2005). The value relevance of environmental performance. *European Accounting Review, 14*(1), 41-61.

Hayn, C. (1995). The information content of losses. *Journal of Accounting & Economics, 20*(2), 125-153.

Hellstrøm, K. (2006). The Value Relevance of Financial Accounting Information in a Transition Economy: The Case of the Czech Republic. *European Accounting Review, 15*(3), 325-349.

Holthausen, R. W., & Watts, R. L. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting & Economics, 31*(1-3), 3-75.
Hope, O.-K. (1999). Value Relevance Effects of the Introduction of Interperiod Tax Allocation: The Case of Norway. In *Advances in international accounting. Volume 12* (pp. 157-191).
Hope, O.-K., & Kang, T. (2005). The Role of "Other Information" in the Valuation of Foreign Income for U.S. Multinationals. *Journal of Accounting, Auditing & Finance, 20*(4), 355-377.
Hope, O.-K., Kang, T., Thomas, W. B., & Vasvari, F. (2008). Pricing and Mispricing Effects of SFAS 131. *Journal of Business Finance & Accounting, 35*(3/4), 281-306.
Horton, J. (2007). The value relevance of 'realistic reporting': evidence from UK life insurers. *Accounting & Business Research, 37*(3), 175-197.
Hossain, M. (2008). Change in value relevance of quarterly foreign sales data of U.S. multinational corporations after adopting SFAS 131. *Review of Quantitative Finance & Accounting, 30*(1), 1-23.
Hribar, P., & Collins, D. W. (2002). Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting Research, 40*(1), 105-134.
Hung, M., & Subramanyam, K. (2007). Financial statement effects of adopting international accounting standards: the case of Germany. *Review of Accounting Studies, 12*(4), 623-657.
Jenkins, D. S. (2003). The Transitory Nature of Negative Earnings and the Implications for Earnings Prediction and Stock Valuation. *Review of Quantitative Finance & Accounting, 21*(4), 379-404.
Jermakowicz, E. K., Prather-Kinsey, J., & Wulf, I. (2007). The Value Relevance of Accounting Income Reported by DAX-30 German Companies. *Journal of International Financial Management & Accounting, 18*(3), 151-191.
Jianwei, L., & Chunjiao, L. (2007). Value Relevance of Accounting Information in Different Stock Market Segments: The Case of Chinese A-, B-, and H-Shares. *Journal of International Accounting Research, 6*(2), 55-81.
Joos, P., & Plesko, G. A. (2005). Valuing Loss Firms. *The Accounting Review, 80*(3).
Kerstein, J., & Kim, S. (1995). The Incremental Information Content of Capital Expenditures. *Accounting Review, 70*(3), 513-526.
Khurana, I. K., & Myung-Sun, K. (2003). Relative value relevance of historical cost vs. fair value: Evidence from bank holding companies. *Journal of Accounting & Public Policy, 22*(1), 19-42.
Kim, M., & Kross, W. (2006). The Ability of Earnings to Predict Future Operating Cash Flows Has Been Increasing - Not Decreasing. *CFA Digest, 36*(2), 51-52.
Kim, O., Lim, S. C., & Park, T. (2008). Measuring the impact of sales on earnings and equity price. *Review of Quantitative Financial Accounting*.
King, R. D., & Langli, J. C. (1998). Accounting Diversity and Firm Valuation. *International Journal of Accounting, 33*(4), 529-567.
Kirch, G., Terra, P. R. S., & Zanella, F. C. (2007). Mind the GAAP? Market Reaction to Accounting Principles: Evidence from Brazilian Cross-Listed Stocks. *International Journal of Business Research, 7*(3), 217-227.
Konan Chan, A., Jegadeesh, N., & Sougiannis, T. (2004). The Accrual Effect on Future Earnings. *Review of Quantitative Finance & Accounting, 22*(2), 97-121.
Kormendi, R., & Lipe, R. (1987). Earnings Innovations, Earnings Persistence, and Stock Returns. *Journal of Business, 60*(3), 323-345.

Kothari, S. P. (2001). Capital markets research in accounting. *Journal of Accounting & Economics, 31*(1-3), 105.
Kothari, S. P., & Sloan, R. G. (1992). Information in Prices about Future Earnings: Implications for Earnings Response Coefficients. *Journal of Accounting and Economics, 15*(2-3), 143-171.
Kothari, S. P., & Zimmerman, J. L. (1995). Price and return models. *Journal of Accounting & Economics, 20*(2), 155-192.
Kyriazis, D., & Anastassis, C. (2007). The Validity of the Economic Value Added Approach: an Empirical Application. *European Financial Management, 13*(1), 71-100.
Lajili, K., & Zeghal, D. (2005). Labor cost voluntary disclosures and firm equity values: Is human capital information value-relevant? *Journal of International Accounting, Auditing & Taxation, 14*(2), 121-138.
Landsman, W. R., & Magliolo, J. (1988). Cross-Sectional Capital Market Research and Model Specification. *Accounting Review, 63*(4), 586.
Landsman, W. R., Miller, B. L., & Yeh, S. (2007). Implications of Components of Income Excluded from Pro Forma Earnings for Future Profitability and Equity Valuation. *Journal of Business Finance & Accounting, 34*(3/4), 650-675.
Lapointe-Antunes, P., Cormier, D., Magnan, M., & Gay-Angers, S. (2006). On the Relationship between Voluntary Disclosure, Earnings Smoothing and the Value-Relevance of Earnings: The Case of Switzerland. *European Accounting Review, 15*(4), 465-505.
Lara, J. M. G. a., Osma, B. G. a., & Noguer, B. n. G. d. A. (2006). Effects of database choice on international accounting research. *Abacus, 42*(3/4), 426-454.
Lev, B. (1974). On the Association Between Operating Leverage and Risk. *Journal of Financial & Quantitative Analysis, 9*(4), 627.
Lev, B. (1989). On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research. *Journal of Accounting Research, 27*(3), 153-192.
Lev, B., & Nissim, D. (2006). The Persistence of the Accruals Anomaly. *Contemporary Accounting Research, 23*(1), 193-226.
Lev, B., & Sougiannis, T. (1996). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting & Economics, 21*(1), 107-138.
Lev, B., & Thiagarajan, S. R. (1993). Fundamental Information Analysis. *Journal of Accounting Research, 31*(2), 190-215.
Lev, B., & Zarowin, P. (1999). The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research, 37*(2), 353-385.
Lianzan, X., & Cai, F. (2005). The Valuation of High-Tech 'New Economy" Companies. *Journal of Global Competitiveness, 13*(1/2), 1-8.
Liu, J., Nissim, D., & Thomas, J. (2007). Is Cash Flow King in Valuations? *Financial Analysts Journal, 63*(2).
Liu, J., & Thomas, J. (2000). Stock Returns and Accounting Earnings. *Journal of Accounting Research, 38*(1), 71-101.
Livnat, J., & Zarowin, P. (1990). The Incremental Information Content of Cash-Flow Components. *Journal of Accounting and Economics, 13*(1), 25-46.
Marquardt, C. A., & Wiedman, C. I. (2004). The Effect of Earnings Management on the Value Relevance of Accounting Information. *Journal of Business Finance & Accounting, 31*(3/4), 297-332.
Mingyi, H. (2000). Accounting standards and value relevance of financial statements: An international analysis. *Journal of Accounting & Economics, 30*(3), 401-420.

Monahan, S. J. (2005). Conservatism, Growth and the Role of Accounting Numbers in the Fundamental Analysis Process. *Review of Accounting Studies, 10*(2-3), 227-260.
Niskanen, J., Kinnunen, J., & Kasanen, E. (2000). The value relevance of IAS reconciliation components: empirical evidence from Finland. *Journal of Accounting & Public Policy, 19*(2), 119-137.
Ohlson, J. A. (1995). Earnings, Book Values, and Dividends in Equity Valuation. *Contemporary Accounting Research, 11*(2), 661-687.
Ohlson, J. A., & Penman, S. H. (1992). Disaggregated Accounting Data as Explanatory Variables for Returns. *Journal of Accounting, Auditing & Finance, 7*(4), 553-573.
Osmundsen, P., Asche, F., Misund, B. r., & Mohn, K. (2006). Valuation of International Oil Companies. *Energy Journal, 27*(3), 49-64.
Othman, H. B., & Zeghal, D. (2006). A study of earnings-management motives in the Anglo-American and Euro-Continental accounting models: The Canadian and French cases *The International Journal of Accounting, 41*.
Penman, S. H. (1998). Combining Earnings and Book Value in Equity Valuation. *Contemporary Accounting Research, 15*(3), 291-324.
Penman, S. H., & Xiao-Jun, Z. (2002). Accounting Conservatism, the Quality of Earnings, and Stock Returns. *Accounting Review, 77*(2), 237.
Petroni, K. R., & Wahlen, J. M. (1995). Fair Values of Equity and Debt Securities and Share Prices of Property-liability Insurers. *Journal of Risk & Insurance, 62*(4), 719-737.
Pincus, M., Rajgopal, S., & Venkatachal, M. (2007). The Accrual Anomaly: International Evidence. *Accounting Review, 82*(1), 169-203.
Piotroski, J. D. (2000). Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers. *Journal of Accounting Research, 38*(3), 1-41.
Pope, P. F. (2005). Discussion--Accruals, Accounting-Based Valuation Models, and the Prediction of Equity Values. *Journal of Accounting, Auditing & Finance, 20*(4), 347-354.
Preinreich, G. A. D. (1938). Annual Survey of Economic Theory: The Theory of Depreciation. *Econometrica, 6*(3), 219-241.
Ramakrishnan, R. T. S., & Thomas, J. K. (1998). Valuation of Permanent, Transitory, and Price-Irrelevant Components of Reported Earnings. *Journal of Accounting, Auditing and Finance, 13*(3), 301-336.
Rayburn, J. (1986). The Association of Operating Cash Flow and Accruals with Security Returns. *Journal of Accounting Research, 24*(3), 112-133.
Sloan, R. G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings? *Accounting Review, 71*(3), 289-315.
Subramanyam, K. R., & Venkatachalam, M. (2007). Earnings, Cash Flows, and Ex Post Intrinsic Value of Equity. *Accounting Review, 82*(2), 457-481.
Teets, W. R., & Wasley, C. E. (1996). Estimating earnings response coefficients: Pooled versus firm-specific models. *Journal of Accounting & Economics, 21*(3), 279-295.
Thomas, W. B. (1999). A test of the market's mispricing of domestic and foreign earnings. *Journal of Accounting & Economics, 28*(3), 243-267.
Tsuji, C. (2006). Does EVA beat earnings and cash flow in Japan? *Applied Financial Economics, 16*(16), 1199-1216.
Vincent, L. (1997). Equity valuation implications of purchase versus pooling accounting. *Journal of Financial Statement Analysis, 2*(4), 5.
Williams, J. (1938). The Theory of Investment Value. *Harvard University Press, Cambridge*.

Wilson, G. P. (1986). The Relative Information Content of Accruals and Cash Flows: Combined Evidence at the Earnings Announcement and Annual Report Release Date. *Journal of Accounting Research, 24*(3), 165-200.

Essay 2:

Predictive Ability and Value Relevance of Accounting Measures

Leif Atle Beisland
University of Agder

Abstract

This paper presents evidence that the earnings component of cash flow is a significant predictor of short term firm performance as measured by future cash flow and earnings. The findings also assert that the accrual component is related to future earnings but not to future cash flow. However, both cash flow and accruals are value relevant, i.e., statistically related to current stock return. Because company value is the present value of future cash flows/earnings, studies on accounting variables' relation to short term future cash flows and earnings may provide *indirect evidence* with respect to the variables' value relevance. The analysis shows that while prediction tests may provide *indications* with respect to value relevance, there is not a one-to-one relationship between cash flow and accruals' ability as short term cash flow and earnings predictors and their value relevance. In fact, cash flow and/or earnings prediction analyses may act as poor substitutes for value relevance studies.

1 Introduction

This study presents a three-step analysis of the time series properties and value relevance of accounting measures. Step 1 investigates the ability of cash flow and aggregate accruals, i.e., earnings, to predict short term firm performance. Future earnings and cash flow from operations are applied as measures of firm performance. One to three year-ahead periods are examined. I find that cash flow is significantly associated with both future cash flow and future earnings. There is strong evidence that cash flow is related to future short term performance, as it does not matter whether next year or the mean of the next three years is investigated. Accruals, on the other hand, appear to be unrelated to future short term cash flow. They are, however, significantly associated with future earnings, both next year's earnings and the mean of the three next earnings.

Step 2 of the study investigates cash flow and accruals' relation with stock return, i.e., their value relevance. As the market value of equity is equal to the discounted value of all future cash flows/earnings, step 2 measures the association of cash flow and accruals with long term (infinite) firm performance. The value relevance study presents evidence that both cash flow and accruals are highly related to contemporaneous stock return. The analysis shows that stock return is positively related to cash flow, while it is negatively related to accruals. In other words, for a given earnings level, the investors react more favourably when the cash flow components of earnings is larger (compare Sloan, 1996; Wilson, 1986). The results of steps 1 and 2 are, however, heavily dependent on the sign of earnings. When split into cash flow and accruals, earnings appear to have almost no predictive ability or value relevance when they are negative (compare Hayn, 1995).

Step 3 of the study discusses possible relations between accounting numbers' predictive ability for future cash flow and earnings, and their value relevance, i.e., possible relations between step 1 and step 2. In general, value relevance research studies the statistical relationship between market values of stocks and accounting information. However, since stock value is the present value of future cash flow/earnings, value relevance can also be *indirectly* assessed by studying accounting information's ability to forecast future cash flow/earnings (Barth, Cram, & Nelson, 2001; Dechow, Kothari, & Watts, 1998; Finger, 1994; M. Kim & Kross, 2005). For instance, Finger (1994) states, "This paper examines the value relevance of earnings by testing their ability to predict two future benefits of equity investment: earnings and cash flow from operations" (Finger, 1994, p. 210). Francis and Schipper (1999) deepen Finger's statement: "…financial information is value relevant if it contains the variables used in a valuation model or assists in predicting those variables" (Francis & Schipper, 1999, p. 325). As such, it can be claimed that prediction studies in the accounting literature implicitly and sometimes explicitly (e.g., Finger, 1994) assume that there is a close relation between those prediction studies and the value relevance research, i.e., between indirect and direct analysis of value relevance. Still, while stock value is the present value of all future cash flow/earnings, studies of cash flows' or earnings' predictive ability for future firm performance often consider rather short time horizons. In fact, sometimes only next year's cash flow or next year's earnings are assessed (e.g., M. Kim & Kross, 2005; Sloan, 1996). Step 3 of the study investigates whether or not analyses of accounting variables' short term predictive abilities of firm performance can act as substitutes for analyses of the same variables' association with stock value, i.e., their value relevance. I predict that if cash flow and accruals are related to short term firm performance, it is reasonable to expect that the variables are also value relevant. I find empirical support for this prediction. However, it is neither a necessary nor a sufficient condition that accounting variables are related to short term future performance for them to be value relevant. This study suggests that while accounting variables' association with future short term cash flow and/or earnings may provide *indications* with respect to the variables' value relevance, the two types of studies are not equivalent.

Several papers explore the predictive ability of current cash flow and accruals with respect to future cash flows. Most of them conclude that earnings are a better cash flow predictor than current cash flow (see for instance Barth, Cram, & Nelson, 2001; Dechow, Kothari, & Watts, 1998). As for earnings predictions, several studies find that current earnings are a significant predictor of future earnings (Finger, 1994; Francis & Smith, 2005; Sloan, 1996). Sloan (1996) reports that the accruals component of earnings is less persistent than the cash flow component. The value relevance of accruals is also heavily investigated in prior research. Most empirical studies find that earnings, relatively speaking, are a more value relevant measure than cash flow (Biddle, Seow, & Siegel, 1995; Dechow, 1994; Rayburn, 1986; Subramanyam & Venkatachalam, 2007). In general, prior capital market-based accounting research has tended to focus on *either* the accounting variables' relation to stock values *or* their relation to future firm performance (cash flow and/or earnings), i.e., either direct or indirect investigation of value relevance. The study by Kim and Kross (2005) is one of very few studies that discuss possible relations between the two lines of research. Kim and Kross investigate current earnings' ability to predict future cash flow, and they anticipate that this ability has decreased over time. They cite several studies that show that the value relevance of earnings has decreased over the prior decades: "If the relationship between current earnings and prices is decreasing, the relationship between current earnings and future cash flows should also be decreasing" (M. Kim & Kross, 2005, p. 759). However, Kim and Kross document that the relationship between current earnings and future operating cash flow has *increased* over time. As such, they provide evidence that what I refer to as direct and indirect studies of value relevance may produce contradictory results. Kim and Kross suggest several reasons for their findings. For instance, their findings are consistent with accounting information generally bearing little value relevance. They also note that the findings may be because they are investigating the ability of earnings to predict next year's cash flow, while stock prices are the discounted value of all future cash flows. An additional explanation, which Kim and Kross do not note, might be that while stock valuation models discount *free* cash flows, Kim and Kross only study cash flow from operations. Note also that Kim et al. (2007) provide evidence that cash flow predictions are contaminated by noise in the cash flows and a spurious (value unrelated) correlation between one-year-ahead cash flows and current earnings. Consistent with Kim and Kross' (2005) results on intertemporal variations, I also find that earnings may be more value relevant in periods where they appear less able to explain future firm performance.

This paper contributes to the existing research by further investigating the relationship between the time-series properties of accounting variables and their value relevance, i.e., the accounting variables' indirect and direct value relevance. I extend the analysis of Kim et al. (2007) by also studying earnings' predictive ability for longer term cash flows, i.e., the three next annual cash flows, as well as for future earnings. Valuation theory, or more generally finance theory, has traditionally had a "cash is king" perspective. However, equity valuation today does not solely focus on cash flow discounting. In fact, when using the residual income model, the value driver of firm equity is accounting earnings, not cash flow. Earnings forecasts have become just as important as cash flow forecasts[1]. Special attention is drawn to

[1] In practice, financial analysts tend to focus on earnings forecasts and compute cash flows from pro-forma income statements and balance sheets (compare for instance Penman, 2001). As such, one of the objectives of accounting accruals should be to help investors and other users of accounting information assess the amount and timing of both earnings and cash flow. The cash flow model and the residual income model are equivalent in

the accrual component of earnings since this measure to some extent is the result of subjective judgment from managers and accountants. Earnings are, through the accruals, also a function of the prevailing accounting framework and regulations. Cash flow is claimed to be an objective measure of firm performance, a figure that in principle is unaffected by accounting laws and standards. The Financial Accounting Standards Board (FASB) has, on several occasions, stated that accruals make earnings a better predictor of future cash flows than current cash flow[2]. A primary objective of financial reporting is to provide information to help investors, creditors, and others assess the amount and timing of prospective cash flows. This is accomplished through the accrual adjustment process. However, the FASB does not define future cash flows further. If the FASB by future cash flow refers to rather short term future cash flow, an assumption often applied in empirical research (see for instance Finger, 1994), this paper provides evidence against the FASB assertion. On the other hand, if the FASB is referring to the relation to all future cash flows, i.e., the market value of equity (compare discussion in Kim et al, 2007), this paper provides evidence consistent with the FASB assertion. The analysis is performed on Norwegian data, but the conclusions can likely be generalised to other countries as well. Specifically, during the last decades, Norwegian accounting legislation has changed from a tax-based and relatively conservative model to an Anglo-American investor-oriented accounting model (Gjerde, Knivsflå, & Sættem, 2007b).

This paper is organised as follows: Section 2 summarises relevant conclusions from prior research. Section 3 describes the research design of the paper and develops the prediction to be tested. Section 4 presents the data employed in the analyses, while section 5 summarises

---

theory, but it is sometimes claimed that inconsistent implementation may cause the two models to differ (Lundholm, O'Keefe, & Feltham, 2001; Lundholm & O'Keefe, 2001; Penman, 2001b; Penman & Sougiannis, 1998).

[2] See, for instance, FASB's Objective of Financial Reporting by Business Enterprises (1978).

the main empirical findings. Robustness checks are listed in section 6. Section 7 concludes the paper.

2 Prior Research

The time series properties of accounting numbers have been heavily investigated empirically. For instance, the FASB-statement that current earnings provide better forecasts of future cash flows than do current cash flow is a frequently studied issue. One such study is conducted by Bowen et al. (1986). Bowen et al. find no support for the FASB assertion. Using five different cash flow measures, they conclude that earnings numbers do not provide better forecasts of future cash flows than do cash flow numbers. Their findings are supported by Finger (1994). She finds that cash flow is a better short term predictor of cash flows than are earnings, but that the two are approximately equivalent in the long term. On the other hand, Dechow et al. (1998) state that current earnings are a better forecast of future cash flows than current cash flow. In a regression of cash flow on lagged values of both earnings and cash flow, they find that earnings are consistently incrementally useful in forecasting future cash flows, while cash flows themselves exhibit only modest incremental forecasting power[3].

Barth et al. (2001) disaggregate earnings into cash flow and accruals in order to predict future cash flows. They conclude that this disaggregation significantly improves the explanatory power of the specification (see also Barth, Beaver, Hand, & Landsman, 2005). They also run regressions in which accruals are further disaggregated into major components. Each accrual component is significant, and the explanatory power increases further. The cash flow and accrual components of earnings actually have substantially more predictive ability for future

[3] Chen et al. (2006) maintain that fair value accounting reduces the predictive ability of earnings for future cash flows.

cash flows than several lags of aggregate earnings. The study of Barth et al. is performed on US data. Nikkinen and Sahlstrøm (2004) show that equivalent conclusions are valid in Canada, France, Japan, and the UK as well. Francis et al. (2004) state that accrual quality – the degree to which current accruals map into future cash flows – is associated with lower cost of equity.

Prediciton of earnings is another subject frequently discussed within this line of research. In fact, earnings persistence is considered as an important attribute of earnings quality (see for instance Francis et al., 2004). Finger (1994) reports that current earnings are a significant predictor of future earnings in 88 % of her sample. She tests the association between current earnings and a varying number of lags of historical earnings and finds that the ability of earnings to predict themselves increases as more earnings lags are included in the specification. In fact, when only two earnings lags are used, the firm-specific model is outperformed by the random walk (as measured by root mean squared errors). However, the firm-specific model is superior when four or eight lags are used. Sloan (1996) estimates his models both in pooled form and on an industry-level and reports that current earnings are a highly significant predictor of next year's earnings. He rejects the hypothesis that earnings follow a random walk. His findings suggest that accounting earnings are slowly mean reverting[4] (an excellent study of the mean reverting properties of earnings is provided by Fama & French, 2000). Hope (2004) reports that forecast accuracy is positively correlated with greater use of accrual accounting, but that availability of choice among accounting methods is negatively associated with forecast accuracy.

[4] Ben-Hsien and Da-Hsien (2004) present empirical results that earnings smoothers may have higher earnings – to-price multiples than non-smoothers.

Sloan (1996) disaggregates earnings into cash flow and accruals. He finds that the accrual components of earnings exhibit lower persistence than the cash flow components of earnings. This conclusion is confirmed in Collins and Hribar (2000). Francis and Smith (2005) state that the accounting-based measures of cash flow and accruals do not align with current-period income. Using alternative measures of accruals and cash flows, they find that the differential persistence of cash flows over accruals is more than 70 % smaller than when using the traditional definitions[5]. Still, Chan et al. (2004) find that the aggregate future earnings will decrease by \$0.046 and \$0.096, respectively, in the next one and three years for a \$1 increase in current accruals. They also state that the empirical results are consistent with the notion that earnings management causes the negative relationship between current accruals and future earnings.

Lev et al. (2005) study the predictive ability of both cash flow and accruals on future cash flow and earnings. They find that accruals and their embedded estimates do not improve the prediction of cash flow beyond that achieved by current cash flows. Accruals do marginally improve the prediction of earnings, but according to Lev et al., the improvement is economically insignificant. Lev et al. claim that the poor predictive ability is due to accrual estimates of low quality, specifically: "…the objective difficulties of generating reliable estimates and projections in a volatile economy, and their frequent misuse by managers appear to offset the positive role of estimates in conveying forward looking information to investors" (B. Lev et al., 2005, p. 1). Dechow and Ge (2006) report that accruals improve the persistence of earnings relative to cash flows in high accrual firms, but reduce earnings persistence in low accrual firms.

[5] Traditional measures of accruals are functions of current- and non-current-period transactions. Francis and Smith (2005) show that the inclusion of non-current-period transactions leads to a downward bias on the persistence of accruals. For instance, deferred expenses increase current-period accruals and decrease next-period income, whereas deferred revenues decrease current-period accruals and increase next-period income.

Overall, the evidence from the prediction studies suggests that both current cash flow and current earnings are significantly related to future values of themselves; i.e., both metrics appear to be auto correlated. There is clear evidence that the accrual component of earnings is relevant for earnings predictions. However, with respect to accruals' predictive ability for future cash flows, the empirical evidence is mixed. For instance, while Finger (1994) and Lev et al. (2005) report that current earnings are *not* more highly associated with future cash flows than is current cash flow, Dechow et al. (1998) and Barth et al. (2001) reach the opposite conclusion. Several studies suggest that accrual components of earnings exhibit lower persistence than the cash flow components of earnings (Sloan, 1996; Collins and Hribar, 2000; Lev et al., 2005).

The studies that focus strictly on time-series properties of earnings, cash flows and accruals rarely look into the *value relevance* of the measures that they analyse. However, since Ball and Brown's seminal article from 1968, numerous studies on the relationship between accounting earnings and stock returns have been performed. Over the last decades, several researchers have also disaggregated accounting earnings and measured the value relevance of earnings components. Rayburn (1986) analyses operating cash flow and accruals' association with security returns. She finds that both cash flow and accruals have a significant association with abnormal returns. The conclusion holds both for aggregate accruals and for most accrual items when split into major components. Dechow (1994) concludes that there is a stronger contemporaneous association between stock returns and earnings than between stock returns and realised cash flows. The association of stock returns with cash flow does, however, improve relative to the association of stock returns with earnings as the measurement interval is increased. The association between stock returns and earnings is relatively high when there is a large level of aggregate accruals and/or when the firm's operating cycle is long. Subramanyan and Venkatchalam (2007) report that the value relevance of accrual-based earnings also dominates the relevance of operating cash flow when *ex post* intrinsic values of equity are considered. Francis et al. (2003) document that the value relevance of earnings exceeds that of cash flow from operations and EBITDA[6]. Liu et al. (2007) analyse valuation multiples (on an industry level) and find that earnings dominates both cash flows from operations and dividends with regard to valuation performance. In a variance decomposition analysis, Callen and Segal (2004) present evidence that accrual earnings news is a more important factor than cash flow earnings news in driving current stock return.

Consistent with the finding that accrual components of earnings exhibit lower persistence than the cash flow components of earnings (Sloan, 1996; Collins and Hribar, 2000; Lev et al., 2005), Wilson (1986) states that for a given amount of earnings, the stock market reacts more favourably the larger the cash flow component. Bernard and Stober (1989) on the other hand, find no evidence of this when performing a study similar to that of Wilson. Equivalently, Sloan (1996) reports that even though the cash flow component of earnings is more persistent than the accrual component, stock prices do not reflect this difference. Investors "fixate" on earnings and do not make use of information contained in the accrual and cash flow components of current earnings until that information impacts future earnings. Lev and Nissim (2006) refer to this phenomenon as the "accrual anomaly". They show that the accrual anomaly persists, and that it has not declined over time[7].

[6] Francis et al. (2003) also show that earnings dominate their ex-ante preferred non-GAAP performance metrics, for instance, revenue per passenger mile (airline industry), value of new orders (homebuilding industry), and same-store sales (retail restaurants).

[7] One may ask why sophisticated investors do not arbitrage away the anomaly. Lev and Nissim offer the following explanation (Baruch Lev & Nissim, 2006, p. 193): "By and large, institutions shy away from extreme-accruals firms because their attributes, such as small size, low profitability, and high risk stand in stark contrast to those preferred by most institutions. Individual investors are also by and large, unable to profit from trading on accruals information due to the high information and transaction costs associated with implementing a consistently profitable accruals strategy. Consequently, the accruals anomaly persists and will probably endure."

In their study of value relevance, Biddle et al. (1995) distinguish between incremental and relative information content. They analyse net income, cash flow and net sales and find that, in pairwise comparisons, each measure provides incremental information content beyond each of the other. In pairwise comparisons of relative information content, net income provides significantly greater information content than net sales and cash flow, and net sales provide significantly greater information content than cash flow. However, there is evidence that sales revenue outperforms earnings for high-tech "New Economy" stocks (Davis, 2002; Lianzan & Cai, 2005). Bradshaw and Sloan (2002) suggest that the market response to so-called "Street" earnings[8] (modified definitions of GAAP earnings, or pro-forma earnings) has displaced GAAP earnings as a primary determinant of stock prices.

Briefly summarised, prior research suggests that both cash flow and earnings are value relevant. However, there is evidence that earnings are more value relevant than cash flow (Biddle et al, 1995; Dechow, 1994; Francis et al, 2003; Subramanyan and Venkatchalam, 2007). When earnings are split into cash flow and accruals, both components appear to be equally well associated with stock return (Bernard & Stober, 1989, Sloan, 1996). This conclusion is not consistent with the finding that the accrual component of earnings is less persistent than the cash flow components (the accrual anomaly).

Several studies analyse *either* the predictive ability *or* the value relevance of accounting variables. Kim and Kross (2005) and Kim et al. (2007) combine these two lines of research. Kim and Kross (2005) investigate how earnings' ability to forecast future cash flows has

[8] Cornell and Landsman (2003) report that none of the pro-forma earnings measures released by companies are specifically defined. However, the pro-forma earnings/Street earnings typically exclude special items and non-cash items. Landsman et al. (2007) present evidence that these exclusions are actually value relevant, but that they are mispriced by the market.

developed over time. Based on prior studies' conclusions that the value relevance of earnings has been decreasing over time (Collins, Maydew, & Weiss, 1997; Francis & Schipper, 1999; Gu, 2007; Baruch Lev & Zarowin, 1999), they expect that earnings' ability to predict future cash flow has decreased as well. Their expectation is founded on the fact that stock prices are the present value of future cash flow. Kim and Kross are surprised to find that the ability of earnings to forecast future (operating) cash flow has actually been increasing over the last decades: "If stock price is the present value of future cash flows, the deterioration in the association between accounting earnings and stock prices implies a growing inability of accounting numbers to forecast future cash flows, but that is not what we find" (Kim & Kross, 2005, p. 754). Although they claim that their finding is consistent with market inefficiency, they nevertheless conclude that they are unable to reconcile the increasing ability of current earnings to predict future cash flows with the decreasing ability of current earnings and cash flows to explain prices. This avenue is pursued by Kim et al. (2007). Kim et al. show theoretically that cash flow prediction regressions are contaminated by the presence of noise in the cash flows and value-unrelated (spurious) correlation between one-year-ahead cash flows and current earnings[9]. They find empirical evidence that both factors contributed to the findings of Kim and Kross (2005).

Note that the research quoted above is conducted on U.S. data. Relatively few studies analyse the predictive ability and value relevance of Norwegian accounting data. King and Langli (1998) find that book value of equity per share and earnings per share are significantly related to stock prices when analysing Norwegian accounting data for the period 1982-1996. Earnings per share do, however, have a low incremental explanatory power when book value per share is already included in the regressions. In an analysis of value relevance over time,

[9] Specifically, one-year-ahead cash flows may be a very noisy proxy for all prospective cash flows because they contain significant value irrelevant noise, which is correlated with current earnings (Kim et al., 2007).

Gjerde et al. (2007b) find that the value relevance of financial reporting for investors trading on the Oslo Stock Exchange has increased significantly over the past four decades. Gjerde et al. confirm King and Langli's results that book value per share and earnings per share are significant explanatory variables for stock prices. They also test the explanatory ability of earnings and change in earnings for stock returns. Both earnings and the first difference of earnings are significantly associated with stock returns. Similar results are reported by Hope (1999)[10]. Gjerde et al. (2007a) report that the value relevance of Norwegian accounting numbers was little influenced by the introduction of IFRS for consolidated statements of quoted companies in 2005.

As for value relevance research in the other Nordic countries, Hellstrøm (2006) and Hassel et al. (2005) find that both book value of equity and accounting earnings are value relevant for their Swedish samples. However, Hellstrøm reports that earnings changes are generally not related to stock return. In their study of the Finnish stock market, Juntilla et al. (2005) present evidence that both earnings and the change in earnings are significantly related to stock return. In Denmark, Banghøj and Plenborg (2006) find that neither earnings nor the change in earnings are significantly related to stock return. None of these Nordic studies compare earnings with cash flow to assess the influence of accruals on value relevance.

In an international study comparing value relevance in 20 countries (one of which is Norway), Brown et al. (2006) investigate whether conditional conservatism affects the value relevance of earnings. They conclude that the association between conditional conservatism and the value relevance of earnings depends on the country-specific accrual intensity. Specifically, in countries with higher accrual intensity, more conditionally conservative earnings have a

[10] Hope's (1999) main finding is that the introduction of deferred tax accounting in Norway in 1992 significantly increased the value relevance of earnings numbers.

higher degree of value relevance. They define conditional conservatism as the asymmetric recognition of gains and losses in earnings. In this study, Norwegian GAAP (NGAAP) is characterised as an accounting system with a high use of accrual accounting. On the presented "accrual index", NGAAP scores approximately equal to the scores of Australia, Canada, the UK, and the USA. Ali and Hwang (2000) evaluate the value relevance of cash flow, earnings and accruals in 16 countries, among them Norway. For Norway and 11 other countries, Ali and Hwang find that accruals have incremental value relevance beyond that of cash flow.

3 Predictions and Research Design

3.1 Prediction Development and Variable Definitions

The purpose of this three-step analysis is to investigate cash flow and accruals' predictive ability and value relevance, and then to examine possible relations between steps 1 and 2. Specifically, step 1 analyses the predictive ability of cash flow and accruals for short term future cash flows and earnings. Step 2 examines the value relevance of the same explanatory variables. Step 1 can be regarded as an indirect investigation of value relevance (compare Finger's statement from section 1 that the value relevance of earnings is studied by testing their ability to predict future earnings and cash flow from operations). This section starts out by discussing possible relations between the prediction analysis of step 1 and the association studies of step 2. The discussion is founded on traditional valuation theory.

The ultimate return of every investment is the cash flow generated by the investment. Financial theory says that an asset's value is the present value of its future cash flows. The current value of firm equity is the present value of all future dividends (the dividend model is often attributed to Williams, 1938). The dividend model can be restated in several equivalent forms. For instance, Feltham and Ohlson (1995) show that, under some fairly reasonable assumptions[11], equity value (EV) is today's value of net financial assets plus the present value of all future free cash flows from operating activities:

$$EV_0 = NFA_0 + \sum_{t=1}^{\infty} \frac{E(CFO_t)}{(1+r_t)^t}$$

where

NFA = net financial assets (negative if debts exceed gross financial assets)

CFO = free cash flow from operating activities

r = discount rate

Calculation of cash flow predictions is a vital task in asset valuation. One objective (compare Holthausen & Watts, 2001) of financial reporting is to assist investors, creditors, and others in predicting cash flow. This is accomplished through the accruals, and the FASB asserts that information about earnings and its components (i.e., cash flow and accruals) is generally more predictive of future cash flows than current cash flow. However, modern valuation theory has proven that different versions of cash flow discounting are not the only methods for computing intrinsic equity values. Ohlson (1995) shows that if the clean surplus relation holds, then the dividend model can also be expressed as the book value of equity plus the present value of all future residual income:

$$EV_0 = BV_0 + \sum_{t=1}^{\infty} \frac{E(RI_t)}{(1+r_t)^t}$$

[11] Specifically, the Financial Asset Relation (FAR) and the Financial Asset Marked-to-Market Relation (FAM) must hold. FAR says that all transfers to the common equity holders are made through the financial assets, and these assets are further influenced by financial income and the free cash flows from operations. FAM says that the risk-adjusted expected financial income equals the riskless spot interest rate times the opening book value of the financial assets (Christensen & Feltham, 2003).

where

BV = book value of equity

RI = residual income, defined as $EARN_t - BV_{t-1} * r_t$. EARN is accounting earnings.

r = discount rate

Hence, equity value can be computed both as a function of cash flows and as a function of accounting earnings. Both of the presented models are deduced from the dividend model and will therefore give the exact same equity estimate when applied consistently. Today's accounting earnings should help investors and others assess the level of future cash flow *and* the level of future earnings. In theory, equity value is a function of the infinite cash flows or earnings. However, one may expect that shorter term firm performance, as measured by cash flow and earnings, gives an *indication* of company value. For instance, numerous studies document that both cash flow and earnings are relatively persistent (Barth et al., 2001; Dechow et al., 1998; Finger, 1994; M. Kim & Kross, 2005; Sloan, 1996). Thus, the current accounting measures that predict short term future firm performance should also be associated with current stock returns. This assumption is implicit in most papers studying the accounting variables' ability to forecast future cash flows or earnings; compare the vast amount of what I earlier referred to as indirect value relevance research. I expect that the accounting measures that are significant predictors of future firm performance are also significantly related to current stock return. Specifically, if accruals and cash flows are related to short term future firm performance as measured by accounting earnings and cash flow, it is reasonable to expect that they are also significantly associated with current stock return.

The prediction is one-directional. It is easy to construct examples in which cash flow and accruals are totally unrelated to short term firm performance but are still value relevant. Transitory cash flow and/or earnings items may be associated with stock return even if they, by definition, are not related to future cash flows or earnings. However, if current earnings are highly related to earnings and cash flows one to three years ahead, I suggest that current earnings on average will also be related to current stock return. Prior research strongly proposes that permanent cash flow or earnings are more value relevant than transitory cash flows or earnings (Elliot & Hanna, 1996; Ramakrishnan & Thomas, 1998). Overall, my prediction suggests that there is an association between accounting variables' predictive ability and their value relevance, but that the association may not be as one-to-one as implicitly assumed in the indirect value relevance studies (compare O. Kim et al., 2007). It should be noted that if there is no association between accounting variables' relation with future firm performance and their value relevance, then previous studies of accounting variables' predictive ability would give no indication of value relevance whatsoever.

The primary focus of many value relevance and prediction analyses (e.g., Ball & Shivakumar, 2006; Barth et al., 2001; Francis, LaFond, Olsson, & Schipper, 2005; Rayburn, 1986) is the role of accruals. Accruals, and consequently earnings, are a function of the prevailing accounting regime. Accountants cannot, in principle[12], influence the size of the cash flow. In contrast, the size of the accruals follows from subjective judgements of legislators, standard setters and accountants. Thus, particular attention is given to the predictive ability and value relevance of accruals. As for cash flows, there are several versions of the cash flow valuation

[12] The net cash flow, the change in cash, is a one hundred percent objective measure. No accounting law or standard can change this measure. However, as soon as one starts to use other measures of cash flow, for instance, cash from operations, the prevailing accounting regime may perfectly well influence the measure. For example, the treatment of intangibles will directly influence the cash flow measure applied in this study; see later in this section.

model. It is not obvious which cash flow measure should be analysed[13]. The appendix examines this issue more thoroughly. However, since this study focuses on the possible connection between cash flow/earnings predictions and value relevance, it can be regarded as a follow-up paper of prior research. I leave, therefore, the choice of cash flow concept to future research and choose to employ the same cash flow definitions as the other papers within this research tradition (compare Subramanyam & Venkatachalam, 2007). Hence, cash flow from operations (CF) is defined as (Biddle et al., 1995; Finger, 1994; Klein & Marquardt, 2006; Rayburn, 1986)[14]:

CF	=	Net income before extraordinary items[15] (EARN) - Accruals (ACC)
where		
Accruals	=	Change[16] in total current assets
	-	Change in cash
	-	Change in total current liabilities
	+	Change in interest bearing short term debt[17]
	-	Change in deferred taxes
	-	Depreciation and impairment

I focus on EARN before extraordinary items, since extraordinary items are expected to have little persistence (Barth et al., 2005; Dechow & Ge, 2006) and bear little value relevance

[13] Although not specifically related to this discussion, Bowen et al. (1986) look into the relationship between various measures of cash flow.
[14] According to Biddle et al. (1995), this cash flow measure is designed to approximate the definition of cash flow from operations specified by FASB's Statement No. 95.
[15] The ratio of earnings to cash flow from operations is affected by leverage. Since leverage varies over time and across companies, one might argue that earnings exclusive of interest payments should have been applied in the analysis.
[16] The change variables are defined as follows: $\frac{X_t - X_{t-1}}{MVE_{t-1}}$. X is the accounting variables in question, while MVE is market value of equity, compare also section 4.
[17] Including first-year instalment of long term debt.

(Bradshaw & Sloan, 2002; Landsman et al., 2007; Ramakrishnan & Thomas, 1998). All variables – CF, EARN and ACC – are scaled by market value of equity at the beginning of each year; this is the preferred scaling factor according to Easton and Sommers (2003). In this study, observations are pooled cross-sectionally and over time. Christie (1987) states that scaling avoids spurious correlation due to size and reduces problems with heteroskedasticity. In comparable studies, there seems to be no standard for which variable is preferable for scaling. Some researchers choose to deflate by average total assets (for instance Barth et al., 2001; Francis & Smith, 2005; Sloan, 1996), while others scale by market value of equity (for instance Biddle et al., 1995; Dechow, 1994; Francis et al., 2003; Rayburn, 1986). Barth and Kallapur (1996) claim that scale should be handled by including a scale proxy as an independent variable in cases where the true scale factor is not known. Easton and Sommers (2003), however, state that the scale factor is known in market-based accounting research. They maintain that market capitalisation is more than just a *possible* scale proxy - it *is* scale. In this study, the choice of scale factor follows from my econometric models (see the next section). Step 2 of the analysis uses a return specification. In the return specification, market value of equity is the scale factor. To assure a consistent analysis of my proposed prediction, it is essential that the same scale factors are used in both steps of the study.

3.2 Econometric Model

Step 1 of the study is to analyse the predictive ability of cash flow and accruals for future cash flows and earnings. Step 2 is a value relevance analysis of the same explanatory variables. The following regression specifications are used in steps 1 and 2, respectively (compare Ali & Lee-Seok, 2000; Easton & Harris, 1991; Baruch Lev & Zarowin, 1999):

(1a) $$CF_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1b) $$meanCF_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$ where

$$meanCF_{i,t+1,2,3} = \frac{CF_{i,t+1} + CF_{i,t+2} + CF_{i,t+3}}{3}$$

(1c) $$EARN_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1d) $$meanEARN_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$ where

$$meanEARN_{i,t+1,2,3} = \frac{EARN_{i,t+1} + EARN_{i,t+2} + EARN_{i,t+3}}{3}$$

(2) $$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

Step 1 starts out by regressing next year's cash flow on current cash flow and accruals. Kim and Kross (2005) find it puzzling that there is no relationship between earnings' ability to predict one-year-ahead cash flow and their value relevance. However, since value is a function of all future cash flows and not only the first one, I test the measures' predictive ability for a slightly longer horizon as well. Kim et al. (2007) show that individual years might be contaminated by value irrelevant noise that even out over time and thus are not priced. It may be the case that this year's accruals and cash flow are related to longer term firm performance even if they are not related to next year's cash flow and earnings[18]. Hence, in part b of step 1, the mean of the next three cash flows ($meanCF_{t+1,2,3}$ for simplicity) is regressed on current cash flow and accruals. Regression specifications (1a) and (1b) are in some sense based on the "cash is king" perspective. One acknowledges that because cash is the ultimate return from all investments, the predictive ability with respect to future cash

[18] It may also be the case that the relations are non-linear; compare discussion of positive versus negative earnings at the end of this section.

flows is the most important. Regression specifications (1c) and (1d) recognise that according to modern valuation theory, current equity value may be estimated as a function of future accounting earnings. Hence, the predictive ability of accruals and cash flow with respect to future earnings is as important as their ability to predict future cash flow. Specifications (1c) and (1d) are equivalent to the previous specifications with the exception that earnings are now used as the dependent variable. Generally, one will expect that three-year averages of the variables are less noisy than individual observations. As such, the influence of temporary noise in cash flow and/or earnings will be less in specifications (1b) and (1d) than in (1a) and (1c).

In step 2 of the analysis, future cash flow and earnings are replaced by current stock return as the dependent variable in order to evaluate the value relevance of cash flow and accruals[19]. The prediction says that if cash flow and accruals are related to future cash flow and accounting earnings, it is reasonable to expect that they are also associated with current stock returns. In other words, if the β's are significantly different from zero in step 1 of the analysis, I expect them to be significantly different from zero in step 2 as well. Cash flow and accruals might be related to long term cash flows and earnings even if they are not associated with the more short term measures of firm performance employed in this study. Hence, current cash flow and accruals may be value relevant even if they are non-significant in step 1 of the study. Note that if ignoring discounting, step 1 and step 2 will measure exactly the same thing if indefinite cash flow and earnings were included as dependent variables in step 1. However, a main purpose of this study is to investigate whether or not relatively short term cash flow and/or earnings predictions can act as proxies for value relevance analyses. Since the focus in

[19] Barth et al. (2005) state that median equity prediction errors are smallest when earnings are disaggregated into cash flow and total accruals.

the prediction studies is on nominal values of earnings and cash flows, the future values of these attributes are not discounted[20].

The econometric models use cash flow, accruals, and their associated changes as explanatory variables. Easton and Harris (1991) show that, depending on the valuation model employed, stock return can be seen as a function of *both* earnings and the change in earnings. The residual income model can easily illustrate this important point. This model says that equity value is a function of book value of equity and accounting earnings (see Ohlson, 1995). Change in equity value, which is equivalent to stock return, is a function of the change in book value of equity and the change in earnings. The change in book value of equity equals earnings when no dividends are paid. Hence, change in equity value (stock return) is a function of both earnings and change in earnings[21].

Prior research shows that the value relevance of earnings may be a non-linear function of the earnings level (for instance Freeman & Tse, 1992). Specifically, research widely documents that value relevance is dependent on the sign of earnings (Basu, 1997; Joos & Plesko, 2005). Negative earnings are hardly related to current stock returns at all. This finding is often attributed to the liquidation option that investors hold (see, e.g., Hayn, 1995). Investors will liquidate incorrigible loss firms rather than suffer from indefinite losses. If loss firms survive, it must be because investors expect the losses to be temporary. The lack of persistence of negative earnings may not only affect the value relevance regressions. Obviously, if negative

[20] Obviously, if direct and indirect studies of value relevance cannot be reconciled, one of the reasons may be the lack of present value calculations in cash flow/earnings prediction studies. However, since discount rates are unobservable in the stock market, such calculations may be rather noisy: "We acknowledge that estimating discount rates is susceptible to measurement error" (Subramanyam & Venkatchalam, 2007, p. 464).

[21] Easton and Harris (1991) perform an empirical study where both earnings and change in earnings are used as explanatory variables for return. They find that earnings levels are significantly associated with stock return. As for earnings changes, the regression coefficient is statistically significant in slightly less than half of the years analysed. Lev and Zarowin (1999) employ the same methodology for cash flows, but they report only the combined slope coefficients for the two cash flow variables.

earnings have low persistence, the predictions of step 1 are also expected to be influenced by the sign of earnings. Ball and Shivakumar (2006) claim that linear specifications may understate the ability of current earnings to predict future cash flows. As such, the predictive ability and value relevance of cash flow and accruals are analysed not only for a pooled sample but also for positive and negative earnings sub-samples. This will assure that the sign effect has been controlled for when the study's conclusions are stated.

4 Data

The sample consists of firms listed on the Oslo Stock Exchange. To ensure consistency with sample-selection criteria used in prior studies, the sample excludes financial services firms. All accounting data are obtained from the Oslo Stock Exchange accounting database for exchange-listed companies. Stock price data are collected from the Norwegian School of Economics and Business Administration's Stock Market Database. All stock prices are adjusted for dividends, splits, etc. Stock values and –returns are measured on 30 December each year[22].

Observations are from 1992-2004. In 1992, the Norwegian accounting legislation was changed to introduce deferred tax liabilities and assets (An "accounting revolution", see Hope, 1999). A major tax reform was implemented at the same time[23]. In 2005, European law required Norwegian quoted companies to report consolidated statements according to International Financial Reporting Standards (IFRS). Since the introduction of IFRS may have influenced both the structural relationship between stock return and earnings numbers, as well as earnings numbers' ability to predict themselves, I do not include the IFRS observations in

[22] In fact, prices from the last actual transactions are employed for all years. Hence, market data for the most illiquid stocks might be measured a few days prior to 30 December.
[23] Note also that older data might have suffered from poor liquidity at Oslo Stock Exchange (OSE). While the value weighted percentage turnover at OSE was at approximately the same level in 2002 as in 1992, the turnover was almost twenty times higher in 1992 than in 1982 (Næs, Skjeltorp, & Ødegaard, 2008, p. 4)!

this study. The sample consists of 1664 observations before data trimming. Observations belonging to the upper or lower percentile of RET, CF, ΔCF, ACC and ΔACC are deleted to avoid extreme observations with unreasonably large influence on the regression results. Due to a large degree of overlap among extreme observations, the actual number of observations deleted is 77 (4.9 %), far less than the theoretical maximum of 10 %. The final sample size is 1587 observations. The maximum number of available observations is applied for all main regressions. However, as a robustness check, I repeat the analyses using a constant sample.

Table 1 shows the main descriptive statistics of the variables employed in the analysis. The distributional characteristics are found in panel A. Mean cash flow from operations is equal to 12.9 % of the beginning market value of equity. Mean accruals are -11.7 %, while average earnings are only 0.8 % of market value of equity in this sample. Actually, untabulated results show that mean earnings are negative in 7 out of 13 years. The standard deviations for cash flow and accruals are quite high, while the variation in net income is lower. Accruals do somewhat level out the cash flow variations. As for the change variables, the mean change in cash flow and accruals seem moderate. However, the standard deviations are higher than for the original variables. Even though the change in cash flow and accruals fluctuates around zero on average, the dispersion is definitely substantial. As expected, the volatility of an average is lower than that of an individual observation. Hence, the means of the next three cash flows and accounting earnings have substantially lower standard deviations than the yearly observations. Note that the mean stock return is very high for the period in question. Nevertheless, the risk, as measured by the annual standard deviation, is considerable.

Table 1: Descriptive Statistics

Panel A: Distributional Characteristics

Variable	Mean	Q1	Median	Q3	St. dev	Obs.
CF	0.129	-0.001	0.061	0.201	0.293	1509
ΔCF	0.027	-0.059	0.005	0.106	0.358	1385
ACC	-0.117	-0.163	-0.045	0.000	0.271	1509
ΔACC	0.001	-0.079	-0.002	0.060	0.326	1385
EARN	0.008	-0.016	0.021	0.076	0.220	1587
ΔEARN	0.033	-0.030	0.004	0.050	0.243	1507
$meanCF_{t+1,2,3}$	0.130	0.011	0.082	0.188	0.200	967
$meanEARN_{t+1,2,3}$	0.018	-0.007	0.027	0.075	0.135	1033
RET	0.216	-0.270	0.076	0.458	0.792	1572

Panel B: Pearson (Spearman) Correlations Above (Below) the Diagonal

Variable	CF	ΔCF	ACC	ΔACC	EARN	ΔEARN	CF_{t+1}	MeanCF	$EARN_{t+1}$	MeanEARN	RET
CF		**0.54**	**-0.70**	**-0.44**	**0.47**	**0.23**	**0.34**	**0.51**	**0.14**	**0.26**	**0.20**
ΔCF	**0.53**		**-0.34**	**-0.76**	**0.28**	**0.46**	0.03	0.03	-0.01	0.07	**0.14**
ACC	**-0.69**	**-0.44**		**0.37**	**0.30**	-0.03	**-0.24**	**-0.44**	**0.13**	-0.06	**-0.07**
ΔACC	**-0.39**	**-0.70**	**0.53**		**-0.11**	**0.23**	**-0.06**	0.01	0.03	0.01	0.03
EARN	**0.59**	**0.22**	-0.01	0.04		**0.27**	**0.18**	**0.23**	**0.41**	**0.40**	**0.19**
ΔEARN	**0.22**	**0.42**	0.02	**0.15**	**0.40**		0.00	**0.16**	**0.07**	**0.23**	**0.24**
CF_{t+1}	**0.39**	0.05	**-0.25**	-0.04	**0.34**	**0.06**		**0.74**	**0.45**	**0.32**	-0.04
$meanCF_{t+1,2,3}$	**0.42**	0.05	**-0.32**	0.00	**0.31**	**0.09**	**0.67**		**0.35**	**0.44**	-0.04
$EARN_{t+1}$	**0.41**	**0.10**	**-0.16**	-0.03	**0.51**	**0.16**	**0.59**	**0.45**		**0.68**	**0.12**
$meanEARN_{t+1,2,3}$	**0.39**	**0.09**	**-0.18**	-0.02	**0.44**	**0.18**	**0.50**	**0.64**	**0.71**		**0.08**
RET	**0.24**	**0.12**	-0.04	0.03	**0.35**	**0.26**	0.00	0.01	**0.15**	**0.11**	

Table description

Panel A of table 1 shows descriptive statistics for a sample of Norwegian firms in the period 1992 to 2004. The panel displays the mean, first quarter, median, third quarter, standard deviation and number of observations for each variable used in the analysis. Panel B lists Pearson (Spearman) correlation coefficients above (below) the diagonal.

<u>Variable definitions:</u>

CF:	Cash flow from operations. Cash flow = Earnings – Accruals.
EARN:	Net earnings before extraordinary items.
ACC:	Accruals = Change in total current assets – Change in cash – Change in current liabilities + Change in interest bearing short term debt – Change in deferred taxes – Depreciation and impairment.
Δ:	Denotes yearly change in the variables.
CF_{t+1} and $EARN_{t+1}$	Next year's cash flow and earnings.
$meanCF_{t+1,2,3}$ and $meanEARN_{t+1,2,3}$	The mean of the three next annual cash flows and earnings.
RET:	Stock return, measured per 30 December.

All CF, EARN and ACC data are scaled by the market value of equity at 30 December in year t-1. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

Correlation coefficients between the variables are presented in panel B. Cash flow and accruals seem to be highly negatively correlated. This is further evidence that accruals contribute to level out the cash flow variations. In addition, the change in cash flow is significantly negatively correlated with the change in accruals. Earnings are significantly correlated with cash flow, but they have a lower correlation with accruals. The measures of future firm performance are generally correlated with today's cash flow and accruals but not with the first difference of these variables. All measures of future firm performance are significantly correlated with each other. Note that none of the variables have a particularly high correlation with stock return. Specifically, accruals seem to have a low association with stock return.

5 Main Empirical Results

5.1 Step One: Cash Flow and Earnings Predictions

The first step of the study analyses the predictive ability of current cash flow and accruals with respect to future firm performance as measured by cash flow and accounting earnings. Table 2 summarises the empirical findings from these regressions. In the total sample, cash flow seems to be a significant predictor[24] of future cash flows. As for next year's cash flow, both the level and the first difference of current cash flow turn out to be significant predictors. However, accruals seem to be unrelated to future cash flow. In fact, this conclusion holds with respect to next year's cash flow as well as the mean of the next three cash flows. The mean of the next three cash flows appears to be easier to forecast than next year's cash flow, as the explanatory power is 2.5 times higher in regression (1b) than in (1a)[25]. Overall, these results indicate that there is positive auto correlation for cash flows; a high cash flow in one year is

[24] The presented t-values are computed using White-adjusted standard deviations. The White estimator for variance controls for possible heteroskedasticity in the regression analyses. Coefficients are termed "significant" if they are significant on a 5 % level, using two sided tests.

[25] Note that the sample size differs between the regressions. As a robustness check, all regressions are re-run on an identical sample, compare section 6.1.

typically followed by a high cash flow the next year as well, a result consistent with prior research (Barth et al., 2001; Dechow et al., 1998). Even though a high cash flow in the normal case is followed by another high cash flow, a high *increase* in cash flow seems to have a negative impact on future cash flows, at least next year's cash flow. This finding indicates that the cash flows to a certain extent mean revert. The indication that companies performing badly for some time tend to perform better in the future, and vice versa, is a phenomenon frequently discussed in capital market-based accounting research (see for instance Ball & Brown, 1968; Basu, 1997; Hayn, 1995; Sloan, 1996).

