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Has IFRS raised the Standard of accounting?

*Value relevance of financial statements for stock prices in light of IFRS
changes*

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Abstract

This thesis measures the value relevance of the financial statement through analyzing the explanatory power and coefficients of earnings per share and book value of equity per share on next quarter's stock price. The analysis is done for the time period of 2005-2019Q2 in Europe to assess the effect of new IFRS Standards using quarterly data and a large sample size covering over 90 percent of free-float market capitalization in Europe. The contribution should be seen as an overall assessment of IFRS policymakers and whether they succeed in making financial statements more relevant, which is one of the two desired characteristics highlighted in the IFRS Conceptual Framework. Researchers carry a big responsibility as a watchdog to understand and assess actions taken by actors who influence capital market effectiveness, and this thesis tries to do just that with IFRS. Hypothesis on the value relevance effect of new IFRS Standards is created for each defined period. A synthesis of the different hypotheses is that many of the issued Standards are not superior to the IAS Standards which they supersede, and often create noise. Hypotheses are tested empirically with linear regression on the Ohlson-model from Ohlson (1995) and a decomposition model used in Collins et al. (1997). Lastly, additional testing on cash flows versus accruals utilizing the approach of Sloan et al. (2018) shows findings that indicate a steady persistence of accruals anomaly.

In the analysis, a significant fall in value relevance in the tested period of around 0.7 percentage points per year is observed. However, compared to previous research, we find higher overall value relevance and informational overlap between the income statement and balance sheet. These findings are robust to changes in both time intervals and model specifications. The implication from our findings is that IFRS Standards should be placed under stronger scrutiny before their EU endorsement and that further research should focus on the underlying mechanisms that lead to the fall in value relevance.

Keywords – Value relevance, IFRS

Contents

1	Introduction	1
2	Background	3
3	Literature Review	4
3.1	Institutional background	4
3.1.1	Historical background of IFRS	4
3.1.2	Financial statements according to IFRS	6
3.2	Previous research	7
3.2.1	Value relevance of income statement and balance sheet	8
3.2.2	Value relevance of accruals and cash flow	11
3.2.3	Value relevance and IFRS	14
3.3	Hypothesis development	18
3.3.1	Time periods	18
3.3.2	Hypothesis for each time period	20
4	Method	29
4.1	Data selection	29
4.2	Data adjustment	31
4.3	Research design	34
5	Data Analysis	41
5.1	Value relevance of income statement and balance sheet	41
5.2	Value relevance of accruals and cash flow	46
5.2.1	Value relevance of accruals and cash flow from operations	46
5.2.2	Value relevance of comprehensive accruals and free cash flow to equity	48
5.3	Robustness	49
6	Discussion	53
6.1	Hypothesis evaluation in light of findings	53
6.2	Discussion of findings and hypothesis	56
7	Conclusion	62
	List of References	64
	Appendix	68
A1	Literature	68
A1.1	Components of the financial statement	68
A1.2	Explanation of IFRS Standards by time periods	70
A1.3	Valuation of a company	80
A2	Method	81
A2.1	Collecting the data	81
A2.2	Merging the data	82
A2.3	Variable definition	84
A2.4	Robustness	85

A3	Data analysis	87
A3.1	Value relevance of income statement and balance sheet	87
A3.2	Value relevance of accruals and cash flow from operations	89
A3.3	Value relevance of comprehensive accruals and free cash flow to equity	90
A3.4	Value relevance of comprehensive earnings and disaggregated balance sheet	97
A3.5	Effect of annual data	100
A3.6	Effect from change in equity market risk premium and interest rates	101

List of Figures

3.1	Illustration of Bowen	17
4.1	Timeline for stock price measurement	31
5.1	Value relevance of income statement and balance sheet	43
5.2	Value relevance of accruals and cash flow from operations	47
6.1	Value relevance of accruals and cash flow using quarterly and annual data	60
A2.1	Winsorization at 0%, 1% and 5%	85
A2.2	Variance inflation factor test of Ohlson-model (4.1)	86
A2.3	Omitted variable test of Ohlson-model (4.1)	86
A2.4	Variance in inflation factor test of disaggregated model (4.14)	86
A2.5	Omitted variable test of disaggregated model (4.14)	86
A3.1	Value relevance of comprehensive accruals and free cash flow to equity	92
A3.2	Alternative and conventional method of measuring accruals	96
A3.3	Value relevance of comprehensive earnings and disaggregated balance sheet	100
A3.4	Value relevance of income statement and balance sheet using annual data	101
A3.5	Equity market risk premium (KPMG, 2019)	102
A3.6	Equity market risk premium (ValueTrust, 2018)	102
A3.7	Euro area interest rate (Economics, 2019)	102

List of Tables

3.1	IFRS Time periods	20
3.2	IFRS Standards in time periods 1-4	20
3.3	Overview of hypotheses	28
4.1	Definition of variables used in formulas	32
5.1	Value relevance of income statement and balance sheet	41
5.2	Income statement and balance sheet explanatory power over time	45
5.3	Significance of change in coefficients in value relevance of income statement and balance sheet	45
5.4	Value relevance of accruals and cash flow from operations	46
5.5	Accruals and cash flow from operations explanatory power over time	48
5.6	Value relevance of comprehensive accruals and free cash flow to equity	49
6.1	Value relevance of comprehensive accruals and free cash flow to equity 2005-2012	57
6.2	Value relevance of comprehensive accruals and cash flow 2013-2019	58
6.3	Value relevance of accruals and cash flow using annual data	59
A1.1	IFRS Standards before 2005 (Deloitte, 2019)	71
A1.2	Multiple valuation based on Operating Segment	72
A1.3	Timing of revenue recognition (Kinserdal et al., 2017)	77
A2.1	Financial statement variables from COMPUSTAT	84
A2.2	Other variables from COMPUSTAT	84
A3.1	Value relevance of income statement	87
A3.2	Value relevance of balance sheet	87
A3.3	Incremental value relevance of income statement and balance sheet	88
A3.4	Value relevance of income statement 2016 - 2019	88
A3.5	Value relevance of balance sheet 2016 - 2019	88
A3.6	Value relevance of income statement and balance sheet 2016 - 2019	89
A3.7	Significance of change in coefficients in value relevance of accruals and cash flow from operations	89
A3.8	Significance of change in coefficients for comprehensive accruals and free cash flow to equity	90
A3.9	Comprehensive accruals and free cash flow to equity explanatory power over time	91
A3.10	Value relevance of comprehensive accruals and free cash flow to equity by year for Industrials	93
A3.11	Value relevance of comprehensive accruals and free cash flow to equity by year for Materials	94
A3.12	Conventional measure of total accruals	95
A3.13	Alternative measure of total accruals	95
A3.14	Value relevance of comprehensive earnings and disaggregated balance sheet	98
A3.15	Comprehensive earnings and disaggregated balance sheet explanatory power over time	99
A3.16	Value relevance of income statement and balance sheet using annual data	100

1 Introduction

A frequently used phrase in security valuation is the GIGO-principle, meaning "Garbage In, Garbage Out." The reflection is that an analysts' output for security valuation can never be better than the input. In other words, despite rapid and unprecedented improvements in computational power and algorithmic ability, security valuation analysts are crucially dependent on the quality of input information to increase the precision of their models. Stating the obvious, the accuracy of financial modeling is an imperative assumption for efficient capital markets. Furthermore, financial statements are the primary source through which investors access financial information that goes into their security valuation models (Sloan et al., 2018). It is as such necessary that the financial statement represents a fair and relevant view of the firms underlying operations. Since 2005, the EU companies have seen the mandatory implementation of the International Framework Reporting Standard (IFRS), which has recognized multiple major updates in the last 15 years. IFRS aims to standardize the way accounting information is reported across countries as well as improving the reliability and relevance for accounting numbers.

This thesis will cover a frequently debated topic within the accounting literature, which has been on the value relevance of the income statement versus the balance sheet, and the two jointly as accruals versus the cash flow statement. The use of accruals in accounting strikes at the core of financial reporting, as relevance and reliability are the main goals of IFRS. Papers combining financial statements and stock price development dates back to the greats of the accounting and valuation field like Graham and Dodd (1934), Fama (1970), Modigliani and Miller (1959) and Ohlson (1995). The value relevance literature is a newer view of this topic, with the most influential papers stemming from US studies on US markets like Collins et al. (1997) and Francis and Schipper (1999). European papers have compared value relevance before and after IFRS adoption on a EU level as in Clarkson et al. (2011) or country-by-country as Callao et al. (2007) and Dobija and Klimczak (2010). To the best of our knowledge, there has not been conducted any large sample size tests on the entire IFRS period in Europe to assess the development in value relevance for financial statements.

Our thesis will examine the following:

To what extent have issued IFRS Standards improved the value relevance of financial statements?

The overarching IFRS period between 2005-2019 will be broken down in several periods to analyze the value relevance effect stemming from different IFRS Standards that became effective in the period. By using stock data as the dependent variable in regression models, the evaluation criteria will be the explanatory power of variables from the IFRS financial statement on the next quarter's stock price, and the weight equity investors put on the financial information reported through the financial statements. The periods are divided by assessing the impact of the different revisions, leaving a particular focus on the IFRS Standards that are expected to have the most considerable influence on value relevance. For each period, a hypothesis is set based on previous research, reactions to the implementation, and accounting theory. In addition, by using quarterly data, we get more data to test the value relevance effect of the newest IFRS Standards IFRS 15 - Revenue recognition and IFRS 16 - Leasing. By doing so, we aim to shed additional light on the value relevance debate with the limelight on the most impactful IFRS changes in the last 15 years.

2 Background

A nuanced understanding of the financial statements with its caveats, and the regulations that dictate the presentation of the financial statements, is arguably a crucial aspect of being an economist. By writing this master thesis we have been able to take a scientific approach to these subjects, and the insight gained from studying research papers of great thinkers such as Graham (1949) and Mossin (1966) within the field of accounting and finance can not be highlighted enough. Furthermore, the intersection between accounting and finance, for instance, the link between accounting numbers and company valuation, is what we would argue to be the most exciting topic from both a theoretical research perspective and a practitioner's view.

Our motivation for this choice of master thesis stems from large amounts of admiration. We admire the greats of accounting and finance and want to use this opportunity to get a deeper appreciation of their seminal works. In other words, the opportunity to build a thesis that stands on the shoulders of giants is genuinely appealing.

Financial statements are of vital importance within banking, consulting, and investing, which are industries we are on the path to pursue. By delving deep into the IFRS and assessing the different IFRS Standards, our understanding of the various aspects in an annual report is sharpened. The experience has undoubtedly led to valuable insight, as virtually all non-business students perceive financial statements and disclosure notes as intangible and hard to grasp. As a matter of fact, our experience is that most business students also feel the same way, especially when it comes to tasks beyond just only calculating key ratios and assessing trading multiples. We are grateful for the opportunity to feel differently.

