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Thesis

"Value relevance of accounting: Emphasis on quarterly earnings reports in Norway"

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Abstract

In this thesis we study the value relevance of accounting information on the Oslo Stock Exchange. We address two questions; 1) are quarterly earnings reports value relevant and 2) are quarterly earnings more value relevant than annual earnings. This is studied over the ten year period 2002-2011 which covers the period after quarterly reporting became mandatory. Our findings indicate that quarterly earnings in fact are value relevant. Further, a return regressions on quarterly earnings figures yields a higher explanatory power (R^2 = 0.1234) than for the traditional regression of return on annual earnings (R^2 = 0.1074). The results found indicate that timely reporting is important and indeed relevant.

Keywords: value relevance, quarterly earnings, annual earnings, timeliness.

1. Introduction

An important factor setting the basis for capitalist economies is effective capital allocation and capital being reinvested where funds are needed. For capital to be effectively allocated and relocated capital markets need to be efficient. Security markets are assumed to be efficient when security prices reflect all publicly known information in the marketplace (Scott, 2011). One of the most important components of this information is financial statements conveying vital information of past performance in addition to facilitate future expectations. Several stakeholders have interest in financial statements, i.e. creditors, employees, suppliers, customers and investors. However, the latter may be regarded as the most important users of financial statements. Consequently, information disclosed in financial statements is expected to explain a portion of the price level and return of stocks (Lev, 1989; Easton and Harris, 1991; Kothari and Zimmermann, 1995). The variation in stock returns explained by financial statements is investigated by value relevance studies and will be the theme of this thesis.

The general impression of modern capital markets is that investors and analysts place a lot of emphasis on quarterly interim reports as these provide more timely information than annual reports (Tan and Wong, 2012). Business newspapers also use considerable time and space on reporting quarterly figures from listed companies. Current earnings and change in earnings from the same period last year are often printed indicating that quarterly earnings information is of high interest to the public and for investment decisions. Mandatory quarterly interim reporting was imposed by law in Norway in 2000[1] and our study focuses on the value relevance of quarterly earnings announcements after this was implemented. Recently a proposal has been made within the European Union to remove mandatory quarterly earnings reporting for small and medium sized enterprises (SME's) based in its member countries[2]. The main argument for removing quarterly earnings reports is the high cost and time burden imposed on SME's.

[1] http://www.oslobors.no/Oslo-Boers/Regelverk/Boerssirkulaerer/06-1999-OPPHEVET-Endringer-i-boersforskriften

[2] Source: http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A7-2012-0292+0+DOC+XML+V0//EN#title3 (Retrieved April 18th 2013).

The value relevance literature has been criticized for not being relevant for accounting standard setting (Holthausen and Watts, 2001). However, studying the value relevance of quarterly earnings may give useful inputs to accounting standard setters in the discussion of mandatory quarterly reporting.

Beaver (1998) developed a theoretical link between earnings (an accounting variable) and share prices (a stock market variable) in which he based his theory on three assumptions; 1) current earnings changes provide information to predict future earnings, which 2) affect future dividend expectations, which 3) represents inputs to find firm equity value. Previous research has shown that the ability of earnings in explaining stock returns is rather low. For example, Francis and Schipper (1999) report an average R^2 of 22 %, Easton and Harris (1991) find a R^2 equal to 7.7 % and Gjerde et al. (2011) report a R^2 of 5.2 %. Most of the previous research studying this relation has more or less neglected the concept of timeliness (Beaver, 2002). However, in a recent study based on U.S. data, Tan and Wong (2012) found that decomposing annual earnings into its more timely quarterly components resulted in a significantly improved association between earnings and stock returns.

Inspired by the research of Tan and Wong (2012) and due to the fact that the value relevance literature has limited focus on quarterly earnings, we find the topic highly interesting. To the best of our knowledge there is no research on quarterly earnings on Norwegian data. Consequently, we have formulated the following two research questions:

RQ1: Are quarterly earnings reports value relevant for investors on the Oslo stock exchange?

RQ2: Are quarterly earnings reports more value relevant than annual earnings reports?

This thesis is organized as follows: section 2 presents value relevance as a concept and how it is measured. In section 3 we review previous research conducted on this concept both from an international perspective as well as a Norwegian perspective. In section 4 we present our research design with our hypotheses, and

a discussion regarding research design. Sections 5 and 6 provide the empirical analysis and discussion of the results. Finally, section 7 concludes the thesis.

2. The Concept of Value Relevance

According to Beaver (2002) the most important research areas within capital markets during the 1990s were market efficiency, Feltham-Ohlson modeling, value relevance, analyst's behavior and discretionary behavior. There has been vast research on value relevance and the usefulness of accounting information since the 1960s, in which Ball and Brown (1968) set the basis with their research on earnings response coefficients. They were the first to find evidence that financial statement information have an effect on firm's share returns (Scott, 2011). Over the period 1957 – 1965 they studied 261 New York Stock Exchange (NYSE) firms and how earnings information affected share returns. In essence, their study revealed a link between accounting information and market security returns by finding a market response to earnings deviating from the expectations.

In the late 1960s the emphasis on earnings usefulness was related to policy-relevance for accounting standard setters. The motives of these early studies were to find optimal accounting procedures. Barth et al. (2001) claim that value relevance research is a helpful tool to provide inputs and evidence to accounting standard setters which can be informative in their process of deliberating and updating accounting standards. However, during the next decades the research turned in the direction of finding relations between earnings information and security returns (Lev, 1989). This has resulted in research exploring how value relevance of accounting information has changed over time (Francis and Schipper, 1999; Collins et. al, 1997; Brown et. al, 1999; King and Langli; 1998), how it differs across borders and accounting practices (King and Langli, 1998; Harris et. al, 1994), how it is affected by financial crisis (Beisland, 2011) and how timeliness affects value relevance (Tan and Wong, 2012; Griffin, 2003). This list is not exhaustive but includes some of the value relevance research areas that have been studied in the past few decades.

2.1.Defining Value Relevance

Francis and Schipper (1999) provide four interpretations for the construct value relevance. Interpretation 1 suggests that financial statement information is value relevant if it is possible to earn profits based on accounting-based trading rules. Interpretation 2 suggests that financial statement information is value relevant if the accounting variables inherent are included in valuation models or helps predict the variables used in these valuation models. Interpretation 3 concerns the ability of accounting information to change/revise the total information in the market. Interpretation 4 suggests that value relevance concerns the ability of financial statement information to capture or summarize the information that affects share values. Most previous research is concerned with finding the proportion of explained variance in stock prices or returns by accounting information, corresponding to the latter interpretation.

According to Barth et al. (2001: 95) "value relevance research examines the association between accounting amounts and equity market values." Holthausen and Watts (2001: 26) have a similar definition in which they claim that "value-relevant means the accounting amount is associated with some measure of value, e.g., share prices". Another interpretation of the term is provided by Beaver (2002: 459) stating that value relevance is the "association between a security price-based dependent variable and a set of accounting variables". Beaver (2002: 459) also explains that "an accounting number is termed value relevant if it is significantly related to the dependent variable." It should be noted that regardless of whether investors receive information from financial reports or other sources, the information conveyed in financial reports should still be associated with market values or stock returns in order to be value relevant (Thinggaard and Damkier, 2008).

According to these definitions and interpretations it seems clear that the term "value relevance" seeks to explain the relationship between accounting variables and a market security value (see figure 1 below). Thus, accounting information is said to be value relevant if it can assist users of accounting information to make better investment decisions.

Figure 1: Value Relevance Studies

2.2.Value Relevance and Standard Setting

There are mainly two influential standard setting agencies in the world; International Accounting Standards Board (IASB) and Financial Accounting Standards Board FASB. According to the IASB/FASB Conceptual Framework draft (2008), the objective of financial information is to provide information that is useful in making decisions for investors, lenders and creditors (Scott, 2011). These capital providers and equity investors in particular have a future oriented emphasis on the firm's performance, whereas financial accounting information (e.g. income statements and balance sheets) summarizes historical events. Under these characteristics, the accounting information must be able to serve its users with information that possibly can change their prior beliefs concerning future performance of the security being analyzed. According to FASB (1980), the two primary qualities making accounting information useful are relevance and reliability. FASB (1980:7) defines relevance as:

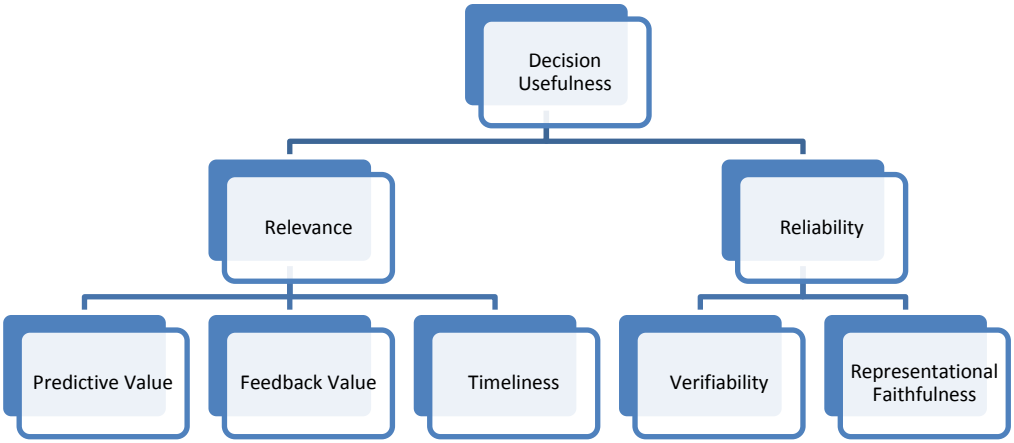
> The capacity of information to make a difference in a decision by helping users to form predictions about the outcomes of past, present, and future events or to confirm or correct prior expectations.

Reliability is defined by FASB (1980:7) as:

> The quality of information that assures that information is reasonably free from error and bias and faithfully represents what it purports to represent.

These qualities can be depicted by figure 2 below, as portrayed in FASB (1980).

Figure 2: Hierarchy of accounting qualities



From figure 2 it is evident that financial information must be both relevant and reliable to be useful. Value relevance studies are mainly focused on the left part of the figure. The right side of the figure is generally the auditors responsibility in order to ensure that the users of the financial information can trust the information disclosed. Most prior value relevance studies have focused on the financial reports predictive value and have more or less neglected the concept of timeliness (Beaver, 2002). Timeliness is defined as the ability of having information available before it loses its decision usefulness (FASB, 1980). To enhance the relevance of accounting, standardsetters have introduced more fair value accounting, e.g., fair value of financial instruments, derivatives and intangible assets. However, fair value accounting imposes more management subjectivity which may affect the reliability of the financial information. This has been an extensively discussed topic in the accounting litterature (see for instance Barth, 1994 and Barth et al., 1996) and it exemplifies one of many difficult tradeoffs standard setters face when developing and improving accounting standards.

2.3.Measuring Value Relevance

Value relevance is generally measured by the explanatory power from univariate and/or multiple regressions of stock market dependent variables on accounting independent variables. Even though examination of the adjusted R^2 is the most common measure, previous research has focused on other alternative measures as indicators of value relevance. Holthausen and Watts (2001) classify value relevance studies intro three broad categories:

i. Relative association studies

ii. Incremental association studies

iii. Marginal information content studies

Relative association studies generally compare the statistical association between bottom-line measures and stock market values or stock returns. These studies are mainly focused on the R^2 from various regressions. Incremental association studies investigate whether various accounting variables are value relevant after controlling for other specified variables. These studies typically analyze the specific regression coefficients (also called response coefficients) and their significance. Marginal information content studies are event studies over a relatively short time period in which price reactions to the disclosure of accounting information are investigated. Until 2001, almost 95% of all prior value relevance studies were association studies (relative and/or incremental) (Holthausen and Watts, 2001). Our study will be a contribution within this research category.

2.3.1. Valuation Model

An important aspect when testing for value relevance is to select a proper valuation model. According to Barth et al. (2001), the Ohlson model (Ohlson, 1995) model has been frequently used and set the basis for most value relevance research since 1995. The model presents firm value as a linear function of book value of equity and the present value of expected residual earnings. It is also known as the residual income valuation model, and it can formally be written as:

$$MV_0 = BV_0 + \sum_{t=1}^{\infty} \frac{E(EARN_t - r_t * BV_{t-1})}{(1 + r_t)} \quad (1)$$

where MV_0 is the market value of equity at time zero, BV_0 (BV_{t-1}) is the book value of equity at time zero (year t-1), $EARN_t$ is earnings in period t and r_t is the expected rate of return. Thus, the summation captures the expected present value of future residual earnings. The model is derived from the dividend discount model (DDM) and assumes clean surplus. Based on the Ohlson model value relevance researchers have commonly used two different types of regression equations;

price level regressions and return regressions, which will be further elaborated in the next two subsections.

2.3.2. Price Level Regression

Price level regressions are heavily used in the value relevance literature. Several important and widely cited articles rely on this type of regression, e.g. Francis and Shipper (1999), Collins et al. (1997), Brown et al. (1999) and Lev and Zarowin (1999). This regression expresses firm value as a linear function of earnings and book value of equity:

$$MV_{i,t} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 EARN_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $MV_{i,t}$ is the market value of equity per share (stock price) of firm i in year t, $BV_{i,t}$ is the book value of equity per share of firm i in year t, and $EARN_{i,t}$ is earnings per share of firm i in year t. This model seeks to explain the level of security prices (dependent variable) by the two above mentioned accounting variables (independent variables). Price level regressions are thus interested in explaining what is reflected in firm value (Barth et al., 2001).

Value relevance is generally measured by the adjusted R^2 from the multiple regression equation (2) above. R^2 is the total variation in the dependent variable explained by the independent variables. Thus, the R^2 tells us something about the explanatory power of accounting information on firm market equity value. Consequently, a higher R^2 means more value relevant accounting information. In addition, the estimated coefficients reveal the effect of earnings and book values on market equity values. Collins et al. (1997) also investigates the incremental explanatory power of book values (3) and earnings (4), by the following two equations (based on the notation from (2):

$$MV_{i,t} = \beta_0 + \beta_1 BV_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$MV_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \varepsilon_{i,t} \quad (4)$$

By decomposing (2) into two univariate regression models one can explore how the two independent variables contribute to explaining market value of equity. In

order to find the incremental explanatory power of earnings and book values, Collins et al. (1997) estimate R^2 for equations (2)-(4). By subtracting R^2 for (3) from (2) they obtain the incremental explanatory power of earnings ($R^2_{EARN} = R^2_{TOT} - R^2_3$). Similarly, subtracting R^2 for (4) from (2) they find the incremental explanatory power of book values ($R^2_{BV} = R^2_{TOT} - R^2_4$). The explanatory power common to both earnings and book values are thus represented by ($R^2_{COM} = R^2_{TOT} - R^2_{BV} - R^2_{EARN}$). Note that the notations in the equations above differ slightly from the ones used in Collins et al. (1997).

2.3.3. Return Regression

The second major approach to study value relevance of accounting information is what Francis and Schipper (1999) refers to as the "earnings relation". This approach is also referred to as a price return study and is commonly used within the field of value relevance research (Francis and Schipper, 1999; Easton and Harris, 1991; Lev and Zarowin, 1999). The regression equation can be written as:

$$R_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \beta_2 \Delta EARN_{i,t} + \varepsilon_{i,t} \quad (5)$$

where $R_{i,t}$ is the stock return for firm i in period t and $\Delta EARN_{i,t}$ ($= EARN_{i,t} - EARN_{i,t-1}$) refers to change in earnings for firm i in period t. Easton and Harris (1991) show that (5) can be derived from (1) and (2) in which a change in the market value of equity (return) comes from a change in the book value of equity (earnings) and a change in earnings if assuming clean surplus and that change in earnings proxies for residual earnings.

By decomposing (5) into two univariate regressions, similar to the decomposition of the price level regression above, it is possible to explore how the two earnings variables contribute to explain the variance in stock returns. These regressions can formally be written as:

$$R_{i,t} = \beta_0 + \beta_1 EARN_{i,t} + \varepsilon_{i,t} \quad (6)$$

$$R_{i,t} = \beta_0 + \beta_1 \Delta EARN_{i,t} + \varepsilon_{i,t} \quad (7)$$

The analysis of the two variables' incremental explanatory power is similar to the computations in section 2.3.2.

2.3.4. Abnormal Return Regression

The abnormal return regression is also applied in the value relevance literature and tests the relationship between abnormal returns and abnormal earnings. Abnormal returns and earnings cannot be observed and researchers use proxies in their estimations. Abnormal return is commonly calculated by using the market model and abnormal earnings are calculated based on earnings in excess of expected earnings. Analysts' forecasts as a proxy for expected earnings are typically used (Freeman and Tse, 1992; Easton and Zmijewski, 1989). In its simplest form abnormal earnings is calculated as the change in earnings. The abnormal return regression derived from Freeman and Tse (1992) can be written as:

$$AR_{i,t} = \beta_0 + \beta_1 AE_{i,t} + \varepsilon_{i,t} \quad (8)$$

where $AR_{i,t}$ is the abnormal return for firm i in period t and $AE_{i,t}$ is abnormal earnings for firm i in period t.

2.3.5. Perfect Foreknowledge

Another measure of value relevance is what Francis and Schipper (1999) call portfolio tests. Portfolio tests are not as widely used but are still regarded as a valid measure of value relevance. This measurement approach has been used by Alford et al. (1993) in their extensive study of value relevance in seventeen countries, and Thinggaard and Damkier (2008) in their study of value relevance on the Danish stock market. This approach measures value relevance as the portion of total return that could be earned from having perfect foreknowledge of financial statement information. One advantage of this approach is that it controls for the changes in the variability of returns, which Francis and Schipper (1999) argue have increased over time.

The portfolio measure is based on the market-adjusted returns which could be earned based on perfect foreknowledge of financial information. The market-

adjusted return is calculated as the premium of the compound return in excess of the equally weighted market portfolio. Francis and Schipper (1999) and Thinggaard and Damkier (2008) make five accounting-based hedge portfolios and take short or long positions based on predefined investment criteria and strategies e.g. long position in stocks with the 40% highest positive change in earnings and short position in stocks with the 40% lowest change in earnings. Further, they calculate the market-adjusted returns to perfect foresight return-based hedge portfolios and measure value relevance as the portion of portfolio returns that could be earned from accounting information. A high proportion yields high value relevance.

2.3.6. Return window

Value relevance can be studied both in a short term perspective and in a long term perspective. This is referred to as narrow window studies and wide window studies respectively. However, one should be aware of the potential caveats by using different time intervals. Very narrow window studies will in theory (if assuming fully efficient markets) provide opportunity to isolate the effect of earnings announcements. However, research indicates that markets may not be fully efficient and not absorbing information instantly (Scott, 2011), implying that very narrow windows might understate the usefulness of earnings due to delayed investor reaction to earnings announcements (Lev, 1989). This phenomenon is known as post-announcement drift. Wide window studies on the other hand overcome the problem of post-announcement drift. However, these studies might overstate the usefulness of earnings due to the fact that there is a vast array of other factors influencing stock price changes in a longer timeframe (Lev, 1989).

Wide window studies are most commonly used in the value relevance research literature. These studies do not take timeliness of information into consideration which in contrast is highly important in narrow window studies. Also, in these studies researchers usually analyze yearly data to find statistical relationships between stock prices and financial accounting information (Beisland, 2012). Common return intervals used are 12 months (Easton and Harris, 1991; Beisland and Hamberg, 2008) and 15 months (Francis and Schipper, 1999; Thinggard and Damkier, 2008; Alford et al., 1993).

3. Previous Research on Value Relevance

Value relevance has been widely studied the past 25 years and has been one of the top five research areas within capital market research (Beaver, 2002). However, Ball and Brown (1968) were the first researchers to provide evidence that earnings had an effect on stock returns. Even though almost 90 percent of the information conveyed in financial statements was captured by stock prices before the announcement date, they concluded that income/earnings in fact captured at least 50 percent of all the information regarding the company in a given year. Beaver (1968) also found evidence of the information content of earnings by analyzing the trading volume surrounding the date of disclosure. He found a significant increase in trading volume around these dates providing evidence of the relevance of earnings.

In this section we will present previous research within the value relevance literature. It is not the purpose of this section to review all of the value relevance literature. However, we will focus on the most important topics by some of the most influential contributors based on a sample of articles that has been widely cited in the literature. In addition, more recent contributions to the value relevance literature and topics which are closely related to our research questions have also been included.

3.1. Value Relevance over Time

Even though most researchers have found that earnings in fact are relevant for investors in making investment decisions, a lot of the research has studied the development of value relevance over time (Collins et. al, 1997; Francis and Schipper, 1999; Brown et. al, 1999; Lev and Zarowin, 1999; Gjerde et. al, 2011). Francis and Schipper (1999) provide a thorough analysis of the claim stated in the 1990's that financial statements had lost relevance over time. Their analysis covers data for U.S. listed firms over the period 1952 – 1994. Over these years, they found that book values and earnings (price level regression) on average explained 62% of the variation in market share prices, ranging from 47% to 78%. Furthermore, in their time regression they provide evidence suggesting that the relevance of earnings declined during the period while the relevance of book values, and book values and earnings in total, increased. The estimated time

coefficient for book value suggested an annual increase in R^2 of 1.3% and 0.37% for the book value and earnings relation in total. All coefficients were statistically significant at .01 level. However, when using the perfect foreknowledge measurement approach they found declining value relevance in three of the five accounting based hedge portfolios. In conclusion, Francis and Schipper found mixed evidence of the claim that accounting information had lost relevance during the period.

Collins et al. (1997) have conducted a similar study as Francis and Schipper in which they investigated the value relevance over the period 1953 – 1993 with a sample of U.S. listed firms. Their study showed that the adjusted R^2 for earnings and book values jointly explained 54% of the variation in security prices. In addition, the coefficients for both earnings and book values were significant at the .01 level in almost every year. Consistent with the findings of Francis and Schipper (1999), Collins et al. (1997) found that the incremental explanatory power of earnings declined over the period while the explanatory power of book values increased over the period. They propose these findings as a consequence of several factors; 1) increasing intensity of one-time items, 2) negative earnings, 3) change in firm size and 4) intangible intensity (large amounts of unrecorded intangibles). They also state that several other researchers (Barth et al., 1997; Burgstahler and Dichev, 1997; Jan and Ou, 1995) have found that negative earnings over time have led to a shift of value relevance towards book values. When earnings become persistently negative investors will perceive book value of equity as a more relevant accounting variable due to the fact that book values can be perceived as the liquidation value (or abandonment value) of the firm.

In contrast to the findings in Collins et al. (1997), Brown et al. (1999) conclude that value relevance has in fact declined in the U.S. during the period 1958 – 1996 after controlling for potential scale effects possibly present in value relevance studies. They argue that scale effects (such as firm size) will bias the explanatory power (R^2) due to the fact that the increased variation in stock prices explained by scale effects has been greater than the decline in explained variation from accounting variables. Still, their results are consistent with Collins et al. (1997) finding that the value relevance of earnings have declined and increased for book values over the forty year period.

Consistent with Brown et al. (1999) Lev and Zarowin (1999) reveal a decreasing trend in value relevance for reported earnings, cash flows and book values over the twenty year period 1977 – 1996. They hold that the increasing rate of change undergone by U.S. companies in this period has affected value relevance of accounting information. More specifically, the delayed and biased recognition of change by the U.S. accounting system has failed to keep track with the growing number of firms with rapid changes, intangible assets and non-transitory items. An example is R&D expenses (often predominant in modern companies) which are generally expensed up front while the benefits are recognized in later periods. Thus, the relevance of earnings may potentially be affected and biased.