Table 2: Step 1 - Predictive Ability of Cash Flow and Accruals

Total Sample

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.46**	6.48	**0.47**	5.82	**0.48**	6.27	**0.49**	5.81
ΔCF	**-0.23**	-3.03	-0.06	-0.71	-0.10	-1.70	0.05	0.68
ACC	0.08	0.93	-0.13	-1.08	**0.48**	5.23	**0.41**	4.45
ΔACC	-0.11	-1.42	0.18	1.79	-0.06	-0.89	0.10	1.17
Constant	**0.09**	10.15	**0.08**	11.39	0.01	1.48	0.00	-0.80
Adj. R^2	0.12		0.29		0.16		0.16	
n	1105		693		1105		693	
Mean VIF	2.81		4.64		2.81		4.64	

Positive Earnings

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.80**	5.96	**0.66**	5.67	**0.64**	5.81	**0.48**	4.76
ΔCF	**-0.57**	-5.41	-0.21	-1.82	**-0.32**	-3.69	-0.12	-1.61
ACC	**0.34**	2.08	0.06	0.38	**0.60**	5.15	**0.44**	3.81
ΔACC	**-0.34**	-3.02	0.14	0.95	**-0.24**	-2.71	-0.10	-0.99
Constant	**0.07**	6.78	**0.07**	8.98	0.02	1.84	**0.01**	2.19
Adj. R^2	0.20		0.36		0.16		0.14	
n	776		524		776		524	

Negative Earnings

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.37**	2.60	0.33	1.65	0.34	1.80	0.42	1.55
ΔCF	-0.02	-0.34	-0.04	-0.38	0.04	0.66	0.14	1.10
ACC	0.01	0.09	-0.29	-1.87	**0.37**	3.04	0.25	1.38
ΔACC	0.05	0.75	0.14	1.23	0.08	0.86	0.22	1.42
Constant	**0.08**	5.02	**0.06**	3.37	-0.03	-1.63	**-0.05**	-2.56
Adj. R^2	0.05		0.16		0.09		0.04	
n	327		167		327		167	

Table description

Table 2 describes the predictive ability of earnings split into cash flow and accruals for a sample of Norwegian firms in the period 1992 to 2004. It summarises the regression coefficients (Coeff.), White-adjusted t-values (t-value), total explanatory power (adj. R^2) and number of observations (n) for the total sample as well as for the positive and negative earnings sub-samples. Mean variance inflation factor (VIF) is displayed for the total sample. Data are analysed using the following regression specifications:

(1a) $$CF_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1b) $$meanCF_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanCF_{i,t+1,2,3} = \frac{CF_{i,t+1} + CF_{i,t+2} + CF_{i,t+3}}{3}$$

(1c) $$EARN_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1d) $$meanEARN_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanEARN_{i,t+1,2,3} = \frac{EARN_{i,t+1} + EARN_{i,t+2} + EARN_{i,t+3}}{3}$$

where $CF_{i,t}$ is cash flow from operations for company i in year t, ACC is total accruals and EARN is earnings before extraordinary items. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity at 30 December in year t-1. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

Contrary to Barth et al. (2001) and Dechow et al. (1998), table 2 suggests that there is no significant relation between future cash flows and current accruals in the total sample. Neither accruals nor the change in accruals shows significant coefficients in the regressions. It does not matter whether the dependent variable is next year's cash flow or the average of the next three cash flows. The explanatory power of the two specifications is 12 % and 29 %, respectively. When only cash flow and its first difference are used as explanatory variables, the adjusted R^2 is respectively 12 % and 28 % (untabulated). These results contradict the assertion that accruals make current earnings a better predictor of future cash flows than current cash flow. When the sample is split according to the sign of earnings, accruals are significantly related to next year's cash flow for the positive earnings sample. Accruals remain unable to predict the mean of the next three cash flows. Consistent with prior research (for instance Hayn, 1995), today's cash flow and accruals have a low association with future cash flow when earnings are negative. Actually, none of the regression coefficients are significant when the mean of the three next cash flows is analysed. Explanatory power is also dramatically lower when negative earnings are considered than when positive earnings are investigated. Note that cash flow may be both positive and negative when the sample is split – the split is governed by the sign of the *earnings*.

Table 2 also displays the findings from regressions of future earnings on today's cash flow and accruals. The results for the total sample clearly indicate that accruals are a relevant earnings predictor. In fact, both cash flow and accruals are significantly associated with future firm performance when cash flow is replaced by earnings as the dependent variable. Though cash flows are positively related to future earnings, large levels of accruals are typically associated with *lower* future earnings (note that total accruals typically are *negative*). Still, the change in accruals is statistically unrelated to future earnings. This is also the case for the change in cash flow. The explanatory power is the same in regression (1c) and (1d). In contrast to the cash flow regressions, it does not appear to be easier to forecast the mean of the next three earnings than next year's earnings. This finding may be attributed to the higher variation in cash flow than in earnings (see table 1). Accruals contribute to levelling out earnings but not cash flow. Note that untabulated results show that the explanatory power of the earnings regressions falls dramatically if either cash flow or accruals are omitted as an explanatory variable. For instance, the adjusted R^2 is only 2 % when next year's earnings are regressed on either cash flow or accruals.

As with cash flow predictions, earnings predictability for future earnings is sign dependent (see table 2). All explanatory variables are significant when earnings are positive and next year's earnings are to be forecasted. When the mean of the next three earnings is predicted, only the level of cash flow and accruals is significant. In the case of negative earnings, the mean of the next three earnings seems practically unpredictable. Only the level of accruals is significantly related to next year's earnings when earnings are negative. The explanatory power from the earnings prediction regressions is lower when earnings are negative than when they are positive, but the explanatory power is less sign dependent than in the cash flow predictions.

Note that multicollinearity could have been a challenge in these specifications since four related measures are used as explanatory variables. Fortunately, it is not. The variance inflation factor (VIF) is computed for each regression, and they are each significantly below the cut-off threshold of 10 proposed by for instance Hair et al. (2006). As a result, multicollinearity is not considered a problem in the regression analyses.

Overall, the findings of step 1 indicate that both cash flow and accruals are significantly related to future firm performance. However, the results are dependent on the sign of earnings and whether cash flow or earnings is forecasted. The most unambiguous results are found for cash flow levels. Present cash flow is related to future cash flow and earnings in the total sample and when earnings are positive. It does not matter whether it is next year's performance or the mean of the next three years that is analysed. Accruals are related to future earnings as long as earnings are not negative. However, accruals are generally *not* related to future cash flow. Except for short term predictions in the positive earnings sample, the change variables are insignificant. In the negative earnings sample, all explanatory variables are typically insignificant. Thus, cash flow and accruals seem to show little association with future firm performance when earnings are negative.

5.2 Step Two: Value Relevance

In the value relevance study of cash flow and accruals, current stock return replaces future cash flow and earnings as the dependent variable of the regression specification. The results from this regression are presented in table 3. In this specification, all explanatory variables come up with significant coefficients in the total sample. Both cash flow and the change in cash flow are positively related to stock return. A high and increasing cash flow is generally associated with high stock return. This result is comparable to Easton and Harris (1991), who found that both earnings and the change in earnings generally are significantly related to stock return. Also analogous to Easton and Harris' results on earnings, I find that the cash flow coefficient is higher than the change in cash flow coefficient. The coefficients on the two accruals variables are also significant. Since accruals typically are a negative earnings item, both the level and change of accruals appear to be negatively related to stock return. In other words, the findings suggest that large and increasing accruals are associated with *lower* stock return. In particular, *increasing* accruals seem to be a perceived as a negative signal by equity investors (see the large coefficient on this variable). To illustrate the significance of accruals in this specification, it is worth mentioning that the explanatory power is halved if accruals are deleted from the specification (not tabulated). Note that the explanatory power as measured by the adjusted R^2 is generally much lower in this analysis than in the first step of the study. Most variation in stock returns is explained by factors other than accounting variables such as earnings. This is a common conclusion in international value relevance research (compare Basu, 1997; Collins, Kothari, Shanken, & Sloan, 1994; Kormendi & Lipe, 1987; Baruch Lev, 1989).

Table 3: Step 2 - Value Relevance of Cash Flow and Accruals

Dependent variable:	Total Sample RET		Positive Earnings RET		Negative Earnings RET	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.78**	5.46	**1.18**	4.10	0.26	1.10
ΔCF	**0.51**	3.07	**0.96**	3.81	0.19	1.27
ACC	**0.30**	2.07	**1.22**	3.46	-0.24	-1.46
ΔACC	**0.68**	4.20	**0.82**	3.70	**0.37**	2.02
Constant	**0.11**	4.82	**0.15**	4.90	**-0.10**	-2.57
Adj. R^2	0.09		0.13		0.02	
n	1376		947		427	

Table description

Table 3 describes the value relevance of earnings split into cash flow and accruals for a sample of Norwegian firms in the period 1992 to 2004. It summarises the regression coefficients (Coeff.), White-adjusted t-values (t-value), total explanatory power (adj. R^2) and number of observations (n) for the total sample as well as for the positive and negative earnings sub-samples. Data are analysed using the following regression specification:

$$(2) \qquad RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the stock return for company i in year t, CF is cash flow from operations and ACC is total accruals. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity at 30 December in year t-1. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

All other things being equal, my findings suggest that for given earnings, investors prefer higher cash flow proportions. More cash flow and less accruals are “better” as measured by stock returns. Sloan (1996) found that investors fixate on earnings and fail to fully reflect the information contained in the accrual and cash flow components of earnings (the accrual anomaly; see Baruch Lev & Nissim, 2006). Contrary to Sloan (1996), my findings suggest that investors understand the different information content and consider this when valuing equity. Sloan reports that investors price the cash flow component and the accrual component of earnings identically, even if the cash flow component is far more persistent. The higher persistence of cash flow than accruals is also found in my sample. However, my findings suggest that investors see through this phenomenon and price the two earnings components differently. The regression coefficients for cash flow and accruals are significantly different from each other on a 0.01 % level (untabulated).

Split into positive and negative earnings, the sample shows that positive earnings are more highly associated with stock return. All regression coefficients are significant when earnings are positive. Explanatory power equals 13 %. The adjusted R^2 drops to 2 % when earnings are negative. Only the change in accruals shows a significant regression coefficient. Briefly summarised, stock returns seem to be associated with both cash flow and accruals. However, further analysis shows that the association typically only applies when earnings are positive.

5.3 Step 3: The Association Between Predictive Ability and Value Relevance

The prediction from section 3 says that if accruals and cash flows are related to short-term future firm performance as measured by accounting earnings and cash flow, it is reasonable to expect that they are also significantly associated with current stock return. Current cash flow is significantly related to both future cash flow and future earnings, while current accruals appear to be significantly related only to future earnings. Both variables are value relevant. As such, one may claim the empirical findings support the proposed prediction. However, the regression coefficients are more significant in the value relevance study than in the future performance study. This means that cash flow and accruals have a closer association with stock return than with future cash flows or earnings (as measured by significance level of individual coefficients). Even if all explanatory variables seem significantly related to stock return in the total sample, none of the regressions in step 1 find that all variables are significant predictors of cash flow or earnings. Only when earnings are positive and one-year ahead cash flow or earnings are predicted do all explanatory variables become significant. Taken together, steps 1 and 2 reveal that the prediction of section 3 cannot be reversed. Cash flow or earnings prediction studies may provide *indications* with respect to value relevance, but they do not at all present the complete picture. What I have referred to as indirect value relevance studies do not seem to be equivalent to “pure” or direct value relevance studies.

Stated differently, conclusions about accounting variables' value relevance may not be drawn based upon short term predictions tests (indirect value relevance studies). Assume, for instance, that only cash flow predictions were studied, and that these studies should proxy for value relevance studies. Such tests would have suggested that accruals are not related to company value. The value relevance study shows that this conclusion would have been wrong.

An empirical result of particular interest is the finding that accruals are related to stock return even if they are not associated with future cash flow in the short term. From a "cash is king" perspective, one would have expected that the failure of accruals to predict future cash flow would render them unrelated to current stock return; see the discussion of Kim and Kross (2005) on the relationship between cash flow predictions and value relevance. However, even if accruals are unrelated to future cash flows, they appear to be related to future earnings. Section 3 showed that company value could be expressed as a function of accounting earnings; compare the residual income model (Edwards & Bell, 1961; Feltham & Ohlson, 1995; Ohlson, 1995). As such, there might be a relation between accruals' role as an earnings predictor and their value relevance. In addition, earnings have an indirect role in equity valuation, as many investors predict earnings and derive future cash flows from the earnings predictions. This issue is discussed by Lev et al. (2005). They state that "…while economic theory prescribes that asset values are determined by their future cash flows, financial analysts predominantly predict earnings" (B. Lev et al., 2005, p. 9). And further: "The underlying heuristics are somewhat obscured; perhaps investors predict earnings first, and derive future cash flow estimates from the predicted earnings" (B. Lev et al., 2005, p. 9). Lev et al. ask why investors and analysts have this almost universal "obsession" with earnings. They present one answer when showing that the returns on portfolios constructed from a perfect prediction of earnings are substantially higher than the returns on portfolios constructed from predicted cash flows. However, this result holds only for perfect predictions. When portfolios are constructed from actual and not perfect predictions, the returns are higher for cash flow than for earnings-based portfolios. Lev et al. suggest that some analysts may ignore the latter finding.

Kim and Kross (2005) are surprised to find that the over-time development in earnings' ability to predict one-year ahead cash flow is not identical to the over time development in earnings' value relevance. In fact, while accounting earnings seem to have lost value relevance over time (S. Brown, Kin, & Lys, 1999; Collins et al., 1997; Gu, 2007; Baruch Lev & Zarowin, 1999), Kim and Kross document that earnings' ability to forecast cash flows has actually increased. To further investigate the possible relationship between short term cash flow and earnings predictions and value relevance, I examine if this phenomenon is present in my data sample as well. However, while Kim and Kross only focus on one-year cash flow predictions, I continue to analyse both three-year future cash flows as well as one- and three-year future earnings. I split the sample in two, using 1999 as the cut-off year. This year is not randomly chosen as the cut-off year: The Norwegian Accounting Act of 1998 was put into effect in 1999. However, the Accounting Act of 1998 did not introduce any revolutionary changes in the Norwegian accounting system. The main principle is still historic cost with traditional principles for revenues and cost recognition, such that revenues should be earned and costs matched with the earned revenues for the period (Gjerde et al., 2007b). The most notable change was probably that fair value for liquid short term financial instruments was introduced. The partial effect of such a change should normally be increased value relevance of the accounting figures. Table 4 lists the results for the periods before and after 1999.

Table 4: Predictive Ability and Value Relevance of Cash Flow and Accruals - 2 Sub-periods

Panel A: 1992-1998

Total Sample

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.70**	3.36	**0.59**	4.68	**1.13**	4.36	**0.69**	4.14	**0.82**	5.57
ΔCF	-0.40	-1.81	-0.18	-1.65	**-0.32**	-2.15	0.13	0.87	**0.83**	3.65
ACC	0.22	0.82	0.01	0.07	**1.22**	4.07	**0.76**	3.78	**0.64**	3.96
ΔACC	-0.14	-0.57	0.12	0.88	**-0.32**	-1.92	0.09	0.64	**0.73**	3.94
Constant	**0.06**	5.31	**0.05**	7.56	-0.01	-0.94	-0.01	-0.95	0.05	1.81
Adj. R^2	0.21		0.43		0.36		0.24		0.07	
n	504		409		504		409		558	

Positive Earnings

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.92**	4.67	**0.72**	5.45	**0.56**	6.03	**0.35**	4.08	-0.20	-0.42
ΔCF	**-0.65**	-2.59	-0.23	-1.82	**-0.24**	-2.61	-0.02	-0.27	**1.33**	2.90
ACC	0.41	1.61	0.15	0.95	**0.54**	4.78	**0.35**	3.30	-0.39	-0.74
ΔACC	-0.27	-1.01	0.06	0.35	**-0.21**	-2.17	-0.05	-0.43	**1.05**	2.17
Constant	**0.05**	4.43	**0.05**	6.50	**0.02**	3.68	**0.02**	3.86	**0.15**	3.50
Adj. R^2	0.27		0.47		0.13		0.08		0.05	
n	408		342		408		342		444	

Negative Earnings

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	0.26	0.67	0.05	0.16	**1.75**	5.67	**0.95**	2.12	**1.04**	2.86
ΔCF	0.03	0.12	-0.01	-0.03	-0.13	-0.50	0.51	1.26	0.12	0.26
ACC	0.20	0.45	-0.32	-0.97	**2.00**	4.56	**1.80**	4.47	0.17	0.56
ΔACC	0.00	0.00	0.22	0.97	-0.21	-0.59	0.12	0.42	0.50	1.48
Constant	**0.06**	2.39	**0.04**	1.96	**0.04**	2.28	0.03	1.25	**-0.16**	-2.11
Adj. R^2	-0.02		0.00		0.52		0.40		0.01	
n	96		67		96		67		114	

Panel B: 1999-2004

Total Sample

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.42**	5.40	**0.49**	5.09	**0.40**	5.49	**0.46**	5.72	**0.79**	4.46
ΔCF	**-0.21**	-2.81	-0.05	-0.50	-0.10	-1.52	-0.05	-0.77	**0.48**	2.61
ACC	0.08	0.92	-0.14	-0.91	**0.41**	4.42	**0.23**	2.38	0.30	1.71
ΔACC	-0.14	-1.75	0.15	1.21	-0.07	-0.97	0.03	0.32	**0.68**	3.62
Constant	0.11	8.21	**0.11**	6.83	0.01	1.27	-0.01	-1.37	**0.16**	4.76
Adj. R^2	0.09		0.20		0.13		0.16		0.11	
n	601		284		604		284		818	

Positive Earnings

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.68**	4.16	**0.54**	2.94	**0.67**	4.49	**0.61**	4.37	**1.51**	4.36
ΔCF	**-0.52**	-4.29	-0.21	-1.36	**-0.35**	-3.30	**-0.22**	-2.47	**0.88**	3.04
ACC	0.28	1.34	-0.11	-0.36	**0.61**	3.98	**0.41**	2.50	**1.66**	3.81
ΔACC	**-0.36**	-3.05	0.22	1.01	**-0.24**	-2.49	-0.10	-0.72	**0.77**	3.04
Constant	**0.10**	5.64	**0.11**	6.15	0.01	0.74	0.00	-0.22	**0.20**	4.23
Adj. R^2	0.15		0.21		0.16		0.27		0.16	
n	368		182		368		182		503	

Negative Earnings

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.40**	2.56	0.47	1.72	0.15	1.00	0.11	0.52	0.10	0.39
ΔCF	-0.03	-0.45	-0.04	-0.44	0.02	0.34	-0.04	-0.34	0.24	1.40
ACC	0.03	0.29	-0.27	-1.61	**0.28**	2.33	-0.05	-0.31	-0.34	-1.81
ΔACC	0.04	0.54	0.10	0.80	0.02	0.23	-0.01	-0.12	**0.41**	2.02
Constant	**0.10**	4.61	**0.08**	3.05	-0.03	-1.45	**-0.07**	-2.76	-0.09	-1.70
Adj. R^2	0.05		0.20		0.06		-0.02		0.02	
n	231		100		231		100		313	

Table description

Table 4 describes the predictive ability and value relevance of earnings split into cash flow and accruals for a sample of Norwegian firms in the period 1992 to 2004. It summarises the regression coefficients (Coeff.), White-adjusted t-values (t-value), total explanatory power (adj. R^2) and number of observations (n) for the total sample as well as for the positive and negative earnings sub-samples. Panel A shows the results for the period 1992 to 1998. Panel B shows the results for the period 1999 to 2004. Predictive ability (step 1) is analysed using regression specification (1a) to (1d), while value relevance (step 2) is analysed using regression specification (2):

(1a) $$CF_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1b) $$meanCF_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanCF_{i,t+1,2,3} = \frac{CF_{i,t+1} + CF_{i,t+2} + CF_{i,t+3}}{3}$$

(1c) $$EARN_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1d) $$meanEARN_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanEARN_{i,t+1,2,3} = \frac{EARN_{i,t+1} + EARN_{i,t+2} + EARN_{i,t+3}}{3}$$

(2) $$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

where $CF_{i,t}$ is cash flow from operations for company i in year t, ACC is total accruals, EARN is earnings before extraordinary items and RET is stock return. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity at 30 December in year t-1. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

Results are presented for the total sample and for the positive and negative earnings sub-samples. I am focusing primarily on the results for the total sample. Table 4 reveals that the adjusted R^2 is higher for all cash flow and earnings predictions (step 1) in the first period than in the second period. It appears that current cash flow and accruals were a far better indicator of future firm performance as measured by cash flow and earnings in the 1992-98 period than in the 1999-04 period. Even so, current cash flow and accruals have a higher association with current stock return in the second period than in the first (step 2). Even if cash flow and accruals' predictive ability for future firm performance have decreased over time, value relevance has actually increased[26]. This is further evidence that short term cash flow and earnings prediction tests are not equivalent to value relevance analysis. The analysis of predictive ability is more extensive here than in Kim and Kross' (2005) study, as longer term cash flows as well as future earnings are added to the analysis. Still, the findings are consistent with Kim and Kross' conclusions. The over time development in earnings' predictive ability is not identical to the over time development in earnings' value relevance. Note, however, that my results are opposite in sign to those of Kim and Kross since the predictive ability has *decreased* while value relevance has *increased* in my sample[27].

Prior research has shown that adjusted R^2 may be incomparable across samples (S. Brown et al., 1999; Gu, 2007). Specifically, Brown et al. (1999) and Gu (2007) show that scale differences and/or sampling variations might lead to adjusted R^2 differences even if the underlying economic relation is identical in two samples. The analysis of this section is

[26] The result that value relevance is higher in the second period than in the first is consistent with the conclusion of Gjerde et al. (2007), who also find that the Accounting Act of 1998 has contributed to increased value relevance of earnings.

[27] The primary focus of this study is not the over-time development in the predictive ability and value relevance of accounting measures. Therefore, I do not discuss possible reasons for the change. Note, however, that untabulated results show that the percentage share of firms that report negative earnings has increased over the sample period. In addition, more companies report impairment expenses in the second period than in the first. On the other hand, there seems to be a slight decrease in companies reporting extraordinary items on the income statement. As for the balance sheet, there has been a significant increase in companies reporting capitalised intangible assets.

repeated using scale-adjusted RMSE as the measure of explanatory power, a methodology recommended by Gu (2007). Scale-adjusted RMSE gives exactly the same results as the ones reported in table 4. In other words, predictive ability has decreased while value relevance has increased when scale-adjusted RMSE is applied as the measure of explanatory power.

6 Robustness Checks

Several alternative tests are performed in order to test the robustness of step 1 and step 2 of this study. The robustness checks generally confirm the results from the main analysis. All tests are run for the positive and negative earnings sub-samples in addition to the total sample. However, as all results are very similar to the main analysis, I present results only for the total sample.

6.1 Identical Samples

Regression specification (2) demands fewer observations than specifications (1a) and (1c), which again demand fewer observations than specifications (1b) and (1d). As a result of this, the number of observations varies across the different specifications. The differences between the various regression analyses can theoretically be the result of different samples employed in the regressions. The first robustness check controls for this. In this test, only observations that are without missing values for any of the regression variables are used in every test. The results are presented in table 5.

Table 5: Predictive Ability and Value Relevance of Cash Flow and Accruals - Identical Samples

Dependent variable:	**CF_{t+1}**		**$meanCF_{t+1,2,3}$**		**$EARN_{t+1}$**		**$meanEARN_{t+1,2,3}$**		**RET**	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.60**	5.51	**0.47**	5.82	**0.56**	6.75	**0.49**	5.81	**0.82**	3.43
ΔCF	-0.07	-0.63	-0.06	-0.71	0.00	-0.02	0.05	0.68	**0.46**	1.98
ACC	0.07	0.50	-0.13	-1.08	**0.48**	5.22	**0.41**	4.45	**0.69**	2.59
ΔACC	0.15	1.25	0.18	1.79	0.03	0.37	0.10	1.17	**0.49**	2.08
Constant	**0.06**	6.51	**0.08**	11.39	0.00	-0.58	0.00	-0.80	**0.11**	3.72
Adj. R^2	0.18		0.29		0.22		0.16		0.03	
n	693		693		693		693		693	

Table description

Table 5 describes the predictive ability and value relevance of earnings split into cash flow and accruals for a sample of Norwegian firms in the period 1992 to 2004. It summarises the regression coefficients (Coeff.), White-adjusted t-values (t-value), total explanatory power (adj. R^2) and number of observations (n) for the total sample. The table presents the regression results when identical samples are used in all regressions, i.e., only observations with no missing values for any of the regression variables are used. Predictive ability (step 1) is analysed using regression specification (1a) to (1d), while value relevance (step 2) is analysed using regression specification (2):

(1a) $$CF_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1b) $$meanCF_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanCF_{i,t+1,2,3} = \frac{CF_{i,t+1} + CF_{i,t+2} + CF_{i,t+3}}{3}$$

(1c) $$EARN_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1d) $$meanEARN_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanEARN_{i,t+1,2,3} = \frac{EARN_{i,t+1} + EARN_{i,t+2} + EARN_{i,t+3}}{3}$$

(2) $$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

$CF_{i,t}$ is cash flow from operations for company i in year t, ACC is total accruals, EARN is earnings before extraordinary items and RET is stock return. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity at 30 December in year t-1. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

Table 6: Predictive Ability and Value Relevance of Cash Flow and Accruals - Market Values From March

Dependent variable:	CF_{t+1}		$meanCF_{t+1,2,3}$		$EARN_{t+1}$		$meanEARN_{t+1,2,3}$		RET	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
CF	**0.40**	5.45	**0.33**	3.97	**0.47**	5.97	**0.46**	5.42	**0.50**	3.43
ΔCF	-0.17	-1.94	-0.03	-0.46	**-0.16**	-2.84	-0.02	-0.33	-0.24	-1.52
ACC	0.02	0.19	**-0.28**	-2.38	**0.45**	4.88	**0.37**	4.00	**0.81**	5.97
ΔACC	-0.02	-0.33	**0.19**	1.99	-0.08	-1.46	0.02	0.32	**-0.28**	-2.01
Constant	**0.09**	8.88	**0.08**	11.80	0.01	1.01	0.00	-0.75	**0.26**	9.91
Adj. R^2	0.09		0.27		0.15		0.14		0.03	
n	1112		697		1112		697		1259	

Table description

Table 6 describes the predictive ability and value relevance of earnings split into cash flow and accruals for a sample of Norwegian firms in the period 1992 to 2004. It summarises the regression coefficients (Coeff.), White-adjusted t-values (t-value), total explanatory power (adj. R^2) and number of observations (n) for the total sample. Predictive ability (step 1) is analysed using regression specification (1a) to (1d), while value relevance (step 2) is analysed using regression specification (2):

(1a) $$CF_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1b) $$meanCF_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanCF_{i,t+1,2,3} = \frac{CF_{i,t+1} + CF_{i,t+2} + CF_{i,t+3}}{3}$$

(1c) $$EARN_{i,t+1} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

(1d) $$meanEARN_{i,t+1,2,3} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t} \text{ where}$$

$$meanEARN_{i,t+1,2,3} = \frac{EARN_{i,t+1} + EARN_{i,t+2} + EARN_{i,t+3}}{3}$$

(2) $$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

$CF_{i,t}$ is cash flow from operations for company i in year t, ACC is total accruals, EARN is earnings before extraordinary items and RET is stock return. Δ denotes yearly change in the variables. **Note the following changes from previous tables**: RET is stock return from 31 March in year t until 31 March in year t+1. All CF, EARN and ACC data are scaled by the market value of equity per 31 March in year t. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

Table 5 confirms the results from the main analysis. Cash flow is a significant cash flow predictor, while accruals are not. Both cash flow and accruals are related to future accounting earnings. The change variables are significant predictors of neither cash flow nor earnings. However, all explanatory variables are significantly associated with stock return.

6.2 Stock Prices Measured in March

The main analysis used stock prices measured in December each year. Several value relevance studies employ stock prices measured some time in year t+1, arguing that financial reports are not published on 31 December. Therefore, it takes some time for accounting information to become publicly known among the stock investors. As an alternative test, stock returns are measured from 31 March[28] in year t to 31 March in year t+1. Note that this change does not only influence the stock return figures. All cash flow, accruals and earnings data are also changed since the variables now are deflated by the market value of equity on 31 March and not 30 December. Consequently, all regressions have to be re-run. The results are found in table 6.

Some of the regression parameters have changed from the main analysis. Accruals are now significantly negatively related to the mean of the next three cash flows. As before, cash flow is a significant cash flow predictor. Both cash flow and accruals are related to future earnings. All explanatory variables except for the change in cash flow are significantly associated with stock return.

Note that the explanatory power is much lower in this value relevance regression. The accounting variables are able to explain very little of the stock return measured in March each

[28] Again, only actual trade prices are employed. Market data for the most illiquid stocks might be measured a few days prior to 31 March.

year. Timing is essential in value relevance studies. Aboody et al. (2002) suggest that stock markets are inefficient and react with a time delay to publicly available accounting information; they propose a way to overcome this inefficiency. Specifically, they multiply stock prices with the ratio of one plus the actual stock return to one plus the required rate of return, both measured in the future period τ, and claim that this procedure adjusts stock prices for predictable future price changes. They apply τ equal to 12, 24 and 36 months in their empirical analysis. In my study, the timeliness seems to have decreased as stock price measurement is delayed from December to March. This might be an indication that the stock market reacts quicker than Aboody et al. (2002) assume, and an indication that market inefficiency is not an issue in this kind of value relevance research. It might also be seen as evidence that the main analysis is more trustworthy than this robustness check.

6.3 Excess Return

The main analysis employs raw returns as the measure of stock returns. Although there is no explicit standard for what return measure to use in value relevance research, some might argue that the market return must be controlled for in the regression specifications. For instance, a company may perform well even in years in which its stock has had a negative return, since all stock returns tend to be negative when the stock market plummets. As such, raw returns may understate the true value relevance of accounting information. Following Dechow (1994), all value relevance regressions are re-run using RET defined as stock return minus market wide return. Market wide returns are estimated from OSEBX[29] – Oslo Stock Exchange Benchmark Index – per 30 December each year. Mean yearly market return is 15.7 % in the 1992-2004 period.

[29] OSEBX is a value-weighted, investable index consisting of a representative selection of exchange listed companies at Oslo Stock Exchange. OB Total – Oslo Stock Exchange's all shares index – is used to represent market wide returns for the period 1992-1995.

Table 7: Value Relevance of Cash Flow and Accruals - Excess Return

Dependent variable:	RET	
	Coeff.	*t-value*
CF	**0.71**	5.78
ΔCF	**0.46**	3.31
ACC	**0.30**	2.42
ΔACC	**0.60**	4.24
Constant	0.00	-0.20
Adj. R^2	0.10	
n	1376	

Table description

Table 7 describes the value relevance of earnings split into cash flow and accruals for a sample of Norwegian firms in the period 1992 to 2004. It summarises the regression coefficients (Coeff.), White-adjusted t-values (t-value), total explanatory power (adj. R^2) and number of observations (n) for the total sample. Data are analysed using the following regression specification:

$$(2) \qquad RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

$RET_{i,t}$ is the *excess* stock return for company i in year t, CF is cash flow from operations and ACC is total accruals. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity at 30 December in year t-1. **Note the following change from previous tables**: RET is in table 7 defined as excess return = stock return – market wide return. Market wide return is computed using OSEBX, a value-weighted, investable index consisting of a representative selection of exchange listed companies at Oslo Stock Exchange. OB Total – Oslo Stock Exchange's all shares index – is used to represent market wide returns for the period 1992-1995. Coefficients marked in **boldface** denote a statistical significance at a 5 % level, two sided test.

The change in stock return definition does not influence the analysis of the variables' ability to predict future cash flows and earnings. Therefore, only the value relevance regression is presented in table 7. Table 7 is practically identical to step 2 of table 3. Using excess returns instead of raw returns does not influence the study's conclusion.

6.4 Other Robustness Checks

Some alternative statistical procedures have been used in order to test the robustness of the conclusions (untabulated):

- Newey-West standard deviations that control for possible autocorrelation in the data sample have been computed.

- Even though the upper and lower percentiles of all explanatory variables were deleted before the study was conducted, a small number of observations may still be influential on the results. I have run robust regressions on the sample to test for the possible effect of outliers. Robust regression first performs an initial screening based on Cook's distance > 1 to eliminate gross outliers before calculating starting values and then performs Huber iterations followed by biweight iterations (StataCorp, 2005).
- Panel data techniques that apply generalised least squares have been performed.

All tests show that short term cash flow and earnings predictions are not equivalent to value relevance studies. Cash flow and accruals are significantly associated with current stock return. Current cash flow is consistently related to future cash flow and earnings, while accruals' significance level remains dependent on whether cash flow or earnings are used as measures of future firm performance.

7 Concluding Remarks

Step 1 of this study investigates the predictive ability of cash flow and accruals for short term firm performance as measured by future cash flow and earnings. The empirical findings suggest that cash flow is consistently related to both future cash flow and future earnings. Accruals appear to be associated with future earnings but not with future cash flow. This can be seen as evidence against the FASB assertion that accruals make current earnings a better cash flow predictor than current cash flow. Step 2 of the study investigates the value relevance of cash flow and accruals. Both variables appear to be highly related to stock return. The results of step 1 and 2 are, however, dependent of the sign of earnings. Consistent with Hayn's (1995) assertion that negative earnings are less persistent than positive earnings, neither cash flow nor accruals are generally associated with future cash flow and earnings when earnings are negative. Step 3 of the analysis tries to reconcile the results of step 1 with the findings of step 2. I predict that if accruals and cash flows are related to short term future firm performance as measured by accounting earnings and cash flow, it is reasonable to expect that they are also significantly associated with current stock return. The findings are overall consistent with the prediction. However, the results strongly suggest that the prediction cannot be reversed. Accounting variables do not need to be associated with short term future cash flow or earnings, even if they are value relevant.

Much empirical accounting literature focuses on the predictive ability of accounting measures with respect to future cash flow and/or earnings. While some of the studies explicitly state that such prediction studies are regarded as substitutes for value relevance studies (e.g., Finger, 1994), this assumption is more implicitly observed in other prediction studies (e.g., Barth et al., 2001). As such, the prediction studies can be viewed as indirect value relevance studies. Kim and Kross' (2005) study is one of few analyses that relates direct value relevance studies to indirect ones. Specifically, they compare the over time development in earnings' ability as a short term cash flow predictor with the development in earnings' value relevance. They are surprised to find that earnings have become more related to one-year-ahead cash flows in a time period where earnings' value relevance has decreased. My study extends the analysis of Kim and Kross (2005). Specifically, I study earnings' ability to predict the mean of the three next cash flows, as well as one-year ahead earnings and the mean of the three next earnings. My findings are qualitatively identical to Kim and Kross (2005). The conclusion is that results from the cash flow and earnings predictions merely provide *indications* with respect to accounting variables' value relevance. There is no one-to-one relationship between cash flow and accruals' ability as cash flow and earnings predictors and their value relevance.

As such, indirect value relevance studies may be poor proxies for direct investigations of accounting variables' relation with stock return.

There are several reasons why short term cash flow and earnings prediction tests may differ from value relevance studies. First, while the prediction studies typically analyse very short time horizons, company value is a function of all future cash flows/earnings. For instance, transitory earnings items may introduce noise (compare Kim et al., 2007) in current cash flow and earnings that render them unrelated to future cash flow and earnings even if they are statistically associated with stock return. Second, cash flow or earnings may be defined differently in empirical studies than in equity valuation models. For instance, the traditional cash flow model computes value as a function of free cash flow to equity. Equity value can also be expressed as a function of net financial assets and free cash flow from operations. Nevertheless, most research focuses on cash flow from operations *before* investments. This research tradition uses another cash flow definition than the models that constitute the theoretical foundation of the empirical studies. Whether a change in cash flow definition towards free cash flow would materially alter the conclusions of prior research is an issue left for future research.

Literature

Aboody, D., Hughes, J., & Liu, J. (2002). Measuring Value Relevance in a (Possibly) Inefficient Market. *Journal of Accounting Research, 40*(4), 965-986.

Ali, A., & Lee-Seok, H. (2000). Country-Specific Factors Related to Financial Reporting and the Value Relevance of Accounting Data. *Journal of Accounting Research, 38*(1), 1-21.

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research, 6*(2), 159-178.

Ball, R., & Shivakumar, L. (2006). The Role of Accruals in Asymmetrically Timely Gain and Loss Recognition. *Journal of Accounting Research, 44*(2), 207-242.

Banghøj, J., & Plenborg, T. (2006). The value relevance of voluntary disclosure in the annual report. *Working Paper*.

Barth, M. E., Beaver, W. H., Hand, J. R. M., & Landsman, W. R. (2005). Accruals, Accounting-Based Valuation Models, and the Prediction of Equity Values. *Journal of Accounting, Auditing & Finance, 20*(4), 311-345.

Barth, M. E., Cram, D. P., & Nelson, K. K. (2001). Accruals and the Prediction of Future Cash Flows. *The Accounting Review, 76*(1), 27-58.

Barth, M. E., & Kallapur, S. (1996). The Effects of Cross-Sectional Scale Differences on Regression Results in Empirical Accounting Research. *Contemporary Accounting Research, 13*(2), 527-567.

Basu, S. (1997). The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting & Economics, 24*(1), 3.

Ben-Hsien, B., & Da-Hsien, B. (2004). Income Smoothing, Earnings Quality and Firm Valuation. *Journal of Business Finance & Accounting, 31*(9/10), 1525-1557.

Bernard, V. L., & Stober, T. L. (1989). The Nature and Amount of Information in Cash Flows and Accruals. *Accounting Review, 64*(4), 624.

Biddle, G. C., Seow, G. S., & Siegel, A. F. (1995). Relative versus Incremental Information Content. *Contemporary Accounting Research, 12*(1), 1-23.

Bowen, R. M., Burgstahler, D., & Daley, L. A. (1986). Evidence on the Relationships Between Earnings and Various Measures of Cash Flow. *Accounting Review, 61*(4), 713.

Bradshaw, M. T., & Sloan, R. G. (2002). GAAP versus The Street: An Empirical Assessment of Two Alternative Definitions of Earnings. *Journal of Accounting Research, 40*(1), 41-66.

Brown, S., Kin, L., & Lys, T. (1999). Use of R^2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting & Economics, 28*(2), 83-115.

Brown, W. D., He, H., & Teitel, K. (2006). Conditional Conservatism and the Value Relevance of Accounting Earnings: An International Study. *European Accounting Review, 15*(4), 605-626.

Callen, J. L., & Segal, D. (2004). Do Accruals Drive Firm-Level Stock Returns? A Variance Decomposition Analysis. *Journal of Accounting Research, 42*(3), 527-560.

Chen, K., Sommers, G. A., & Taylor, G. K. (2006). Fair Value's Affect on Accounting's Ability to Predict Future Cash Flows: A Glance Back and a Look at the Potential Impact of Reaching the Goal. *Working Paper - Available at SSRN*.

Christensen, P., & Feltham, G. A. (2003). Economics of Accounting, Volume I: Information in Markets. *Springer*.

Christie, A. A. (1987). On Cross-Sectional Analysis in Accounting Research. *Journal of Accounting and Economics, 9*(3), 231-258.

Collins, D. W., & Hribar, P. (2000). Earning-based and accrual -based market anomalies: one effect or two? *Journal of Accounting & Economics, 29*(1), 101-123.
Collins, D. W., Kothari, S. P., Shanken, J., & Sloan, R. G. (1994). Lack of Timeliness and Noise as Explanations for the Low Contemporaneous Return-Earnings Association. *Journal of Accounting and Economics, 18*(3), 289-324.
Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting & Economics, 24*(1), 39.
Cornell, B., & Landsman, W. R. (2003). Accounting Valuation: Is Earnings Quality an Issue? *Financial Analysts Journal*.
Davis, A. K. (2002). The Value Relevance of Revenue for Internet Firms: Does Reporting Grossed-up or Barter Revenue Make a Difference? *Journal of Accounting Research, 40*(2), 445-477.
Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting & Economics, 18*(1), 3-42.
Dechow, P. M., & Ge, W. (2006). The persistence of earnings and cash flows and the role of special items: Implications for the accrual anomaly. *Review of Accounting Studies, 11*.
Dechow, P. M., Kothari, S. P., & Watts, R. L. (1998). The relation between earnings and cash flows. *Journal of Accounting & Economics, 25*(2), 133-168.
Easton, P. D., & Sommers, G. A. (2003). Scale and the Scale Effect in Market-based Accounting Research. *Journal of Business Finance & Accounting, 30*(1/2), 25-55.
Edwards, E. O., & Bell, P. W. (1961). The Theory and Measurement of Business Income *University of California Press*
Fama, E. F., & French, K. R. (2000). Forecasting Profitability and Earnings. *Journal of Business, 73*(2), 161.
FASB. (1978). Financial Accounting Standards Board. Objectives of Financial Reporting by Business Enterprises. *Statement of Financial Accounting Concepts No. 1*.
Feltham, G. A., & Ohlson, J. A. (1995). Valuation and Clean Surplus Accounting for Operating and Financial Activities. *Contemporary Accounting Research, 11*(2), 689-731.
Feltham, G. A., & Ohlson, J. A. (1996). Uncertainty Resolution and the Theory of Depreciation Measurement. *Journal of Accounting Research, 34*(2).
Finger, C. A. (1994). The Ability of Earnings to Predict Future Earnings and Cash Flow. *Journal of Accounting Research, 32*(2), 210-223.
Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of Equity and Earnings Attributes. *Accounting Review, 79*(4), 967-1010.
Francis, J., & Schipper, K. (1999). Have Financial Statements Lost Their Relevance? *Journal of Accounting Research, 37*(2), 319-352.
Francis, J., Schipper, K., & Vincent, L. (2003). The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns. *Contemporary Accounting Research, 20*(1), 121-164.
Francis, J., & Smith, M. (2005). A Reexamination of the Persistence of Accruals and Cash Flows. *Journal of Accounting Research, 43*(3), 413-451.
Freeman, R. N., & Tse, S. Y. (1992). A Nonlinear Model of Security Price Responses to Unexpected Earnings. *Journal of Accounting Research, 30*(2), 185-209.
Gjerde, Ø., Knivsflå, K. H., & Sættem, F. (2007a). The Value-Relevance of Adopting IFRS: Evidence from 145 NGAAP Restatements. *Working Paper - The Norwegian School of Economics and Business Administration*.

Gjerde, Ø., Knivsflå, K. H., & Sættem, F. (2007b). The Value Relevance of Financial Reporting in Norway 1965-2004. *The Norwegian School of Economics and Business Administration - Working Paper*.

Gu, Z. (2007). Across-Sample Incomparability of R2s and Additional Evidence on Value Relevance Changes Over Time *Journal of Business Finance & Accounting, 34*.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate Data Analysis, Sixth Edition. *PEARSON Prentice Hall*.

Hassel, L., Nilsson, H., & Nyquist, S. (2005). The value relevance of environmental performance. *European Accounting Review, 14*(1), 41-61.

Hayn, C. (1995). The information content of losses. *Journal of Accounting & Economics, 20*(2), 125-153.

Hellstrøm, K. (2006). The Value Relevance of Financial Accounting Information in a Transition Economy: The Case of the Czech Republic. *European Accounting Review, 15*(3), 325-349.

Holthausen, R. W., & Watts, R. L. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting & Economics, 31*(1-3), 3-75.

Hope, O.-K. (1999). Value Relevance Effects of the Introduction of Interperiod Tax Allocation: The Case of Norway. In *Advances in international accounting. Volume 12* (pp. 157-191).

Hope, O.-K. (2004). Variations in the Financial Reporting Environment and Earnings Forecasting. *Journal of International Financial Management & Accounting, 15*(1), 21-43.

Joos, P., & Plesko, G. A. (2005). Valuing Loss Firms. *The Accounting Review, 80*(3).

Junttila, J., Kallunki, J.-P., Karja, A., & Martikainen, M. (2005). Stock market response to analysts' perceptions and earnings in a technology-intensive environment. *International Review of Financial Analysis, 14*(1), 77-92.

Kim, M., & Kross, W. (2005). The Ability of Earnings to Predict Future Operating Cash Flows Has Been Increasing — Not Decreasing. *Journal of Accounting Research, 43*(5).

Kim, O., Lim, S. C., & Park, T. (2007). The Value Relevance of Earnings and the Prediction of One-Year-Ahead Cash Flows. *Working Paper - Available at SSRN*.

King, R. D., & Langli, J. C. (1998). Accounting Diversity and Firm Valuation. *International Journal of Accounting, 33*(4), 529-567.

Klein, A., & Marquardt, C. A. (2006). Fundamentals of Accounting Losses. *The Accounting Review, 81*(1).

Konan Chan, A., Jegadeesh, N., & Sougiannis, T. (2004). The Accrual Effect on Future Earnings. *Review of Quantitative Finance & Accounting, 22*(2), 97-121.

Kormendi, R., & Lipe, R. (1987). Earnings Innovations, Earnings Persistence, and Stock Returns. *Journal of Business, 60*(3), 323-345.

Landsman, W. R., Miller, B. L., & Yeh, S. (2007). Implications of Components of Income Excluded from Pro Forma Earnings for Future Profitability and Equity Valuation. *Journal of Business Finance & Accounting, 34*(3/4), 650-675.

Lev, B. (1989). On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research. *Journal of Accounting Research, 27*(3), 153-192.

Lev, B., Li, S., & Sougiannis, T. (2005). Accounting Estimates: Pervasive, Yet of Questionable Usefulness. *Working Paper*.

Lev, B., & Nissim, D. (2006). The Persistence of the Accruals Anomaly. *Contemporary Accounting Research, 23*(1), 193-226.

Lev, B., & Zarowin, P. (1999). The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research, 37*(2), 353-385.
Lianzan, X., & Cai, F. (2005). The Valuation of High-Tech 'New Economy" Companies. *Journal of Global Competitiveness, 13*(1/2), 1-8.
Liu, J., Nissim, D., & Thomas, J. (2007). Is Cash Flow King in Valuations? *Financial Analysts Journal, 63*(2).
Nikkinen, J., & Sahlstrøm, P. (2004). Impact of an accounting environment on cash flow prediction. *Journal of International Accounting, Auditing & Taxation, 13*(1), 39-52.
Næs, R., Skjeltorp, J. A., & Ødegaard, B. A. (2008). Liquidity at the Oslo Stock Exchange. *Working Paper - Available at www.norges-bank.no*.
Ohlson, J. A. (1995). Earnings, Book Values, and Dividends in Equity Valuation. *Contemporary Accounting Research, 11*(2), 661-687.
Penman, S. H. (2001). Financial Statement Analysis and Security Valuation. *McGraw-Hill*.
Ramakrishnan, R. T. S., & Thomas, J. K. (1998). Valuation of Permanent, Transitory, and Price-Irrelevant Components of Reported Earnings. *Journal of Accounting, Auditing and Finance, 13*(3), 301-336.
Rayburn, J. (1986). The Association of Operating Cash Flow and Accruals with Security Returns. *Journal of Accounting Research, 24*(3), 112-133.
Sloan, R. G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings? *Accounting Review, 71*(3), 289-315.
StataCorp. (2005). Stata Statistical Software: Release 9. *College Station, TX: StataCorp LP*.
Subramanyam, K. R., & Venkatachalam, M. (2007). Earnings, Cash Flows, and Ex Post Intrinsic Value of Equity. *Accounting Review, 82*(2), 457-481.
Williams, J. (1938). The Theory of Investment Value. *Harvard University Press, Cambridge*.
Wilson, G. P. (1986). The Relative Information Content of Accruals and Cash Flows: Combined Evidence at the Earnings Announcement and Annual Report Release Date. *Journal of Accounting Research, 24*(3), 165-200.

Appendix: Cash Flows in Value Relevance Research

Company value is the present value of future cash flows generated by the company. Several versions of the cash flow valuation model exist. However, regardless of the cash flow model used, company value is generally a function of future *free* cash flows. Still, when prior research analyses cash flows' predictive ability and value relevance, the focus is almost exclusively on cash from operations *before* investments (Barth et al., 2001; Biddle et al., 1995; Dechow, 1994; Dechow et al., 1998; Finger, 1994; M. Kim & Kross, 2005; O. Kim et al., 2007; Rayburn, 1986; Subramanyam & Venkatachalam, 2007). This may seem like a paradox, particularly since the research maintains that it focuses on cash flows because they are important *drivers of company value*; see the following statements from prior studies:

> This study investigates the role of accruals in predicting future cash flows. A firm's ability to generate cash flow affects the values of its securities (Barth et al., 2001, p. 28).

> Various explanations for the prominence of accounting earnings and the reasons for its usage have been offered. One explanation is that earnings reflects cash flow forecasts and has a higher correlation with value then does current cash flow. Earnings' inclusion of those forecasts causes earnings to be a better forecast of (and so a better proxy for) future cash flows than current cash flows (Dechow et al., 1998, pp. 133-134).

> Since the results of prior research document deterioration in the relation between prices and earnings over time, it is puzzling that the relation between earnings and future cash flows is generally increasing over time, because stock price should equal the present value of future cash flows (M. Kim & Kross, 2005, p. 775).

> A fundamental question in accounting is the relative ability of accrual-based earnings and cash flows to predict a firm's ability to generate future cash flows (Subramanyam & Venkatachalam, 2007, p. 457).

The authors give few reasons for their choice of cash flow concept. In fact, the cash flow definition is not debated much in the above listed articles. However, some arguments for the choice are put forward:

> Since the primary interest is in operating performance measures and assessing what information, if any, about future cash flows is provided by accruals in the income determination process, the focus in this paper is on operating cash flows rather than total cash flows (Rayburn, 1986, p. 114).

> Cash flow from operations reflects the net cash flows generated by the firm's operating activities. This measure includes accruals that are long-term in nature (i.e., do not reverse within one year) and mitigate timing and matching problems associated with the firm's investment and financing activities (Dechow, 1994, p. 8).

The only article that I have found that actually discusses the use of cash flow from operations versus free cash flow is Subramanyam and Venkatachalam (2007). Even though they decide to investigate cash flow from operations in their empirical study, they state that "…*operating* cash flows are not value attributes. This is because operating cash flows ignore investments in operating assets; the appropriate value attribute is *free* cash flows" (Subramanyam & Venkatachalam, 2007, p. 461). They state that the reason why they still apply cash flow from operations is that this variable has been used traditionally in the literature to evaluate value relevance.

Cash flow from operations is sometimes viewed as a better short term measure of firm performance than free cash flow from operations. Investments decrease the current free cash flow. Thus, investments may be implicitly regarded as "negative" if the time horizon is too short. Free cash flow may give an incorrect picture of the cash flow generating capabilities of companies that temporarily have large investment expenditures, for instance, companies that are early in their life-cycle. Dechow (1994) claims that the choice of cash flow concept mitigates timing and matching problems associated with the firm's investment activities[30]. Still, company value is undoubtedly a function of cash flow not only from historical investments but also from current investments and from known or expected future investments. Rayburn (1986) states that her choice of cash flow definition is due to her focus on information content of accruals. When disregarding capital expenditures in the cash flow concept, the difference between net income and cash flow is equal to the accruals. Accruals are definitely of particular interest in accounting research. One can argue that the choice of accounting framework, i.e., accounting law and standards, is materialised through the accruals. Hence, it may be natural to disregard the "objective" investment expenditures[31]. It should also be noted that the cash flow definition applied in the quoted research is equal to free cash flow to equity if one assumes that capital expenditures are financed through net financial assets[32]. Although such an assumption probably is highly unreasonable, it would make the analyses consistent with the original cash flow valuation model. Some databases lack information on capital expenditure and make this assumption tempting to use. It can also

---

[30] Dechow (1994) analyses the value relevance of both cash flow and earnings. One may claim that if investment decisions are disregarded in the cash flow definition, one should disregard the financial items, i.e., use operating earnings, in the earnings definition. The cash flow and earnings definitions may then be more comparable. However, Dechow (1994) applies an earnings definition inclusive of financial items (but exclusive of extraordinary items).

[31] Although the *classification* of cash flow might be highly subjective.

[32] Assume no dirty surplus. Then:

Free Cash Flow to Equity = Earnings - Change in Equity

= Earnings - (Change in Net Operating Assets - Change in Net Financial Debt)

= Earnings - (Capital Expenditures - Depreciation & Amortisation + Change in Working Capital) + Change in Net Financial Debt

= Earnings + Depreciation and Amortisation – Change in Working Capital - (Capital Expenditures – Change in Net Financial Debt)

If Capital Expenditures = Change in Net Financial Debt (i.e., investments are financed through net financial debt), then

Free Cash Flow from Equity = Earnings + Depreciation and Amortisation – Change in Working Capital be a challenge to isolate capital expenditure spent on expansions from the capital expenditure that is necessary to maintain current operations[33]. Nevertheless, none of the listed papers use any of these lines of reasoning to substantiate their cash flow definition. Note that the FASB, in its assertions that earnings are a better cash flow predictor than current cash flow, does not specify to which cash flow concept they are referring. One cannot disregard the possibility that Kim and Kross (2005) (see section 2) are unable to reconcile the increase in earnings' ability to predict cash flows with earnings' decreasing association with stock return simply because they apply cash from operations in their empirical study.

The intention with this discussion is to question the choice of cash flow definition used in this research tradition. Since cash flow is viewed as a value driver, it may be peculiar to use a cash flow concept that is not the input in any valuation model. There may be good arguments for the choice, but most papers tend to ignore such a discussion.

[33] Feltham and Ohlson (1996) develop a valuation model where company value equals the present value of future expected cash receipts due to prior and current periods' investments plus the present value of future expected investments (both replacements and expansions).

Essay 3:

Variations in the Value Relevance of Accounting Information

Leif Atle Beisland
University of Agder

Mattias Hamberg
Göteborg University

Abstract

It has been claimed that accounting information is losing relevance over time as firms increasingly rely on resources that cannot be capitalized under the existing accounting regime. We find that easily detected transitory elements of reported earnings cause visible differences in value relevance between traditional and non-traditional industries. When the different properties of earnings components are considered, non-traditional industries provide no less relevant information to the market. We furthermore extend past research by investigating changes in value relevance over time and find that the non-traditional industries experience considerably more variance, independent of the transitory elements of reported earnings. This variance is associated to both stock market sentiments and the growth of the economy. When the economy is doing well and firms are highly valued in relation to fundamentals, accounting information is considerably less able to explain security prices in non-traditional industries.

* We would like to thank Jiri Novak for his suggestions and comments on earlier versions of this paper.

1. Introduction

The value of an economic entity is determined by its future cash flows and accounting information plays an important role in the investors' forecasts of these cash flows. A considerable amount of research has examined if the value relevance of accounting information changes over time (e.g., Collins, Maydew, and Weiss [1997], Brown, Kin, and Lys [1999], Francis and Schipper [1999], Lev and Zarowin [1999], Aboody, Hughes, and Liu [2002], Dontoh, Radhakrishnan, and Ronen [2004], Goodwin and Ahmed [2006]). A number of these studies find that accounting information over time has indeed become less relevant for investors (e.g., Brown, Kin, and Lys [1999], Lev and Zarowin [1999]). A common explanation is that the accounting system, based on conservative accounting principles, fails to reflect the situation of today's enterprises that increasingly rely on resources which cannot be recognized (e.g., Lev and Zarowin [1999], Goodwin and Ahmed [2006]). In particular it appears as if the reported earnings has lost relevance over time (Collins, Maydew, and Weiss [1997], Brown, Kin, and Lys [1999], Lev and Zarowin [1999]). This causes great concern for timing and matching problems and the extent to which the accounting system is able to allocate cash flows from irrelevant periods of time, to the relevant periods.