3 Literature Review

3.1 Institutional background

Keeping checks and balances is a prerequisite for organizing large communities of people and land, and the early signs of accounting go all the way back to ancient Egypt and Mesopotamia thousands of years ago (Garbutt, 2018). However, the accounting system used today dates back to Luca Pacioli in 1494 with the concept that all transactions are recorded in the double-entry bookkeeping system, and is arguably, at least for economists, one of the most important inventions in modern human history. The principle of duality, meaning that every recorded transaction has two aspects which offset or balance each other, is the conceptual cornerstone of accounting. Every transaction that is recorded consists of at least one debit and one credit record and the total amount of debits must equal the total amount of credits for each transaction (Kinserdal et al., 2017).

3.1.1 Historical background of IFRS

During the late 20th century, with capital moving between borders in a more globalized world, the need for universal accounting standards became apparent. The project to harmonize the accounting policies between countries began in 1973, with the International Accounting Standards Committee (IASC), which was a joint coordination between the accounting bodies of 10 countries. The IASC developed the International Accounting Standards (IAS) and issued a total of 41 accounting standards, including a Conceptual Framework, between 1973 and 2001. The IAS Standards were not mandatory, and most European countries used local GAAP (Generally Accepted Accounting Principles), which varied between countries and made it difficult to compare companies across countries. For instance, PwC sent out identical company data to their auditors in seven different EU countries using GAAP and found the reported profit to vary between 131 and 192 million Euro (Kinserdal et al., 2017). With dual-listed companies in different countries

reporting sizeable discrepancies in earnings using the various local GAAP, a need for a change became pressing. The lack of comparability and reliability of accounting data was a complicating factor in free trade and free move of capital within the EU market.

On April 1st, 2001, the responsibilities of the IASC shifted to the International Accounting Standards Board (IASB), who adopted the current IAS Standards and the Conceptual Framework in their first meeting. Their mission is to develop standards that bring transparency, accountability, and efficiency to financial markets around the world (Deloitte, 2019). Since 2001, IASB has updated some IAS Standards and the Conceptual Framework, in addition to developing their own new IFRS Standards. Some new IFRS Standards supersede old IAS Standards, while others contain new rules not covered in previous IAS Standards. IFRS thus has three main components; (1) the Conceptual Framework that sets the general principles for accounting, (2) adopted IAS Standards that have not been withdrawn, and (3) new IFRS Standards that define specific rules for certain areas. To harmonize financial accounting across Europe, IFRS became mandatory for all listed companies reporting consolidated statements in the EU since 2005 (Deloitte, 2019).

IFRS Conceptual Framework

A critical difference between IFRS and GAAP is that the IFRS is principle-based as opposed to rules-based, meaning that there are fewer detailed rules for a particular situation but instead predefined principles that guide the accounting policy. The principles governing IFRS found in the IFRS Conceptual Framework describe "*the objective of, and the concepts for, general purpose financial reporting*" (IASB, 2018). As such, it details the overall qualitative characteristics that the IASB issue Standards to reach. The Conceptual Framework is not a Standard and does not override any issued Standards or requirements specified in any Standard. Conceptual Framework revisions occurred in 2010 and 2018, but since it does not hold any overriding properties, the effect from the changes are somewhat limited. The two characteristics for the Standard-setting are relevance and faithfulness. Relevance means the ability to make a difference in the decisions that are made by the users. To what exactly it means for the accounting data to be faithful, the Conceptual Framework clarifies by elaborating that "*the information must be complete, neutral and free from error*" (IASB, 2018).

3.1.2 Financial statements according to IFRS

The financial statement

Having developed a fundamental understanding of the role of IFRS, this thesis can dig further into the world of accounting. Financial statements are required under IFRS. As stated in the IFRS Conceptual Framework, *"The objective of financial statements is to provide information about an entity's assets, liabilities, equity, income and expenses that is useful to financial statements users"* (IASB, 2018).

As there have been no major changes to the requirements of the financial statement under IFRS, the Standard guiding financial statement is IAS 1 - Presentation of Financial Statements, which was reissued in 2007. IAS 1 *"sets out the overall requirements for financial statements, including how they should be structured"* (IAS, 2007).

The annual report is a primary source through which stakeholders receive information about a company. The financial statement is an integral part of the annual report and is a reliable source since it is audited according to current IFRS Standards. IAS 1 requires *"a complete set of financial statements to comprise a statement of financial position, a statement of profit or loss and other comprehensive income, a statement of changes in equity and a statement of cash flows."* (IAS, 2007). This thesis will focus on the statement of financial position (hereby: balance sheet), the statement of profit or loss (hereby: income statement), and statement of cash flows (hereby: cash flow statement) as these are the three main components of financial statements.

Users of financial statements are different stakeholders, which can be divided into three groups, namely equity-oriented stakeholders, debt-capital-oriented stakeholders, and performance-oriented stakeholders. With a limelight on the relationship between stock price, income statement, and balance sheet, this thesis' focus is within the realm of equity-oriented stakeholders who are interested in calculating the intrinsic value of an asset. Common types of equity-oriented stakeholders include investors, analysts, pension funds, venture capital, and private equity providers (Kinserdal et al., 2017).

Users of financial statements aim to gain a better understanding of how the profits of a company have been produced. For this to be the case, the stakeholder needs a good knowledge of all three main parts of the financial statement. For an overview of the different components in the financial statements, see the appendix section A1.1.

The role of accruals

The financial statement aims to present a relevant and reliable view of the company's ability to create value for its shareholders. Closely related to this is the debate regarding accruals versus cash flows. IAS 1 requires that an entity prepare its financial statements, except for cash flow information, using the accrual basis of accounting (IAS, 2007). As such, the balance sheet and income statement are accrual-based, while the cash flow statement is not. An accrual is a revenue or expense that has incurred and impacts a company's net income in the income statement without a cash transaction having taken place. Accruals also affect the balance sheet through both non-cash assets and liabilities. Common types of accruals are accounts payable and account receivables (Kinserdal et al., 2017).

The use of accruals implicates that the profit of a firm can be viewed through both accrual-based and cash-based performance measures. Accrual-based performance measures are based on the income statement. They include measures like EBIT (Earnings Before Interest and Taxes) and net earnings, while cash-based performance measures include measures like cash flow from operations and free cash flow to equity. There is an ongoing debate as to which performance measures are superior, and both are a part of the value relevance debate.

3.2 Previous research

After gaining insight into the institutional background on IFRS, it is time to move on to the literature on the value relevance of the financial statement, and the research methodology used to explore this area. As an understanding of the underlying profitability and economic position of an asset is a fundamental process to value securities, it follows

naturally that the general literature on this topic is vast. In writing this thesis, we have made a substantial effort in going through a fair portion of the available literature. To structure the highlighted research that this master thesis is influenced by, we have divided the general field into the following main categories:

1. Value relevance of income statement and balance sheet
2. Value relevance of accruals and cash flows
3. Value relevance and IFRS

3.2.1 Value relevance of income statement and balance sheet

The value relevance debate is fundamentally about to what extent the financial statement is relevant for the market value for a company. The discussion regarding the value relevance of financial statements began in the early 1990s. Around this time, there were expressed concerns both in academia and among accountants that current reporting models had remained stagnant while the essence of businesses had changed as current accounting standards had diverged from practices that provide value relevant information (Francis and Schipper, 1999).

The value relevance of the income statement and balance sheet is most commonly tested using the "Ohlson-model" from Ohlson (1995), which is among recent innovation in valuation techniques. As the valuation of a company is a vast topic and only carry value as a subordinated structure in this thesis, development in the valuation field before the Ohlson-model can be found in the appendix in section A1.3.

The Ohlson-model is based on the standard neoclassical valuation model and values a company as the present value of expected dividends (PVED-model). Ohlson assumes that dividends reduce the book value of equity on a dollar-for-dollar basis, but does not affect future abnormal earnings. A further assumption is made that information beyond earnings and book value of equity follows a random walk function so that it can be modeled as

an auto-regressive process (Ohlson, 1995). The model holds appealing properties such as dividend policy irrelevance, similar to Modigliani and Miller (1959) findings.

Since the Ohlson-model's inception in 1995, the regression has been the norm in empirical testing within the value relevance literature, and the model expresses the market value of equity as a function of earnings (EARN) and the book value of equity (BVE). As earnings come from the income statement and the book value of equity comes from the balance sheet, testing the explanatory power, as measured by the R^2 , of these measures on the stock price is a test of the value relevance of the income statement and the balance sheet.

$$P_{t+1} = \alpha + \beta_1 * \frac{EARN}{SHO} + \beta_2 * \frac{BVE}{SHO} \quad (3.1)$$

The main disadvantage of the Ohlson-model is the inability to control for market volatility over time. An underlying stable value relevance in a market with increasing volatility that is not represented in the annual data can wrongfully be interpreted as reduced value relevance, as the variation is not explained by the accounting information (Francis and Schipper, 1999). However, the market volatility has remained relatively stable in Europe, at least since late 2011, following the end of the financial crisis (KPMG, 2019) and (ValueTrust, 2018).

Value relevance can be tested through short-window or long-window analysis. A short-window analysis looks at *"the total return that could be earned from foreknowledge of financial statement information"* while a long-window look at *"the explanatory power of accounting information for measures of market value"*, which is done through a Ohlson-model (Francis and Schipper, 1999).

This thesis will use the long-window approach using variations of the Ohlson-model to test the usefulness of accounting information. This thesis takes a holistic approach to combine all IFRS changes and aims to focus on the interaction between firm value, accounting information, and IFRS legislation, and therefore, it is natural to use a long-window approach.

The first explicit mention of the term "value relevance" is found in Amir et al. (1993), who compared the value relevance of U.S and non-U.S. GAAP accounting standards for companies listed on the U.S. stock exchange to understand both which accounting standards and accounting items were the most value relevant. The paper found that both earnings and shareholders' equity are value relevant, and U.S. GAAP is more value relevant than the mix of non-U.S. GAAP systems (Amir et al., 1993).

An essential contribution to the value relevance debate was Collins et al. (1997), who investigated the systematic changes in the value relevance of both the income statement and balance sheet over time. Based on the Ohlson-model, testing the R^2 of the book value of equity or earnings per share alone shows the individual value relevance. The total value relevance is determined by running a regression using both earnings and book value of equity. As such, the incremental value relevance of earnings (book value of equity) is the total value relevance less the value relevance of the book value of equity (earnings), which can be seen as the amount of the joint information not explained by the book value of equity (earnings) (Collins et al., 1997). Based on sample data from 1953 to 1993, Collins has three major findings: i) The paper does not support the hypothesis that the value relevance of earnings and book values has decreased. According to their finding the value relevance has increased over the past 40 years. ii) The incremental value relevance of bottom-line earnings has decreased, as it has been replaced by an increased value relevance of book earnings. iii) The shift of value relevance from earnings to book value comes from one-off items, which has increased in frequency and magnitude, as well as a higher frequency of negative earnings, changes in firm size, and increased use of intangible assets across time (Collins et al., 1997).

Francis and Schipper (1999) adds to the debate on the value relevance of financial statements in a similar manner to Collins et al. (1997). The paper follows the Ohlson-model and uses the book value of equity and earnings as proxies for the combined value relevance of the income statement and balance sheet. The tested time period is 1952 - 1994. The paper finds that the explanatory power of earnings has decreased and the explanatory power of equity has increased (Francis and Schipper, 1999), in line with the findings of Collins et al. (1997). Elliott (1995) noted that financial statements have become less relevant because it does not pay attention to information-age assets like a firm's capacity for

innovation and human resources, which leads to less relevant information being expressed through financial statements.