Value relevance over time has also been studied from a Norwegian perspective. Gjerde et al. (2011) conducted an extensive study of the value relevance of financial reporting in Norway during the period 1965 – 2004. Based on data from companies listed on the Oslo Stock Exchange, the researchers found that value relevance has increased significantly, which is consistent with the findings of other researchers (Francis and Schipper, 1999; Collins et al., 1997). However, in contrast to the findings in international research, Gjerde at al. (2011) found that the value relevance of earnings in Norway has not decreased. They argue that the difference is a consequence of NGAAP being more earnings oriented than the USGAAP and IFRS being more balance sheet oriented. In general, NGAAP emphasize matching expenses with corresponding revenues to a larger degree. Over the forty year period studied, they found that 59.80% of the variation in stock prices could be explained by per share earnings and book value of equity when applying the price level regression. However, when applying the price return regression only 5.20% of the variation is explained. This implies that it is easier to explain the determinants of the level of the price rather than the price change. Similar results have been found on Australian data in a study by Brimble and Hodgson (2007). They use a non-linear model to study the 28 year period from 1973 – 2001 and find that value relevance of core accounting earnings has not declined. Earnings are actually more associated with share prices than book values which are in contrast with comparable U.S. studies. Further, they argue that a linear model is not able to explain the more complex financial environment properly.

Previous research provides strong evidence that the value relevance of earnings has declined over time. Several researchers have proposed arguments for why value relevance of earnings has changed. In addition to the arguments above provided by Collins et al. (1997), Dontah et al. (2004) argue that an increasing amount of noise trading diminishes the value relevance of earnings over time. Through the development of the internet and the possibility of fast moving information, transaction costs in the global stock market has decreased and may have increased the portion of speculative investors contra fundamental investors.

3.2.Value Relevance and Negative Earnings

An important theme in modern value relevance research is the implications of negative earnings. Negative earnings cannot be expected to persist because eventually the firm will go bankrupt. However, many firms in today's market report negative earnings. These are often regarded as growth firms relying on expectations of future earnings. Evidence shows that controlling for these firms (or at least the presence of negative earnings) increases value relevance.

The problem of negative earnings has been studied by Hayn (1995). She finds that the value relevance (measured by R^2) of stock return on earnings almost triples when excluding loss firm-year observations. Losses are thus more weakly associated with stock return than are profits. Basu (1997) achieve results consistent with Hayn (1995) and further claims that negative earnings changes are less value relevant than positive earnings changes. Due to accounting conservatism which implies losses being recognized earlier than gains, negative earnings changes have a tendency to reverse while positive earnings changes are more persistent. Beisland (2008b) also found similar results in his dissertation of value relevance based on Norwegian data. Further he finds that aggregation of negative earnings into other components enhances the value relevance of negative earnings. This may be a sign of investors putting more emphasis on the components causing negative earnings than the negative earnings themselves. Ohlson (1995) suggest that book value of equity represent the present value of expected future normal earnings. According to Collins et al. (1999: 32), in the presence of losses "the market acts if it relies on book value of equity both as a proxy for expected future normal earnings and as a proxy for abandonment value". When firms report negative earnings it must necessarily be the case that

investors perceive these negative earnings as temporary. If not, they would liquidate the company. Hayn (1995) explains this as investors having a put option on the firm which they can exercise at any time to the prevailing market price.

Some value relevance research focus on financial crises and to what extent such periods affect value relevance. During financial crises investors put most emphasis on book values since the risk of bankruptcy is higher (Barth et al. 1998). Beisland (2011), cited in Beisland (2012), has studied the financial crisis starting in 2008 and argues that book values are more value relevant than earnings for Norwegian companies. In 2008, the Oslo Stock Exchange experienced a decline of about 65% but the overall explanatory power (R^2) did not change significantly from other periods. However, the explanatory power of book value of equity increased dramatically in this period implying that book values become relatively more value relevant than earnings during financial crises. In financially distressed periods, investors may be more concerned with the going concern of the firms and rely more on the underlying values in the company (book values). This is also consistent with findings in Barth et al. (1998) in which they found that investors put more emphasis on book values during financial crises since the risk of bankruptcy is higher.

3.3.Value Relevance and Firm Differences

The value relevance of financial statements is shown to vary between different industries and types of companies. Lev and Zarowin (1999) argue that the value relevance of accounting information is low in service and technology-based firms that invest in intangible assets. These assets contribute to market value but are only recognized to some extent in financial statements due to accounting rules. Barth et al. (1998) shows that the explanatory power of net income and book values are significantly different depending upon the industries in which the firms operate. In particular, pharmaceutical companies' net income figures contribute more than book values whereas the opposite is evident for firms which fall under the category "financial services". In contrast to Lev Zarowin (1999), Francis and Schipper (1999) do not find conclusive evidence that the value relevance of high-technology firms declined more than low-technology firms.

The value relevance of financial statements also differs with company size (Brown et al., 1999). The earnings persistence is lower for smaller companies since they are more likely to report losses than bigger firms. A reason may be the fact that larger firms are more diversified and better able to overcome fluctuating economic environments (Collins et al., 1997). According to the Ohlson valuation model (Ohlson, 1995) this increases the importance of book values relative to earnings. Investing in smaller companies is considered more risky and investors place greater weight on book values, which predicts the liquidation value in case of bankruptcy (Collins et al., 1997).

Bae and Jeong (2007) have performed a study of value relevance of Korean business groups firms (chaebols) with a high concentration of controlling power concentrated on a single family or an individual. They study industrial firms listed on the Korean Stock Exchange during the period 1987 – 1998 and found that the value relevance of earnings and book values is significantly lower for firms affiliated with business groups. On the other hand, foreign equity ownership has a positive effect on value relevance. They argue that the results are consistent with the view of the poor governance structure associated with chaebols.

3.4.Value Relevance and Accounting Standards

Holthausen and Watts (2001) have expressed concerns regarding the relevance of value relevance research for accounting standard setting. In general, they claim that value relevance research does not rely on any adequate theory with an aim of explaining accounting and standard setting, and that value relevance research offers little or no insight for standard setting. However, Barth, Beaver and Landsman (2001) argue that value relevance research is indeed useful and highly relevant for standard setting. They provide six strong arguments for why value relevance research is relevant, e.g., they hold that value relevance research provides insights as to what extent investors use accounting amounts in valuing firms' equity. In addition, key dimensions of the FASB's theory to assess the reliability and relevance of accounting figures is operationalized in value relevance reseach. Barth, Beaver and Landsman are all active participants within accounting standard setting and it is reasonable to assume that value relevance research has in fact contributed to standard setting. A discussion of the extent to

whether value relevance research contributes to standard setting or not lies somewhat beyond the scope of this study. However, we provide some tentative analysis that may be informative to standard setters and future research in relation to the proposal of removing mandatory quarterly reporting for SME's in the EU.

Several studies claim fair value accounting is more value relevant than historical cost accounting (Barth et al., 1996; King and Langli, 1998; Beisland and Knivsflå, 2013). Studies related to fair value of debt and equity securities consistently find that investors consider fair value estimates more relevant than historical cost figures (Petroni and Wahlen, 1995; Barth et al., 1996; Eccher et al., 1996). The same evidence is found in a study of value relevance in relation to fair value estimates of derivatives (Venkatachalam, 1996). Even though these estimates are uncertain investors perceive fair value estimates to be more precise and relevant than their notional amounts (Barth et al., 2001).

Extensive research has been conducted on Norwegian accounting standards by Gjerde et al. (2011) in the period 1965-2004. The study tests whether new accounting standards within the Norwegian Generally Accepted Accounting Principles (NGAAP) have contributed to increased value relevance or not. However, the study does not consider the implementation of International Financial Reporting Standards (IFRS) for publicly listed companies in 2005. NGAAP focuses primarily on earnings (earnings oriented conceptual view), while the United States Generally Accepted Accounting Principles (USGAAP) and IFRS are more based upon the balance sheet (balance sheet oriented conceptual framework). They study the value relevance implications of major changes in Norwegian accounting standards. The new accounting act of 1998 appeared to have the greatest effect on total value relevance. The researchers explain that most of the increased value relevance can be attributed to the introduction of fair value of financial instruments. As opposed to being valued in accordance with historical cost, this change increased the relevance of the balance sheet. Another important factor improving value relevance of NGAAP was the introduction of deferred taxes in 1992. According to Hope (1999) deferred taxes prevent managers from adjusting financial statements for tax purposes affecting the underlying economic information being provided to investors.

The introduction of IFRS in 2005 has also been studied by Beisland and Knivsflå (2013) in which they study value relevance four years before (2001 – 2004) the introduction of IFRS and four years after (2005 – 2008). The results of their study shows that value relevance remained fairly constant during the tested periods. In addition, their study confirmed that introducing IFRS with higher emphasis on fair values increased the value relevance of book values at the expense of the relevance of earnings. Introducing more fair values in financial statements will imply more volatility in the income statement (e.g. change in the valuation of interest rate swaps), making earnings less relevant for investing purposes. Jermakowizc et al. (2007) studied the difference in value relevance between firms using German GAAP and IFRS or US GAAP. Their results indicate that adopting US GAAP or IFRS significantly increases the value relevance of earnings. In contrast, Hung and Subramanyam (2007) concluded that introducing International Accounting Standards (IAS) did not increase the value relevance of neither book values nor net income, based on a sample of 80 German firms during the period 1998-2002. In 2005, all Norwegian listed companies had to disclose comparable figures for both NGAAP and IFRS for the fiscal year 2004. Gjerde et al. (2008) studied these comparable accounting figures and did not find any strong evidence of increased value relevance after the IFRS implementation. However, they found that the adjustment in itself was value relevant for both earnings and book values. Horton and Serafeim (2010) found evidence from the same reconciliation in the UK where the adjustment was value relevant for earnings but not for book values, partially supporting the results presented by Gjerde et al. (2008).

King and Langli (1998) investigated the implications of different accounting regimes across borders. Over the period 1982 -1996 they studied differences in value relevance in the UK, Germany and Norway. These three countries have distinctly different accounting standards from one another. Germany is considered to be the most conservative heavily based on historical cost principles. The UK has the least conservative accounting standards while NGAAP is considered to be less (more) conservative than Germany (the UK). They find that accounting information is relevant in the three countries. However, the total value relevance is highest in the UK (R^2 = 70%) and lowest in Germany (R^2 = 40%) with Norway (R^2 = 60%) between the two. Book values explain more of the variation in stock prices than earnings in Germany and Norway compared to the UK. King and

Langli illustrate that the value relevance of accounting is a function of the characteristics of a country's accounting standards.

Introducing fair value accounting tends to increase relevance to investors. However, financial information is also meant to fulfill another important quality; reliability. Even though international research on value relevance has been important for financial accounting standard setters they need to take the standards' reliability into account as well as prevent management errors and manipulation.

3.5. Value Relevance and Alternative Accounting Measures

Most value relevance research has been conducted with earnings and book value of equity as the standard accounting measures. However, some studies are conducted on alternative accounting measures. Francis et al. (2003) use EBITDA, cash flow from operations and other non-GAAP industry specific performance measures (e.g. revenue/cost per passenger mile and load factor for the airline industry). They find that the alternative performance measures are in fact relevant. However, earnings as a performance measure are dominant both in industries where earnings is the common performance metric and in industries where other performance measures were expected to be more relevant. In his dissertation, Mbagwu (2007) analyzes three alternative earnings measures; 1) normal GAAP earnings, 2) analysts' actual earnings and 3) pro forma earnings. In contrast to Francis et al. (2003), he finds that pro forma earnings are more informative than both GAAP earnings and analysts' actual earnings. Note that the approach used by Mbagwu (2007) is inspired by Collins et al. (1994) which in turn differs from the one adopted by Francis et al. (2003) which does not make these studies directly comparable. Choi et al. (2007) also focus on non-GAAP earnings. They study the incremental value relevance of managements' supplementary earnings metrics in the UK and found evidence that these supplements are in fact relevant.

A well-known accounting relation is the separation of earnings into cash flow and aggregate accruals. Rayburn (1986) examines the association of accruals and cash flows relative to stock returns. She finds that changes in working capital and cash flows have significant relations to stock returns, while accruals such as depreciation and deferred taxes do not. Further, she concludes that short term

accruals are more value relevant than long term accruals. Bowen et al. (1987) studied 98 U.S. firms over a ten year period to examine the incremental information content of cash flows relative to earnings. They find that accruals provide fruitful information in addition to cash flows as well as finding that cash flows provide incremental information content relative to earnings. Sloan (1996) found that the persistence of the cash flow component were a better predictor of future earnings then were the accruals component. Thus, the stock market should react more favorably the larger is the cash flow portion of earnings. However, Sloan (1996) report that investors do not tend to separate the cash flow and accrual component of earnings, and focus on earnings in total instead. This is referred to as the accrual anomaly (Lev and Nissim, 2006).

From a Norwegian perspective, Beisland (2008a) also studies the value relevance of cash flows and accruals. Based on observations from 1992 – 2004, Beisland finds that both components are relevant and that cash flows are more relevant to investors. In fact, both the level and change in accruals are negatively related to stock return and equity investors appear to perceive increasing accruals as a negative signal.

Value relevance studies have also been conducted on the relation between residual earnings and abnormal returns. Residual earnings and returns are not observable measures and the researchers have to estimate these measures by themselves or rely on external estimates. In a study conducted by Biddle et al. (1997) they compare economic value added (EVA®[3]) to earnings in relation to stock returns. Their study reveals that earnings is most value relevant and outperform EVA®. In their study of U.S. data from 1983 – 1992 Chen and Dodd (2001) also examine the value relevance of EVA® in addition to operating income and residual income. They found that operating income tended to show higher explanatory power of stock return than both residual income and EVA® figures. An explanation provided by Chen and Dodd is that investors rely more on audited accounting numbers than unaudited and estimated figures. Even though residual income and EVA® do not seem to be as value relevant as operating income the two measures provide incremental information not available in operating income

[3] EVA® is a Stern registered trademark closely resembling residual income.

(Chen and Dodd, 2001). This implies that using complementary information might enhance investors' possibility of making good investment decisions.

3.6.Value Relevance and Timeliness

Most of the prior research conducted on value relevance does not take timeliness into consideration (Beaver, 2002). The majority of the value relevance literature focuses on annual figures and returns. By looking at narrower return windows researchers can investigate the effect of earnings disclosures and thus potentially isolate the effect of more timely information. Generally, a small R^2 is observed when conducting regressions of annual returns on earnings (return regression) (Easton and Harris; 1991; Francis and Schipper, 1999; Gjerde et al., 2011). Easton et al. (1992) suggest that a lack of timeliness might be one of the factors contributing to this seemingly low R^2. This claim is also supported by Collins et al. (1994) who further claim that objectivity, conservatism and verifiability decrease the timeliness of earnings. Timeliness can be defined as the ability of providing accounting information in a timely manner, i.e. disclosing information early or more frequently. Mensah and Werner (2008) examine the implications of the frequency of financial interim reporting on stock price volatility. They compare the U.S. and Canada with the U.K. and Australia. Canada and the U.S. use quarterly interim report while Australia and the U.K. report semi-annually. The study shows that quarterly interim reports tend to increase capital market volatility compared to semi-annual reports. An implication which may be drawn from this study is that more frequent interim reporting allows investors to make more timely investment decisions during the financial year. According to Chambers and Penman (1984) earlier reporting increases the usefulness of the information disclosed (see also Givoly and Palmon, 1982).

Easton et al. (1992) finds that by expanding the return window and aggregating earnings in the same window increases the return/earnings association substantially. More specifically, for a ten-year return and the aggregation of the corresponding earnings, they obtain an R^2 of 63% compared to an R^2 of 6% in conventional one-year studies. Further, they conclude that earnings aggregation better reflects value relevant events and returns over longer periods. A more recent study by Tan and Wong (2012) follows some of the same arguments as the

ones provided in Easton et al. (1992). By decomposing annual earnings into quarterly earnings, they provide evidence of higher explanatory power of the return regression than using annual earnings only. By decomposing annual earnings into quarterly earnings researchers are able to obtain some of the same aggregation referred to by Easton et al. (1992). Tan and Wong (2012) uses U.S. data from 1971 – 2010 and concludes that taking timeliness into consideration by including interim reports increases value relevance of earnings. Further, they claim that conventional value relevance research has understated the relevance of earnings. In addition, their study reveal that early disclosures are more value relevant than later disclosures. This area of research within value relevance seems to be somewhat lacking. Value relevance focusing on quarterly interim reports has generally received limited attention in the literature even though investors and analysts put high emphasis on quarterly reports. Thus, we would like to contribute to this area by focusing on the Norwegian stock market. In addition, a tentative analysis of SME's will be performed in relation to the EU proposal of removing mandatory quarterly reporting for SME's.

4. Research Design

Value relevance research requires a quantitative method in which we will apply regression analysis to try to explain the explanatory power of financial accounting information on stock returns. Value relevance research does not attempt to prove causal relationships, but relies on finding statistical associations between the dependent and independent variables. This is generally called descriptive analysis (Gauri and Grønhaug, 2010) and will also be the basis of our study. The outline of this section is as follows: Section 4.1 presents our hypotheses and section 4.2 – 4.4 presents the models we will use for testing our hypotheses. Section 4.5 concerns the econometric implications of scale effects and section 4.6 includes a presentation of our data sample and descriptive statistics.

4.1.Research Questions and Hypotheses

Our study addresses two research questions. First, are quarterly earnings reports value relevant for investors investing on the Oslo Stock Exchange? Second, are quarterly earnings reports more value relevant than annual earnings reports? We

regard research question two as the most important. However, we believe that an analysis of research question one sets the basis for studying our second research question.

In accordance with previous research we expect quarterly interim reports to be value relevant (Tan and Wong, 2012; Hassel et al., 2005; Hossain, 2008). Tan and Wong (2012) find that quarterly earnings are value relevant but that the R^2 for the annual earnings are higher than for the *individual* quarterly earnings. This is consistent with the findings in Griffin (2003). He argues that this is caused by investors putting less emphasis on quarterly earnings than annual earnings. We support this explanation due to the fact that annual reports contain more information which might be relevant for investors than quarterly interim reports. However, even though *individual* quarterly earnings announcements might not be as relevant as annual earnings announcements it is not necessarily the case that quarterly earnings announcements are less value relevant after all. Tan and Wong (2012) also find that the aggregation of quarterly earnings to constitute annual earnings increases the explanatory power of earnings information on stock returns significantly. They conclude that quarterly earnings announcements are disclosed in a timelier manner than annual earnings announcements and thus the effect of more timely information increases value relevance to investors.

Hassel et al. (2005) study quarterly financial statements from Swedish listed companies and finds that quarterly announcements of book values and net income provide value relevant information to investors. Even though their study is mainly focused on the value relevance of environmental performance they provide evidence in relation to our first research question. Hossain (2008) study the value relevance of domestic and foreign sales data disclosed in U.S. companies' quarterly reports. In addition to finding that foreign sales data is value relevant information they also found earnings per share to be value relevant. However, it should be noted that his study is focusing on abnormal returns in a narrow window study. This is different from our approach which will be based on a wide window study.

As mentioned in section 3.6, Easton et al. (1992) found that aggregate earnings explained most of the variation in stock returns. More specifically they found that

by aggregating two, five and ten year earnings and regress it by the corresponding stock returns, R^2 increased dramatically. Inspired by Easton et al. (1992) we are following the same approach but in a slightly modified way. Instead of aggregating annual earnings over several years we aggregate quarterly earnings within one year, consistent with Tan and Wong (2012).

Research on the value relevance of quarterly earnings and the effect of timeliness has been rather limited (Beaver, 2002). To the best of our knowledge there has not been conducted any previous research on this topic on Norwegian data. Consequently, we would like to contribute within this field with emphasis on the Norwegian stock market. Based on our research questions, previous research and theory we propose two hypotheses for our study, both stated as alternative to their null hypotheses.

Hypothesis 1:

H_a: Quarterly earnings reports are value relevant for investors investing on the Oslo Stock Exchange.

Hypothesis 2:

H_a: Quarterly earnings reports are more value relevant than annual earnings reports.

4.2.Research models

There are mainly two approaches to measure value relevance; price level regression and return regression. Landsman and Magliolo (1988) argue that the approach being used should be jointly dependent upon the research question(s) and econometric considerations. Since our research questions are mainly focused on earnings as an explanatory variable for returns we believe the return regression is best suited for our study. The advantage of using the return regression is that it enables the researcher to explore how much earnings and changes in earnings explain of the variation in returns. From an investor's point of view this is highly interesting. In addition, return regression are considered to be less affected by scale effects than price level regressions (Gjerde et al., 2011). See section 4.3 for a discussion regarding scale effects and how it is controlled for.

Value relevance of quarterly interim reports can be measured by the adjusted R^2 in addition to interpreting the individual coefficients (Tan and Wong, 2012; Hassel et al., 2005; Hossain, 2008). The conventional return regression (hereby referred to as the annual earnings model) as formulated in the research literature is written as:

$$R_{i,t} = \beta_0 + \beta_1 EPS_{i,t} + \beta_2 \Delta EPS_{i,t} + \varepsilon_{i,t} \quad (9)$$

where $R_{i,t}$ is the 15 month return for firm i measured from January 1st in year t to March 31st in year t+1 , $EPS_{i,t}$ is the earnings per share for firm i in period t and $\Delta EPS_{i,t}$ $(= EPS_{i,t} - EPS_{i,t-1})$ is the change in earnings per share for firm i in period t.

Based on (9), we decompose (as suggested by Tan and Wong, 2012) the annual earnings model into its quarterly components in order to test hypothesis 1. The decomposed return regression (hereby referred to as the quarterly earnings model) can formally be written as:

$$\begin{aligned} R_{i,t} = \quad & \beta_0 + \beta_1 EPSQ1_{i,t} + \beta_2 \Delta EPSQ1_{i,t} + \beta_3 EPSQ2_{i,t} + \beta_4 \Delta EPSQ2_{i,t} + \\ & \beta_5 EPSQ3_{i,t} + \beta_6 \Delta EPSQ3_{i,t} + \beta_7 EPSQ4_{i,t} + \beta_8 \Delta EPSQ4_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (10)$$

where $R_{i,t}$ is the 15 month return for firm i measured from January 1st in year t to March 31st in year t+1, $EPSQ1_{i,t}$ to $EPSQ4_{i,t}$ is earnings per share for firm i for quarter 1 to 4 respectively, and $\Delta EPSQ1_{i,t}$ to $\Delta EPSQ4_{i,t}$ $(= EPSQk_{i,t} - EPSQk_{i,t-1})$ is the change in earnings per share for firm i for quarter k = 1, 2, 3, 4 compared to the same quarter last year. Adding the quarterly earnings per share and change in earnings should equal the annual figures used in (9). Note that restatements may cause inequalities due to the lack of auditing of quarterly reports.

To test hypothesis 2 we use both (9) and (10) and test for differences in R^2 for the two regression equations. In order to perform this test we will conduct both cross sectional regression for all years and pooled regressions. The next step in our analysis is to test for differences in R^2 from (9) and (10) by using an F-test (see

Beisland, 2008b; Tan and Wong, 2012). In this case (10) will be the unrestricted model and (9) will be the restricted model.

In addition, we will study the differences in value relevance among the quarterly interim earnings to analyze which (if any) quarters are most value relevant. In order to examine the issue we will study the incremental explanatory power of each quarter following the same principle as studying the incremental explanatory power in section 2.3.2 and 2.3.3:

$$R_{i,t} = \beta_0 + \beta_1 EPSQk_{i,t} + \beta_2 \Delta EPSQk_{i,t} + \varepsilon_{i,t} \quad (11)$$

where k = 1, 2, 3, 4.