We use a data set consisting of essentially all firms listed at the Stockholm Stock Exchange in the years 1979 to 2004. The firms are divided into two broad industry sectors; traditional and non-traditional industries. While several of the past studies have identified changes in value relevance over time (usually seen as trends) none of them have closely examined inter-temporal differences in value relevance across industries. We do so, and with a particular focus on transitory components of earnings. Overall, it is expected that the nature of non-traditional industries creates a greater variance in the level of association between accounting information and security prices/returns. However, if we are able to detect the causes for cross-sectional differences in value relevance, then it is likely that investors can do likewise.

In the first part of the study we are concerned with the accounting information's relative ability of explaining security prices/returns in non-traditional industries as to traditional industries. Because of somewhat inconclusive past findings we expect no difference in value relevance between these two groups *on average* as any temporary difference cancel out over a prolonged period of time. While past studies only take nonlinearities in the form of losses into account, we also consider variations in positive earnings. Also profits contain a transitory element and taking the different properties of sustainable and transitory earnings into account, both the overall value relevance and the relative value relevance of non-traditional industries increase. In addition we find no decrease in value relevance over time and return model specifications consistently suggest that the accounting information is *more* value relevant in the non-traditional industries.

The second part of the paper concerns inter-temporal variations in the overall explanatory power of accounting information in traditional and non-traditional industries. We expect non-traditional industries to experience more time-varying value relevance. There are several reasons for this: If the firm value to a greater extent is determined by resources that cannot be capitalized then profits might be lower in good times (because of investments that are expensed) and higher in bad times. The non-traditional industries might also be more uncertain than traditional industries and the uncertainty can be leveraged by market sentiments. An example of this is the so-called IT-bubble in the late 1990s when many non-traditional firms were expected to experience a very rosy future. The relative value relevance of accounting information for the non-traditional industries in this time period was exceptionally low. We expect an association between the relative explanatory power of accounting information provided by firms operating in non-traditional industries, and the state of the economy and equity market sentiments. In particular, we expect that accounting information is less relevant in periods of time when investors have high expectations for the future. Such a loss of relevance affects firms in non-traditional industries more than those operating in traditional industries. Also these expectations are confirmed. We find a higher variance in the value relevance within the non-traditional industries. We argue that such variations, in a long-term perspective, also constitute a measure of value relevance. The variations for non-traditional industries appear to be explained by macro-economic factors and market sentiments.

The remainder of the paper is organized as follows. Section two contains a theoretical background and research hypotheses. Section three deals with the research design and describes the data. Section four contains the empirical analysis and the fifth section concludes.

2 Theoretical Background

A number of different definitions of value relevance exist in the accounting research literature (e.g., Francis and Schipper [1999]), and these are not necessarily mutually exclusive. We define value relevance as the ability of financial statement information to capture and summarize information that determines the firm's value. Thus, value relevance is measured as the degree of statistical association between accounting information and market values or returns over a long time horizon.

During the last decade there has been an interest in the long term development of accounting information's relevance to investors. Most of this research has been conducted in the U.S. where there is rather undisputed evidence that accounting information has lost some of its relevance over time (Collins, Maydew, and Weiss [1997], Chang [1998], Brown, Kin, and

Lys [1999], Ely and Waymire [1999], Francis and Schipper [1999], Lev and Zarowin [1999]). The decrease in value relevance seems to be related to a lower relevance of earnings (e.g., Collins, Maydew, and Weiss [1997], Lev and Zarowin [1999]). While Collins, Maydew, and Weiss [1997] find that the loss in value relevance of accounting earnings is compensated by an increase in the relevance of book value of equity, other studies suggest that the decrease in the relevance of accounting earnings is the main reason why the overall relevance has gone down (e.g., Lev and Zarowin, 1999).

Several explanations for the loss of value relevance is offered in the existing literature, including an increased portion of non-information based stock trading (Dontoh, Ramakrishnan, and Ronen [2004]), an increased volatility in stock returns (Francis and Schipper [1999]), an increased frequency of negative earnings and non-recurring items (Collins, Maydew, and Weiss [1997], Hayn [1995]) and an increased change in pace (Lev and Zarowin [1999]). These explanations are not mutually exclusive. Firms operating in an uncertain environment can be more prone to report losses and irregularities. Similarly, an accounting system's failure to account for changes often creates losses and irregularities among firms.

Most studies dealing with long term changes in value relevance have to some extent discussed that firms increasingly rely on resources that have to remain unrecognized due to strict recognition requirements in conservative accounting systems (Collins, Maydew, and Weiss [1997], Lev and Zarowin [1999], Francis and Schipper [1999], Goodwin and Ahmed [2006]). The consequences of this are that (1) the value of recognized net resources (equity) constitute a smaller portion of the firm's market value of equity, and (2) investments in unrecognizable resources create more timing and matching problems in reported earnings. Collins, Maydew, and Weiss [1997] stress that more firms nowadays operate in service and high-tech industries where many resources remain unrecognized. They find that the level of intangible-intensity has a negative association with value relevance. In contrast, Francis and Schipper [1999] find no significant difference in the value relevance of earnings when comparing high-tech and low-tech stocks for the period 1952-1994. Although they find some evidence that balance sheet information explains a higher portion of the variability in prices for low-tech firms relative to high-tech firms, they document significant increases over time in the explained variability of this relation for both industry categories. They conclude that any evidence of a decline in value relevance cannot be attributed to the increasing number and importance of high-tech firms in the economy. We will develop these ideas further later in this section.

It is important to note that an increasing number of international studies find no decrease in value relevance. King and Langli [1998] find no decrease in value relevance in Germany and the UK, but a decrease in Norway. However, in a more extensive and recent study, Gjerde, Knivsflå, and Sættem [2007] re-examine Norwegian data and find no change in value relevance in the time period 1965 to 2004. Using Australian data, Goodwin and Ahmed [2006] find no change in value relevance when controlling for losses. Taken together these studies suggest that the decrease in value relevance is primarily related to the United States. We know of no study outside the U.S. that examines the long term value relevance in respect to different industries. Because of different results when using U.S. and international data, as well as the fact that nobody has used detailed industry data outside the U.S. it is difficult to form clear-cut *a priori* expectations. Our major concern in this study is the value relevance of firms operating in non-traditional industries relative to traditional industries. Regardless of if there is any time-series trend in the level of value relevance, we expect no difference in value relevance between traditional and non-traditional industries. We base this expectation on

Francis and Schipper [1999:347] who conclude "We do not believe evidence of a decline in the value relevance of financial information can be attributed solely, or even primarily, to the increasing number and importance of high-tech firms in the economy".

Hypothesis 1: Accounting information is equally relevant in non-traditional and traditional industries.

In several past studies of the long-term value relevance of accounting information researchers have recognized the different properties of positive and negative earnings (e.g., Collins, Maydew and Weiss [1997], Core, Guay and Van Buskirk [2001], Francis, Schipper and Vincent [2003], Goodwin and Ahmed [2006]). The reason for doing so is that negative earnings simply represent an exception from a series of positive earnings that constitutes a (positive) value (see e.g. Hayn [1995] or Collins, Pincus and Xie [1999] for discussions of negative earnings and the value of equity). A firm for which losses are indicative of the future is simply a firm that has no value. Adjustments for the different properties of profits and losses tend to substantially improve the value relevance of accounting information. For example, Goodwin and Ahmed [2006] report almost twice as high R^2 when removing loss-making firms.

But are losses the only non-recurring items that firms report? Clearly a conservative accounting system ensures that one-time items of a negative character are recognized earlier than those of a positive character (Basu [1997], Watts [2003], Ball and Shivakumar [2006]). Hence reported non-recurring losses are larger and more visible than non-recurring profits, but probably also less frequent. If non-recurring items are transitory and hence largely value-irrelevant to investors, then adjusting merely for the losses is likely to be a biased procedure.[1] Both predictable and unpredictable changes in e.g. customer demand and input prices affect (positive and negative) earnings and make it vary over time. A conservative accounting system ensures that these known/predictable effects are accounted for after their occurence. There is an abundant accounting literature on earnings persistence (see e.g., Penman [1999], Ramakrishnan and Thomas [1999], Penman and Zhang [2002]) suggesting that the nature of events and accounting rules cause reported earnings to have several distinguishable components. To understand these it is vital to also understand firms' long-term profitability prospects. Profitability is known to reverse to a firm and/or industry mean.[2] Penman and Zhang [2002] and [2004] use the return on net operating assets to determine the mean reversion pattern in earnings. In a similar study, Fama and French [2000] use the return on capital employed and find a negative autocorrelation over time. A most fundamental aspect of the investment strategy proposed by Sloan [1996] is the finding that persistence (or mean reversion patterns) of cash flows and accruals differ. Most of these models do not take industry-differences into account (although at least Penman and Zhang [2004] note that this probably would improve results further). Even simple models that just separate reported earnings into a sustainable and transitory component prove useful in investment strategies (e.g., Penman and Zhang [2004], Anderson and Brooks [2006]). We expect that adjustments for the different properties of sustainable and transitory components of earnings increase the overall value relevance of accounting information.

Hypothesis 2a: Measures of sustainable earnings improve the overall value relevance of accounting information.

---

[1] There are also good reasons to believe that many managers choose to label non-recurring income increasing items as normal items. If investors are able to detect such earnings management these items are essentially irrelevant to investors.

[2] A phenomenon documented by many including Freeman, Ohlson and Penman [1982], Penman [1991], Dechow [1994], Sloan [1996], Fama and French [2000], Penman and Zhang [2002] and [2004].

The magnitude and frequency of the transitory elements of earnings can, and are expected to, vary systematically across industries. One effect of a conservative accounting system is that losses are recognized earlier than gains (e.g., Basu [1997], Watts [2003]). Bad news thus appear as a one-time transitory element whereas (normal) good news is spread over several future periods as gains are realized. We expect that firms' investments are affected differently depending on the extent to which they are recognizable in the accounting system. The less able a firm is to capitalize its investments at the time of acquisition (because of accounting conservatism), the more affected by transitory elements its earnings is going to be. A growth in unrecognized investments reduces contemporary earnings and creates "hidden reserves" (c.f., Penman and Zhang [2002]). Similarly, a reduction in the level of investment releases these reserves and increases contemporary earnings. We build on the arguments of Penman and Zhang [2002] and suggest that there is a systematic variation in current earnings caused by unrecognizable investments. As firms operating in the non-traditional industries are more likely to make investments that have to be immediately expensed we expect these industries to benefit the most from the acknowledgement of different properties of sustainable and transitory earnings components. Hence the decomposition has a greater incremental effect on the value relevance as measured in non-traditional industries.

Hypothesis 2b: Measures of sustainable earnings improve the value relevance of the non-traditional industries relative to that of traditional industries.

According to the first hypothesis value relevance, measured as the *long term mean explanatory power* of accounting information on security prices/returns, is expected to be similar in traditional and non-traditional industries. A number of studies suggest that the explanatory power of accounting information is not constant over time (Lev and Zarowin [1999], Francis and Schipper [1999], Gjerde, Knivsflå, and Sættem [2007]) and it is obvious that variations around a mean can be industry dependent. To the best of our knowledge, no previous study has investigated differences in the long term inter-temporal *variability* in value relevance. Our aim is to shed light on the value relevance of accounting information as reported by firms operating in non-traditional industries *relative* to that of firms operating in traditional industries. We propose two different reasons as to why there are greater variations in the explanatory power of accounting information in non-traditional industries. First, as discussed extensively above, investments made by firms in non-traditional industries are to a greater extent expensed when acquired. Therefore their accounting earnings contain fewer accruals than what is found in traditional industries. An investment in a production facility is capitalized and depreciated over its expected economic life. However, a computer software developer or biotech firm has to expense most of its investment immediately although their investments are just as critical for future earnings as the production facility is for the manufacturing firm. The software developer and biotech firm are likely to produce accounting earnings that are more correlated with contemporary cash flows and less correlated with future cash flows, as compared with the manufacturing firm. For the non-traditional industries we expect that the lower ability to make use of accruals reduces the relative explanatory power of accounting earnings in times when the level of investment is high. The conservative accounting system requires a higher degree of verification for recognizing good news as opposed to bad news (Basu [1997]) and therefore we expect that a faster recognition of bad news improves the value relevance for bad years within the non-traditional industries relative to the traditional industries.

Hypothesis 3a: The relative value relevance of non-traditional industries is negatively affected by the economic conditions.

Firms operating in non-traditional industries have fewer recognized resources and hence a greater portion of their market value of equity is dependent on uncertain future cash flows, rather than verified values of current resources. Ceteris paribus, increased uncertainty generates more changes in investor expectations and hence also in share prices. In relation to this, Francis and Schipper [1999] argue that an increased return volatility has a negative effect on the value relevance of accounting information. Similarly, Dontoh, Ramakrishnan, and Ronen [2004] show that an increased amount of non-information based trading decreases the value relevance of accounting information. We expect that firms operating in non-traditional industries have fewer capitalized resources and investors have less certain information to anchor their expectations on. Noise traders are known to be more frequent in such trading environments, particularly in good times. We build on the ideas of Dontoh, Ramakrishnan, and Ronen [2004] and suggest that the value relevance of accounting information is lower in the non-traditional industries when the stock market has a relatively high valuation. For example, in the IT-bubble of the late 1990s the values of information technology and telecommunication firms increased dramatically. There were few capitalized resources that contributed to this increase in value. On the other hand, when the bubble burst the values of these firms became closely aligned with fundamentals. We therefore suggest the opposite in bad times, namely that noise-trading decreases and hence that the relative value relevance of non-traditional industries increases.

Hypothesis 3b: The relative value relevance of non-traditional industries is negatively affected by market sentiments.

3. Method

3.1 Research Design

Value relevance is defined as the ability of financial statement information to capture and summarize information that affects firm value. Following a vast tradition in accounting research we study the value relevance by examining the statistical association between accounting information variables and the level of (change in) market value using multiple regressions. The explanatory power of a model (adjusted R^2, hereafter R^2) is therefore the primary measure of value relevance. A high explanatory power indicates that within a group of firms the market values are well reflected by the accounting information. We use a traditional price regression for our first measure of value relevance:

$$P_{i,t} = a_0 + a_1 BVS_{i,t} + a_2 EPS_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where P_{it} is stock price, and it is measured in the end of March in year $t+1$. BVS_{it} is book value of equity per share and EPS_{it} is earnings per share for year t.[3] This model is often referred to as being based on the Ohlson [1995] valuation framework (e.g., Collins, Maydew, and Weiss [1997], Francis and Schipper [1999], and Lev and Zarowin [1999]). There are some rather well-known problems with the price model specification (e.g., Brown, Kin, and Lys [1999], Gu [2007]). In particular it has been shown that scale effects increase the R^2, and this effect increases with the scale factor's coefficient of variation. Comparisons between samples based on R^2 may be invalid if the scale factor's coefficient of variation differs between the samples. Several measures are taken to control for these biases, including simple remedies such as scaling by the number of outstanding shares and trimming the sample. In

[3] Prices are measured three months after the end of the fiscal year to avoid hindsight bias. We make no further adjustments of our model related to market inefficiency (c.f., Aboody, Hughes, and Liu [2002]) but assume that the market is equally (in)efficient across our sample. Also note that our measures are per share to reduce the well-known heteroskedasticity problems in these kinds of studies (Christie [1987]).

addition we complement the price model specifications with return model specifications and calculate a scale-adjusted root mean squared errors (RMSE) as recommended by Gu [2007].

Easton and Harris [1991] show that the changes in share price (return) is a function of earnings and the change in earnings. This is illustrated by the residual income model where the market value of equity is a function of book value and the present value of residual income. Thus, a change in the market value of equity comes from a change in book value (i.e., net earnings if we assume a clean surplus) and the change in residual earnings. When earnings proxy for residual earnings the stock return is a function of earnings and the first difference of earnings. Many empirical studies show that earnings are a significant explanatory variable for stock return. Several past studies use this model specification (e.g., Easton and Harris [1991], Alford, Leftwich, Jones, and Zmijewski [1993], Lev and Zarowin [1999], Francis and Schipper [1999]) and we do likewise:

$$R_{i,t} = b_0 + b_1 Earn_{i,t} + b_2 \Delta Earn_{i,t} + \varepsilon_{i,t} \tag{2}$$

where R_{it}, is the 12-month dividend-adjusted stock return measured from the end of March in year t to the end of March in year $t+1$. $Earn_{it}$ is the net earnings and $\Delta Earn_{it}$ is the change in net earnings from year $t\text{-}1$ till year t. Also return model specifications suffer from scale-related problems. Easton and Sommers [2003] show that the market value of equity is the *true* scale factor of the firm. The starting value of equity is the obvious left-hand side deflator in return model specifications and therefore we deflate $Earn_{it}$ and $\Delta Earn_{it}$ by market value of equity at the beginning of year t. As mentioned the return model is primarily used as a complement to the price model. Over the years a number of researchers have discussed the relative usefulness of the two specifications without being able to say that one outperforms the other (e.g., Landsman and Magliolo [1988], Kothari and Zimmerman [1995], Barth, Beaver, and Landsman [2001], Gu [2005]). We believe that the price model is somewhat better specified when addressing our research problem. However, following the suggested precautions of e.g., Kothari and Zimmerman [1995] both models are tested in the empirical analysis.

The association between accounting information and market value is known to be non-linear. Both negative earnings and negative equity are unrepresentative for the future (e.g., Basu [1997], Hayn [1995], Ramakrishnan and Thomas [1998]). Lev and Zarowin [1999] argue that companies in a fast changing environment report losses more frequently. We test and control for the effect of negative earnings by introducing a dummy variable in the regression models, where D is set to 1 if EPS<0, but otherwise 0 (c.f., Francis, Schipper, and Vincent [2003]).[4] We transform models (1) and (2) into:

$$P_{it} = a_0 + a_1 BVS_{it} + a_2 EPS_{it} + a_3 EPS_{it} * D + \varepsilon_{it} \tag{3}$$

$$R_{it} = b_0 + b_1 Earn_{it} + b_2 \Delta Earn_{it} + b_3 Earn_{it} * D + \varepsilon_{it} \tag{4}$$

Even though our primary metric for value relevance is the explanatory power of the regression specifications, we also analyze the value relevance of each individual explanatory variable. We apply the procedure outlined in Collins, Maydew, and Weiss [1997] to assess the variables' incremental value relevance. Incremental value relevance is analyzed for both the price and return model specifications. We describe the procedure for the price regression, but

[4] Specifications with sign-dependent intercept and more interaction terms are also tested, for instance : $P_{i,t} = a_0 + a_1 BVS_{i,t} + a_2 EPS_{i,t} + a_3 * D + a_4 * BVS_{i,t} * D + a_5 EPS_{i,t} * D + \varepsilon_{it}$
As such changes in the specifications do not have any material effect on the empirical results we stick to the more basic and interpretable specifications.

the method is used equivalently for the return regression. Denote adjusted $\mathrm{R}^2_{\mathrm{TOT}}$ the total explanatory power from the price regression, and adjusted R^2_1 and adjusted R^2_2 the explanatory power from respectively a regression of stock price on book value per share and a regression of stock price on earnings per share. The incremental value relevance from respectively book value per share and earnings per share, R^2_{BVS} and $\mathrm{R}^2_{\mathrm{EPS}}$ is then computed as:

$$R^2_{BVS} = R^2_{TOT} - R^2_2$$
$$R^2_{EPS} = R^2_{TOT} - R^2_1$$

The value relevance common to both explanatory variables, $\mathrm{R}^2_{\mathrm{COM}}$, is computed as:

$$R^2_{COM} = R^2_{TOT} - R^2_{BVS} - R^2_{EPS}$$

3.2 Data sample

The sample comprises all non-financial firms quoted at the Stockholm Stock Exchange between 1979 and 2004. We end the analysis in 2004 to avoid concerns regarding the effect that a switch to IFRS has on value relevance. The data are obtained through the Trust database provided by Six Estimates. Our initial sample contains 6006 firm-year observations. We exclude firms using other local GAAPs (in total 8 firms), but retain those that apply international accounting standards.[5] Since 1998 new international accounting standards have been more or less precisely translated into Swedish and adopted by the Swedish Financial Accounting Standards Council (Redovisningsrådet). When it comes to intangible assets Sweden has no tradition of capitalizing internally generated intangible assets (as it was in

[5] In 2001 this include four firms increasing to nine firms in 2004. In no single year do they constitute more than 3% of the total observations. Because the accounting framework has to be identified manually we retain them to increase replicability. However, these observations have no material effect on the results.

many other European countries). Both research and development expenses could be capitalized with a maximum economic life of 10 years but even pharmaceutical firms with large R&D investments chose to expense them straight away. Acquired goodwill could be capitalized and amortized over a maximum of 20 years, but Swedish company law suggests an economic life of no more than five years and many firms used a shorter economic life. In 2004 (the last year before the adoption of international accounting standards) the mean (median) economic life was 11 (8) years (anonymous reference).

All firms have been classified into one of twenty industries based on the nature of their operations each year. In accordance with common practice, financially oriented firms are excluded from the analysis as their accounting framework differs substantially from that of other firms. The excluded industry categories are “investment companies”, “banks and insurance companies”, “real estate” and “other financial services”. In addition, firms with odd industry classifications are disregarded (referred to as “miscellaneous” in our database). The remaining industries are split into traditional and non-traditional industries as shown in Table 1. The non-traditional industries include most firms coupled to the “new economy”, but it is not a perfect measure of it.

After trimming the highest and lowest percentile for each variable, the data set comprises 3732 observations. Overall, we have a very small number of missing observations. In total, 72.7% of the observations are firms located in traditional industries. Table 2 presents descriptive statistics for the data sample. The distributional characteristics for the total sample are found in Panel A, while Panels B and C list the distributional characteristics for the traditional industries and the non-traditional industries, respectively. Mean earnings equals 3% of market value of equity for the total sample. Median earnings are higher than the mean

Table 1: Industry classification

	Non-traditional industries
13	Industrial development
17	High-tech development
20	Services (excl consulting and IT)
21	Consulting (excl IT)
22	Information technology services
25	Pharmaceuticals and biotechnology
26	Medical technology

	Traditional industries
11	Industrial manufacturing
12	Consumer manufacturing
14	Raw materials and forestry
15	Trading
16	Chemicals
18	Building and construction
19	Other production
23	Transportation

	Excluded industries
31	Banks and Insurance
32	Other financial services
33	Real estate
34	Investment
40	Miscellaneous

Table description
Table 1 displays information concerning the industry categories used in the analysis of the value relevance of accounting information, based on Swedish data from the years 1979 to 2004. On the basis of the nature of the firm's operations in the end of an accounting period it has been placed in one of twenty industry categories.

for both traditional and non-traditional firms, suggesting that the distribution is skewed to the left. It is evident that firms operating in traditional industries are more profitable than their counterparts in non-traditional industries. The mean change in earnings is positive for both sub-samples. The relative amount of shares seems to be larger in the non-traditional sector than in the traditional sector as share prices on average are higher for firms in traditional industries. The non-traditional industries report a lower book value per share and earnings per share. The dispersion is however quite large for both groups. Firms operating in traditional

Table 2: Descriptive statistics

Panel A: Distributional characteristics – total sample (n=3732)

Variable	Mean	Q1	Median	Q3	St. dev.
Earn	0.030	0.011	0.051	0.091	0.143
ΔEarn	0.014	-0.024	0.008	0.043	0.146
BV	33.635	9.439	23.481	45.828	34.107
EPS	3.113	0.216	1.918	5.707	6.288
R	0.202	-0.153	0.126	0.447	0.551
P	72.237	22.300	51.500	100.000	68.757
BM	0.596	0.274	0.462	0.744	0.502

Panel B: Distributional characteristics – traditional industries (n=2715)

Variable	Mean	Q1	Median	Q3	St. dev.
Earn	0.054	0.026	0.062	0.101	0.118
ΔEarn	0.010	-0.023	0.008	0.043	0.134
BV	39.537	13.296	29.458	54.620	36.162
EPS	4.174	0.688	2.905	6.887	6.358
R	0.220	-0.110	0.146	0.448	0.496
P	77.332	26.500	57.384	107.485	69.094
BM	0.637	0.323	0.510	0.791	0.484

Panel C: Distributional characteristics – non-traditional industries (n=1017)

Variable	Mean	Q1	Median	Q3	St. dev.
Earn	-0.039	-0.076	0.010	0.055	0.183
ΔEarn	0.026	-0.031	0.004	0.041	0.176
BV	17.878	4.996	11.555	25.084	20.908
EPS	0.283	-1.393	0.231	2.177	5.118
R	0.149	-0.335	0.037	0.441	0.149
P	58.550	13.841	35.500	80.000	65.954
BM	0.487	0.192	0.322	0.590	0.531

Panel D: Correlations between variables

	Earn	ΔEarn	BV	EPS	R	P
Earn		**0.85**	**0.06**	**0.19**	0.02	**0.07**
ΔEarn	**0.49**		-0.02	**0.05**	**0.04**	-0.01
BV	**0.31**	**-0.05**		**0.57**	**-0.05**	**0.68**
EPS	**0.77**	**0.33**	**0.63**		**0.07**	**0.55**
R	**0.34**	**0.26**	0.02	**0.19**		**0.15**
P	**0.25**	0.00	**0.76**	**0.67**	**0.25**	

Table description
Panels A, B and C of Table 2 show descriptive statistics for all industries, traditional industries and non traditional industries respectively. Each panel displays the mean, first quarter, median, third quarter and standard deviations for each of the variables used in the analysis. EARN = net earnings deflated by marked value of equity at the end of t-1, ΔEARN = yearly change in net earnings, deflated by market value of equity at the end of t-1, BVS = book value of equity per share, EPS = net earnings per share, R = the dividend-adjusted stock return, P = share price, and B/M = the book value of equity divided by the market value of equity. Panel D displays the Pearson (Spearman) correlation coefficients above (below) the diagonal for all the industries. Coefficients marked in **boldface** denote a statistical significance at a 5% level, two-sided test.

industries had the highest stock returns in the period. Finally, we note that the mean book-to-market ratio of firms in the non-traditional industries is substantially lower than that of firms in traditional industries. The industry-specific book-to-market ratios are also considerably lower among firms in the non-traditional industries (not tabulated).

Panel D of Table 2 displays correlation matrices for the variables applied in the regression analyses. Both Pearson and Spearman coefficients are presented for the total sample. Earnings and change in earnings have a high and significant correlation coefficient. Earnings appear to be uncorrelated with returns when parametric correlation coefficients (Pearson) are employed. However, the non-parametric correlation coefficients (Spearman) that adjust for outliers make earnings much more closely related to stock returns. As expected, share prices have a significant association with both book value per share and earnings per share.

4. Empirical Findings

Table 3 contains results from tests of the first hypothesis without any consideration of nonlinearities. The table shows regression coefficients, as well as the total and incremental explanatory power from price and return regressions. We focus the analysis on the mean coefficients and explanatory power from annual regressions. However, the table also displays figures for five-year pooled regressions and a pooled regression for the complete sample period. All regressions are run for the total sample (Panel A), and the two subsamples with traditional and non-traditional industries (Panels B and C).

Panel A of Table 3 shows that the mean adjusted R^2 for the price model specification is 55% for the total sample and that most coefficients are statistically significant.[6][7] A comparison of

---

[6] The significance level of the mean of the regression coefficients is estimated using the Fama and MacBeth [1973] methodology.

[7] For price model specifications an explanatory power of 55% is low compared to findings in past U.S. studies. Collins, Maydew, and Weiss [1997] report an average annual explanatory power for the 1983-1993 period of

Panels B and C reveal substantial differences in explanatory power between the two sub-samples. While the traditional industries report an R^2 of 60%, the non-traditional industries report an R^2 of only 45%. As for the incremental explanatory power, the non-traditional industries have a higher incremental R^2 for the book value of equity than the traditional industries. The value relevance common to book value and earnings is far higher for the traditional industries. Both sub-samples have a low incremental value relevance of net earnings. The same pattern exists when the individual years are aggregated into five-year periods. As we test for a difference in the mean adjusted R^2 between the traditional and non-traditional industries we find strong support for an overall difference in value relevance in favour of the traditional industries (p=0.006).[8]

The return regressions do not at all support this difference between the two industry categories. The mean explanatory power is 11% for the traditional industries and 13% for the non-traditional industries.[9] The traditional industries report more significant regression coefficients than the non-traditional sector, caused partly by fewer observations (particularly in some early years) for the non-traditional industry category. The five-year pooled regressions do not change the impression that there is no substantial difference in the explanatory power between the two samples when using a return specification. As for the incremental explanatory power of earnings and the change in earnings, the results appear relatively similar between the two sectors.

75.4%. A similar figure is reported by Lev and Zarowin [1999]. Gjerde, Knivsflå, and Sættem [2007] report an average explanatory power for their Norwegian sample in the years 1980-2004 of 46.7%.

[8] When applying a standard t-test for differences in means.

[9] For Return model specifications an average explanatory power of 11.2% is high compared to many other studies. Lev and Zarowin [1999] report an average R^2 of 7.4% in the years 1978 to 1996. Gjerde et al. [2007] report an average R^2 of 5.4% in the years 1980 to 2004. Plenborg [1998] reports an average of 13.7% for a Danish sample between 1985 and 1991. Alford, Jones, Leftwich, and Zmijewski [1993] report a low R^2 for Sweden in 1984 to 1990 (2.7%, which is the lowest of all countries in their sample). In our study there are 6 times as many observations as in their study and we report an average R^2 of 7.3% in that same period (see Panel A of Table 3).

Table 3: Value Relevance over time

Panel A: All Observations

	Price Model							Return Model						
Year	**N**	**a1**	**a2**	**R^2_{PRI}**	**R^2_{BVS}**	**R^2_{EPS}**	**R^2_{COM}**	**N**	**b1**	**b2**	**R^2_{RET}**	**R^2_{EPS}**	**$R^2_{\Delta EPS}$**	**R^2_{COM}**
1979	61	**0,65**	0,61	0,59	0,35	0,00	0,24							
1980	66	**0,61**	**3,24**	0,52	0,13	0,02	0,37	64	**1,61**	-0,21	0,11	0,12	-0,01	0,00
1981	70	**0,87**	0,96	0,62	0,30	0,00	0,31	63	**1,42**	0,91	0,22	0,08	0,01	0,13
1982	74	**1,59**	**2,42**	0,66	0,40	0,01	0,25	71	-0,41	-0,07	0,00	0,00	0,00	0,00
1983	109	**2,17**	0,82	0,56	0,23	0,00	0,34	77	0,58	**1,81**	0,15	-0,01	0,07	0,09
1984	153	**1,81**	-0,42	0,60	0,35	0,00	0,26	114	**1,96**	-0,66	0,07	0,06	0,00	0,00
1985	164	**1,28**	**3,66**	0,70	0,14	0,03	0,54	155	**2,93**	-0,47	0,16	0,17	0,00	0,00
1986	155	**1,85**	0,46	0,59	0,42	0,00	0,17	157	0,73	0,39	0,02	0,00	0,00	0,02
1987	157	**1,60**	**3,40**	0,65	0,13	0,02	0,51	153	0,34	**1,40**	0,10	0,00	0,05	0,05
1988	154	**1,52**	**2,52**	0,62	0,18	0,03	0,41	147	**2,95**	**-1,48**	0,16	0,10	0,01	0,04
1989	149	**1,84**	0,96	0,59	0,21	0,00	0,38	151	0,18	**0,54**	0,03	-0,01	0,01	0,02
1990	133	**1,32**	1,38	0,62	0,25	0,00	0,36	140	**1,02**	-0,27	0,12	0,08	0,00	0,04
1991	114	**0,76**	0,56	0,36	0,36	0,00	0,00	116	**0,61**	-0,19	0,01	0,02	-0,01	0,00
1992	114	**0,96**	**0,76**	0,66	0,63	0,03	0,01	107	**0,92**	-0,08	0,18	0,15	-0,01	0,03
1993	126	**1,20**	0,61	0,53	0,49	0,00	0,04	103	0,39	0,51	0,03	0,01	0,01	0,01
1994	145	**0,88**	**1,93**	0,52	0,21	0,04	0,27	122	**0,47**	0,35	0,06	0,03	0,01	0,02
1995	145	**1,17**	-0,20	0,34	0,24	0,00	0,10	137	-0,05	0,46	0,00	0,00	0,00	0,00
1996	157	**0,89**	**3,00**	0,52	0,13	0,04	0,35	138	**1,77**	-0,39	0,08	0,06	0,00	0,02
1997	179	**0,86**	**2,56**	0,41	0,10	0,03	0,28	140	**1,89**	0,30	0,12	0,06	0,00	0,07
1998	196	**0,79**	**2,73**	0,39	0,10	0,04	0,24	172	0,17	**1,60**	0,17	0,00	0,08	0,09
1999	191	**0,67**	**2,04**	0,13	0,04	0,01	0,08	173	0,18	0,06	0,00	0,00	0,00	0,00
2000	195	**0,89**	**1,73**	0,39	0,14	0,02	0,22	166	**1,70**	**0,37**	0,26	0,23	0,01	0,01
2001	182	**1,03**	**2,86**	0,54	0,23	0,06	0,25	175	**1,24**	0,10	0,33	0,00	0,00	0,34
2002	182	**1,02**	**2,42**	0,73	0,36	0,07	0,31	169	**0,74**	0,10	0,18	0,00	0,00	0,18
2003	181	**1,22**	**3,18**	0,75	0,26	0,06	0,43	158	0,00	**0,42**	0,01	0,00	0,02	-0,01
2004	180	**1,19**	**4,82**	0,67	0,13	0,06	0,48	180	**1,45**	0,22	0,21	0,00	0,01	0,21
Mean	144	**1,18**	**1,88**	0,55	0,25	0,02	0,28	134	**0,99**	0,23	0,11	0,05	0,01	0,05
1980-84	472	**1,20**	**2,02**	0,45	0,20	0,00	0,25	389	**0,81**	-0,46	0,01	0,01	0,00	0,00
1985-89	779	**1,62**	**2,12**	0,62	0,22	0,01	0,39	763	**1,34**	0,10	0,06	0,03	0,00	0,03
1990-94	632	**1,02**	**1,54**	0,53	0,38	0,04	0,11	588	0,18	**0,96**	0,10	0,00	0,07	0,03
1995-99	868	**0,89**	**1,74**	0,30	0,11	0,01	0,18	760	**0,55**	0,37	0,02	0,01	0,00	0,01
2000-04	920	**1,08**	**2,93**	0,59	0,22	0,06	0,31	848	**0,61**	**0,28**	0,05	0,04	0,00	0,01
Pooled	3732	**1,06**	**2,59**	0,47	0,19	0,04	0,24	3348	**0,70**	**0,35**	0,05	0,03	0,01	0,01

Table description

Table 3 describes the value relevance of accounting information for a sample of Swedish firms in the time-period 1979 to 2004. It summarizes the number of observations (N), regression coefficients (a_1, a_2, b_1 and b_2), total explanatory power (R^2_{PRI} and R^2_{RET}) as well as the incremental and common explanatory power (R^2_{BVS}, R^2_{EPS}, $R^2_{\Delta EPS}$, R^2_{COM}) for the total sample (Panel A), the traditional industries sample (Panel B) and the non-traditional sample (Panel C). Firms are classified into industries following Table 1. Each Panel presents data for individual years, the mean for all years, pooled results for 5-year periods and pooled results for the whole 25-year period. The highlighted years refer to the "IT-bubble" years. Data is analyzed using both a Price and a Return model, defined as:

Price Model: $$P_{it} = a_0 + a_1 BVS_{it} + a_2 EPS_{it} + \varepsilon_{it}$$

Return Model: $$R_{it} = b_0 + b_1 Earn_{it} + b_2 \Delta Earn_{it} + \varepsilon_{it}$$

where P_{it} is the share price of firm *i* in period *t*, *BVS* is the book value per share, *EPS* is the net earnings per share, *R* is the dividend-adjusted return, Earn is earnings and ΔEarn is the yearly change in earnings. Both Earn and ΔEarn are scaled by the market value of equity at *t-1*. The incremental value relevance is estimated in a similar way for Price and Return models. For the Price model, we first estimate R^2_{PRI} (the total explanatory power), R^2_1 (a regression of P_{it} on BVS_{it}) and R^2_2 (a regression of P_{it} on EPS_{it}). The incremental value relevance (R^2_{BVS} and R^2_{EPS}) and the common value relevance in then calculated as:

$$R^2_{BVS} = R^2_{PRI} - R^2_2$$
$$R^2_{EPS} = R^2_{PRI} - R^2_1$$
$$R^2_{COM} = R^2_{PRI} - R^2_{BVS} - R^2_{EPS}$$

The annual means for the non-traditional industries are computed for the period 1985-2004 due to few observations in the first years of the sample period. Boldface denotes significance at a 10% level, two-sided test. R^2 is set equal to zero if negative. In such cases, the incremental explanatory power is set equal to zero as well.

t-test for difference in the mean adjusted R^2 between traditional and non-traditional industries:

0.006 for the Price model specification (p-value, difference in favour of the traditional industries)
0.563 for the Return model specification (p-value, difference in favour of the non-traditional industries)

Panel B: Traditional Industries

	Price Model							Return Model						
Year	**N**	**a1**	**a2**	R^2_{PRI}	R^2_{BVS}	R^2_{EPS}	R^2_{COM}	**N**	**b1**	**b2**	R^2_{RET}	R^2_{EPS}	$R^2_{\Delta EPS}$	R^2_{COM}
1979	59	0,67	0,54	0,61	0,37	0,00	0,24							
1980	64	0,65	2,93	0,53	0,15	0,02	0,37	61	**1,82**	-0,31	0,13	0,14	0,00	-0,01
1981	67	**0,89**	0,72	0,61	0,26	0,00	0,36	61	**1,52**	0,82	0,24	0,09	0,01	0,14
1982	70	**1,61**	**2,46**	0,67	0,41	0,01	0,25	68	**2,15**	-0,95	0,04	0,04	0,00	-0,01
1983	97	2,11	1,42	0,61	0,23	0,00	0,38	72	-0,10	**2,83**	0,24	-0,01	0,15	0,11
1984	134	1,84	-0,58	0,62	0,36	0,00	0,27	102	**1,75**	-0,50	0,06	0,05	0,00	0,01
1985	142	**1,21**	3,96	0,76	0,13	0,03	0,59	136	**2,90**	-0,45	0,16	0,17	0,00	-0,01
1986	128	1,87	0,19	0,60	0,43	0,00	0,18	135	-1,03	**1,93**	0,03	0,00	0,02	0,01
1987	131	1,62	3,44	0,66	0,12	0,02	0,52	127	0,42	0,81	0,03	0,00	0,01	0,02
1988	126	1,36	3,92	0,68	0,13	0,06	0,48	119	**2,84**	-1,18	0,14	0,09	0,01	0,05
1989	121	1,97	0,64	0,60	0,21	0,00	0,39	125	-0,13	0,54	0,00	0,00	0,00	0,00
1990	109	**1,31**	1,59	0,64	0,25	0,01	0,38	114	**0,90**	-0,21	0,11	0,07	0,00	0,05
1991	95	**0,75**	0,12	0,38	0,39	-0,01	0,00	95	**1,39**	**-0,80**	0,04	0,05	0,02	-0,03
1992	96	**0,99**	0,70	0,68	0,66	0,02	0,00	90	**0,86**	-0,06	0,17	0,13	-0,01	0,04
1993	105	**1,23**	0,98	0,63	0,57	0,01	0,05	87	0,32	**0,59**	0,04	0,01	0,02	0,02
1994	116	0,68	3,31	0,68	0,16	0,13	0,40	100	**0,52**	0,31	0,06	0,04	0,01	0,02
1995	113	0,72	2,75	0,63	0,16	0,11	0,36	108	0,56	0,01	0,01	0,01	-0,01	0,01
1996	115	**0,72**	4,22	0,55	0,09	0,09	0,38	107	**1,96**	-0,47	0,09	0,08	0,00	0,01
1997	116	**0,76**	3,28	0,47	0,08	0,04	0,35	100	**1,49**	0,34	0,09	0,04	0,00	0,05
1998	119	**0,54**	5,08	0,56	0,06	0,14	0,36	112	0,35	**1,12**	0,10	-0,01	0,03	0,08
1999	104	0,76	3,96	0,43	0,10	0,09	0,24	109	-0,28	0,64	0,00	0,00	0,00	0,00
2000	101	**0,37**	4,20	0,47	0,02	0,11	0,33	97	**1,71**	0,27	0,21	0,22	0,00	-0,01
2001	96	**0,83**	3,47	0,55	0,19	0,13	0,23	93	**0,76**	0,53	0,22	0,02	0,00	0,20
2002	98	**0,84**	3,14	0,67	0,25	0,13	0,30	95	**1,17**	-0,17	0,31	0,30	0,01	0,00
2003	97	**1,02**	**3,36**	0,65	0,20	0,08	0,37	91	-0,17	**0,96**	0,10	-0,01	0,10	0,01
2004	96	1,01	4,96	0,57	0,09	0,07	0,41	95	**1,61**	0,25	0,17	0,17	0,01	-0,01
Mean	104	**1,09**	**2,49**	0,60	0,23	0,05	0,32	100	**1,01**	0,27	0,11	0,07	0,01	0,03
1980-84	432	**1,24**	**1,92**	0,49	0,21	0,01	0,27	364	**2,36**	-0,63	0,07	0,07	0,00	0,00
1985-89	648	**1,58**	**2,52**	0,65	0,21	0,02	0,42	642	**1,33**	-0,02	0,05	0,03	0,00	0,02
1990-94	521	**1,01**	**1,64**	0,58	0,41	0,05	0,12	486	0,08	**0,99**	0,11	0,00	0,08	0,03
1995-99	567	**0,76**	**3,57**	0,49	0,10	0,07	0,32	536	**0,81**	0,01	0,02	0,01	0,00	0,01
2000-04	488	**0,84**	**3,63**	0,54	0,14	0,10	0,30	471	**0,90**	**0,21**	0,09	0,06	0,01	0,02
Pooled	2715	**0,99**	**3,17**	0,52	0,18	0,06	0,28	2499	**0,72**	**0,39**	0,06	0,03	0,01	0,02

Panel C: Non-Traditional Industries

	Price Model							Return Model						
Year	**N**	**a1**	**a2**	R^2_{PRI}	R^2_{BVS}	R^2_{EPS}	R^2_{COM}	**N**	**b1**	**b2**	R^2_{RET}	R^2_{EPS}	$R^2_{\Delta EPS}$	R^2_{COM}
1979	2	0,05	0,00											
1980	2	0,03	0,00											
1981	3	2,31	6,03					2	-0,31	0,00				
1982	4	9,05	-14,14					3	-12,00	19,01				
1983	12	**7,86**	**-27,15**	0,69	0,69	0,09	-0,08	5	-1,72	-0,58	0,00	0,00	0,00	0,00
1984	19	**1,61**	**18,14**	0,66	0,23	0,24	0,19	12	14,19	-2,14	0,14	0,20	-0,03	-0,02
1985	22	**2,08**	6,30	0,47	0,20	0,01	0,26	19	5,18	-2,90	0,00	0,00	0,00	0,00
1986	27	**2,60**	**5,04**	0,53	0,48	0,07	-0,02	22	**1,18**	-0,09	0,10	0,15	-0,04	0,00
1987	26	**1,35**	2,84	0,51	0,15	0,01	0,35	26	-0,15	**2,51**	0,36	-0,03	0,28	0,11
1988	28	**1,77**	-0,22	0,37	0,26	-0,02	0,14	28	**3,69**	-3,41	0,12	0,13	0,04	-0,04
1989	28	**1,25**	1,84	0,45	0,18	0,01	0,27	26	**2,16**	**1,03**	0,33	0,16	0,12	0,06
1990	24	**1,67**	0,29	0,31	0,20	-0,03	0,15	26	**1,71**	-0,59	0,14	0,13	-0,03	0,03
1991	19	**0,99**	2,19	0,20	0,12	0,07	0,01	21	0,06	0,48	0,00	0,00	0,00	0,00
1992	18	**0,68**	1,63	0,24	0,14	0,09	0,01	17	**1,40**	-0,22	0,18	0,24	-0,03	-0,03
1993	21	**2,19**	-1,07	0,24	0,28	-0,02	-0,01	16	1,54	-0,12	0,00	0,00	0,00	0,00
1994	29	**2,53**	-1,11	0,60	0,61	0,00	-0,01	22	-0,85	2,27	0,09	-0,02	0,09	0,02
1995	32	**3,63**	**-7,85**	0,70	0,70	0,17	-0,17	29	-0,84	3,64	0,02	-0,03	0,02	0,03
1996	42	**2,04**	-0,96	0,49	0,49	-0,01	0,00	31	0,52	0,85	0,01	-0,03	-0,03	0,07
1997	63	**1,55**	2,02	0,21	0,13	0,01	0,06	40	3,09	-0,35	0,13	0,03	-0,02	0,13
1998	77	**2,35**	1,69	0,29	0,29	0,00	0,00	60	0,62	**1,82**	0,30	0,00	0,09	0,20
1999	87	**2,86**	0,80	0,18	0,16	-0,01	0,03	64	**1,70**	-0,76	0,10	0,10	0,00	-0,01
2000	94	**2,05**	**2,52**	0,52	0,42	0,05	0,04	69	**0,95**	1,20	0,14	0,03	0,02	0,09
2001	86	**1,71**	**2,27**	0,50	0,39	0,02	0,09	82	**0,76**	**0,36**	0,27	0,20	0,02	0,05
2002	84	**1,38**	**1,19**	0,80	0,75	0,02	0,03	74	**0,59**	**0,26**	0,11	0,11	0,03	-0,03
2003	84	**1,57**	**2,83**	0,84	0,38	0,05	0,41	67	0,32	0,04	0,00	0,00	0,00	0,00
2004	84	**1,28**	**4,12**	0,64	0,26	0,06	0,32	85	**1,20**	0,21	0,19	0,17	0,00	0,03
Mean[1]	49	**1,88**	**1,32**	0,45	0,33	0,03	0,10	41	**1,24**	0,31	0,13	0,07	0,03	0,04
1980-84	40	**1,40**	**7,01**	0,19	0,14	0,08	-0,03	25	**-1,74**	-0,07	0,26	0,07	-0,03	0,22
1985-89	131	**1,79**	0,75	0,44	0,28	0,00	0,16	121	**1,19**	0,62	0,09	0,04	0,01	0,04
1990-94	111	**1,70**	0,88	0,37	0,30	0,01	0,06	102	**0,90**	**0,85**	0,08	0,02	0,03	0,03
1995-99	301	**2,27**	-0,09	0,23	0,22	0,00	0,01	224	**1,15**	0,52	0,05	0,03	0,00	0,02
2000-04	432	**1,64**	**2,38**	0,60	0,43	0,04	0,13	377	**0,35**	**0,31**	0,02	0,01	0,01	0,00
Pooled	1017	1,72	1,81	0,36	0,27	0,02	0,07	849	**0,64**	**0,27**	0,03	0,02	0,00	0,01

Next, we re-run the regressions and control for the non-linearity caused by negative earnings. The results reported in Table 4 change the picture somewhat. For the price model specification the mean annual R^2 increases, to 58%, for the total sample (Panel A). Thus an adjustment for negative earnings, as suggested by e.g. Hayn [1995], Collins, Maydew and Weiss [1997], Francis, Schipper and Vincent [2003], enables accounting information to explain security prices better. But whereas the traditional industries experience hardly any change in explanatory power (an increase from 60% to 61%) the change is substantial for the non-traditional industries (an increase from 45% to 56%). Indeed, the difference in explanatory power between the two industry categories is now statistically insignificant (p=0.369). However, we note a substantial instability over time in the association between the accounting information and market values for the non-traditional industries relative to that of the traditional industries.

A control for negative earnings also benefits the value relevance as measured by the return models. However, here the increase is similar for both sub-samples as the traditional industries experience an increase from 11% to 15% and non-traditional industries change from 13% to 18%. There is no statistically significant difference between the two industry categories (p=0.396), but it seems like the value relevance is not *higher* in traditional industries.

The model specifications with a dummy for negative earnings appear better than the previous ones with more statistically significant coefficients and higher explanatory power. The properties of positive and negative earnings are apparently different and adjusting our models to accommodate such differences improves the results. There is reason to believe that both

Table 4: Value Relevance over time, Dummy for Negative Earnings

Panel A: All Observations

	Price Model					Return Model				
Year	**N**	**a1**	**a2**	**a3**	**R^2_{PRI}**	**N**	**b1**	**b2**	**b3**	**R^2_{RET}**
1979	61	**0,77**	-0,52	4,37	0,60					
1980	66	**0,95**	-0,61	**45,09**	0,56	64	**1,42**	-0,34	6,54	0,12
1981	70	**0,90**	0,62	1,36	0,61	63	0,73	**1,26**	**7,02**	0,28
1982	74	**1,59**	2,37	0,12	0,66	71	**3,29**	-0,44	**-4,72**	0,14
1983	109	**2,19**	0,64	1,17	0,56	77	1,71	**1,66**	**-3,06**	0,17
1984	152	**1,79**	-0,19	-5,19	0,60	114	**1,87**	-0,67	10,28	0,07
1985	164	**1,28**	**3,64**	0,37	0,70	154	**3,16**	-0,54	-1,27	0,16
1986	155	**1,60**	**2,72**	**-9,05**	0,61	157	0,63	0,45	0,22	0,02
1987	157	**1,50**	**4,01**	-2,92	0,65	153	0,47	**1,44**	-0,50	0,09
1988	154	**1,39**	**3,35**	**-3,83**	0,63	147	**2,92**	**-1,48**	0,05	0,15
1989	149	**1,73**	1,67	-3,88	0,59	151	0,43	0,50	-0,46	0,02
1990	133	**1,29**	**1,82**	-3,27	0,62	139	**1,24**	-0,26	-0,32	0,12
1991	114	**0,67**	**5,17**	**-6,50**	0,42	116	**2,52**	-0,30	**-2,50**	0,06
1992	113	**0,94**	**1,34**	-0,84	0,66	106	**1,95**	-0,13	-1,24	0,19
1993	126	**1,08**	**3,20**	**-5,41**	0,58	102	**3,54**	0,19	**-4,06**	0,18
1994	145	**0,65**	**4,22**	**-11,28**	0,65	121	**1,90**	0,16	**-2,27**	0,19
1995	145	**0,63**	**3,48**	**-21,48**	0,57	136	-0,02	0,44	0,03	0,00
1996	157	**0,71**	**4,67**	**-5,22**	0,53	138	**3,36**	-0,22	**-3,64**	0,15
1997	179	**0,80**	**3,13**	-2,26	0,41	140	**1,66**	0,30	0,78	0,11
1998	196	**0,37**	**6,59**	**-9,04**	0,43	172	0,05	**1,59**	0,19	0,17
1999	190	**0,47**	**4,36**	**-5,78**	0,16	173	-0,95	0,18	1,62	0,00
2000	195	**0,84**	**2,20**	-1,24	0,39	166	**3,09**	-0,04	**-2,72**	0,32
2001	182	**0,86**	**5,23**	**-4,41**	0,56	175	**4,49**	0,18	**-3,86**	0,47
2002	182	**0,73**	**5,71**	**-6,22**	0,78	169	**2,96**	0,02	**-2,63**	0,28
2003	181	**0,99**	**5,77**	**-5,75**	0,78	158	-0,21	**0,43**	0,25	0,00
2004	180	**0,90**	**7,70**	**-9,04**	0,69	180	**3,18**	0,05	**-2,37**	0,25
Mean	143	**1,06**	**3,16**	-2,70	0,58	134	**1,82**	0,18	-0,35	0,15
1980-84	471	**1,19**	**2,18**	-0,18	0,45	389	**3,33**	-0,39	**-5,52**	0,16
1985-89	779	**1,48**	**3,10**	**-5,50**	0,63	762	**1,60**	0,05	-0,64	0,06
1990-94	631	**0,88**	**3,38**	**-3,83**	0,56	584	**2,77**	**0,69**	**-3,37**	0,18
1995-99	867	**0,66**	**3,82**	**-6,44**	0,33	759	**1,18**	0,32	**-1,09**	0,02
2000-04	920	**0,89**	**4,97**	**-4,52**	0,61	848	**3,28**	0,14	**-3,25**	0,12
Pooled	3729	**0,90**	**4,10**	**-4,11**	0,48	3342	**2,47**	**0,17**	**-2,42**	0,09

Table description

Table 4 describes the value relevance of accounting information for a sample of Swedish firms in the time-period 1979 to 2004. It summarizes the number of observations (N), regression coefficients (a_1, a_2, a_3, b_1, b_2 and b_3) and the total explanatory power (R^2_{PRI} and R^2_{RET}) for the total sample (Panel A), the traditional industries sample (Panel B) and the non-traditional sample (Panel C). Firms are classified into industries following Table 1. Each Panel presents data for individual years, the mean for all years, pooled results for 5-year periods and pooled results for the whole 25-year period. The highlighted years refer to the "IT-bubble" years. Data is analyzed using both a Price and a Return model, defined as (cf. Francis et al., 2003):

Price Model:

$$P_{it} = a_0 + a_1 BVS_{it} + a_2 EPS_{it} + a_3 EPS_{it} \cdot D + \varepsilon_{it}$$
$$\text{where } D = 1 \text{ when } EPS < 0, \text{otherwise } 0$$

Return Model:

$$R_{it} = b_0 + b_1 Earn_{it} + b_2 \Delta Earn_{it} + b_3 Earn_{it} \cdot D + \varepsilon_{it}$$
$$\text{where } D = 1 \text{ when } Earn < 0, \text{otherwise } 0$$

where P_{it} is the share price of firm *i* in period *t*, *BVS* is the book value per share, *EPS* is the net earnings per share, *R* is the dividend-adjusted return, Earn is earnings and ΔEarn is the yearly change in earnings. Both Earn and ΔEarn are scaled by the market value of equity at *t-1*.