As seen in both Collins et al. (1997) and Francis and Schipper (1999), R^2 is the key metric in determining the value relevance of the income statement and the balance sheet, measured through the Ohlson-model of earnings per share and book value of equity per share. Thus, additional factors manipulating this metric becomes important to adjust for. An important contribution to the improved method of measurement was through Brown et al. (1999). This paper shows that company growth followed by stock splits affect the earnings per share, and thus create noise in the data using the Ohlson-model. As explained in the article, if a firm does a 2:1 stock split, both stock price and EARN is half of what it was last period, and regression of price on EARN will thus yield a higher R^2 indicating increased value relevance (Brown et al., 1999). The authors highlight that in future research on value relevance, researchers must deflate observations by a proxy for scale for the results to increase their validity. This thesis will follow the recommendation of Brown et al. (1999) to improve the validity of the analysis.

3.2.2 Value relevance of accruals and cash flow

Tests on accruals versus cash flow

The previously mentioned literature on value relevance has examined the value relevance of the financial statement through looking at the income statement and the balance sheet, and assessed the value relevance using the Ohlson-model. However, a third and important part of the financial statements is the cash flow statement. Opposed to the balance sheet and the income statement, which are accrual-based, the cash flow statement is naturally cash flow based. A key question is if the cash flow statement has value that is incrementally useful compared to the accrual part of the financial statement - the income statement and the balance sheet.

The Ohlson-model does not include a cash flow component and as such, tests for the value relevance of cash flows can not directly use this model. In examining the value relevance

of accruals and cash flows Banker et al. (2009) expanded the Ohlson-model to also include cash flow from operations per share (CFO) as shown in the equation 3.2, noting that this is necessary to evaluate the value relevance of cash flows. Banker et al. (2009) also expanded the framework for analyzing the incremental value relevance of accounting items found in Collins et al. (1997) and viewed the incremental value relevance of cash flows as the total value relevance of earnings, book value of equity and cash flow from operations, less the value relevance of earnings and book value of equity.

$$P_{t+1} = \alpha + \beta_1 * \frac{EARN}{SHO} + \beta_2 * \frac{BVE}{SHO} + \beta_3 * \frac{CFO}{SHO} \quad (3.2)$$

Bowen et al. (1987) published a paper on the incremental information content of cash flows in relation to accruals when it comes to security pricing. Bowen took the view that there is a total amount of market information, and to understand the value relevance of the cash flow versus accruals there is a need to know if they express information that is both individually and incrementally important. The two key findings were that cash flows have incremental value relevance compared to both earnings alone and also compared to accruals jointly, of the tested cash flow metrics, cash flow from operations performed particularly well (Bowen et al., 1987).

With the information that cash flows have information that is incremental value relevant to accruals, the next question at hand is whether accruals or cash flows are a better predictor of future cash flows.

Dechow (1994) used empirical tests to explore circumstances where accruals improve earnings ability to measure the firm's performance, as measured by stock returns. The circumstances are that i) with shorter performance measurement intervals, ii) with greater volatility in working capital, investments and financing activities, and iii) the longer the firm operating cycle. For all of these circumstances, the value relevance of cash flows decreases. Earnings are better predictors for future cash flow than the current cash flow according to Dechow (1994).

In a later paper, Dechow et al. (1998) explored the relation between earnings and cash flows

using a theoretical model of a random walk sales process. The theoretical model shows that earnings are better to predict future cash flows than current cash flows. Findings strengthens as a function of the length of the cash conversion cycle. The theoretical model is then compared to 1337 sample firms to prove that the model is consistent with actual data.

The aforementioned papers all look at accruals aggregated. Barth et al. (2001b) further investigated accruals and the prediction of future cash flows based on the model of Dechow et al. (1998) and found that when attempting to predict future cash flows, disaggregating accruals into its components such as accounts receivable, payable and inventory increases the predictive ability of accruals. The predictive ability of disaggregated accruals and cash flow components of earnings has a higher predictive ability than aggregated earnings by itself. As such, previous studies exploring the value relevance of accruals may have understated its importance, as disaggregating accruals reveals more information. This is in line with the stated objective of the IASB, which is that the earnings with its accrual components should provide a better indication for future cash flows than current cash flows.

With a vast amount of literature on the topic of accruals and cash flows it become rather crucial that there is a scientific agreement as to just how these are to be measured. Sloan et al. (2018) claims while the research on accruals has been pervasive, the modeling of accruals in research papers has been inconsistent. In this paper, the authors offer a comprehensive definition of accruals that should be used by researchers going forward to ensure consistency between research papers (Sloan et al., 2018).

Accrual anomaly

Earnings are made of cash and accruals, and Graham and Dodd (1934) claimed that investors should prefer the cash piece of earnings more so than the accrual piece of earnings. After the introduction of the market efficiency hypothesis developed by Fama (1970), all evidence that contradicts this fundamental assumption of corporate finance has been declared an "anomaly." A key question in fundamental analysis is which earnings measures to focus on and if investors do in fact focus on cash flows rather than accruals.

According to the theory there should be a higher valuation of cash flows than accruals. This is because cash flows are realized, while accruals will give a realized future cash flow, and are subject to discounting and risk (Pfeiffer and Elgers, 1999). Evidence from reality was different, so in an influential paper Sloan (1996) found evidence that the market undervalues cash flow components of earnings, and thus overvalues accrual components of earnings. To compare firms of different sizes, Sloan divided the accruals, cash flows and earnings by total assets. Accruals are changes in assets, so a substantial change in the level of assets means that the accrual contribution to earnings is high. Sloan rated companies by the degree to which accruals contributed to earnings and found that high accrual companies with high earnings quickly converged to lower earnings.

A company with high earnings is expected to have reasonably high earnings going forward, but the likelihood is affected by whether the high earnings come from accruals or cash flow, with the former reducing the persistence of high earnings. Companies with the highest share of accrual earnings had the lowest return in t_{+1} and t_{+2} , consistent with investors not expecting the drop in earnings. Sloan thus concluded that companies with a high level of accruals will experience negative future abnormal stock returns and that investors do not correctly use publicly available information. However, the mispricing is gradually corrected over a period of three years after the reported earnings as it becomes clear that the accruals do not transform into cash earnings. In sum, Sloan states that an investor should trust the cash piece of earnings more so than the accrual part of earnings. Collins and Hribar (2000) investigates whether the findings of Sloan (1996) hold for quarterly data and finds that the market appears to overestimate the persistence of the accrual component of earnings, supporting the findings of Sloan (Collins and Hribar, 2000).

3.2.3 Value relevance and IFRS

Impact on accounting standards

With an understanding of the debate surrounding value relevance it is further interesting to explore the implications of this debate. Holthausen and Watts (2001) claims that there is a lack of usefulness in the value relevance literature. According to the authors has

limited application for standard-setter as *"Our evaluation concentrates on the accounting, standard-setting and valuation theories underlying the value-relevance literature's standard-setting inferences. The reason is those inferences are likely to be useful to standard setters only if the underlying theories are descriptive"*, noting that they are not descriptive (Holthausen and Watts, 2001). Barth et al. (2001a) takes an opposing view, explaining that existing research on value relevance aims to explain to what extent accounting numbers reflect the information that is used by equity investors, as well as how these findings are important for standard-setters. The authors highlight that one of the main focus of the financial statement is on equity investment. The fact that the information found in the financial statement is also relevant for management compensation and debt contracts does not diminish the focus on equity investment, which is the focus in the value relevance research. Barth et al. (2001a) further disagrees with Holthausen and Watts (2001) in that there is not a presence of underlying descriptive theories. The authors here highlight that the Conceptual Frameworks of accounting articulate the theories of both accounting and standard-setting, and that the value relevance debate is operationalised using well-accepted valuation models, such as Ohlson (1995), to assess the relevance and reliability of the financial statements.

It is further interesting to look further into other research regarding the adoption effects of IFRS. Ahmed et al. (2013) did a meta-analysis of these effects and found that the findings vary. Still, overall findings suggest that the value relevance of the book value of equity has not increased after the adaptation of IFRS, while the value relevance of earnings has increased. The paper also finds that analyst forecasts have improved, suggesting increased value relevance of the financial statement. There are further studies done on a cross-section of European countries. Clarkson et al. (2011) explores the value relevance of the book value of equity and earnings before and after the introduction of IFRS for 15 countries but did not find evidence that IFRS improves value relevance using the Ohlson (1995) approach, but found that IFRS enhances comparability between countries. Devalle et al. (2010) explored the value relevance for Germany, Spain, France, England and Italy and no evidence for increased overall value relevance, but increased stock price influence of earnings after the implementation of IFRS. As for country-specific papers Callao et al. (2007) found no improvement in the value relevance post-IFRS in Spain in the short term,

but speculated that this may increase in the long run, Kargin (2013) found improved value relevance for the book value of equity in Turkey, and Dobija and Klimczak (2010) saw no increase in value relevance after IFRS adoption in Poland. As such, current literature on the value relevance effects of IFRS suggests that there has not been an increase in the value relevance.

Visualizing value relevance

In the examination of the relationship between both the income statement and balance sheet, and between accruals and cash flows versus security price return, there can exist multiple alternatives scenarios. In order to clarify the different forms of possible relationships our explanation will be aided by visualizations presented below, similar to the work of Bowen et al. (1987).

The size of the square in figure 3.1 indicates the complete market information available and follows the assumption that prices fully reflect the total available market information at any point in time. The square, therefore, contains all information that is relevant for equity investors in order to value securities accurately. The inferences from the visualization is not particularly vulnerable to whether this assumption is wholly fulfilled, as this is simply a helpful tool to understand nuances rather than a stringent theory. Moving on, the size of the circles represent the total stand-alone explanatory power of accrual-based financial items and cash flows. The overlap between the two circles represents the value relevance revealed by either one of them, which is the common explanatory power. Somewhat simplified, the main scenarios for the relationship between accruals and cash flows can be visualized as A: Both individually significant and incrementally value relevant, B: Both individually significant but neither individually value relevant or C: Both individually significant but only one incrementally value relevant, as seen in figure 3.1.

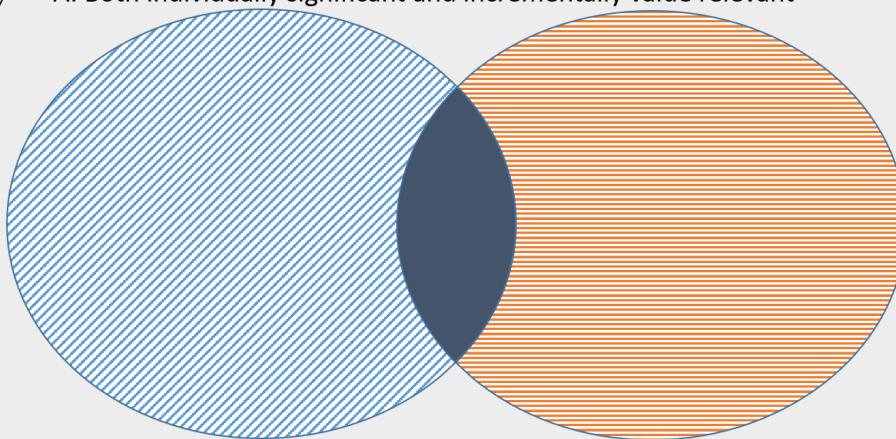
Other scenarios not visualized include, among other less plausible options, that neither of them are important or that they are only important in union.