Next, we will calculate the incremental explanatory power of each quarter by subtracting the R^2 from the three remaining quarters (obtained from (11)) from the total R^2 from (10). As an illustration, the incremental explanatory power of quarter 1 can be derived as: $R^2_{Q1} = R^2_{TOT} - R^2_{Q2} - R^2_{Q3} - R^2_{Q4}$.

4.3.Controlling for Negative Earnings

The effect of negative earnings may severely affect estimation results (see section 3.2). Consequently, we will control for negative earnings when testing our two hypotheses by adding dummy variables to our two regression models:

$$R_{i,t} = \beta_0 + \beta_1 EPS_{i,t} + \beta_2 \Delta EPS_{i,t} + \beta_3 * D + \beta_4 EPS_{i,t} * D + \varepsilon_{j,t} \quad (12)$$

Where D = 1 if EPS < 0, zero otherwise.

$$\begin{aligned} R_{i,t} = \quad & \beta_0 + \beta_1 EPSQ1_{i,t} + \beta_2 EPSQ2_{i,t} + \beta_3 EPSQ3_{i,t} + \beta_4 EPSQ4_{i,t} + \\ & \beta_5 \Delta EPSQ1_{i,t} + \beta_6 \Delta EPSQ2_{i,t} + \beta_7 \Delta EPSQ3_{i,t} + \beta_8 \Delta EPSQ4_{i,t} + \beta_9 * DQ1 + \\ & \beta_{10} * DQ2 + \beta_{11} * DQ3 + \beta_{12} * DQ4 + \beta_{13} EPSQ1_{i,t} * DQ1 + \\ & \beta_{14} EPSQ2_{i,t} * DQ2 + \beta_{15} EPSQ3_{i,t} * DQ3 + \beta_{16} EPSQ4_{i,t} * DQ4 + \varepsilon_{i,t} \quad (13) \end{aligned}$$

where DQ1-4 = 1 if EPS < 0, zero otherwise.

4.4. Introduction of IFRS

All firms listed on Oslo Stock Exchange were imposed to adopt IFRS in their consolidated financial statements in 2005. The introduction of IFRS has been studied by several researchers. Gjerde et al. (2008) examined the implications of IFRS on the value relevance of financial information in Norway and did not find any significant differences in value relevance compared to pre-IFRS financial accounting figures. Hung and Subramanyam (2007) also found similar results when comparing IAS to German GAAP. However, Beisland and Knivsflå (2013) found that IFRS has increased the value relevance of book values at the expense of earnings. It is evident that the introduction of IFRS may influence our estimates. Consequently, we will examine the effects of IFRS on our estimates. A dummy variable is introduced giving the following equations based on (9) and (10):

$$R_{i,t} = \beta_0 + \beta_1 EPS_{i,t} + \beta_2 \Delta EPS_{i,t} + \beta_3 EPS_{i,t} * IFRS + \beta_4 * IFRS + \beta_5 \Delta EPS_{i,t} * IFRS + \varepsilon_{i,t} \quad (14)$$

$$\begin{aligned} R_{i,t} = \; & \beta_0 + \beta_1 EPSQ1_{i,t} + \beta_2 EPSQ2_{i,t} + \beta_3 EPSQ3_{i,t} + \beta_4 EPSQ4_{i,t} + \\ & \beta_5 \Delta EPSQ1_{i,t} + \beta_6 \Delta EPSQ2_{i,t} + \beta_7 \Delta EPSQ3_{i,t} + \beta_8 \Delta EPSQ4_{i,t} + \\ & \beta_9 IFRS + \beta_{10} EPSQ1_{i,t} * IFRS + \beta_{11} EPSQ2_{i,t} * IFRS + \\ & \beta_{12} EPSQ3_{i,t} * IFRS + \beta_{13} EPSQ4_{i,t} * IFRS + \beta_{14} \Delta EPSQ1_{i,t} * IFRS + \\ & \beta_{15} \Delta EPSQ2_{i,t} * IFRS + \beta_{16} \Delta EPSQ3_{i,t} * IFRS + \beta_{17} \Delta EPSQ4_{i,t} * IFRS + \\ & \varepsilon_{i,t} \end{aligned} \quad (15)$$

where IFRS = 1 in years with IFRS reporting (2005-2011), zero otherwise.

From (14) we are interested in β_4 and in (15) we are interested in β_{10} through β_{17} in addition to the adjusted R^2 for both regression models. By looking at these parameters we are able to assess whether IFRS had an effect on the individual response coefficients of earnings and the value relevance of earnings.

4.5. Adjusting for Scale Effects

Brown et al. (1999) have expressed concerns regarding the use of R^2 as a measure of value relevance. They are especially concerned about how scale effects (e.g.

stock splits[4]) may influence and increase R^2. As referred to above, firm size may also affect the results of our study. Brown et al. (1999) suggest adding another variable that takes into consideration the coefficient of variation of the scale variable, or alternatively deflating earnings by the market value of equity at the beginning of the measurement period. This adjustment for scale has become more or less a common practice in modern value relevance studies. Even though there has been a discussion regarding which is the correct scale component, Easton and Sommers (2003) argue that market value of equity (or stock price) is the true scale indicator. They further conclude that scale *is* market capitalization. In accordance with Easton and Sommers (2003) and Gjerde et al. (2011) we deflate our independent/accounting variables with market price per share. Note that beginning-of-period price per share is the natural deflator in the return calculation. Thus, it will also be the most appropriate deflator for the independent variables.

4.6. Data Sample

In 2000 companies listed on the Oslo Stock Exchange were imposed by law to provide quarterly interim reports. However, due to insufficient observations in year 2000 this year has not been included. Hence, our analysis will cover the period 2001-2011 in which we have sufficient data. Our sample includes all companies listed on Oslo Stock Exchange during this period excluding firms classified within the areas of banking, investments, real estate and insurance because these firms use accounting rules deviating from traditional industrial companies. In addition, we exclude firms without fiscal year end December 31st to minimize the risk of biased estimations. This is consistent with previous research (Kothari and Zimmerman, 1995; King and Langli, 1998; Beisland, 2008; Thingaard and Damkier, 2008). Data is collected from the Thomson Reuters Datastream/Worldscope database and include annual and quarterly adjusted stock prices (code: P) and earnings per share (code: WC10010). Commonly, errors may occur in databases and cause extreme values which have the potential to bias our regression results. Consequently, we trim the data and delete the upper and lower one percentile of all variables (both dependent and independent) in order to avoid

[4] If assuming a world in which accounting information has no impact on stock prices and consequently zero R^2, a stock split will actually result in increasing R^2 and to the false conclusion of increasing value relevance over time.

extreme outliers. Even though we risk deleting some of the truth we also mitigate the risk of inflated errors and biased statistical estimates. This procedure is also common practice in the value relevance literature (King and Langli, 1998; Beisland and Hamberg, 2008; Beisland, 2008b; Gjerde et al., 2011). Table 1 depicts the derivation of our final sample size.

Table 1: Description of Sample Size

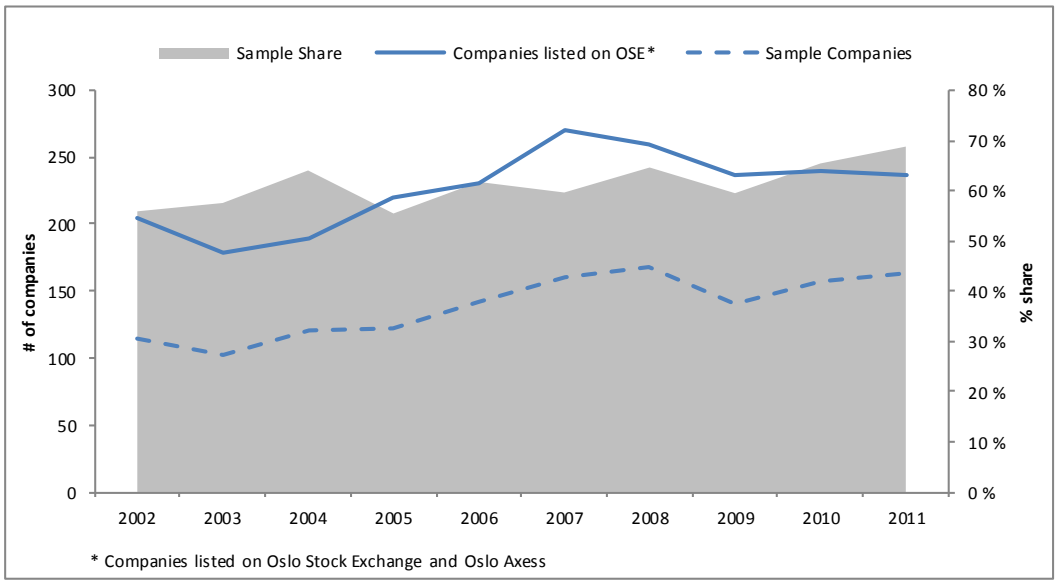
	Deleted	Remaining
Total firm year observations*		2 445
Less: Missing Q1EPS observations	32	2 413
Less: Missing Q2EPS observations	44	2 369
Less: Missing Q3EPS observations	48	2 321
Less: Missing Q4EPS observations	248	2 073
Less: Missing annual EPS observaions	2	2 071
Less: Missing adj.price beginning of period	194	1 877
Less: Missing return calculations	1	1 876
Less: Firm year observations with deviant fiscal year end**	31	1 845
Less: Bank companies firm year observations	228	1 617
Less: Property companies firm year observations	26	1 591
Less: Insurance companies firm year observations	21	1 570
Less: Financial companies firm year observations	33	1 537
Less: Upper and lower 1% percentile of all variables	145	1 392
Final Sample Size		**1 392**

* Comparable figures for both annual and quarter
** Companies ending fiscal year deviant from 31.12

Note that the large number of observations deleted from Q4 is due to the fact that 2012 Q4 financial information was not available at the time the data was collected. Hence, all firm-year observations for 2012 were deleted from our sample. Furthermore, observations from 2001 are lost due to the calculations of change in earnings. Consequently, our data sample covers the ten year period 2002 – 2011 and contains 1,392 firm-year observations. The list of all sample companies is tabulated in appendix 1.

Figure 3 depicts the number of firms included in our sample compared to the total number of firms listed on the Oslo Stock Exchange (including Oslo Axess) from the year 2002 - 2011. The sample's share of the population ranges from 56 percent to 69 percent with an average of 61 percent. We are confident that our sample size is sufficient for analyzing our research questions.

Figure 3: Data Sample



Descriptive statistics for the data used in our analysis are shown in table 2. Mean annual scaled earnings per share is -0.0094 while the median is 0.0325. The negative mean annual earnings per share are mainly caused by the impact of the years 2008 – 2010 in which a high frequency of negative earnings were reported. Of our sample of 1392 firm-year observations 514 shows negative annual earnings per share, which is approximately 37 percent. All changes in earnings per share have a greater median than mean indicating that the distribution is skewed to the left (negative skewness). The opposite is observed for the level of quarterly and annual earnings per share in addition to returns meaning that the distribution is skewed to the right (positive skewness). As expected, the descriptive statistics confirm that the sum of mean quarterly earnings per share is close to the mean of annual earnings per share. The same accounts for changes in earnings per share. The explanation for the minor discrepancy could be the fact that quarterly earnings are not subject to mandatory audit and may be restated, especially for the fourth quarter. Even though we have trimmed the data set by deleting the highest and lowest percentile for all variables the columns for minimum and maximum in table 2 may indicate the presence of extreme values. This contributes to a greater variance measured as standard deviation in table 2 above.

Table 2: Descriptive Statistics

Variable	n	Mean	Median	Std.dev	Min	25% Quantile	75% Quantile	Max
Q1EPS	1392	0,0003	0,0066	0,0523	-0,3452	-0,0138	0,0208	0,2730
ΔQ1EPS	1392	0,0071	0,0021	0,0806	-0,4092	-0,1112	0,0172	0,9295
Q2EPS	1392	0,0017	0,0096	0,0618	-0,4175	-0,0119	0,0269	0,2959
ΔQ2EPS	1392	0,0050	0,0028	0,1001	-0,6275	-0,0147	0,0211	1,2140
Q3EPS	1392	0,0031	0,0091	0,0719	-0,7051	-0,0142	0,0260	0,4673
ΔQ3EPS	1392	0,0087	0,0021	0,1157	-0,7592	-0,0129	0,0211	1,1193
Q4EPS	1392	-0,0153	0,0059	0,1217	-1,1488	-0,0305	0,0307	0,3969
ΔQ4EPS	1392	0,0255	0,0018	0,2380	-1,2752	-0,0255	0,0343	3,8625
EPS	1392	-0,0094	0,0325	0,2212	-1,4775	-0,0607	0,0923	0,6833
ΔEPS	1392	0,0497	0,0097	0,3466	-1,4073	-0,0470	0,0830	3,9899
RET	1392	0,1139	-0,0153	0,6774	-0,9570	-0,3307	0,4234	4,1192

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the share price at the beginning of year t
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t

We expect to find positive correlations between the level and changes in earnings per share and returns. This is confirmed by the Pearson correlation matrix in table 3. All independent variables are significantly correlated with returns except change in earnings per share for quarter 1 and 2. The matrix reveals an increasing pattern in correlation with returns whereby quarter 1 has the lowest (0.1326) and quarter 4 has the highest (0.2790). Further, annual earnings per share have the highest correlation with returns (0.3087). As expected, the level and changes in quarterly earnings per share are significantly correlated with the level and change in annual earnings per share respectively. In addition, the fourth quarter has the strongest correlation with annual earnings per share (0.7936) compared to quarter 1 (0.6520), quarter 2 (0.6646) and quarter 3 (0.6497). Another interesting pattern is that quarterly EPS has the strongest correlation with the closest subsequent quarter and decreasing correlation with later quarters. For example, quarter 1 has a high correlation with quarter 2 and a decreasing correlation with quarter 3 and 4. This may indicate that previous quarters have an ability to predict future quarters' EPS.

Table 3: Pearson Correlation Matrix

Variable	RET	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS	EPS	ΔEPS
RET	1,0000										
Q1EPS	0,1326**	1,0000									
ΔQ1EPS	0,0482	0,2510**	1,0000								
Q2EPS	0,1977*	0,4605**	0,0337	1,0000							
ΔQ2EPS	0,0227	-0,0092	0,3259**	0,2521**	1,0000						
Q3EPS	0,2337**	0,3634**	-0,0338	0,3830**	-0,0755**	1,0000					
ΔQ3EPS	0,1264**	-0,0581*	0,2135**	-0,0268	0,2360**	0,4113**	1,0000				
Q4EPS	0,2790**	0,3060**	-0,0728**	0,2966**	-0,0462	0,2770**	-0,0023	1,0000			
ΔQ4EPS	0,1362**	-0,1133**	0,0603*	-0,1387**	0,0694**	-0,0313	0,1105**	0,2543**	1,0000		
EPS	0,3087**	0,6520**	0,0134	0,6646**	0,0239	0,6497**	0,0956**	0,7956**	0,0559*	1,0000	
ΔEPS	0,1415**	-0,0388	0,4616**	-0,0517	0,5242**	0,0621*	0,4990**	0,1312**	0,7314**	0,0852**	1,0000

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t

Explanations for matrix

**	Significant at 1%
*	Siginificant at 5%

5. Empirical Analyses

In this section of the study we will present our main findings and relate our findings to previous research. Studying value relevance is the main purpose of this thesis. Consequently, the main focus is on R^2. Earnings response coefficients will be discussed to a limited degree. Section 5.1 relates to hypothesis 1 and studies whether quarterly earnings information is value relevant. Section 5.2 relates to hypothesis 2 and tests the difference in value relevance between quarterly and annual earnings reports. Controls for the effects of negative earnings and the implementation of IFRS are conducted in sections 5.3 and 5.4 respectively. Section 5.5 analyses the difference in value relevance between large, and small and medium sized companies. The last section presents several robustness checks.

5.1. Value Relevance of Quarterly Earnings

We start our empirical analysis by regressing returns on quarterly earnings per share and changes in earnings per share. The test of hypothesis 1 is based on the regression output in table 4. In addition, we analyze the incremental explanatory

power of each quarter in table 5 in order to study whether any particularly quarters are more value relevant than others.

Table 4: Regression of Return on Quarterly Earnings

Model specification:

$$RET_{it}=\beta 0 + \beta_1 Q1EPS_1 + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS
Pooled	1392	0,1234	0,1113**	-0,5066	0,6313*	1,5515**	-0,2828	1.0870**	0,3756	1,0924**	0,2743**
			(6,87)	(-0,91)	(2,14)	(3,56)	(-1,51)	(3,25)	(1,86)	(6,06)	(2,93)
2002	114	0,3489	-0,2012**	1,8531	-1,3046	1,7328**	-0,7659**	0,6047	1,0042	1,1539**	-0,4435**
			(-5,67)	(1,76)	(1,82)	(2,97)	(3,57)	(0,68)	(1,31)	(3,07)	(-2,80)
2003	103	0,1122	0,6441**	-1,0294	1,5087	-1,4946	1,269	-0,6212	2,2175**	1,9621*	-0,2960
			(9,15)	(-0,52)	(0,92)	(-1,07)	(1,32)	(0,59)	(2,63)	(2,27)	(-1,12)
2004	121	0,1159	0,1771**	0,3779	1,4377*	1,8876	-0,5166	1,758	-0,2892	1,7454	0,367
			(3,17)	(0,14)	(2,05)	(0,77)	(-0,57)	(0,96)	(-0,28)	(1,91)	(0,52)
2005	122	0,0907	0,5928**	-2,6278	0,3298	-4,9370	2,1179	0,4417	3,1681	2,2350	0,7776
			(5,72)	(-1,10)	(0,22)	(-1,69)	(1,02)	(0,17)	(1,53)	(1,54)	(0,70)
2006	142	0,1270	0,3115**	-0,0252	-0,8249	4,0911**	-0,3112	0,2367	1,1996	1,2808	0,2995
			(5,88)	(-0,01)	(-0,58)	(2,68)	(-0,59)	(0,29)	(1,63)	(1,03)	(0,48)
2007	161	0,1264	-0,0906**	1,0635	-0,0334	0,4952	0,1921	1,4040*	-0,2371	0,2555	1,7715*
			(-2,76)	(1,02)	(-0,05)	(0,63)	(0,36)	(2,30)	(-0,89)	(0,30)	(2,55)
2008	168	0,1268	-0,4281**	0,9324	-0,3782	0,2345	0,2189	0,3261	0,1209	0,5439*	0,2471
			(-16,10)	(1,35)	(-0,82)	(0,44)	(0,41)	(0,58)	(0,26)	(2,17)	(1,23)
2009	141	0,1950	0,4063**	-0,5092	-0,6098	1,9607*	0,0611	1,7359*	0,1600	0,3606	0,2642*
			(6,87)	(0,58)	(-1,41)	(2,35)	(0,18)	(2,11)	(0,47)	(1,03)	(2,38)
2010	157	0,1083	0,1331**	-1,4831	1,0954**	2,1320	-0,6085	1,1446	0,6433	0,8740**	-0,1513
			(2,90)	(1,17)	(3,48)	(1,94)	(-0,54)	(1,61)	(1,14)	(4,29)	(-1,75)
2011	163	0,1944	-0,1331**	-0,1704	1,7675	2,2907*	-1,2318**	0,1344	0,5461	0,9137	0,3568
			(-4,05)	(-0,14)	(1,94)	(2,59)	(-2,61)	(0,22)	(1,34)	(1,82)	(1,65)

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

The output is shown in table 4. We have conducted a pooled regression for the whole sample period and cross-sectional regression for each year. The pooled regression provides an adjusted R^2 of 12.34 percent and significant coefficients for quarter 2, 3 and 4 at the 1 percent-level. In addition, the change in earnings per share in quarters 1 and 4 is significant at the 5 percent-level and 1 percent-level respectively. T-statistics in the pooled regression are adjusted for clustered

dependence and heteroscedasticity (Huber/White/sandwich clustered standard errors). This allows standard errors within companies to be dependent while independent between companies and simultaneously adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality. The same adjusted standard errors are used for all following pooled and cross-sectional regressions. In addition, tests of the variance inflation factors (VIF) show no presence of multicollinearity among the independent variables (see appendix 2).

The cross-sectional analysis gives values of adjusted R^2 ranging from a low of 9.07 percent in 2005 to a high of 34.89 percent in 2002. The sample size ranges from 105 – 165 observations per year. The cross-sectional regression provides no consistent indicators with regard to which quarter (if any) being more value relevant than others. In most of the years, very few significant coefficients are in fact reported and for the year 2005 we do not find any significant coefficients at all. This may be caused by the implementation of IFRS which will be further examined in section 5.4. The level of earnings per share for quarter 1 has no significant coefficients while quarters 2 and 4 have most significant coefficients. Even though regression coefficients may be insignificant the adjusted R^2 for all years are significant and fairly stable above 10 percent.

A study of the incremental explanatory power of each quarter is conducted in table 5. When regressing returns on figures for each quarter we find that quarter 1 has the lowest adjusted R^2 of 1.64 percent and quarter 4 has the highest R^2 of 8.11 percent. Further, we study the incremental explanatory power of each quarter and find that only the fourth quarter provides incremental explanatory power (1.41 percent). The remaining quarters all have negative incremental explanatory power implying that they do not individually add any value relevance beyond the other quarters. We hold this as evidence of quarter 4 being the most value relevant quarter, which is in line with our expectations based on the correlation matrix.

Table 5: Incremental Value Relevance of Quarterly Earnings

Model specifications:

Total $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

Q1 $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \varepsilon_{it}$

Q2 $RET_{it} = \beta_0 + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \varepsilon_{it}$

Q3 $RET_{it} = \beta_0 + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \varepsilon_{it}$

Q4 $RET_{it} = \beta_0 + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

Year	n	Adj. R2	Constant	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS
Total	1392	0,1234	0,1113** (6,87)	-0,5066 (-0,91)	0,6313* (2,14)	1,5515** (3,56)	-0,2828 (-1,51)	1.0870** (3,25)	0,3756 (1,86)	1,0924** (6,06)	0,2743** (2,93)
Q1	1392	0,0164	0,1123** (6,22)	1,6638** (3,89)	0,1338 (0,50)						
Q2	1392	0,0385	0,1109** (6,74)			2,2479** (6,53)	-0,1957 (-1,16)				
Q3	1392	0,0544	0,1055** (6,43)					2,0604** (6,56)	0,2140 (1,10)		
Q4	1392	0,0811	0,1310** (7,62)							1,4544** (7,93)	0,1985* (1,98)

	Total	Q1	Q2	Q3	Q4	Common
Incremental R2	0,1234	-0,0506	-0,0285	-0,0126	0,0141	-0,067

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t

Incremental R2

Explanatory power of the total regression less the explanatoy power of the sum of the other regressions:

$R^2_{Q1} = R^2_{Total} - R^2_{Q2} - R^2_{Q3} - R^2_{Q4}$

$R^2_{Q2} = R^2_{Total} - R^2_{Q1} - R^2_{Q3} - R^2_{Q4}$

$R^2_{Q3} = R^2_{Total} - R^2_{Q1} - R^2_{Q2} - R^2_{Q4}$

$R^2_{Q4} = R^2_{Total} - R^2_{Q1} - R^2_{Q2} - R^2_{Q3}$

$R^2_{Common} = R^2_{Total} - R^2_{Q1} - R^2_{Q2} - R^2_{Q3} - R^2_{Q4}$

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

The results from the pooled regression output in table 4 show a positive relationship between returns and earnings per share level and changes for the significant coefficients. The R^2 of 12.34 percent is significantly different from zero. Our results are consistent with Tan and Wong (2012) who presents an average adjusted R^2 of 14.90 percent for the period 1971 – 2010. As a comparison Tan and Wong (2012) finds an average adjusted R^2 of 13.20 percent for the ten year period 2001 – 2010 while we find an average adjusted R^2 of 15.61 percent. The reported R^2 for the cross sectional regressions are also significant, but most coefficients are not significant, nor conclusive. However, based on the results from the pooled regression, we hold that quarterly earnings information is value

relevant for investors on Oslo Stock Exchange. This is consistent with hypothesis 1 providing the opportunity to study hypothesis 2. In addition, based on our study of incremental explanatory power we conclude that quarter 4 provides the most value relevant earnings information to investors.