The annual means for the non-traditional industries are computed for the period 1985-2004 due to few observations in the first years of the sample period. Boldface denotes significance at a 10% level, two-sided test. R^2 is set equal to zero if negative.

t-test for difference in the mean adjusted R^2 between traditional and non-traditional industries:

0.369 for the Price model specification (p-value, difference in favour of the traditional industries)
0.396 for the Return model specification (p-value, difference in favour of the non-traditional industries)

Panel B: Traditional Industries

	Price Model					Return Model				
Year	**N**	**a1**	**a2**	**a3**	R^2_{PRI}	**N**	**b1**	**b2**	**b3**	R^2_{RET}
1979	59	**0,81**	-0,78	**5,06**	0,63					
1980	64	**1,06**	-1,71	**52,93**	0,59	61	**1,64**	-0,45	6,52	0,15
1981	67	**0,96**	0,18	25,58	0,61	61	0,87	**1,15**	**6,53**	0,29
1982	70	**1,61**	2,51	-0,12	0,67	68	**3,19**	-0,71	-3,56	0,06
1983	97	**2,10**	1,50	-0,53	0,61	72	1,07	**2,60**	-2,87	0,26
1984	133	**1,81**	-0,25	-7,82	0,62	102	**1,64**	-0,50	10,62	0,06
1985	142	**1,21**	**4,01**	-1,11	0,76	135	**3,16**	-0,53	-1,38	0,16
1986	128	**1,60**	**2,60**	**-11,11**	0,64	135	-0,93	**2,07**	-1,88	0,02
1987	131	**1,48**	**4,22**	-3,36	0,66	127	0,53	0,89	-0,60	0,02
1988	126	**1,36**	**3,89**	0,88	0,67	119	**3,08**	-1,16	-0,81	0,14
1989	121	**1,88**	1,26	-6,85	0,61	125	-0,09	0,53	-0,07	0,00
1990	109	**1,30**	**1,64**	-1,03	0,63	114	**1,10**	-0,21	-0,26	0,11
1991	95	**0,68**	**3,85**	**-5,50**	0,42	95	**2,69**	-0,73	**-2,02**	0,06
1992	95	**0,97**	**1,07**	-0,56	0,68	89	**2,01**	-0,18	-1,31	0,18
1993	105	**1,20**	**1,65**	-1,53	0,63	87	**3,38**	0,19	**-3,87**	0,21
1994	116	**0,67**	**3,41**	-1,69	0,68	100	**2,07**	0,05	**-2,50**	0,22
1995	113	**0,66**	**3,14**	-5,54	0,64	108	**0,99**	0,04	**-3,07**	0,04
1996	115	**0,60**	**5,45**	-4,41	0,55	107	**3,27**	-0,36	**-2,87**	0,11
1997	116	**0,71**	**3,75**	-3,17	0,47	100	**1,89**	0,41	-2,53	0,09
1998	119	**0,30**	**7,45**	**-8,64**	0,59	112	0,18	**1,07**	0,40	0,10
1999	104	**0,53**	**6,53**	**-9,43**	0,47	109	-0,04	0,65	-0,44	0,00
2000	101	**0,32**	**4,72**	-3,59	0,47	97	**3,06**	-0,32	**-3,45**	0,28
2001	96	**0,64**	**5,77**	**-4,94**	0,57	93	**2,54**	**0,75**	**-2,53**	0,30
2002	98	**0,38**	**7,43**	**-9,35**	0,75	95	**3,64**	-0,04	**-3,39**	0,49
2003	97	**0,72**	**6,79**	**-6,77**	0,69	91	**2,14**	**0,89**	**-2,94**	0,17
2004	96	**0,66**	**8,54**	**-10,08**	0,61	95	**3,07**	0,06	-2,16	0,18
Mean	104	**1,01**	**3,41**	-0,87	0,61	100	**1,84**	0,25	-0,82	0,15
1980-84	431	**1,20**	**2,28**	-2,33	0,49	364	**3,30**	-0,47	**-5,82**	0,12
1985-89	648	**1,45**	**3,40**	**-8,00**	0,66	641	**1,59**	-0,05	-0,82	0,05
1990-94	520	**0,94**	**2,71**	**-2,39**	0,59	485	**2,57**	**0,67**	**-3,18**	0,19
1995-99	567	**0,65**	**4,61**	**-4,93**	0,50	536	**1,49**	0,06	**-1,70**	0,03
2000-04	488	**0,59**	**6,21**	**-6,25**	0,57	471	**2,93**	0,15	**-2,82**	0,14
Pooled	2713	**0,86**	**4,38**	**-3,97**	0,53	2497	**2,18**	**0,26**	**-2,25**	0,09

Panel C: Non-Traditional Industries

	Price Model					Return Model				
Year	**N**	**a1**	**a2**	**a3**	R^2_{PRI}	**N**	**b1**	**b2**	**b3**	R^2_{RET}
1979										
1980										
1981										
1982										
1983	12	**7,86**	**-27,15**	0,00	0,69	5	-1,72	-0,58	0,00	0,00
1984	19	**1,90**	**15,58**	19,86	0,64	12	14,19	-2,14	0,00	0,14
1985	22	**3,25**	-2,24	**14,90**	0,53	19	4,82	-6,04	**42,34**	0,10
1986	27	**2,56**	5,33	-0,66	0,51	22	**3,17**	-0,90	-3,07	0,16
1987	26	**1,34**	2,63	40,16	0,49	26	-0,02	**2,52**	-0,25	0,33
1988	28	**2,03**	-1,38	1,80	0,35	28	0,21	-2,96	**4,59**	0,19
1989	28	0,72	5,07	-6,77	0,47	26	2,51	0,93	-0,74	0,30
1990	24	**1,18**	4,74	-7,83	0,35	25	1,58	-0,57	0,20	0,09
1991	19	0,20	**18,71**	**-19,96**	0,74	21	2,67	0,23	-3,13	0,00
1992	18	**0,36**	**15,05**	**-15,23**	0,79	17	2,15	-0,13	-1,09	0,12
1993	21	**1,00**	**10,37**	**-16,93**	0,88	15	**9,98**	2,26	**-18,26**	0,26
1994	29	0,33	**11,62**	**-21,87**	0,85	21	1,31	**3,26**	**-4,23**	0,27
1995	32	**2,14**	2,15	**-18,56**	0,75	28	-1,10	3,60	0,43	0,00
1996	42	**2,14**	-1,75	1,64	0,48	31	2,17	1,44	**-4,71**	0,17
1997	63	**1,66**	1,48	1,51	0,20	40	2,02	0,02	1,88	0,12
1998	77	**2,20**	3,14	**-2,19**	0,28	60	6,28	**2,10**	**-6,75**	0,39
1999	86	**2,88**	0,23	0,89	0,18	64	3,29	-0,93	-1,92	0,09
2000	94	**2,06**	**2,39**	0,26	0,51	69	**2,58**	0,68	**-2,23**	0,18
2001	86	**1,40**	**12,03**	**-12,48**	0,56	82	**8,05**	**0,51**	**-7,66**	0,49
2002	84	**1,25**	**6,12**	**-6,47**	0,85	74	**1,73**	0,19	-1,32	0,12
2003	84	**1,45**	**4,29**	**-4,57**	0,86	67	-2,22	0,08	2,78	0,00
2004	84	**1,16**	**5,63**	**-5,49**	0,65	85	**3,02**	0,07	**-2,26**	0,22
Mean'	49	**1,56**	**5,28**	-3,89	0,56	41	**2,71**	0,32	-0,27	0,18
1980-84	40	0,93	**16,24**	-12,76	0,19	25	**4,44**	1,40	**-7,71**	0,54
1985-89	131	**1,73**	1,12	-0,79	0,43	121	1,08	0,64	0,17	0,09
1990-94	111	**0,65**	**10,28**	**-13,75**	0,63	99	**4,78**	**1,00**	**-5,63**	0,17
1995-99	300	**2,22**	0,34	-0,74	0,24	223	**2,94**	0,26	**-2,37**	0,07
2000-04	432	**1,52**	**4,34**	**-3,64**	0,61	377	**3,65**	0,14	**-3,69**	0,07
Pooled	1016	**1,55**	**3,68**	**-3,42**	0,38	845	**3,83**	0,06	**-3,78**	0,09

negative and positive reported earnings contain transitory elements. Next, we examine the properties of accounting earnings by dividing reported earnings into a transitory and a sustainable component. It is expected that the accounting earnings reported by firms in general, and in non-traditional industries in particular, contain a transitory component. The value relevance of accounting information can be negatively influenced by this transitory component of earnings. Sustainable earnings for the individual firm (SE_{it}) are estimated by multiplying the beginning of the period total assets with its mean net profit scaled by total assets for the past five years (minimum three years). We denote this period *T*.

$$SE_{i,t} = TA_{i,T-1} \cdot \left(\sum_{t=T-4}^{T} \frac{NP_{i,t}}{TA_{i,t-1}} \Big/ T \right)$$

This measure is used to estimate transitory earnings. Reported earnings is decomposed into a sustainable (hereafter SEPS) and a residual transitory component. Untabulated results show that substituting reported earnings with SEPS actually decrease the value relevance for both the price and return model specifications. Hence the transitory component of earnings is relevant to investors (but again, untabulated results show that it is less relevant than SEPS). Table 5 reports the value relevance when earnings are decomposed into its sustainable and transitory components. In price regressions the overall explanatory power increases to 58% (from 55% for the standard model shown in Table 3). There is hardly any change for the value relevance of accounting information in the traditional industries (up from 60% to 61%), but a substantial increase for the non-traditional industries (up from 45% to 53%). Although the explanatory power is not as high as for the negative earnings model (results shown in Table 4), it is obvious that a considerable part of earnings is transitory and that the market values

Table 5: The Value Relevance of Accounting Earnings and Sustainable Earnings

Panel A: All observations

	Price Model					Return Model					
Year	**N**	**a1**	**a2**	**a3**	**R^2_{TOT}**	**N**	**b1**	**b2**	**b3**	**b4**	**R^2_{TOT}**
1981	63	**0,79**	1,91	-0,19	0,61						
1982	72	**1,58**	2,66	2,23	0,66	64	2,25	-0,23	-3,79	2,56	0,05
1983	101	**2,36**	-0,42	0,58	0,59	75	2,12	**22,74**	**-7,05**	**3,27**	0,26
1984	138	**1,93**	-1,44	-0,89	0,56	103	**1,88**	-2,44	**2,31**	-0,72	0,06
1985	153	**1,33**	**3,21**	**3,23**	0,70	142	**3,33**	-0,69	**3,20**	-0,56	0,14
1986	155	**1,85**	0,46	0,46	0,58	148	0,57	0,34	0,60	0,60	0,03
1987	155	**1,60**	**3,40**	**3,38**	0,65	153	0,06	2,40	0,11	**1,38**	0,09
1988	152	**1,37**	**3,68**	**1,86**	0,63	145	**2,97**	**-1,50**	**2,96**	**-1,55**	0,16
1989	146	**1,62**	**2,17**	0,00	0,60	148	0,04	0,93	0,17	0,29	0,00
1990	128	**1,06**	**2,83**	0,42	0,63	136	**2,16**	**-1,87**	**0,92**	-0,06	0,13
1991	110	**0,32**	**4,26**	0,04	0,44	111	0,19	2,05	0,13	-0,33	0,00
1992	110	**0,87**	**1,60**	**0,57**	0,67	103	0,96	**-2,24**	**1,49**	-0,12	0,22
1993	116	**1,33**	-0,87	**2,27**	0,58	99	0,17	-0,22	0,66	0,49	0,02
1994	127	**0,90**	0,83	**3,02**	0,65	111	**-1,18**	**2,07**	**1,19**	-0,11	0,18
1995	131	**1,08**	**-1,19**	**2,42**	0,60	121	0,35	-1,39	0,74	0,19	0,01
1996	136	**0,94**	**2,24**	**2,61**	0,52	124	**3,09**	**-2,85**	**2,23**	-0,08	0,13
1997	136	**0,68**	**4,41**	1,21	0,48	119	**1,97**	-1,06	**2,33**	0,12	0,15
1998	133	**0,43**	**5,20**	**3,70**	0,48	130	-0,65	**2,15**	0,46	**1,24**	0,15
1999	153	**0,88**	1,37	**2,87**	0,18	121	**-1,03**	**-4,02**	**2,30**	**-1,24**	0,05
2000	154	**0,97**	1,34	**1,46**	0,39	136	**2,27**	**0,82**	**0,77**	0,45	0,29
2001	152	**1,01**	**3,14**	**2,32**	0,55	138	**1,84**	-0,09	**0,84**	0,35	0,39
2002	167	**0,73**	**4,32**	**1,74**	0,74	142	**0,88**	**0,74**	**0,70**	-0,06	0,23
2003	175	**1,17**	**3,53**	**3,00**	0,75	146	-0,03	**1,26**	**0,52**	0,30	0,08
2004	180	**1,00**	**6,39**	**3,98**	0,69	174	**1,38**	0,43	**1,37**	0,24	0,21
Mean	135	**1,16**	**2,29**	**1,76**	0,58	126	**1,11**	0,75	0,66	0,29	0,13
1980-84	374	**1,54**	0,91	1,19	0,51	242	1,14	-3,33	0,87	-0,59	0,00
1985-89	761	**1,64**	**1,96**	**1,95**	0,62	736	**1,29**	0,12	**1,27**	0,14	0,06
1990-94	591	**1,09**	**1,00**	**1,69**	0,54	560	**0,35**	0,38	**0,33**	**0,96**	0,11
1995-99	689	**0,95**	**1,38**	**2,38**	0,35	615	**0,71**	**-1,40**	**1,21**	0,13	0,04
2000-04	828	**1,02**	**3,44**	**2,56**	0,60	736	**0,42**	**0,83**	**0,95**	0,01	0,07
Pooled	3243	**1,15**	**2,51**	**2,51**	0,51	2889	**0,64**	**0,35**	**0,62**	**0,37**	0,05

Table description

Table 5 describes the value relevance of accounting information for a sample of Swedish firms in the time-period 1979 to 2004. It summarizes the number of observations (N), regression coefficients (a_1, a_2, a_3, b_1, b_2, b_3 and b_4) and the total explanatory power (R^2_{TOR}) for the total sample (Panel A), the traditional industries sample (Panel B) and the non-traditional sample (Panel C). Firms are classified into industries following Table 1. Each Panel presents data for individual years, the mean for all years, pooled results for 5-year periods and pooled results for the whole 25-year period. The highlighted years refer to the "IT-bubble" years. Data is analyzed using both a Price and a Return model, defined as:

Price Model: $$P_{it} = a_0 + a_1 BVS_{it} + a_2 SEPS_{it} + a_3 (EPS_{it} - SPES_{it}) + \varepsilon_{it}$$

Return Model: $$R_{it} = b_0 + b_1 Earn_{it} + b_2 \Delta Earn_{it} + b_3 (Earn_{it} - SE_{it}) + b_4 (\Delta Earn_{it} - \Delta SE_{it}) + \varepsilon_{it}$$

where P_{it} is the share price of firm *i* in period *t*, *BVS* is the book value per share, *EPS* is the net earnings per share, *R* is the dividend-adjusted return, Earn is earnings and ΔEarn is the yearly change in earnings. Both Earn and ΔEarn are scaled by the market value of equity at *t-1*. A sustainable component of reported earnings is estimated using the model:

$$SE_{i,t} = TA_{i,T-1} \cdot \left(\sum_{t=T-4}^{T} \frac{NP_{i,t}}{TA_{i,t-1}} \Big/ T \right)$$

In the Price model specification sustainable earnings are divided by the number of outstanding shares at time *t*, and in the Return model specification they are divided by the market value of equity at *t-1*. The difference between reported and sustainable earnings is the transitory component of earnings ((EPS – SEPS) and (Earn – SE)).

The annual means for the non-traditional industries are computed for the period 1985-2004 due to few observations in the first years of the sample period. Boldface denotes significance at a 10% level, two-sided test. R^2 is set equal to zero if negative.

t-test for difference in the mean adjusted R^2 between traditional and non-traditional industries:

0.086 for the Price model specification (p-value, difference in favour of traditional industries)
0.784 for the Return model specification (p-value, difference in favour of non-traditional industries)

Panel B: Traditional Industries

Year	Price Model N	a_1	a_2	a_3	R^2_{TOT}	Return Model N	b_1	b_2	b_3	b_4	R^2_{TOT}
1981	60	**0,82**	1,66	-0,88	0,61						
1982	69	**1,59**	2,74	2,14	0,66	61	**2,96**	-3,93	1,38	0,22	0,02
1983	89	**2,29**	0,35	1,23	0,65	71	0,77	**27,33**	**-8,45**	**4,17**	0,36
1984	121	**1,92**	-1,33	-0,84	0,58	91	**1,62**	-2,39	**2,07**	-0,56	0,06
1985	133	**1,24**	**3,74**	**3,75**	0,76	125	**3,42**	-0,67	**3,29**	-0,54	0,14
1986	128	**1,87**	0,19	0,18	0,60	128	**-2,25**	3,05	**-2,26**	**3,13**	0,07
1987	129	**1,62**	**3,43**	**3,41**	0,65	127	-0,16	2,73	-0,05	0,85	0,02
1988	124	**1,26**	**4,62**	**3,44**	0,68	117	**3,08**	-0,66	2,13	-0,78	0,15
1989	121	**1,57**	**2,85**	-0,21	0,62	123	-0,42	**1,32**	-0,34	0,60	0,00
1990	106	**1,09**	**2,72**	0,69	0,65	113	**2,17**	**-1,93**	**1,05**	-0,21	0,13
1991	92	**0,32**	**3,85**	-0,27	0,46	92	0,70	1,09	0,88	-0,76	0,02
1992	93	**0,93**	**1,25**	**0,58**	0,68	87	0,97	**-3,29**	**1,63**	-0,06	0,24
1993	98	**1,26**	0,65	**1,29**	0,64	85	0,26	0,11	0,48	0,53	0,03
1994	106	**0,68**	**3,84**	**3,06**	0,69	93	**-1,33**	**1,98**	**1,20**	-0,19	0,17
1995	106	**0,65**	**3,79**	**2,56**	0,66	100	**1,48**	-1,59	**0,86**	0,04	0,05
1996	106	**0,42**	**8,37**	**2,14**	0,62	101	**2,88**	-2,11	**2,07**	-0,13	0,10
1997	101	0,26	**8,21**	1,16	0,55	91	1,32	-0,02	**1,44**	0,32	0,05
1998	96	0,12	**7,84**	**4,18**	0,56	97	-1,05	**3,14**	0,63	0,63	0,10
1999	97	**0,54**	**5,58**	**2,72**	0,43	87	**-2,13**	**5,46**	-1,16	0,07	0,05
2000	92	0,24	**5,15**	**3,66**	0,46	91	**2,75**	0,44	**0,86**	**0,71**	0,26
2001	85	**0,44**	**6,60**	**2,90**	0,58	84	**1,50**	0,44	0,10	**1,21**	0,29
2002	89	**0,43**	**5,89**	**2,35**	0,69	84	**1,55**	-0,53	**1,47**	-0,17	0,36
2003	92	**0,89**	**4,13**	**2,85**	0,65	83	0,41	0,83	-0,39	**1,12**	0,10
2004	96	**0,58**	**8,35**	**3,54**	0,61	90	**1,59**	**3,45**	**0,93**	0,35	0,18
Mean	101	**0,96**	**3,94**	**1,90**	0,61	97	**0,96**	1,49	0,43	**0,46**	0,13
1980-84	339	**1,56**	0,83	1,01	0,54	223	**3,63**	-5,03	**4,05**	**-1,39**	0,06
1985-89	635	**1,59**	**2,41**	**2,41**	0,65	620	**1,19**	0,12	**1,18**	0,14	0,05
1990-94	495	**0,92**	**2,71**	**1,40**	0,59	470	0,26	0,48	0,21	**0,98**	0,11
1995-99	505	**0,40**	**6,87**	**2,33**	0,54	476	0,58	0,10	**0,86**	-0,10	0,01
2000-04	454	**0,64**	**5,02**	**3,15**	0,54	432	**1,35**	-0,02	**0,64**	**0,50**	0,10
Pooled	2429	**1,06**	**3,09**	**3,04**	0,54	2221	**0,64**	**0,44**	**0,61**	**0,48**	0,05

Panel C: Non-Traditional Industries

Year	Price Model N	a_1	a_2	a_3	R^2_{TOT}	Return Model N	b_1	b_2	b_3	b_4	R^2_{TOT}
1981											
1982						3	0,00	0,00	-15,42	25,88	
1983	12	**7,67**	-13,03	-20,54	0,70	4	-3,32	0,00	9,23	-3,54	
1984	17	2,37	13,74	10,27	0,65	12	13,39	30,68	15,12	-8,77	0,22
1985	20	**3,71**	4,99	-4,29	0,66	17	10,29	-21,44	11,90	**-13,87**	0,00
1986	27	**1,58**	**23,01**	**-14,92**	0,69	20	**7,62**	2,31	-2,67	0,72	0,27
1987	26	**1,39**	4,79	0,92	0,51	26	**7,38**	4,23	**-7,02**	**7,33**	0,47
1988	28	**1,63**	**3,46**	-2,10	0,48	28	-2,28	2,49	**5,66**	**-5,62**	0,17
1989	25	**1,27**	1,66	0,60	0,44	25	0,88	3,37	**2,08**	0,71	0,00
1990	22	1,08	4,61	-0,11	0,40	23	3,31	-0,99	-0,97	2,23	0,06
1991	18	0,79	5,64	1,56	0,23	19	-0,95	-1,29	1,02	0,48	0,00
1992	17	0,32	**7,13**	0,03	0,37	16	1,86	-1,48	1,41	-0,07	0,02
1993	18	0,97	-0,25	**11,50**	0,58	14	3,35	-9,45	1,53	1,22	0,00
1994	21	**1,77**	1,44	**3,71**	0,76	18	-0,01	1,24	0,52	1,46	0,10
1995	25	**3,06**	-4,51	-2,71	0,75	21	-0,63	2,66	0,07	3,08	0,01
1996	30	**2,00**	-1,14	-1,33	0,42	23	2,44	-5,19	2,28	0,70	0,07
1997	35	**1,56**	0,21	**3,22**	0,30	28	**4,00**	**-4,33**	**6,38**	-3,37	0,27
1998	37	**2,48**	0,60	**6,16**	0,47	33	0,44	2,23	0,35	**1,70**	0,26
1999	56	**3,22**	-1,50	2,36	0,19	34	-0,41	**-11,06**	**5,00**	**-1,96**	0,24
2000	62	**2,28**	0,62	**2,58**	0,56	45	**1,98**	**3,29**	-0,80	1,68	0,20
2001	67	**2,29**	-1,46	**5,07**	0,56	54	**0,73**	-0,87	**1,55**	-0,06	0,29
2002	78	**1,24**	**2,19**	0,74	0,81	58	0,27	0,23	**0,68**	-0,05	0,07
2003	83	**1,55**	**2,99**	**2,79**	0,84	63	0,38	**1,09**	**0,93**	-0,02	0,08
2004	84	**1,23**	**5,05**	**3,72**	0,66	84	**1,15**	0,42	**1,15**	0,25	0,19
Mean	39	**1,77**	**2,98**	0,97	0,53	32	**2,09**	-1,63	**1,55**	-0,17	0,14
1980-84	35	**3,52**	**15,24**	**8,66**	0,53	19	0,44	19,61	**-10,33**	2,78	0,44
1985-89	126	**1,85**	**1,79**	-0,88	0,47	116	**1,63**	0,10	**1,10**	0,61	0,05
1990-94	96	**1,58**	0,52	**2,65**	0,50	90	0,95	0,06	**1,28**	0,87	0,07
1995-99	183	**2,03**	0,07	**2,36**	0,30	139	**1,38**	**-3,01**	**1,90**	0,41	0,14
2000-04	374	**1,62**	**2,42**	**1,96**	0,63	304	0,19	**1,02**	**0,95**	-0,15	0,08
Pooled	814	**1,86**	**1,08**	**2,39**	0,45	668	**0,34**	**0,64**	**0,85**	-0,03	0,04

sustainable and transitory earnings very differently. Return regressions also display an increase in value relevance and the largest increase occurs for the traditional industries. However, decomposing earnings into a sustainable and a transitory component does not disturb the previous finding that non-traditional industries display slightly higher value relevance than traditional industries.

Next we examine whether a measure of sustainable earnings has information beyond that of a simple dummy that merely adjusts for differences between profits and losses. It can be expected that many of the transitory components our model detects are in fact losses. Table 6 shows results from the price model in which reported earnings is decomposed into its sustainable and transitory components and a dummy is used for negative earnings.[10] Again we find an incremental positive effect of adding an additional explanatory variable. The overall explanatory power increases to 59%. For the full sample as well as the two sub-samples all four explanatory variables are statistically significant. More important, the explanatory power is substantially higher for both the traditional and non-traditional industry categories than what it is for the total sample. The incremental effect of controlling for nonlinearities in positive earnings is 2% in traditional industries and 7% in non-traditional industries. The explanatory power in the non-traditional industries increases to such an extent that there is no difference between traditional and non-traditional industries as both industry categories display an R^2 of 63% (p=0.941). The transitory elements of earnings are thus not just losses but also variations in the level of profits. We emphasize that the results do not refute past findings that the value relevance is lower in non-traditional industries when using *reported* accounting information, but we broaden the perspective by showing that the differences disappear if the different properties of sustainable and transitory earnings are considered.

[10] We have also re-run the return regression using this methodology. However, as the results are practically identical to the ones reported in Table 4, we do not tabulate the results. Mean explanatory power is identical to Table 4 for the traditional sector, while it increases by one percentage point for the non-traditional industries.

Table 6: The Value Relevance of Accounting Earnings, Sustainable Earnings and Negative Earnings

	Total Sample						Traditional Industries						Non-Traditional Industries					
Year	N	a1	a2	a3	a4	R^2_{TOT}	N	a1	a2	a3	a4	R^2_{TOT}	N	a1	a2	a3	a4	R^2_{TOT}
1981	63	**0,84**	1,57	-0,95	2,09	0,61	60	**0,90**	1,01	-0,84	19,00	0,60						
1982	72	**1,53**	3,12	2,44	-0,81	0,65	69	**1,53**	3,30	2,40	-1,00	0,66						
1983	101	**2,39**	-0,71	0,30	1,73	0,59	89	**2,28**	0,39	1,27	-0,24	0,65	12	**7,67**	-13,03	-20,54	0,00	0,70
1984	138	**1,87**	-0,93	-0,41	-13,97	0,56	121	**1,85**	-0,73	-0,28	-15,51	0,58	17	2,37	13,74	10,27	0,00	0,65
1985	153	**1,34**	**3,17**	**3,18**	23,16	0,70	133	**1,24**	**3,71**	**3,72**	17,17	0,76	20	**3,71**	4,99	-4,29	0,00	0,66
1986	155	**1,60**	**2,72**	**2,71**	**-9,05**	0,61	128	**1,60**	**2,60**	**2,60**	**-11,11**	0,64	27	0,23	**35,48**	**-13,87**	**-15,80**	0,73
1987	155	**1,50**	**4,00**	**3,98**	-2,86	0,65	129	**1,48**	**4,20**	**4,18**	-3,29	0,65	26	**1,38**	4,58	0,70	10,38	0,49
1988	152	**1,26**	**4,37**	**2,64**	**-3,47**	0,64	124	**1,26**	**4,60**	**3,42**	0,80	0,67	28	**2,52**	0,39	**-6,81**	6,41	0,51
1989	146	**1,48**	**3,06**	0,75	-4,23	0,60	121	**1,44**	**3,71**	0,43	**-7,71**	0,62	25	0,90	3,84	2,94	-4,15	0,43
1990	128	**1,06**	**3,01**	0,74	-1,93	0,63	106	**1,09**	**2,72**	0,68	0,08	0,64	22	0,47	9,23	4,00	-6,71	0,42
1991	110	**0,27**	**8,47**	**4,51**	**-6,25**	0,50	92	**0,28**	**7,04**	**3,16**	**-5,03**	0,50	18	**0,71**	**19,82**	**22,94**	**-23,40**	0,95
1992	110	**0,84**	**2,16**	**1,16**	-0,85	0,67	93	**0,90**	**1,63**	0,96	-0,58	0,68	17	**0,33**	**16,15**	**19,76**	**-19,81**	0,89
1993	116	**1,13**	**2,83**	**4,44**	**-5,57**	0,61	98	**1,20**	1,86	**2,18**	-2,05	0,64	18	**0,97**	**13,24**	**9,22**	**-21,06**	0,91
1994	127	**0,76**	**2,87**	**3,77**	**-7,41**	0,66	106	**0,66**	**4,22**	**3,22**	-2,48	0,69	21	0,24	**12,37**	**11,79**	**-24,34**	0,86
1995	131	**0,82**	1,49	**3,45**	**-12,94**	0,63	106	**0,60**	**4,15**	**2,97**	-5,55	0,66	25	**2,35**	1,81	2,16	-16,81	0,76
1996	136	**0,78**	**3,87**	**3,78**	**-4,39**	0,52	106	0,28	**9,76**	**3,28**	-4,07	0,63	30	**1,88**	0,31	-0,73	-5,18	0,40
1997	136	**0,59**	**5,21**	1,67	-2,41	0,47	101	0,24	**8,39**	1,34	-1,15	0,54	35	**2,76**	**-6,08**	1,11	**12,32**	0,41
1998	133	0,20	**7,43**	**6,26**	**-5,98**	0,50	96	-0,06	**9,65**	**6,42**	**-7,99**	0,59	37	**2,45**	0,91	6,56	-0,55	0,45
1999	153	**0,70**	**3,74**	**6,29**	**-7,52**	0,20	97	**0,44**	**7,09**	**5,66**	**-8,38**	0,45	56	**3,07**	0,13	4,08	-2,40	0,18
2000	154	**0,89**	2,08	**2,04**	-1,76	0,39	92	0,17	**5,88**	**4,22**	-3,97	0,46	62	**2,28**	0,68	**2,62**	-0,10	0,56
2001	152	**0,79**	**5,86**	**4,64**	**-4,82**	0,57	85	0,21	**9,07**	**5,16**	**-5,54**	0,61	67	**2,08**	**7,66**	**15,40**	**-12,48**	0,62
2002	167	**0,50**	**7,20**	**5,07**	**-6,03**	0,78	89	0,08	**9,47**	**6,73**	**-8,97**	0,77	78	**1,16**	**6,64**	**5,64**	**-6,26**	0,85
2003	175	**0,91**	**6,30**	**5,54**	**-5,84**	0,78	92	**0,58**	**7,63**	**6,19**	**-6,75**	0,69	83	**1,41**	**4,60**	**4,25**	**-4,67**	0,86
2004	180	**0,69**	**9,44**	**6,93**	**-9,35**	0,72	96	0,16	**12,50**	**7,30**	**-10,93**	0,66	84	**1,09**	**6,77**	**5,36**	**-6,04**	0,67
Mean'	135	**1,03**	**3,85**	**3,12**	**-3,77**	0,59	101	**0,85**	**5,16**	**3,18**	**-3,14**	0,63	39	**1,60**	**7,18**	**4,64**	**-7,03**	0,63
1980-84	374	**1,60**	0,38	0,70	2,27	0,51	339	**1,57**	0,79	0,97	0,25	0,54	35	**4,59**	4,28	-3,06	16,41	0,54
1985-89	761	**1,50**	**2,93**	**2,93**	**-5,43**	0,63	635	**1,46**	**3,30**	**3,30**	**-8,33**	0,66	126	**2,03**	0,85	-2,02	2,11	0,47
1990-94	591	**0,93**	**3,01**	**3,45**	**-3,71**	0,57	495	**0,83**	**3,88**	**2,52**	**-2,47**	0,60	96	**0,64**	**9,28**	**10,80**	**-12,44**	0,70
1995-99	689	**0,76**	**3,13**	**3,78**	**-4,95**	0,36	506	**0,31**	**7,70**	**3,23**	**-4,17**	0,54	183	**2,24**	-1,51	0,88	2,93	0,30
2000-04	828	**0,82**	**5,61**	**4,61**	**-4,76**	0,62	454	**0,37**	**7,70**	**5,66**	**-6,41**	0,57	374	**1,48**	**4,61**	**3,99**	**-3,99**	0,65
Pooled	3243	**1,00**	**3,90**	**3,89**	**-3,76**	0,52	2429	**0,93**	**4,23**	**4,19**	**-3,72**	0,55	814	**1,74**	**2,41**	**3,62**	**-2,36**	0,46

Table description

Table 6 describes the value relevance of accounting information for a sample of Swedish firms in the time-period 1979 to 2004. It summarizes the number of observations (N), regression coefficients (a_1, a_2, a_3 and a_4) and the total explanatory power (R^2_{TOT}) for the total sample, the traditional industries sample and the non-traditional industries sample. Firms are classified into industries following Table 1. Each Panel presents data for individual years, the mean for all years, pooled results for 5-year periods and pooled results for the whole 25-year period. The highlighted years refer to the "IT-bubble" years. Data is analyzed using a Price model specification:

Price Model:

$$P_{it} = a_0 + a_1 BVS_{it} + a_2 SEPS_{it} + a_3 (EPS_{it} - SEPS_{it}) + a_4 EPS_{it} * D + \varepsilon_{it}$$
$$\text{where } D = 1 \text{ if } EPS < 0, \text{ zero otherwise}$$

where P_{it} is the share price of firm *i* in period *t*, *BVS* is the book value per share, and *EPS* is the net earnings per share. A sustainable component of reported earnings is estimated using the model:

$$SE_{i,t} = TA_{i,T-1} \cdot \left(\sum_{t=T-4}^{T} \frac{NP_{i,t}}{TA_{i,t-1}} \Big/ T \right)$$

The sustainable earnings are divided by the number of outstanding shares at time *t*. The difference between reported and sustainable earnings is the transitory component of earnings (EPS - SEPS).

The annual means for the non-traditional industries are computed for the period 1985-2004 due to few observations in the first years of the sample period. Boldface denotes significance at a 10% level, two-sided test. R^2_{TOT} is set equal to zero if negative.

t-test for difference in the mean adjusted R^2 between traditional and non-traditional industries:
0.941 for the Price model specification (p-value, in favour of the non-traditional industries)

While the long term average value relevance does not differ between traditional and non-traditional industries, it seems as if the larger and more frequently occurring transitory components makes the associations more unstable in the non-traditional industries. We expect that the value relevance of accounting information provided by firms in non-traditional industries varies more over time. The standard deviations of annual price and return regressions (from Tables 3 and 4) are presented in Panel A of Table 7. The standard deviation of the mean annual R^2 is 0.15/0.16 for the complete sample when the price model specification is considered. When the sample is divided into traditional and non-traditional industries, the standard deviations amount to respectively 0.09/0.10 and 0.22/0.20. All price model specifications yield statistically significant differences (p-values of 0.003 and 0.000, respectively).[11][12] Non-traditional industries have a considerably higher variability in the association between accounting information and share prices than traditional industries. The return model specifications yields smaller and statistically insignificant differences (p-values of 0.186 and 0.714, respectively), suggesting a higher variance in the non-traditional industries. In addition, Panel B of Table 7 shows that the Mean Absolute Deviation is higher for non-traditional industries for both price and return model specifications, with and without an adjustment for negative earnings. As in Panel A, the differences are smaller for return model specifications.

In response to the critique made by Gu [2007] that comparisons of value relevance (as measured by R^2) across samples are biased we use his suggested alternative measure; a scale-adjusted RMSE (i.e., RMSE minus RMSE in the appropriate scale decile), as the metric of value relevance. This alternative measure does not alter any of the conclusions and we therefore present R^2s throughout the paper as they can be related to past studies and have a more intuitive interpretation. When the RMSE and R^2 are as highly correlated as in this study, the problems suggested by Gu [2007] vanishes. In summary, the RMSE measure

[11] When applying a standard two-sample variance comparison F-test.

[12] The models including sustainable earnings are no different. There is almost no decrease in standard deviation for the traditional industries (0.09 for the specifications in Tables 5 and 6) and a slight decrease for non-traditional industries (to 0.19 and 0.18 respectively). Differences between the two industry categories remain statistically significant. The same holds for our tests based on RMSE as suggested by Gu [2007].

Table 7: Variation in Value Relevance (R^2_{TOT})

Panel A: Standard Regressions

	Price Model		**Return model**	
	with dummy	w/o dummy	with dummy	w/o dummy
All observations	0,15	0,16	0,12	0,09
Traditional Industries	0,09	0,10	0,12	0,08
Non-Traditional Industries	0,22	0,20	0,13	0,11
P-value (F-test)	0	0,003	0,714	0,186

Panel B: Mean absolute deviation (R^2_{TOT})

	Price Model		**Return model**	
	with dummy	w/o dummy	with dummy	w/o dummy
All observations	0,11	0,12	0,09	0,08
Traditional Industries	0,07	0,08	0,09	0,07
Non-Traditional Industries	0,19	0,16	0,10	0,09

Table description
Table 7 shows the variation in value relevance of accounting information for a sample of Swedish firms in the time-period 1979 to 2004 using both Price and Return model specifications. The model without a dummy is based on R^2s from Panels A, B and C of Table 3, and the model with a dummy is based on R^2s from Panels A, B and C of Table 4. Both panels are computed with information from the years 1985-2004 (due to few observations for the non-traditional industries in the first years of the sample). Panel A shows the standard deviations of the annual adjusted R^2 for each model. These standard deviations are measures of the over-time variability in value relevance for the various sub-samples. Panel B shows an alternative measure; the mean absolute deviation (MAD), of the annual adjusted R^2 for each model.

F-test for difference in the variance of adjusted R^2 between traditional and non-traditional industries:

Standard regressions (Panel A)	Price model:	p-value of 0.003
	Return model:	p-value of 0.186
Negative earnings (Panel B)	Price model:	p-value of 0.000
	Return model:	p-value of 0.714

suggests that there is no difference in the average annual explanatory power when using a price model specification (p=0.909) and a return model specification (p=0.230, but the difference is in favour of non-traditional industries). The RMSE measure suggests that there is a difference in the variations (p=0.020 for both model specifications).[13]

As mentioned earlier, the period 1997-2000 – popularly referred to as the “IT-bubble” – was given much attention in media. It was a particularly dramatic period in the history of equity markets and during these years the “new economy” was often discussed, also by accounting researchers (see e.g. Core, Guay and Van Buskirk [2003]). Table 4 shows that the mean R^2 for

[13] Details on these tests can be obtained from the authors upon request. The p-values refer to the regression specifications applied in Table 4.

the annual price regressions is 50% for firms operating in the traditional industries in the years 1997 to 2000. However, for non-traditional industries, the mean R^2 is only 29%. While the explanatory power decreased for both industry categories in this turbulent period we note that both the period preceding and following the IT-bubble display much higher value relevance for both industry categories. In fact, the average for these years (1993-96 and 2001-04) is 64% for the traditional industries and 74 % for the non-traditional industries. While all industries suffered in the IT-bubble years the non-traditional industries suffered considerably more. What is really surprising is that the surrounding years make the average 1993 to 2004 explanatory power *higher* in the non-traditional industries. The finding is unlikely to be caused by a sample selection bias as (1) the explanatory power is higher both before and after the IT-bubble, and (2) the number of firms in the non-traditional industries continued to increase in the years after the IT-bubble years, while the number of firms in the traditional industries decreased.

The return models display slightly different results. Both model specifications (with and without a consideration for negative earnings) show that the non-traditional industries provide *more* value relevant information in the last 12 years (1993-2004). During the IT-bubble years the value relevance is considerably higher for non-traditional industries and it is only in the years after the IT-bubble that firms in traditional industries experience higher value relevance. Firms in the non-traditional industries are those that provide the most value relevant accounting information in the IT-bubble years.

In the price regressions, the incremental value relevance of book value decreases substantially in the years 1997 to 2000, while the incremental explanatory power for earnings remain at almost the same level. More specifically, it is the incremental value relevance of *BVS* that is low for the non-traditional sector during the IT-bubble years. That is not very surprising. It is particularly during a boom, when stock prices are at their highest level, that the statistical association between the stock prices and conservative accounting values is likely to reach its lowest levels. Furthermore, the stock price increases were especially large for IT and high-tech stocks during this period. As such, the combination of the extreme levels of share price for non-traditional firms and the fact that these industries are relatively more influenced by conservative accounting rules, may be the cause of their low value relevance in these years.

In accordance with the third hypothesis the value relevance of accounting information varies more over time in the non-traditional industries. To understand the variations better we display them in Figure 1. This figure shows that value relevance not only varies more for non-traditional industries, but also that it moves in a cyclical pattern around the, reasonably stable, value relevance of the traditional industries.

Next, we assess the extent to which these variations in value relevance are determined by the economic conditions and equity market sentiments. We use three crude measures based on annual information: the stock market return, the growth of the economy, and the equity market's valuation. The equity market return captures primarily market sentiments, but also expectations of future economic growth. We measure it as the 12-month change in the AFGX, an index based on the largest firms at the Stockholm Stock Exchange. The economic growth disregards the stock market's expectations and focuses purely on the state of the economy. We measure it as the annual change in GDP-per-capita. The stock market's valuation captures both expectations about the future economic growth and market sentiments. We measure it as the average equal-weighted market-to-book ratio for all firms listed at the Stockholm Stock Exchange. Table 8 provides correlation coefficients for the three measures and as expected all

Figure 1: Variations in Value Relevance

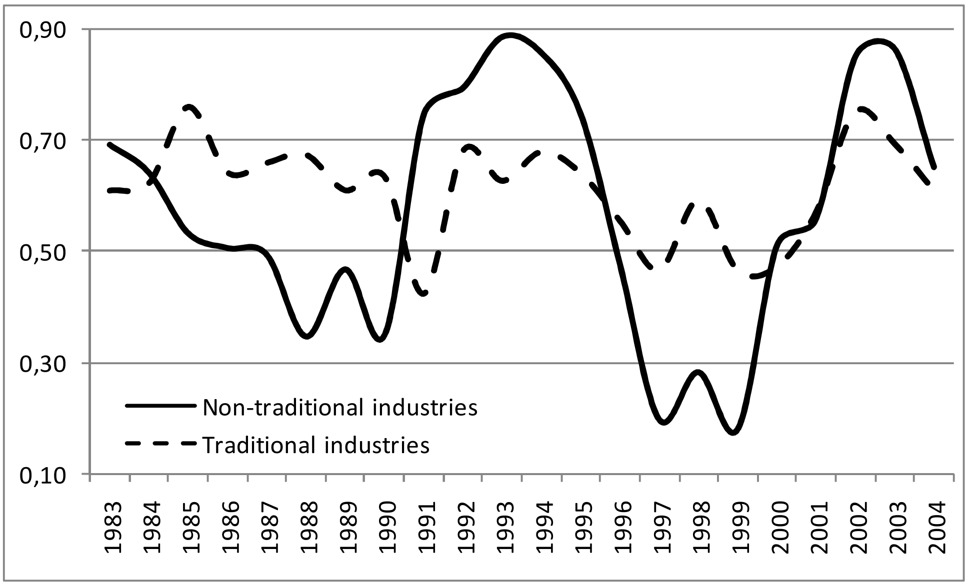

Figure description
Figure 1 is based on an analysis of the value relevance over time for a sample of firms listed at the Swedish Stock Exchange in the years 1983 to 2004 using a Price model specification with an adjustment for negative earnings:

$$P_{it} = a_0 + a_1 BVS_{it} + a_2 EPS_{it} + a_3 EPS_{it} \cdot D + \varepsilon_{it}$$
$$\text{where D} = 1 \text{ when EPS} < 0, \text{ otherwise } 0$$

where P_{it} is the share price of firm *i* in period *t*, *BVS* is the book value per share, and *EPS* is the net earnings per share. See Table 4 for details on the model specification. Figure 1 shows the explanatory power (adjusted R^2) for the traditional and non-traditional industry categories as outlined in Panels B and C of Table 4.

measures are correlated. We find the highest correlation between stock market valuation and the economic growth. As shown the measures are correlated to each other, but they are far from perfect substitutes of each other.

To test the third hypothesis we rank all the years based on each variable and sort out the ten years with the highest/lowest values for each variable. Table 8 displays findings for the price and return model specifications with an adjustment for negative earnings.[14] For the price model specification we expect that there is a greater difference in value relevance of non-traditional industries between strong and weak years. We expect that there is a negative

[14] Untabulated results show qualitatively similar results when applying price and return models without an adjustment for negative earnings, as well as when applying models with adjustment for sustainable earnings.

association, meaning that the value relevance is lower when there is high economic growth and strong market sentiments. We also expect book values of equity to be particularly affected by stock market sentiments and therefore that the price model specification is more affected.

Panel A presents the value relevance's association to stock market performance. Tests based on the price model specification confirm our expectations. In good times the average difference is 9 percentage points (in favour of the traditional industries) whereas there is no difference in bad times. We also note that there is no difference at all in value relevance between high- and low-return years within the traditional industries. Thus the difference in relative value relevance between traditional and non-traditional industries is driven solely by inter-temporal variations in the non-traditional industry category. Panel B displays results of an analysis based on economic growth. Again, the price model specification confirms our expectations. In good times the average difference is 14 percentage points higher for the traditional industries whereas the non-traditional industries have a 5 percentage point higher relevance in bad years. The inter-temporal variation is almost completely due to the non-traditional industries.

Panel C displays the same analysis based on stock market valuation. When firms have high values relative to fundamentals the value relevance is 14 percentage points in favour of the traditional industries, whereas it is 5 percentage points in favour of the non-traditional industries when firms are valued low relative to fundamentals. As in the previous panels we see no variation within the traditional industries, but all changes in the relative value relevance is caused by inter-temporal variations within the non-traditional industries. To summarize, the three measures of economic conditions show differences in the relative value relevance of 9, 19 and 19 percentage points in support of hypotheses 3a and 3b.

Table 8: Value relevance and economic conditions

Panel A: Stock market sentiments

		Price Model			Return Model		
High return	**AFGX-Ret**	**Trad**	**Non-Trad**	**Diff**	**Trad**	**Non-Trad**	**Diff**
1985	0,25	0,76	0,53	0,23	0,16	0,10	0,05
1986	0,51	0,64	0,51	0,14	0,02	0,16	-0,13
1988	0,52	0,67	0,35	0,33	0,14	0,19	-0,05
1989	0,24	0,61	0,47	0,14	0,00	0,30	-0,31
1993	0,54	0,63	0,88	-0,26	0,21	0,26	-0,05
1995	0,18	0,64	0,75	-0,11	0,04	0,00	0,04
1996	0,38	0,55	0,48	0,08	0,11	0,17	-0,05
1997	0,25	0,47	0,20	0,27	0,09	0,12	-0,03
1999	0,66	0,47	0,18	0,28	0,00	0,09	-0,09
2003	0,30	0,69	0,86	-0,17	0,17	0,00	0,17
Mean	0,38	0,61	0,52	0,09	0,09	0,14	-0,04

		Price Model			Return Model		
Low return	**AFGX-Ret**	**Trad**	**Non-Trad**	**Diff**	**Trad**	**Non-Trad**	**Diff**
1987	-0,08	0,66	0,49	0,16	0,02	0,33	-0,31
1990	-0,31	0,63	0,35	0,28	0,11	0,09	0,02
1991	0,05	0,42	0,74	-0,32	0,06	0,00	0,06
1992	-0,01	0,68	0,79	-0,11	0,18	0,12	0,06
1994	0,05	0,68	0,85	-0,18	0,22	0,27	-0,05
1998	0,11	0,59	0,28	0,31	0,10	0,39	-0,29
2000	-0,12	0,47	0,51	-0,04	0,28	0,18	0,10
2001	-0,17	0,57	0,56	0,01	0,30	0,49	-0,19
2002	-0,37	0,75	0,85	-0,10	0,49	0,12	0,37
2004	0,17	0,61	0,65	-0,04	0,18	0,22	-0,04
Mean	-0,07	0,61	0,61	0,00	0,19	0,22	-0,03

Panel B: Economic growth

		Price Model			Return Model		
High growth	**ΔGDP**	**Trad**	**Non-Trad**	**Diff**	**Trad**	**Non-Trad**	**Diff**
1985	0,07	0,76	0,53	0,23	0,16	0,10	0,05
1986	0,06	0,64	0,51	0,14	0,02	0,16	-0,13
1987	0,06	0,66	0,49	0,16	0,02	0,33	-0,31
1988	0,07	0,67	0,35	0,33	0,14	0,19	-0,05
1989	0,08	0,61	0,47	0,14	0,00	0,30	-0,31
1990	0,05	0,63	0,35	0,28	0,11	0,09	0,02
1995	0,06	0,64	0,75	-0,11	0,04	0,00	0,04
1997	0,05	0,47	0,20	0,27	0,09	0,12	-0,03
2000	0,08	0,47	0,51	-0,04	0,28	0,18	0,10
2004	0,06	0,61	0,65	-0,04	0,18	0,22	-0,04
Mean	0,06	0,62	0,48	0,14	0,10	0,17	-0,07

		Price Model			Return Model		
Low growth	**ΔGDP**	**Trad**	**Non-Trad**	**Diff**	**Trad**	**Non-Trad**	**Diff**
1991	0,00	0,42	0,74	-0,32	0,06	0,00	0,06
1992	-0,02	0,68	0,79	-0,11	0,18	0,12	0,06
1993	0,03	0,63	0,88	-0,26	0,21	0,26	-0,05
1994	0,05	0,68	0,85	-0,18	0,22	0,27	-0,05
1996	0,05	0,55	0,48	0,08	0,11	0,17	-0,05
1998	0,04	0,59	0,28	0,31	0,10	0,39	-0,29
1999	0,05	0,47	0,18	0,28	0,00	0,09	-0,09
2001	-0,01	0,57	0,56	0,01	0,30	0,49	-0,19
2002	0,02	0,75	0,85	-0,10	0,49	0,12	0,37
2003	0,04	0,69	0,86	-0,17	0,17	0,00	0,17
Mean	0,02	0,60	0,65	-0,05	0,18	0,19	-0,01

Panel C: Valuation

		Price Model			Return Model		
High values	**B/M**	**Trad**	**Non-Trad**	**Diff**	**Trad**	**Non-Trad**	**Diff**
1985	0,42	0,76	0,53	0,23	0,16	0,10	0,05
1986	0,35	0,64	0,51	0,14	0,02	0,16	-0,13
1987	0,35	0,66	0,49	0,16	0,02	0,33	-0,31
1988	0,32	0,67	0,35	0,33	0,14	0,19	-0,05
1989	0,41	0,61	0,47	0,14	0,00	0,30	-0,31
1996	0,49	0,55	0,48	0,08	0,11	0,17	-0,05
1997	0,44	0,47	0,20	0,27	0,09	0,12	-0,03
1999	0,47	0,47	0,18	0,28	0,00	0,09	-0,09
2003	0,52	0,69	0,86	-0,17	0,17	0,00	0,17
2004	0,44	0,61	0,65	-0,04	0,18	0,22	-0,04
Mean	0,42	0,61	0,47	0,14	0,09	0,17	-0,08

		Price Model			Return Model		
Low values	**B/M**	**Trad**	**Non-Trad**	**Diff**	**Trad**	**Non-Trad**	**Diff**
1990	0,61	0,63	0,35	0,28	0,11	0,09	0,02
1991	0,97	0,42	0,74	-0,32	0,06	0,00	0,06
1992	1,22	0,68	0,79	-0,11	0,18	0,12	0,06
1993	0,61	0,63	0,88	-0,26	0,21	0,26	-0,05
1994	0,69	0,68	0,85	-0,18	0,22	0,27	-0,05
1995	0,70	0,64	0,75	-0,11	0,04	0,00	0,04
1998	0,63	0,59	0,28	0,31	0,10	0,39	-0,29
2000	0,70	0,47	0,51	-0,04	0,28	0,18	0,10
2001	0,67	0,57	0,56	0,01	0,30	0,49	-0,19
2002	1,01	0,75	0,85	-0,10	0,49	0,12	0,37
Mean	0,78	0,61	0,66	-0,05	0,20	0,19	0,01

Table description

Table 8 shows the value relevance of accounting information for a sample of Swedish firms in the time-period 1985 to 2004 conditioned on the stock market performance (Panel A), economic growth (Panel B) and valuation (Panel C). Each panel is divided into two parts where the first part displays the value relevance in the ten years with the highest performance, and the second part displays the value relevance in the ten years with the lowest performance. Each panel displays results for the Price model and the Return model respectively (see Table 4). *Trad* is the explanatory power (R^2) when the model is applied to firms classified into traditional industries, and *Non-trad* is the explanatory power (R^2) when the model is applied to firms classified into non-traditional industries. See Table 1 for industry classifications. *Diff* is the difference between *Trad* and *Non-trad*. Stock market performance is measured as the annual change in the AFGX index. The economic growth is measured as the annual change in GDP-per-capita, and valuation is measured as the mean equal-weighted association between market and book value of equity for all non-financial firms at the Swedish Stock Exchange.

Correlation between indicators of economic conditions:

	AFGX return	GDP / Capita growth	Book / Market
AFGX return	1.00		
GDP / Capita growth	0.29	1.00	
Market / Book	0.54	0.70	1.00

We perform a similar analysis based on the return model specification. The results are inconclusive. Recall that the return model suggested that accounting information overall is more value relevant in the non-traditional industries. Panel A of Table 8 shows that the value relevance of both traditional and non-traditional industries decrease in periods with high market returns. The change is however similar in size and hence firms in non-traditional industries provide more value relevant information both in periods with high and low market returns. Panels B and C show that non-traditional industries provide more value relevant information, but here the difference is attributed to periods of high economic growth and high stock market valuations. Overall, measures of value relevance stemming from return model specifications appear less affected by the business environment and stock market sentiments. The results are in the opposite direction of that in the price model specification and with much smaller magnitudes. Note that the value relevance for both traditional and non-traditional industries is lower in years characterized by high economic growth and strong market sentiments, respectively.

The price model specification supports hypotheses 3a and 3b, showing that while accounting information's value relevance is largely unchanged over time in traditional industries, it varies substantially for the non-traditional industries. These variations are explained with the growth of the economy and market sentiments. While the return model specification does not support these relative inter-temporal variations, it suggests that both traditional and non-traditional industries experience less value relevant information with high economic growth and strong market sentiments. A firm's value is not only determined by fundamentals related to its history, but also on expectations of the future. The influence of such other factors seems to be relatively stronger under favourable economic conditions, and it is possible that share prices deviate more from their fundamental values under the favourable economic conditions. Stock prices are limited downwards, while there is no natural limit upwards. The non-traditional sector seems to be more sensitive to the market sentiments than the traditional sector, at least when value relevance is measured with a price model specification.

5 Conclusions

Past research has suggested that one reason that the value relevance of accounting information is decreasing (if it is so?) is the growing number of firms relying largely on resources that cannot be recognized under conventional accounting standards. Using a sample of Swedish publicly listed firms we show that while the reported accounting earnings and book value of equity might appear to be less relevant in non-traditional industries this is mainly because of a greater portion of transitory earnings that can easily be captured in a model. Past research has acknowledged the different properties of positive and negative earnings (e.g., Hayn [1995], Collins, Maydew, and Weiss [1997], Ball and Shivakumar [2006], Goodwin and Ahmed [2006]). We prove that the lower value relevance is not just related to a higher frequency of losses among firms in the non-traditional industries, but also to variations in positive earnings. To understand earnings persistence better we make a simple decomposition of earnings into a transitory and sustainable component. It is then evident that differences between the two industry categories (seen when using only reported numbers) largely depend on the transitory elements of positive earnings. It does not seem overly naïve to expect that investors also are able to separate and understand the different properties of sustainable and transitory elements of earnings. Hence past findings of differences between traditional and non-traditional firms based on reported earnings are likely to be biased.

Regardless of which model specification we use, the *changes* in share prices are consistently better explained by accounting information in the non-traditional industries. Our results go against most past findings in research using data from U.S. equity markets in the sense that we find no decrease in value relevance over time. However, the fairly complete dataset we use supports a growing body of international research suggesting that the value relevance of accounting information outside of the U.S. is not decreasing. From our non-U.S. perspective this raises the question of what it is that makes the U.S. accounting environment different from other environments: Are changes in the U.S. accounting system different from those in other countries, or could it be a change in e.g. the composition of listed firms in the U.S. that has not occurred in other countries?

A significant finding of this study is that the level of value relevance (measured as the adjusted R^2) over time varies considerably more for the non-traditional industries. We find this variation to be largely unrelated to the choice of model specification, but it appears to follow a systematic pattern over time. The data reveal a negative association between value relevance and economic conditions and market sentiments. When the economy does well and investors have high hopes for the future, accounting information appears less capable of explaining security prices for firms operating in the non-traditional industries. However, when the economy slows down and stock prices decrease there is a better association between accounting numbers and share prices. This finding is not dependent on any adjustment for loss-making firms and not even the transitory component of accounting earnings.

We conclude the study by rhetorically asking what value relevance really is. Is the considerably higher variation in stock prices' relation with accounting measures actually not a measure of value relevance? Although we can ex post identify associations between the level of value relevance and variables such as GDP-per-capita and stock returns we might not be able to predict how well accounting information will represent levels of (changes in) share prices in the coming periods. The variation in value relevance is more than twice as high for the non-traditional industries compared to traditional industries. If this is a problem, it may not be one that accounting standard setters are able to deal with. We believe it is simply an artefact of (1) a well-accepted, and to some extent irreplaceable, conservative accounting system, (2) market sentiments and (3) a faster changing world in which firms rely on uncertain resources. It will certainly be interesting to see the effect of the current international trend of moving towards more fair value accounting (e.g., IAS 39 on financial instruments) and more managerial discretion (e.g., IFRS 3 on business combinations). In respect of our findings, perhaps such changes to accounting systems can diminish inter-temporal variations.

Literature

Aboody, D., Hughes, J., & Liu, J. (2002). Measuring Value Relevance in a (Possibly) Inefficient Market. *Journal of Accounting Research, 40*(4), 965-986.

Aboody, D., & Lev, B. (1998). The Value Relevance of Intangibles: The Case of Software Capitalization. *Journal of Accounting Research, 36*(3), 161-191.

Anderson, K.P., & Brooks, C. (2006) The Long Term Price-Earnings Ratio. *Journal of Business Finance & Accounting, 33*(7-8), 1063-1086.