The motivation behind the chosen explanation is to highlight two differences that will be important to clarify in the following discussions. When we refer to a change in value

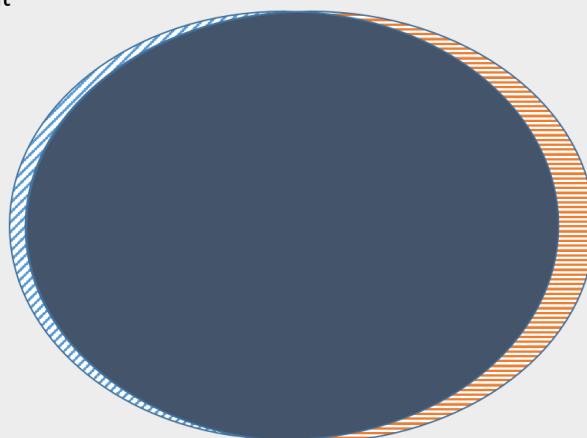
Figure 3.1: Illustration of Bowen

- Common – Informational overlap
- ◐ Inc. R2 of Income Statement
- ◑ Inc. R2 of Balance Sheet
- Size of square is total market information: $R^2 = 100\%$

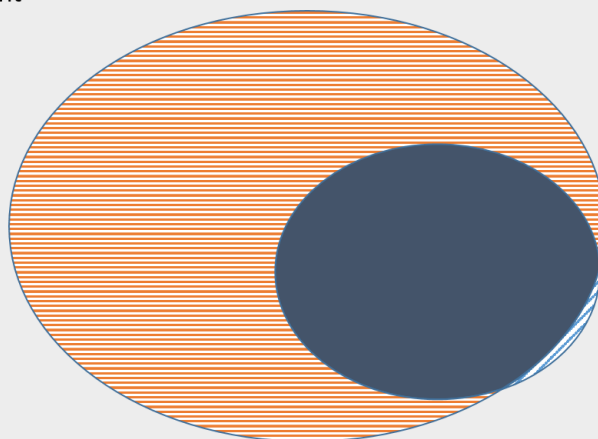
A: Both individually significant and incrementally value relevant



B: Both individually significant but neither incrementally value relevant



C: Both individually significant but only one incrementally value relevant



relevance the focus is on the total R^2 of a variable. In contrast, changes in the incremental value relevance is the total size subtracted by the overlap. An increase in value relevance measured by explanatory power can occur if either the total explanatory power of a variable increase *more* than the increase in overlap or if the overlap decreases *more* than the decrease in size. The change in overall value relevance of the Ohlson-model is then the net of both changes in the total size and overlap.

3.3 Hypothesis development

Based on the institutional background on IFRS, the literature on value relevance, and the link between value relevance and IFRS, we will form hypotheses for the effect of impactful IFRS Standards on the value relevance of the income statement and the balance sheet. As several IFRS Standards are endorsed and issued at the same time, the testing of value relevance will be based on time periods. This thesis will review each period using examples, accounting theory and existing value relevance literature to build a hypothesis on the effect of new IFRS Standards on the value relevance of the financial statement for each period.

3.3.1 Time periods

Value relevance pre and post IFRS adoption have been tested in multiple countries as seen in Ahmed et al. (2013) and Clarkson et al. (2011) and for individual countries as seen in Kargin (2013), Callao et al. (2007) and Dobija and Klimczak (2010). In contrast, this thesis aims to examine the development across Europe within the IFRS period, not compare the value relevance before and after. The starting period of this thesis will be 2005 when IFRS became mandatory, and the last period will be the last quarter of available data, which is 2019 Q2.

2005 to 2019 Q2 has to be divided into periods so that each period includes at least one IFRS Standard with a hypothesized substantial effect, and also are not too close together

which enables better comparability. In appendix section A1.2 we elaborate on the periods, including an explanation of why the lines were drawn at those periods and the notable IFRS changes that happened within the different periods. Classification of the total IFRS period into time periods to test the development has been conducted by scrutinizing each IFRS Standard and revision in detail.

After bundling the most considerable changes together in periods, setting the starting- and stopping point in between periods is not straight forward. All IFRS changes have to be endorsed by the European Financial Reporting Advisory Group (EFRAG) before it can become effective. When EFRAG publish their official endorsement, an EU effective date is set for when the policy change becomes mandatory to comply with (EFRAG, 2019). IFRS allows for early adoption, and for Standards, this is generally for one year ahead. The larger listed companies in the EU, which have strong financial reporting capabilities, typically early adopt to the IFRS change as long as EFRAG officially endorses the change (see for instance Nordisk (2012) or Amadeus (2018)). However, this is not the case for all companies, and to make matters worse, which company adopts when also varies depending on whether the accounting policy change have positive reporting effects for a said company or not. The table below shows when the different IFRS Standards were endorsed in the EU.

As it is not practical to manually check each company for the adoption date of each IFRS change, there is a need for simplification. What can be said for sure is that from the day EU has officially endorsed a pending IFRS change, European companies gradually adapt to the change some time in between the endorsement date and the mandatory date. By setting each period start at the endorsement date, we can be certain that each period includes the full effect from each change, and therefore each period's starting point will be the EU endorsement date. Based on the explanation of IFRS Standards in the appendix section A1.2 and EU endorsement dates, this thesis will divide the IFRS period into the periods seen in table 3.1. As 2005 - 2007 end of year does not have a previous IFRS period to be compared to this period is numbered as time period 0. IFRS Standards 1 - 7 are not shown in table 3.2 as they fall under or before time period 0 from 2005-2007 end of year. As such, hypotheses are developed for time periods 1 - 4. Table 3.2 shows IFRS Standards from period 1 to period 4, in addition to which time period the IFRS Standard

falls within. Although IFRS 8 - Operating Segments was endorsed at the very end of time period 0 it will mark the beginning of time period 1 in the analysis due to the lag effect from the date of endorsement that is discussed under section 4. The same goes for the series of IFRS Standards endorsed in the second half of 2012 (which is period 1), but affect the financial statement from period 2. Additionally, IFRS 9 - Financial Instruments is excluded from the analysis as the implementation was postponed until 2018 and that it primarily is a Standard to regulate financial companies who are removed from our sample set in line with previous research.

Table 3.1: IFRS Time periods

Time period	Years
0	2005-2007 end of year
1	2008-2012 end of year
2	2013-2016 end of year
3	2017-2017 end of year
4	2018-2019 end of second quarter

Table 3.2: IFRS Standards in time periods 1-4

IFRS Standard	EU endorsement date	Effective date	Period
IFRS 8 - Operating segments	22nd Sept, 2007	1st Jan, 2009	1
IFRS 9 - Financial Instruments	22nd Nov, 2016	1st Jan, 2018	x
IFRS 10 - Consolidated Statement	11th Dec, 2012	1st Jan, 2014	2
IFRS 11 - Joint Arrangements	29th Dec, 2012	1st Jan, 2014	2
IFRS 12 - Disclosure of interest	30th Dec, 2012	1st Jan, 2014	2
IAS 19R - Pension liabilities	6th June, 2012	1st Jan, 2013	2
IFRS 13 - Fair value	29th Dec, 2012	1st Jan, 2013	2
IFRS 14 - Reg. Deferral accounts	No endorsement	1st Jan, 2013	2
IFRS 15 - Revenue recognition	29th Oct, 2016	1st Jan, 2018	3
IFRS 16 - Leasing	9th Nov, 2017	1st Jan, 2019	4

3.3.2 Hypothesis for each time period

Hypothesis on time period 1: 2008 - 2012 end of year

The material change going into effect from 2008 was new regulation to disclose information on the operating segments through IFRS 8 - Operating Segments, which was endorsed in September 2007 (EFRAG, 2007). There are no apparent downsides of the reporting from an equity investors' perspective, even though company management may feel that

they are required to disclose information they were reluctant to share with competitors. However, when assessing the effect on value relevance, it is essential to measure the IFRS Standard against its predecessor, which was IAS 14. As explained in the appendix in section A1.2, the change faced criticism, and the auditing company EY explicitly said that the change could result in less comparability (EY, 2007). The reason for this was that the new Standard focused on a "management view", meaning that segment reporting could be reported similarly to how it was reported internally to managers. This approach meant that the number would be more company-specific and linked to internal procedures as opposed to the general IFRS Conceptual Framework. By doing so, it could result in less uniformity in the reported figures between companies.

The IASB handled this by imposing strict disclosure requirements for how the segment calculations were done, but this does not change the effect that the numbers become less comparable between companies, and thus create more noise in a regression analysis. The same effect will appear in the balance sheet, where assets and liabilities also could be linked to the individual segments using the "management view". In addition to the reduced comparability, there exist incentive issues in terms of the quality of information the management wishes to give out publicly. On one side, management wants to keep investors enlightened and provide them with the best possible information. On the other hand, the operating revenue and profits of different segments would reveal information on prices, deals and growth rates for different segments that could be exploited by existing competitors, or even attract new competitors. In that case, it is in the companies own interest to display a fogged view of the operating segments to avoid revealing sensitive information to competitors. The new Standard, with its focus on "management view" offers more possibilities to do so compared to the more rules-based and stringent IAS 14.

Hypothesis for period 1: Decreased value relevance of income statement and balance sheet

Hypothesis on time period 2: 2013-2016 end of year

By January 1st, 2013, a plethora of changes was introduced where multiple of these can have a material impact on the value relevance. In the following, we conduct a brief discussion of the different IFRS Standards and their expected effect before tying it all up

together and pointing at the main effects that drive the hypothesis.

IFRS 10 - Consolidated Financial Statements

Firstly, the Standard posed requirements for when entities had to create consolidated financial statements. Secondly, the arguably most significant effect from the Standard was the fact that consolidated financial statements must eliminate intragroup balances, meaning that entities owning subsidiaries in multiple stages in a vertical value chain had to remove all the intragroup balances. Before this, equity investors could not be confident about what percentage of revenues that came from mutually controlled entities, making it hard to assess the future growth potential or actual market penetration. Also, it reduced the wiggle room for earnings management or smoothing of the financial results between mutually controlled entities. The increased transparency should reflect in more faithful numbers, which all else equal will mean that an equity investor will value an additional Euro of earnings higher since it now is of higher quality. In terms of overlap between accruals and cash flows, the removal of the intragroup balances should lead to a lower degree of accrual earnings, meaning that the cash flow component of earnings is larger, thus creating a larger overlap between the two, especially for annual data.

Hypothesis for IFRS 10: Increased value relevance of income statement and balance sheet.