5.2.Compare Quarterly Earnings with Annual Earnings

In order to analyze our second hypothesis a regression of stock return on annual earnings per share figures is conducted as a comparison to the quarterly regressions in section 5.1. The empirical results are shown in table 6 with a pooled regression and cross sectional regressions for all years included in our study.

The pooled regression yields a R^2 of 10.74 percent which is lower than the R^2 from the quarterly regression (12.34 percent). Our results yield a higher adjusted R^2 than Gjerde et al. (2011) who also studies the Norwegian stock market. They report an average adjusted R^2 of 5.20 percent for the period 1965 – 2004. In addition, our reported adjusted R^2 is higher than the R^2 of 7.70 percent documented by Easton and Harris (1991) in their study of US data from 1968 – 1986. Further, both coefficients are statistically significant at 1 percent-level and positively related to stock returns. The coefficients for the earnings per share level and earnings per share change are 0.9152 and 0.2268 with t-values of 9.26 and 3.09 respectively. All t-statistics are adjusted for clustered dependence and heteroscedasticity. Tests indicate no presence of multicollinearity among the independent variables. Thus, no further adjustments have been made.

Adjusted R^2 from the cross-sectional regressions ranges from 3.10 percent to 29.58 percent. It appears that there is a considerable amount of variation in adjusted R^2 from year to year. However, this is not uncommon. Francis and Schipper (1999) also report similar results with a low adjusted R^2 of 6.00 percent to a high of 46.00 percent. Coefficients for the earnings per share level are significant and positively related to stock returns except for the year 2003. The yearly coefficients range from 0.5019 to 1.4452. The coefficients related to changes in earnings are not as conclusive with only three out of ten years being significant at 5 percent or lower.

Table 6: Regression of Returns on Annual Earnings

Model specification:

$$RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	EPS	ΔEPS
Pooled	1392	0,1074	0,1111** (7,21)	0,9152** (9,26)	0,2268** (3,09)
2002	114	0,2958	-0,1846** (-5,21)	1,1696** (6,17)	-0,4225** (-2,70)
2003	103	0,0310	0,6522** (9,54)	0,2734 (0,70)	0,3368 (1,26)
2004	121	0,1193	0,1929** (3,62)	1,3204** (2,76)	0,2779 (0,92)
2005	122	0,0387	0,5672** (6,12)	-0,1305 (-0,15)	1,7580* (2,10)
2006	142	0,1275	0,1336** (6,17)	1,4452** (3,81)	-0,1029 (-0,29)
2007	161	0,1354	-0,0970** (-2,97)	0,7548** (2,78)	0,5576** (2,70)
2008	168	0,1439	-0,4317** (-17,41)	0,5019** (5,93)	0,1130 (1,42)
2009	141	0,1405	0,4127** (7,03)	0,8042** (4,59)	0,1464 (1,18)
2010	157	0,0873	0,1310** (2,79)	0,6416** (2,95)	0,0326 (0,54)
2011	163	0,1356	-0,1288** (-3,85)	0,8800** (6,22)	0,0547 (0,32)

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Figure 4: Comparison of adjusted R^2

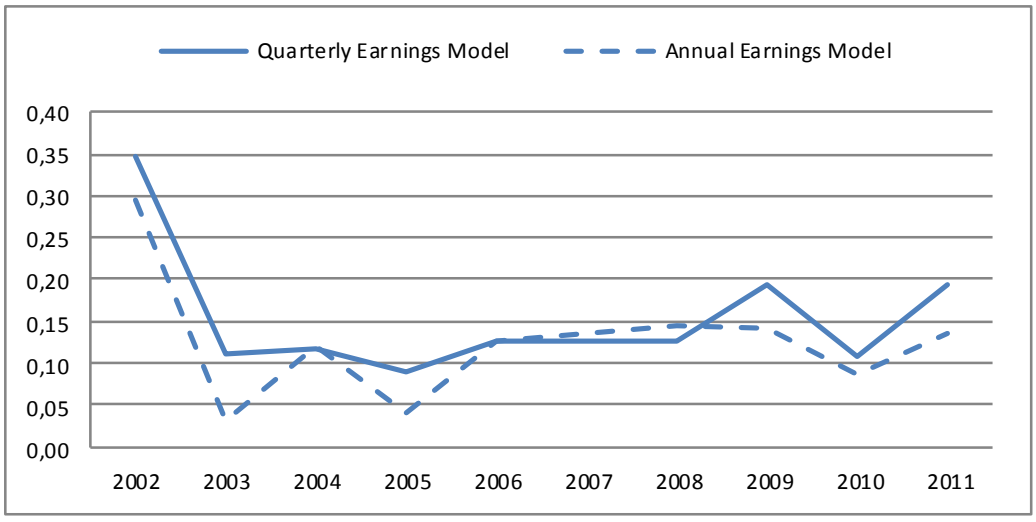


Figure 4 depicts the development of adjusted R^2 for yearly and quarterly earnings. Evidently, the two measures move in the same direction and pattern. However, the adjusted R^2 for quarterly earnings model is greater than the corresponding annual earnings model except for the years 2004, 2006, 2007 and 2008. The differences in adjusted R^2 between the quarterly and annual earnings model have been tested with an F-test for both the pooled and cross sectional regressions. This is presented in table 7 below. The test for the pooled regressions shows a significantly higher adjusted R^2 for the quarterly earnings model than the annual earnings model. The F-statistic of 4.2072 is significant at the 1 percent-level. Our results are consistent with Tan and Wong (2012) who concludes that the more timely quarterly earnings reports are more value relevant than annual earnings reports. However, in contrast to Tan and Wong (2012) no tests for the individual years (2002 – 2011) have significant F-statistics and provide no conclusive evidence of the hypothesis that quarterly earnings model explains more than the annual earnings model. Due to the relatively small yearly sample sizes we are not able to prove differences in adjusted R^2 for the two models in individual years.

Table 7: Test of differences in adjusted R^2

Model specifications:

Unrestricted: $RET_{it} = \beta_0 + \beta_{1t}Q1EPS_{it} + \beta_{2t}\Delta Q1EPS_{it} + \beta_{3t}Q2EPS_{it} + \beta_{4t}\Delta Q2EPS_{it} + \beta_{5t}Q3EPS_{it} + \beta_{6t}\Delta Q3EPS_{it} + \beta_{7t}Q4EPS_{it} + \beta_{8t}\Delta Q4EPS_{it} + \varepsilon_{it}$

Restricted: $RET_{it} = \beta_0 + \beta_{1t}EPS_{it} + \beta_{2t}\Delta EPS_{it} \quad \varepsilon_{it}$

Year	Unrestrict. adj. R2	Restricted adj. R2	n	Δ df	df	F-stat	
Pooled	0,1234	0,1074	1392,00	6	1383,00	4,2072	**
2002	0,3489	0,2958	114,00	6	105,00	1,4272	
2003	0,1122	0,0310	103,00	6	94,00	1,4329	
2004	0,1159	0,1193	121,00	6	112,00	-0,0718	
2005	0,0907	0,0387	122,00	6	113,00	1,0770	
2006	0,1270	0,1275	142,00	6	133,00	-0,0127	
2007	0,1264	0,1354	161,00	6	152,00	-0,2610	
2008	0,1268	0,1439	168,00	6	159,00	-0,5190	
2009	0,1950	0,1405	141,00	6	132,00	1,4894	
2010	0,1083	0,0873	157,00	6	148,00	0,5809	
2011	0,1944	0,1356	163,00	6	154,00	1,8734	

Definition of variables:

Unrestricted adj. R2	Adjusted R2 from the unrestricted (quarterly earnings) model.
Restricted adj. R2	Adjusted R2 from the restricted (yearly earnings) model
n	Number of observations
Δ df	Difference in degrees of freedom from the restricted model less the unrestricted model
df	Degrees of freedom in the unrestricted model calculated as n - K - 1 where K equals the number of independent variables
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Explanations for table:

**	Significant at 1 %
*	Significant at 5 %

The F-tests for each year does not provide evidence of the quarterly earnings model being more value relevant than the annual earnings model. However, we hold that quarterly earnings reports do in fact provide more value relevant information than annual earnings reports based on a test for the whole sample period. In addition, we hold this as evidence that timely reporting does add value to investors on the Oslo Stock Exchange and that only focusing on annual earnings will underestimate the value relevance provided by earnings reports disclosed during the fiscal year (Tan and Wong, 2012).

5.3. Controlling for Negative Earnings

As mentioned in section 4.6, 514 observations in our sample of 1392 firm-year observations contain at least one negative earnings per share observation. The presence of negative earnings may have severe effects on the regressions estimates due to the fact that negative earnings cannot persist. Consequently, we have performed the quarterly and annual earnings regressions and controlled for the presence of negative earnings.

Table 8 depicts the results from the regressions when controlling for negative earnings. In the quarterly earnings model the same coefficients are significant as before. However, the parameter of most interest in our study, the adjusted R^2, increases from 12.34 percent to 16.96 percent. This is consistent with prior research (Hayn, 1995; Francis et al., 2003; Beisland, 2008b). The fourth quarter still seems to be most value relevant to investors relative to the other quarters. For the annual earnings model the coefficients are greater than for the original model, similar to what we observe from the quarterly earnings model. In addition, we find an increase in adjusted R^2 from 10.74 percent to 14.99 percent. As a comparison, a similar increase is reported in Beisland (2008b) where adjusted R^2 increases from 7.61 percent to 13.70 percent after controlling for negative earnings. In the presence of negative earnings Beisland (2008b) suggests that one has to "dig deeper" into the components of earnings indicating that negative earnings alone are of low quality and value relevance.

Further, an analysis of the changes in adjusted R^2 after controlling for negative earnings is conducted to find additional support for hypothesis 2 (see appendix 3). We find that the adjusted R^2 increases for each year when controlling for negative earnings both for the quarterly and annual earnings model. However, we only find a significantly greater adjusted R^2 (F-statistic = 2.72) for the quarterly earnings model compared to the annual earnings model in the pooled regression but in no individual year. This is consistent with our findings in the previous section providing stronger evidence that the quarterly earnings model does in fact have better explanatory power of stock returns than do the annual earnings model.

We have also performed an analysis of the incremental R^2 and no conclusions are changed after controlling for negative earnings (see appendix 4). Quarters 1 – 3 are not offering any incremental explanatory power and quarter 4 is still the most relevant quarter for the investors on the Oslo Stock Exchange. This further supports our findings from the correlation matrix showing a high correlation between quarter 4 EPS and annual EPS (0.7956), and from the results in table 5.

Table 8: Regressions Controlling for Negative Earnings

Model specification:

(1) $RET_{it} = \beta_0 + \beta_{1t}Q1EPS_{it} + \beta_{2t}\Delta Q1EPS_{it} + \beta_{3t}Q2EPS_{it} + \beta_{4t}\Delta Q2EPS_{it} + \beta_{5t}Q3EPS_{it} + \beta_{6t}\Delta Q3EPS_{it} + \beta_{7t}Q4EPS_{it} + \beta_{8t}\Delta Q4EPS_{it} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 Q1EPS_{1t} + \beta_2\Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4\Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6\Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8\Delta Q4EPS_{it} + \beta_9 DQ1t + \beta_{10}DQ2_{it} + \beta_{11}DQ3_{1t} + \beta_{12}DQ4_{1t} + \beta_{13}InterQ1_{1t} + \beta_{14}InterQ2_{1t} + \beta_{15}InterQ3_{1t} + \beta_{16}InterQ4_{1t} + \varepsilon_{it}$

(3) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2\Delta EPS_{it} + \varepsilon_{it}$

(4) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2\Delta EPS_{it} + \beta_3 DYr_{it} + \beta_4 InterYr_{it} + \varepsilon_{it}$

	Model 1 w/out dummy		Model 2 w/dummy		Model 3 w/out		Model 4 w/dummy	
Variables	**Coefficient**	**T-statistic**	**Coefficient**	**T-statistic**	**Coefficient**	**T-statistic**	**Coefficient**	**T-statistic**
Constant	0,1113**	(6,87)	0,0640	(1,69)	0,1111**	(7,21)	0,0239	(0,69)
Q1EPS	-0,5066	(-0,91)	0,08955	(0,88)				
ΔQ1EPS	0,6313*	(2,14)	0,5798*	(1,97)				
Q2EPS	1,5515**	(3,56)	1,9825*	(2,25)				
ΔQ2EPS	-0,2828	(-1,51)	-0,1928	(-0,99)				
Q3EPS	1,0870**	(3,25)	0,8810	(1,57)				
ΔQ3EPS	0,3756	(1,86)	0,2834	(1,42)				
Q4EPS	1,0924**	(6,06)	2,8923**	(4,39)				
ΔQ4EPS	0,2743**	(2,93)	0,2157*	(2,39)				
DQ1			0,0518	(1,12)				
DQ2			-0,0084	(-0,16)				
DQ3			-0,0578	(-1,30)				
DQ4			-0,1585**	(-3,31)				
InterQ1			-1,8803	(-1,41)				
InterQ2			-1,0417	(-1,01)				
InterQ3			0,1148	(0,16)				
InterQ4			-2,5797**	(-3,82)				
EPS					0,9152**	(9,26)	2,1587**	(5,88)
ΔEPS					0,2268**	(3,09)	0,1860**	(2,77)
DYr							-0,0989*	(-2,01)
InterYr							-1,8760**	(-4,91)
n	1392		1392		1392		1392	
Adj. R2	0,1234		0,1696		0,1074		0,1499	

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
DQ1 - DQ4	Dummy variable for negative quarterly earnings. Value 1 for quarters with negative earnings, 0 otherwise.
InterQ1 - Inter Q4	Interaction term between Q1EPS - Q4EOS and DQ1 - DQ4. (Example for Q1: Q1EPS*DQ1)
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
DYr	Dummy variable for negative annual earnings. Value 1 for years with negative earnings. 0 otherwise
InterYr	Interaction term between EPS and DYr. (EPS * DYr).

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics are highligted in parantheses

5.4.Controlling for the Implementation of IFRS

In order to be able to control for the effects of IFRS which was introduced in 2005 we have performed regressions including a dummy variable taking years with IFRS into account. The results of the regressions are shown in table 9.

All interaction terms are insignificant indicating that IFRS has had no effects on earnings' ability in explaining stock returns. This is supported in a recent study by Beisland and Knivsflå (2013) in which they find that only book values (and not earnings) are affected by IFRS reporting. The dummy variable for IFRS is significantly negative both for the quarterly and annual regressions. This suggests IFRS has a negative effect on stock returns, which is illogical and may indicate that the coefficients are biased from an omitted variable problem. We believe the presence of negative earnings may be the omitted variable causing the seemingly negative effect IFRS has on stock returns. In appendix 5 and 6 we have run the quarterly earnings model and the annual earnings model, respectively, controlling for both the implementation of IFRS and negative earnings. The new results show no significant negative effect of IFRS on returns. Years with a large portion of observations with negative returns (e.g. 2008) can now be explained by the variables controlling for negative earnings and not the dummy variable for IFRS.

In table 9 we find fewer significant coefficients than in the original regressions. However, quarter 4 still seems to be the quarter providing most value relevant earnings information. This is consistent with our previous findings. Adjusted R^2 increases slightly from 12.34 percent to 12.89 percent for the quarterly earnings model and from 10.74 percent to 11.20 percent for the annual earnings model. The difference in adjusted R^2 between the quarterly earnings model and the annual earnings model is still significant, making our previous results more robust.

Table 9: Regressions Controlling for IFRS

Model specification:

(1) $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$

(3) $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \beta_9 IFRS_{it} + \beta_{10} Q1EPS*IFRS_{it} + \beta_{11} \Delta Q1EPS*IFRS_{it} + \beta_{12} Q2EPS*IFRS_{it} + \beta_{13} \Delta Q2EPS*IFRS_{it} + \beta_{14} Q3EPS*IFRS_{it} + \beta_{15} \Delta Q3EPS*IFRS_{it} + \beta_{16} Q4EPS*IFRS_{it} + \beta_{17} \Delta Q4EPS*IFRS_{it} + \varepsilon_{it}$

(4) $RET_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 \Delta EPS_{it} + \beta_3 IFRS_{it} + \beta_4 EPS_{it}*IFRS + \beta_5 \Delta EPS_{it}*IFRS + \varepsilon_{it}$

	WITHOUT IFRS - DUMMY				WITH IFRS - DUMMY			
	Model 1 - Quarterly		Model 2 - Annual		Model 3 - Quarterly		Model 4 - Annual	
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	0,1113**	(6,87)	0,1111**	(7,21)	0,1995**	(6,49)	0,1979**	(6,70)
Q1EPS	-0,5066	(-0,91)			-0,0368	(-0,03)		
ΔQ1EPS	0,6313*	(2,14)			0,6600	(1,04)		
Q2EPS	1,5515**	(3,56)			0,7641	(0,92)		
ΔQ2EPS	-0,2828	(-1,51)			-0,4103	(-1,15)		
Q3EPS	1,0870**	(3,25)			0,7871	(1,15)		
ΔQ3EPS	0,3756	(1,86)			0,9740	(1,64)		
Q4EPS	1,0924**	(6,06)			1,1744**	(3,00)		
ΔQ4EPS	0,2743**	(2,93)			0,2195	(1,31)		
IFRS					-0,1184**	(-3,33)	-0,1152**	(-3,34)
Q1EPS * IFRS					-0,5521	(-0,46)		
ΔQ1EPS * IFRS					-0,1831	(-0,26)		
Q2EPS * IFRS					1,1638	(1,34)		
ΔQ2EPS * IFRS					0,2312	(0,57)		
Q3EPS * IFRS					0,2933	(0,39)		
ΔQ3EPS * IFRS					-0,7802	(-1,24)		
Q4EPS * IFRS					-0,1581	(-0,39)		
ΔQ4EPS * IFRS					0,1028	(0,52)		
EPS			0,9152**	(9,26)			0,8893**	(3,90)
ΔEPS			0,2268**	(3,09)			0,2970	(1,78)
EPS * IFRS							0,0188	(0,07)
ΔEPS * IFRS							-0,1018	(-0,54)
n	1392		1392		1392		1392	
Adj. R2	0,1234		0,1074		0,1289		0,1120	
Δ Adj. R2		0,0160**				0,0169**		
F-statistic		(4,2072)				(2,2214)		

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
IFRS	Dummy variable for years with IFRS. Value 1 for years with IFRS, 0 otherwise.
QiEPS * IFRS	Interaction term between IFRS and quarterly earnings per share, where i = quarter 1 - 4
ΔQiEPS * IFRS	Interaction term between IFRS and quarterly change in earnings per share, where i = quarter 1 - 4
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS * IFRS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
EPS * IFRS	Interaction term between IFRS and annual earnings per share.
ΔEPS * IFRS	Interaction term between IFRS and annual change in earnings per share.
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$ Tests the difference in R-squared between the quarterly earnings model (1) and the annual earnings model (2) both before and after IFRS was implemented.

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics and F-statistics are highligted in parantheses

Another analysis has been performed in order to analyze the implications of IFRS on our results (see appendix 7). Inspired by Beisland and Knivsflå (2013) the data set is split in two parts; before and after the implementation of IFRS. We have 338 observations before 2005 and 1054 observations from 2005 – 2011. We find no significant difference in adjusted R^2 between the quarterly earnings model and the annual earnings model before IFRS was implemented. However, adjusted R^2 is significantly higher for the quarterly earnings model after IFRS with an adjusted R^2 of 12.66 percent compared to 10.91 percent for the annual earnings model. IFRS was adopted by Norwegian based firms in 2005 and this may have biased the computed change in earnings in this year. Since earnings in 2005 are reported in accordance with IFRS whereas earnings in 2004 are reported in accordance with NGAAP, the resulting earnings change may be inconsistently measured. Consequently, we have performed a regression excluding 2005 in order to circumvent this potential problem. The results and conclusion do not change and results can be found in appendix 8.

5.5. Size Effect

With regard to the EU proposal of removing mandatory interim reporting for small and medium sized companies we have performed an analysis of whether the quarterly earnings model is still more value relevant than the annual earnings model. We split the data set in two, comprising a sample of large companies and a sample of small and medium sized companies. Total assets are used as the measure of company size and we simply use the median for each individual year to determine which companies belong to the two groups. Alternative measures of size could have been total sales, market capitalization or number of employees. However, total sales may not take high growth firms into consideration. Also, market capitalization may not reflect the size of companies with different levels of leverage. Number of employees may not fully reflect the size of companies either because some large firms have few employees while some small firms may have relatively many employees. Although total assets may not take the size of knowledge intensive companies into consideration we still believe this is the most appropriate measure for the analysis. Pooled regressions for both sub-samples are conducted. Results are depicted in table 10.

Table 10: Company Size Regressions

Model specification:

(1) $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$

	LARGE COMPANIES				SMALL AND MEDIUM SIZED COMPANIES (SME)			
	Model 1 - Quarterly		Model 2 - Annual		Model 1 - Quarterly		Model 2 - Annual	
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	0,1116**	(4,40)	0,1068**	(5,42)	0,1226**	(4,29)	0,1075**	(4,43)
Q1EPS	0,0182	(0,03)			-1,1326	(-1,24)		
ΔQ1EPS	0,6195	(1,55)			0,6500	(1,27)		
Q2EPS	1,1307	(1,70)			2,3662**	(4,07)		
ΔQ2EPS	-0,6821	(-1,81)			-0,2694	(1,37)		
Q3EPS	1,4091**	(2,71)			0,7675	(1,89)		
ΔQ3EPS	-0,1980	(-0,60)			0,6162*	(2,58)		
Q4EPS	1,6440**	(5,30)			0,9348**	(4,71)		
ΔQ4EPS	0,4883**	(4,39)			0,1000	(1,10)		
EPS			1,0147**	(6,73)			0,8394**	(6,61)
ΔEPS			0,4089**	(3,73)			0,1349	(1,73)
n	705		705		687		687	
Adj. R2	0,1495		0,1234		0,1146		0,0936	
Δ Adj. R2		0,0261**				0,0210*		
F-statistic		(3,5597)				(2,6801)		

The sample of "LARGE COMPANIES" consists of companies with total assets > median total assets for each year
The sample of "SME" consists of companies with total assets < median total assets for each year

Definition of variables:

RET	15 month stock return from January 1. in year t - March 31. in year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$ Tests the difference in R-squared between the quarterly earnings model (1) and the annual earnings model (2) for a sample of large companies and a sample of small-and medium sized companies.

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics and F-statistics are highligted in parantheses

Our analysis of differences in adjusted R^2 indicate that quarterly earnings reports are more value relevant than annual earnings reports for both sub-samples. However, the difference is greater for large companies (ΔR^2 = 2.61 %) than for smaller companies (ΔR^2 = 2.10 %). The difference is also more significant for large companies (1 % level) than for small companies (5 % level). In addition, we observe that both annual and quarterly earnings reports are more value relevant for large companies than for small companies, which is consistent with Brown et al. (1999). Collins et al. (1997) argues that this may be caused by large companies' ability of overcoming fluctuating economic environments. Thus large

companies are less likely to report losses. Following this argument we have performed regressions controlling for negative earnings in both sub-samples using equations (12) and (13) in section 4.3 (see appendix 9).