Ball, R., & Shivakumar, L. (2006). The Role of Accruals in Asymmetrically Timely Gain and Loss Recognition. *Journal of Accounting Research, 44*(2), 207-242.

Barth, M. E., Beaver, W. H., & Landsman, W. R. (2001). The Relevance of the Value Relevance Literature for Financial Accounting Standard Setting: Another View. *Journal of Accounting & Economics, 31*(1-3), 77-104.

Basu, S. (1997). The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting & Economics, 24*(1), 3-38.

Brown, S., Kin, L., & Lys, T. (1999). Use of R^2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting & Economics, 28*(2), 83-115.

Chang, J. (1998). The decline in value relevance of earnings & book values. *Working paper. University of Pennsylvania*.

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

Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting & Economics, 24*(1), 39-67.

Collins, D. W., Pincus, M. and Xie, H. (1999). Equity Valuation and Negative Earnings: The Role of Negative Earnings. *The Accounting Review 74*, 29-61.

Core, J. E., Guay, W. R. & Van Buskirk, A. (2003). Market valuations in the New Economy: an investigation of what has happened, *Journal of Accounting & Economics 34*, 43-67.

Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting & Economics, 18*(1), 3-42.

Dontoh, A., Radhakrishnan, S., & Ronen, J. (2004). The Declining Value-relevance of Accounting Information and Non-information-based Trading: An Empirical Analysis. *Contemporary Accounting Research, 21*(4), 795-812.

Easton, P. D., & Harris, T. S. (1991). Earnings as an Explanatory Variable for Returns. *Journal of Accounting Research, 29*(1), 19-36.

Easton, P. D., & Sommers, G. A. (2003). Scale and the Scale Effect in Market-based Accounting Research. *Journal of Business Finance & Accounting, 30*(1/2), 25-55.

Ely, K., & Waymire, G. (1999). Accounting Standard-Setting Organizations and Earnings Relevance: Longitudinal Evidence From NYSE Common Stocks, 1927-93. *Journal of Accounting Research, 37*(2), 293-317.

Fama, E. F., & French, K. (2000). Forecasting Profitability and Earnings. *Journal of Business, 73*(2), 161-175.

Fama, E. F., & MacBeth, J. D. (1973). Risk, Return, and Equilibrium: Empirical Tests. *Journal of Political Economy, 81*(3), 607.

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

Francis, J., Schipper, K., & Vincent, L. (2003). The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns. *Contemporary Accounting Research, 20*(1), 121-164.

Freeman, R. N., Ohlson, J. A. & Penman, S. H. (1982). Book Rate-of-Return and Prediction of Earnings Changes: An Empirical Investigation. *Journal of Accounting Research 20*, 639–653.

Gjerde, Ø., Knivsflå, K. H., & Sættem, F. (2007). The Value Relevance of Financial Reporting in Norway 1965-2004. *Working paper. The Norwegian School of Economics and Business Administration*.

Goodwin, J., & Ahmed, K. (2006). Longitudinal value relevance of earnings and intangible assets: Evidence from Australian firms. *Journal of International Accounting, Auditing & Taxation, 15*(1), 72-91.

Gu, Z. (2005). Scale Factor, R2 and Choice of Levels versus Returns Models. *Journal of Accounting, Auditing and Finance, 20*(1), 71-91.

Gu, Z. (2007). Across-sample Incomparability of R^2s and Additional Evidence on Value Relevance Changes Over Time. *Journal of Business Finance & Accounting, 34*(7/8), 1073-1098.

Hayn, C. (1995). The information content of losses. *Journal of Accounting & Economics, 20*(2), 125-153.

King, R. D., & Langli, J. C. (1998). Accounting Diversity and Firm Valuation. *International Journal of Accounting, 33*(4), 529-567.

Landsman, W. R., & Magliolo, J. (1988). Cross-Sectional Capital Market Research and Model Specification. *The Accounting Review, 63*(4), 586-604.

Lev, B., & Zarowin, P. (1999). The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research, 37*(2), 353-385.

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

Penman, S. H. (1991). An Evaluation of Accounting Rate-of-Return. *Journal of Accounting, Auditing, and Finance 6*, 233–255.

Penman, S.H. (1999) On Transitory Earnings. *Review of Accounting Studies*, 4(3-4), 145-162.

Penman, S. H., & Zhang, X-J. (2002). Accounting Conservatism, the Quality of Earnings, and Stock Returns. *The Accounting Review*, 77(2), 237-264.

Penman, S. and X. Zhang. (2004). Modeling sustainable earnings and P/E Ratios with financial statement analysis. *Working paper*. Columbia University and University of California, Berkeley. Available at SSRN: http://ssrn.com/abstract=318967.

Plenborg, T. (1998). A comparison of the information content of US and Danish earnings. *European Accounting Review, 7*(1), 41-63.

Ramakrishnan, R., & Thomas, J. (1998). Valuation of Permanent, Transitory, and Price-Irrelevant Components of Reported Earnings. *Journal of Accounting, Auditing and Finance*, 11, 301-349.

Sloan, R. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? *The Accounting Review 71*(3), 289-315.

Watts, R. (2003). Conservatism in Accounting Part I: Explanations and Implications. *Accounting Horizons*, 17(3), 207-221.

Essay 4:

The Importance of Earnings Aggregation and the Sign of Earnings in Value Relevance Research

Leif Atle Beisland
University of Agder

Abstract

Prior research has suggested that earnings explain a larger portion of the variation in stock returns when they are disaggregated into components. This study shows that the increase in explanatory power stems primarily from disaggregation of *negative* earnings. While bottom-line earnings generally have very low associations with stock returns when negative, explanatory power increases dramatically as the negative earnings are disaggregated. In general, the paper presents evidence that traditional value relevance studies that disregard both the sign effect and the aggregation effect of accounting earnings may seriously understate the value relevance of income statement information.

1 Introduction

Prior research has shown that negative earnings are less value-relevant than positive earnings (e.g., Hayn, 1995, Basu, 1997, Joos and Plesko, 2005). Several studies have also proven that disaggregated earnings, i.e., earnings split into components, are more value-relevant than aggregated earnings (e.g., Ohlson and Penman, 1992, Barth et al., 2001, Carnes, 2003, Barth et al., 2005). This study presents evidence that it is relatively more useful, using the explanatory power of regression analysis as the value relevance metric, to disaggregate earnings when bottom line earnings are negative than when they are positive. The study also investigates the relative importance of the sign effect and the aggregation effect when positive and negative earnings, respectively, are pooled into one sample. I find that it is useful to account for the sign of earnings for all earnings aggregation levels and vice versa. It is generally useful to disaggregate earnings numbers even if the sign of earnings is taken into account. The sign effect dominates the aggregation effect unless earnings are highly disaggregated. In other words, the "true" value relevance of earnings information appears to be more understated if the non-linear relationship between earnings and returns is disregarded than if the information content of all earnings items is assumed to be equal.

Ohlson and Penman (1992) show that the explanatory power of return regressions increases when earnings are disaggregated into items (after controlling for reduced degrees of freedom). The explanatory power of their regressions is 80% higher when earnings are disaggregated into seven items than when aggregated bottom line earnings are applied. The findings are consistent with Pope's (2003) assertion that earnings components generally do not "add up" in valuation. This study begins by analysing whether disaggregation has different consequences for a positive earnings sample versus a negative earnings sample. Hayn (1995) presents evidence that positive earnings are far more value-relevant than negative earnings. In fact, she concludes that negative earnings are hardly value-relevant at all. She attributes her findings to the liquidation option held by stock investors. When companies with negative earnings exist and are not liquidated, it must be the case that investors expect that the negative earnings will not persist. Positive earnings, on the other hand, are generally much more persistent. Hayn performs her study on aggregated earnings data. I test the hypothesis that even though bottom line earnings are not expected to persist when they are negative and therefore relay little relevant information to stock investors, individual earnings items may still be highly informative. For example, compare Joos and Plesko's (2005) assertion that investors generally do not consider losses to be homogeneous, but evaluate the causes and nature of the loss to assess its long-term implications for firm value. I hypothesize that the relative usefulness of earnings disaggregation is larger for negative earnings than for positive earnings. The explanatory power of return regressions increases from 12.96% for an aggregated earnings model to 13.62% for earnings disaggregated into cash flow and accruals items when earnings are positive. The increase in explanatory power equals 5%. However, for negative earnings, the equivalent increase is 916%, from 0.64% for the aggregated earnings model to 6.50% for the disaggregated earnings model. Overall, this finding is consistent with the hypothesis that it is relatively more useful to disaggregate earnings information when earnings are negative than when they are positive.

The first part of the study indicates that both the sign of aggregate earnings and the earnings aggregation level are important factors in value relevance research. Value relevance, measured by the explanatory power of return regressions, increases both as the sign of earnings is taken into account and as earnings are disaggregated. The second part of the study asks which of these two effects is most important. There is no simple answer to this question, as empirical analysis shows that the aggregation effect and the sign effect are both extremely important. However, even in aggregated earnings regressions, the explanatory power practically doubles (7.61% to 13.70%) when the sign of earnings is considered. One has to disaggregate earnings into a substantial amount of earnings items to have the same effect on explanatory power if the sign of earnings is not considered. Overall, when earnings are disaggregated and the sign of earnings effect is incorporated into the regression models, explanatory power increases by more than 150% compared to a traditional aggregate earnings specification (7.61% to 19.08%). This study instructively illustrates how the value relevance of accounting information may be seriously understated if earnings components are aggregated and the different information contents of positive and negative earnings are disregarded. This general conclusion is likely to be country-independent. The analyses are, however, performed on a Norwegian data sample.

This paper is organized as follows: Section 2 presents the theoretical background of the study and develops the hypotheses to be tested. Data and research design are described in Section 3. Empirical findings are discussed in Section 4, and Section 5 concludes.

2 Theoretical Background and Hypothesis Development

Lev (1989) assesses the usefulness of accounting earnings by evaluating a large number of studies on the relationship between stock returns and accounting earnings. He finds that most studies report a remarkably low statistical association between stock returns and current earnings. The explanatory power as measured by R^2 from regression analyses is often below 10%, and actually approaches zero in some cases. Lev concludes that, while earnings appear to be used by investors, *the extent* of earnings usefulness is rather limited. He claims that low information content of reported earnings and other financial variables are important explanations for the poor returns-to-earnings association. He also states that low information content is probably due to biases induced by accounting measurement and valuation principles and, in some cases, to manipulation of reported data by managers. The seemingly low returns-to-earnings association is heavily investigated in value relevance research. Many explanations for this phenomenon are advanced in prior research (the list is not exhaustive): low earnings persistence (Kormendi & Lipe, 1987), lack of timeliness of earnings due to strict requirements regarding objectivity and verifiability of accounting numbers (Collins, Kothari, Shanken, & Sloan, 1994), conservative accounting (Basu, 1997; Penman & Xiao-Jun, 2002), mis-specification of statistical models (W. H. Beaver, McAnally, & Stinson, 1997; Easton & Harris, 1991; Freeman & Tse, 1992; Hayn, 1995; Liu & Thomas, 2000), overly short measurement intervals for returns and earnings (Easton, Harris, & Ohlson, 1992), aggregation of earnings items (Barth, Cram, & Nelson, 2001; Bodnar & Weintrop, 1997; Kerstein & Kim, 1995; Ohlson & Penman, 1992; Ramakrishnan & Thomas, 1998; Rayburn, 1986; Thomas, 1999), etc. This paper studies how the sign of earnings (compare Hayn, 1995) interacts with earnings disaggregation (compare Barth et al., 2001) in value relevance research.

Hayn (1995) suggests that the relationship between stock returns and accounting earnings is non-linear. Specifically, she proposes that losses are more weakly associated with stock returns than profits. She argues that losses are perceived by investors as temporary because shareholders can always liquidate the firm rather than suffer from indefinite losses. Investors hold a put option on the future cash flows of the firm that, at any time, may be exercised at a price equal to the market price of the firm's equity. Hayn's empirical study shows that stock price movements are much more strongly linked to current profits than to current losses. Losses actually do not appear to be at all related with contemporaneous stock price movements. Excluding loss firms from the sample results in a near tripling in ERC (earnings response coefficient) and explanatory power. In fact, her results show that the returns-to-earnings association is weak not only in loss situations but also in profitable cases in which accounting earnings are too low to be expected to recur. According to Hayn, very low earnings would make liquidating the firm a preferred alternative to perpetuating the reported earnings level. Thus, the liquidation option theory can explain the lower explanatory power of both negative earnings and small positive earnings. Dechow and Ge (2006) claim that earnings persistence will be affected by the magnitude and sign of *accruals*. Specifically, they report that low accrual firms have more transitory earnings than high accrual firms. They maintain that large negative accruals originate from balance sheet adjustments relating to special items, and that these negative accruals are often indicative of firms reducing assets and downsizing. Jenkins (2003) proposes that future prospects of loss firms can be analysed through a sales-based model of future normal earnings. In this model, transitory earnings items unrelated to sales revenue are disregarded.

In contrast to Hayn's findings, Balkrishna, et al. (2007) report that losses are relatively persistent and that the probability of loss reversal declines monotonically as the history of loss extends. According to Darrough and Ye (2007), many of the loss firms are not necessarily candidates for abandonment. Instead, they are actually likely to stay in business for many years. Many firms are able to survive and receive high market valuation because of their future prospects, in spite of current losses. Their findings are attributed to the accounting system's inability to capture R&D and other hidden assets valued by the market. Darrough and Ye state that, as the economy shifts towards more knowledge-based industries, unrecorded intangible assets generally become more important and consequently play a larger role in valuation of firms. Joos and Plesko (2005) find that when persistent losses contain R&D, investors separately value the R&D component as an asset, but value the non-R&D component as a transitory loss. They also maintain that investors generally do not consider losses to be homogeneous, but consider the causes and nature of the loss in assessing its long-term implications for firm value. Joos and Plesko conclude that investors use information beyond aggregate earnings, cash flows, and accruals to distinguish between persistent losses related to financial distress and losses related to R&D investments that have the potential to generate earnings in the future.

Expensing intangibles is one aspect of *accounting conservatism*. Generally, the conservatism principle[1] can contribute to a non-linear returns-to-earnings relationship. Basu (1997) reverses the returns-to-earnings regression and finds that the contemporaneous sensitivity of earnings to negative returns is two to six times the sensitivity of earnings to positive returns (compare also Ball & Shivakumar, 2006). Basu attributes his findings to accounting conservatism. He interprets conservatism as resulting in the reflection of "bad news" from earnings more quickly than "good news." Basu also reports, when running a "traditional" regression of stock returns on earnings, that negative changes in earnings have systematically lower ERCs than positive changes in earnings. He argues that positive changes in earnings are more persistent than negative changes in earnings. This asymmetric persistence is another attribute of accounting conservatism. In Australia, Balkrishna et al. (2007) find that, although conservatism is generally a pervasive aspect of accounting numbers, it is more evident among loss firms. Similarly, Klein and Marquardt (2006) report that the annual percentage of losses for U.S. firms is significantly related to accounting conservatism.[2]

[1] Givoly and Hayn (2000) find that conservatism in financial reporting has increased over time.

[2] Klein and Marquardt (2006) also find that the loss percentage is related to Compustat coverage of small firms (there is a positive association between the annual percentage of losses and the rise in the percentage of small firms appearing in the Compustat database over time), real firm performance (measured by cash flows from operations), and business cycle factors. Moreover, while conservatism is generally a significant determinant of accounting losses, its overall contribution is considerably lessened when placed alongside other independent variables.

Overall, there is strong evidence that positive and negative earnings can be differentially related to stock return. Empirical models may be far better specified if one accounts for this possibly non-linear relationship. However, earnings disaggregation may also improve the return-to-earnings association. Ramakrishnan and Thomas (1998) find that the stock price-to-earnings association is better described by separating components of unexpected earnings and multiplying each by a different response coefficient, rather than applying a single earnings response coefficient to aggregate unexpected earnings. Rayburn (1986) splits earnings into operating cash flows and aggregate accruals and find that both are associated with stock returns. However, when disaggregating accruals into changes in working capital, depreciation, and changes in deferred taxes, only operating cash flows and changes in working capital have significant explanatory ability.

Ohlson and Penman (1992) begin by regressing stock returns on aggregate earnings. They then achieve an explanatory power, measured by mean adjusted R^2, of 11%. Next, they disaggregate earnings into gross margin, operating expenses, depreciation, tax expenses, other income items, extraordinary items, and total dividends declared and find that the explanatory power increases to 19%. The sign of the individual estimated regression coefficients are generally correct, but the estimated coefficients are lower for those items that are problematic from an accounting measurement perspective, such as taxes and extraordinary items. Overall, Ohlson and Penman (1992) present clear evidence that disaggregation of earnings numbers significantly improves the returns-to-earnings association. Consistent with Ohlson and Penman's findings, Carnes (2006) finds that unexpected changes in quarterly line items (i.e., accounts receivable, inventory, current liabilities, gross margin, SGA expense, and depreciation expense) affect the value of a firm's stock. Carnes states that "[o]ne reason line items are expected to be value-relevant is because they can provide information that is useful in ascertaining whether changes in earnings are transitory or permanent, a distinction that has been shown to be important in determining firm value." (Carnes, 2006, p. 100). Kim et al. (2008) also disaggregate earnings into items. They report that sales-related earnings components have a much stronger impact on stock returns than sales-unrelated earnings components. Kim et al. find that the regression coefficient of the sales margin is three times the earnings response coefficients.

The conclusions of Ohlson and Penman (1992), Carnes (2006), etc. are indirectly analysed by Barth et al. (2001). They study the effect of earnings disaggregation on cash flow predictions. Barth et al. split aggregate earnings into cash flow and major accrual items. They claim that each accrual component reflects different information relating to future cash flows, and that aggregate earnings mask this information. Their findings reveal that disaggregating earnings into cash flow and aggregate accruals significantly increases predictive ability relative to aggregate earnings. However, disaggregating accruals into major components further significantly increases predictive ability. Barth et al. report identical conclusions when as a robustness check, they replace future cash flow with stock returns as the dependent variable of their regressions. Lev et al. (2005) also test the predictive ability of cash flow and accruals. In their out-of-sample predictions, they actually reach opposite conclusions to Barth et al. Lev et al. state that accounting accruals do not improve the prediction of future firm performance. This conclusion holds even if accruals are split into major items.[3] The finding is attributed to the difficulties of generating reliable estimates and projections in a volatile economy, as well as the frequent misuse of such estimates by managers. Barth et al. (2005), who also perform out-of-sample predictions of equity values, report that mean squared and absolute prediction errors are smallest when disaggregating earnings into cash flow and major accrual components, whereas median prediction errors are smallest when disaggregating earnings into cash flow and total accruals. They state that if concern is with errors in the tails of distributions of the equity value prediction error, then earnings should be disaggregated into cash flow and the major accrual components; otherwise, earnings should only be disaggregated into cash flow and total accruals. Pope (2005) claims that earnings components generally do not "add up" in valuation and that accrual components are especially informative about "unusual" firms.

The effect of earnings disaggregation is investigated in several contexts. For instance, Armstrong et al. (2006) study how different earnings and balance sheet items are related to firm value in the venture-backed, private equity market. Amir and Kama (2004) analyse the influence of return on common equity components on market return. They report that net profit margin is the dominant component. Callen and Segal (2004) use a variance decomposition procedure to address the relative value relevance of news of accruals, cash flow news, and expected return news in driving firm level equity returns. After splitting net income into cash flow and accrual components, they find evidence that accrual news dominates both expected-return (discount rate) news and cash flow news in driving firm-level stock returns.

Briefly summarised, prior research suggests that accounting for the sign of aggregate earnings in value relevance regressions significantly improves the return-to-earnings association. The association also improves if earnings are disaggregated into major components. The first part

[3] Lev et al. (2005) apply the following accruals items: change in working capital items minus inventory, change in inventory, depreciation and amortization, deferred taxes, and all other operating accruals.

of this study investigates the incremental value relevance of disaggregation[4] when the sign of earnings has already been taken into account. I maintain that disaggregation is relatively more important when earnings are negative than when they are positive. Negative earnings are not related to stock returns simply because they are not expected to persist. If negative earnings were expected to persist, stock investors would liquidate the firm rather than suffer from indefinite losses.[5] However, even if negative earnings are unrelated to stock returns on an aggregate level, individual earnings components may contain significant amounts of value-relevant information (compare Pope's (2005) assertion that earnings items do not "add up" in valuation). Individual earnings components may be persistent in cases where bottom-line earnings show little or no persistency. Such persistency could potentially be revealed if earnings are disaggregated. Note, for instance, that, while price-to-earnings ratios are frequently used for quick estimates of company value, other ratios have to be used in the case of negative earnings, such as price to cash flow or price to sales ratios (compare Kim et al., 2008). Financial statements can reveal value-relevant information even in loss cases, but one may have to dig deeper. Note that earnings disaggregation can also improve the return-to-earnings association for positive earnings companies. These companies may have earnings items with different valuation impacts as well. However, positive earnings are more often persistent on an aggregate level than negative earnings. Prior research has shown that positive earnings are a significant explanatory variable for both future earnings (and cash flow) and

[4] The FASB states the following about earnings disaggregation in *Objectives of Financial Reporting by Business Enterprises*: "Information about enterprise earnings and its components measured by accrual accounting generally provides a better indication of enterprise performance than information about current cash receipts and payments" (FASB, 1978, paragraph 44). As far as I can see, the FASB does not propose that the information content of earnings is a function of the earnings level (for instance earnings above or below zero).

[5] Darrough and Ye (2007) and Joos and Plesko (2005) claim that losses may be persistent if some of the costs that cause the loss in reality are investments (for instance R&D expenditure). However, even if losses are expected to prevail for some time, the investors definitely expect that they will not continue indefinitely. The investments are expected to pay off eventually and the loss will turn to a profit. Thus, even if Darrough and Ye (2007) and Joos and Plesko (2005) consider longer time horizons than Hayn (1995), the liquidation option theory proposed by Hayn is equally relevant for the cases discussed by Darrough & Ye and Joos & Plesko. Losses can under no circumstances be expected to be permanent (remember that over the lifetime of a company, summed earnings are equal to sum net cash flow), and thus they are always expected to be transitory over a time period that may be very short or quite long.

contemporaneous stock returns (see for instance Jenkins, 2003). Thus, the *relative* usefulness from earnings disaggregation is expected to be lower for positive than for negative earnings. Thus, I propose the following *alternative* hypothesis:

Hypothesis: Disaggregation of earnings information is relatively more useful for negative than for positive earnings.

My hypothesis relates to the relative usefulness of disaggregation when the sign of earnings is taken into account. Prior research suggests that the returns-to-earnings association improves when the sign of earnings is taken into account and when earnings are disaggregated into components. In other words, the explanatory power of regression analysis is expected to increase as the sign effect and the disaggregation effect are incorporated into the regression specifications. The second part of this paper analyses which of these two effects dominate. Is the relative increase in explanatory power from the consideration of the sign of earnings more pronounced than from earnings disaggregation? Is earnings disaggregation useful when the sign of earnings is taken into account? Or is it the other way around? Is the sign of earnings really important when earnings are disaggregated? These research questions are not easily answered by theory or past empirical research. Still, the questions are highly relevant for market-based accounting research if regression models are to be correctly specified. The second part of this paper presents an explorative analysis of the relationship between the sign of earnings and the earnings disaggregation effect. As I have no expectations with respect to the relative importance of the two effects, I do not propose any hypothesis for this part of the study.

Although I am not aware of any study that analyses the combined value relevance effect of the sign of earnings and the earnings aggregation level, several studies provide evidence of the partial influence on explanatory power from accounting for one of these effects. Hayn (1995) reports an adjusted R^2 of 16.9% for positive earnings compared to 9.3% for her total sample. The explanatory power for the negative earnings sample is actually 0.0! Basu (1997) regresses abnormal returns on changes in earnings. He finds that the explanatory power increases dramatically if a dummy variable for the sign of earnings is included in his regression. The increase in adjusted R^2 varies across different assumptions concerning the length of the earnings announcement period. The lowest increase in explanatory power is 44%, while the highest increase is 429%. In their study of disaggregation of earnings items, Ohlson and Penman (1992) report an adjusted R^2 of 11% when stock returns are regressed on aggregate earnings. When earnings are split into cash flow and depreciation, the explanatory power increases to 14%. However, maximal explanatory power of 19% is reached when earnings are disaggregated into the most items possible (seven items in their study; see earlier this section). Barth et al. (2001) report an explanatory power of 10% for aggregate earnings. When earnings are split into cash flow and aggregate accruals, the adjusted R^2 increases to 12%, and it increases further to 15% when earnings are split into cash flow and accruals items. These studies confirm that both the sign effect and the disaggregation effect are potentially important in explaining value relevance.

Note that statistical models may be seriously mis-specified if they disregard the sign effect and the different relationships that earnings items have with stock returns, if these two effects are as important as suggested by prior research. Such mis-specification depresses regression coefficients and explanatory power, and highly significant explanatory variables may appear to be unrelated to stock returns. The intent of the explorative part of the study is to shed some further light on these issues.

3 Research Design and Data Sample

This section presents the research design and the data sample of the study.

3.1 Research Design and Variable Definitions

Value relevance is tested using regression analysis of stock returns on accounting variables. Specifically, explanatory power (adjusted R^2) [6] is used as my primary measure of value relevance.[7] The adjusted R^2 of the regressions measure the proportion of stock returns explained by earnings variables. I employ an Easton and Harris (1991) framework and regress stock returns on earnings and their associated changes. Easton and Harris show that stock returns can be theoretically seen as a function of both earnings and change in earnings (compare also the residual income model). In their empirical study, both earnings and the first difference of earnings are generally significant explanatory variables for returns. The Easton and Harris framework is extensively applied in value relevance research (see, e.g., Brimble & Hodgson, 2007; Elgers, Porter, & Emily Xu, 2008; Francis, Schipper, & Vincent, 2003; Monahan, 2005).

[6] Adjusts for the reduced degrees of freedom as more explanatory variables are included in the regression.

[7] Brown et al. (1999) and Gu (2007) present evidence that explanatory power may be incomparable *between* samples. However, I am going to compare adjusted R^2 from running different regressions on *constant samples*. Brown et al. and Gu primarily discuss comparisons of explanatory power over time and across countries, but papers like Hayn (1995), where the explanatory power of a positive earnings sample is compared with the explanatory power of a negative earnings sample, are also hit by their critique.

I use income before extraordinary items as my measure of aggregated earnings. Following prior research (Biddle, Seow, & Siegel, 1995; Finger, 1994; Klein & Marquardt, 2006), cash flow is defined as earnings minus accruals:

CF = Net income before extraordinary items[8] (EARN) - Accruals (ACC)

where:

Accruals = Change in total working capital (ΔWC)[9]

- Change in deferred taxes (ΔDT)

- Depreciation and impairment (DEP)

To test the hypothesis that earnings disaggregation is relatively more important for negative than for positive earnings, I apply three levels of earnings disaggregation and run the following regressions (regarding disaggregation of the Easton & Harris specification, see Ali & Lee-Seok, 2000 ; Baruch Lev & Zarowin, 1999)[10]:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \varepsilon_{i,t}$$

where

(1):

$RET_{i,t}$ = stock return in year t for company i

$EARN_{i,t}$ = earnings in year t for company i

Δ denotes yearly change in variable

[8] The threshold for categorizing earnings items as extraordinary has increased over the years in Norway. Extraordinary items appear more frequently in the former years of my sample than in the latter. See Table 7 of the Appendix. Thus, earnings items that would have been categorized as extraordinary in the first years of the sample are more likely to be viewed as ordinary in the last years of the sample.

[9] Change in current assets – Change in cash – Change in total current liabilities + Change in interest bearing short-term debt (inclusive of first-year instalment of long-term debt).

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

where

(2):

$CF_{i,t}$ = cash flow from operations in year t for company i

$ACC_{i,t}$ = accruals in year t for company i

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \varepsilon_{i,t}$$

where

(3):

$WC_{i,t}$ = working capital in year t for company i

$DT_{i,t}$ = deferred taxes in year t for company i

$DEP_{i,t}$ = total depreciation and impairment in year t for company i

All variables are scaled by market value of equity at the end of year t-1[11].

Explanatory power is expected to increase from regression specification (1) to regression specification (3) for both positive and negative earnings. However, the hypothesis says that the relative increase in adjusted R^2 after earnings disaggregation will be larger for the negative than for the positive earnings sample. The second part of the study is an explorative analysis of the relative importance of the earnings sign effect and the earnings disaggregation effect. The sign of earnings is taken into account by introducing a dummy for negative earnings in the regressions. For the total sample, the regressions (4) to (6) are compared with regressions (1) to (3) (a dummy variable for negative earnings in the Easton & Harris framework is used by, for instance, Francis et al., (2003)):

---

[10] I actually run regressions of even more disaggregated accounting data to test the robustness of the conclusions. However, to keep the analysis well arranged, I will focus on the results from these three aggregation levels and only briefly comment on the results from the other specification levels.

$$\text{(4):}\quad \begin{aligned}&RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \beta_3 * D_{i,t} + \beta_4 EARN_{i,t} * D_{i,t}\\ &+ \beta_5 \Delta EARN_{i,t} * D_{i,t} + \varepsilon_{i,t}\end{aligned}$$

$$\text{(5):}\quad \begin{aligned}&RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \beta_5 * D_{i,t} +\\ &\beta_6 CF_{i,t} * D_{i,t} + \beta_7 \Delta CF_{i,t} * D_{i,t} + \beta_8 ACC_{i,t} * D_{i,t} + \beta_9 \Delta ACC_{i,t} * D_{i,t} + \varepsilon_{i,t}\end{aligned}$$

$$\text{(6):}\quad \begin{aligned}&RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t}\\ &+ \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \beta_9 * D_{i,t} + \beta_{10} CF_{i,t} * D_{i,t} + \beta_{11} \Delta CF_{i,t} * D_{i,t} +\\ &\beta_{12} \Delta WC_{i,t} * D_{i,t} + \beta_{13} \Delta\Delta WC_{i,t} * D_{i,t} + \beta_{14} DEP_{i,t} * D_{i,t} + \beta_{15} \Delta DEP_{i,t} * D_{it}\\ &+ \beta_{16} \Delta DT_{i,t} * D_{i,t} + \beta_{17} \Delta\Delta DT_{i,t} * D_{i,t} + \varepsilon_{i,t}\end{aligned}$$

$D_{i,t}$ is equal to 1 if company *i*'s earnings in year *t* are negative, and is 0 otherwise. Note that both the intercept and the slopes are allowed to be dependent on the sign of earnings.

Explanatory power is expected to increase as the disaggregation level increases, i.e., as one goes from specification (1) to (3) or (4) to (6) (Ohlson & Penman, 1992, Barth et al., 2001). However, prior research has suggested that the adjusted R^2 effect from introducing a dummy variable for negative earnings (going from specification (1) to (4), (2) to (5) or (3) to (6)) also will be substantial (Hayn, 1995, Basu, 1997). An analysis of the explanatory power of regressions (1) to (6) is expected to provide evidence of the relative importance of the earnings sign effect and the earnings disaggregation effect. The analysis will also reveal whether positive and negative earnings have different regression coefficients on a disaggregated earnings level. The definition of separate valuation relevance applied by, for instance, Stark (1997), requires that valuation coefficients (i.e., regression coefficients) for the

[11] The change variables are defined as follows: $\frac{X_t - X_{t-1}}{MVE_{t-1}}$. X is the accounting variables in question, while MVE is market value of equity. Compare to Section 4.

disaggregated variables to be different if disaggregation is viewed as providing value-relevant information.

3.2 Data

The sample consists of firms listed on the Oslo Stock Exchange. All accounting data is obtained from the Oslo Stock Exchange's own accounting database for quoted companies. Stock price data is collected from the Norwegian School of Economics and Business Administration's Stock Market Database. All stock returns are adjusted for dividends, splits, etc. Stock values and returns are measured at the 30th of December of each year.[12] Observations are from 1992 to 2004. In 1992, Norwegian accounting legislation was changed to introduce deferred tax liabilities and assets (an "accounting revolution", see Hope, 1999). A major tax reform was implemented at the same time. In 2005, European law required Norwegian quoted companies to report consolidated statements in accordance with International Financial Reporting Standards (IFRS). Because the introduction of IFRS may have influenced the structural relationship between stock returns and earnings numbers, I do not include IFRS observations in this study.

Consistent with prior research, financial firms are excluded from the data sample. The original data sample consists of 1,661 observations. However, one observation is lost for each company when calculating change variables for the accounting variables. One additional observation is lost when change in accruals is calculated (due to estimation of "change in change" of working capital and deferred taxes). Observations belonging to the upper or lower percentile of *RET*, *CF*, ΔCF, *ACC* and ΔACC are deleted to avoid extreme observations having unreasonably large influence on the regression results. Due to a large degree of overlap among extreme observations, the actual number of observations deleted is 77, far less than the theoretical maximum of 10%. The final sample size is equal to 1,372 observations.

All accounting variables are scaled by the market value of equity at the beginning of year *t*. In this study, observations are aggregated cross-sectionally over time. Scaling avoids spurious correlation due to size and reduces problems with heteroskedasticity (Christie, 1987). Several scale factors could have been chosen. Most researchers deflate either by average total assets or market value of equity. I use a return specification to evaluate the value relevance of accounting earnings. In a return specification, market value of equity is the scale factor of the left-hand side of the regression. Therefore, applying market value of equity as the scale factor also for the accounting variables is consistent. Easton and Summers (2003) claim that market value of equity is the *true* scale factor, and, thus, the natural choice when it comes to deflating variables in capital market based accounting research.

Table 1 summarises descriptions of the variables used in this study. Panel A shows the distributional characteristics of the total sample. Mean earnings equals 1.2%[13] of the starting value of equity, while the median is equal to 2.3%. Mean earnings is comprised of 12.3% cash flow and –11.1% accruals. The standard deviation for earnings is less than standard deviations for both cash flow and accruals. This indicates that accruals, to a certain extent, level out cash flow fluctuations. Depreciation is by far the most important item in accruals. The change in working capital is close to zero on average, but the dispersion is wide. Thus, the variable may

[12] In fact, prices from the last actual transactions are employed for all years. Hence, market data for the most illiquid stocks might be measured a few days prior to 30 December.

[13] Note that a mean of 1.2% is not necessarily as low as it may seem at a first glance. Mean market deflated earnings is often not very high when long time horizons are applied. In a study of the predictive ability of accounting earnings of quoted companies in the USA, Kim and Kross (2005) report mean deflated earnings of 0.7%. Their sample is drawn from the annual Compustat industrial file for the period 1973-2000 and includes more than 100,000 observations.

Table 1: Descriptive Statistics

Panel A: Total Sample (n = 1372)

Variable	Mean	Q1	Median	Q3	St. dev
EARN	0.012	-0.013	0.023	0.081	0.216
ΔEARN	0.029	-0.031	0.004	0.048	0.240
CF	0.123	-0.002	0.060	0.197	0.277
ΔCF	0.026	-0.059	0.005	0.106	0.357
ACC	-0.111	-0.160	-0.045	0.000	0.260
ΔACC	0.003	-0.077	-0.002	0.060	0.325
ΔWC	-0.007	-0.041	0.000	0.040	0.197
ΔΔWC	0.004	-0.065	-0.001	0.064	0.313
DEP	0.105	0.015	0.052	0.127	0.180
ΔDEP	-0.002	-0.004	0.002	0.015	0.115
ΔDT	-0.001	-0.003	0.000	0.004	0.052
ΔΔDT	0.003	-0.004	0.000	0.007	0.065
RET	0.188	-0.266	0.074	0.412	0.754
SALES	4 385	233	619	2 376	18 100
TOT. ASSETS	5 707	311	959	3 303	19 900
MV EQUITY	5 664	327	962	3 216	17 300

Panel B: Positive Earnings (n = 945)

Variable	Mean	Q1	Median	Q3	St. dev
EARN	0.087	0.020	0.055	0.110	0.111
ΔEARN	0.052	-0.009	0.010	0.054	0.186
CF	0.174	0.019	0.102	0.258	0.271
ΔCF	0.049	-0.038	0.013	0.111	0.286
ACC	-0.087	-0.144	-0.039	0.003	0.227
ΔACC	0.003	-0.064	-0.001	0.061	0.267
ΔWC	0.007	-0.030	0.002	0.048	0.180
ΔΔWC	0.007	-0.055	0.000	0.068	0.259
DEP	0.092	0.015	0.053	0.123	0.128
ΔDEP	0.000	-0.002	0.002	0.013	0.062
ΔDT	0.002	-0.002	0.000	0.007	0.041
ΔΔDT	0.003	-0.004	0.000	0.008	0.058
RET	0.303	-0.113	0.155	0.497	0.732
SALES	5 334	318	817	2 915	21 100
TOT. ASSETS	7 009	405	1 299	4 351	23 200
MV EQUITY	6 924	437	1 350	4 523	19 100

Panel C: Negative Earnings (n = 427)

Variable	Mean	Q1	Median	Q3	St. dev
EARN	-0.155	-0.153	-0.065	-0.019	0.287
ΔEARN	-0.023	-0.116	-0.027	0.031	0.323
CF	0.010	-0.061	-0.003	0.058	0.255
ΔCF	-0.025	-0.111	-0.008	0.083	0.474
ACC	-0.165	-0.209	-0.056	-0.090	0.315
ΔACC	0.002	-0.100	-0.007	0.059	0.426
ΔWC	-0.039	-0.069	-0.006	0.022	0.228
ΔΔWC	-0.002	-0.083	-0.006	0.054	0.409
DEP	0.136	0.014	0.049	0.149	0.258
ΔDEP	-0.006	-0.010	0.001	0.021	0.184
ΔDT	-0.009	-0.011	0.000	0.000	0.070
ΔΔDT	0.002	-0.008	0.000	0.004	0.078
RET	-0.066	-0.517	-0.243	0.165	0.740
SALES	2 285	119	370	1 158	8 030
TOT. ASSETS	2 826	170	584	1 426	8 462
MV EQUITY	2 873	186	512	1 502	12 100

Panel D: Pearson Correlation Matrix

	EARN	ΔEARN	CF	ΔCF	ACC	ΔACC	ΔWC	ΔΔWC	DEP	ΔDEP	ΔDT	ΔΔDT	RET
EARN	**1.00**	0.07	**0.33**	**0.23**	**0.64**	**-0.20**	**0.20**	**-0.18**	**-0.60**	**0.14**	-0.03	**-0.16**	-0.05
ΔEARN	**0.52**	**1.00**	-0.06	**0.48**	**0.12**	**0.22**	**0.18**	0.05	0.04	**-0.40**	-0.09	0.01	0.09
CF	**0.57**	**0.36**	**1.00**	**0.42**	**-0.51**	**-0.51**	**-0.55**	**-0.45**	**0.17**	**0.24**	**-0.14**	**-0.14**	0.08
ΔCF	**0.36**	**0.42**	**0.63**	**1.00**	**-0.13**	**-0.75**	**-0.36**	**-0.77**	**-0.15**	0.01	-0.05	0.00	0.02
ACC	**-0.19**	**-0.17**	**-0.92**	**-0.57**	**1.00**	**0.23**	**0.63**	**0.20**	**-0.69**	-0.07	0.09	-0.03	**-0.11**
ΔACC	-0.02	**0.24**	**-0.42**	**-0.78**	**0.49**	**1.00**	**0.54**	**0.90**	**0.20**	**-0.32**	-0.01	0.01	0.05
ΔWC	0.03	**-0.09**	**-0.66**	**-0.58**	**0.80**	**0.55**	**1.00**	**0.61**	0.09	0.08	0.09	0.05	0.03
ΔΔWC	-0.01	**0.25**	**-0.37**	**-0.72**	**0.44**	**0.95**	**0.53**	**1.00**	**0.27**	0.08	0.09	**0.12**	0.00
DEP	**0.40**	**0.20**	**0.65**	**0.18**	**-0.58**	-0.06	-0.02	-0.03	**1.00**	**0.19**	**-0.30**	**-0.14**	**0.21**
ΔDEP	0.02	**-0.23**	**0.07**	0.04	**-0.07**	**-0.20**	0.00	0.03	**0.12**	**1.00**	**-0.13**	**-0.19**	-0.07
ΔDT	**-0.07**	**-0.07**	**0.14**	**0.08**	**-0.20**	**-0.13**	-0.01	-0.04	0.02	0.02	**1.00**	**0.85**	**-0.16**
ΔΔDT	0.05	**0.26**	**0.23**	**0.32**	**-0.25**	**-0.16**	**-0.21**	0.05	0.03	-0.01	**0.42**	**1.00**	**-0.13**
RET	**0.31**	**0.32**	**0.20**	**0.20**	**-0.09**	0.01	**-0.07**	0.02	**0.10**	**-0.06**	**-0.10**	**0.09**	**1.00**

Table description

Table 1 shows descriptive statistics for a sample of Norwegian firms from 1992 to 2004. Panels A, B and C display the mean, first quarter, median, third quarter, standard deviation, and number of observations for the total sample, the positive earnings sample, and the negative earnings sample, respectively. Panel D lists correlation coefficients for the positive (negative) earnings sample below (above) the diagonal. Coefficients in **bold** denote a statistical significance at a 5% level using a two sided test.

Variable definitions:

CF:	Cash flow from operations. Cash flow = Earnings – Accruals.
EARN:	Net earnings before extraordinary items.
ACC:	Accruals = Change in working capital (ΔWC) – Change in deferred taxes (ΔDT) – Depreciation and impairment (DEP).
WC:	Working capital = Total current assets – Cash – Total current liabilities + Interest bearing short term debt
Δ:	Denotes yearly change in the variables.

All accounting variables are scaled by the market value of equity at 30 December in year t-1.

RET:	Stock return (adjusted for dividends, splits, etc.), measured per 30 December.
SALES:	Total sales and revenue (Million Norwegian Kroner)
TOT. ASSETS:	Book value of total assets (Million Norwegian Kroner)
MV EQUITY:	Market value of equity (Million Norwegian Kroner)

be highly influential in the regression analyses despite its low mean. Mean stock return is high for this sample. However, the mean of 18.8% is accompanied by a standard deviation of 75.4%. Thus, the risk is substantial. Data for sales, total assets, and market value of equity are also provided in the table. Except for the fact that market value of equity is applied to scale the accounting variables, none of these variables are actually used in the empirical study. Still, they provide some indications of the distribution of company sizes in the sample. The companies are small on average. The turnover is slightly less than 4.5 billion NOK, while total assets equal 5.7 billion NOK. However, note the substantial standard deviations for these numbers. Oslo Stock Exchange is generally comprised of small companies, but some companies are considerably larger than the average.

This study focuses on the difference between positive and negative earnings. Thus, I also report descriptive statistics for these two sub-samples. 945 observations report profits, while 427 observations report losses (i.e., a loss frequency of 31%).[14] Panels B and C display the statistics for the positive and the negative earnings sample, respectively. Note that the absolute values of negative earnings are larger than the absolute values of positive earnings. On average, negative earnings companies report relatively large deficits. This is consistent with findings of previous research (W. Beaver, McNichols, & Nelson, 2007; Burgstahler & Dichev, 1997; Hayn, 1995) that there are few companies that report earnings just below zero.[15] It is also evidence that several of the negative earnings companies might have implemented a "big bath" strategy. The positive earnings companies have both larger cash

[14] Two observations have earnings equal to zero. These have been added to the positive earnings sample, but do not influence any empirical results.

[15] This finding has often been seen as evidence that companies manage earnings to report a small profit instead of a loss (Barua, Legoria, & Moffitt, 2006; Burgstahler & Dichev, 1997; Degeorge, Patel, & Zeckhauser, 1999). Beaver et al. (2007) show that asymmetric effects of income taxes and special items for profit and loss firms contribute to a discontinuity at zero in the distribution of earnings. Specifically, they show that effective tax rates are higher for profit firms, thereby shifting profit observations to the region just above zero. However, the magnitude and frequency of negative items are greater for loss firms, thereby shifting small loss observations away from zero.

flow and larger accruals than the negative earnings sample. Depreciation is considerably higher for negative than for positive earnings companies. Not surprisingly, positive earnings companies have a much larger stock return than negative earnings companies. In fact, the stock return of the negative earnings sample is significantly negative on average. The three size variables reveal that negative earnings companies generally are much smaller than positive earnings companies. This result is also identical to Hayn's (1995) findings. Non-tabulated results show that the means of all the earnings items (*CF, ACC, ΔWC, DEP, ΔDT*) are significantly different from each other in the positive and negative earnings samples. The same holds for stock return (*RET*). P-values are all less than 0.1%. Note that some supplementary descriptive statistics are provided in Table 7 of the Appendix. For example, the development in the proportion of companies reporting negative earnings over time is displayed in Table 7.

Panel D of Table 1 lists the correlation coefficients between the variables applied in the empirical study. The correlations are shown for both the positive and the negative earnings samples. For the positive earnings sample, there is a significant correlation between stock returns and earnings, cash flow, and accruals. Most of the individual accruals items are also statistically related to stock returns in this bivariate analysis. However, for the negative earnings sample, there seems to be low correlations between stock returns and the accounting variables. Both total earnings and total cash flow seem to be unrelated to stock returns. Accruals are negatively correlated with stock returns both for the positive and for the negative earnings samples. As expected, the accounting variables are highly interrelated for both samples. Nevertheless, many of the accruals items are statistically unrelated to positive earnings, but are significantly associated with negative earnings. Note that cash flow is generally correlated with all other accounting variables. Accruals and cash flows are significantly negatively correlated. This is further evidence that accruals, to some extent, balance out changes in cash flow and make total earnings a more stable figure than its separate components. There are 58 significant correlation coefficients in the positive earnings sample, while the equivalent total in the negative earnings sample is 49. Thus, the accounting variables are more interrelated for positive than for negative earnings.

4 Empirical Findings

Section 4.1 tests the hypothesis that it is more useful to disaggregate earnings into components when earnings are negative than when they are positive. Section 4.2 discusses the relative importance of the sign effect and the disaggregation effect in value relevance research. The rest of section 4 is devoted to testing the robustness of the empirical findings.

4.1 Disaggregation in Positive and Negative Earnings Samples

My hypothesis is tested by running regressions (1) to (3) separately on the positive and the negative earnings samples. The results are presented in Table 2. Panel A shows the results from the positive earnings sample. Both earnings and the change in earnings are significant[16] explanatory variables for stock returns (compare Easton and Harris, 1991). These two variables are able to explain 12.96% of the variation in returns. When earnings are split into cash flow and accruals, all explanatory variables remain significant. However, the explanatory power does not increase. The adjusted R^2 is now 12.95%, a slight decrease (due to decreased

[16] Preliminary tests show that the residuals suffer from some heteroskedasticity, but that autocorrelation does not seem to be an issue. The presented t-values are computed using White-adjusted standard errors. The White estimator for variance controls for possible heteroskedasticity in the regression analyses. Coefficients are termed "significant" if they are significant on a 5% level using two-sided tests. I have also run all regressions using Newey-West standard errors. Newey-West accounts for possible autocorrelation as well as for heteroskedasticity. The t-values of the regression coefficients are hardly affected when corrections for autocorrelation are made.

degrees of freedom) compared to the case of aggregate earnings. When the accruals are further split into their components, explanatory power increases to 13.62%. Except for the change in depreciation and "the change in change" of deferred taxes, the explanatory variables are all significant.

Table 2: Value Relevance of Positive and Negative Earnings

Panel A: Positive Earnings

	Aggregate Earnings		Cash Flow + Accruals		Cash flow + Accruals Items	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
EARN	**1.26**	4.35				
ΔEARN	**0.89**	3.91				
CF			**1.21**	4.13	**1.37**	4.48
ΔCF			**0.96**	3.79	**0.77**	2.90
ACC			**1.24**	3.49		
ΔACC			**0.82**	3.68		
ΔWC					**1.24**	3.86
ΔΔWC					**0.71**	3.34
DEP					**-1.51**	-3.50
ΔDEP					-0.98	-1.57
ΔDT					**-3.15**	-2.93
ΔΔDT					0.08	0.13
Constant	**0.15**	4.97	**0.15**	4.89	**0.16**	5.04
Adj. R^2	12.96 %		12.95 %		13.62 %	
n	945		945		945	

Panel B: Negative Earnings

	Aggregate Earnings		Cash Flow + Accruals		Cash flow + Accruals Items	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
EARN	-0.15	-0.86				
ΔEARN	0.21	1.31				
CF			0.26	1.10	0.35	1.63
ΔCF			0.19	1.27	0.00	-0.02
ACC			-0.24	-1.46		
ΔACC			**0.37**	2.02		
ΔWC					0.42	1.58
ΔΔWC					-0.10	-0.58
DEP					**0.56**	2.99
ΔDEP					**-0.65**	-2.20
ΔDT					-0.41	-0.42
ΔΔDT					-0.79	-0.98
Constant	**-0.08**	-2.06	**-0.10**	2.57	**-0.14**	-3.20
Adj. R^2	0.64 %		2.24 %		6.50 %	
n	427		427		427	

Table description
Table 2 describes the value relevance of earnings for a sample of Norwegian firms from 1992 to 2004. It summarises the regression coefficients (Coefficient), White-adjusted t-values (t-statistic), total explanatory power (adj. R^2), and number of observations (*n*) for the positive and the negative earnings sub-samples, respectively. Data is analysed using the following regression specifications:

Aggregate earnings specification:
$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \varepsilon_{i,t}$$

Cash flow + accruals specification:
$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

Cash flow + accruals items specification:
$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the stock return for company *i* in year *t*, EARN is earnings before extraordinary items, CF is cash flow from operations, ACC is total accruals, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity at 30 December in year t-1. Coefficients in **bold** denote a statistical significance at a 5% level using a two sided test.

Panel B presents the results for the negative earnings sample. Now, aggregate earnings and their associated changes are able to explain only 0.64% of the variation in stock return. The results are consistent with prior research (compare to Hayn, 1995). Negative earnings have hardly any explanatory power with respect to stock returns. Neither earnings nor the change in earnings has significant regression coefficients in the most aggregated specification. The explanatory power of the regression increases as earnings are split into cash flow and accruals. The adjusted R^2 is now 2.24%. Cash flow and its associated changes are, however, not significant in the regression. Only change in accruals has a significant coefficient. When the accruals are split into three components, only depreciation and the change in depreciation are significant.[17] Furthermore, depreciation (which also includes impairment) has a significantly negative coefficient for the positive earnings sample, while the coefficient is

[17] Non-tabulated results show that multicollinearity is not an issue in the regression. I have, as a robustness check, regressed stock return on earnings, change in earnings, depreciation, and change in depreciation when earnings are negative. Even after controlling for earnings and change in earnings, depreciation and change in depreciation remain significantly related to stock return. I have also excluded the earnings change items from the level variables so that the change variables do not appear twice on the right hand side of the regression (i.e., regressed stock return on $EARN_{t-1} + \Delta EARN_t$). When the most disaggregated regression is run, DEP remains positively associated with stock return and ΔDEP remains negatively associated with stock return when earnings are negative. However, now only the DEP coefficient is significant.

significantly positive for the negative earnings sample. The explanation for this result is not obvious. It may be that for a given amount of negative earnings, investors prefer that the loss can be attributed to a non-cash expense like depreciation instead of "real" cash outflows. It may also be that the larger deprecation expenses for negative earnings companies are due to some kind of "big bath" strategy, and that this kind of strategy is also accepted by investors. However, even if several of the explanatory variables are insignificant in this specification, the adjusted R^2 increases to 6.50%.

Adjusted R^2 is the chosen metric for analysing value relevance in this study. Table 3 summarises the explanatory power from the regressions run so far. An F-test for restrictions on regression coefficients is provided to test the significance of the differences in adjusted R^2 (Barth et al., 2001, p. 42; Maddala, 2001, p. 155). The explanatory power varies little across specifications for the positive earnings sample. Still, the adjusted R^2 of 13.63% for the most disaggregated model is significantly higher than the adjusted R^2 from the two other specifications. For the negative earnings sample, the explanatory power is highly dependent on specification. The more disaggregated the regression specification, the higher the adjusted R^2. The adjusted R^2 from the three regressions are all significantly different from each other. Overall, the difference in explanatory power between the specifications is far more substantial for the negative than for the positive earnings sample. The p-values are also much smaller for the negative earnings sample. For the negative earnings sample, the increase in explanatory power is 916% from the aggregated to the most disaggregated model, compared to only 5% for the positive earnings sample. However, if the standard deviations of the adjusted R^2 values are large, I cannot really conclude that 916% is, in fact, significantly larger than 5%. I have used bootstrapping to test the significance of the difference, and it turns out that the difference is statistically significant (p-value = 0.024). In this bootstrapping test, 945 observations are drawn from the positive earnings sample, while 427 observations are drawn from the negative earnings sample. The procedure is repeated 10,000 times. As 945 and 427 equal the original numbers of observations in the positive and negative earnings samples, respectively, each observation can be drawn several times in each simulation. The adjusted R^2 is computed for both samples in all 10,000 simulations. Only in 236 of these simulations are the relative increases in adjusted R^2 smaller in the negative than in the positive earnings sample.[18] The conclusion is that Tables 2 and 3 provide strong support for the proposed hypothesis. Value relevance studies that only analyse aggregate earnings severely understate the value relevance of negative earnings.

Table 3: Comparisons of Models - Explanatory Power

Panel A: Positive Earnings

Aggregate Earnings	Cash Flow + Accruals	Cash flow + Accruals Items
12.96 %	12.95 %	13.63 %
p-value = 0.386 (Aggregate vs. Cash Flow + Accruals)	*p-value = 0.024* (Cash Flow + Accruals vs. Items)	
	p-value = 0.042 (Aggregate vs. Items)	

Panel B: Negative Earnings

Aggregate Earnings	Cash Flow + Accruals	Cash flow + Accruals Items
0.64 %	2.24 %	6.50 %
p-value = 0.012 (Aggregate vs. Cash Flow + Accruals)	*p-value = 0.000* (Cash Flow + Accruals vs. Items)	
	p-value = 0.000 (Aggregate vs. Items)	

Table 3 summarises the adjusted R^2 from the regressions performed in Table 2. Significance levels for differences in R^2 are computed using F-tests for restrictions on coefficients (Barth et al., 2001, p. 42; Maddala, 2001, p. 155).

Earnings may be disaggregated in numerous ways. As a robustness check, I run several regressions using even more disaggregated earnings than in specification (3). First, I split working capital into current assets and current liabilities. Second, I split the current assets into inventory and receivables. Third, I disaggregate the variable "depreciation and impairment"

[18] This test involves comparing the adjusted R^2 values between samples, see previously explained critique by Brown et al. (1999) and Gu (2007).

into its two components. Several combinations of different aggregation levels are applied. It turns out that the adjusted R^2 generally increases as more disaggregated specifications are applied. This is evidence that each earnings item has its unique association (slope) with stock returns. The explanatory power for the most disaggregated specification is equal to 16.68% and 10.45% for the positive and negative earnings samples, respectively. The difference in explanatory power between the two samples has further decreased, both in absolute and relative terms. This is additional evidence for the proposed hypothesis. The results from running the most disaggregated regressions are presented in Table 8 of the Appendix. Because these regressions suffer from multicollinearity the attention should be directed against the explanatory power, not the regression coefficients, of these specifications.

4.2 The Relative Importance of Earnings Disaggregation and the Sign of Earnings

The relative importance of earnings disaggregation and the sign of earnings is tested by running regressions (1) to (6) on the total sample. The results are displayed in Table 4. Panel A shows the results from regressions (1) and (4), which are the most aggregated specifications. This panel reveals that the regression model seems far better specified when the sign of earnings is taken into account. The dummy variable *D* is equal to 1 when earnings are negative and equal to zero for positive earnings. Panel A presents evidence that the intercept is significantly different for negative and positive earnings. The slope coefficients for both earnings and the change in earnings are also highly sign dependent (see the significant interaction terms). *D* is only dependent on the sign of *EARN*. The change in *EARN* may be both positive and negative when *D* is equal to one. The explanatory power increases from 7.61% to 13.70% as the dummy variable is included in the regressions.