IFRS 11 - Joint Arrangements

IFRS 11 set out to clarify the requirements for a joint arrangement and whether that was a joint venture or a joint operation. Joint ventures would be accounted for in the balance sheet using the equity method, whereas joint operations would be accounted for as they were the companies' assets. The difference affects the balance sheet as the assets recognized in the balance sheet is likely to be substantially higher in a joint operation where normal IFRS regulation apply, compared to using the equity method for joint ventures. The IASB has issued changes and clarifications on the Standard, and it is currently subject to a PIR (Post Implementation Review) to clarify whether or not it functions as intended. However, it was heavily criticized already prior to its implementation, where leading accounting firms were negative to the change. Deloitte expressed in their pre-

implementation comment letter that *"The argument that proportionate consolidation is inconsistent with the Framework, without a true and thorough analysis of accounting for joint arrangements, in our view, leaves the IASB open to criticism that it has proposed a solution only for the sake of US GAAP convergence"* (Deloitte, 2019). EY commented that *"We are concerned that the equity method has not been subject to a thorough analysis – a method which we believe also has major shortcomings and inconsistencies with the Framework"* (EY, 2011a). In light of the heavy criticism and the ex-post need for further clarifications, and the sharp balance sheet difference between operations and ventures, which can be a thin line.

Hypothesis for IFRS 11: No change in value relevance of income statement and decreased value relevance of balance sheet.

IFRS 12 - Disclosure of Interest in Other Entities

The introduction of Disclosure of interest in other entities was to help users better understand the risks and liabilities linked to interest in other entities such as subsidiaries. Since this is more of a risk related disclosure, with a limited direct effect on accruals, it is expected to have limited influence on the value relevance of the income statement and balance sheet. However, one could argue that a deeper understanding of the risks linked to subsidiaries will manifest itself in a change in the regression coefficients of, for instance, earnings as a result. The reason for so is that the equity investor gets better information about risk to assess the likelihood of whether or not the reported earnings will be attainable to the investor. Even though the underlying risk of the company is, of course, unaffected by an accounting policy change, the policy change could result in better information to investors and thus reduce the informational uncertainty.

Hypothesis for IFRS 12: No hypothesized change in value relevance.

IFRS 13 - Fair Value Measurement

The income statement and the balance sheet are inextricably linked to one another in the sense that the balance sheet is the manifestation of accumulated income statements. On

the flip side, no change can happen in the balance sheet without being recorded in the income statement. As a natural consequence, an updated or frequently revised balance sheet on fair values will distort the income statement by adding a lot of noise, for instance, due to the revaluation of assets such as financial instruments, livestock, or goodwill. For instance, the reassessment of all livestock for the industry leader in salmon fish farming, Mowi (previously Marine Harvest), to be done on sales price per kilo less cost of sales, create massive fluctuations in the quarterly earnings, rendering them close to useless to estimate the underlying economic result. This anecdotal example highlights the effect that stems from how a frequently revalued balance sheet creates noise for the income statement. However, if the livestock was not valued at fair market value, the assets in the balance sheet would not represent the market value. That would make the balance sheet less value relevant for an equity investor that value the company on total enterprise value less debt. The stock price correlates heavily with the market price of one kilo of salmon, and now since the balance sheet does the same due to fair value estimation of livestock, the correlation is stronger. However, the Standard does not increase the use of fair value, it merely regulates how fair value estimation should be done. In that case, it might only lead to higher comparability.

Hypothesis for IFRS 13: Decreased value relevance of income statement and increased value relevance of balance sheet.

IFRS 14 - Regulatory Deferral Accounts

Regulatory deferral accounts is expected to have a minimal effect on the value relevance, as this is more of a niche Standard aimed at companies delivering products to customers with a fixed government price where the government ensures that total costs are covered. Overall, this is an issue that is only relevant for a small portion of companies, and is in all assumed to have little impact on the value relevance.

Hypothesis for IFRS 14: No hypothesized change in value relevance.

IAS 19R - Employee Benefits

The last change by January 1st, 2013 is not an IFRS Standard, but a revision of the previous IAS regulation on employee benefits. The effect was highly relevant for companies using defined benefit pension plans. One extreme example of this was the largest airline in the Nordics in 2012, where they had a book value of equity of 11 billion SEK and unrecognized pension liabilities of 13.5 billion SEK, effectively being bankrupt (Kinserdal et al., 2017). The revision meant increased balance sheet volatility for the companies that were using the corridor approach. Still, the net profit was not affected by the re-measurements as this was only accounted for in other comprehensive income. The exemption from net income means that the changes will be materialized in the balance sheet as opposed to in the income statement. Similar to the covenants issues that the new leasing Standard had, this revision could dramatically decrease the equity share of total assets for many companies.

EY stated in their publication after the revision was known that *"These changes will result in increased balance sheet volatility for those entities currently applying the corridor approach. Entities should carefully consider how these changes will impact their key balance sheet metrics or debt covenants on a continuing basis"* (EY, 2011b). As to the effect on the value relevance, one would expect that the value relevance of the income statement would stay the same since the changes were only introduced in OCI. However, for the balance sheet, the changes were dramatic for some companies, and the magnitude of change in the balance sheet compared to the lower magnitude of change in stock price should result in a lower correlation between the two.

Hypothesis for IAS 19R: Decreased value relevance of balance sheet.

Overall hypothesis for 2013-2016 end of year

In light of the many changes going into effect from January 1st, 2013, it is a challenging task to tie it all up to one coherent hypothesis. The consolidated financial statement Standard should improve the transparency of financial accounting, whereas, on the other side, the joint arrangements Standard created uncertainty and somewhat arbitrary differences in accounting policies. The regulation of fair value estimates should result in higher comparability, which again leads to greater value relevance of book value. As for the

IAS 19 revision, the balance sheet would reveal more information, but the additional information could also be labeled as noise.

Hypothesis for time period 2: Decreased value relevance of income statement and increased value relevance for the balance sheet

Hypothesis on time period 3: 2017-2017 end of year

By January 1st 2018, a new Standard was made effective, addressing the important aspect of revenue recognition. Revenue growth is one of the most important value drivers in financial modeling, and companies missing their announced growth target in quarterly reports often find themselves heavily punished measured by stock price reactions. In addition, top-line growth is often also linked to management incentives, where the independent consultancy firm Compensation Advisory Partners in a 2017 survey found that revenue and profitability was the most common thing to measure in bonus programs (Partners, 2019). In essence, revenue and revenue growth are some of the most important financial numbers. Perhaps not surprising that premature revenue accounting was the most pressing concern for the SEC in the US (Turner, 2001). As revenue recognition is regulated tighter with the new Standard, the expected effect is that i) the reliability of income statement and accruals in the balance sheet increases. We also expect that stricter rules on revenue recognition mean that revenue will be accounted for at a later stage, reducing the percentage of accruals in income statement items such as earnings and thus increasing the overlap between the income statement and cash flows. With more strict rules accruals in the balance sheet, the accruals that pass the strong revenue recognition regulations should be considered safer. Thus the coefficient for book values is expected to increase.

Hypothesis for time period 3: Increased value relevance for income statement and balance sheet.

Hypothesis on time period 4: 2018-2019 Q2

In 2019 IFRS 16 - Leases became mandatory, regulating the use of leases. The major

change was that all leases had to be accounted for in the balance sheet, where companies that previously leased a large portion of their assets as operating leases now had to add them to the balance sheet. This posed significant challenges for multiple companies due to debt covenant constraints and hit airlines and retail concepts that rented their locations hard, as seen with XXL in section A1.2 in the appendix. In addition, the multiples of industries changed dramatically, as both EBIT and EBITDA increased since the operating leases were now accounted for as a financial expense and not an operating cost. The change gives rise to two questions. The first being if investors, since they now observe the changes in the income statement and balance sheet, value companies differently. However, since the information should largely be known in the market as it has been disclosed in the notes for a long time, the stock price reaction should be very limited. The second part is whether or not this inclusion increases the value relevance of accruals since they now incorporate more information. This is a plausible scenario since relevant information that previously was held in disclosed notes now is reported as accounting items, and accounting data should, therefore, incorporate that information. On the flip side, the accounting reaction can be rather large since the assets are significantly changed as a result of Standard, as the example with XXL showed. A substantial change in the financial statements coupled with a much smaller change in the stock prices should reflect in a lower correlation, meaning that the value relevance measured as explanatory power is expected to decrease.

Hypothesis for time period 4: No change in value relevance of income statement and decreased value relevance of balance sheet

Overview of hypotheses

A full overview of this thesis hypothesis is seen in table 3.3. An important point to make is that while this thesis will test the value relevance of the cash flow statement comparatively to the income and balance sheet statement, we have not made any hypothesis for this. The reason being that IFRS Standards target the income statement and balance sheet and cash flows are unaffected by changes in accounting policies.

Table 3.3: Overview of hypotheses

Time period	Years	Hypothesis
1	2008 - 2012	Decreased value relevance of income statement and balance sheet
2	2013-2016	Decreased value relevance of income statement and increased value relevance for the balance sheet
3	2017-2017	Increased value relevance for income statement and balance sheet
4	2018-2019Q2	No change in value relevance of income statement and decreased value relevance of balance sheet

4 Method

As stated in section 1 the aim is to explore if the new IFRS Standards have been able to improve the value relevance of the financial statements. To evaluate the changes, a lot of methodological decisions that have to be made. The chosen methodology will be largely based on the contents of both section 3.1 and section 3.2, and we will, in line with previous literature, follow a quantitative deductive approach to test the hypotheses outlined above. This will be tested by evaluating the value relevance of the financial statement measured through the explanatory power of the income statement and balance sheet on the next quarters' stock price based on the Ohlson-model.

4.1 Data selection

Sample selection

From section 3.1, it is evident that IFRS is mandatory for EU listed companies, and as such, it is natural for this thesis to analyze European companies, but the question is which European companies to include. Ideally, the data should represent the majority of the European market across a variety of countries, as well as companies of different sizes, to be able to measure the full effect of the changes in IFRS in Europe. The STOXX 600 Index includes 600 large, mid and small capitalization companies at any given time, across 19 European countries. The market capitalization in the STOXX 600 portfolio covers around 90 percent of the total free-float market capitalization in Europe in total (STOXX600, 2011). By combining a portfolio of all companies that have been included in the STOXX 600 since IFRS became mandatory in 2005 until today, we get a collection of 898 companies that strongly represent the European free-float market capitalization. With a highly representative sample, the analysis has high external validity, which will allow us to make inferences for the entire population of companies using IFRS based on our sample.

Measurement interval

The Ohlson-model and its modifications require data input from the financial statement. A key question is if we should use quarterly or annual data. Section 3.2 showed that seminal papers like the Collins et al. (1997) and Francis and Schipper (1999) use annual data for examining value relevance from the 1950s to the 1990s. The use of annual data in these studies is most likely because the sample size is already quite large due to the number of years tested. Collins and Hribar (2000), on the other hand, used quarterly data in comparing the predictive ability of accruals versus cash flows in a shorter time interval of 9 years.