When controlling for negative earnings the adjusted R^2 increases substantially for both sub-samples (see appendix 9), the same as experienced in section 5.3. We observe the same results as the regressions depicted in table 10; that earnings information is more relevant for large companies and that quarterly earnings reports are more value relevant than annual earnings reports for both large and small companies.

In summary, we find that quarterly earnings reports are more value relevant than annual earnings reports for both large and small companies. In relation to the recent EU proposal of removing mandatory interim reporting for SME's these results may provide fruitful inputs to the discussion.

5.6. Robustness Analysis

In order to check for the robustness of our analysis we have conducted several robustness tests including samples with discrepancies between quarterly earnings and annual earnings, different return windows and different approaches to handle outliers in the data.

5.6.1 Discrepancy between Quarterly Earnings and Annual Earnings

Quarterly interim reports may differ from annual reports since interim reports are not subject to mandatory auditing. According to IAS 34.28 interim reports are to be presented in accordance with the same principles as the annual report. Hence, the sum of quarterly earnings should equal annual earnings (Hansen and Sellæg, 2012). Based on our sample of 1392 observations, 364 had aggregated quarterly earnings deviating from annual earnings[5]. The data set is split in two samples; 1) without discrepancies and 2) with discrepancies. The regression output can be found in appendix 10. Both quarterly earnings in accordance with and diverging

[5] Includes all observations in which the sum of quarterly EPS deviates from annual EPS, no matter the size of the deviation.

from audited annual earnings are value relevant. In fact, quarterly earnings in the sample with discrepancy yields a higher explanatory power (R^2 = 0.1361) than the sample without discrepancy (R^2 = 0.1199). However, the quarterly earnings model is significantly more value relevant than the annual earnings model only for the sample without discrepancies. Thus, it is reasonable to conclude that figures without any corrections being made (implicitly audited[6]) are more reliable and affects value relevance in a positive way.

5.6.2 Return Windows

We have repeated the regressions for the quarterly earnings model and the annual earnings model with a 12-months return window, from January 1st to December 31st and a lagged 12-month return window from March 31st to March 31st. Both measures of return have been used in previous literature (Easton and Harris, 1991; Lev and Zarowin, 1999; Francis et al., 2003; Beisland, 2008b).

The results from the 12-months return regression is depicted in appendix 11 and 12. The adjusted R^2 decreases from 12.34 percent to 10.24 percent and from 10.74 percent to 8.39 percent using 12-months return as the dependent variable in the quarterly earnings regression and annual earnings regression respectively. A similar pattern is found for regressions with lagged 12-months returns as the dependent variable (see appendix 14 and 15). All variables are deflated by the stock price of March 31st in the 12 months lagged return regressions. An explanation for the higher adjusted R^2 for the 15 months return window might be that this return window captures the effects of all earnings reports in a financial year. On the other hand, a 12 month window measured in the financial year is not able to capture the effects of earnings announcements for the fourth quarter and the annual report.

Tests of differences in adjusted R^2 are tabulated in appendix 13 and the findings presented above still hold. The similar regressions and tests when using the 12 month lagged return give the same results providing further support to our previous results (see appendix 16).

[6] Own expression: since annual earnings are audited one may say that quarterly earnings adding up to annual earnings are implicitly audited.

5.6.3 Outliers

In our main analysis we delete the top and bottom percentile in order to mitigate the effects of outliers in the data sample. Even though this approach is commonly used in the value relevance literature it is not necessarily the best approach to mitigate effects of extreme values. Therefore, we have performed our regressions with two other outlier approaches; Cook's distance and winsorizing. Cook's distance checks the leverage and studentized residuals as a measure of particularly influential observations (Sharpe et al., 2010). Compared to trimming and Cook's distance, winsorizing does not involve deleting observations but rather transforming values of extreme observations below (above) the lower (upper) percentile with their respective percentile values (Kennedy et al., 1992).

All observations with Cook's distance greater than 4/n were deleted, where n is the number of observation (Bollen and Jackman, 1990). The regressions and tests performed with Cook's distance are tabulated in appendix 17 – 19. After deleting outliers our final sample is 1474 observations compared to 1392 in the original analyses. Even though coefficients and t-statistics change to some degree the main original results are still valid. The adjusted R^2 is 11.45 percent and 9.31 percent compared to the original 12.34 percent and 10.74 for the pooled regressions for quarterly earnings and annual earnings respectively. The adjusted R^2 is still significantly higher for the pooled quarterly earnings regression.

Each variable in the dataset has also been winsorized to transform observations in the upper and lower percentile. When using winsorizing as the approach to mitigate outliers we are able to use all 1536 observations in our data set. The regressions and tests are depicted in appendix 20 – 22. As with the other robustness checks performed our initial results still hold. However, adjusted R^2 drops from 12.34 percent and 10.74 percent to 7.70 percent and 5.43 percent for the quarterly earnings model and annual earnings model respectively. Adjusted R^2 is still significantly higher for the quarterly earnings model for the pooled regressions. In addition, the adjusted R^2 for the quarterly earnings model is significantly higher in 2004, 2005 and 2011 when using the winsorizing approach.

6. Discussion

Value relevance of accounting figures has been extensively studied the last decades. However, limited value relevance research has been conducted on quarterly earnings. Inspired by Tan and Wong (2012) we have studied the value relevance of quarterly earnings reports compared to annual earnings reports in Norway. It should be noted that Tan and Wong (2012) is a working paper that has not been published as of April 2013. Since their article has not been published we do not know if the study has been reviewed or controlled by external peers. To the best of our knowledge no such study has been conducted on Norwegian data. Our expectations are based on previous research and we are able to fulfill our expectations and find evidence in favor of both our hypotheses. Our robustness checks provide strength to our hypothesis of the quarterly earnings model being more value relevant than the annual earnings model. Even though coefficients for the individual independent variables changes both in significance and in direction, our main focus, the R^2, provide results indicating that the quarterly earnings model do in fact have greater value relevance than the annual earnings model.

Previous research has shown that financial crises have an effect on the value relevance of earnings. Typically the incremental value relevance of earnings decreases during financial crises while the value relevance of book values increases (Barth et al., 1998). A study by Beisland (2011) found similar results on Norwegian data when examining the "crisis year" 2008. Based on our findings we are not able to identify trends in adjusted R^2 indicating that earnings' explanatory power decreases during the financial crisis year 2008 (see figure 4). Note that the studies by Barth et al. and Beisland focus on price regressions which differs from our return regressions.

Even though we are able to prove our hypotheses and find results consistent with Tan and Wong (2012) our study has its limitations. Oslo Stock Exchange is a relatively small equity market with approximately 230 listed firms. Including other countries with more yearly observations could have given our study more inference as well as presumably finding more significant coefficients and differences in adjusted R^2. Relative to international research our cross-sectional regressions have few observations ranging from 103 to 163 per year. Small samples may inflict empirical results and we were not able to find significant

differences in adjusted R^2 between quarterly and annual earnings for the individual years in our study.

In our study a 15 month return from the beginning of the year to March 31st the year after has been used. A possible improvement of our study could be to measure the return from the beginning of the year to the day the annual report is announced. This would enable the researchers to examine the timeliness of earnings announcements even better and may give more conclusive evidence.

Quarterly earnings reports are proven to be value relevant. However, there is a discussion concerning whether quarterly earnings reports are reliable or not. Quarterly reports in Norway are generally not audited. This provides opportunities for management to intentionally or unintentionally bias the information disclosed to the public. The reliability of quarterly earnings has been studied by Hansen and Selæg (2012) and they find that 27 percent of the firms on the Oslo Stock Exchange in 2010 had an annual net income deviating from the sum of quarterly earnings disclosed in the report for the fourth quarter. Out of a sample of 1392 observations we find 364 observations (35.4%) where the sum of quarterly earnings does not add up to annual earnings. This highlights the point in Hansen and Selæg (2012) in which they claim that a pressure towards disclosing earnings reports earlier actually may affect the quality and reliability of the figures.

A suggestion for future research is to study the value relevance of quarterly earnings relative to annual earnings in several countries to be able to generalize across borders. The fact that this study focuses on Norwegian data only impacts the ability to generalize our results in relation to other countries and regions. Another suggestion is to perform a price regression with quarterly earnings to examine the ability of quarterly earnings to explain the level of stock prices. This might be done by disaggregating annual earnings in the original price regressions into its quarterly earnings components and investigate whether quarterly earnings are able to explain a larger proportion of the variation on stock prices than annual earnings. Another research design which could be used to study the value relevance of quarterly earnings is to look at the ability of quarterly earnings to predict future earnings. Brown and Niederhoffer (1968, 489) state that "one of the purposes of interim reports is to give stock holders information about future

earnings". If quarterly earnings are able to predict future earnings, the theoretical link between earnings and share prices provided by Beaver (1998) will hold. In this respect, a study focusing on this particular topic will possibly provide further evidence of quarterly earnings being value relevant.

Recently, a proposal has been presented in the European Union to remove mandatory quarterly reporting for small and medium sized enterprises (SME's) within its member countries. The argument for the removal of quarterly reporting is the high cost and time burden associated with preparing and disclosing quarterly reports for SME's. Even though this particular topic lies somewhat beyond the scope of this study we have performed some tentative analysis indicating that quarterly earnings reports are important for SME's as well as large companies. We hope our study can inspire other researchers to perform similar studies on data from other countries to provide inputs to the discussion of whether mandatory quarterly reporting should endure or not. In this respect, our study and hopefully future studies will contribute to accounting standard setting.

7. Concluding Remarks

This study focuses on quarterly earnings reports and its effects on value relevance as a comparison to the traditional value relevance of annual earnings reports using a sample of companies listed on Oslo Stock Exchange. Generally, the sum of quarterly and annual earnings reports should contain the same information, but quarterly earnings reports are distinguished from annual reports in the way that quarterly earnings reports are disclosed in a timelier manner. Consequently, this study focuses on a concept of high importance for the relevance of accounting information which has been somewhat neglected in previous value relevance literature. Timeliness can be achieved by disclosing information early, translated in our study as the disclosure of quarterly earnings reports.

Since research on value relevance of quarterly earnings is somewhat lacking in the vast amount of research conducted within this field our first analysis studied the value relevance of quarterly earnings in general. Based on the fact that annual earnings information in general has proven to be value relevant we expected quarterly earnings also to be value relevant for investors on the Oslo Stock

Exchange. Further we expected that a model capturing all the individual quarterly earnings (the quarterly earnings model) explains more of the variation in stock returns than a model capturing only annual returns (the annual earnings model).

Our results show that quarterly earnings reports are value relevant, with some quarters being more relevant than others. In particular, results show that the 4th quarter appears to be most value relevant. Furthermore, we find evidence that the quarterly earnings model is a better model in explaining stock returns and hence being more value relevant than the traditional annual earnings model. Our results are still valid in the presence of negative earnings and when controlling for the implementation of IFRS and we hold this as strong support for our conclusion that the quarterly earnings model is more value relevant than the annual earnings model. Based on the ongoing discussion in the EU of maintaining the mandatory quarterly reporting for SME's we provide inputs in favor of keeping mandatory quarterly reporting. We suggest more research should be conducted on quarterly earnings, especially with an emphasis on SME's, before a decision is made. Finally, we support the claim provided by Tan and Wong (2012, 27) stating that "prior research that relies on annual earnings to measure the value relevance of earnings may have understated the overall importance of earnings to investors".

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Appendixes

Appendix 1: Sample Companies

Company Name	#	Company Name	#	Company Name	#
24 Seven Technology Group	4	GC Rieber Shipping	9	PCI Biotech Holdings	2
A-pressen ASA	1	Ganger Rolf ASA	9	PSI Group ASA	8
AF Gruppen ASA	10	Golar LNG Ltd.	10	Panoro Energy ASA	1
AGR Group ASA	5	Golden Ocean Group	6	Petrojack ASA	2
AKVA Group ASA	5	Goodtech ASA	9	Petroleum Geo-Services	8
Adresseavisen	6	Grenland Group ASA	5	Petrolia	2
Aker ASA	7	Gresvig ASA	4	Photocure ASA	9
Aker Biomarine ASA	6	Grieg Seafood ASA	2	Polarcus Ltd.	2
Aker Floating Production	2	Gyldendal ASA	9	Polaris Media	3
Aker Philadelphia	3	Hafslund "A"	8	Powel ASA	3
Aker Seafood ASA	6	Hafslund "B"	8	ProfDoc ASA	5
Aker Solutions	7	Hands ASA	3	Pronova Biopharma	4
Algeta ASA	3	Havila Ariel ASA	3	Prosafe S.E	10
Altinex ASA	3	Havila Shipping ASA	5	Q-Free ASA	9
American Shipping Co.	3	Havila Supply ASA	1	Raufoss ASA	1
Andvord Tybring-Gjedde	4	Hexagon Composites	10	Reach Subsea ASA	8
Apptix ASA	9	Hjellegjerde ASA	6	Rem Offshore ASA	4
Aqua Bio Technology	3	Hurtigruten ASA	6	Renewable Energy (REC)	5
Archer Ltd.	1	HÅG ASA	3	Repant ASA	5
Arendals Fossekompani ASA	9	I.M. Skaugen ASA	10	Reservoir Exploration Technology	2
Atea ASA	10	IDEX ASA	1	Revus Energy ASA	2
Austevoll Seafood ASA	5	Ignis ASA	7	Rica Hotels SA	4
Avantor ASA	1	Imarex ASA	2	Rieber & Son ASA	10
Awilco ASA"A"	1	Infratek ASA	4	Rocksource ASA	8
Awilco Offshore ASA	2	Inmeta Crayon ASA	9	Romreal Ltd.	4
BW Offshore Ltd.	5	Intelecom Group ASA	6	Roxar ASA	5
BWG Homes ASA	5	Interoil Exploration	3	STX Europe ASA	3
Badger Explorer	4	Intex Resources ASA	3	Salmar ASA	4
Bakkafrost	1	Itera ASA	9	Scana Industrier ASA	8
Belships ASA	9	Jason Shipping	5	Scanarc ASA	3
Bergen Group ASA	3	Jinhui Shipping & Transportation	6	Scandinavian Clinic Nut.	3
Bergesen d.y.	1	Kenor ASA	2	Schibsted ASA	10
Bionor Pharma ASA	10	Kitron ASA	10	Seabird Exploration	5
Biotech Pharmacon ASA	6	Klippen Invest ASA	2	Seadrill Ltd	6
Birdstep Technology	9	Komplett ASA	9	Sense Communications	1
Bjørge ASA	5	Kongsberg Automotive Holdings	6	Sensonor ASA	1
Blom ASA	8	Kongsberg Gruppen ASA	10	Sevan Marine	6
Bonheur	8	Kristiansand Dyrepark ASA	1	Shine / Eqology ASA	1
Borgestad ASA	7	Kverneland ASA	8	Siem Offshore Inc.	3
Borgestad Industries	3	Kværner ASA	1	Siem Shipping Inc.	10
Bouvet ASA	4	Leif Hoegh & Co. ASA	1	Simrad Optronics	4
Bridge Energy	1	Lerøy Seafood ASA	9	Simtronics ASA	4
Byggma ASA	9	Luxo ASA	7	Sinocean Shipping	8
Cecon ASA	3	Mamut ASA	5	Sinvest ASA	1
Cellcura ASA	1	Marine Farms ASA	3	Skiens Aktiemølle	9
Cermaq ASA	6	Marine Harvest ASA	6	Smedvig ASA "A"	4
Choice Hotels	3	Maritime Industrial Services	2	Smedvig ASA "B"	4
Clavis Pharma ASA	4	Medi-Stim ASA	7	Software Innovation	7
Codfarmers ASA	4	Mefjorden ASA	1	Solstad Offshore ASA	10
Component Software Group	3	Morpol ASA	1	Solvang ASA	10
Comrod Communication	5	Namsos Trafikkselskap	10	Spectrum ASA	2
Conseptor ASA	1	Nattopharma ASA	4	Statoil	10
ContextVision AB	10	Navamedic ASA	5	Stavanger Aftenblad	7
Copeinica	4	Neas ASA	4	Steen & Strøm ASA	5
DNO International	9	Nera ASA	4	Stepstone ASA	5
DOF ASA	10	NetConnect ASA	1	Subsea 7	1
DOF Subsea ASA	2	Nextgentel ASA	2	Subsea 7 Inc.	8
Data Respons ASA	10	Nexus Floating Production	1	SuperOffice ASA	6
Deep Ocean ASA	2	Nio Inc.	6	Synnøve Finden ASA	7
Deep Sea Supply Plc.	6	Noral ASA	1	Sølvtrans Holding	1
Det Norske Oljeselskap	4	Norda ASA	5	TGS Nopec Geophysical	10
Diagenic ASA	7	Nordic Mining	4	TTS Group ASA	9
Dockwise	4	Nordic Semiconductor	8	Tandberg ASA	8
Dolphin Inter	3	Norgani Hotels ASA	1	Tandberg Data ASA	3
Domstein ASA	8	Norman ASA	7	Tandberg Storage	4
EMS Seven Seas ASA	8	Norse Energy Corp.	10	Tandberg Television	2
EVRY ASA	10	Norsk Hydro	10	Technor ASA	4
Eastern Drilling ASA	1	Norsk Vekst ASA	3	Teco Maritime ASA	7
Eidesvik Offshore	4	Norske Skogindustrier	9	Telecomputing ASA	7
Eitzen Chemical ASA	5	Norstat ASA	1	Telenor	10
Ekornes	10	North Energy ASA	2	Telio Holding	5
Electromagnetic GeoServices	4	Northern Logistics Production	4	Thin Film Electronics	4
Elkem ASA	3	Northern Offshore	3	Thule Drilling ASA	2
Eltek ASA	8	Norway Pelagic ASA	3	Tide ASA	10
Exense ASA	6	Norwegian Air Shuttle ASA	6	Tomra Systems ASA	10
Expert ASA	5	Norwegian Car Carriers	10	Transocean NOR / Aker Drilling	3
Fairstar Heavy Transport	5	Norwegian Energy Co.	4	Trolltech ASA	1
Fara ASA	5	Ocean Rig ASA	5	Unitor ASA	3
Farstad Shipping	10	Oceanteam ASA	1	Veidekke ASA	9
Fast Search and Transfer	6	Odfjell "A"	10	Visma ASA	4
Fesil ASA	5	Odfjell "B"	10	Vitis Invest / Gregoirè ASA	3
Fjord Seafood	4	Odim ASA	4	Vmetro ASA	6
Fornebu Utvikling	1	Office Line ASA	2	Voice ASA	1
Fosen ASA	6	Opera Software ASA	7	Wentworth Resources	3
Fred Olsen Production	4	Opticom ASA	3	Wilh. Wilhelmsen ASA	1
Fred. Olsen Energy	8	Origio ASA	10	Wilh. Wilhelmsen Holdings	9
Frontier Drilling	1	Orkla	7	Wilh. Wilhelmsen Holdings "B"	10
Frontline Ltd.	10	Otrum ASA	7	Wilson ASA	6
Funcom N.V.	6	P4 Radio Hele Norge	4	Yara International	7

Appendix 2: VIF-values

Panel A: VIF - values quarterly regression

Model specification:

$$RET_{it}=\beta 0 + \beta_1 Q1EPS_1 + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$$

Year	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS	Mean
Pooled	1,73	1,41	1,79	1,47	1,88	1,60	1,35	1,19	1,55
2002	1,70	1,72	1,63	1,51	1,56	1,98	2,39	2,26	1,84
2003	2,18	1,33	2,65	2,30	2,66	2,66	1,68	1,54	2,12
2004	1,72	1,79	2,14	2,74	1,45	3,20	1,57	1,53	2,02
2005	1,61	1,51	1,93	1,78	2,84	2,28	2,55	2,22	2,09
2006	2,68	1,56	3,28	2,21	2,92	2,55	2,37	1,82	2,42
2007	3,08	1,77	2,30	1,44	2,46	1,40	4,65	3,75	2,61
2008	3,33	1,64	4,13	2,48	4,76	3,87	3,25	3,07	3,31
2009	1,97	1,68	2,00	1,67	2,58	1,49	1,64	1,20	1,78
2010	2,10	1,55	2,53	1,95	2,21	2,90	1,41	1,77	2,05
2011	3,79	4,51	2,25	2,26	2,47	1,84	1,14	1,21	2,43

Panel B: VIF - values yearly regression

Model specification:

$$RET_{it} = \beta_0 + \beta_{1t} EPS_{it} + \beta_{2t} \Delta EPS_{it} + \varepsilon_{it}$$

Year	EPS	ΔEPS	Mean
Pooled	1,01	1,01	1,01
2002	1,23	1,23	1,23
2003	1,00	1,00	1,00
2004	1,03	1,03	1,03
2005	1,27	1,27	1,27
2006	1,30	1,30	1,30
2007	1,23	1,23	1,23
2008	1,27	1,27	1,27
2009	1,00	1,00	1,00
2010	1,03	1,03	1,03
2011	1,02	1,02	1,02

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t

Further notes:

Panel A shows VIF-values for the variables in the regression of return on quarterly earnings.
Panel B shows VIF-values for the variables in the regression of return on yearly earnings
VIF values > 10 may indicate problems of multicollinearity (Hair et al., 2009). However, none of the above variables seem to suffer from multicollinearity. VIF-values are mainly far less than the critical value.