Panel B presents the results when earnings are split into cash flow and accruals. The dummy variable *D* is still equal to 1 when earnings are negative and is not dependent on the sign of cash flow and accruals. Cash flow and accruals and their associated changes all have significant coefficients when the sign of earnings is taken into account. Accruals are barely significant when the dummy variable is excluded, but because its regression coefficient is actually dependent on the sign of earnings, the accruals' regression coefficient and its associated t-value are both depressed when observations are pooled. The change in accruals is the only explanatory variable that seems to have a coefficient independent of the sign of earnings. As in panel A, the intercept is also highly sign dependent. Again, there is a dramatic increase in explanatory power when the dummy variable is included in the regression. The adjusted R^2 increases from 9.36% to 14.18% when the sign of earnings is taken into account.

The results from the most disaggregated regression specification are found in Panel C. The pattern is the same as in the two former specifications. Most explanatory variables have regression coefficients that differ according to the sign of earnings. The interaction terms for the change in working capital and the change in deferred taxes have p-values slightly above 5%, while the change in depreciation and the "change in change" in deferred taxes appear to have coefficients totally independent of the sign of earnings. The rest of the interaction terms are statistically significant. However, there is some multicollinearity in this regression. The mean variance inflation factor (VIF) is equal to 7.57. Even though this is below the critical limit of 10 proposed by Hair et al. (2006), the individual regression coefficients should be interpreted with some caution (due to their large standard errors). The VIFs of the individual

Table 4: The Effect of Negative Earnings on Regression Coefficients

Panel A: Aggregate Earnings

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
EARN	**0.53**	3.65	**1.26**	4.35
∆EARN	**0.62**	3.51	**0.89**	3.91
EARN*D			**-1.41**	-4.18
∆EARN*D			**-0.67**	-2.43
D			**-0.23**	-4.55
Constant	**0.16**	8.73	**0.15**	4.86
Adj. R^2	7.61 %		13.70 %	
n	1372		1372	

F-test for restrictions on coefficients: p-value = 0,000

Panel B: Cash Flow + Accruals

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
CF	**0.78**	5.45	**1.21**	4.13
∆CF	**0.51**	3.07	**0.96**	3.79
ACC	**0.30**	2.07	**1.24**	3.49
∆ACC	**0.68**	4.20	**0.82**	3.68
CF*D			**-0.95**	-2.54
∆CF*D			**-0.77**	-2.61
ACC*D			**-1.49**	-3.78
∆ACC*D			-0.46	-1.59
D			**-0.26**	-5.01
Constant	**0.11**	4.84	**0.15**	4.88
Adj. R^2	9.36 %		14.18 %	
n	1372		1372	

F-test for restrictions on coefficients: p-value = 0,000

Panel C: Cash Flow + Accruals Items

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
CF	**0.88**	6.10	**1.37**	4.47
ΔCF	**0.37**	2.24	**0.77**	2.89
ΔWC	**0.65**	3.09	**1.24**	3.85
ΔΔWC	**0.44**	2.63	**0.71**	3.34
DEP	-0.15	-0.89	**-1.51**	-3.50
ΔDEP	**-0.81**	-3.19	-0.98	-1.56
ΔDT	**-2.45**	-2.93	**-3.15**	-2.92
ΔΔDT	0.47	0.83	0.08	0.13
CF*D			**-1.01**	-2.71
ΔCF*D			**-0.77**	-2.55
ΔWC*D			-0.81	-1.95
ΔΔWC*D			**-0.81**	-2.96
DEP*D			**2.07**	4.40
ΔDEP*D			0.33	0.47
ΔDT*D			2.73	1.88
ΔΔDT*D			-0.87	-0.85
D			**-0.30**	-5.58
Constant	**0.08**	3.21	**0.16**	5.03
Adj. R^2	10.79 %		15.90 %	
n	1372		1372	
Mean VIF	2.26		7.57	

F-test for restrictions on coefficients: p-value = 0,000

Panel D: Explanatory Power Summarized

Regression:	**Standard Specification**	**Dummy for Negative Earnings**
Aggregate Earnings	7.61 %	13.70 %
Cash Flow + Accruals	9.36 %	14.18 %
Cash Flow + Accruals Items	10.79 %	15.90 %

Table description

Table 4 describes the value relevance of earnings for a sample of Norwegian firms from 1992 to 2004. It summarises the regression coefficients (Coefficient), White-adjusted t-values (t-statistic), total explanatory power (adj. R^2) and number of observations (*n*) for the total sample. Possible multicollinearity is examined by mean variance inflation factor (mean VIF – only reported for the most disaggregated earnings specification). Data is analysed using 3 different earnings aggregation levels.

Panel A presents the results of the following regressions:

Standard specification:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \varepsilon_{i,t}$$

Dummy variable for negative earnings:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \beta_3 * D_{i,t} + \beta_4 EARN_{i,t} * D_{i,t} + \beta_5 \Delta EARN_{i,t} * D_{i,t} + \varepsilon_{i,t}$$

Panel B presents the results of the following regressions:

Standard specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \varepsilon_{i,t}$$

Dummy variable for negative earnings:

$$\mathrm{RET}_{i,t} = \beta_0 + \beta_1 \mathrm{CF}_{i,t} + \beta_2 \Delta \mathrm{CF}_{i,t} + \beta_3 \mathrm{ACC}_{i,t} + \beta_4 \Delta \mathrm{ACC}_{i,t} + \beta_5 * \mathrm{D}_{i,t}$$
$$+ \beta_6 \mathrm{CF}_{i,t} * \mathrm{D}_{i,t} + \beta_7 \Delta \mathrm{CF}_{i,t} * \mathrm{D}_{i,t} + \beta_8 \mathrm{ACC}_{i,t} * \mathrm{D}_{i,t} + \beta_9 \Delta \mathrm{ACC}_{i,t} * \mathrm{D}_{i,t} + \varepsilon_{i,t}$$

Panel C presents the results of the following regressions:

Standard specification:

$$\mathrm{RET}_{i,t} = \beta_0 + \beta_1 \mathrm{CF}_{i,t} + \beta_2 \Delta \mathrm{CF}_{i,t} + \beta_3 \Delta \mathrm{WC}_{i,t} + \beta_4 \Delta\Delta \mathrm{WC}_{i,t} + \beta_5 \mathrm{DEP}_{i,t} + \beta_6 \Delta \mathrm{DEP}_{i,t} + \beta_7 \Delta \mathrm{DT}_{i,t} + \beta_8 \Delta\Delta \mathrm{DT}_{i,t} + \varepsilon_{i,t}$$

Dummy for negative earnings:

$$\mathrm{RET}_{i,t} = \beta_0 + \beta_1 \mathrm{CF}_{i,t} + \beta_2 \Delta \mathrm{CF}_{i,t} + \beta_3 \Delta \mathrm{WC}_{i,t} + \beta_4 \Delta\Delta \mathrm{WC}_{i,t} + \beta_5 \mathrm{DEP}_{i,t} + \beta_6 \Delta \mathrm{DEP}_{i,t} + \beta_7 \Delta \mathrm{DT}_{i,t} + \beta_8 \Delta\Delta \mathrm{DT}_{i,t} + \beta_9 * \mathrm{D}_{i,t}$$
$$+ \beta_{10} \mathrm{CF}_{i,t} * \mathrm{D}_{i,t} + \beta_{11} \Delta \mathrm{CF}_{i,t} * \mathrm{D}_{i,t} + \beta_{12} \Delta \mathrm{WC}_{i,t} * \mathrm{D}_{i,t} + \beta_{13} \Delta\Delta \mathrm{WC}_{i,t} * \mathrm{D}_{i,t} + \beta_{14} \mathrm{DEP}_{i,t} * \mathrm{D}_{i,t} + \beta_{15} \Delta \mathrm{DEP}_{i,t} * \mathrm{D}_{it}$$
$$+ \beta_{16} \Delta \mathrm{DT}_{i,t} * \mathrm{D}_{i,t} + \beta_{17} \Delta\Delta \mathrm{DT}_{i,t} * \mathrm{D}_{i,t} + \varepsilon_{i,t}$$

where $\mathrm{RET}_{i,t}$ is the stock return for company *i* in year *t*, EARN is earnings before extraordinary items, CF is cash flow from operations, ACC is total accruals, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. D is a dummy variable equal to 1 when earnings are negative, 0 otherwise. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in year *t-1*. Coefficients in **bold** denote a statistical significance at a 5% level using a two sided test.

Panel D summarises the adjusted R^2 from the regressions. Using F-tests for restrictions on coefficients, it turns out that all adjusted R^2 values are significantly different from each other at the 5% level.

regression coefficients are displayed in Table 9 of the Appendix.[19] Still, explanatory power is not biased from multicollinearity. The adjusted R^2 increases from 10.79% to 15.90% when the dummy variable for negative earnings is introduced.

Panel D summarises the explanatory power of all regressions in Table 4. It turns out that all the adjusted R^2 values of Panel D are significantly different from each other, both horizontally and vertically (14.18% is barely significantly different from 13.70%, however). When the most aggregated model is used and the sign of earnings is not taken into account, the explanatory power equals 7.61%. This number increases to 9.36% when earnings are split into cash flow and accruals, and it increases further to 10.79% when accruals are split into major components. These findings are consistent with Barth et al. (2001). However, when a dummy variable for negative earnings is included in the most aggregated specification, the

[19] If CF is excluded from the specification that accounts for negative earnings, mean VIF drops from 7.57 to 4.64 and all individual VIFs are then below 10. The explanatory power is reduced to 14.35%.

adjusted R^2 is 13.70%. After the sign of earnings has been taken into account, the increase in explanatory power from disaggregation of earnings is rather modest. Maximum adjusted R^2 is 15.90% for the most disaggregated model. Thus, Panel D indicates that the sign of earnings effect dominates the disaggregation effect. When a dummy variable for negative earnings is introduced in the aggregated specification, explanatory power increases from 7.61% to 13.70%. This is far higher than the explanatory power of 10.79% for the disaggregated model that does not include a dummy variable for negative earnings. Furthermore, when using bootstrapping technique, the increase in explanatory power from introducing a dummy variable for negative earnings is larger than the increase from disaggregating earnings in more than 90% of the cases (10,000 iterations).

Further robustness checks suggest that the conclusion above may have to be moderated slightly. Again, I run several regressions of stock returns on cash flow and accruals disaggregated into more detailed components than in regressions (3) and (6). Even though some of these specifications suffer from multicollinearity, the explanatory power of the regressions generally increases as earnings are increasingly disaggregated. When using the most disaggregated model (see Table 8 in Appendix) the adjusted R^2 is equal to 15.55% when the sign of earnings is not taken into account and 19.08% when a dummy variable for negative earnings is included in the regression. The importance of the sign effect and the disaggregation effect are both substantial. The conclusion is that regardless of the aggregation level of earnings, the explanatory power of the regressions will increase if the sign of earnings is taken into account. Similarly, if the sign of earnings is taken into account, the explanatory power will generally increase if earnings are disaggregated into components. However, in order for the disaggregation effect to be as important as the sign effect, bottom line earnings must be highly disaggregated. Table 4 presents clear evidence that one has to account for the sign of earnings and disaggregate earnings into items to extract the "full" value relevance of the income statement.

4.3 Control Variables

The analysis so far assumes that value relevance is a function of the sign of earnings and the earnings aggregation level. However, prior research has shown that value relevance can be a function of several firm characteristics. Company size is one example of this kind of characteristic. For example, if the positive earnings sample and the negative earnings sample differ in average company size, and one sample mainly consists of small companies while the other mainly consists of large companies, I may be measuring the effect of company size and not the earnings sign or earnings disaggregation effect. Generally speaking, if the sign or aggregation level of earnings just proxies for something else, I may be measuring the effects of these other factors. Therefore, I now add control variables that may influence value relevance to my regression analyses. Note that these results need to be interpreted carefully. The sign or aggregation level of earnings may be proxies for one or more of the control variables. Still, the control variables may also have a direct *explanatory effect* on stock returns. For instance, several studies show that company size is significantly associated with stock returns (Banz, 1981; Fama & French, 1992, 1993). If the inclusion of company size in the regressions leads to a diminished difference in explanatory power, this may be due to company size acting as an explanatory variable for stock returns, and this may indicate that this effect, for some reason, is different in the two samples. In this case, value relevance may be different between the two samples even if company size seems to be balancing out the differences in explanatory power.

Prior research suggests that value relevance might be a function of a relatively large number of factors. The factors assumed to be most important are evaluated in this section. My first control variable is company size. According to Easton and Zmijevski (1989), value relevance may be an increasing function of company size.[20] SIZE is measured as the log of the market value of equity at the end of year *t*. The next control variable is INTANG. INTANG is a measure of the company-specific intangible asset intensity.[21] It is measured as total intangible assets deflated by the total market value of equity at the beginning of year *t*. Several studies suggest that high intangible asset intensity reduces the value relevance of accounting numbers (Aboody & Lev, 1998; Baruch Lev & Sougiannis, 1996; Baruch Lev & Zarowin, 1999). Specifically, these studies find that expensing intangibles renders financial reports less value-relevant. The Norwegian GAAP allows a great deal of flexibility regarding the treatment of intangibles. Thus, the accounting based INTANG may be an imperfect measure of the "true" intangible asset intensity of companies.[22]

Collins and Kothari (1989) state that value relevance is a function of growth prospects. I use the book-to-market ratio (BM) as my (inverse) proxy for expected future growth.[23] However, this ratio may also be considered as a control variable for accounting conservatism. Basu

[20] Collins and Kothari (1989) also find that the return-to-earnings relationship varies with firm size. They do, however, view size as a proxy for differences in information environment, for instance, risk, growth, and persistence. Higher value relevance of large firms can also be due to their smaller loss probability (Hayn, 1995). The loss probability is obviously indirectly controlled in my empirical tests!

[21] The intangible assets intensity is often industry dependent. Thus, INTANG may also be viewed as a control variable for industry differences in value relevance.

[22] According to Norwegian GAAP, intangible assets are typically expensed rather than capitalized. Capitalization of intangibles occurs somewhat randomly. In principle, because INTANG is a measure of the intangibles that actually are recorded on the balance sheet, one may expect that INTANG is positively correlated with value relevance (compare Aboody & Lev, 1998; Lev & Sougiannis, 1996). However, it may also be the case that high levels of INTANG are indications that even more intangibles are expensed. In such a case, one may expect INTANG to be negatively correlated with value relevance. If annual capital expenditure related to intangible assets had been available in the data base, this would probably have been a better indicator of the intangible asset intensity.

[23] Actually, the book-to-market ratio may be viewed as a measure of value relevance itself, i.e., the value relevance of the balance sheet. Additionally, several studies provide evidence that book-to-market ratios are significantly related to stock returns (see for instance Fama & French, 1992, 1993; Rosenberg, Reid, & Lanstein, 1985; Stattman, 1980).

(1997) presents evidence that this conservatism reduces the value relevance of accounting numbers. Interest rate (INTEREST) and market volatility (VOL) are also applied as control variables. Collins and Kothari (1989) find a negative relationship between interest rates and value relevance, while Easton and Zmijevski (1989) propose that value relevance is negatively related to the expected rate of return (which over time is highly correlated with the level of interest rates). Dontoh et al. (2004) suggest that value relevance is an inverse function of non-information based trading activity, and I apply market volatility as a proxy for this kind of trading. The expected return on 5-year risk-free government bonds is used as my interest rate measure, while VOL is computed as the standard deviation of monthly returns on the Oslo Stock Exchange.[24] My final control variable is net reported extraordinary items scaled by the market value of equity at *t-1*, labelled EXTRA. I have defined earnings as earnings before extraordinary items. It is still possible that extraordinary items are related to stock returns, and that the relationship is different in the positive and negative earnings samples. Descriptive statistics for all six control variables are presented in Table 10 of the Appendix.

The control variables are included in the regressions from Tables 2 and 4. However, one needs to be careful when interpreting these results. For instance, I am not focusing on how company size *directly* affects stock returns. I want to study the influence of company size on value relevance, i.e., how company size affects relationships between the earnings variables' and stock returns. Disregarding the control variables' direct effect on stock returns is important for this study. To separate the direct effect of control variables on stock returns, I apply the incremental value relevance methodology presented by Collins et al. (1997). The principles of incremental value relevance are as follows:

[24] The OSEBX index is applied. OSEBX is a value-weighted, investable index consisting of a representative selection of exchange listed companies on the Oslo Stock Exchange.

I begin by running regressions that include both earnings and control variables:

$$RET_{i,t} = \alpha + \sum_{k} \beta_k EV_{i,t} + \sum_{p} \gamma_p CV_{i,t} + \varepsilon_{i,t}$$

where

$$EV = \text{earnings variable} \left(\text{EARN, CF, ACC, WC, DEP, DT} - \text{depending on aggregation level}\right)$$
$$CV = \text{control variable} \left(\text{SIZE, INTANG, BM, INTEREST, VOL, EXTRA}\right)$$

The explanatory power from this regression is labelled R^2_{TOT}. I then run one regression on only the earnings variables (see Table 2) and one regression on only the control variables. The explanatory power values from these regressions are labelled R^2_1 and R^2_2, respectively. The incremental explanatory power of the earnings variables and the control variables, respectively, can now be defined as:

$$R^2_{EARN} = R^2_{TOT} - R^2_2$$
$$R^2_{CON} = R^2_{TOT} - R^2_1$$

R^2_{COM} is the explanatory power common to both sets of variables, and it is defined as:

$$R^2_{COM} = R^2_{TOT} - R^2_{EARN} - R^2_{CON}$$

The incremental explanatory power of the earnings variables, R^2_{EARN}, is the metric of interest. The results from the incremental explanatory power analyses are presented in Tables 5 and 6. These tables are equivalent to Table 3 and Panel D of Table 4, respectively, with the only exception being that control variables have been added to the regressions. Because explanatory power is the chosen measure of value relevance, I do not focus on individual regression coefficients in these robustness checks. It turns out that all control variables except for EXTRA generally have significant regression coefficients. Details of these regressions can be found in Tables 11 and 12 of the Appendix.

Table 5: Incremental Explanatory Power in Positive and Negative Earnings Samples

Panel A: Positive Earnings

	R^2_{TOT}	R^2_{EARN}	R^2_{CON}	R^2_{COM}
Aggregate Earnings	30.22 %	11.16 %	17.26 %	1.80 %
Cash Flow + Accruals	30.22 %	11.16 %	17.27 %	1.79 %
Cash Flow + Accruals Items	30.77 %	11.71 %	17.15 %	1.91 %

Panel B: Negative Earnings

	R^2_{TOT}	R^2_{EARN}	R^2_{CON}	R^2_{COM}
Aggregate Earnings	17.84 %	0.90 %	17.20 %	-0.26 %
Cash Flow + Accruals	19.96 %	3.02 %	17.72 %	-0.78 %
Cash Flow + Accruals Items	24.87 %	7.93 %	18.37 %	-1.43 %

Table description
Table 5 lists total and incremental explanatory power (further regression details are provided in Table 11 of the Appendix) from regressions of stock returns on earnings variables and six control variables for the positive and negative earnings samples, respectively. Explanatory power is analysed for a sample of Norwegian firms from 1992 to 2004. R^2_{TOT} is the adjusted R^2 from the following regressions:

Aggregate earnings specification:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals items specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the stock return for company *i* in year *t*, EARN is earnings before extraordinary items, CF is cash flow from operations, ACC is total accruals, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in year *t-1*. CV_i is control variable *i*. The control variables are company size (log of market value of equity), intangible asset intensity (sum of intangible assets at time *t* divided by the market value of equity at the beginning of year *t*), the book-to-market ratio (book value of equity divided by market value of equity at time *t*), interest rate (the expected return on 5-year risk free government bonds), stock price volatility (the standard deviation of monthly returns on Oslo Stock Exchange) and net extraordinary items (total extraordinary items at time *t* divided by the market value of equity at the beginning of year *t*).

Define R_1^2 as the explanatory power from a regression that only includes the earnings variables, and R_2^2 as the explanatory power from a regression that only includes the control variables. The incremental value relevance of earnings, R_{EARN}^2, and the control variables, R_{CON}^2, can then be defined as:

$$R_{EARN}^2 = R_{TOT}^2 - R_2^2$$
$$R_{CON}^2 = R_{TOT}^2 - R_1^2$$

R_{COM}^2 is the explanatory power common to both set of variables, and it is defined as:

$$R_{COM}^2 = R_{TOT}^2 - R_{EARN}^2 - R_{CON}^2$$

Table 6: Incremental Explanatory Power Using Dummy for Negative Earnings

Panel A: Standard Specification

	R^2_{TOT}	R^2_{EARN}	R^2_{CON}	R^2_{COM}
Aggregate Earnings	24.69 %	5.99 %	17.08 %	1.62 %
Cash Flow + Accruals	26.66 %	7.96 %	17.30 %	1.40 %
Cash Flow + Accruals Items	28.02 %	9.32 %	17.23 %	1.47 %

Panel B: Dummy for Negative Earnings

	R^2_{TOT}	R^2_{EARN}	R^2_{CON}	R^2_{COM}
Aggregate Earnings	29.88 %	11.18 %	16.18 %	2.52 %
Cash Flow + Accruals	30.55 %	11.85 %	16.37 %	2.33 %
Cash Flow + Accruals Items	32.19 %	13.49 %	16.29 %	2.41 %

Table description
Table 6 lists total and incremental explanatory power (further regression details are provided in Table 12 of the Appendix) from regressions of stock returns on earnings variables and six control variables for a sample of Norwegian firms from 1992 to 2004. R_{TOT}^2 is the adjusted R^2 from the following regressions:

Panel A:
Aggregate earnings specification:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals items specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Panel B:
Aggregate earnings specification:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \beta_3 * D_{i,t} + \beta_4 EARN_{i,t} * D_{i,t} + \beta_5 \Delta EARN_{i,t} * D_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \beta_5 * D_{i,t}$$

$$+ \beta_6 CF_{i,t} * D_{i,t} + \beta_7 \Delta CF_{i,t} * D_{i,t} + \beta_8 ACC_{i,t} * D_{i,t} + \beta_9 \Delta ACC_{i,t} * D_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals items specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t}$$

$$+ \beta_8 \Delta\Delta DT_{i,t} + \beta_9 * D_{i,t} + \beta_{10} CF_{i,t} * D_{i,t} + \beta_{11} \Delta CF_{i,t} * D_{i,t} + \beta_{12} \Delta WC_{i,t} * D_{i,t} + \beta_{13} \Delta\Delta WC_{i,t} * D_{i,t}$$

$$+ \beta_{14} DEP_{i,t} * D_{i,t} + \beta_{15} \Delta DEP_{i,t} * D_{it} + \beta_{16} \Delta DT_{i,t} * D_{i,t} + \beta_{17} \Delta\Delta DT_{i,t} * D_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the stock return for company *i* in year *t*, EARN is earnings before extraordinary items, CF is cash flow from operations, ACC is total accruals, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. D is a dummy variable equal to 1 when earnings are negative, 0 otherwise. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in *year t-1*. CV_i is control variable *i*. The control variables are company size (log of market value of equity), intangible asset intensity (sum of intangible assets at time *t* divided by the market value of equity at the beginning of year *t*), the book-to-market ratio (book value of equity divided by market value of equity at time *t*), interest rate (the expected return on 5-year risk free government bonds), stock price volatility (the standard deviation of monthly returns on Oslo Stock Exchange) and net extraordinary items (total extraordinary items at time *t* divided by the market value of equity at the beginning of year *t*).

Define R_1^2 as the explanatory power from a regression that only includes the earnings variables, and R_2^2 as the explanatory power from a regression that only includes the control variables. The incremental value relevance of earnings, R^2_{EARN}, and the control variables, R^2_{CON}, can then be defined as:

$$R^2_{EARN} = R^2_{TOT} - R^2_2$$
$$R^2_{CON} = R^2_{TOT} - R^2_1$$

R^2_{COM} is the explanatory power common to both set of variables, and it is defined as:

$$R^2_{COM} = R^2_{TOT} - R^2_{EARN} - R^2_{CON}$$

Table 5 shows that explanatory power increases substantially in all regressions as control variables are added to the specifications. However, it is the incremental explanatory power of the earnings variables that is the measure of the accounting variables' ability to explain stock returns. This incremental explanatory power is almost constant across different earnings aggregation levels for positive earnings. However, for the negative earnings sample, the incremental explanatory power of the earnings variables increases substantially as earnings are increasingly split into components. Incremental explanatory power increases from 11.16% to 11.71% as positive earnings are disaggregated, while the increase is from 0.90% to 7.93% when negative earnings are split into components. These findings support my hypothesis.

The influence of control variables on the relative importance of the sign of earnings and earnings disaggregation is also studied in this section. Table 6 indicates that the incremental explanatory power of earnings increases as earnings are disaggregated. However, the effect of including a dummy variable for negative earnings appears to be even more substantial than the earnings disaggregation effect. Incremental explanatory power increases from 5.99% to 9.32% as earnings are disaggregated. Even with aggregated earnings, the incremental explanatory power is still 11.18% when the sign of earnings is taken into account. Table 6 shows that the incremental explanatory power reaches 13.49% as earnings are disaggregated and a dummy variable for the sign of earnings is included. As in the main analysis, there is clear evidence that both disaggregated earnings and the sign of earnings should be incorporated in value relevance studies. There is much to gain by accounting for the sign effect even if earnings are disaggregated, and vice versa.[25] Overall, Tables 5 and 6 do not present results that alter previously stated conclusions.

4.4 Excess Return

In all analyses so far I have applied the "raw" return for each stock. To control for possibly exogenous (to accounting earnings) market-wide effects on stock returns (e.g., changes in expected return), I re-run all regressions using excess return as the stock return measure (see Dechow, 1994). Excess return is defined as the return of a stock minus the yearly market-wide return. Market wide returns are estimated from OSEBX[26] – Oslo Stock Exchange Benchmark Index – at 30 December of each year. It turns out that this change has practically no influence on the adjusted R^2 values previously reported. These results are therefore not tabulated. The conclusions stated in the main section remain unchanged after this robustness check.

[25] I have also run tests in which one control variable is added at a time. The results are qualitatively identical to the reported results.

5 Concluding Remarks

Several prior studies (e.g., Hayn, 1995, Basu, 1997, Jenkins, 2003) have shown that negative earnings are less value-relevant than positive earnings. Negative earnings often seem to have no association with stock returns at all. This study provides evidence that the lack of value relevance for negative earnings, to a certain extent, is a matter of earnings aggregation. When bottom line earnings are used as the explanatory variable in value relevance regressions, negative earnings are far less value-relevant than positive earnings. However, as earnings are disaggregated into major components, the increase in value relevance is much larger for negative than for positive earnings. The gains in explanatory power from disaggregating earnings into components are much more substantial for negative than for positive earnings. These results are consistent with my hypothesis. Negative bottom line earnings are not expected to persist and will therefore have little value relevance. However, individual earnings components may still be persistent and, thus, will contain information relevant to investors.

The second part of the paper studies whether it is more useful to account for the sign of earnings in value relevance research than to disaggregate earnings into components. The empirical findings show that explanatory power of regression analyses increase dramatically as earnings are disaggregated and the sign of bottom line earnings is taken into account. Compared to a "standard" Easton and Harris regression of stock returns on aggregate and changes in earnings, disaggregating earnings and accounting for the sign of earnings doubles the explanatory power of the regressions. Explanatory power increases significantly when

[26] OB Total – Oslo Stock Exchange's all shares index – is used to represent market wide returns for the period 1992-1995.

aggregated earnings are split, even in cases where the sign of earnings is initially taken into account. Similarly, accounting for the sign of earnings is extremely useful for all earnings aggregation levels. However, if earnings are not disaggregated into a relatively large number of items, the sign effect seems to dominate the disaggregation effect. Overall, the empirical findings suggest that the various earnings items generally have different associations (regression coefficients) with stock returns. Additionally, each earnings item's coefficient is likely to be dependent on the sign of bottom line earnings.

Several interesting questions arise from studies like this. I will focus particularly on one such question: Why are depreciation and changes in depreciation the only significant explanatory variables in the most disaggregated earnings specification for the negative earnings sample? In the positive earnings sample, explanatory power is 13.62% for the most disaggregated specification. The equivalent number for the negative earnings sample is 6.50%. In the positive earnings sample, most earnings components have significant coefficients. In the negative earnings sample, only depreciation and depreciation change are statistically significant. The coefficient on depreciation is positive, while the coefficient on the change in depreciation is negative. The finding that, for a given amount of loss, stock returns are higher when the loss can be attributed to depreciation than when it can be attributed to cash flows is in some sense understandable. On the other hand, increases in depreciation have a negative effect on stock returns. Clearly, for negative earnings, depreciation bears information highly associated with stock returns. Why is this? Does depreciation proxy for something else? This issue is left for future research.

Literature

Aboody, D., & Lev, B. (1998). The Value Relevance of Intangibles: The Case of Software Capitalization. *Journal of Accounting Research, 36*(3), 161-191.

Ali, A., & Lee-Seok, H. (2000). Country-Specific Factors Related to Financial Reporting and the Value Relevance of Accounting Data. *Journal of Accounting Research, 38*(1), 1-21.

Amir, E., & Kama, I. (2004). The Market Reaction to ROCE Components: Implications for Valuation and Financial Statement Analysis. *Working Paper*.

Armstrong, C., Davila, A., & Foster, G. (2006). Venture-backed Private Equity Valuation and Financial Statement Information. *Review of Accounting Studies, 11*(1), 119-154.

Balkrishna, H., Coulton, J. J., & Taylor, S. L. (2007). Accounting losses and earnings conservatism: evidence from Australian Generally Accepted Accounting Principles. *Accounting and Finance, 47*.

Ball, R., & Shivakumar, L. (2006). The Role of Accruals in Asymmetrically Timely Gain and Loss Recognition. *Journal of Accounting Research, 44*(2), 207-242.

Banz, R. W. (1981). The Relationship Between Return and Market Value of Common Stocks. *Journal of Financial Economics, 9*(1), 3-18.

Barth, M. E., Beaver, W. H., Hand, J. R. M., & Landsman, W. R. (2005). Accruals, Accounting-Based Valuation Models, and the Prediction of Equity Values. *Journal of Accounting, Auditing & Finance, 20*(4), 311-345.

Barth, M. E., Cram, D. P., & Nelson, K. K. (2001). Accruals and the Prediction of Future Cash Flows. *The Accounting Review, 76*(1), 27-58.

Barua, A., Legoria, J., & Moffitt, J. S. (2006). Accruals Management to Achieve Earnings Benchmarks: A Comparison of Pre-managed Profit and Loss Firms. *Journal of Business Finance & Accounting, 33*(5 & 6).

Basu, S. (1997). The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting & Economics, 24*(1), 3.

Beaver, W., McNichols, M. F., & Nelson, K. K. (2007). An alternative interpretation of the discontinuity in earnings distributions. *Review of Accounting Studies, 12*.

Beaver, W. H., McAnally, M. L., & Stinson, C. H. (1997). The information content of earnings and prices: A simultaneous equations approach. *Journal of Accounting & Economics, 23*(1), 53-81.

Biddle, G. C., Seow, G. S., & Siegel, A. F. (1995). Relative versus Incremental Information Content. *Contemporary Accounting Research, 12*(1), 1-23.

Bodnar, G. M., & Weintrop, J. (1997). The valuation of the foreign income of US multinational firms: a growth opportunities perspective. *Journal of Accounting & Economics, 24*(1), 69-97.

Brimble, M., & Hodgson, A. (2007). On the intertemporal value relevance of conventional financial accounting in Australia. *Accounting & Finance, 47*(4), 599-622.

Brown, S., Kin, L., & Lys, T. (1999). Use of R^2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting & Economics, 28*(2), 83-115.

Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting & Economics, 24*.

Callen, J. L., & Segal, D. (2004). Do Accruals Drive Firm-Level Stock Returns? A Variance Decomposition Analysis. *Journal of Accounting Research, 42*(3), 527-560.

Carnes, T. A. (2006). Unexpected Changes in Quarterly Financial-Statement Line Items and Their Relationship to Stock Prices. *Academy of Accounting and Financial Studies Journal, 10*(3).

Christie, A. A. (1987). On Cross-Sectional Analysis in Accounting Research. *Journal of Accounting and Economics, 9*(3), 231-258.
Collins, D. W., & Kothari, S. P. (1989). An Analysis of Intertemporal and Cross-Sectional Determinants of Earnings Response Coefficients. *Journal of Accounting & Economics, 11*(2-3), 143-181.
Collins, D. W., & Kothari, S. P. (1989). An Analysis of Intertemporal and Cross-sectional Determinants of Earnings Response Coefficients. *Journal of Accounting and Economics, 11*(2-3), 143-181.
Collins, D. W., Kothari, S. P., Shanken, J., & Sloan, R. G. (1994). Lack of Timeliness and Noise as Explanations for the Low Contemporaneous Return-Earnings Association. *Journal of Accounting and Economics, 18*(3), 289-324.
Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting & Economics, 24*(1), 39.
Darrough, M., & Ye, J. (2007). Valuation of loss firms in a knowledge-based economy. *Review of Accounting Studies, 12*.
Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting & Economics, 18*(1), 3-42.
Dechow, P. M., & Ge, W. (2006). The persistence of earnings and cash flows and the role of special items: Implications for the accrual anomaly. *Review of Accounting Studies, 11*.
Degeorge, F., Patel, J., & Zeckhauser, R. (1999). Earnings management to exceed thresholds. *Journal of Business, 72*.
Dontoh, A., Radhakrishnan, S., & Ronen, J. (2004). The Declining Value-relevance of Accounting Information and Non-information-based Trading: An Empirical Analysis. *Contemporary Accounting Research, 21*(4), 795-812.
Easton, P. D., & Harris, T. S. (1991). Earnings as an Explanatory Variable for Returns. *Journal of Accounting Research, 29*(1), 19-36.
Easton, P. D., Harris, T. S., & Ohlson, J. A. (1992). Aggregate accounting earnings can explain most of security returns. *Journal of Accounting & Economics, 15*(2/3), 119-142.
Easton, P. D., & Sommers, G. A. (2003). Scale and the Scale Effect in Market-based Accounting Research. *Journal of Business Finance & Accounting, 30*(1/2), 25-55.
Easton, P. D., & Zmijewski, M. E. (1989). Cross-Sectional Variation in the Stock Market Response to Accounting Earnings Announcements. *Journal of Accounting & Economics, 11*(2/3), 117-141.
Elgers, P. T., Porter, S. L., & Emily Xu, L. (2008). The timing of industry and firm earnings information in security prices: A re-evaluation. *Journal of Accounting & Economics, 45*(1), 78-93.
Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *Journal of Finance, 47*(2), 427-465.
Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3-56.
FASB. (1978). Financial Accounting Standards Board. Objectives of Financial Reporting by Business Enterprises. *Statement of Financial Accounting Concepts No. 1*.
Finger, C. A. (1994). The Ability of Earnings to Predict Future Earnings and Cash Flow. *Journal of Accounting Research, 32*(2), 210-223.
Francis, J., Schipper, K., & Vincent, L. (2003). The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns. *Contemporary Accounting Research, 20*(1), 121-164.

Freeman, R. N., & Tse, S. Y. (1992). A Nonlinear Model of Security Price Responses to Unexpected Earnings. *Journal of Accounting Research, 30*(2), 185-209.

Givoly, D., & Hayn, C. (2000). The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? *Journal of Accounting & Economics, 29*(3), 287-320.

Gu, Z. (2007). Across-Sample Incomparability of R2s and Additional Evidence on Value Relevance Changes Over Time *Journal of Business Finance & Accounting, 34*.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate Data Analysis, Sixth Edition. *PEARSON Prentice Hall*.

Hayn, C. (1995). The information content of losses. *Journal of Accounting & Economics, 20*(2), 125-153.

Hope, O.-K. (1999). Value Relevance Effects of the Introduction of Interperiod Tax Allocation: The Case of Norway. In *Advances in international accounting. Volume 12* (pp. 157-191).

Jenkins, D. S. (2003). The Transitory Nature of Negative Earnings and the Implications for Earnings Prediction and Stock Valuation. *Review of Quantitative Finance & Accounting, 21*(4), 379-404.

Joos, P., & Plesko, G. A. (2005). Valuing Loss Firms. *The Accounting Review, 80*(3).

Kerstein, J., & Kim, S. (1995). The Incremental Information Content of Capital Expenditures. *Accounting Review, 70*(3), 513-526.

Kim, M., & Kross, W. (2005). The Ability of Earnings to Predict Future Operating Cash Flows Has Been Increasing — Not Decreasing. *Journal of Accounting Research, 43*(5).

Kim, O., Lim, S. C., & Park, T. (2008). Measuring the impact of sales on earnings and equity price. *Review of Quantitative Financial Accounting*.

Klein, A., & Marquardt, C. A. (2006). Fundamentals of Accounting Losses. *The Accounting Review, 81*(1).

Kormendi, R., & Lipe, R. (1987). Earnings Innovations, Earnings Persistence, and Stock Returns. *Journal of Business, 60*(3), 323-345.

Lev, B. (1989). On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research. *Journal of Accounting Research, 27*(3), 153-192.

Lev, B., Li, S., & Sougiannis, T. (2005). Accounting Estimates: Pervasive, Yet of Questionable Usefulness. *Working Paper*.

Lev, B., & Sougiannis, T. (1996). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting & Economics, 21*(1), 107-138.

Lev, B., & Zarowin, P. (1999). The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research, 37*(2), 353-385.

Liu, J., & Thomas, J. (2000). Stock Returns and Accounting Earnings. *Journal of Accounting Research, 38*(1), 71-101.

Maddala, G. S. (2001). Introduction to Econometrics - Third Edition. *John Wiley and Sons Ltd.* .

Monahan, S. J. (2005). Conservatism, Growth and the Role of Accounting Numbers in the Fundamental Analysis Process. *Review of Accounting Studies, 10*(2-3), 227-260.

Ohlson, J. A., & Penman, S. H. (1992). Disaggregated Accounting Data as Explanatory Variables for Returns. *Journal of Accounting, Auditing & Finance, 7*(4), 553-573.

Penman, S. H., & Xiao-Jun, Z. (2002). Accounting Conservatism, the Quality of Earnings, and Stock Returns. *Accounting Review, 77*(2), 237.

Pope, P. F. (2005). Discussion--Accruals, Accounting-Based Valuation Models, and the Prediction of Equity Values. *Journal of Accounting, Auditing & Finance, 20*(4), 347-354.
Ramakrishnan, R. T. S., & Thomas, J. K. (1998). Valuation of Permanent, Transitory, and Price-Irrelevant Components of Reported Earnings. *Journal of Accounting, Auditing and Finance, 13*(3), 301-336.
Rayburn, J. (1986). The Association of Operating Cash Flow and Accruals with Security Returns. *Journal of Accounting Research, 24*(3), 112-133.
Rosenberg, B., Reid, K., & Lanstein, R. (1985). Persuasive evidence of market inefficiency. *Journal of Portfolio Management, 11*(3), 9-16.
Stark, A. W. (1997). Linear Information Dynamics, Dividend Irrelevance, Corporate Valuation and the Clean Surplus Relationship. *Accounting & Business Research, 27*(3).
Stattman, D. (1980). Book Values and Stock Returns. *The Chicago MBA: A Journal of Selected Papers*.
Thomas, W. B. (1999). A test of the market's mispricing of domestic and foreign earnings. *Journal of Accounting & Economics, 28*(3), 243-267.

Appendix: Supplementary Tables

Table 7: Supplementary Descriptive Statistics - Over Time Development in Some Key Accounting Variables

Year	Companies reporting negative net earnings		Companies reporting extraordinary items		Companies reporting intangible assets		Companies reporting impairment	
1994	17	18 %	59	63 %	57	61 %	8	9 %
1995	10	11 %	46	51 %	54	60 %	8	9 %
1996	15	15 %	62	62 %	64	64 %	7	7 %
1997	31	26 %	73	61 %	78	65 %	8	7 %
1998	41	27 %	83	55 %	109	72 %	14	9 %
1999	53	36 %	63	42 %	125	84 %	18	12 %
2000	56	40 %	72	51 %	116	82 %	25	18 %
2001	61	45 %	65	48 %	116	86 %	31	23 %
2002	64	47 %	67	49 %	119	87 %	35	26 %
2003	40	33 %	64	52 %	107	87 %	24	20 %
2004	39	30 %	57	44 %	110	84 %	27	21 %

Table description

Table 7 lists the number and percentage share of companies reporting respectively negative earnings, extraordinary items, intangible assets, and impairment from 1994 to 2004.

Table 8: Detailed Accruals

Panel A: Value Relevance of Positive and Negative Earnings

	Positive Earnings		Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
CF	**1.19**	4.09	0.43	1.87
ΔCF	**0.78**	2.91	0.16	1.06
ΔINV	-1.65	-1.79	0.07	0.08
ΔΔINV	**1.45**	4.96	**0.63**	2.59
ΔREC	**-1.85**	-2.13	-0.19	-0.22
ΔΔREC	**1.00**	4.88	0.09	0.47
ΔPAY	**1.87**	2.07	0.16	0.18
ΔΔPAY	**-0.64**	-2.51	0.19	1.02
DEPR	1.51	1.53	1.19	1.33
ΔDEPR	-1.50	-1.45	-1.03	-1.91
IMP	-1.47	-0.87	1.12	1.06
ΔIMP	-0.47	-0.51	-0.52	-1.39
ΔDT	-0.18	-0.30	-0.40	-0.55
ΔΔDT	**2.79**	2.79	0.67	0.73
Constant	**0.17**	4.99	**-0.13**	-2.95
Adj. R^2	16.68 %		10.45 %	
n	945		427	
Mean VIF	12.23		30.13	

Panel B: The Effect of Negative Earnings on Regression Coefficients

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
CF	**0.83**	5.45	**1.19**	4.08
ΔCF	**0.51**	3.24	**0.78**	2.90
ΔINV	**0.67**	2.85	**1.14**	2.60
ΔΔINV	**1.31**	6.39	**1.45**	4.94
ΔREC	**0.60**	3.06	**0.94**	2.98
ΔΔREC	**0.71**	4.37	**1.00**	4.86
ΔPAY	**-0.59**	-2.92	**-0.92**	-2.99
ΔΔPAY	**-0.34**	-2.19	**-0.64**	-2.50
DEPR	-0.21	-1.19	**-1.28**	-3.22
ΔDEPR	**-1.43**	-3.75	-1.50	-1.45
IMP	-0.31	-0.58	**-4.26**	-2.97
ΔIMP	-0.46	-1.06	-0.47	-0.51
ΔDT	**-2.17**	-2.98	**-2.79**	-2.78
ΔΔDT	0.25	0.51	-0.18	-0.30
CF*D			**-0.76**	-2.07
ΔCF*D			**-0.62**	-2.01
ΔINV*D			-0.41	-0.81
ΔΔINV*D			**-0.82**	-2.17
ΔREC*D			-0.47	-1.13
ΔΔREC*D			**-0.91**	-3.30
ΔPAY*D			0.41	0.99
ΔΔPAY*D			**0.83**	2.62
DEPR*D			**1.81**	4.12
ΔDEPR*D			0.47	0.41
IMP*D			**4.71**	3.08
ΔIMP*D			-0.05	-0.05
ΔDT*D			2.12	1.57
ΔΔDT*D			-0.22	-0.24
D			**-0.29**	-5.41
Constant	**0.09**	3.45	**0.17**	4.97
Adj. R^2	15.55 %		19.08 %	
n	1372		1372	
Mean VIF	3.40		12.38	

Table description

Table 8 describes the value relevance of detailed earnings components for a sample of Norwegian firms from 1992 to 2004. It summarises the regression coefficients (Coefficient), White-adjusted t-values (t-statistic), total explanatory power (adj. R^2), number of observations (*n)* and mean variance inflation factor (Mean VIF) for positive and negative earnings sub-samples, respectively. Data is analysed using the following regression specifications:

The standard specification is applied in panel A and the leftmost analysis of panel B:

$$\begin{aligned} RET_{i,t} &= \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta INV_{i,t} + \beta_4 \Delta\Delta INV_{i,t} + \beta_5 \Delta REC_{i,t} \\ &+ \beta_6 \Delta\Delta REC_{i,t} + \beta_7 \Delta PAY_{i,t} + \beta_8 \Delta\Delta PAY_{i,t} + \beta_9 DEPR_{i,t} + \beta_{10} \Delta DEPR_{i,t} + \beta_{11} IMP_{i,t} \\ &+ \beta_{12} \Delta IMP_{i,t} + \beta_{13} \Delta DT_{i,t} + \beta_{14} \Delta\Delta DT_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Dummy variable for negative earnings is applied in the rightmost analysis of panel B:

$$
\begin{aligned}
RET_{i,t} &= \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta INV_{i,t} + \beta_4 \Delta\Delta INV_{i,t} + \beta_5 \Delta REC_{i,t} \\
&+ \beta_6 \Delta\Delta REC_{i,t} + \beta_7 \Delta PAY_{i,t} + \beta_8 \Delta\Delta PAY_{i,t} + \beta_9 DEPR_{i,t} + \beta_{10} \Delta DEPR_{i,t} + \beta_{11} IMP_{i,t} \\
&+ \beta_{12} \Delta IMP_{i,t} + \beta_{13} \Delta DT_{i,t} + \beta_{14} \Delta\Delta DT_{i,t} + \beta_{15} * D_{i,t} + \beta_{16} CF_{i,t} * D_{i,t} + \beta_{17} \Delta CF_{i,t} * D_{i,t} \\
&+ \beta_{18} \Delta INV_{i,t} * D_{i,t} + \beta_{19} \Delta\Delta INV_{i,t} * D_{i,t} + \beta_{20} \Delta REC_{i,t} * D_{i,t} + \beta_{21} \Delta\Delta REC_{i,t} * D_{it} \\
&+ \beta_{22} \Delta PAY_{i,t} * D_{i,t} + \beta_{23} \Delta\Delta PAY_{i,t} * D_{i,t} + \beta_{24} DEPR_{i,t} * D_{i,t} + \beta_{25} \Delta DEPR_{i,t} * D_{i,t} + \beta_{26} IMP_{i,t} * D_{i,t} \\
&+ \beta_{27} \Delta IMP_{i,t} * D_{i,t} + \beta_{28} \Delta DT_{i,t} * D_{i,t} + \beta_{29} \Delta\Delta DT_{i,t} * D_{i,t} + \varepsilon_{i,t}
\end{aligned}
$$
:

where $RET_{i,t}$ is the stock return for company *i* in year *t*, CF is cash flow from operations, INV is inventory, REC is receivables, PAY is payables, DEPR is depreciation, IMP is impairment and DT is deferred taxes. D is a dummy variable equal to 1 when earnings are negative, 0 otherwise. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in year *t-1*. Coefficients in **bold** denote a statistical significance at a 5% level using a two sided test.

Table 9: VIF per Regression Coefficient

Variable:	Standard Specification	Dummy for Negative Earnings
CF	3.44	15.83
ΔCF	3.35	13.31
ΔWC	2.47	11.86
ΔΔWC	2.19	10.98
DEP	2.18	9.05
ΔDEP	1.98	8.83
ΔDT	1.43	8.21
ΔΔDT	1.08	7.45
CF*D		6.34
ΔCF*D		6.13
ΔWC*D		6.00
ΔΔWC*D		5.81
DEP*D		5.34
ΔDEP*D		5.15
ΔDT*D		3.48
ΔΔDT*D		3.46
D		1.54
Mean VIF	2.26	7.57

Table description
Table 9 lists the regression coefficients' individual variance inflation factor in the following regressions (see Panel C of table 4):

Standard specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \varepsilon_{i,t}$$

Dummy variable for negative earnings:

$$
\begin{aligned}
RET_{i,t} &= \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \beta_9 * D_{i,t} \\
&+ \beta_{10} CF_{i,t} * D_{i,t} + \beta_{11} \Delta CF_{i,t} * D_{i,t} + \beta_{12} \Delta WC_{i,t} * D_{i,t} + \beta_{13} \Delta\Delta WC_{i,t} * D_{i,t} + \beta_{14} DEP_{i,t} * D_{i,t} + \beta_{15} \Delta DEP_{i,t} * D_{it} \\
&+ \beta_{16} \Delta DT_{i,t} * D_{i,t} + \beta_{17} \Delta\Delta DT_{i,t} * D_{i,t} + \varepsilon_{i,t}
\end{aligned}
$$

where $RET_{i,t}$ is the stock return for company *i* in year *t*, CF is cash flow from operations, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. D is a dummy variable equal to 1 when earnings are negative, 0 otherwise. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in year *t-1*.

Table 10: Descriptive Statistics Control Variables

Panel A: Positive Earnings (n = 945)

Variable	Mean	Q1	Median	Q3	St. dev
SIZE	21.09	19.89	21.02	22.23	1.71
INTANG	0.09	0.00	0.02	0.10	0.21
BM	0.69	0.23	0.48	0.81	1.65
INTEREST	5.66	5.12	5.98	6.38	0.98
VOL	5.75	3.99	5.18	6.95	1.92
EXTRA	0.001	0.000	0.000	0.000	0.050

Panel B: Negative Earnings (n = 427)

Variable	Mean	Q1	Median	Q3	St. dev
SIZE	20.17	19.04	20.05	21.13	1.60
INTANG	0.15	0.00	0.05	0.15	0.31
BM	0.85	0.15	0.43	0.94	1.50
INTEREST	5.66	5.12	5.98	6.36	0.92
VOL	6.10	4.53	5.79	6.95	1.72
EXTRA	0.011	0.000	0.000	0.000	0.184

Table 10 presents descriptive statistics for the control variables (see Tables 5 and 6) company size (SIZE = log of market value of equity), intangible asset intensity (INTANG = sum of intangible assets at time *t* divided by the market value of equity at the beginning of year *t*), the book-to-market ratio (BM = book value of equity divided by market value of equity at time *t*), interest rate (INTEREST = the expected return on 5-year risk free government bonds), stock price volatility (VOL = the standard deviation of monthly returns on Oslo Stock Exchange) and net extraordinary items (EXTRA = total extraordinary items at time *t* divided by the market value of equity at the beginning of year *t*). It summarises the mean, first quarter, median, third quarter, standard deviation, and number of observations for the positive and the negative earnings sample, respectively.

Table 11: Value Relevance of Positive and Negative Earnings - Control Variables Included

Panel A: Positive Earnings

	Aggregate Earnings		Cash Flow + Accruals		Cash flow + Accruals Items	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
EARN	**1.15**	4.62				
ΔEARN	**1.00**	5.26				
CF			**1.11**	4.47	**1.14**	4.35
ΔCF			**1.01**	4.73	**0.88**	3.83
ACC			**1.01**	3.23		
ΔACC			**0.98**	5.01		
ΔWC					**1.01**	3.44
ΔΔWC					**0.84**	4.45
DEP					**-0.95**	-2.49
ΔDEP					**-1.37**	-2.39
ΔDT					**-2.68**	-3.02
ΔΔDT					-0.20	-0.35
SIZE	**0.05**	4.06	**0.05**	4.06	**0.06**	4.28
INTANG	**0.29**	2.00	0.28	1.94	**0.26**	2.15
BM	**-0.09**	-2.44	**-0.09**	-2.41	**-0.08**	-2.37
INTEREST	**-0.13**	-6.25	**-0.13**	-6.30	**-0.13**	-6.26
VOL	**-0.10**	-12.06	**-0.10**	-12.05	**-0.10**	-12.08
EXTRA	-0.31	-0.57	-0.27	-0.48	-0.22	-0.39
Constant	0.38	1.21	0.36	1.14	0.33	1.04
Adj. R^2	30.22 %		30.22 %		30.77 %	
n	945		945		945	

Panel B: Negative Earnings

	Aggregate Earnings		Cash Flow + Accruals		Cash flow + Accruals Items	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
EARN	-0.24	-1.80				
ΔEARN	**0.23**	2.11				
CF			0.15	0.61	0.23	1.33
ΔCF			0.22	1.90	0.00	-0.01
ACC			**-0.45**	-2.65		
ΔACC			**0.34**	2.45		
ΔWC					0.09	0.52
ΔΔWC					-0.15	-1.28
DEP					**0.96**	6.08
ΔDEP					**-0.78**	-4.07
ΔDT					-0.49	-0.54
ΔΔDT					-0.71	-0.94
SIZE	**0.09**	3.94	**0.09**	3.98	**0.08**	4.00
INTANG	**0.24**	2.04	0.12	0.84	-0.17	-1.53
BM	-0.04	-1.70	**-0.06**	-2.99	**-0.08**	-4.41
INTEREST	**-0.21**	-5.77	**-0.22**	-5.98	**-0.22**	-5.99
VOL	**-0.08**	-3.95	**-0.07**	-4.61	**-0.07**	-4.41
EXTRA	0.02	0.08	0.00	0.00	-0.15	-0.69
Constant	-0.18	-0.35	-0.19	-0.39	-0.19	-0.40
Adj. R^2	17.84 %		19.96 %		24.87 %	
n	427		427		427	

Table description

Table 11 describes the value relevance of earnings for a sample of Norwegian firms from 1992 to 2004 when control variables are included in the regression analyses (see Table 5). It summarises the regression coefficients (Coefficient), White-adjusted t-values (t-statistic), total explanatory power (adj. R^2) and number of observations (*n*) for the positive and negative earnings samples, respectively. Data is analysed using 3 different earnings aggregation levels.

Aggregate earnings specification:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Cash flow + accruals items specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 \Delta WC_{i,t} + \beta_4 \Delta\Delta WC_{i,t} + \beta_5 DEP_{i,t} + \beta_6 \Delta DEP_{i,t} + \beta_7 \Delta DT_{i,t} + \beta_8 \Delta\Delta DT_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the stock return for company *i* in year *t*, EARN is earnings before extraordinary items, CF is cash flow from operations, ACC is total accruals, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in year *t-1*. CV_i is control variable *i*. The control variables are company size (SIZE = log of market value of equity), intangible asset intensity (INTANG = sum intangible assets at time *t* divided by the market value of equity at the beginning of year *t*), the book-to-market ratio (BM = book value of equity divided by market value of equity at time *t*), interest rate (INTEREST = the expected return on 5-year risk free government bonds), stock price volatility (VOL = the standard deviation of monthly returns on Oslo Stock Exchange) and net extraordinary items (EXTRA = total extraordinary items at time *t* divided by the market value of equity at the beginning of year *t*).