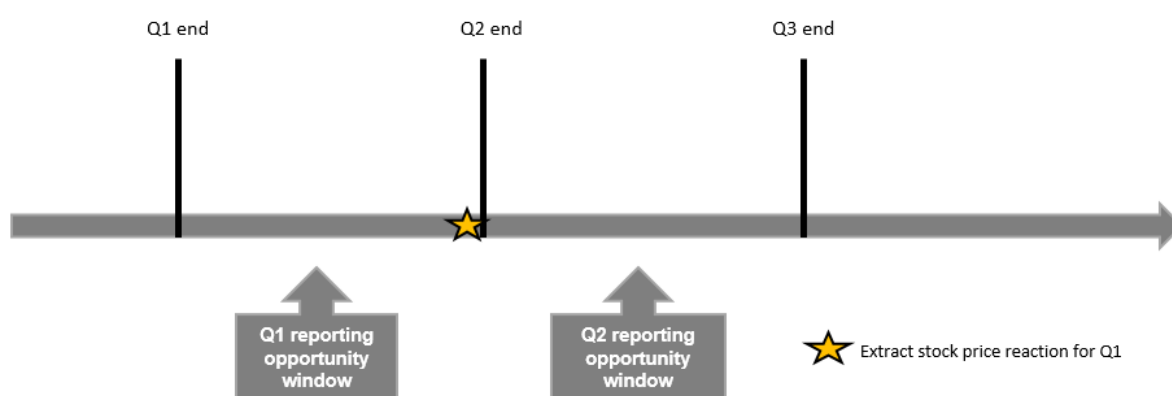
In the STOXX 600 sample set, every company but one reports quarterly reports. The IFRS does not require quarterly financial reporting, but since it is mandatory in the US, it is standard practice for EU listed companies to do as well. As the newly effective IFRS 16 - Leasing has been discussed widely, this was an exciting period to evaluate, and this necessitated quarterly data. For annual statements, the newest available data is taken from the annual statements of 2018, but for quarterly data, the newest available data is 2019 Q2. Given complete information on all the metrics, it is ideal to have the highest possible measurement frequency within any year to maximize sample size. Quarterly data increases the number of observations for the period, which is shorter than the four decades analyzed by Collins et al. (1997) and Pfeiffer and Elgers (1999) and closer to the time period seen in Collins and Hribar (2000). As effectively all companies in the STOXX 600 portfolio report quarterly data, this thesis will primarily use quarterly data. Testing of time interval sensitivity is also conducting using annual data.

How to measure stock price reaction consistently

As quarterly reporting is not mandatory within IFRS, EU listed companies do it because it is the norm, setting the measurement date is not straight forward. For annual measurements, the time period for measuring the stock price reaction to the financial statement is often set at three months after year-end. For quarterly data, fewer research papers have been published. However, Easton and Zmijewsk (1993) found in a US study that the earnings report becomes publicly available at an average of 44.7 days after the

fiscal quarter-end, which was 14.7 days after the earnings announcement date. With the innovation in technology and high-speed algorithmic trading, this number is likely to have been reduced. To hedge against uncertainty, we follow conservatism, similar to that of Collins and Hribar (2000) did by extending the public date to 18 days after the announcement. Since we can not validate the time of the announcement except knowing that the Q1 report is published before Q3 starts, we choose the last day of Q2 as the price reaction to the quarterly earnings in Q1, as shown in figure 4.1.

Figure 4.1: Timeline for stock price measurement



4.2 Data adjustment

Adjusting accounting information

Financial statement data and stock data was collected in COMPUSTAT and merged with R, where a detailed overview of how the data was collected can be found in section A2 in the appendix. Accounting data is exported from COMPUSTAT in whole millions in the local currency. The stock data is naturally on a per-share basis. To facilitate a comparison between whole numbers and a stock price per share, we have to deflate each accounting number by the number of outstanding shares for the quarter multiplied with the cumulative adjustment factor AJEXDI to facilitate comparison across time as discussed by Brown et al. (1999). Stock prices gets multiplied with the cumulative adjustment factor for the same reason. In running the regression, we will keep the accounting information in millions per share. As such, in running a regression of for example, the dependent variable

share price t_{+1} and the independent variable earnings (millions) per share, the coefficient would state the change in price t_{+1} per million change in earnings. Furthermore, currency rate data from the Norwegian Sovereign Bank is used to adjust all the non-Euro data to Euro. The balance sheet items are currency converted based on the conversion rate last day of the quarter, and income statement and cash flow statement items are converted based on the quarter's average currency conversion rate.

Filtering

In line with Collins et al. (1997), Sloan (1996) and Bowen et al. (1987), the banking industry, identified by GIC Sector code, is removed from the sample set. Besides, to avoid double counting of stocks with multiple stock classes, only primary public offerings are counted by filtering on issue ID 01W in COMPUSTAT. After doing so, the sample set contains 36,863 firm-year observations, which are quite evenly spread out over the different year. A more detailed overview is found in the appendix part A2.

Additional variable definition

Most of the variables are taken directly from COMPUSTAT and explained in the appendix in table A2.1 and table A2.2. However, some variables had to be created based on other COMPUSTAT variables to follow the best practice on the measurement of accruals suggested by Sloan et al. (2018). For a summary, see table 4.1.

Table 4.1: Definition of variables used in formulas

Variable	Variable design	Abbreviation
Earnings	Gross profit - Tax payable	EARN
Equity	Total assets - Total liabilities	BVE
Cash flow from operations	No formula	CFO
Comprehensive accruals	Delta equity - delta cash and short-term investments	COMPACC
Free cash flow to equity	Earnings - delta COMPACC	FCFE
Shares outstanding	Adjusted shares outstanding	SHO
Price	Adjusted price	P_{t+1}

In table 4.1, we see the use of Sloan et al. (2018) measure of accruals "COMPACC". The measure created by calculating the net change in the accrual accounting process, so the aggregate change in liabilities needs to be subtracted from the aggregate change in

non-cash assets. Sloan et al. (2018) refer to this as the comprehensive accruals for the period (COMPACC), and measure this as the change in common stockholders equity (CEQ) less the change in cash and cash equivalents (CHE). Let:

$$COMPACC = (CEQ_t - CEQ_{t-1}) - (CHE - CHE_{t-1})$$

Where CEQ is "Stockholders Equity - Total" and CHE is "Cash and short-term investments" in COMPUSTAT. Cash and short-term investments are not the same as cash and cash equivalents, which would be the optimal measure, but the COMPUSTAT database has a lot of blanks for cash and cash equivalents, making cash and short-term investments a better approximation.

Following this definition, it comes naturally that free cash flow to equity holders (FCFE) is simply the part of earnings that is not comprehensive accruals, let:

$$FCFE = EARNINGS - COMPACC$$

Earnings are defined as the COMPUSTAT item Pretax Income subtracted with the item Tax Payable.

Data manipulation

As the data is quarterly, but the regressions aim to show annual ratios of, for example, EARN, the quarterly data in the income statement and cash flow statement are annualized by multiplying the variable with 4. The annualization does not affect the regressions as the variables are only scaled. All it does it affect the regression coefficients, making it more comparable to previous research and intuitive to explain.

The last part of data manipulation is winsorization. Given the large size of the data set and the use of quarterly data, there are several large outliers creating noise in the regression. Previous literature used winsorization at both 1% on each side and 5% on

each side. As seen in the appendix, through figure A2.1, winsorization at 5% is the most optimal for our dataset. Winsorizing improves the quality of the data set by normalizing the outliers.

4.3 Research design

In the choice of research design, we follow the Collins et al. (1997) paper and use the same decomposition technique before extending on the model. The methodology is conducted by running three regressions with only one variable difference between them and using them to create a pure explanatory power for the addition of the variable, which is a measure of the incremental explanatory power. The extension of the model, which includes cash flows, use the same intrinsic logic, follow the updated methodology of Banker et al. (2009), and will then provide a measure of value relevance for accruals compared to cash flows. Lastly, earnings get decomposed into a cash-component and an accrual-component using the definitions of Sloan et al. (2018) to regress the Ohlson-model with this decomposition to compare investor reaction to accrual earnings and cash earnings.

This approach allows us to highlight the incremental value relevance of cash flows. We use quarterly data to increase the number of observations for recent changes and add more granularity to assess IFRS changes, although we conduct a similar test on annual data to evaluate time interval sensitivity. It is expected that the explanatory value of cash flows and the overlap between accruals and cash flows increase (decrease) with increasing (decreasing) time length. Lastly, a decomposition of earnings into the accrual-based portion of earnings, denoted COMPACC, and the cash-based portion of earnings denoted FCFE is made. This process follows a newly revised categorization suggested by Sloan et al. (2018), and enables separation of cash flows while still keeping a theoretically identical regression to the Ohlson-model.

The starting point of all models is anchored in a theoretical model where the market value of a firm's equity be expressed as a function of its earnings and book value equity (Ohlson, 1995).

$$P_{t+1} = \alpha + \beta_1 * \frac{EARN}{SHO} + \beta_2 * \frac{BVE}{SHO} \quad (4.1)$$

The stock price is the security price measured at the end of the next quarter since the quarterly report for the quarterly report to be known market information. Still, no new interim report has been issued as all quarterly reports are published q_{+1} , as seen in figure 4.1. Similar to Collins et al. (1997) we measure both earnings and book value of equity deflated at a per-share basis. To explore the explanatory power of accruals, total explanatory power is decomposed into three categories, i) incremental explanatory power of earnings, ii) incremental explanatory power of equity book value and iii) common explanatory power of both earnings and book value of equity. Let:

$$P_{t+1} = \alpha + \beta_1 * \frac{EARN}{SHO} \quad (4.2)$$

and

$$P_{t+1} = \alpha + \beta_1 * \frac{BVE}{SHO} \quad (4.3)$$

The explanatory power from the equations (4.1), (4.2) and (4.3) are denoted $R(4.1)$, $R(4.2)$ and $R(4.3)$. $R(4.1)$ subtracted with $R(4.2)$ represent the incremental explanatory power of BVE, as it is the residual in the total regression not explained by earnings and thus the incremental explanatory power of the book value of equity. $R(4.1)$ subtracted with $R(4.3)$ thus represent the incremental explanatory power of EARN. $R(4.1)$ less the incremental explanatory power of both represent the common explanatory power of both equity book value and earnings. These regressions can subsequently be analyzed to check whether or not they have changed over time, let:

$$R_i = \alpha + \beta_1 * TIME \quad (4.4)$$

This can be done for all equations (4.1), (4.2) and (4.3) for each quarter from 2005 to 2019Q2 in order to test for changes in R^2 over time.

Secondly, an extension of the framework is conducted by also adding cash flows in a similar process, decomposing total explanatory power into three new categories, i) incremental explanatory power of accruals, ii) incremental explanatory power of cash flows and iii) common explanatory power of both accruals and cash flows, similar to Banker et al. (2009). Earnings and equity book value is measured as in the previous test, and likewise, cash flows are measured as reported in the quarterly report. Let:

$$P_{t+1} = \alpha + \beta_1 * \frac{EARN}{SHO} + \beta_2 * \frac{BVE}{SHO} + \beta_3 * \frac{CFO}{SHO} \quad (4.5)$$

and

$$P_{t+1} = \alpha + \beta_1 * \frac{EARN}{SHO} + \beta_2 * \frac{BVE}{SHO} \quad (4.6)$$

and

$$P_{t+1} = \alpha + \beta_1 * \frac{CFO}{SHO} \quad (4.7)$$

The explanatory power from the equations (4.6), (4.7) and (4.5) are denoted $R(4.6)$, $R(4.7)$ and $R(4.5)$. $R(4.5)$ subtracted with $R(4.7)$ represent the incremental explanatory power of accruals. $R(4.5)$ subtracted with $R(4.6)$ represent the incremental explanatory power of CFO. $R(4.5)$ less the incremental value relevance of both thus represent the common explanatory power of both accruals and cash flows. These regressions can subsequently be analyzed to check whether or not they have changed over time as seen in (4.4).