Appendix 3: Changes in Adjusted R^2 after Controlling for Negative Earnings

Model specifications:

Unrestricted: $RET_{it} = \beta 0 + \beta_1 Q1EPS_{1t} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \beta_9 DQ1t + \beta_{10} DQ2_{it} + \beta_{11} DQ3_{1t} + \beta_{12} DQ4_{1t} + \beta_{13} InterQ1_{1t} + \beta_{14} InterQ2_{1t} + \beta_{15} InterQ3_{1t} + \beta_{16} InterQ4_{1t} + \varepsilon_{it}$

Restricted: $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \beta_3 DYr_{it} + \beta_4 InterYr_{it} + \varepsilon_{it}$

Year	Unrestricted adj. R2	Restricted adj. R2	n	Δ df	df	F-stat	
Pooled	0,1696	0,1499	1392,00	12	1375,00	2,7183	**
2002	0,5115	0,4447	114,00	12	97,00	1,1054	
2003	0,1235	0,0377	103,00	12	86,00	0,7015	
2004	0,2417	0,2369	121,00	12	104,00	0,0549	
2005	0,1155	0,0808	122,00	12	105,00	0,3433	
2006	0,2374	0,1711	142,00	12	125,00	0,9056	
2007	0,1702	0,1532	161,00	12	144,00	0,2458	
2008	0,1585	0,1609	168,00	12	151,00	-0,0359	
2009	0,2550	0,1869	141,00	12	124,00	0,9446	
2010	0,1339	0,1034	157,00	12	140,00	0,4108	
2011	0,2276	0,1385	163,00	12	146,00	1,4035	

Definition of variables:

Unrestricted adj. R2	Adjusted R2 from the unrestricted (quarterly earnings) model.
Restricted adj. R2	Adjusted R2 from the restricted (yearly earnings) model
n	Number of observations
Δ df	Difference in degrees of freedom from the restricted model less the unrestricted model
df	Degrees of freedom in the unrestricted model calculated as n - K - 1 where K equals the number of independent variables.
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Explanations for table:

**	Significant at 1 %
*	Significant at 5 %

Appendix 4: Incremental R^2 after Controlling for Negative Earnings

Model specifications:

Total $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \beta_9 DQ1_{it} + \beta_{10} DQ2_{it} + \beta_{11} DQ3_{it} + \beta_{12} DQ4_{it} + \beta_{13} InterQ1_{it} + \beta_{14} InterQ2_{it} + \beta_{15} InterQ3_{it} + \beta_{16} InterQ4_{it} + \varepsilon_{it}$

Q1 $RET_{it} = \beta_0 + \beta_1 Q1EPS_{1t} + \beta_2 \Delta Q1EPS_{it} + \beta_9 DQ1_{it} + \beta_{13} InterQ1_{it} + \varepsilon_{it}$

Q2 $RET_{it} = \beta_0 + \beta_3 Q2EPS_{1t} + \beta_5 \Delta Q2EPS_{it} + \beta_{10} DQ2_{it} + \beta_{14} InterQ2_{it} + \varepsilon_{it}$

Q3 $RET_{it} = \beta_0 + \beta_5 Q3EPS_{1t} + \beta_6 \Delta Q3EPS_{it} + \beta_{11} DQ3_{it} + \beta_{15} InterQ3_{it} + \varepsilon_{it}$

Q4 $RET_{it} = \beta_0 + \beta_7 Q4EPS_{1t} + \beta_8 \Delta Q4EPS_{it} + \beta_{12} DQ4_{it} + \beta_{16} InterQ4_{it} + \varepsilon_{it}$

	Total	Q1	Q2	Q3	Q4	Common
Adjusted R2	**0,1696**	**0,0218**	**0,0496**	**0,0660**	**0,1307**	**-**
Incremental R2	-	-0,0767	-0,0489	-0,0325	0,0322	-0,0985

Incremental R2:
Explanatory power of the total regression less the explanatoy power of the sum of the other regressions:

$R^2_{Q1} = R^2_{Total} - R^2_{Q2} - R^2_{Q3} - R^2_{Q4}$
$R^2_{Q2} = R^2_{Total} - R^2_{Q1} - R^2_{Q3} - R^2_{Q4}$
$R^2_{Q3} = R^2_{Total} - R^2_{Q1} - R^2_{Q2} - R^2_{Q4}$
$R^2_{Q4} = R^2_{Total} - R^2_{Q1} - R^2_{Q2} - R^2_{Q3}$
$R^2_{Common} = R^2_{Total} - R^2_{Q1} - R^2_{Q2} - R^2_{Q3} - R^2_{Q4}$

Appendix 5: Regression of Quarterly Earnings Controlled for IFRS and Negative Earnings

Model specification:

$$RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \beta_9 IFRS_{it} + \beta_{10} Q1EPS*IFRS_{it} + \beta_{11} \Delta Q1EPS*IFRS_{it} + \beta_{12} Q2EPS*IFRS_{it} + \beta_{13} \Delta Q2EPS*IFRS_{it} + \beta_{14} Q3EPS*IFRS_{it} + \beta_{15} \Delta Q3EPS*IFRS_{it} + \beta_{16} Q4EPS*IFRS_{it} + \beta_{17} \Delta Q4EPS*IFRS_{it} + \beta_{18} NEGQ1_{it} + \beta_{19} NEGQ2_{it} + \beta_{20} NEGQ3_{it} + \beta_{21} NEGQ4_{it} + \beta_{22} Q1EPS*NEGQ1_{it} + \beta_{23} Q2EPS*NEGQ2_{it} + \beta_{24} Q3EPS*NEGQ3_{it} + \beta_{25} Q4EPS*NEGQ4_{it} + \beta_{26} NEGQ1*IFRS_{it} + \beta_{27} NEGQ2*IFRS_{it} + \beta_{28} NEGQ3*IFRS_{it} + \beta_{29} NEGQ4*IFRS_{it} + \beta_{30} Q1EPS*NEGQ1*IFRS_{it} + \beta_{31} Q2EPS*NEGQ2*IFRS_{it} + \beta_{32} Q3EPS*NEGQ3*IFRS_{it} + \beta_{33} Q4EPS*NEGQ4*IFRS_{it} + \varepsilon_{it}$$

Variables	Coefficient	T-statistic	Cont. Variables	Coefficient	T-statistic
Constant	0,0889	(1,21)	**NEGQ1**	0,0737	(0,74)
Q1EPS	5,7319**	(3,14)	**NEGQ2**	-0,1834	(-1,77)
ΔQ1EPS	0,5376	(0,79)	**NEGQ3**	-0,1589	(-1,57)
Q2EPS	0,3261	(0,18)	**NEGQ4**	-0,0490	(-0,52)
ΔQ2EPS	-0,1117	(-0,30)	**Q1EPS * NEGQ1**	-8,5259**	(-3,17)
Q3EPS	0,8408	(0,98)	**Q2EPS * NEGQ2**	-1,0089	(-0,42)
ΔQ3EPS	0,9224	(1,80)	**Q3EPS * NEGQ3**	-1,4694	(-1,27)
Q4EPS	2,2925*	(2,59)	**Q4EPS * NEGQ4**	-1,6032	(-1,65)
ΔQ4EPS	1,1950	(1,31)	**NEGQ1 * IFRS**	-0,0257	(-0,23)
IFRS	-0,0373	(-0,43)	**NEGQ2 * IFRS**	0,2314*	(2,08)
Q1EPS * IFRS	-5,6411**	(-2,78)	**NEGQ3 * IFRS**	0,1260	(1,08)
ΔQ1EPS * IFRS	-0,1219	(-0,17)	**NEGQ4 * IFRS**	-0,1503	(-1,39)
Q2EPS * IFRS	1,8755	(0,92)	**Q1EPS * NEGQ1 * IFRS**	7,8534**	(2,61)
ΔQ2EPS * IFRS	0,0625	(0,15)	**Q2EPS * NEGQ2 * IFRS**	-0,5262	(0,19)
Q3EPS * IFRS	0,0101	(0,01)	**Q3EPS * NEGQ3 * IFRS**	1,7575	(1,28)
ΔQ3EPS * IFRS	-0,7884	(1-,44)	**Q4EPS * NEGQ4 * IFRS**	-1,2866	(-0,98)
Q4EPS * IFRS	0,6831	(0,57)			
ΔQ4EPS * IFRS	0,0577	(0,32)			
n	1392				
Adjusted R2	0,1835				

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
IFRS	Dummy variable for observations with IFRS. Value 1 for observations with IFRS ; 0 otherwise.
QiEPS * IFRS	Interaction term between IFRS and quarterly earnings per share, where i = quarter 1 - 4
ΔQiEPS * IFRS	Interaction term between IFRS and quarterly change in earnings per share, where i = quarter 1 - 4
NEGQi	Dummy variable for negative quarterly earnings, where Qi = quarter 1 - 4. Value 1 if EPS < 0 ; 0 otherwise
QiEPS*NEGQi	Interaction term between quarterly EPS and negative earnings, where i = quarter 1 - 4
NEGQi*IFRS	Interaction term between negative quarterly earnings per share and IFRS, where i = 1 - 4 and
QiEPS*NEGQi*IFRS	Interaction term between quarterly EPS and negative earnings and IFRS, where i = quarter 1 - 4

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics are highligted in parantheses

Appendix 6: Regression of Annual Earnings Controlled for IFRS and Negative Earnings

Model specification:

$$RET_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 \Delta EPS_{it} + \beta_3 IFRS_{it} + \beta_4 EPS*IFRS_{it} + \beta_5 \Delta EPS*IFRS_{it} + \beta_6 NEG_{it} + \beta_7 EPS*NEG_{it} + \beta_8 IFRS*NEG_{it} + \beta_9 EPS*IFRS*NEG_{it} + \epsilon_{it}$$

Variables	Coefficient	T-statistic
Constant	0,0371	(0,57)
EPS	2,7700**	(4,95)
ΔEPS	0,3175*	(1,99)
IFRS	-0,0268	(-0,34)
EPS * IFRS	-0,7515	(-1,08)
ΔEPS * IFRS	-0,1745	(-0,99)
NEG	-0,0887	(-0,74)
EPS * NEG	-2,8196**	(-4,58)
IFRS * NEG	-0,0267	(-0,22)
EPS * IFRS * NEG	1,1286	(1,51)
n	1392	
Adjusted R2	0,1566	

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
EPS	Earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share from year t-1, scaled by the price per share at the beginning of year t
IFRS	Dummy variable for observations with IFRS. Value 1 for observations with IFRS ; 0 otherwise.
EPS * IFRS	Interaction term between IFRS and earnings per share
ΔEPS * IFRS	Interaction term between IFRS and change in annual earnings per share
NEG	Dummy variable for negative earnings. Value 1 if EPS < 0 ; 0 otherwise
EPS*NEG	Interaction term between EPS and negative earnings
IFRS * NEG	Interaction termn between observations with IFRS and negative earnings
EPS*NEG*IFRS	Interaction term between EPS and negative earnings and IFRS

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics are highligted in parantheses

Appendix 7: Regressions before and after IFRS

Model specification:

(1) $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$

	BEFORE IFRS				AFTER IFRS			
	Model 1 - Quarterly		Model 2 - Annual		Model 1 - Quarterly		Model 2 - Annual	
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	0,1995**	(6,44)	0,1979**	(6,68)	0,0811**	(4,30)	0,0827**	(4,55)
Q1EPS	-0,0368	(-0,03)			-0,5889	(-0,98)		
ΔQ1EPS	0,6600	(1,03)			0,4769	(1,42)		
Q2EPS	0,7641	(0,92)			1,9279**	(4,62)		
ΔQ2EPS	-0,4103	(-1,15)			-0,1791	(-0,82)		
Q3EPS	0,7871	(1,15)			1,0804**	(3,09)		
ΔQ3EPS	0,9740	(1,63)			0,1938	(0,96)		
Q4EPS	1,1744**	(2,98)			1,0163**	(5,73)		
ΔQ4EPS	0,2195	(1,30)			0,3223**	(3,30)		
EPS			0,8893**	(3,89)			0,9081**	(8,23)
ΔEPS			0,2970	(1,77)			0,1953*	(2,35)
n	338		338		1054		1054	
Adj. R2	0,1074		0,0930		0,1266		0,1091	
Δ Adj. R2		0,0144				0,0175**		
F-statistic		(0,8846)				(3,4897)		

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$ Tests the difference in R-squared between the quarterly earnings model (1) and the annual earnings model (2) both before and after IFRS was implemented.

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics and F-statistics are highligted in parantheses

Appendix 8: Regressions Before and After IFRS Excluding 2005

Model specification:

(1) $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$

	BEFORE IFRS				AFTER IFRS EXCL. YEAR 2005			
	Model 1 - Quarterly		Model 2 - Annual		Model 1 - Quarterly		Model 2 - Annual	
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	0,1995**	(6,44)	0,1979**	(6,68)	0,0133	(0,75)	0,0181	(1,05)
Q1EPS	-0,0368	(-0,03)			-0,3053	(-0,54)		
ΔQ1EPS	0,6600	(1,03)			0,5055	(1,54)		
Q2EPS	0,7641	(0,92)			2,1008**	(5,20)		
ΔQ2EPS	-0,4103	(-1,15)			-0,2978	(-1,48)		
Q3EPS	0,7871	(1,15)			0,7965*	(2,54)		
ΔQ3EPS	0,9740	(1,63)			0,1989	(1,02)		
Q4EPS	1,1744**	(2,98)			0,7823**	(5,31)		
ΔQ4EPS	0,2195	(1,30)			0,3464**	(3,63)		
EPS			0,8893**	(3,89)			0,8319**	(7,80)
ΔEPS			0,2970	(1,77)			0,1854*	(2,28)
n	338		338		932		932	
Adj. R2	0,1074		0,0930		0,1381		0,1196	
Δ Adj. R2		0,0144				0,0185**		
F-statistic		(0,8846)				(3,3019)		

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$ Tests the difference in R-squared between the quarterly earnings model (1) and the annual earnings model (2) both before and after IFRS was implemented.

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics and F-statistics are highligted in parantheses

Appendix 9: Company Size Regressions Controlling for Negative Earnings

Model specifications:

(1) $RET_{it} = \beta 0 + \beta_1 Q1EPS_{1t} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \beta_9 DQ1t + \beta_{10} DQ2_{it} + \beta_{11} DQ3_{1t} + \beta_{12} DQ4_{1t} + \beta_{13} InterQ1_{1t} + \beta_{14} InterQ2_{1t} + \beta_{15} InterQ3_{1t} + \beta_{16} InterQ4_{1t} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \beta_3 DYr_{it} + \beta_4 InterYr_{it} + \varepsilon_{it}$

	LARGE COMPANIES				SMALL AND MEDIUM SIZED COMPANIES (SME)			
	Model 1: Quarterly		Model 2: Annual		Model 1: Quarterly		Model 2: Annual	
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	0,0119	(0,807)	0,0001	(0,00)	0,0424	(0,72)	0,0559	(1,08)
Q1EPS	-0,4784	(-0,44)			3,8231*	(2,38)		
ΔQ1EPS	04820	(1,55)			0,7932	(1,47)		
Q2EPS	1,6099	(1,55)			3,7692*	(2,15)		
ΔQ2EPS	-0,2778	(-0,63)			-0,3375	(-1,91)		
Q3EPS	1,9529*	(2,59)			0,0307	(0,05)		
ΔQ3EPS	-0,1158	(-0,34)			0,4792*	(2,23)		
Q4EPS	4,4887**	(4,04)			1,7493*	(2,40)		
ΔQ4EPS	0,3651**	(3,24)			0,0492	(0,46)		
DQ1	0,0609	(0,95)			0,0892	(1,31)		
DQ2	0,0294	(0,36)			-0,0425	(-0,61)		
DQ3	-0,0504	(-0,77)			-0,0764	(-1,15)		
DQ4	-0,1331*	(-1,99)			-0,1346	(-1,97)		
InterQ1	2,0921	(1,23)			-6,7682**	(-3,65)		
InterQ2	-1,4165	(-1,09)			-1,9307	(-1,04)		
InterQ3	-1,9659	(-1,85)			1,0407	(1,20)		
InterQ4	-3,9610**	(-3,46)			-1,1451	(1,48)		
EPS			2,0828**	(4,72)			2,2820**	(3,68)
ΔEPS			0,3415**	(3,51)			0,1065	(1,43)
DYr			-0,0389	(-0,51)			-0,1467*	(-2,17)
InterYr			-1,7978**	(-3,42)			-2,0046**	(-3,21)
n	705		705		687		687	
Adj. R2	0,2087		0,1545		0,1681		0,1434	
Δ Adj. R2		0,0542**				0,0247*		
F-statistic		(4,2840)				(1,8085)		

The sample of "LARGE COMPANIES" consists of companies with total assets > median total assets for each year
The sample of "SME" consists of companies with total assets < median total assets for each year

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
DQ1 - DQ4	Dummy variable for negative quarterly earnings. Value 1 for quarters with negative earnings, 0 otherwise.
InterQ1 - Inter Q4	Interaction term between Q1EPS - Q4EOS and DQ1 - DQ4. (Example for Q1: Q1EPS*DQ1)
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
DYr	Dummy variable for negative annual earnings. Value 1 for years with negative earnings. 0 otherwise
InterYr	Interaction term between EPS and DYr. (EPS * DYr).
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$ Tests the difference in R-squared between the quarterly earnings model (1) and the annual earnings model (2) for a sample of large companies and a sample of small-and medium sized companies.

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics are highligted in parantheses

Appendix 10: Regressions Controlling for Earnings Discrepancy

Model specification:

(1) $RET_{it} = \beta_0 + \beta_1 Q1EPS_{it} + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$

(2) $RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$

	WITHOUT DISCREPANCY				WITH DISCREPANCY			
	Model 1 - Quarterly		Model 2 - Annual		Model 1 - Quarterly		Model 2 - Annual	
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	0,1248**	(6,86)	0,1231**	(7,19)	0,0718*	(2,08)	0,0735*	(2,13)
Q1EPS	-1,1733	(-1,71)			0,4684	(0,55)		
ΔQ1EPS	1,0500*	(2,06)			0,0229	(0,05)		
Q2EPS	1,2323*	(2,25)			1,9554**	(3,35)		
ΔQ2EPS	-0,0759	(-0,25)			-0,3161	(-1,14)		
Q3EPS	1,3482**	(3,52)			0,5904	(1,17)		
ΔQ3EPS	0,4500	(1,49)			0,2124	(0,90)		
Q4EPS	1,2620**	(4,84)			0,8545**	(3,42)		
ΔQ4EPS	0,1692	(1,50)			0,4592**	(4,75)		
EPS			0,8636**	(7,32)			0,9062**	(5,53)
ΔEPS			0,3508**	(3,43)			0,1167	(1,15)
n	1028		1028		364		364	
Adj. R2	0,1199		0,1073		0,1361		0,1081	
Δ Adj. R2		0,0126*				0,0280		
F-statistic		(2,43)				(1,92)		

The sample "WITHOUT DISCREPANCY" consists of observations where the sum of quarterly EPS equals annual EPS
The sample "WITH DISCREPANCY" consists of observations where the sum of quarterly EPS does not equal annual EPS

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Tests the difference in R-squared between the quarterly earnings model (1) and the annual earnings model (2) for a sample of observations where the sum of quarterly earnings equals annual earnings ("WITHOUT DISCREPANCY") and a sample companies where the sum of quarterly earnings does not equal annual earnings ("WITHOUT DISCREPANCY")

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980).

T-statistics and F-statistics are highligted in parantheses

Appendix 11: Regression of 12-months Return on Quarterly Earnings

Model specification:

$$RET_{it}=\beta 0 + \beta_1 Q1EPS_1 + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS
Pooled	1392	0,1024	0,0834**	-0,7401	0,6977**	1,2720**	-0,2799	0,9230**	0,3363	0,8763**	0,2954**
			(6,66)	(-1,52)	(2,65)	(3,28)	(-1,51)	(3,00)	(1,77)	(5,17)	(2,70)
2002	114	0,313	-0,2540**	2,1466	-1,4210	1.4856*	-0,4790*	0,4199	1,1942	0,9742*	-0,3632*
			(-7,59)	(1,90)	(-1,82)	(2,55)	(-2,27)	(0,56)	(1,51)	(2,41)	(-2,25)
2003	103	0,0778	0,7822**	-0,7160	1,6124	-2,0750	0,9747	-0,5192	1,9040*	2,2320*	-0,2160
			(10,74)	(-0,37)	(1,19)	(-1,44)	(1,07)	(-0,48)	(2,10)	(2,16)	(-0,70)
2004	121	0,0961	0,1942**	-0,3231	1,3856*	2,7096	-0,3191	1,4637	-0,1029	1,2680	-0,3428
			(3,88)	(-0,16)	(2,16)	(1,56)	(-0,34)	(1,09)	(-0,10)	(1,71)	(0,52)
2005	122	0,0486	0,4340**	-3,0277	0,5378	-3,1834	1,6044	-0,4239	2,5031	1,2800	0,0048
			(4,99)	(-1,58)	(0,45)	(-1,33)	(1,21)	(-0,19)	(1,51)	(1,19)	(0,01)
2006	142	0,0841	0,2562**	-0,2455	0,4388	3,0915**	-0,4254	0,4421	0,5360	0,3988	-0,1244
			(5,86)	(-0,13)	(0,40)	(2,67)	(-0,93)	(0,55)	(0,76)	(0,50)	(-0,29)
2007	161	0,1537	-0,1378**	0,7233	0,3015	0,4636	0,0375	1,0939*	-0,3203	0,6644	1,0319
			(-5,22)	(0,80)	(0,41)	(0,57)	(0,08)	(2,09)	(-1,51)	(0,97)	(1,82)
2008	168	0,1461	-0,4627**	0,4137	0,1696	0,6009	-0,3345	0,1522	0,4986	0,5071*	0,2203
			(-19,03)	(0,71)	(0,50)	(1,29)	(-0,73)	(0,24)	(0,98)	(2,31)	(1,22)
2009	141	0,1395	0,4146**	-0,5867	-0,5510	1,8659*	-0,0376	0,9249	0,2206	0,2559	0,3634**
			(7,43)	(-0,61)	(-1,39)	(2,50)	(-0,11)	(1,15)	(0,65)	(0,72)	(2,96)
2010	157	0,1001	0,1397**	-0,8515	0,8373**	1,2215	-0,3195	0,8105	0,4614	0,7876**	-0,2174
			(4,38)	(-1,61)	(3,05)	(1,54)	(-1,08)	(1,20)	(1,33)	(4,01)	(-1,63)
2011	163	0,1160	-0,1406**	-0,4481	1,2055	1,7775*	-0,8156*	0,5822	0,0866	0,8128	0,1275
			(-4,52)	(0,44)	(1,63)	(2,48)	(-2,26)	(1,36)	(0,42)	(1,66)	(1,19)

Definition of variables:

RET	12 month stock return from January 1. year t - December 31. year t (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 12: Regression of 12-months Return on Annual Earnings

Model specification:

$$RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	EPS	ΔEPS
Pooled	1392	0,0839	0,0835**	0,6977**	0,2374**
			(7,14)	(7,74)	(3,21)
2002	114	0,242	-0,2366**	1,0219**	-0,3146
			(-6,82)	(5,84)	(-1,92)
2003	103	0,0209	0,7724**	0,2338	0,3143
			(10,79)	(0,68)	(1,16)
2004	121	0,1152	0,20662**	1,1755**	0,3178
			(4,15)	(2,93)	(1,15)
2005	122	0,0249	0,4209**	-0,5562	1,2024*
			(5,33)	(-0,72)	(2,21)
2006	142	0,0848	0,2437**	0,9683**	-0,1737
			(6,00)	(3,34)	(-0,62)
2007	161	0,1605	-0,1426**	0,7208**	0,3670
			(-5,51)	(2,90)	(1,93)
2008	168	0,1538	-0,4657**	0,4221**	0,1859*
			(-20,19)	(4,84)	(2,50)
2009	141	0,0823	0,4340**	0,5585**	0,1760
			(7,45)	(3,11)	(1,27)
2010	157	0,0537	0,1312**	0,3949**	0,0134
			(4,28)	(2,76)	(0,20)
2011	163	0,1143	-0,1372**	0,7604**	-0,0424
			(-4,51)	(5,91)	(-0,50)

Definition of variables:

RET	12 month stock return from January 1. year t - December 31. year t (adjusted for dividends and stock splits)
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 13: Test of Difference in Adjusted R^2 using 12-months Return

Model specifications:

Unrestricted: $RET_{it} = \beta_0 + \beta_{1t}Q1EPS_{it} + \beta_{2t}\Delta Q1EPS_{it} + \beta_{3t}Q2EPS_{it} + \beta_{4t}\Delta Q2EPS_{it} + \beta_{5t}Q3EPS_{it} + \beta_{6t}\Delta Q3EPS_{it} + \beta_{7t}Q4EPS_{it} + \beta_{8t}\Delta Q4EPS_{it} + \varepsilon_{it}$

Restricted: $RET_{it} = \beta_0 + \beta_{1t}EPS_{it} + \beta_{2t}\Delta EPS_{it} \quad \varepsilon_{it}$

Year	Unrestricted adj. R2	Restricted adj. R2	n	Δ df	df	F-stat	
Pooled	0,1024	0,0839	1392,00	6	1383,00	4,7507	**
2002	0,3130	0,2420	114,00	6	105,00	1,8086	
2003	0,0778	0,0209	103,00	6	94,00	0,9666	
2004	0,0961	0,1152	121,00	6	112,00	-0,3944	
2005	0,0486	0,0249	122,00	6	113,00	0,4692	
2006	0,0841	0,0848	142,00	6	133,00	-0,0169	
2007	0,1537	0,1605	161,00	6	152,00	-0,2036	
2008	0,1461	0,1538	168,00	6	159,00	-0,2390	
2009	0,1395	0,0823	141,00	6	132,00	1,4624	
2010	0,1001	0,0537	157,00	6	148,00	1,2718	
2011	0,1160	0,1143	163,00	6	154,00	0,0494	

Definition of variables:

Unrestricted adj. R2	Adjusted R2 from the unrestricted (quarterly earnings) model.
Restricted adj. R2	Adjusted R2 from the restricted (yearly earnings) model
n	Number of observations
Δ df	Difference in degrees of freedom from the restricted model less the unrestricted model
df	Degrees of freedom in the unrestricted model calculated as n - K - 1 where K equals the number of independent variables
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Explanations for table:

**	Significant at 1 %
*	Significant at 5 %

Appendix 14: Regression of Lagged 12-months Return on Quarterly Earnings

Model specification:

$$RET_{it}=\beta 0 + \beta_1 Q1EPS_1 + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS
Pooled	1391	0,0967	0,0829**	-0,5821	0,4391	0,8496*	-0,1568	0,9178**	0,3554*	0,9181**	0,1663**
			(5,92)	(-1,29)	(1,82)	(2,25)	(-1,22)	(3,27)	(2,29)	(5,80)	(2,74)
2002	114	0,2946	-0,2332**	1,0528	-0,7781	0,5510	-0,3645	0,6992	0,4080	0,8917**	-0,3498*
			(-8,94)	(1,79)	(-1,81)	(1,18)	(-1,62)	(1,11)	(0,60)	(3,90)	(-2,30)
2003	104	0,097	0,5913**	-0,7344	0,3720	-1,4548	1,2241	0,0386	1,7588*	0,5244	-0,2395
			(8,96)	(-0,77)	(0,31)	(-1,22)	(1,81)	(0,05)	(2,61)	(0,75)	(-1,45)
2004	123	0,0680	0,2886**	-2,1267	0,7642	0,4868	-0,7063	1,2944	0,4019	1,4711	0,3869
			(5,28)	(-0,90)	(1,07)	(0,26)	(-0,78)	(1,07)	(0,51)	(1,68)	(0,56)
2005	122	0,1005	0,5635**	-0,7908	0,3436	-3,7171	1,4117	1,7371	3,4804	0,4280	1,6579
			(7,21)	(-0,32)	(0,24)	(-1,19)	(0,51)	(0,71)	(1,63)	(0,26)	(1,45)
2006	143	0,1945	0,1418**	0,4523	-2,7650	3,2749	-0,3229	0,3581	0,1089	1,4547	0,5226
			(3,31)	(0,15)	(-1,84)	(1,97)	(-0,43)	(0,44)	(0,17)	(1,22)	(1,22)
2007	161	0,1098	-0,1293**	0,6340	0,1210	0,4047	0,2005	1,1871*	-0,0413	-0,4334	2,0475**
			(-4,94)	(0,55)	(0,20)	(0,80)	(0,47)	(2,37)	(-0,28)	(-0,51)	(3,25)
2008	170	0,1259	-0,4397**	0,4570	-0,3456	0,0650	0,5168	-0,0594	0,1513	0,5724*	0,2628
			(-18,56)	(0,65)	(-0,83)	(0,11)	(0,90)	(-0,11)	(0,33)	(2,53)	(1,41)
2009	138	0,1921	0,2943**	0,6311	-0,4038	0,6360	0,2293	0,9361	0,2189	0,6012	0,2486**
			(6,78)	(0,77)	(-1,20)	(1,06)	(0,89)	(1,18)	(0,76)	(1,81)	(3,95)
2010	155	0,0525	0,1049**	-2,3304	0,4524	1,6869*	-0,3214	0,1273	0,5277	0,6061**	-0,2638*
			(3,14)	(-1,84)	(1,50)	(2,12)	(-1,08)	(0,22)	(1,53)	(2,67)	(-2,30)
2011	161	0,1808	-0,1117**	-0,5462	1,0868	1,9395**	-0,6112	0,3022	0,2314	0,8837*	0,3622
			(-3,57)	(-0,62)	(1,63)	(3,30)	(-1,53)	(0,70)	(1,02)	(2,22)	(1,77)

Definition of variables:

RET	12 month stock return from March 31. in year t - March 31. in year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at March 31. in year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at March 31. in year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 15: Regression of Lagged 12-months Return on Annual Earnings

Model specification:

$$RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	EPS	ΔEPS
Pooled	1391	0,7858	0,8173**	0,6563**	0,1565**
			(6,57)	(9,37)	(2,80)
2002	114	0,2755	-0,2308**	0,7717**	-0,3221**
			(-8,82)	(6,37)	(-3,44)
2003	104	-0,0020	0,6013**	0,0712	0,1577
			(9,99)	(0,21)	(1,03)
2004	123	0,0308	0,3075**	0,3022	0,3135
			(5,88)	(1,10)	(1,12)
2005	122	0,0585	0,5682**	-0,0838	1,8643*
			(7,99)	(-0,15)	(2,41)
2006	143	0,1335	0,1550**	1,3978**	-0,5065
			(3,98)	(3,32)	(-1,08)
2007	161	0,1047	-0,1353**	0,4015*	0,5231**
			(-5,04)	(2,00)	(3,08)
2008	170	0,1161	-0,4478**	0,2507**	0,2596*
			(-19,88)	(2,63)	(2,59)
2009	138	0,2055	0,2832**	0,7601**	0,1584**
			(6,97)	(7,08)	(3,95)
2010	155	0,0255	0,0976**	0,2840*	0,0478
			(3,06)	(2,27)	(1,63)
2011	161	0,1391	-0,1083**	0,7472**	-0,0102
			(-3,48)	(7,57)	(-0,13)

Definition of variables:

RET	12 month stock return from March 31. year t - March 31. year t+1 (adjusted for dividends and stock splits)
EPS	Annual earnings per share scaled by the price per share at March 31. in year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at March 31. in year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 16: Test of Difference in Adjusted R^2 using Lagged 12-months Return

Model specifications:

Unrestricted: $RET_{it} = \beta_0 + \beta_{1t}Q1EPS_{it} + \beta_{2t}\Delta Q1EPS_{it} + \beta_{3t}Q2EPS_{it} + \beta_{4t}\Delta Q2EPS_{it} + \beta_{5t}Q3EPS_{it} + \beta_{6t}\Delta Q3EPS_{it} + \beta_{7t}Q4EPS_{it} + \beta_{8t}\Delta Q4EPS_{it} + \varepsilon_{it}$

Restricted: $RET_{it} = \beta_0 + \beta_{1t}EPS_{it} + \beta_{2t}\Delta EPS_{it} \quad \varepsilon_{it}$

Year	Unrestricted adj. R2	Restricted adj. R2	n	Δ df	df	F-stat	
Pooled	0,0976	0,0786	1391,00	6	1382,00	4,8497	**
2002	0,2946	0,2755	114,00	6	105,00	0,4738	
2003	0,0979	-0,0020	104,00	6	95,00	1,7534	
2004	0,0680	0,0308	123,00	6	114,00	0,7584	
2005	0,1005	0,0585	122,00	6	113,00	0,8794	
2006	0,1945	0,1335	143,00	6	134,00	1,6913	
2007	0,1098	0,1047	161,00	6	152,00	0,1451	
2008	0,1259	0,1161	170,00	6	161,00	0,3008	
2009	0,1921	0,2055	138,00	6	129,00	-0,3566	
2010	0,0525	0,0255	155,00	6	146,00	0,6934	
2011	0,1808	0,1391	161,00	6	152,00	1,2896	

Definition of variables:

Unrestricted adj. R2	Adjusted R2 from the unrestricted (quarterly earnings) model.
Restricted adj. R2	Adjusted R2 from the restricted (yearly earnings) model
n	Number of observations
Δ df	Difference in degrees of freedom from the restricted model less the unrestricted model
df	Degrees of freedom in the unrestricted model calculated as n - K - 1 where K equals the number of independent variables
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Explanations for table:

**	Significant at 1 %
*	Significant at 5 %

Appendix 17: Regression of Quarterly Earnings with Cook's Distance Outliers Approach

Model specification:

$$RET_{it}=\beta 0 + \beta_1 Q1EPS_1 + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS
Pooled	1474	0,1146	0,1130**	-0,3729	0,2559*	0,8347**	-0,1008	0,4714*	0,3058**	0,8729**	0,0920**
			(6,88)	(-1,93)	(2,59)	(4,65)	(-1,20)	(2,36)	(2,79)	(7,80)	(2,66)
2002	133	0,2258	-0,2040**	0,5250	-0,0766	0,3421	-0,0158	-0,1085	0,1984	1,5220**	-0,5856**
			(-5,31)	(1,73)	(-0,73)	(1,20)	(0,11)	(-0,17)	(0,35)	(3,91)	(-3,43)
2003	109	0,0311	0,6459**	0,2934	-0,0874	-0,2250	0,2417	-1,2965	2,2145*	1,0992	-0,2051
			(9,38)	(0,28)	(-0,12)	(-0,25)	(0,47)	(-1,44)	(2,62)	(1,71)	(-1,51)
2004	124	0,1377	0,1703**	0,1816	1,2914*	1,0258	-0,6519	2,6958	-0,1605	1,6327	0,2700
			(3,08)	(0,13)	(2,05)	(0,71)	(-0,75)	(1,53)	(-0,16)	(1,95)	(0,38)
2005	124	0,0459	0,6123**	-4,1556	-0,5224	-2,0554	1,8153	-2,0780	3,1090	2,9871*	-0,6397
			(6,78)	(-1,87)	(-0,34)	(-1,06)	(1,00)	(-0,80)	(1,39)	(2,17)	(-0,69)
2006	147	0,0505	0,3181**	2,2250	-1,7770	0,9190	-0,3659	0,1977	0,6217	1,8797	-0,5936*
			(5,74)	(0,87)	(-1,25)	(0,97)	(-0,40)	(0,22)	(0,84)	(1,48)	(-2,24)
2007	163	0,1193	-0,0882*	0,5609	-0,2416	0,5826	0,4475	1,6086*	-0,0089	0,2963	1,2513
			(-2,56)	(0,53)	(-0,40)	(0,97)	(1,04)	(2,51)	(-0,03)	(-0,39)	(1,82)
2008	180	0,1081	-0,4442**	-0,1192	-0,1807	0,4813	0,0110	0,1409	0,2142	0,3805	0,0868
			(-17,08)	(-0,23)	(-0,41)	(0,93)	(0,02)	(0,26)	(0,48)	(1,77)	(0,43)
2009	157	0,2061	0,3843**	-0,5955	-0,3632	1,5715**	-0,0056	0,7770	0,3582	0,4842**	0,0178
			(6,69)	(-1,02)	(0,99)	(2,72)	(-0,02)	(1,76)	(1,53)	(3,10)	(0,18)
2010	166	0,13	0,1094**	-1,6343**	0,1904	1,3112**	0,1542*	-0,0853	-0,0974	0,7457**	-0,0263
			(3,17)	(-2,67)	(0,64)	(2,72)	(2,23)	(0,17)	(-0,54)	(3,92)	(-0,64)
2011	171	0,1755	-0,1295**	0,0891	0,9447**	2,0355**	-0,5318**	-0,2397	0,6437	1,0742**	0,0316
			(-3,91)	(0,14)	(4,07)	(3,31)	(-3,00)	(-0,51)	(1.95)	(3,39)	(0,16)

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 18: Regression of Annual Earnings with Cook's Distance Outliers Approach

Model specification:

$$RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	EPS	ΔEPS
Pooled	1474	0,0931	0,1083**	0,5558**	0,0809**
			(6,70)	(8,85)	(3,03)
2002	133	0,1666	-0,2286**	0,4711**	-0,0942
			(-6,18)	(3,69)	(-1,21)
2003	109	-0,0047	0,6618**	0,1063	0,0769
			(10,10)	(0,62)	(0,92)
2004	124	0,1295	0,1945**	1,2779**	0,2604
			(3,66)	(2,85)	(0,88)
2005	124	-0,0018	0,6059**	-0,3725	0,6392
			(7,05)	(-0,47)	(1,10)
2006	147	0,0750	0,3193**	1,2070**	-0,4504
			(6,14)	(4,24)	(-1,47)
2007	163	0,1479	-0,0921**	0,5525**	0,3577
			(-2,86)	(3,47)	(1,80)
2008	180	0,1175	-0,4424**	0,2839*	0,0829
			(-17,85)	(2,33)	(0,65)
2009	157	0,164	0,3945**	0,5271**	-0,0203
			(6,86)	(5,57)	(-0,39)
2010	166	0,0642	0,0982**	0,3316**	0,0571*
			(3,00)	(2,97)	(2,15)
2011	171	0,116	-0,1392**	0,5703**	0,0221
			(-4,14)	(4,13)	(0,17)

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 19: Test of Difference in Adjusted R^2 with Cook's Distance Outlier Approach

Model specifications:

Unrestricted: $RET_{it} = \beta_0 + \beta_{1t}Q1EPS_{it} + \beta_{2t}\Delta Q1EPS_{it} + \beta_{3t}Q2EPS_{it} + \beta_{4t}\Delta Q2EPS_{it} + \beta_{5t}Q3EPS_{it} + \beta_{6t}\Delta Q3EPS_{it} + \beta_{7t}Q4EPS_{it} + \beta_{8t}\Delta Q4EPS_{it} + \varepsilon_{it}$

Restricted: $RET_{it} = \beta_0 + \beta_{1t}EPS_{it} + \beta_{2t}\Delta EPS_{it} \quad \varepsilon_{it}$

Year	Unrestricted adj. R2	Restricted adj. R2	n	Δ df	df	F-stat	
Pooled	0,1146	0,0931	1474	6	1465	5,9291	**
2002	0,2258	0,1666	133	6	124	1,5803	
2003	0,0311	-0,0047	109	6	100	0,6158	
2004	0,1377	0,1295	124	6	115	0,1823	
2005	0,0459	-0,0018	124	6	115	0,9582	
2006	0,0505	0,0750	147	6	138	-0,5935	
2007	0,1193	0,1479	163	6	154	-0,8335	
2008	0,1081	0,1175	180	6	171	-0,3004	
2009	0,2061	0,1640	157	6	148	1,3081	
2010	0,1304	0,0642	166	6	157	1,9920	
2011	0,1755	0,1160	171	6	162	1,9485	

Definition of variables:

Unrestricted adj. R2	Adjusted R2 from the unrestricted (quarterly earnings) model.
Restricted adj. R2	Adjusted R2 from the restricted (yearly earnings) model
n	Number of observations
Δ df	Difference in degrees of freedom from the restricted model less the unrestricted model
df	Degrees of freedom in the unrestricted model calculated as n - K - 1 where K equals the number of independent variables
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Explanations for table:

**	Significant at 1 %
*	Significant at 5 %

Appendix 20: Regression of Quarterly Earnings with Winsorized Variables

Model specification:

$$RET_{it}=\beta 0 + \beta_1 Q1EPS_1 + \beta_2 \Delta Q1EPS_{it} + \beta_3 Q2EPS_{it} + \beta_4 \Delta Q2EPS_{it} + \beta_5 Q3EPS_{it} + \beta_6 \Delta Q3EPS_{it} + \beta_7 Q4EPS_{it} + \beta_8 \Delta Q4EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	Q1EPS	ΔQ1EPS	Q2EPS	ΔQ2EPS	Q3EPS	ΔQ3EPS	Q4EPS	ΔQ4EPS
Pooled	1536	0,0770	0,1710**	-0,9129	0,3267	1,2156**	-0,3530	0,2966	0,2420	0,7685**	0,2169**
			(8,68)	(-1,59)	(1,08)	(2,78)	(-1,45)	(0,77)	(1,17)	(4,27(	(2,72)
2002	137	0,2269	-0,2163**	0,6409	-0,0569	0,7759	-0,1112	0,1954	0,2873	0,9679**	-0,2868
			(-5,77)	(1,71)	(-0,20)	(1,52)	(-0,66)	(0,34)	(0,58)	(2,76)	(-1,41)
2003	127	0,1382	0,8573**	-2,5681	1,5207*	1,8375	-0,1819	-1,5330	0,6404	0,6037	0,1906
			(9,03)	(-1,90)	(2,12)	(0,85)	(-0,37)	(-1,14)	(0,61)	(0,57)	(0,62)
2004	127	0,1954	0,2076**	-0,5005	1,0603	1,2853	-1,2740*	0,4082	1,4140*	2,4070*	0,2288
			(3,55)	(-0,30)	(1,09)	(1,00)	(-2,47)	(0,22)	(2,16)	(2,62)	(0,49)
2005	128	0,1192	0,6861**	-6,2283*	-0,6538	-5,8215	2,8402	0,6939	3,7413	2,3605	-1,5767
			(6,68)	(2,22)	(-0,38)	(-1,65)	(1,70)	(0,22)	(1,38)	(1,92)	(-1,34)
2006	148	0,0826	0,3243**	2,1741	0,1946	2,6275*	-0,8246	0,1718	0,7283	1,0426	-0,2429
			(5,70)	(0,82)	(0,12)	(2,39)	(-1,91)	(0,21)	(0,98)	(0,88)	(-0,70)
2007	163	0,1314	-0,0863*	0,3480	-0,2618	0,6204	0,3643	1,4891*	0,0316	-0,0602	1,3543*
			(-2,53)	(0,33)	(-0,43)	(0,97)	(0,82)	(2,47)	(0,10)	(-0,18)	(2,07)
2008	182	0,139	-0.4371**	-0,2573	-0,1277	0,4822	-0,0226	0,0292	0,3401	0,6310**	-0,0590
			(-16,79)	(-0,63)	(-0,33)	(1,90)	(-0,11)	(0,08)	(1,67)	(4,00)	(-0,52)
2009	177	0,1063	0,5471**	-0,8470	-0,6490	2,3568*	0,0218	0,7246	-0,1218	0,1702	0,1260
			(6,74)	(-0,78)	(-1,62)	(2,17)	(0,06)	(0,82)	(-0,43)	(0,48)	(1,38)
2010	172	0,03	0,1396**	-0,7862	-0,1534	0,8837	0,3039	-0,1819	-0,1048	0,5115*	-0,0597
			(2,93)	(-0,77)	(-0,44)	(1,31)	(1,28)	(-0,47)	(-0,59)	(2,16)	(-0,63)
2011	175	0,1344	-0,1316**	0,7786	0,6252	1,8107*	-1,0059*	-0,4368	0,6199*	0,2288	-0,1191
			(-3,80)	(0,71)	(1,27)	(2,23)	(-2,57)	(-0,74)	(2,22)	(0,84)	(-0,94)

All variables are winsorized at 1% in each tail (p = 0,01) to mitigate outlier effects.

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
Q1EPS - Q4EPS	Quarterly earnings per share scaled by the price per share at the beginning of year t
ΔQ1EPS - ΔQ4EPS	Change in quarterly earnings per share from year t-1, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 21: Regression of Annual Earnings with Winsorized Variables

Model specification:

$$RET_{it} = \beta 0 + \beta_1 EPS_1 + \beta_2 \Delta EPS_{it} + \varepsilon_{it}$$

Year	n	Adj. R2	Constant	EPS	ΔEPS
Pooled	1536	0,0543	0,1719**	0,4621**	0,1165**
			(8,94)	(4,95)	(2,71)
2002	137	0,2166	-0,2250**	0,5057**	-0,0840**
			(-6,10)	(5,27)	(-4,73)
2003	127	0,0828	0,9025**	-0,1859	0,2805*
			(9,35)	(-0,55)	(2,18)
2004	127	0,0774	0,2290**	0,7952	0,4119
			(4,06)	(1,20)	(1,19)
2005	128	0,0145	0,6792**	-0,6245	0,9587
			(8,18)	(-0,97)	(1,26)
2006	148	0,1048	0,3181**	1,3680**	-0,3360
			(6,06)	(4,32)	(-1,21)
2007	163	0,1500	-0,0907**	0,5906**	0,3703
			(-2,83)	(3,18)	(1,93)
2008	182	0,1143	-0,4473**	0,3612**	-0,0484
			(-18,22)	(4,00)	(-1,14)
2009	177	0,1071	0,5934**	0,6938**	0,0088
			(7,48)	(6,11)	(0,17)
2010	172	0,0118	0,1262**	0,2123	0,0009
			(2,77)	(1,31)	(0,02)
2011	175	0,0354	-0,1404**	0,2918	-0,0226
			(-4,12)	(1,81)	(-0,38)

All variables are winsorized at 1% in each tail (p = 0,01) to mitigate outlier effects.

Definition of variables:

RET	15 month stock return from January 1. year t - March 31. year t+1 (adjusted for dividends and stock splits)
EPS	Annual earnings per share scaled by the price per share at the beginning of year t
ΔEPS	Change in annual earnings per share, scaled by the price per share at the beginning of year t

Explanations for table:

**	Significant at 1%
*	Significant at 5%

Further notes:

The pooled regression is conducted with Huber/White/sandwich clustered standard errors allowing standard errors within companies to be dependent while independent between companies and adjusting for heteroscedasticity (Huber, 1967; White, 1980). The cross sectional regressions are conducted with White adjusted robust standard errors to control for heteroscedasticity and non-normality.

T-statistics are highligted in parantheses

Appendix 22: Test of Difference in Adjusted R^2 with Winsorized Variables

Model specifications:

Unrestricted: $RET_{it} = \beta_0 + \beta_{1t}Q1EPS_{it} + \beta_{2t}\Delta Q1EPS_{it} + \beta_{3t}Q2EPS_{it} + \beta_{4t}\Delta Q2EPS_{it} + \beta_{5t}Q3EPS_{it} + \beta_{6t}\Delta Q3EPS_{it} + \beta_{7t}Q4EPS_{it} + \beta_{8t}\Delta Q4EPS_{it} + \varepsilon_{it}$

Restricted: $RET_{it} = \beta_0 + \beta_{1t}EPS_{it} + \beta_{2t}\Delta EPS_{it} + \varepsilon_{it}$

Year	Unrestricted adj. R2	Restricted adj. R2	n	Δ df	df	F-stat	
Pooled	0,0770	0,0543	1536,00	6	1527,00	6,2591	**
2002	0,2269	0,2166	137,00	6	128,00	0,2842	
2003	0,1382	0,0828	127,00	6	118,00	1,2643	
2004	0,1954	0,0774	127,00	6	118,00	2,8842	**
2005	0,1192	0,0145	128,00	6	119,00	2,3576	*
2006	0,0826	0,1048	148,00	6	139,00	-0,5606	
2007	0,1314	0,1500	163,00	6	154,00	-0,5496	
2008	0,1390	0,1143	182,00	6	173,00	0,8272	
2009	0,1063	0,1071	177,00	6	168,00	-0,0251	
2010	0,0296	0,0118	172,00	6	163,00	0,4983	
2011	0,1344	0,0354	175,00	6	166,00	3,1643	**

Definition of variables:

Unrestricted adj. R2	Adjusted R2 from the unrestricted (quarterly earnings) model.
Restricted adj. R2	Adjusted R2 from the restricted (yearly earnings) model
n	Number of observations
Δ df	Difference in degrees of freedom from the restricted model less the unrestricted model
df	Degrees of freedom in the unrestricted model calculated as n - K - 1 where K equals the number of independent variables.
F-statistic	$F = [(R^2_{Unrestricted} - R^2_{Restricted}) / \Delta df] / [(1 - R^2_{Unrestricted}) / (df_{Unrestricted})]$

Explanations for table:

**	Significant at 1 %
*	Significant at 5 %

Preliminary Master Thesis Report

BI Norwegian Business School –

Preliminary Thesis Report

"Value relevance of accounting: An assessment of the Norwegian stock market during financial crises"

GRA 1902

MSc in Business and Economics
Major Business Lax, Tax and Accounting

Supervisor:
John Christian Langli

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Tables and figures

1. Introduction

Several stakeholders have interest in financial statements, i.e. creditors, employees, suppliers, customers and investors. However, the latter is by far regarded as the most important user of financial statements. Consequently, there are reasons to believe financial accounting information has an effect on stock prices and firm valuation. This is what the value relevance studies are trying to investigate.