Table 12: The Effect of Negative Earnings on Regression Coefficients

Panel A: Aggregate Earnings

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
EARN	**0.41**	2.53	**1.13**	4.55
ΔEARN	**0.60**	3.80	**0.98**	5.28
EARN*D			**-1.38**	-4.48
ΔEARN*D			**-0.79**	-3.43
SIZE	**0.06**	5.13	**0.06**	5.48
INTANG	**0.44**	3.73	**0.29**	2.62
BM	**-0.05**	-3.28	**-0.08**	-3.54
INTEREST	**-0.17**	-8.77	**-0.15**	-8.29
VOL	**-0.10**	-13.60	**-0.10**	-13.24
EXTRA	-0.02	-0.08	-0.02	-0.08
D			**-0.17**	-3.56
Constant	0.45	1.63	0.28	1.05
Adj. R^2	24.69 %		29.88 %	
n	1372		1372	

Panel B: Cash Flow + Accruals

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
CF	**0.64**	4.60	**1.10**	4.43
ΔCF	**0.52**	3.57	**1.02**	4.84
ACC	0.11	0.73	**0.98**	3.13
ΔACC	**0.68**	4.77	**0.99**	5.22
CF*D			**-0.94**	-2.79
ΔCF*D			**-0.82**	-3.36
ACC*D			**-1.40**	-4.10
ΔACC*D			**-0.67**	-2.86
SIZE	**0.07**	5.50	**0.06**	5.45
INTANG	**0.34**	2.95	**0.22**	2.20
BM	**-0.07**	-2.85	**-0.08**	-3.28
INTEREST	**-0.17**	-8.88	**-0.15**	-8.48
VOL	**-0.10**	-13.30	**-0.09**	-12.91
EXTRA	-0.03	-0.15	-0.04	-0.19
D			**-0.19**	-3.99
Constant	0.27	0.97	0.27	1.03
Adj. R^2	26.66 %		30.55 %	
n	1372		1372	

Panel C: Cash Flow + Accruals Items

	Standard Specification		Dummy for Negative Earnings	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
CF	**0.72**	5.27	**1.11**	4.25
ΔCF	**0.40**	2.70	**0.93**	4.09
ΔWC	**0.39**	2.03	**1.00**	3.42
ΔΔWC	**0.46**	3.09	**0.89**	4.81
DEP	0.10	0.58	**-0.86**	-2.25
ΔDEP	**-0.96**	-4.29	**-1.38**	-2.41
ΔDT	**-2.13**	-2.94	**-2.71**	-3.00
ΔΔDT	0.28	0.54	-0.15	-0.26
CF*D			**-0.90**	-2.93
ΔCF*D			**-0.92**	-3.68
ΔWC*D			**-0.94**	-2.70
ΔΔWC*D			**-1.01**	-4.58
DEP*D			**1.62**	4.00
ΔDEP*D			0.61	1.01
ΔDT*D			**2.55**	2.02
ΔΔDT*D			-0.83	-0.91
SIZE	**0.07**	6.07	**0.06**	5.66
INTANG	**0.21**	2.27	0.10	1.22
BM	**-0.07**	-2.70	**-0.08**	-3.16
INTEREST	**-0.16**	-8.74	**-0.15**	-8.42
VOL	**-0.10**	-13.18	**-0.09**	-12.84
EXTRA	-0.07	-0.36	-0.18	-0.84
D			**-0.21**	-4.47
Constant	0.15	0.54	0.26	0.99
Adj. R^2	28.02 %		32.19 %	
n	1372		1372	

Table description

Table 12 describes the value relevance of earnings for a sample of Norwegian firms from 1992 to 2004 when control variables are included in the regression analyses (see Table 6). It summarises the regression coefficients (Coefficient), White-adjusted t-values (t-statistic), total explanatory power (adj. R^2) and number of observations (*n*) for the total sample. Data is analysed using 3 different earnings aggregation levels.

<u>Panel A presents the results of the following regressions:</u>

Standard specification:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Dummy variable for negative earnings:

$$RET_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \beta_3 * D_{i,t} + \beta_4 EARN_{i,t} * D_{i,t} + \beta_5 \Delta EARN_{i,t} * D_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

<u>Panel B presents the results of the following regressions:</u>

Standard specification:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Dummy variable for negative earnings:

$$RET_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 \Delta CF_{i,t} + \beta_3 ACC_{i,t} + \beta_4 \Delta ACC_{i,t} + \beta_5 * D_{i,t}$$

$$+ \beta_6 CF_{i,t} * D_{i,t} + \beta_7 \Delta CF_{i,t} * D_{i,t} + \beta_8 ACC_{i,t} * D_{i,t} + \beta_9 \Delta ACC_{i,t} * D_{i,t} + \sum_{i=1}^{6} \gamma_i CV_i + \varepsilon_{i,t}$$

Panel C presents the results of the following regressions:

Standard specification:

$$\mathrm{RET}_{i,t} = \beta_0 + \beta_1\mathrm{CF}_{i,t} + \beta_2\Delta\mathrm{CF}_{i,t} + \beta_3\Delta\mathrm{WC}_{i,t} + \beta_4\Delta\Delta\mathrm{WC}_{i,t} + \beta_5\mathrm{DEP}_{i,t} + \beta_6\Delta\mathrm{DEP}_{i,t} + \beta_7\Delta\mathrm{DT}_{i,t} + \beta_8\Delta\Delta\mathrm{DT}_{i,t} + \sum_{i=1}^{6}\gamma_i\mathrm{CV}_i + \varepsilon_{i,t}$$

Dummy for negative earnings:

$$\begin{aligned}\mathrm{RET}_{i,t} &= \beta_0 + \beta_1\mathrm{CF}_{i,t} + \beta_2\Delta\mathrm{CF}_{i,t} + \beta_3\Delta\mathrm{WC}_{i,t} + \beta_4\Delta\Delta\mathrm{WC}_{i,t} + \beta_5\mathrm{DEP}_{i,t} + \beta_6\Delta\mathrm{DEP}_{i,t} + \beta_7\Delta\mathrm{DT}_{i,t} \\ &+ \beta_8\Delta\Delta\mathrm{DT}_{i,t} + \beta_9 * \mathrm{D}_{i,t} + \beta_{10}\mathrm{CF}_{i,t} * \mathrm{D}_{i,t} + \beta_{11}\Delta\mathrm{CF}_{i,t} * \mathrm{D}_{i,t} + \beta_{12}\Delta\mathrm{WC}_{i,t} * \mathrm{D}_{i,t} + \beta_{13}\Delta\Delta\mathrm{WC}_{i,t} * \mathrm{D}_{i,t} \\ &+ \beta_{14}\mathrm{DEP}_{i,t} * \mathrm{D}_{i,t} + \beta_{15}\Delta\mathrm{DEP}_{i,t} * \mathrm{D}_{it} + \beta_{16}\Delta\mathrm{DT}_{i,t} * \mathrm{D}_{i,t} + \beta_{17}\Delta\Delta\mathrm{DT}_{i,t} * \mathrm{D}_{i,t} + \sum_{i=1}^{6}\gamma_i\mathrm{CV}_i + \varepsilon_{i,t}\end{aligned}$$

where $\mathrm{RET}_{i,t}$ is the stock return for company *i* in year *t*, EARN is earnings before extraordinary items, CF is cash flow from operations, ACC is total accruals, WC is working capital, DEP is depreciation and impairment, and DT is deferred taxes. D is a dummy variable equal to 1 when earnings are negative, 0 otherwise. Δ denotes yearly change in the variables. The accounting variables are scaled by the market value of equity on 30 December in year *t-1*. CV_i is control variable *i*. The control variables are company size (SIZE = log of market value of equity), intangible asset intensity (INTANG = sum intangible assets at time *t* divided by the market value of equity at the beginning of year *t*), the book-to-market ratio (BM = book value of equity divided by market value of equity at time *t*), interest rate (INTEREST = the expected return on 5-year risk free government bonds), stock price volatility (VOL = the standard deviation of monthly returns on Oslo Stock Exchange) and net extraordinary items (EXTRA = total extraordinary items at time *t* divided by the market value of equity at the beginning of year *t*).

Essay 5:

Has IFRS Changed How Investors Respond to Earnings and Book Values?

Leif Atle Beisland
University of Agder

Kjell Henry Knivsflå
Norwegian School of Economics and Business Administration

Abstract

Firms listed on European stock exchanges are required to report according to International Financial Reporting Standards, IFRS, in their consolidated financial statements as of 2005. We use a sample of 741 firm-year observations from the Oslo Stock Exchange in Norway over the years 2003-2006 to examine whether this shift in reporting regime from local GAAP to IFRS has changed how investors respond to accounting information. After controlling for economic drivers of response coefficients, we find that while the association between stock prices and book values has increased after the transition to IFRS, the earnings response coefficients have been reduced. The increase in investors' response to book values is attributed to more recognition of intangible assets and more measurement at fair value. The lower response to earnings is found to be driven mainly by non-recurring items. Thus, fair value revaluations appear to be detrimental to the value relevance of earnings.

1. Introduction

European law requires all exchange listed firms within the European Economic Area to adopt International Financial Reporting Standards, IFRS, from 2005 and onwards in their consolidated financial accounts.[1] We use this mandatory transition to IFRS to study the effect on how investors respond to this new reporting regime, relative to the previously used regime – in our case Norwegian Generally Accepted Accounting Principles, NGAAP. According to Gjerde, Knivsflå and Sættem (2008), there are two main differences between IFRS and NGAAP; more recognition of intangible assets and more measurement at fair values for financial instruments and investment properties, as well as for certain operating assets such as biological assets.

We form testable hypotheses on how these two major differences in reporting between IFRS and NGAAP will influence investors' response to earnings and book values, based on previous empirical findings about the effect of increased recognition of intangible assets (e.g. Lev and Sougiannis, 1996) and measurement at fair value (e.g. Hann, Heflin and Subramanayam, 2007). We expect the stock price's response coefficient to the corresponding book value to increase, though the hypothesis is formulated and tested two-sided. The response coefficient of the stock price to earnings per share is also expected to be different after the adoption of IFRS, as there is a potential trade-off between at least two effects. More recognition of intangible assets may increase the coefficient, while more measurement at fair value may make earnings more transitory and hence make the price less responsive to earnings. After controlling for other differences between the IFRS and NGAAP samples, such as differences in risk, loss reporting, intangible asset intensity and non-recurrence of earnings, we find evidence that the balance sheet becomes more important under IFRS whereas the value relevance of the

[1] The European Economic Area is comprised of the members of the European Union plus Norway, Iceland and Lichtenstein.

income statement has deteriorated. More recognition and measurement at fair value make the balance sheet more value relevant, while fair value revaluations seem to create transitory 'noise' in the income statement; compare Penman (2007).

This paper is unique in several aspects. We are the first to provide long term evidence on the effects of adopting IFRS in Norway. Gjerde, Knivsflå and Sættem (2008) only focus on one year, 2004, in which they analyze the NGAAP figures with their restated IFRS counterparts in 2005. We analyze the effect over the four year period from 2003 to 2006, with considerably more observations. Secondly, we use a methodological technique to study the structural break between NGAAP and IFRS involving controlled moderation effects on the response coefficients of both earnings and book values. This means that we avoid potential criticism by comparing the explanatory power in terms of the adjusted R^2 in two different samples; see e.g. Easton and Sommers (2003) and Gu (2007). Finally, we are able to control for a large set of other value relevance drivers not purely related to differences in accounting regime, such as the degree of loss reporting, the intangible asset intensity and the non-recurrence of earnings.

Our first hypothesis is that the stock price responds differently to the book value of equity under IFRS than under NGAAP. There is empirical evidence suggesting that more recognition and 'better' measurement increases the response coefficient of the balance sheet relative to the case where it is based on expensing as incurred and past transactional cost; see e.g. Lev and Sougiannis (1996) and Aboody and Lev (1998) in relation to intangible asset recognition versus expensing as incurred, and e.g. Barth, Beaver and Landsman (1996), Khurana and Kim (2003) and Henn, Heflin and Subramanyam (2007) in relation to measurement at fair value versus transactional cost.

To test the hypothesis, we utilize a set of Norwegian data from the Oslo Stock Exchange, OSE. We have access to 741 firm-year observations from firms reporting either according to IFRS or NGAAP. After removing the 1% upper and lower tails, we have 381 IFRS observations and 341 NGAAP observations. After controlling for other known drivers of response coefficients unrelated to the choice of reporting regime, which reduces the sample from 722 to 635 or 590 firm-year observations due to missing control variables, we find that the investors are more responsive to IFRS than to NGAAP book values; there is evidence of a significant structural break between the two samples. We therefore reject the null hypothesis in favour of our alternative. The sources of these results are identified to be increased emphasis by investors on net operating assets as well as on net financial debt, consistent with the expected effects of increased recognition of intangibles and increased measurement at fair value. This result is found to be quite robust to changes in the empirical specification and the statistical test procedures.

Our second hypothesis is that there is a structural break in the earnings response coefficient when firms alter reporting regime from NGAAP to IFRS. We believe that the earnings effect caused by the shift in accounting regime is more ambiguous than the book value effect. First, increased recognition of intangible assets may lead to improved 'matching' of investment expenditures with future revenues. This is believed to increase the correlation between stock returns and price-deflated earnings. There is also evidence that increased recognition of intangible assets increases the value relevance of earnings; see e.g. Lev and Sougiannis (1996), Aboody and Lev (1998) and Lev and Zarowin (1999). Second, more measurement at fair values induces more non-recurring or transitory revaluations into earnings, which tends to decrease earnings response coefficients; see Beaver (1998, pp. 74-76). Previous empirical studies find support for transitory earnings due to fair value revaluations having a smaller response coefficient than permanent earnings; see e.g. Stunda and Typpo (2004) and Hann, Heflin and Subramanayam (2007).

Our empirical tests of the second hypothesis provide evidence that the earnings response coefficient under NGAAP is larger than under IFRS, after controlling for value relevance drivers not directly related to financial reporting. This result holds both when tested by price and return regressions, and when the sample is constant, consisting of the same firms both in the IFRS and NGAAP sample. The main source of this finding is that the earnings response coefficient of firms reporting according to IFRS is reduced due to transitory items, relative to the ones reporting according to NGAAP.

This paper is outlined as follows. Section 2 gives a short summary of the differences between IFRS and NGAAP and a short review of related literature, develops the hypotheses and outlines the test design. The data, the selected sample, descriptive statistics and analyses of simple correlations are given in Section 3. Section 4 performs the statistical tests and discusses the results. The sources of the findings in Section 4 are further examined in Section 5. Finally, Section 6 concludes.

2. Accounting Differences, Previous Research, Hypotheses Development and Test Methodology

This section starts with a brief overview of the accounting differences between IFRS and NGAAP. Then the previous research on the value relevance differences between IFRS and NGAAP are reviewed, as well as the most important studies focusing on the value relevance effects of increased recognition of intangible assets and increased measurement at fair value. Based on the accounting differences and previous research, we form our hypotheses regarding possible changes in how investors respond to accounting information when financial reporting shifts from NGAAP to IFRS. Finally, we outline the methodology for testing these hypotheses.

2.1 Major Differences between IFRS and NGAAP

International Financial Reporting Standards, IFRS, are the accounting standards issued by the International Accounting Standards Board, IASB, in London. These standards aim at being the accounting regime utilized internationally. In 2002, the European Union decided that all exchange listed firms within the European Economic Area, EEA, must adopt IFRS in their consolidated financial statements from 2005 – and many countries outside the EEA have chosen to follow. IFRS are based on a balance sheet oriented conceptual framework, which defines assets and liabilities[2]. Equity is the residual, i.e. assets minus liabilities. The IFRS has increasingly pointed at fair values as the principle of measurement after the initial recognition of assets and liabilities, but transactional historical cost is widely accepted when there is no reliable measurement of fair value.[3] In principle, revenue is an increase in assets or decrease in debt; costs are increases in debt or decreases in assets. Thus, comprehensive income is the change in equity not related to capital expansions or withdrawals. Although some fair value revaluations are booked directly in equity, other revaluation gains and losses are reported in earnings, making earnings more non-recurring than if earnings are governed by the matching of transactional costs with earned revenue (see Penman, 2007).

Norwegian Generally Accepted Accounting Principles, NGAAP, are the accounting regulation in Norway, a member of the EEA. The most important regulations under NGAAP are the

[2] For a discussion of the balance sheet orientation of IASB and FASB, see Dichev (2007). Dichev calls for a reassessment of the balance sheet approach and argues that the income statement approach to accounting is the natural foundation for financial reporting for most firms.
[3] Whittington (2008) claims that a fair value view is implicit in IASB's public pronouncements. On the other hand, Cairns (2006) maintains that the use of fair values in IFRS is not as extensive as many imply.

Accounting Act of 1998 and accounting standards issued by the Norwegian Accounting Standards Board, NASB. The NGAAP is based on an earnings oriented conceptual framework in which expenditures are matched with earned revenue to calculate the period's earnings, based on unbiased estimates of for example economic lives. The matching principle is combined with prudence in which the book value is written down to fair value if there is an impairment loss, and reversed maximum to historical cost if fair value increases again. In principle, there is no other revaluation, i.e. write-ups to fair value when it is above transactional cost. But liquid financial instruments are to be measured at fair value. From 2005, all Norwegian firms have the option to report financial accounts according to IFRS – not only the exchange listed firms which are required to do so.[4]

The difference between IFRS and NGAAP may appear considerable as their main principles of valuation of assets and debt in the balance sheet are fair value and past transactional cost, respectively. Still, in practical terms, the two accounting regimes are not dramatically different for important classes of assets such as most inventories, fixed and intangible assets. For example; the cost model is usually chosen for fixed and intangible assets by firms reporting according to IFRS, even though the revaluation model is an equally emphasized option.[5] According to Gjerde, Knivsflå and Sættem (2008), the most important differences between IFRS and NGAAP are:

[4] Regulation No. 1852, 17 December 2004; compare IFRS 1.

[5] Fixed and intangible assets are recognized at transactional costs both according to IFRS and NGAAP, as the cost equals the fair value at the time of the transaction. After recognition the two accounting regimes might differ in measurement. According to IFRS, a revaluation model or a cost model is to be chosen. The cost model, in which assets measured at costs are amortized over the best estimate of their useful lives combined with impairment to fair value (conservatism), is the only alternative according to NGAAP. Since fair values of fixed and intangible assets could be difficult to obtain, the cost model is chosen by most firms reporting according to IFRS. Then there is no material difference in reporting. If instead the revaluation model is chosen according to IFRS, the carrying amount of fixed and intangible assets is fair value at the times of revaluation. Between revaluations, the assets are amortized like in the cost model. Revaluation should happen so often that the carrying amount of the asset does not differ materially from its fair value. But since write-ups are reported directly in equity, earnings are not affected relative to the cost model; write-downs are reported in earnings as in the cost model. However, equity will differ.

- Goodwill, and other intangible assets with indefinite economic lives, is to be tested annually for impairment according to IFRS. Impairment testing is also present in NGAAP, but NGAAP also requires goodwill to be amortized over the best estimate of its useful life.
- IFRS requires research expenditures to be expensed, while NGAAP allows the rarely used option to recognize such expenditures as intangible assets. In contrast, development expenditures should be recognized as an intangible asset under IFRS, as long as it satisfies the definition of an asset. NGAAP permits immediate expensing of such assets – an option that is commonly used.
- Provisions for future expenditures are more rarely recognized as debt according to IFRS than NGAAP; as such expenditures have to satisfy the definition of debt to be booked as liabilities. For instance, NGAAP allows expected expenditures of future periodic maintenance to be reported as an accrued expense. IFRS treats periodic maintenance as an investment when incurred, i.e. as a component of the maintained asset. This is also allowed according to NGAAP.
- IFRS requires biological assets to be measured at fair value if they can be measured reliably. Investment properties may be valued at fair value or cost. NGAAP, however, requires transactional cost combined with prudence in both cases.
- NGAAP measures financial assets and debts at cost unless they are short term financial instruments traded in a liquid market. IFRS measures more financial instruments at fair value.

To summarize the differences between IFRS and NGAAP, we may conclude that IFRS has more recognition and measurement at fair value than NGAAP; increased recognition is related especially to certain intangible assets. These accounting differences are one of the starting points for making hypotheses regarding differences in the response coefficients of earnings and book value in subsection 2.3. The other starting point is the following review of the literature.

2.2 Previous Research on IFRS versus NGAAP, Recognition of Intangibles and Measurement at Fair Value

Gjerde, Knivsflå and Sættem (2008) analyze the value relevance effects of adopting IFRS in Norway, focusing on the restated financial statements from NGAAP to IFRS in 2004, the year prior to the mandatory adoption of IFRS on the Oslo Stock Exchange. In 2005 comparable figures for 2004 had to be disclosed. The advantage of their approach is that they have two sets of financial statements, one according to NGAAP and one according to IFRS, representing identical underlying economic activity. Differences in value relevance are thereby caused solely by reporting differences. The cost of their approach is that the number of observations is limited, only 145. Nevertheless, Gjerde et al. find little evidence of increased value relevance after adopting IFRS when evaluating the two accounting regimes independently. However, they find that the reconcilement adjustment is incrementally value relevant both for the balance sheet and the income statement, after adjusting for non-recurring items in earnings. Gjerde et al. attribute the marginal improvement in the value relevance of the balance sheet to increased use of fair value, and in earnings to an improvement in the value relevance of the net operating income caused by increased recognition of intangible assets (formerly expensed goodwill and development expenditures).

Capkun, Cazavan-Jeny, Jeanjean and Weiss (2008) also focus on restatements from local GAAP to IFRS, but include pooled observations from nine European countries. They have 1,722 observations, of which 98 are Norwegian. However, no separate results are reported for

Norway. Capkun et al. find that earnings reconciliations are marginally value relevant, while equity reconciliations are not. The problem with such a pooled approach is that it is not easy to pinpoint what are the accounting drivers behind the result, since local GAAP might be inconsistent. Including countries with a weak tradition for high quality reporting, e.g. in terms of conservative accounting estimates, will contribute to change the expected effects of adopting IFRS relative to a benchmark like Norway with unbiased accounting based on transactional costs. A major advantage of utilizing data from several countries is the ability of focusing on broad economic effects in large samples, such as the effect on the cost of capital caused by more homogenous financial reporting; see also Daske, Hail, Leuz and Verdi (2007).

Several studies of individual European countries' transition to IFRS have been conducted.[6] For example, Horton and Serafeim (2008) investigate the market reaction and value relevance of First Time Adoption of IFRS in the UK. The reconciliation adjustment from UKGAAP to IFRS is value relevant for earnings (and not for equity). They attribute this result to differences in the reporting of goodwill, share-based payments, employment benefits, financial instruments and deferred taxes. Specifically, they find significant negative abnormal returns and positive trading activity for firms reporting a negative reconciliation adjustment from UK-GAAP to IFRS earnings. Horton and Serafeim conclude that their findings are consistent with IFRS altering investors' beliefs about risk-adjusted cash flows and, hence, also about stock prices.

We concluded the previous subsection by summarizing the main differences between IFRS and NGAAP being more recognition of intangible assets and more measurement at fair value

[6] Some studies focus only on the implementation of specific standards within the IFRS. For instance, Hamberg, Novak and Paananen (2008) study the value relevance effect of implementing IFRS 3 Business Combinations in Sweden.

according to IFRS. We therefore review some empirical studies focusing on the value relevance effects caused by increased recognition of investment expenditures as intangible assets, relative to expensing them as incurred, and increased use of fair value, relative to transactional historic cost.

Lev and Zarowin (1999) find that the value relevance of financial reporting has been deteriorating over time. They attribute the fall to increased investments in intangible assets and the inability of current reporting regimes to account for such investments; see also Collins, Maydew and Weiss (1997) and Francis and Schipper (1999). This conclusion is also supported by e.g. Lev and Sougiannis (1996) and Aboody and Lev (1998), focusing on the value relevance of expensing versus capitalizing research and development expenditures, and e.g. Jennings, Robinson, Thompson and Duvall (1996) and Henning, Lewis and Shaw (2000), focusing on the value relevance of goodwill recognition. For example, Lev and Sougiannis (1996) analyze price and return regressions in which the misstatement of earnings and book value due to absent capitalization of research and development expenditures enter as explanatory variables. The coefficients of both the misstatements are positive, but the balance sheet effect seems to be more significant than the earnings effect. Thus, a substantial number of empirical studies find that increased recognition of intangible assets in the balance sheet leads to increased value relevance of book value and earnings, though the earnings evidence is more mixed.

Prior research presents evidence that fair value accounting increases the value relevance of the balance sheet – though some mixed evidence exists; see e.g. Barth (1994), Petroni and Wahlen (1995), Barth, Beaver and Landsman (1996), Nelson (1996), Eccher, Ramesh and Thiagarajan (1996), Venkatachalam (1996), Park, Park and Ro (1999), Carroll, Linsmeier and Petroni (2003), Beaver and Venkatachalam (2003), Khurana and Kim (2003), Nissim (2003) and Hann, Heflin and Subramanayam (2007).[7] For example, Barth, Beaver and Landsman (1996) study fair value reporting for banks and find that fair value estimates of financial instruments such as loans, securities and long term debt provide significant explanatory power for bank share prices beyond that provided by transactional cost values. Khurana and Kim (2003) provide evidence that the relationship between stock market value and fair value is larger than the relationship between market value and transactional cost value for available-for-sale securities, but not for loans and deposits since these assets are not actively traded and hence contain more measurement errors. Hann, Heflin and Subramanayam (2007) find that the regression coefficient of the balance sheet increases if net pension obligations are reported at fair and not smoothed value. However, in their price regression with both earnings and book value, the coefficient of the book value increases only from 0.70 when smoothed to 0.74 at fair value, which is not significant.

While the evidence regarding the information content of fair values in the balance sheet is generally positive as long as fair values are not unreliable due to illiquid valuation or managerial manipulation, evidence on the value relevance effects of periodic unrealized gains and losses in the income statement is more mixed. Barth (1994) finds that unrealized gains and losses do not explain stock returns; see Ahmed and Takeda (1995) and Park, Park and Ro (1999) for opposite results. Hann, Heflin and Subramanayam (2007) analyze fair value pension accounting and find that fair values impair the value relevance of the income statement. In their price regression with both earnings and book value, the coefficient of earnings decreases from 3.92 when smoothed to 3.14 at fair value. The difference of 0.77 is highly sig-

[7] Some evidence indicates that fair values might be manipulated, for example for banks in financial distress. Manipulation of the recognized value might lead to transactional costs becoming the most value relevant principle of measurement; see Barth, Beaver and Landsman (1994), Beaver and Venkatachalam (2003) and Nissim (2003). The lacking increase in the response coefficient of book values due to the implementation of IFRS found by Capkun, Cazavan-Jeny, Jeanjean and Weiss (2008) and Horton and Serafeim (2008) may have similar explanations.

nificant (p-value = 0.000). This is consistent with the findings of e.g. Stunda and Typpo (2004), who studies the effect of reporting real estate investments at fair value relative to reporting them at historical cost. They conclude, like Hann et al., that as earnings become more transitory, they lose value relevance.[8]

If the value relevance of the balance sheet increases and the value relevance of net earnings decreases when shifting from transactional cost to fair value, the effect on the combined value relevance is ambiguous. However, Hann, Heflin and Subramanayam (2007) analyze the effect on adjusted R^2 and report 57.3% when pension gains and losses are smoothed and 55.1% when they are reported at fair value. The fall in adjusted R^2 of 2.3 percentage point is significant by the Vuong test (p-value = 0.000).

2.3 Hypotheses to be Tested

We have concluded in subsection 2.1 that the two major differences between IFRS and NGAAP are more recognition of intangible assets and more measurement at fair values, but several minor differences exist. In subsection 2.2, the empirical evidence suggests that more recognition of intangibles as well as measurement at fair value tend to increase the value relevance of the balance sheet, i.e. equity. As for the value relevance of earnings, more recognition of intangible assets is found to have a positive effect. However, increased measurement at fair value may be detrimental to the value relevance of earnings relative to measurement at transactional cost. These empirical findings are the basis for specifying our test hypotheses:

Hypothesis 1: The response coefficients of stock prices to equity book values are different under IFRS than under NGAAP.

[8] Bradshaw and Sloan (2002) document that so called “Street” earnings have gained increased focus and value relevance, where earnings used by “The Street”, i.e. financial analysts, are typically normalized by removing onetime items.

Hypothesis 2: The response coefficients of stock prices to earnings are different under IFRS than under NGAAP.

If the effect of more recognition of especially intangible assets is dominating other effects, we expect, based on previous empirical findings, both the balance sheet and the income statement under IFRS to be more relevant than under NGAAP. If the effect of more fair value is dominating other effects, we expect, again based on previous empirical findings, that the balance sheet becomes more value relevant and earnings less value relevant under IFRS than under NGAAP.[9] Since the main effects predict increased value relevance of the balance sheet, Hypothesis 1 could be specified one-sided. However, since there also are some minor differences between IFRS and NGAAP identified in subsection 2.1, we choose to specify Hypothesis 1 two-sided and accordingly apply two-sided tests in the empirical analysis.

A possible explanation for the expected increase in the response coefficient of the balance sheet due to increased recognition and measurement at fair value could be based on an informational perspective, in which the book value of equity is considered a signal about 'underlying value'. The response coefficient of the book value of equity will increase if it becomes more correlated with the underlying value and if the precision of the book value as an informational signal about value increases. When reporting according to fair value with full recognition, the coefficient of the balance sheet will be one. Current earnings are contained in the book value at the end of the year – and will therefore indirectly have a response coefficient equal to one. When measured at transactional historic cost, current earnings are also a potential signal of future earnings and thereby an additional signal of current value compared to the

[9] Nissim and Penman (2008) explicitly state, when theoretically comparing fair value with historical cost, that "…while fair value accounting reports a balance sheet that is informative about value, it renders an income value that is uninformative about that value" (Nissim and Penman, 2008, p. i).

contribution of a cost-based book. If earnings become a 'better' signal of future earnings and thereby current value, the earnings response coefficient will increase beyond one.[10] But the fact that there are two signals, book value and earnings, means that they are also weighted as informational contributors relative to their correlation with value and precision as signals. As the weight of earnings increases, the weight of the book value tends to fall below one; see Penman (1998) and Zhang (2000).[11] This view coincides with response coefficients being projections of the dependent variable, i.e. the stock price, into the information space of accounting information represented by book value and earnings per share; see e.g. Green (2008, pp. 25-26).

Prior research has also provided us with an important insight which explains why earnings could be an inferior signal of underlying value under fair value accounting; see e.g. Beaver (1998, pp. 72-76) or Kothari (2001, pp. 123-124). If current earnings are becoming more transitory, containing relatively more non-recurring items, the relationship between earnings and the stock price will be reduced. Thus, non-recurring gains and losses in earnings due to fair value revaluation could decrease the value relevance of earnings, as measured by the earnings

[10] "…if earnings' time-series properties are such that earnings innovations are permanent, then assuming a one-to-one relation between earnings innovations and net cash flow innovations, the earnings response coefficient is the present value of the perpetuity of the earnings innovation calculated by discounting the perpetuity at the risk adjusted rate of return on equity. The present value of a $1 permanent innovation in annual earnings is (1+1/r) where r is the annual risk-adjusted discount rate for equity" (Kothari, 2001, p. 123-124). In contrast, under fair value accounting (Nissim and Penman, 2008, p. 13) "…earnings are uninformative about future earnings and about value; earnings are changes in value and as such do not predict future value changes, nor do they inform about value (value follows a random walk, as it is said)."

[11] Zhang (2000, Proposition 2) shows that conservative accounting methods on average yield a weight on the book value less than zero and a weight on earnings, capitalized with the normal earnings multiplier, greater than one. Thus, more recognition of intangible assets and measurement at fair values tend to make accounting less conservative or more unbiased, which will increase the weight on the balance sheet toward one and decrease the weight on earnings toward one. In empirical studies using price regressions with book values and earnings, there are intercept terms and no restrictions on the sum of the coefficients, meaning that the measured coefficients of book value and earnings could deviate somewhat from the ones predicted by the models of Penman (1998) and Zhang (2000). In relation to our data, the valuation weight of earnings, capitalized with the estimated normal earnings multiplier, is estimated at -0.136 in the IFRS sample and at 0.325 in the NGAAP sample, suggesting weights of the balance sheet of 1.136 and 0.675, respectively. Pooled, the earnings weight is estimated at 0.235 with a normal earnings multiplier of 9.819. Thus, the earnings response coefficient is 2.037 and the coefficient of the balance sheet is 0.765. In comparison, Penman (1998) estimates the median weight in his U.S. sample to be 0.420, suggesting an earnings response coefficient of approximately 4.620 and a book response of 0.580.

response coefficient. Under transactional historic cost, current earnings are not only signals about current performance but also about future performance and therefore about the current stock price, which depends on the book value of equity, including current earnings, and future abnormal earnings. If the link between current earnings and future abnormal earnings is reduced, e.g. by more fair value accounting, the informational value of current earnings is reduced and so is the earnings response coefficient; see Penman (2007). The balance sheet is, however, weighted upward. When reporting according to fair value with full recognition, the earnings response coefficient is reduced to one, as current earnings are contained in the book value and there is no correlation with future earnings. The response coefficient of the balance sheet will also be one.

2.4 Test Methodology

We now discuss how the two outlined hypotheses are to be tested empirically. Hypothesis 1 could be tested by the price regression:

(1) $\text{PRICE} = \alpha_0 + \alpha_1 \cdot \text{BOOK} + \alpha_2 \cdot \text{IFRS} + \alpha_4 \cdot \text{BOOK} \cdot \text{IFRS} + \varepsilon,$

where PRICE is the stock price for firm i at time t, BOOK is the book value of equity per share, and IFRS is a dummy or indicator variable which equals 1 if firm i reports according to IFRS during period t, or equals 0 if the firm reports according to NGAAP during the same period. Finally, ε is the error term of the regression and α_0, α_1, α_2 and α_4 are the regression coefficients.[12]

[12] The constant term α_0 might be replaced by a constant term $\alpha_0 \cdot$ IND for each industry so to adjust for fixed industry effects, where IND is a vector of dummy variables for each industry. Of course, the model could also be extended to adjust for other fixed effects, but not fixed time effects because the shift from NGAAP to IFRS is to a large extent time dependent.

It follows from (1) that the stock price's response coefficient to the book value of equity per share on the cross-section of companies over time, i.e. ∂ PRICE/ ∂ BOOK, equals

(2) $\quad BRC = \alpha_1 + \alpha_4 \cdot IFRS.$

The book response coefficient BRC equals the 'core' coefficient α_1, in our case the coefficient of NGAAP, plus a term, $\alpha_4 \cdot$ IFRS, depending on or moderated by the reporting regime IFRS.[13] Thus, the indicator variable IFRS has a significant impact on the balance sheet's net response coefficient BRC if α_4 is significantly different from zero.[14] We can restate our Hypothesis 1 as $\alpha_4 \neq 0$, meaning that the BRC is moderated by IFRS. We expect that the BRC is larger under IFRS than under NGAAP – but the opposite cannot be ruled out; see subsection 2.3. This simple way of testing for structural breaks in the coefficient structure is standard and equivalent to the test approach originated from Chow (1960). The test with interaction effects is more flexible than simple Chow test statistics, e.g. in correcting for possible heteroskedasticity between the two samples.

Specification (1) implicitly assumes that there are no other effects on the book response coefficient BRC than the reporting regime IFRS. In order to control for other effects, (2) could be extended to

(3) $\quad BRC = \alpha_1 + \alpha_4 \cdot IFRS + \alpha_5 \cdot CONT,$

[13] Some may claim that stock prices do not *respond to* book values of equity. Rather, they respond to the value creation as measured by earnings. Thus, the concept of "book value response coefficient" could be replaced by "book value association coefficient". However, because the latter term does not appear to be standard in the literature, we choose to apply BRC throughout this paper (see e.g., Ghosh, Zhaoyang and Jain, 2005).

[14] The regression coefficients are usually estimated through ordinary least squares OLS. However, the standard deviation of the coefficients, which are important when calculating t- and p-values, should be adjusted for heteroskedasticity and autocorrelation (HAC) – at least if tests show the presence of such empirical problems; see White (1980) and Newey and West (1987). If severe HAC is detected, feasible GLS should be considered, at least as a robustness test.

in which CONT is a vector of control variables possible affecting the BRC, in addition to IFRS.[15] In this way, other effects between the sample of firms reporting according to IFRS and those reporting according to NGAAP could be controlled for, including earnings per share EARN'; see Easton and Harris (1991). Another factor that should be controlled for is the intangible asset intensity of the two types of firms; see e.g. Lev and Zarowin (1999). Such a control would rule out that the difference in BRC is driven by difference in the intangible asset intensity between those who are reporting according to NGAAP and those who are reporting according to IFRS. Other control variables are presented after we have introduced the test methodology of Hypothesis 2. A supplementary approach to increase the level of control for other differences could be to focus on a constant sample of firms across reporting regime.

Hypothesis 2 could be tested by extending (1) to a price regression which includes both the book value per share BOOK and the earnings per share EARN' as explanatory variables,[16] or by running a regression of price on earnings alone. However, we will not test Hypothesis 2 in these ways (other than as a robustness test to (4) - (6) below). The reason is that price regressions suffer by scale problems in which the relation between two variables could be driven by different underlying scales – and not a 'causal' relationship between them; see Barth and Kallapur (1996), Brown, Lo and Lys (1999) and Easton and Sommers (2003).

[15] The corresponding price regression consistent with (3) becomes $PRICE = \alpha_0 + \alpha_1 \cdot BOOK + \alpha_2 \cdot IFRS + \alpha_3 \cdot CONT + \alpha_4 \cdot BOOK \cdot IFRS + \alpha_5 \cdot BOOK \cdot CONT + \varepsilon$. The regression could also be extended by including the interaction term BOOK · IFRS · CONT, but we choose not to do that in order to limit potential multicollinearity problems.

[16] Notice that the period's earnings per share EARN' is included indirectly in the specified price regression (1) through the book value of equity per share BOOK. If EARN' is a separate variable, the book value BOOK should be adjusted to BOOK' = BOOK - EARN' in order not to double account for earnings and thereby understate the earnings response coefficient. This adjustment is not considered necessary if EARN' functions as a control and not as a test variable.

The scale problem is reduced by focusing on changes in the variables and dividing or deflating them by some scale measure, typically the previous period's stock price. Thus, the remedy is to focus on the return regression.[17] But since the book value of equity does not enter the return regression, we are stuck with (1) to analyze the response coefficient of the book value and hence the balance sheet.

The return regression is

(4) $RET = \beta_0 + \beta_1 \cdot EARN + \beta_2 \cdot IFRS + \beta_4 \cdot EARN \cdot IFRS + \varepsilon,$

where RET is the stock market return of firm i in period t, and EARN is the period's earnings deflated by the previous period's stock price, i.e. $EARN = EARN'/PRICE_{t-1}$.[18, 19] The betas are the regression coefficients and ε is the error term. The earnings response coefficient, i.e. $\partial RET / \partial EARN$, consistent with (4) equals

(5) $ERC = \beta_1 + \beta_4 \cdot IFRS.$

The earnings response coefficient ERC equals the 'core' coefficient β_1, i.e. the coefficient of NGAAP, plus a term $\beta_4 \cdot IFRS$ depending on the dummy variable IFRS, indicating this reporting regime. Our focus is on the coefficient β_4. If β_4 is significantly different from zero, the

[17] The return regression also suffers from some scale problems, though less than the price regression. The scale of the return is the expected return – and this scale factor could be removed from the analysis by focusing on abnormal stock return. We indirectly do this through (6), since control variables related to risk make the residual equal to abnormal return.

[18] The change in earnings $\Delta EARN$ is included indirectly in the specified return regression (4) through the level variable EARN. If $\Delta EARN$ is a separate variable as e.g. in Easton and Harris (1991), the level variable EARN should be adjusted to $LEARN = EARN - \Delta EARN$ in order not to double account for the change in earnings and thereby understate its response coefficient.

[19] The regression model (4) could also be estimated on an excess stock return basis, in which excess return is return minus a proxy for the risk free rate of return. Thus, the excess return variable replaces the plain return variable in (4).

reporting regime IFRS affects the ERC. Hypothesis 2 could be restated as $\beta_4 \neq 0$, meaning that IFRS moderates the ERC. If $\beta_4 < 0$, stock market investors respond less to reported earnings when prepared according to IFRS than NGAAP.

Prior research has shown that several company specific characteristics may affect the value relevance of accounting information, for instance measured by the earnings response coefficient given by (5). It is therefore important to control for these factors before making statistical inferences about whether and how the ERC is affected by reporting regime:

(6) $\text{ERC} = \beta_1 + \beta_4 \cdot \text{IFRS} + \beta_5 \cdot \text{CONT}.$

In (6) CONT is a vector of control variables possibly affecting ERC, in addition to the indicator variable IFRS.[20] The vector of control variables CONT could be (BETA, SIZE, BTM, MOM; LOSS, INTAN, TRAN). We will now present each of these seven control variables.[21]

The first set of control variables is various risk proxies – systematic as well as firm specific. When stock market returns are explained solely by various risk variables, the residuals become abnormal returns. When other variables, e.g. earnings, enter the return regression, they

[20] The corresponding return regression consistent with ERC given by (6) equals $\text{RET} = \beta_0 + \beta_1 \cdot \text{EARN} + \beta_2 \cdot \text{IFRS} + \beta_3 \cdot \text{CONT} + \beta_4 \cdot \text{EARN} \cdot \text{IFRS} + \beta_5 \cdot \text{EARN} \cdot \text{CONT} + \varepsilon$. The return regression could also be extended by including the interaction term EARN · IFRS · CONT, but we choose not to do that in order to limit potential multicollinearity problems. Another extension is to control directly for changes in earnings ΔEARN; compare Easton and Harris (1991).

[21] We cannot rule out the possibility that our findings are attributable to changes in the economic environment rather than to changes in the financial reporting system. Our research design that includes control variables is constructed to mitigate the effects of the former. Obviously, we cannot disregard the possibility that there are more relevant omitted variables than the ones we have controlled for. For instance, the analysis could have been extended with a variable for investor sentiment; see e.g. Baker and Wurgler (2006). However, we have included the variables that prior research has found to affect value relevance. Even if investor sentiment is related to stock return, it would (by definition) be reasonable to assume that the variable would be unrelated to accounting fundamentals. Thus, the variable would leave regression coefficients on accounting values unaffected. A further control for differences in underlying economic conditions between IFRS and NGAAP is to test Hypothesis 1 and 2 on a sample consisting of exactly the same firms. This we will do as a robustness test.

contribute to explain abnormal returns. The first risk factor BETA is a measure of systematic stock market risk as in the Capital Asset Pricing Model. According to Fama and French (1992), firm size SIZE and the book-to-market ratio BTM are found to be relevant proxy risk factors on the cross-section of companies.[22, 23] Finally, the return momentum MOM is a potential proxy risk factor if returns exhibit serial correlation; see Carhart (1997). In addition to entering directly into the return regression, these four risk factors might also influence the earnings response coefficient ERC, as suggested by (6).

The second set of control variables represents factors potentially influencing the informational content of earnings. Hayn (1995) finds that the response coefficient of negative earnings is far less than the response coefficient of positive earnings; see also Basu (1997). A dummy variable for losses LOSS should therefore enter (6) as a moderator variable for the ERC. Lev and Zarowin (1999) claim that the lack of intangible asset capitalization has been detrimental to the value relevance of financial reporting. Earnings become less informative for investors because expenditures on intangibles are not treated as investment expenditures and not matched with future revenues – and the periodic expenditures might create transitory noise. The variable INTAN, which measures the degree of intangible asset intensity, should therefore be a control variable in (6). Finally, the findings of e.g. Elliot and Hanna (1996) suggest that transitory or non-recurring earnings are less value relevant than permanent or recurring earnings. The degree of transitory earnings TRAN should therefore be included in (6) as a control variable. Our empirical measures of the control variables are presented in detail in subsection 3.2.

[22] Fama and French (1992) do not suggest that for instance SIZE and BTM are risk factors themselves. Instead, these variables may proxy for some underlying (unobservable) risk factors. Hence, the term proxy risk factor.

[23] It is important to adjust the book-to-market ratio so that the book value does not contain the periods' earnings; the earnings variable is a separate variable in the return regression and should not be double accounted for. Furthermore, earnings are not known ex ante and are thereby not a risk factor, but a factor potentially contributing to explain excess return.

A potential problem when running regressions (1) and (4) and to a larger extent their counterparts with control variables is that extensive use of interaction effects might lead to multicollinearity problems. Collinearity means that two explanatory variables are correlated, which in itself is no violation of the assumptions behind the regression model – only perfect collinearity is; see e.g. Wooldridge (2008, pp. 95-99). However, if some explanatory variables are highly correlated, their coefficient loadings might become somewhat 'arbitrary', which creates problems when evaluating the statistical significance of the regression coefficient of a test variable which is highly collinear with another (control) variable. Collinearity or multicollinearity between control variables CONT is no problem for the statistical inference of the emphasized test variable, which in our case is the interaction with the reporting regime IFRS.[24] To evaluate the multicollinearity we focus on the condition number, i.e. the largest condition index. According to Belsley, Kuh and Welsch (1980), there is no multicollinearity problem if the condition number is below 20. A condition number between 20 and 30 indicates some multicollinearity problems, and the problem becomes severe if it is above 30. If a problem is detected, the variance inflation factors, VIF, could be used to determine whether the test variable is involved – or the problem is solely among control variables. No statistical inference results should be emphasized in which the test variable is severely affected by multicollinearity problems, i.e. their VIF should be less than 10. A potential remedy for severe multicollinearity is, however, to alter the empirical specification, e.g. by removing and adding control variables, to analyze coefficient stability. Because OLS standard deviations are inflated by their VIFs, within sample arbitrariness could be better captured by employing bootstrapped standard deviations when making statistical inferences (see subsection 5.1 for more details).

[24] A problem with the control variables LOSS and TRAN is that they cannot be observed directly – and hence has to be estimated on the basis of accounting information. This means that they to some extent are becoming collinear with the test variable, the accounting variable IFRS, which might lead to build in collinearity. This design problem is difficult to circumvent.

3. Data, Sample Selection, Descriptive Statistics and Simple Correlations

This section presents available data, selects the sample to be analyzed, gives some descriptive statistics about the distributional properties of the sample and analyzes simple binary correlation between these variables. The regression results are presented and discussed in the next section.

3.1 Data and Sample Description

We have collected market and accounting data for all firms listed on the Oslo Stock Exchange OSE from 2002 to 2006. Market and accounting data are measured at the end of the accounting year.[25] Firms not reporting according to IFRS or NGAAP are excluded from the sample, mainly firms reporting according to USGAAP. Since the firms were required to report according to IFRS from 2005, IFRS was the prevailing accounting regime in 2005 and 2006.[26] In order to study relatively equal sample sizes of IFRS and NGAAP observations, we also include two years of NGAAP financial statements, i.e. 2003 and 2004. The total number of observations in our sample is equal to 741, of which 391 are IFRS observations while 350 are NGAAP observations; see Panel A of Table 1. We do not have the previous year's market values of firms that have been listed in 2003 - 2006. Therefore, the number of observations is lower in the return specification than in the price specification. The number of observations is reduced to 651.

[25] We have considered the inefficiency-adjustment procedure proposed by Aboody, Hughes and Liu (2002) to account for possible slow stock market adjustment to disclosed accounting information. But since Gjerde, Knivsflå and Sættem (2008) do not find any significant differences in results due to the procedure, we continue without employing it.

[26] Companies not reporting consolidated statements can postpone the transition until 2007, at the latest. Companies not reporting consolidated financial statements because they have no subsidiaries may continue to report according to NGAAP in their company reports.

Table 1: Sample Selection and Variable Definitions

Panel A: Sample Selection

		Price Regression	Return Regression
	IFRS and NGAAP data available 2003 - 2006	741	651
-	Truncation of PRICE and BOOK or RET and EARN	16	22
=	**Selected base sample**	**725**	**629**
	in which		
	• IFRS observations	383	319
	• NGAAP observations	342	310

Panel B: Definition of Variables in the Price and Return Regression, Including Control Variables

PRICE	The stock price of firm i = 1, 2, …, N at the end of the accounting year t = 2003, 2004, 2005, 2006. N, the number of firms in the sample, equals 251.
BOOK	Firm i's book value of equity per share at the end of year t (including provision for proposed dividend not reported as equity).
RET	The excess logarithmic stock return of firm i in year t, where excess means return in excess of the estimated risk free rate. The risk free rate of return is taken to be the one month effective Nibor rate (which is an interbank borrowing rate), adjusted for 28% tax and a risk premium of 10%, i.e. the risk free rate = Nibor01M · (1 - 0.28) · (1 - 0.1).
EARN	Firm i's earnings per share during year t divided by the previous year's stock price, at the end of that year. In the price regression, EARN' is earnings divided by the number of outstanding shares at year end. Thus, EARN = EARN'/$PRICE_{t-1}$.
IFRS	Indicator or dummy variable which equals 1 if the firm reports according to IFRS, or 0 if the firm reports according to NGAAP in a particular year.
LOSS	Indicator variable which equals 1 if EARN < 0, and 0 if EARN > 0.
INTAN	Indicator variable for a firm belonging to an industry with presumably high intangible asset intensity, particularly biotechnology, information technology and communication industries. The industry classification of the companies has been performed by the authors.
TRAN	Indicator variable for a firm with transitory earnings (deflated by the prior year's stock price) below the lower quartile or above the upper quartile. Transitory items are comprised of impairments, other unusual operating items – e.g. large gains from the sale of operational assets and restructuring charges, special income from associated companies, special or non-recurring financial items – e.g. gains and losses on financial instruments and currency gains and losses, and other unusual items reported in the income statement, including the net result from discontinued operations and extraordinary items. The transitory component of earnings has been classified by the authors based on information given in the notes of the financial statements.
BETA	Beta is an estimate of systematic risk, where BETA is estimated from the time series 60 months before the year end. If less data is available, BETA is estimated from shorter time series.
SIZE	Firm size is a proxy risk factor and is measured by the logarithm of previous year's market value of equity.
BTM	Book-to-market ratio is a proxy risk factor. The book-value of equity is reduced by earnings (which is represented through the variable EARN) and the market value equals the previous year's market value.
MOM	Momentum is a proxy risk factor. In the return regression it is measured as the previous year's excess return, i.e. MOM equals RET lagged by one year. In the price regression MOM is the lagged stock price.

The truncation of the stock price and corresponding book value leads to a reduction in the sample of 16 or 2.2%, which is lower than 4.0% (equals 2 tails each of 1% · 2 variables) due to overlapping observations. Similarly, truncation of stock return and corresponding earnings reduces the sample by 22 or 3.4%, because of less overlapping observations.

Panel A of Table 1 presents the sample selection. To avoid outliers having unreasonably large influence on the empirical results, the sample is truncated. In the price regression, the upper and lower percentile of stock price and book value of equity are deleted. Equivalently, the upper and lower percentile of stock return and price-deflated earnings are deleted in the return regression. The truncation is performed separately for the NGAAP and the IFRS sample. As there is some overlap among extreme observations, the final sample for the price regression consists of 725 firm-year observations – a reduction of 2.2%; 383 are IFRS and 342 are NGAAP observations. The final sample for the return regression is 629 firm-year observations – a reduction of 3.4%, 319 observations are according to IFRS and 310 are according to NGAAP.

3.2 Distributional Characteristics

Table 2 lists distributional statistics for the variables entering into the price and return regression, main variables as well as control variables; see Panel B of Table 1 for a list of variable definitions. Data is displayed for the selected sample as well as for the IFRS and NGAAP subsamples.

Table 2: Descriptive Statistics

Panel A: Price Regression Variables

	Obs	Mean	St. dev.	25-percent	Median	75-percent
POOLED:						
PRICE	725	**79.252**	115.459	9.855	33.000	107.500
BOOK	725	**49.866**	94.676	3.664	14.197	57.240
EARN’	725	**6.303**	16.01	-0.000	1.306	7.557
P/B	725	**2.811**	2.867	1.457	2.024	3.247
P/E	543	**83.320**	1085.234	10.511	14.876	24.633
IFRS:						
PRICE	383	**75.484**	110.639	9.267	30.600	91.000
BOOK	383	**40.688**	71.393	3.220	11.915	44.519
EARN’	383	**6.37**	15.639	0.015	1.157	6.857
P/B	383	**3.271**	3.452	1.582	2.368	3.682
P/E	291	**132.075**	1481.124	9.944	14.719	27.186
NGAAP:						
PRICE	342	**83.472**	120.653	9.855	35.850	124.000
BOOK	342	**60.144**	114.546	4.784	17.822	94.821
EARN’	342	**6.153**	16.829	-0.045	1.491	8.328
P/B	342	**2.295**	1.896	1.233	1.715	2.744
P/E	252	**27.019**	51.277	11.239	14.979	22.297

Panel B: Return Regression Variables

	Obs	Mean	St. dev.	25-percent	Median	75-percent
POOLED:						
RET	629	**0.314**	0.425	0.072	0.286	0.523
EARN	629	**0.025**	0.414	0.007	0.074	0.127
IFRS:						
RET	319	**0.286**	0.391	0.000	0.247	0.505
EARN	319	**0.074**	0.145	0.012	0.071	0.127
NGAAP:						
RET	310	**0.342**	0.455	0.118	0.308	0.536
EARN	310	**-0.026**	0.567	0.004	0.079	0.131

Panel C: Control Variables for the Pooled Return Regression

	Obs	Mean	St. dev.	25-percent	Median	75-percent
IFRS	629	**0.507**	0.500	0.000	1.000	1.000
LOSS	629	**0.226**	0.418	0.000	0.000	0.000
INTAN	629	**0.251**	0.434	0.000	0.000	1.000
TRAN	629	**0.494**	0.500	0.000	0.000	1.000
BETA	629	**1.008**	0.744	0.401	0.864	1.506
SIZE	629	**6.671**	1.724	5.546	6.505	7.746
BTM	629	**0.878**	1.055	0.390	0.616	0.956
MOM	570	**0.180**	0.669	-0.063	0.214	0.496

P/B is the price/book ratio, i.e. PRICE/BOOK in which BOOK > 0, P/E is the price/earnings ratio, i.e. PRICE/ EARN’ in which the earnings per share EARN’ > 0. All other variables are defined in Panel B of Table 1. Obs means the number of observations, mean is the sample average of the variable, st.dev. is the corresponding standard deviation, 25-percent is the first quartile, median is the second quartile, and 75-percent is the third quartile.

Panel A shows that the average stock price equals 79.252, while the corresponding equity value per share is 49.866 and the corresponding earnings per share is 6.303.[27, 28] Both the stock price and the two key accounting numbers have distributions skewed to the right. The mean price, book value and earnings are in the interval between the median and the third quartile for the total sample, as well as for the two subsamples. The standard deviations are generally very high.

Focusing on the median, which is a better representation of the middle of skewed distributions than the mean, the price/book ratio is 2.024. The median price/book ratio is 2.368 for the IFRS and 1.715 for the NGAAP observations. This is somewhat surprising. Since IFRS embraces more recognition and measurement at fair value, we would expect that NGAAP would yield the highest price/book ratio. The median price/earnings ratio is 14.876 and very similar in the two subsamples, 14.719 for the IFRS versus 14.979 for the NGAAP sample. Especially in the IFRS sample, there are a few extreme observations, making the mean relatively high. Notice that we have not truncated the sample on the basis of the price/book or price/earnings ratios.

Panel B reveals that we are examining a period of extraordinarily high stock return. The average stock market return is 31.4%, measured by logarithms and in excess of our proxy for the

[27] The average book value is 60.144 according to NGAAP and 40.688 according to IFRS. This might seem strange as far as there are many observations from the same firms reporting according to NGAAP in the years 2003-2004 and IFRS in the years 2005-2006. For these firms, we would expect the BOOK to be higher for the IFRS sample due to more recognition and measurement at fair value. Explanations for the opposite may be stock splits and changes of reporting currency from NOK to EUR. In addition, newly listed firms tend to have lower BOOK than firms delisted from the OSE.

[28] Proposed dividend is included in the book value. According to NGAAP, proposed dividend is accounted for as a short term provision under short term debt. Thus, we add such provisions back to equity, as dividends to investors are certainly not debt in their view. According to IFRS, proposed dividend is only considered as ‘debt’ when it is decided by the general assembly. Therefore proposed dividend is almost always reported as equity at the end of the accounting year according to IFRS.

risk free rate.[29] In general, as the time span of the study is rather short, the variables may deviate considerably from their long-term means. Note for instance the relatively poor earnings yield for the companies; 2.5% on average. The median is higher; 7.4 % of the market value of equity. The earnings distribution appears to be skewed to the left, especially for the NGAAP sample. Thus, there is a tendency of more loss reporting in the NGAAP sample, i.e. in 2003 and 2004.

Panel C presents the distributional statistic of the control variables entering into the return regression.[30] The first variable IFRS is an indicator or dummy variable which equals 1 if the observation comes from the IFRS sample, and 0 if it comes from the NGAAP sample. The average value of this variable is 0.507, suggesting that the two subsamples are almost equally large.

The next three variables are related to properties of earnings and book values of equity - and may function as moderators for their response coefficients; see Hayn (1995), Lev and Zarowin (1999) and Elliot and Hanna (1996). LOSS is an indicator variable for negative earnings, i.e. losses. Panel C reveals that 22.6% of the observations are losses. INTAN is equal to 1 if the firm belong to industries with an a priori high intensity of intangible assets, for example biotechnology, information technology or communications, and zero otherwise.[31] The percentage of 'new economy' observations in the total sample is estimated at 25.1. TRAN is

[29] In terms of plain stock market return the average is 50.8% and the median is 33.2%. The return of the value-weighted stock market index on the OSE, i.e. the OSEBX, was 48.4 %, 38.4 %, 40.5 %, and 32.4 % in the years 2003 to 2006. OSEBX consists of a representative selection of exchange listed companies at the OSE with high liquidity. Note that the high stock return might be an explanation for the higher price/book ratio under IFRS than under NGAAP. When the return is high, stock prices typically grow faster than the book equity does.