The third version is using the Ohlson-model, but decomposing it by the categorization suggested by Sloan et al. (2018), thus showcasing the difference between the accrual part

and the cash flow part of earnings. Let:

$$P_{t+1} = \alpha + \beta_1 * \frac{BVE}{SHO} + \beta_2 * \frac{EARN}{SHO} \quad (4.8)$$

Which is the original version of the Ohlson-model. From section 4.2 we have the expressions for COMPACC and FCFE. By defining EARNINGS = COMPACC + FCFE according to Sloan et al. (2018), the Ohlson-model can be rewritten as:

$$P_{t+1} = \alpha + \beta_1 * \frac{BVE}{SHO} + \beta_2 * \frac{COMPACC}{SHO} + \beta_3 * \frac{FCFE}{SHO} \quad (4.9)$$

$$P_{t+1}1 = \alpha + \beta_1 * \frac{BVE}{SHO} + \beta_2 * \frac{COMPACC}{SHO} \quad (4.10)$$

$$P_{t+1} = \alpha + \beta_1 * \frac{FCFE}{SHO} \quad (4.11)$$

(4.9) subtracted with (4.10) represents the incremental explanatory power gained by including cash flow-based earnings, and (4.9) subtracted with (4.11) represent the incremental explanatory power of including accruals.

Testing for differences in between time periods

Assessing the value relevance changes in between periods could be done in different ways. One way is to check if the mean of R-squared in between the two periods are significantly different. However, since the volatility is relatively high and the number of observations is small since we obtain only one R^2 number per time interval, showing statistical significance is not possible. However, an alternative way is to assess the coefficient of the variables and see if they are significantly different between periods.

If the coefficient of a variable, for example, earnings, significantly varies across periods,

this means that an investor values an additional euro of earnings differently - which can be interpreted as a difference in the relevance and reliability of accounting data. Unfortunately, the change in coefficients might stem from a change in the market risk premium and should not necessarily be taken at face value. Due to regression design, it is not possible to include a market risk premium factor because the regression is run on a number of companies for a given time period, as opposed to on a number of time periods for a given company. However, by looking at the data on implied equity premiums, it is possible to assess whether or not a change in market conditions is likely to affect the inferences that can be made. With the strong exception of the financial crisis in 2008/2009, which definitely affects the inferences that can be made on the IFRS changes in January 2009, the market risk premium has been quite stable (KPMG, 2019) and (ValueTrust, 2018).

Impact from a change in market efficiency

It is natural to assume that other recent innovations in capital markets, such as improved systems to detect insider trading and automated trading through algorithms, may have impacted the effect both accruals and cash flows have on stock prices. In other words, a change in value relevance is not automatically a result of IFRS improvements but due to an improvement in the stock market efficiency. Furthermore, an issue of using the stock market reaction as a measurement of value relevance is that this relies on the notion that the stock market's perception of value relevance is the true value relevance.

The very point of Sloan (1996) and similar researchers is that this is not the case, as equity investors appear to over-react to accrual-based earnings and underestimate cash flow based earnings. In that case, using the stock market reaction to accruals versus cash flows is a skewed measurement as the true value relevance for accruals is lower than the response in the equity markets, and inversely so for cash flows. By breaking down earnings to an accrual component and a cash flow component, an assessment can be made on how investors perceive cash-based earnings compared to accrual-based earnings, which is discussed in light of the accruals anomaly debate. Section 3.2.2 showed that the measurement of accruals in literature has been inconsistent. This thesis will use the latest best practice for measuring accruals, as suggested by Sloan et al. (2018). For details

around this, see section 4.2.

Additional testing

In addition, tests will be conducted to check for robustness. Firstly, the research of Barth et al. (2001b) shows that disaggregating accruals reveal more information as each accounting item holds individual value and combining them in an aggregate masks information. In light of that, the tests will be conducted with disaggregated numbers, where the Ohlson-model will be switched out for a more granular model, including more balance sheet items combined with earnings broken down into comprehensive accruals and free cash flow to equity, which can be described as comprehensive earnings.

The book value of equity is disaggregated into the net difference of total assets and total liabilities. Furthermore, total assets can be disaggregated into non-current and current assets. Current assets are expressed as a function of receivables, inventory, and cash & cash equivalents. Total liabilities are decomposed into current and non-current liabilities. As such, $BVE = \text{Non-current assets} + \text{Cash \& Cash equivalents} + \text{Receivables} + \text{Inventory} - \text{Current liabilities} - \text{non-current liabilities}$. Earnings are used comprehensively with its accrual and cash components so that $EARN = \text{COMPACC} + \text{FCFE}$.

$$P_{t+1} = \alpha + \beta_1 * \frac{ANCQ}{SHO} + \beta_2 * \frac{CHEQ}{SHO} + \beta_3 * \frac{RECTQ}{SHO} + \beta_4 * \frac{INVTQ}{SHO} + \beta_5 * \frac{LCTQ}{SHO} + \beta_6 * \frac{LLTQ}{SHO} \quad (4.12)$$

$$P_{t+1} = \alpha + \beta_1 * \frac{COMPACC}{SHO} + \beta_2 * \frac{FCFE}{SHO} \quad (4.13)$$

$$\begin{aligned}
P_{t+1} = & \alpha + \beta_1 * \frac{ANCQ}{SHO} + \beta_2 * \frac{CHEQ}{SHO} \\
& + \beta_3 * \frac{RECTQ}{SHO} + \beta_4 * \frac{INVTQ}{SHO} + \beta_5 * \frac{LCTQ}{SHO} \\
& + \beta_6 * \frac{LLTQ}{SHO} + \beta_7 * \frac{COMPACC}{SHO} + \beta_8 * \frac{FCFE}{SHO}
\end{aligned} \tag{4.14}$$

Liabilities in the regressions are hypothesized to get a negative coefficient in the regressions. Variable definitions can be found in the appendix table A2.1.

As mentioned previously, the time intervals periods will be changed to annual measurements to evaluate the sensitivity of time length in the incremental explanatory value of cash flows and their overlap with accruals. Lastly, we will check the robustness of the validated hypotheses by conducting additional testing on sub-samples in our sample set, which are expected to be influenced the most by the different IFRS changes. This will be done by conducting statistical robustness tests to test for multicollinearity and omitted variable bias.

5 Data Analysis

5.1 Value relevance of income statement and balance sheet

Value relevance of income statement and balance sheet - Ohlson-model

Table 5.1: Value relevance of income statement and balance sheet

	2005-07	2008-12	2013-16	2017	2018-19
EARN	8.516*** (37.87)	6.143*** (52.55)	9.332*** (42.03)	8.198*** (15.49)	10.07*** (21.52)
BVE	1.372*** (38.05)	0.915*** (65.25)	1.368*** (48.89)	1.798*** (22.71)	1.480*** (20.86)
_cons	20.74*** (3.97)	37.64*** (8.78)	67.78*** (7.88)	93.82*** (4.34)	102.5*** (5.05)
<i>N</i>	5855	11283	8820	2113	2902
<i>R</i> ²	0.868	0.823	0.803	0.793	0.756
adj. <i>R</i> ²	0.868	0.823	0.803	0.793	0.756

t statistics in parentheses

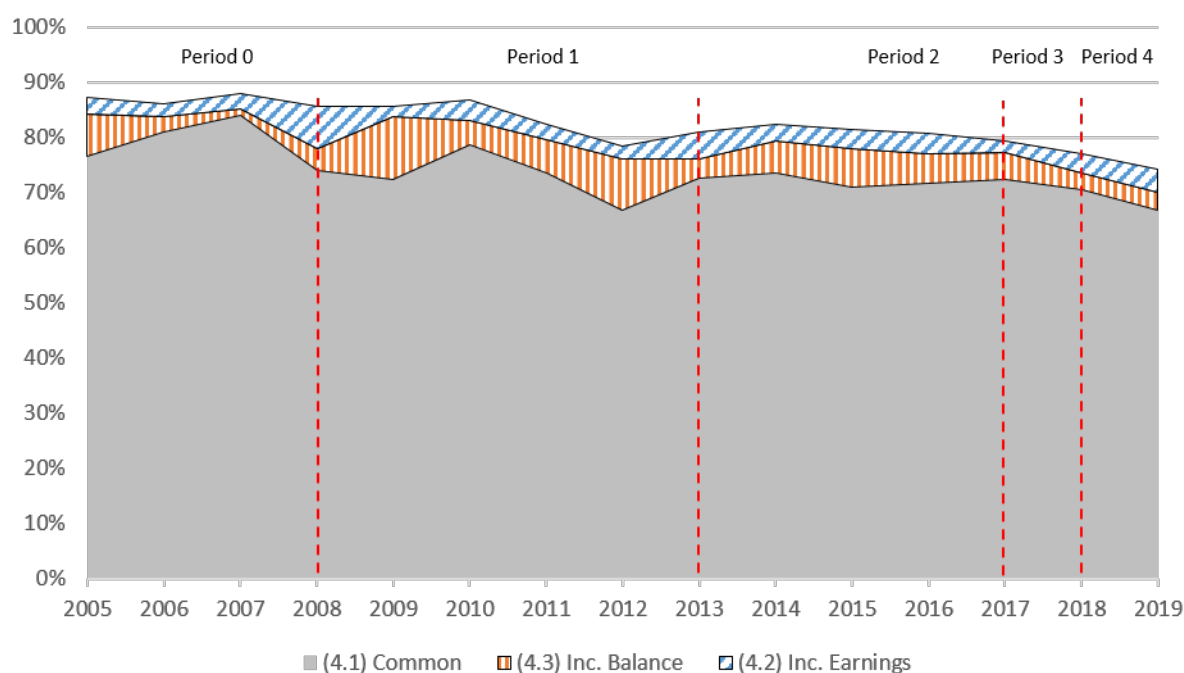
* $p < .10$, ** $p < .05$, *** $p < .01$

The interpretations of the coefficients are how much the stock price increase if the earnings per share or book value of equity per share increase by one Euro. The book value of equity should be around one as it represents the value of total assets less total liabilities. The reason that it for most periods exceeds one might be that the company has earnings above the cost of capital and that the book value of equity, and therefore, represents a Price/Book multiple. Alternatively, it can occur due to conservatism, which is a separate field within the value relevance literature, where intellectual property and other intangible assets are excluded in the balance sheet. As cost related to internal brand development is left off the balance and expensed immediately, companies with strong brands such as Coca-Cola understate assets. Earnings per share represent a relatively low multiple compared to the average P/E in the capital markets. Still, similar results appear previous studies of the Ohlson-model (Dechow et al., 1998), (Kargin, 2013), and (Collins et al.,

1997).