In section 1 of this paper we present value relevance as a concept and how it is measured. In section 2 we review previous research conducted on this concept both from an international perspective as well as a Norwegian perspective. In section 3 we formulate our research questions and hypotheses, and a discussion regarding research design. Section 4 provides a plan for the outline of the rest of the thesis, while section 5 summarizes a tentative time schedule.

1.1. Value Relevance of Accounting – the concept

According to Beaver (2002) the most important research areas within capital markets during the 1990s were market efficiency, Feltham-Ohlson modeling, value relevance, analyst's behavior and discretionary behavior. There has been vast research on value relevance and the usefulness of accounting information since the 1960s, in which Ball and Brown (1968) set the basis with their research on earnings response coefficients. They were the first to find evidence that financial statement information have an effect on firm's share returns (Scott, 2011). Over the period 1957 – 1965 they studied 261 NYSE[7] firms and how earnings information affected share returns. In essence, their study revealed a link between accounting information and market security returns by finding a market response to earnings deviating from the expectations.

In the late 1960s the emphasis on earnings usefulness related to policy-relevance for accounting standard setters. The motives of these early studies were to find optimal accounting procedures. Value relevance research is a helpful tool to provide inputs and evidence to accounting standard setters which can be

[7] NYSE: New York Stock Exchange

informative in their process of deliberating and updating accounting standards (Barth et. al., 2001). However, during the next decade the research turned in the direction of finding relations between earnings information and security returns (Lev, 1989). This has led to research regarding what changes the value relevance of accounting information over time (Francis and Schipper, 1999), how it differs across borders and accounting practices (King and Langli, 1998) and how it is affected by a financial crisis (Beisland, 2011) among several other research areas.

According to Barth et al. (2001: 95) "value relevance studies examines the association between accounting amounts and equity market values." Holthausen and Watts (2001: 26) have a similar definition in which they claim that "value relevant means the accounting is associated with some measure of value, e.g., share prices". Another interpretation of the term is provided by Beaver (2002: 459) stating that value relevance is the "association between a security price-based dependent variable and a set of accounting variables". Beaver (2002: 459) also explains that "an accounting number is termed value relevant if it is significantly related to the dependent variable."

According to these definitions and interpretations it seems clear that the term "value relevance" seeks to explain the relationship between accounting variables and a market security value. Thus, accounting information can be said to be value relevant if helps the users of accounting information to make better investment decisions. This can be illustrated by figure 1 below:

Figure 1: Value Relevance Studies

There are mainly two influential standard setting agencies in the world, namely IASB[8] and FASB[9]. According to the IASB/FASB Conceptual Framework draft (2008), the objective of financial information is to provide information that is useful in making decisions for investors, lenders and creditors (Scott, 2011).

[8] IASB: International Accounting Standards Board

[9] FASB: Financial Accounting Standards Board

These capital providers and equity investors in particular have a future oriented emphasis on the firm's performance, whereas financial accounting information (e.g. income statements and balance sheets) summarizes historical events. Under these characteristics, the accounting information must be able to serve its users with information that possibly will change their prior beliefs concerning the future performance of the security being analyzed. According to FASB (1980), the two primary qualities making accounting information useful are relevance and reliability. FASB (1980:7) defines relevance as:

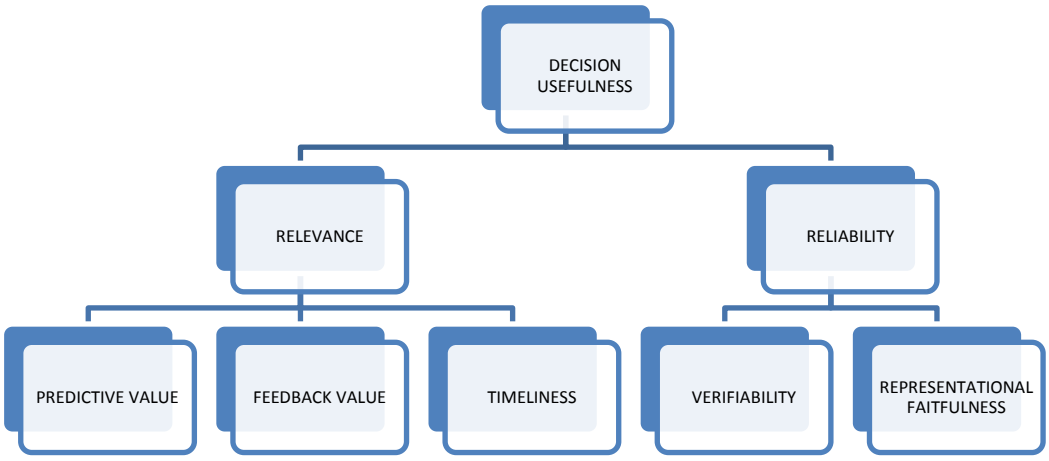
> The capacity of information to make a difference in a decision by helping users to form predictions about the outcomes of past, present, and future events or to confirm or correct prior expectations.

Reliability is defined by FASB (1980:7) as:

> The quality of information that assures that information is reasonably free from error and bias and faithfully represents what it purports to represent.

These qualities can be depicted by figure 2 below, as portrayed in FASB (1980).

Figure 2: Hierarchy of accounting qualities



Thus, from the figure above it is evident that financial information must be both relevant and reliable to be useful. Value relevance studies are mainly focused on the left part of the figure. The right side of the figure is generally the auditors responsibility in order to ensure that the users of the financial information can

trust the information disclosed. In order to enhance the relevance of accounting, standardsetters have introduced more fair value accounting, e.g., fair value of financial instruments, derivatives and intangible assets. However, fair value accounting imposes more management subjectivity which may affect the reliability of the financial information. Thus, the standard setters are facing a difficult and important tradeoff when developing accounting standards.

1.2. Measuring Value Relevance of Accounting

Value relevance can be studied both in a short term perspective and in a long term perspective. This is referred to as narrow window studies and wide window studies respectively. One should however be aware of the potential caveats by using different time intervals. Very narrow window studies will in theory (if we assume fully efficient markets) provide opportunity to isolate the effect of earnings announcements. However, research has shown that markets are not fully efficient and are not absorbing information instantly (Scott, 2011), implying that very narrow windows might understate the usefulness of earnings due to delayed investor reaction to earnings announcements (Lev, 1989). This phenomenon is known as postannoncement drifts. Wide window studies on the other hand overcome the problem of postannouncement drifts. However, these studies might overstate the usefulness of earnings due to the fact that there is a vast array of other factors influencing stock price changes in a longer timeframe (Lev, 1989).

Wide window studies are most commonly used in the value relevance research literature. These studies do not take into consideration the timeliness of information which in contrast is highly important in narrow window studies. Also, in these studies researchers usually analyze yearly data to find statistical relationships between stock prices and financial accounting information (Beisland, 2012).

An important aspect when testing for value relevance is to select a proper valuation model. According to Barth et al. (2001), the model employed by Ohlson (1995) has been frequently used, in which firm value is represented as a linear function of book value of equity and the present value of expected residual

earnings. This model is also known as the residual income valuation model, and it can formally be written as:

$$(1) \qquad MV_0 = BV_0 + \sum_{t=1}^{\infty} \frac{E(earnings_t - r_t * BV_{t-1})}{(1 + r_t)}$$

where MV_0 is the market value of equity on time zero, BV_0 is the book value of equity on time zero while the summation captures the present value of future residual earnings.

Based on the model in equation 1, researchers within the value relevance literature have commonly used a regression equation as given in Francis and Schipper (1999) which they refer to as the "book value & earnings relation":

$$(2) \qquad MV_{j,t} = \delta_{0,t} + \delta_{1,t} BV_{j,t} + \delta_{2,t} EARN_{j,t} + \xi_{j,t}$$

where $MV_{j,t}$ is the per share market value of equity of firm j in year t, $BV_{j,t}$ is the per share book value of equity of firm j in year t, and $EARN_{j,t}$ is the per share earnings of firm j in year t. Collins et al. (1997) also use a similar model in their extensive study of value relevance in the U.S. over the forty year period 1953 – 1993. This model tries to explain the level of security prices (dependent variable) by the two above mentioned accounting variables (independent variables).

Value relevance is generally measured by the R^2 from the multiple regression equation (2) above. R^2 is the total variation in the dependent variable explained by the independent variables. Hence, the R^2 tells us something about the explanatory power of accounting information on firm market equity value. The higher is R^2, the more value relevant is accounting information. In addition, the estimated coefficients reveal the effect of earnings and book values on market equity values. However, R^2 is the most important indicator of value relevance. Collins et al. (1997) also investigates the incremental explanatory power of book values (3) and earnings (4), by the following two equations (based on the notation from (2):

$$(3) \qquad MV_{j,t} = \gamma_{0,t} + \gamma_{1,t} BV_{j,t} + \xi_{j,t}$$

(4) $$MV_{j,t} = \beta_{0,t} + \beta_{2,t} EARN_{j,t} + \xi_{j,t}$$

By decomposing (2) into two univariate regression models we are better able to explore how the two independent variables contribute to explaining market value of equity. In order to find the incremental explanatory power of earnings and book values, Collins et al. (1997) estimate R^2 for equations (2)-(4). By subtracting R^2 for (3) from (2) they obtain the incremental explanatory power of earnings ($R_2^2 - R_3^2 = R_{EARN}^2$). Similarly, subtracting R^2 for (4) from (2) they find the incremental explanatory power of book values ($R_2^2 - R_4^2 = R_{BV}^2$). Note that the notations in the equations above differ from the ones used in Collins et al. (1997).

Another interesting subject is to study whether accounting information remains value relevant over time or not. The same research design has been used by several researchers (Francis and Schipper, 1999; Collins et. al, 1997). In order to analyze this Collins et al. (1997) regress R^2 on a time variable:

(5) $$R_t^2 = \alpha_0 + \alpha_1 TIME_t + \xi_t$$

The estimated coefficient for the time variable reveals whether value relevance has inclined or declined during the period under investigation. A positive coefficient postulates an increase, whereas a negative coefficient suggests a decrease in value relevance over the period.

The second major approach to study value relevance of accounting information is what Francis and Schipper (1999) refers to as the "earnings relation". This approach is also referred to as a price return study.

(6) $$R_{j,t} = \rho_{0,t} + \rho_{1,t} \Delta EARN_{j,t} + \rho_{2,t} EARN_{j,t} + \nu_{j,t}$$

where $R_{j,t}$ is the return on equity of firm j in year t, $\Delta EARN_{j,t}$ refers to change in earnings for firm j in year t and $EARN_{j,t}$ is the earnings for firm j in year t.

The approach being used is basically determined by the research question(s) and econometric considerations (Landsman and Magliolo, 1988) cited in Barth et al. (2001). They argue that research questions regarding timeliness should preferably be studied in accordance with the price return studies which again calls for a narrow window study. Most of the previous research has not focused on the timeliness of accounting information.

2. Value Relevance – previous research and results

As already mentioned, value relevance has been widely researched the past 25 years and has been one of the top five research areas within capital market research (Beaver, 2002). In this section we will present previous research within the value relevance literature both in an international perspective and in a Norwegian perspective.

2.1. Value Relevance in an International Perspective

Francis and Schipper (1999) provide a thorough analysis of the claim that financial statements have lave lost relevance over time. Their analysis covers data for U.S. listed firms over the period 1952 – 1994. Over these years, they found that book values and earnings (the book value & earnings relation) on average explained 62% of the variation in market share prices, ranging from 47% to 78%. Furthermore, in their time regression they provide evidence suggesting that the relevance of earnings declined during the period while the relevance of book values, and book values and earnings in total, increased. The estimated time coefficient for book value suggested an annual increase in R^2 of 1.3% and 0.37% for the book value and earnings relation in total. All coefficients were statistically significant at .01 level. In general, the researchers found mixed evidence of the claim that accounting information had lost relevance during the period.

Collins et al. (1997) have conducted a similar study as Francis and Schipper (1999) in which they investigated the value relevance over the period 1953 – 1993 with a sample of 115,154 firm year observations of U.S. listed firms. Their study showed that the adjusted R^2 for earnings and book values jointly explained 54% of the variation in security prices. Also, the coefficients for both earnings and

book values were significant at the .01 level in almost every year. Consistent with the findings of Francis and Schipper (1999), Collins et al. (1997) also found that the incremental explanatory power of earnings declined over the period while the explanatory power of book values increased over the period. They propose these findings as a consequence of several factors; 1) one-time items, 2) negative earnings, 3) change in firm size and 4) intangible intensity[10]. They also state that several other researchers (Barth et al., 1997; Burgstahler and Dichev, 1997; Jan and Ou, 1995) have found that negative earnings over time have led to a shift of value relevance towards book values. This seems fairly logical. When earnings become persistently negative investors will perceive book value of equity as a more relevant accounting variable due to the fact that book values can be perceived as the liquidation value (or abandonment value) of the firm. Other researchers, such as Ohlson (1995) suggest that book value of equity represent the present value of expected future normal earnings. According to Collins et al. (1999: 32), in the presence of losses, "the market acts if it relies on book value of equity both as a proxy for expected future normal earnings and as a proxy for abandonment value".

The value relevance of financial statements is shown to vary between different industries and types of companies. Lev and Zarowin (1999), cited in Collins et al. (1997: 42), argue that the value relevance of accounting information is low in service and technology-based firms that invest in intangible assets. These assets contribute to market value but are only recognized to some extent in financial statements due to accounting rules. Barth et al. (1998) shows that the explanatory power of net income and book values are significantly different depending upon the industries in which the firms operate. In particular, pharmaceutical companies' net income figures contribute more than book values whereas the opposite is evident for firms which fall under the category "financial services".

The value relevance of financial statements also differs with company size. The earnings persistence is lower for smaller companies since they are more likely to report losses than bigger firms. A reason may be the fact that larger firms are more diversified and better able to overcome fluctuating economic environments

[10] Intangible intensity: large amounts of unrecorded intangibles.

(Collins et al., 1997). According to the Ohlson valuation model (Ohlson, 1995) this increases the importance of book values relative to earnings. Investing in smaller companies is considered more risky and investors place greater weight on book values, which predicts the liquidation value, in case of bankruptcy (Collins et al., 1997).

Several studies claim fair value accounting is more value relevant than historical cost accounting. Studies related to fair value of debt and equity securities consistently find that investors consider fair value estimates more relevant than historical cost figures. The same evidence is found in studies regarding the value relevance in relation to fair value estimates of derivatives. Even though these estimates are uncertain investors perceive fair value estimates as more precise and relevant than their notional amounts (Barth et al., 2001). As mentioned above, introducing more fair value accounting increases relevance to investors. However, financial information is also meant to fulfill another important quality, reliability. Even though international research on value relevance has been important for financial accounting standard setters they need to take the standards' reliability into account as well to prevent management errors and manipulation.

2.2. Value Relevance in a Norwegian Perspective

Gjerde et al. (2011) has conducted an extensive study of the value relevance of financial reporting in Norway during the period 1965 – 2004. The study tests whether new accounting standards within the NGAAP[11] has contributed to increased value relevance or not. However, the study does not consider the implementation of IFRS[12] standards for publicly listed companies in 2005. NGAAP focuses primarily on earnings (earnings oriented conceptual view), while the USGAAP[13] and IFRS are more based upon the balance sheet (balance sheet oriented conceptual framework). Based on the Norwegian data, the researchers found that value relevance has increased significantly, which is consistent with the findings of other researchers (Francis and Schipper, 1999; Collins et al., 1997). However, in contrast to the findings in international research, Gjerde at al. (2011)

[11] NGAAP: Norwegian Generally Accepted Accounting Principles

[12] IFRS: International Financial Reporting Standards

[13] USGAAP: United States Generally Accepted Accounting Principles

found that the value relevance of earnings in Norway did not decrease. They explain this difference as consequence of NGAAP being more earnings oriented, with an emphasis on matching expenses with corresponding revenues, than the USGAAP and IFRS being more balance sheet oriented.

Over the forty year period studied, they found that 59.80% of the variation in stock prices could be explained by per share earnings and book value of equity when applying the price level regression. However, when applying the price return regression only 5.20% of the variation is explained. This implies that it is easier to explain the determinants of the level of the price rather than the change in the price.

Gjerde et al. (2011) also studied the value relevance implications of major changes in Norwegian accounting standards. The new accounting act of 1998 appeared to have the greatest effect increasing total value relevance. The researchers explain that most of the increased value relevance can be attributed to the introduction of fair value of financial instruments. As opposed to being valued in accordance with historical cost, this change increased the relevance of the balance sheet. Another important factor improving value relevance of NGAAP was the introduction of deferred taxes in 1992. According to Hope (1999) deferred taxes prevent managers from adjusting financial statements for tax purposes affecting the underlying economic information being provided to investors.

The introduction of IFRS in 2005 has also been studied by Beisland and Knivsflå (2011) in which they study value relevance four years before (2001 – 2004) the introduction of IFRS and four years after (2005 – 2008). The results of their study shows that value relevance remained fairly constant during the tested periods. In addition, their study confirmed that introducing IFRS with higher emphasis on fair values increased the value relevance of book values at the expense of relevance of earnings. Introducing more fair values in financial statements will imply more volatility in the income statement (e.g. change in the valuation of interest rate swaps), making earnings less relevant for investing purposes.

Some value relevance research focus on financial crises and how such periods affect value relevance. During financial crisis investors put most emphasis on

book values since the risk of bankruptcy is higher (Barth et al. 1998). Beisland (2011), cited in Beisland (2012), has studied the financial crisis starting in 2008 and argues that book values are more value relevant than earnings for Norwegian companies. In 2008, the Oslo Stock Exchange experienced a decline of about 65% but the overall explanatory power (R^2) did not change significantly from other periods. However, the explanatory power of book value of equity increased dramatically in this period implying that book values become relatively more value relevant than earnings during financial crises. In financially distressed periods, investors may be more concerned with the going concern of the firms and rely more on the underlying values in the company (book values). This is also consistent with findings in Barth et al. (1998) in which they found that investors put more emphasis on book values during financial crises since the risk of bankruptcy is higher.

3. Research Questions and Design

According to Beisland (2012), there has been little research on value relevance based on Norwegian data. The fact that the components of value relevance changed during the financial crisis year 2008 as stated by (Beisland, 2011) triggered our interest. Thus, we will study whether this effect is prevalent in other financial crises in Norway, or if the financial crisis year of 2008 remains as a special period.

3.1. Research Questions and Hypotheses

To provide consistency to the literature of value relevance in Norway we will study whether value relevance has changed over time in addition to the impact of financial crises on value relevance in Norway. Consequently, our research questions are:

Research Question 1:

Is accounting information value relevant for investors investing on the Oslo Stock Exchange?

Research Question 2:

Has value relevance of accounting information changed over the period 1980 – 2011?

Research Question 3:

Does value relevance of accounting information change during financial crises?

Based on our research questions and theory of value relevance and previous research we have formed the following set of hypotheses:

Hypothesis 1:

H_a: Accounting information is value relevant for investors investing on the Oslo Stock Exchange.

Hypothesis 2:

H_a: Value relevance of accounting information has changed over the period 1980 – 2011.

Hypothesis 3:

H_a: Value relevance changes during financial crises.

Hypothesis 4:

H_a: In financial crises, book values become more value relevant than earnings

3.2. Research Design

In general there are three main classes of research designs; 1) exploratory, 2) descriptive and 3) causal (Gauri and Grønhaug, 2010). Value relevance studies are trying to describe the relationship between accounting information and stock prices. Previous research indicates that causality is difficult to prove. Consequently we will adopt a descriptive research design in order to try to explain the associations between accounting information and stock prices.

Value relevance research requires a quantitative method in which we will apply regression analysis to try to explain the explanatory power of financial accounting

information on stock prices. Our research questions require both a cross sectional regression and a time series regression. Cross sectional regression is used to analyze research question 1 and 3 while time series regression is used to analyze research question 2. For research question 1 (RQ1) we evaluate the R^2 of the following regression equations (7) and (8):

$$P_{j,t} = \alpha_{0,t} + \alpha_{1,t} BVPS_{j,t} + \alpha_{2,t} EPS_{j,t} + \varepsilon_{j,t} \quad (7)$$

where $P_{j,t}$ is the price of firm j at time t, $BVPS_{j,t}$ is the book value of equity per share of firm j at time t and $EPS_{j,t}$ is the earnings per share of firm j at time t.

$$R_{j,t} = \beta_{0,t} + \beta_{1,t} \Delta EARN_{j,t} + \beta_{2,t} EARN_{j,t} + \varepsilon_{j,t} \quad (8)$$

where $R_{j,t}$ is the return of firm j at time t, $\Delta EARN_{j,t}$ is the change in earnings for the previous year for firm j at time t and $EARN_{j,t}$ is the earnings for firm j at time t.

Equation (7) is generally called a price level study which reveals to what extent the accounting variables are able to explain the level of the stock prices. A high R^2 implies that the accounting variables are relevant for investment purposes. By analyzing the coefficients we are also able to say what impact the two accounting variables have on the level of stock prices and their significance.

Equation (8) is referred to as a price return study which tries to explain how earnings explain the change in stock prices. A high R^2 will imply that earnings information explains much of the variation in stock returns and hence be value relevant for investors.

In order to study research question 2 (RQ2) we will conduct a time series regression to analyze whether the value relevance of accounting changes over the time period under investigation. Our approach is to use R^2 from each year found from estimating equation (7) and perform a time regression:

$$R_t^2 = \gamma_0 + \gamma_1 TIME_t + \varepsilon_t \quad (9)$$

where R_t^2 is the R^2 in year t and $TIME_t$ is the respecting year.

To study research question 3 (RQ3) there are several possible approaches. By analyzing the coefficients for book value of equity per share and earnings per share over time we can study whether a change in the coefficients is prevalent as indicated by previous research on the matter (Beisland, 2011). In addition, we will study the incremental explanatory power of book values and earnings and use time series regression to analyze eventual changes over time and during financial crises.

Brown et al. (1999) have expressed concerns regarding the use of R^2 as a measure of value relevance. They are especially concerned about how scale effects may influence and increase R^2 e.g. stock splits[14]. As referred to above, firm sizes may also affect the results of our study. Consequently, we should check if the distribution of firm sizes changes in our sample during the period.

4. Further progress and outline

4.1. Data Collection

In order to analyze our research question there are mainly two sources of data needed; 1) historical stock prices for companies listed on the OSE and 2) financial statements and earnings announcements for companies listed on the OSE. All of the necessary data is accessible through the Oslo Stock Exchange database. According to BI Library's homepage, stock prices and financial statements are available at the OSE database from 1980. We are confident that the data material for our research question is sufficient.

4.2. Sample Selection

Since data from 1980 is available in the OSE database our study will cover the 32 year period 1980-2011. After the necessary data is collected we will trim the data

[14] If assuming a world in which accounting information has no impact on stock prices and consequently zero R^2, a stock split will actually result in increasing R^2 and to the false conclusion of increasing value relevance over time.

in accordance with earlier research involving omitting extreme values, firms with negative book values etc.

4.3. Data Analysis

We plan to use STATA when analyzing the collected data.

4.4. Results

This part will consist of the conclusions drawn from the data analysis and if/how they can relate to our proposed hypothesis.

4.5. Discussion

Our results and analyses are discussed in a critical view. We evaluate our research on the basis of its strengths and weaknesses and propose suggestions for further research on this topic.

4.6. Conclusion

A summary of our main findings are presented in a simplified way.

5. Time schedule

Actions	**Deadline**
Gain access to OSE database	February 1st 2013.
Complete theory and literature review	March 1st 2013
Finalize research design and regression models	March 20th 2013
Sampling and data analysis	May 1st 2013
Interpreting and discuss results	May 20th 2013
Finalize thesis	June 20th 2013

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