[30] We apply control variables in the price regression as well. However, as the number of observations differs between the two regression specifications, the descriptive statistics for the control variables will not be completely identical in the two sets of analyses. This difference is, though, minor, and we present descriptive statistics only for the control variables that enter the return regression.

[31] Note that the BTM ratio is also related to intangible assets in terms of non-capitalized intangibles. In general, conservative accounting will depress the BTM ratio.

equal to 1 if sum transitory items scaled by ingoing market value of equity is in the lower or upper quartile, i.e. the most extreme observations, and zero otherwise.[32] Thus, the proportion of observations related to extensive transitory earnings is constructed to be approximately 50.0%; the mean turns out to be 49.4%.

The next four variables are risk factors or proxy risk factors expected to influence expected returns. BETA is the beta from the Capital Asset Pricing Model, and it is estimated as the market model beta from time series of monthly stock market returns; see also Panel B of Table 1. The average beta is 1.008. SIZE is the logarithm of the stock market value of the firm at the beginning of the year – and is a measure of firm size. Average value of SIZE is 6.671. The average market value of equity is slightly above NOK 7 billion. BTM is the adjusted book-to-market ratio; the average is 0.878. According to Fama and French (1992), both SIZE and BTM are proxy risk factors. MOM is the previous year's stock return – and functions as a measure of return momentum; see e.g. Carhart (1997). The average momentum value is 0.180.

3.3 Simple Correlations

Panels A and B of Table 2 display the correlation coefficients between the variables applied in the price regression and the return regression, respectively. Correlations are presented both for the IFRS and for the NGAAP sample, below and above the diagonal in the two matrices.

[32] The transitory component of earnings has been classified by the authors based on information given in the notes of the financial statements, see Table 1.

Table 3: Pearson Correlation Matrix

Panel A: Price Regression Variables

	PRICE	BOOK	EARN’	LOSS	INTAN	TRAN	BETA	SIZE	MOM
PRICE	1.000***	0.884***	0.795***	-0.300***	-0.260***	-0.237***	-0.422***	0.321***	0.927***
BOOK	0.863***	1.000***	0.693***	-0.217***	-0.250***	-0.145**	-0.344***	0.172***	0.836***
EARN’	0.751***	0.800***	1.000***	-0.338***	-0.489***	-0.083	-0.318***	0.222***	0.722***
LOSS	-0.279***	-0.240***	-0.290***	1.000***	0.259***	0.206***	0.433***	-0.242***	-0.280***
INTAN	-0.292***	-0.306***	-0.246***	0.192***	1.000***	-0.002	0.559***	-0.140**	-0.247***
TRAN	0.182***	0.202***	0.248***	0.068	-0.270***	1.000***	0.147***	-0.102*	-0.229***
BETA	-0.323***	-0.370***	-0.269***	0.331***	0.285***	-0.063	1.000***	-0.274***	-0.421***
SIZE	0.304***	0.158***	0.179***	-0.252***	-0.236***	0.114**	0.001	1.000***	0.337***
MOM	0.857***	0.776***	0.619***	-0.276***	-0.290***	0.138**	-0.361***	0.314***	1.000***

Panel B: Return Regression Variables

	RET	EARN	LOSS	INTAN	TRAN	BETA	SIZE	BTM	MOM
RET	1.000***	0.159***	-0.255***	-0.006	0.077	0.240***	-0.153***	0.332***	-0.214***
EARN	0.294***	1.000***	-0.491***	0.027	-0.151***	-0.204***	0.213***	-0.494***	0.276***
LOSS	-0.139**	-0.639***	1.000***	0.218***	0.240***	0.424***	-0.240***	0.197***	-0.144**
INTAN	-0.187***	-0.244***	0.142**	1.000***	0.015	0.569***	-0.108*	-0.133**	-0.002
TRAN	0.218***	0.110*	0.068	-0.258***	1.000***	0.177***	-0.105*	0.280***	-0.159***
BETA	0.167***	-0.240***	0.359***	0.351***	-0.045	1.000***	-0.236***	0.193***	-0.146**
SIZE	-0.002	0.219***	-0.241***	-0.220***	0.146**	-0.054	1.000***	-0.347***	0.250***
BTM	0.270***	0.049	0.146**	-0.308***	0.406***	0.032	-0.201***	1.000***	-0.491***
MOM	0.104*	0.066	-0.067	-0.224***	-0.079	0.240***	0.232***	-0.191***	1.000***

Correlation coefficients for the NGAAP sample are presented above the diagonal; the correlations for the IFRS sample are presented below the diagonal. All variables are defined in Panel B of Table 1; EARN’ is an additional control variable in the price regression; see Easton and Harris (1991); BTM is not a valid control variable in the price regression. Statistical significance at the 10% level is indicated by one asterisk * (weakly significant), at the 5% level by two asterisks ** (significant) and at the 1% level by three asterisks *** (highly significant), tested two-sided.

Panel A reveals that stock price is highly correlated with the per share book value of equity in both subsamples. The correlation coefficient is 0.863 for the IFRS and 0.884 for the NGAAP sample. The squared correlation coefficient equals the explanatory power, the R^2, in a regression of one of the variables on the other, suggesting that the book value explains 74.4% in the IFRS and 78.1% in the NGAAP sample. The difference of about 3.7 percentage points (= 0.8839^2 - 0.8628^2) in favour of reporting according to NGAAP is not ‘significant’ (by the Cramer (1987) test). The R^2 from a regression of stock price on earnings per share EARN’ is 0.564 and 0.632 for the IFRS and NGAAP observations, respectively. Nevertheless, the difference of 6.8 percentage points in favour of NGAAP is not ‘significant’. Panel A also presents binary correlation with and between the other control variables.

Panel B of Table 3 presents evidence that earnings are correlated with stock market returns under IFRS as well as under NGAAP. The correlation coefficients between return and earnings are 0.294 and 0.159, respectively. This implies a difference in R^2 of 6.1% – though it is not 'significant'. Notice also that stock market returns are highly correlated with most of the control variables – both earnings moderators and risk factors. For example, RET is negatively correlated with LOSS and positively correlated with BETA.

4. Empirical Findings

In this section, we formally test Hypothesis 1 and 2 by employing the test methodology suggested by the response coefficients (3) and (6). In the next section, we perform tests in which the book value of equity and earnings have been disaggregated into underlying accounting items to find out more about the underlying sources of the main results obtained in subsections 4.1 and 4.2. Some robustness tests are presented along the main analyses, related to estimation technique, outlier effects and constant sample.

4.1 Test of Hypothesis 1

Hypothesis 1 says that the book response coefficient BRC is different when financial reports are prepared according to IFRS than when prepared according to NGAAP. The hypothesis is tested using the test methodology (1) - (3), focusing on whether $\alpha_4 \neq 0$ and statistical significant. The results from running regression (1) and its counterpart with control variables are presented in Table 4.

Table 4: Analysis of Structural Break in the Response Coefficient of the Book Value of Equity due to IFRS

	WITH NO CONTROL VARIABLES			WITH CONTROL VARIABLES			FGLS INSTEAD OF OLS		
	PRICE		**t-value (HAC)**	**PRICE**		**t-value (HAC)**	**PRICE**		**t-value**
BOOK	**0.896**	***	8.28	**0.508**	**	2.23	**0.391**	***	5.08
IFRS	**-4.509**		-0.84	**0.014**		0.00	**0.057**		0.11
EARN’				**2.254**	***	2.71	**1.873**	***	12.51
LOSS				**-0.008**		-0.00	**0.957**		1.53
INTAN				**-50.865**	***	-4.68	**42.513**	***	3.29
TRAN				**2.522**		0.49	**1.535**	***	2.68
BETA				**-0.053**		-0.02	**0.217**		0.43
SIZE				**5.584**	***	3.77	**2.487**	***	8.19
BOOK · IFRS	**0.381**	***	3.02	**0.161**	*	1.65	**0.206**	***	10.90
BOOK · EARN’				**-0.002**	*	-1.95	**-0.003**	***	-3.67
BOOK · LOSS				**0.245**		1.03	**0.118**	***	2.95
BOOK · INTAN				**1.218**	***	3.90	**1.303**	***	13.32
BOOK · TRAN				**-0.203**		-1.63	**-0.166**	***	-7.69
BOOK · BETA				**-0.087**		-0.65	**-0.009**		-0.29
BOOK · SIZE				**0.073**	**	2.25	**0.091**	***	8.77
Adjusted R^2	**0.789**	***		**0.862**	***		**0.857**	***	
Observations	**725**			**635**			**590**		
Condition Number	**5.93**			**29.11**			**28.73**		
VIF of test var.	**1.94**			**2.72**			**2.72**		

The regression model is PRICE = α_0 · IND + α_1 · BOOK + α_2 · IFRS + α_{31} · EARN’ + α_{32} · LOSS + α_{33} · INTAN + α_{34} · TRAN + α_{35} · BETA + α_{36} · SIZE + α_4 · BOOK · IFRS + α_{51} · BOOK · EARN’ + α_{52} · BOOK · LOSS + α_{53} · BOOK · INTAN + α_{54} · BOOK · TRAN + α_{55} · BOOK · BETA + α_{56} · BOOK · SIZE + ε; see (1) - (3). The variables are defined in Panel B of Table 1, except IND, which is a vector of dummy variables for each industry. This means that there is one constant term for each industry, meaning that fixed industry effects are controlled for. The coefficients of IND are not reported. The set of control variables does not include BTM and MOM. BTM is already represented by BOOK. Including the lagged price (MOM) in the regression would change the specification to a regression of the price change on BOOK. Since the Breusch-Pagan test for heteroskedasticity (H) and the Arallano-Bond test of autocorrelation (AC) detect significant HAC, we employ Newey-West standard deviations when calculating the t- and p-values; see White (1980) and Newey and West (1987). The coefficient estimates are based on OLS, unless in the last regression model that utilizes feasible GLS in which HAC is taken into account in the coefficient estimates; it allows firm-specific heteroskedasticity and first-order autocorrelation (45 observations are lost because of only one observation in the panel). One asterisk * means statistical significance at the 10% level, two asterisks ** means significance at the 5% level and three asterisks *** means significance at the 1% level, tested two-sided. The condition number is a measure of multicollinearity. If it is above 20, there is some troublesome multicollinearity; if it is above 30, there is severe multicollinearity; see Belsley, Kuh and Welsch (1980). The condition number with control variables equals 29.11 or 28.73, which indicates problematic multicollinearity. However, further analyses of the variance-decomposition proportions suggest that the test variable BOOK · IFRS is not severely collinear with any other variable – and therefore not an important source of the identified multicollinearity. Furthermore, the variance inflation factor of the test variable is only 2.72. Due to lacking observations, the sample is reduced from 725 to 635 when control variables are employed in the model.

The first regression model of Table 4 shows that the 'core' response coefficient of the book value of equity BOOK is 0.896; it is highly significant.[33] The interaction effect between the BOOK and IFRS yields a coefficient of 0.381, which also is highly significant. Thus, the difference of 0.381 between the BRC of the IFRS sample and the NGAAP sample firms is large enough to reject the null hypothesis of equal BRC in favour of Hypothesis 1. But to conclude in this way is premature, as we have not yet controlled for other drivers of differences in the response coefficient of the balance sheet between the two samples, for example earnings per share EARN'.

The second regression model in Table 4 presents the results when appropriate control variables are utilized – both variables related to risk and attributes of earnings.[34] Observe that the condition number is 29.11, suggesting some problematic multicollinearity. Fortunately, the collinearity is not related to the test variable BOOK · IFRS, as its variance inflation factor is only 2.72 and is thereby far below the often emphasized cut-off value of 10.[35] Whether there is severe multicollinearity among some of the control variables does not matter – as we are not much concerned with their regression coefficients. The coefficient of the test variable is estimated at 0.161, which is only weakly significant.[36]

[33] We apply the concept significant when the significance level is below 5%, tested two-sided. If the significance level is below 1%, it is termed highly significant. If it is below 10%, it is weakly significant – but not emphasized. We have tested the extent of heteroskedasticity (H) and autocorrelation (AC) in the error terms by the Breusch-Pagan test and the Arellano-Bond test, respectively. The result is that the null hypothesis of homoskedasticity and no autocorrelation should be rejected. We choose to stick to OLS but adjust the standard deviation for arbitrary HAC when we calculate t- and p-values; see White (1980) and Newey and West (1987). However, we use, as a robustness test, feasible GLS to estimate the regression coefficients allowing for a general covariance matrix.

[34] Note that we have chosen to exclude BTM and MOM from the price regression. BTM is already represented by BOOK. If the momentum MOM, equal to the lagged value of the price, is included as a variable in this specification, the book value will explain the change in price, not the price itself. Changes are analysed by the return regression.

[35] The variance inflation factor VIF = $1/(1 - R^2)$, in which R^2 is the explained variation in a regression of one explanatory variable on all the other explanatory variables. A VIF of 2.72 means that the regression of the test variable on all the other explanatory variables yields an R^2 of 63.2%. The collinearity is too low to be detrimental. The threshold for this is 90%.

[36] Notice that earnings EARN' is a separate control variable and a variable that moderates BOOK in the second regression model of Table 4. If EARN' is also moderated by IFRS, the estimated coefficient of the test variable

The third regression model in Table 4 is based on GLS instead of OLS, taking heteroskedasticity and first order autocorrelation into account when estimating the coefficients; see e.g. Green (2008, pp. 154-158). We observe that the coefficient of the test variable BOOK · IFRS is estimated at 0.206 and is highly significant. Accordingly, the results suggested by the two OLS models are confirmed and the significance level is strengthened, meaning that the result is robust for changes in the statistical estimation technique.

If we, as an untabulated robustness test, use a constant sample of 113 identical firms each with two IFRS and two NGAAP observations, the estimated test variable coefficient is 0.110 by OLS and 0.177 by GLS. Only the latter coefficient is highly significant (t-value = 7.64). This suggests that the finding of a higher balance sheet response coefficient according to IFRS than according to NGAAP is robust for an extended control in which the firms are identical in the two samples, in addition to controlling for differences in risk and earnings attributes related to each firm over time.

As a second untabulated robustness test, we reintroduce the full sample without removal of 'extreme' observations; see Panel A of Table 1. We focus on the OLS regression model with control variables. Now the regression coefficient of the test variable is estimated at 0.312, which is highly significant (t-value = 3.00). Thus, the removal of 'extreme' observations reduces the differences in the response coefficient of the book value between IFRS and NGAAP from 0.312 to 0.161.

BOOK · IFRS is estimated at 0.248, but insignificant due to increased multicollinearity. The VIF increases from 2.72 to 4.70.

A third untabulated robustness test is to start with the full sample, and then, instead of removing outliers by simple truncation, we perform an initial screening based on Cook's distances larger than one to eliminate gross outliers before calculating starting values and then perform Huber iterations followed by biweight iterations as suggested by Li (1985). Then the coefficient of the test variable is estimated at only 0.084, but still it is highly significant (t-value = 5.88).

The null hypothesis cannot be rejected in favour of Hypothesis 1 by our main test, which is the OLS regression with control variables and statistical inferences based on HAC standard deviations. However, all tests, the main as well as the robustness tests, indicate that IFRS leads to a higher response coefficient of the book value of equity – and hence to a higher balance sheet response. All the employed robustness tests, except one, find that the difference in coefficients is statistical significant. All in all, we interpret the evidence as consistent with Hypothesis 1, and conclude that the response coefficient of the equity book value is larger under IFRS than under NGAAP.

4.2 Test of Hypothesis 2

Hypothesis 2 says that earnings response coefficients are different when financial statements are prepared according to NGAAP than when prepared according to IFRS. The test methodology (4) - (6), i.e. the return regression, is applied to test the hypothesis. The results of the tests are presented in Table 5.

Table 5: Analysis of Structural Break in the Earnings Response Coefficient due to IFRS

	WITH NO CONTROL VARIABLES			WITH CONTROL VARIABLES			FGLS INSTEAD OF OLS		
	RET		**t-value (HAC)**	**RET**		**t-value (HAC)**	**RET**		**t-value**
EARN	**0.161**	*	1.96	**1.408**	***	3.26	**0.885**	***	4.56
IFRS	**-0.127**	***	-3.39	**0.022**		0.59	**-0.029**	**	-2.02
LOSS				**-0.088**		-1.41	**-0.094**	***	-3.61
INTAN				**0.025**		0.40	**0.007**		0.02
TRAN				**0.124**	***	3.06	**0.119**	***	8.26
BETA				**0.195**	***	5.28	**0.235**	***	14.62
SIZE				**-0.030**	***	-2.78	**-0.023**	***	-5.57
BTM				**0.115**	***	5.02	**0.122**	***	10.05
MOM				**-0.062**	*	-1.84	**-0.057**	***	-5.90
EARN · IFRS	**0.526**	**	2.54	**-0.354**		-1.43	**-0.250**	***	-3.25
EARN · LOSS				**-0.159**		-0.05	**-0.206**	*	-1.76
EARN · INTAN				**0.627**	***	2.96	**0.716**	***	6.00
EARN · TRAN				**-1.306**	***	-4.26	**-1.128**	***	-11.70
EARN · BETA				**-0.050**		-0.59	**0.051**		0.83
EARN · SIZE				**0.124**	***	3.44	**0.153**	***	8.74
EARN · BTM				**-0.043**	*	-1.82	**-0.014**		-0.68
EARN · MOM				**-0.022**		-0.40	**0.004**		0.11
Adjusted R^2	**0.086**	***		**0.388**	***		**0.351**	***	
Observations	**629**			**570**			**544**		
Condition Number	**5.57**			**33.70**			**33.70**		
VIF of test var.	**1.49**			**2.34**			**2.34**		

The regression model is RET = $\beta_0 \cdot$ IND + $\beta_1 \cdot$ EARN + $\beta_2 \cdot$ IFRS + $\beta_{31} \cdot$ LOSS + $\beta_{32} \cdot$ INTAN + $\beta_{33} \cdot$ TRAN + $\beta_{34} \cdot$ BETA + $\beta_{35} \cdot$ SIZE + $\beta_{36} \cdot$ BTM + $\beta_{37} \cdot$ MOM + $\beta_4 \cdot$ EARN · IFRS + $\beta_{51} \cdot$ EARN · LOSS + $\beta_{52} \cdot$ EARN · INTAN + $\beta_{53} \cdot$ EARN · TRAN + $\beta_{54} \cdot$ EARN · BETA + $\beta_{55} \cdot$ EARN · SIZE + $\beta_{56} \cdot$ EARN · BTM + $\beta_{57} \cdot$ EARN · MOM + ε; see (4) - (6). The variables are defined in Panel B of Table 1, except IND, which is a vector of dummy variables for each industry. This means that there is one constant term for each industry, so that fixed industry effects are controlled for. The coefficients of IND are not reported. Since the Breusch-Pagan test for heteroskedasticity (H) and the Arallano-Bond test of autocorrelation (AC) detect significant HAC, we employ Newey-West standard deviations when calculating the t- and p-values; see White (1980) and Newey and West (1987). The coefficient estimates are based on OLS in the two first regression models. In the last model, coefficients are estimated based on feasible GLS, allowing for panel specific heteroskedasticity and first order autocorrelation (the number of observations is reduced by 26 because of only one observation in these panels). One asterisk * means statistical significance at the 10% level, two asterisks ** means significance at the 5% level and three asterisks *** means significance at the 1% level, tested two-sided. The condition number is a measure of multicollinearity. If it is above 20, there is some troublesome multicollinearity; if it is above 30, there is severe multicollinearity; see Belsley, Kuh and Welsch (1980). The condition number with control variables equals 33.70, which indicates severe multicollinearity. However, further analyses of the variance-decomposition proportions suggest that the test variable EARN · IFRS is not severely collinear with any other variable – and therefore not an important source of any problematic multicollinearity. Furthermore, the variance inflation factor of the test variable is only 2.34. The sample is reduced from 629 to 570 due to lacking observations of one control variable MOM. If MOM is removed, then the test variable obtains a coefficient of -0.509 with t-value -1.97, which is significant at the 5% level.

The first regression model in Table 5 produces the coefficient of the test variable EARN · IFRS without control variables. The coefficient is estimated at 0.562, implying a difference in earnings response coefficient ERC of the same sign and magnitude between IFRS and NGAAP. The second regression model includes the full set of control variables. Now, the difference in ERC between IFRS and NGAAP is estimated at -0.354, but it is not statistical significant.[37, 38]

Notice that the number of observations falls from 629 to 570, when control variables are included in the regression model. The reason for this is missing observations of one control variable MOM; see also Panel C of Table 2. This variable is not statistically significant. If we drop MOM, the difference in ERC is estimated at -0.509, which is significant at the 5% level. This suggests that there is some evidence from the OLS regression in support of rejecting the null hypothesis in favour of Hypothesis 2. This analysis also illustrates the importance of controlling for other changes than reporting regime between the two samples. Without controls, there is evidence that the ERC of the IFRS sample is larger than for the NGAAP sample. With controls, the opposite is found.

The third regression model in Table 5 employs GLS taking into account heteroskedasticity and first order autocorrelation instead of OLS with HAC standard deviations. The difference in ERC is -0.250 and highly significant. The first untabulated robustness test is to require an identical sample of firms each with two IFRS and two NGAAP observations. The coefficient

[37] If EARN is split in the level LEARN and the change ΔEARN and the analysis is performed by focusing on ΔEARN with LEARN as an additional control variable, the difference in ERC between IFRS and NGAAP is still insignificant.

[38] If we instead use the price regression with control variables for earnings, including the book value interacting with earnings and accounting regime, and test whether the earnings response coefficient differs between IFRS and NGAAP, the coefficient of the test variable EARN' · IFRS is estimated at -0.682, which is insignificantly different from zero.

of the test variable is estimated at -0.312 by OLS (insignificant) and -0.274 by GLS (significant).

As a second untabulated robustness test, we reintroduce the full sample without removal of ‘extreme’ observations; see Panel A of Table 1. The OLS coefficient of the test variable with the full set of control variables is estimated at -0.465, which is highly significant (t-value = -3.50). If we instead, as a third untabulated robustness test, remove ‘extreme’ observations as suggested by Li (1985), the estimated coefficient is -0.538. The corresponding t-value is -5.75. Again; the difference between the earnings response coefficient in the IFRS and NGAAP samples is highly significant.

We cannot reject the null hypothesis in favour of Hypothesis 2 by our main test, which is the controlled OLS regression with statistical inferences based on HAC standard deviations. However, all tests with control variables, main as well as robustness tests, estimate the highest earnings response coefficient under NGAAP. In nearly all robustness tests, the difference in ERC is statistically significant. All in all, we choose to interpret the evidence consistent with Hypothesis 2. The earnings response coefficient ERC is higher under NGAAP than under IFRS.

5. On the Sources of the Structural Breaks in Response Coefficients

In this section, we analyze the sources of the identified structural breaks in the response coefficients between the two reporting regimes. This is done by disaggregating the book value of equity and earnings into their underlying components. Then we analyze whether the response coefficients of the underlying components depend on reporting regime – either IFRS or NGAAP.

5.1 Disaggregation of the Book Value of Equity

The book value of equity can be disaggregated into assets minus liabilities and from there into finer partitions of assets and liabilities. When partitioning assets and debt, we exclude financial companies such as banks, which shrinks the sample from 725 to 602 firm-year observations. Financial firms are excluded because they have a very special balance sheet relative to other firms. Specifically, assets and debt cannot easily be divided into operational and financial components for many financial firms.

In order to avoid too many variables, we choose this partition of the book value of equity:

(7) BOOK = INT + OOA + FA - FD - OD,

where INT equals intangible assets and OOA is other operating assets, which includes property, plant and equipment, investments in associated companies, other long term operating assets, inventory and other short term operational assets, per outstanding shares. FA is financial assets, and FD is financial debt per share. To avoid an extra variable of minor significance, the minority interests are simply classified as financial debt (and not as equity because only the majority's equity is valued by the stock market). OD is operational debt per share, both long term provisions such as deferred taxes and short term debt such as taxes payable. Notice that INT is different from the control variable INTAN.[39]

[39] Specifically, while INT is the reported intangible assets divided by the number of outstanding shares, the indicator variable INTAN is constructed from industry membership; see Table 1.

Panel A of Table 6 presents descriptive statistics for these variables, as well as the corresponding stock price.

Table 6: Disaggregation of the Book Value

Panel A: Descriptive Statistics

	Obs	Mean	St. dev.	25-percent	Median	75-percent
POOLED:						
INT	602	**8.223**	19.975	0.266	1.567	6.054
OOA	602	**79.405**	180.631	2.386	13.139	61.046
FA	602	**18.057**	49.407	0.965	4.060	12.218
BOOK	602	**37.798**	73.538	2.929	11.284	33.398
FD	602	**38.909**	99.748	0.488	4.816	24.606
OD	602	**28.978**	77.419	1.115	4.189	17.216
PRICE	602	**63.964**	106.404	8.750	25.553	66.500
IFRS:						
INT	336	**8.679**	21.442	0.288	1.622	6.183
OOA	336	**73.856**	187.226	2.264	12.253	44.676
FA	336	**16.157**	41.931	0.848	3.292	10.870
BOOK	336	**33.727**	71.071	2.589	9.017	29.313
FD	336	**36.767**	101.749	0.392	3.983	20.451
OD	336	**28.198**	82.100	0.869	3.528	15.076
PRICE	336	**65.134**	110.499	8.415	25.000	66.375
NGAAP:						
INT	266	**7.648**	17.976	0.215	1.533	5.980
OOA	266	**86.414**	172.032	2.765	18.751	80.633
FA	266	**20.457**	57.473	1.215	5.345	13.553
BOOK	266	**42.940**	76.367	3.416	13.193	37.618
FD	266	**41.615**	97.286	0.602	6.407	37.096
OD	266	**29.963**	71.206	1.698	6.484	19.616
PRICE	266	**62.487**	101.182	9.000	25.834	67.000

Panel B: Pearson Correlation Matrix

	PRICE	INT	OOA	FA	BOOK	FD	OD
PRICE	1.000***	0.416***	0.697***	0.721***	0.855***	0.605***	0.628***
INT	0.620***	1.000***	0.480***	0.496***	0.457***	0.485***	0.659***
OOA	0.730***	0.553***	1.000***	0.449***	0.820***	0.869***	0.833***
FA	0.741***	0.695***	0.771***	1.000***	0.659***	0.599***	0.491***
BOOK	0.852***	0.554***	0.902***	0.775***	1.000***	0.657***	0.658***
FD	0.603***	0.500***	0.964***	0.719***	0.803***	1.000***	0.636***
OD	0.720***	0.778***	0.844***	0.888***	0.736***	0.762***	1.000***

Panel C: Price Regressions

	WITHOUT CONTOL VARIABLES			WITH CONTROL VARIABLES		FGSL INSTEAD OF OLS		
	PRICE		t-value (BOOT)	PRICE	t-value (BOOT)	PRICE		t-value
INT	**-0.005**		-0.01	**-0.801**	-1.49	**-1.127**	***	-6.56
OOA	**0.744**	***	4.34	**-0.621**	-1.43	**-0.873**	***	-8.67

FA	**1.288**	***	3.80	**-0.050**		-0.10	**-0.146**		-1.35
FD	**-0.806**	***	-3.59	**0.902**	*	1.76	**1.149**	***	9.68
OD	**-0.417**		-1.49	**0.586**		1.27	**0.903**	***	7.97
IFRS	**1.683**		0.48	**0.052**		0.01	**1.851**	***	4.28
EARN'				**1.631**		1.63	**0.667**	***	4.84
LOSS				**2.411**		0.72	**2.218**	***	4.00
INTAN				**-53.198**	***	-3.59	**-44.059**	***	-12.97
TRAN				**0.386**		0.10	**2.691**	***	7.71
BETA				**-4.063**		-1.44	**-1.196**	**	-2.34
SIZE				**3.165**	**	2.24	**2.439**	***	15.25
INT · IFRS	**1.643**	**	2.44	**0.514**		0.87	**0.724**	***	7.11
OOA · IFRS	**0.534**	**	2.26	**0.623**	**	2.42	**0.738**	***	16.77
FA · IFRS	**0.343**		0.68	**0.184**		0.39	**0.497**	***	6.02
FD · IFRS	**-0.929**	***	-2.78	**-1.202**	***	-3.18	**-1.314**	***	-18.98
OD · IFRS	**-0.504**		-1.42	**-0.073**		-0.20	**-0.403**	***	-6.70
BOOK · EARN'				**-0.003**		-1.08	**-0.002**	***	-3.50
BOOK · LOSS				**-0.210**		-0.66	**-0.280**	***	-4.02
BOOK · INTAN				**1.440**	***	4.03	**1.411**	***	13.84
BOOK · TRAN				**-0.063**		-0.35	**0.003**		0.10
BOOK · BETA				**0.001**		0.01	**0.016**		0.50
BOOK · SIZE				**0.155**	***	3.46	**0.175**	***	12.45
Adjusted R^2	**0.811**	***		**0.875**	***		**0.876**	***	
Observations	**602**			**517**			**476**		
Condition Number	**33.33**			**84.00**			**84.00**		
VIF of INT · IFRS	**8.14**			**9.57**			**9.56**		
VIF of OOA · IFRS	**53.63**			**65.80**			**65.47**		
VIF of FA · IFRS	**7.68**			**9.06**			**9.06**		
VIF of FD · IFRS	**32.26**			**37.80**			**37.69**		
VIF of OD · IFRS	**26.01**			**32.50**			**32.4**		

INT is intangible assets per share, OOA is other operating assets per share, FA is financial assets per share, FD is financial debt per share, and OD is operational debt per share; see Panel B of Table 1 for definitions of the rest of the variables. In the correlation matrix, the IFRS coefficients are found below and the NGAAP coefficients are found above the diagonal. The regression model is PRICE = α_0 · IND + α_{11} · INT + α_{12} · OOA + α_{13} · FA + α_{14} · FD + α_{15} · OD + α_2 · IFRS + α_{31} · EARN' + α_{32} · LOSS + α_{33} · INTAN + α_{34} · TRAN + α_{35} · BETA + α_{36} · SIZE + α_{41} · INT · IFRS + α_{42} · OOA · IFRS + α_{43} · FA · IFRS + α_{44} · FD · IFRS + α_{45} · OD · IFRS + α_{51} · BOOK · EARN' + α_{52} · BOOK · LOSS + α_{53} · BOOK · INTAN + α_{54} · BOOK · TRAN + α_{55} · BOOK · BETA + α_{56} · BOOK · SIZE + ε; see (1) - (3). IND is a vector of dummy variables for each industry. This means that there is one constant term for each industry, meaning that fixed industry effects are controlled for. The coefficients of IND are not reported. The set of control variables does not include BTM and MOM. BTM is already represented by BOOK. Including the lagged price (MOM) in the regression would change the specification to a regression of the price change on BOOK. The coefficient estimates are based on OLS, unless in the last regression model that utilizes feasible GLS in which HAC is taken into account in the coefficient estimates; it allows firm-specific heteroskedasticity and first-order autocorrelation (41 observation are lost because of only one observation in the panel). The condition number is a measure of multicollinearity. If it is above 20, there is some troublesome multicollinearity; if it is above 30, there is severe multicollinearity; see Belsley, Kuh and Welsch (1980). The condition number with control variables equals 33.33 or 84.00, which indicate severe multicollinearity. As suggested by the average variance inflation factors of the test variables, some of the collinearity stems from these variables, making inferences about their coefficients somewhat arbitrary. To build the arbitrariness into statistical inferences, bootstrapped standard deviations with 1000 replications are employed when calculating t- and p-values in the OLS regressions. Thus, for collinear variables BOOT produces higher standard deviation than the HAC standard deviations. One asterisk * means statistical significance at the 10% level, two asterisks ** means significance at the 5% level, and three asterisks *** means significance at the 1% level, tested two-sided. Due to lacking observations, the sample is reduced from 602 to 517 when control variables are employed in the model.

In the total sample, assets consist of 7.8% intangible assets INT, 75.1% other operational assets OOA and 17.1% financial assets FA. These assets are financed by 35.8% equity BOOK, 36.8% financial debt FD and 27.4% operational debt OD. The balance sheet is also split on the two reporting regimes IFRS and NGAAP. The binary correlations between the variables are presented in Panel B of Table 6; IFRS observations are below and NGAAP observations above the diagonal.

Panel C gives the regression results. First notice that there is severe multicollinearity involving the five test variables INT · IFRS, OOA · IFRS, FA · IFRS, FD · IFRS and OD · IFRS. The variance inflation factors show that three of the five test variables are collinear, as they are above 10. This means that the loadings on these coefficients could be somewhat 'arbitrary', possibly making statistical inferences based on HAC standard deviations inadequate. We utilize instead standard deviations directly, incorporating the possible within sample arbitrariness of collinear coefficient estimates, and we do this by bootstrapping.[40] Thus, we draw, for example, 1000 new samples from our sample with each drawing containing the same number of observations, and then estimate the coefficient in each sample; see Green (2008, pp. 596-598). Based on these 1000 observations of each OLS coefficient, we calculate the standard deviation. This procedure typically increases the standard deviation of the coefficient of variables involved in multicollinearity, relative to the HAC standard deviations. Thus, we have thereby adjusted for increased uncertainty in the coefficient estimates – and hence improved the statistical reliability of t- and p-values. In addition, we have employed specifications with and without control variables to catch possible instabilities.

[40] Collinearity increases the variance inflation factor of a variable and thereby the standard deviation of its OLS coefficient. This means that collinear variables typically have high standard deviations and low t-values, making them more insignificant. Still, the bootstrapping procedure might better capture within sample 'arbitrariness' in the loading of the coefficients.

Our results from Panel C of Table 6 indicate that asset response coefficients are larger according to IFRS than NGAAP; this holds for all three types of assets INT, OOA and FA. Furthermore, the regression coefficients of debt, FD as well as OD, are also more responsive, since they are more negative. This is consistent with the conclusion in subsection 4.1, in which the response coefficient of the book value of equity BOOK was found to be higher according to IFRS than NGAAP. The most significant difference is related to financial debt FD. The difference between IFRS and NGAAP is estimated at about -1.2 according to the OLS regression model with control variables, suggesting more weight on the response coefficient according to IFRS, as it is more negative and larger in absolute value. One reason could be that more financial instruments are reported at fair value.

5.2 Disaggregation of Earnings

Earnings can be disaggregated into revenue minus expenses and then into finer partitions of revenue and expenses:

(8) EARN = REV - OCOST - NFC + TEARN - TAX,

in which REV is operational revenue, OCOST is operational expenses, NFC is net financial expenses, TEARN is transitory or non-recurring earnings, and TAX is the tax expense – payable as well as deferred, all variables are deflated by the previous year's stock price. Notice that TEARN is different from the control TRAN, but collinearity between them may cause problems.[41] Panel A of Table 7 presents descriptive statistics regarding these variables – for the total sample and the two subsamples according to reporting regime.

[41] Transitory earnings are defined in Table 1. While TEARN is transitory earnings divided by ingoing market value of equity, TRAN is and indicator variable for 'extreme' TEARN.

Table 7: Disaggregation of Earnings

Panel A: Descriptive Statistics

	Obs	Mean	St. dev.	25-percent	Median	75-percent
POOLED:						
REV	508	**2.246**	3.902	0.461	1.128	2.537
OCOST	508	**2.177**	3.863	0.396	1.018	2.451
NFC	508	**0.042**	0.115	-0.005	0.013	0.043
TEARN	508	**-0.008**	0.286	-0.015	-0.000	0.026
TAX	508	**0.012**	0.112	0.000	0.012	0.037
EARN	508	**0.007**	0.456	-0.005	0.062	0.128
RET	508	**0.331**	0.443	0.073	0.305	0.549
IFRS:						
REV	273	**1.535**	1.915	0.376	0.866	1.949
OCOST	273	**1.454**	1.872	0.328	0.775	1.807
NFC	273	**0.026**	0.049	-0.001	0.010	0.349
TEARN	273	**0.028**	0.113	-0.003	0.002	0.030
TAX	273	**0.013**	0.052	0.000	0.009	0.031
EARN	273	**0.068**	0.154	0.002	0.062	0.127
RET	273	**0.303**	0.406	0.007	0.284	0.528
NGAAP:						
REV	235	**3.073**	5.240	0.707	1.749	3.289
OCOST	235	**3.017**	5.191	0.638	1.586	3.299
NFC	235	**0.060**	0.159	-0.003	0.018	0.059
TEARN	235	**-0.049**	0.398	-0.035	-0.007	0.016
TAX	235	**0.011**	0.156	0.000	0.015	0.042
EARN	235	**-0.064**	0.642	-0.034	0.066	0.134
RET	235	**0.364**	0.481	0.106	0.336	0.575

Panel B: Pearson Correlation Matrix

	RET	REV	OCOST	NFC	TEARN	TAX	EARN
RET	1.000***	0.304***	0.292***	0.218***	0.093	-0.082	0.145***
REV	0.089	1.000***	0.997***	0.456***	-0.264***	-0.165**	-0.132**
OCOST	0.075	0.998***	1.000***	0.454***	-0.286***	-0.190***	-0.195***
NFC	0.135**	0.426***	0.411***	1.000***	-0.276***	-0.133**	-0.341***
TEARN	0.161***	-0.006	-0.016	0.220***	1.000***	0.395***	0.754***
TAX	0.020	0.093	0.067	0.025	0.317***	1.000***	0.224***
EARN	0.265***	0.130**	0.081	0.143**	0.674***	0.232***	1.000***

Panel C: Return Regressions

	WITHOUT CONTOL VARIABLES			WITH CONTROL VARIABLES			FGSL INSTEAD OF OLS		
	RET		t-value (HAC)	RET		t-value (HAC)	RET		t-value
OEARN	**0.213**	**	2.01	**0.962**	*	1.93	**0.876**	***	3.41
NFC	**0.652**	***	2.68	**-0.775**		-1.26	**-0.845**	***	-2.59
TEARN	**0.269**	**	2.48	**0.686**		1.37	**0.502**	**	1.98
TAX	**-0.689**	***	-2.65	**-0.683**		-1.27	**-0.496**	*	-1.85
IFRS	**-0.102**	**	-2.25	**0.054**		1.18	**-0.004**		-0.19
LOSS				**-0.057**		-0.88	**-0.031**		-0.97
INTAN				**0.065**		1.00	**0.057**		0.16
TRAN				**0.091**	**	2.05	**0.084**	***	4.19
BETA				**0.189**	***	4.83	**0.218**	***	12.21

SIZE				**-0.045**	***	-3.61	**-0.038**	***	-8.67
BTM				**0.124**	***	4.85	**0.127**	***	7.40
MOM				**-0.065**	*	-1.84	**-0.069**	***	-3.84
OEARN · IFRS	**0.544**	*	1.77	**-0.318**		-0.86	**-0.342**	**	-2.09
NFC · IFRS	**-0.476**		-0.66	**-0.223**		-0.26	**0.405**		1.25
TEARN · IFRS	**0.314**		1.30	**-0.303**		-0.92	**-0.417**	***	-2.87
TAX · IFRS	**-0.391**		-0.63	**0.556**		0.93	**1.086**	***	2.86
EARN · LOSS				**0.116**		0.35	**-0.274**		-1.60
EARN · INTAN				**0.648**	***	3.64	**0.635**	***	3.94
EARN · TRAN				**-0.892**	***	-2.64	**-0.984**	***	-5.95
EARN · BETA				**-0.128**		-1.48	**-0.002**		-0.02
EARN · SIZE				**0.161**	***	3.44	**0.193**	***	8.19
EARN · BTM				**-0.036**		-1.57	**0.004**		0.16
EARN · MOM				**-0.026**		-0.38	**0.006**		0.10
Adjusted R^2	**0.117**	***		**0.353**	***		**0.359**	***	
Observations	**508**			**453**			**428**		
Condition Number	**6.20**			**40.08**			**40.11**		
VIF DEARN · IFRS	**2.17**			**2.97**			**2.97**		
VIF NFC · IFRS	**1.85**			**2.00**			**2.00**		
VIF TEARN · IFRS	**1.49**			**2.00**			**2.00**		
VIF TAX · IFRS	**1.71**			**1.80**			**1.80**		

REV is operational revenue per share, OCOST is operational expenses per share, OEARN = REV - OCOST, NFC is net financial expenses per share, TEARN is transitory or non-recurring earnings per share, and TAX is taxes per share; all these variables have been price-deflated; the other variables is defined in Panel B of Table 1. In the correlation matrix, the IFRS coefficients are found below and the NGAAP coefficients are found above the diagonal. The regression model is RET = β_0 · IND + β_{11} · OEARN + β_{12} · NFC + β_{13} · TEARN + β_{14} · TAX + β_2 · IFRS + β_{31} · BETA + β_{32} · SIZE + β_{33} · BTM + β_{34} · MOM + β_{35} · LOSS + β_{36} · INTAN + β_{37} · TRAN + β_{41} · OEARN · IFRS + β_{42} · NFC · IFRS + β_{43} · TEARN · IFRS + β_{44} · TAX · IFRS + β_{51} · EARN · BETA + β_{52} · EARN · SIZE + β_{53} · EARN · BTM + β_{54} · EARN · MOM + β_{55} · EARN · LOSS + β_{56} · EARN · INTAN + β_{57} · EARN · TRAN + ε; see also the ERC given by (4) - (6). IND is a vector of dummy variables for each industry. This means that there is one constant term for each industry, meaning that fixed industry effects are controlled for. The coefficients of IND are not reported. Since the Breusch-Pagan test for heteroskedasticity (H) and the Arallano-Bond test of autocorrelation (AC) detect significant HAC, we employ Newey-West standard deviations when calculating the t- and p-values; see White (1980) and Newey and West (1997). One asterisk * means statistical significance at the 10% level, two asterisks ** means significance at the 5% level and three asterisks *** means significance at the 1% level, tested two-sided. The condition number is a measure of multicollinearity. If it is above 20, there is some troublesome multicollinearity and if it is above 30, there is severe multicollinearity; see Belsley, Kuh and Welsch (1980). OEARN is utilized in the regression instead of OREV and OCOST, because these variables according to Panel B are highly collinear. We observe that even though the condition number is high in the regressions with control variables, about 40.1, the variance inflation factors show that test variables are not collinear. Accordingly, we use HAC standard deviations and not the bootstrapped ones; see Table 6.

In the total sample, percentage of OCOST relative to REV is 96.9%, NFC is 1.9%, TEARN is -0.4% and TAX is 0.5%. This means that earnings EARN is only 0.3%, on average. Panel B presents the binary correlation matrix involving the variables in (8); IFRS correlations are below the diagonal and NGAAP correlations are above the diagonal. Notice that the NGAAP correlations between RET and the five accounting variables are, with a few exceptions, higher than the IFRS correlations. Further, notice that REV and OCOST are collinear, suggesting that we should replace them with operational earnings OEARN = REV - OCOST, in the following regression analyses.

Panel C of Table 6 gives the regression results. First, we observe that there is no problematic collinearity involving test variables. We therefore employ HAC standard deviations to examine statistical significance. Second, the coefficients of the test variables are not significant when employing OLS, which is consistent with the second regression model in Table 5. If we utilize GLS, allowing for panel specific heteroskedasticity and first order autocorrelation, we observe that three of the coefficients become significant at the 5% level, which is consistent with the last regression model in Table 5. The response coefficients of the operating earnings OEARN and transitory earnings TEARN are significantly higher according to NGAAP than according to IFRS.

A major source for the finding in subsection 4.2 that IFRS earnings are less value relevant than NGAAP earnings, is that the value relevance of transitory earnings TEARN is smaller under IFRS. Thus, the result could be explained by transitory items being relatively more common under IFRS than under NGAAP, because of more gains and losses due to measurement at fair value; compare e.g. Hann, Heflin and Subramanayan (2007) and Stunda and Typpo (2004).

It is more surprising that the operating earnings OEARN is less responsive under IFRS, given more recognition of intangible assets and the results obtained by Gjerde, Knivsflå and Sættem (2008). However, in subsection 5.1, we find that intangible assets recognized in the balance sheet tend to become more value relevant under IFRS than NGAAP. This effect may lead to less weight on the corresponding signal in the income statement, i.e. OEARN; compare Penman (1998). Thus, more recognition of intangible assets might be detrimental to the value relevance of earnings, contrary to our expectation, due to the positive and dominating balance sheet effect.

6. Conclusions

This study compares the response coefficients of book values and earnings under respectively IFRS and NGAAP. The two accounting regimes are in many respects similar, but IFRS generally allows more measurement at fair value and in practice recognizes more intangible assets than NGAAP. We expected IFRS to exhibit higher response coefficients in relation to the balance sheet (equity), though the hypothesis and the test is two-sided. The effect on earnings response coefficients was considered to be more ambiguous. However, we indicated that non-recurring gains and losses might contribute to earnings response coefficients being lower under IFRS than under NGAAP.

We find evidence that the response coefficient of book equity is higher under IFRS than under NGAAP, as initially expected – in any case it is not lower. Disaggregation of the book value of equity suggests that the difference is related to all items in the balance sheet, but most to financial debt and operating assets. This is consistent with the view that more recognition of intangible assets and measurement at fair value are improving the value relevance of the balance sheet.

Furthermore, we find some evidence that the earnings response coefficient is lower under IFRS than under NGAAP. Among the main sources of a significant difference is less weight on non-recurring earnings. More non-permanent revaluation gains and losses under IFRS create 'noise' in earnings and depress earnings response coefficients; see also e.g. Hann, Heflin and Subramanayam (2007) and Stunda and Typpo (2004). From a policy perspective, our results suggest that IASB should consider introducing a clearer distinction between recurring and non-recurring earnings in the format of the income statement. This is also on the IASB's agenda (*Economist*, 20. September 2008, p. 81).

Literature

Aboody, D., J. Hughes, and J. Liu, 2002, "Measuring Value Relevance in a (Possibly) Inefficient Market," *Journal of Accounting and Economics*, 40, pp. 965-986.

Aboody, D., and B. Lev, 1998, "The Value Relevance of Intangibles: The Case of Software Capitalization," *Journal of Accounting Research*, 36, pp. 161-191.

Ahmed, A. S., and C. Takeda, 1995, "Stock Market Valuations of Gains and Losses for Commercial Banks' Investment Securities: An Empirical Analysis," *Journal of Accounting and Economics*, 20, 207-255.

Baker, M., and J. Wurgler, 2006, "Investor Sentiment and the Cross-Section of Stock Returns," *Journal of Finance*, 61, pp. 230-264.

Barth, M. E., 1994, "Fair Value Accounting: Evidence form Investment Securities and the Market Valuation of Banks," *Accounting Review*, 69, pp. 1-25.

Barth, M. E., W. H. Beaver and W. H. Landsman, 1996, "Value-Relevance of Banks' Fair Value Disclosures under SFAS No. 107," *Accounting Review*, 71, pp. 513-537.

Barth, M., and S. Kallapur, 1996, "The Effects of Cross-Sectional Scale Differences on Regressions in Empirical Accounting Research," *Contemporary Accounting Research*, 19, pp. 1-48.

Basu, S., 1997, "The Conservatism Principle and the Asymmetric Timeliness of Earnings," *Journal of Accounting and Economics*, 24, pp. 3-37.

Beaver, W. H., 1998, "*Financial Reporting: An Accounting Revolution*." Third Edition, Prentice Hall.

Beaver, W. H., and M. Venkatachalam, 2003, "Differential Pricing of Components of Bank Loan Fair Values," *Journal of Accounting, Auditing & Finance*, 18, pp. 41-67.

Belsley, D. A., E. Kuh, and R. E. Welsch, 1980, "*Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*," Wiley.

Bradshaw, M. T., and R. Sloan, 2002, "GAAP versus The Street: An Empirical Assessment of Two Alternative Definitions of Earnings," *Journal of Accounting Research*, 40, pp. 41-66.

Brown, S., K. Lo, and T. Lys, 1999, "Use of R^2 in Accounting Research: Measuring Changes in Value Relevance over the Last Four Decades," *Journal of Accounting and Economics*, 28, pp. 83-115.

Cairns, D., 2006, "The Use of Fair Value in IFRS," *Accounting in Europe*, 3, pp. 5-22.

Capkun, V., A. Cazavan-Jeny, T. Jeanjean and L. A. Weiss, 2008, "Earnings Management and Value Relevance during the Mandatory Transition from Local GAAP to IFRS in Europe," Paper posted at SSRN: http://www.ssrn.com/abstact=1125716.

Carhart, M. M., 1997, "On Persistence in Mutual Fund Performance," *Journal of Finance*, 52, pp. 87-82.

Carroll, T. J., T. J. Linsmeier and K. R. Petroni, 2003, "The Reliability of Fair Values versus Historical Cost Information: Evidence from Closed-End Mutual Funds," *Journal of Accounting, Auditing & Finance*, 18, pp. 1-23.

Chow, G., 1960, "Test of Equality between Sets of Coefficients in Two Linear Regressions," *Econometrica*, 28, pp. 591-605.

Collins, D. W., E. L. Maydew, and I. S. Weiss, 1997, "Changes in the Value Relevance of Earnings and Book Values of the Past Forty Years," *Journal of Accounting and Economics*, 24, pp. 39-67.

Cramer, J. S., 1987, "Mean and Variance of R2 in Small and Moderate Samples," *Journal of Econometrics,* 35, pp. 253-266.

Daske, H., L. Hail, C. Leuz, and R. Verdi, 2007, "Mandatory IFRS Reporting Around the World: Early Evidence on the Economic Consequences." Paper posted at SSRN: http://www.ssrn.com/abstract=1024240.

Dichev, I. D., 2007, ”On the balance sheet based model of financial reporting.” Paper posted at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1009673.

Easton, P. D., and T. S. Harris, 1991, “Earnings as an Explanatory Variable for Returns,” *Journal of Accounting Research*, 29, pp. 19-36.

Easton, P., and G. Sommers, 2003, “Scale and the Scale Effect in Market-Based Accounting Research,” *Journal of Business Finance & Accounting*, 30, pp. 25-55.

Eccher, E. A., K. Ramesh, and S. R. Thiagarajan, 1996, “Fair Value Disclosures by Bank Holding Companies,” *Journal of Accounting and Economics*, 22, 79-117.

Elliot, J. A., and J. D. Hanna, 1996, “Repeated Accounting Write-Offs and the Information Content of Earnings,” *Journal of Accounting Research*, 34, pp. 135-155.

Fama, E. F., and K. R. French, 1992, “The Cross-Section of Expected Returns,” *Journal of Finance*, 47, pp. 427-465.

Francis, J., and K. Schipper, 1999, “Have Financial Statements Lost Their Relevance?” *Journal of Accounting Research*, 37, pp. 319-352.

Ghosh, A., G. Zhaoyang, and P. J. Jain, 2005 “Sustained Earnings and Revenue Growth, Earnings Quality, and Earnings Response Coefficients,” *Review of Accounting Studies, 10*(1), pp. 33-57.

Gjerde, Ø., K. H. Knivsflå, and F. Sættem, 2008, “The Value Relevance of Adopting IFRS: Evidence from 145 NGAAP Restatements,” Forthcoming in the *Journal of International Accounting, Auditing and Taxation*, 17.

Green, W. H., 2008, “*Econometric Analysis*,” Sixth Edition, Pearson Prentice Hall.

Gu, Z., 2007, “Across-Sample Incomparability of R^2s and Additional Evidence on Value Relevance Changes Over Time,” *Journal of Business Finance & Accounting*, 34, pp. 1073-1098.

Hamberg, M., J. Novak, and M. Paananen, 2008, “The Impact of IFRS Adoption of Goodwill Recognition and Stock Market Valuation,” Working Paper, Göteborg University, Sweden.

Hann, R. N., F. Heflin, and K. R. Subramanayam, 2007, “Fair-Value Pension Accounting,” *Journal of Accounting & Economics*, 44, pp. 328-358.

Hayn, C., 1995, “The Information Content of Losses,” *Journal of Accounting and Economics*, 20, pp. 125-153.

Henning, S., B. Lewis, and W. Shaw, 2000, “Valuation of the Components of Purchased Goodwill,” *Journal of Accounting Research*, 38, pp. 375-386.

Horton, J., and G. Serafeim, 2008, “Market Reaction & Valuation of IFRS Reconciliation Adjustments: First Evidence from the UK,” Paper posted at SSRN: http://www.ssrn.com/abstract=923582.

Jennings, R., J. Robinson, R. B. Thompson II, and L. Duvall, 1996,”The Relation between Accounting Goodwill Numbers and Equity Values,” *Journal of Business Finance & Accounting*, 23, pp. 513-533.

Khurana, I. K., and M. Kim, 2003, “Relative Value Relevance of Historical Cost vs. Fair Value: Evidence from Bank Holding Companies,” *Journal of Accounting and Public Policy,* 22, pp. 19-42.

Kothari, S. P., 2001, Capital Markets Research in Accounting. *Journal of Accounting & Economics* 31, pp. 105-231.

Lev, B., 1989, “On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research,” *Journal of Accounting Research,* 27, pp. 153-192.

Lev, B., and T. Sougiannis, 1996, “The Capitalization, Amortization, and Value-Relevance of R&D,” *Journal of Accounting and Economics*, 21, pp. 107-138.

Lev, B. and P. Zarowin, 1999, "The Boundaries of Financial Reporting and How to Extend Them," *Journal of Accounting Research*, 37, pp. 353-385.
Li, G., 1985, "Robust Regression," In Hoaglin, D. C., F. Mosteller, and J. W. Turkey (eds.), "*Exploring Data Tables, Trends, and Shapes*," Wiley, pp. 281-340.
Nelson, K. K., 1996, "Fair Value Accounting for Commercial Banks: An Empirical Analysis of SFAS No. 107," *Accounting Review*, 71, pp. 161-182.
Newey, W., and K. West, 1987, "A Simple Positive Semi-Definite, Heteroscedasticity and Autocorrelation Consistent Covariance Matrix," *Econometrica*, 55, pp. 703-708.
Nissim, D., 2003, "Reliability of Banks' Fair Value Disclosure of Loans," *Review of Quantitative Finance and Accounting*, 20, pp. 355-384.
Nissim, D, and S. H. Penman, 2008, "Principles for the Application of Fair Value Accounting," *Center for Excellence in Accounting and Security Analysis*, White Paper Number Two.
Park, M. S., T. Park, and B. T. Ro, 1999, "Fair Value Disclosures for Investment Securities and Bank Equity: Evidence from SFAS No. 115," *Journal of Accounting, Auditing & Finance*, 14, pp. 347-370.
Penman, S. H., 1998, "Combining Earnings and Book Value in Equity Valuation," *Contemporary Accounting Research*, 15, pp. 291-342.
Penman, S. H., 2007, "Financial Reporting Quality: Is Fair Value a Plus of a Minus?", *Accounting and Business Research*, Special Issue, pp. 33-44.
Petroni, K., and J. Wahlen, 1995, "Fair Value of Equity and Debt Securities and Share Prices of Property-Liability Insurers," *Journal of Risk and Insurance*, 62, pp. 719-737.
Stunda, R. A, and E. Typpo, 2004, "The Relevance of Earnings and Funds Flow from Operations in the Presence of Transitory Earnings," *Journal of Real Estate Portfolio Management*, 10, pp. 37-46.
Venkatachalam, M., 1996, "Value-Relevance of Banks' Derivatives Disclosures," *Journal of Accounting and Economics*, 22, pp. 327-355.
White, H., 1980, "A Heteroscedastic-Consistent Covariance Matrix Estimator and a Direct Test of Heteroscedasticity," *Econometrica*, 48, pp. 817-838.
Whittington, G., "Fair Value and the IASB/FASB Conceptual Framework Project: An Alternative View," *ABACUS*, 44, pp. 139-168.
Wooldridge, J. M., 2008, "*Introductory Econometrics: A Modern Approach*," Fourth Edition, South-Western.
Zhang, X. J., 2000, "Conservative Accounting and Equity Valuation," *Journal of Accounting and Economics*, 29, pp. 125-149.