The total explanatory power of the Ohlson-model decreases each period, indicating that more stock price relevant information omits the balance sheet and income statement over time. The decrease can be seen as evidence of falling value relevance in the IFRS period. However, the total explanatory power is still above 75 percent, meaning that the clear majority of price relevant data is revealed in financial statements. For comparison, 75 percent explanatory power is among the highest reported of any year in the research of Collins et al. (1997) in the period between 1953-1993. Many additional relevant components influence stock prices, such as interest rates, equity market risk premiums, growth rate, and expected future outlook. Taking into account that all these factors are omitted from the regression, more than 75 percent explanatory power does not appear alarmingly low.

Moving on to the total development, the figure 5.1 visualize the incremental explanatory power of earnings, the incremental explanatory power of book value of equity and the common explanatory power for earnings and book value of equity. The incremental explanatory power of earnings is calculated as $R(4.1) - R(4.3)$, and the incremental explanatory power of the book value of equity is calculated as $R(4.1) - R(4.2)$. The common explanatory power is $R(4.1)$ less the incremental explanatory power of the equations above. The bottom area, which is by far the largest, show the common explanatory power that is explained by both the book value of equity and earnings. In other words, regressing stock price on either book value of equity or earnings gives the explanatory power highlighted in grey in addition to the incremental explanatory power of each. To conclude, it is a striking overlap between the two financial items, and they reveal predominantly the same information. However, this should not come as a surprise in the sense that the book value of equity is simply the invested equity plus the cumulative earnings that have not been paid out as dividends. In any given period, the change in the balance sheet is simply the net income plus other comprehensive income less proposed dividends. The aggregate of all the three areas represents the total explanatory power of the Ohlson-model in each period. The incremental value relevance is seen in the appendix in table A3.3.

Figure 5.1: Value relevance of income statement and balance sheet

Compared to the visualizations from Bowen in figure 3.1, the data looks most similar to Panel B - both significant individually with low incremental value relevance. The pattern that common explanatory power is the dominant explanatory factor, and that the relation between variables are similar to Panel B persist throughout all variable specifications in nearly all time periods. The incremental value relevance is quite small compared to the total explanatory power, but markedly higher compared to the unexplained variance, especially in some periods.

Compared to previous findings, the informational overlap seems to have increased, where among others Collins et al. (1997) report an average of over ten percentage points incremental explanatory power for earnings. The highest incremental explanatory power of the balance sheet appeared in 2009, where it was 11 percent of the total and 41 percent of the residual variance unexplained by common. The timing should be seen in the light of the financial crisis, where the US mortgage defaults evolved to a full global financial crisis in the aftermath of, among other things, the collapse of Lehman Brothers 15th of September, 2008. A possible explanation is that when a crisis hits the balance sheet, which expresses financial robustness, it becomes a more important signal for equity investors.

The blue area follows an identical logic to the orange area just for incremental value relevance of earnings. Compared to the balance sheet, the incremental value somewhat lower on average but more stable. A similar trend as with the regression divided into periods can be seen overall, with a reduction in total explanatory power over time, where recent years have seen an increasing downward trend, ending with an all-time low in 2019 of 74 percent. The last three years have all seen total explanatory power under 80 percent, which only happened once in the period between 2005-2016, then in 2012, where the explanatory power was 78 percent.

These findings made it particularly interesting to regress the explanatory power over time to see if it was possible to demonstrate with statistical significance that explanatory power has fallen over time. By running time regressions we can statistically test development in the total, common and incremental value relevance over time. The time regression is conducted over the selected periods for both the individual regressions and the incremental value relevance from the balance sheet and earnings, following the same methodology of Collins et al. (1997). Table 5.2 highlights the coefficient time has on explanatory power (equation 4.4). All values are negative, indicating a negative relationship between time and explanatory power. As for the incremental value relevance, the reduction is not significant. However, for the total explanatory power of earnings and book value, the reduction is significant for both. The same is true for the common explanatory power, and the decline is of similar magnitude for all three, just under one percent each year. The constant does not have any logical interpretation as the interception will be on the Y-axis for year zero since the time values are simply the years 2005-2019. The findings indicate that the informational overlap between earnings and balance has not increased and that the total informational value has decreased.

Additionally, it is interesting to look closer at the coefficient change between the different periods to see if investors value one additional Euro of earnings or book value of equity per share differently in between periods. As long as the equity market risk premium combined with the risk-free interest rate is similar, one euro of income should be valued equally if the reliability of the financial item is equal. In the appendix section A3.6, we discuss the implications of changing interest rates in the EU and the degree of volatility in the equity market. Still, in essence, particularly in the last decade, they have both remained

Table 5.2: Income statement and balance sheet explanatory power over time

	Earnings	Balance	Inc. Earnings	Inc. Balance	Total
Time	-0.00771*** (-3.67)	-0.00828*** (-5.94)	-0.0000114 (-0.01)	-0.000582 (-0.36)	-0.00829*** (-7.37)
Constant	16.27*** (3.86)	17.44*** (6.22)	0.0571 (0.03)	1.223 (0.37)	17.50*** (7.73)
Observations	15	15	15	15	15

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 5.3: Significance of change in coefficients in value relevance of income statement and balance sheet

	2005-07	2008-12	2013-16	2017	2018-2019
EARN	8,516	6,143 -2,373**	9,332 3,189**	8,198 -1,134	10,07 1,872
BVE	1,372	0,915 -0,457**	1,368 0,453**	1,798 0,43	1,48 -0,318

reasonably stable. Table 5.3 below shows the change in coefficients and whether or not they have been significant.

Bold changes are significant based on a t-test of means. As such, the changes in between the first two periods are significant. However, it seems as they are largely affected by the financial crisis, with a sharp drop in 2008-2012 before it bounces back. In short, the value relevance of the financial statement as measured by the Ohlson-model using explanatory power has decreased significantly, and the reliability as measured by the weight an investor places on earnings and book value has not significantly increased.

In conclusion, the significant changes between the periods are likely caused by the financial crisis, and there is no significant change in the coefficient, meaning that there is no significant change in how an equity investor value an additional Euro of book value or earnings between 2005-2019.

5.2 Value relevance of accruals and cash flow

5.2.1 Value relevance of accruals and cash flow from operations

In the following, additions to the Ohlson-model similar to the work of Banker et al. (2009) are done by adding cash flow from operations (equation 4.5). By including cash flow from operations, it is possible to assess the value relevance of cash flow in relation to the accrual components of the financial statement, here expressed through earnings and book value of equity. Below is the regression output (equation 4.5) across the different periods.

Table 5.4: Value relevance of accruals and cash flow from operations

	2005-07	2008-12	2013-16	2017	2018-19
EARN	8.795*** (38.09)	6.188*** (53.02)	9.387*** (40.19)	8.860*** (15.71)	10.96*** (20.77)
BVE	1.301*** (33.57)	0.795*** (47.56)	1.224*** (41.66)	1.633*** (19.61)	1.296*** (16.89)
CFO	0.208*** (4.52)	0.458*** (16.60)	0.664*** (13.46)	0.491*** (4.05)	0.394*** (3.14)
_cons	26.31*** (4.96)	36.65*** (8.64)	69.30*** (8.16)	100.1*** (4.57)	110.8*** (5.35)
<i>N</i>	5452	10454	8176	1953	2676
<i>R</i> ²	0.876	0.831	0.811	0.792	0.747
adj. <i>R</i> ²	0.876	0.831	0.811	0.792	0.746

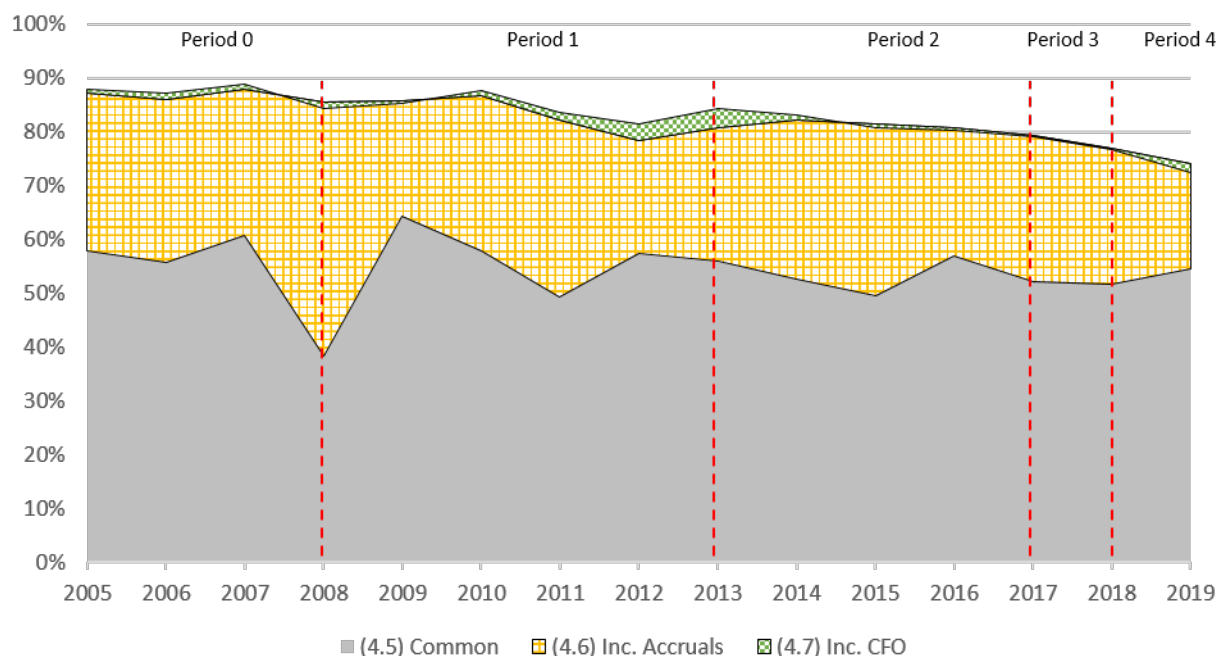
t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

The coefficients of earnings and book value of equity only see minor changes compared to the standard Ohlson-model regression from equation 4.1 shown in table 5.1. The cash flow from operations is significant in all time periods, even though the t-value is substantially lower than the other two variables. The coefficient is also lower, especially compared to earnings. However, when the stock price is regressed on cash flow from operations alone, the coefficient ticked up and showed similar coefficients as earnings. In the different periods, net free cash flow from operations is always positive, signaling that, unsurprisingly, free cash flow has a positive relationship with the stock price even when one accounts for earnings. In comparing the total and incremental explanatory power

of cash flows compared to accruals, we see in figure 5.2 that the additional explanatory power gained from adding free cash flow is quite small.

Figure 5.2: Value relevance of accruals and cash flow from operations



Overall figure 5.2 showing a decrease in total explanatory power, similar to figure 5.1. The figure also shows that the most influential explanatory power is the common one. However, it is clear that accruals dominate in terms of incremental value relevance, and after 2013 the incremental explanatory power is almost eradicated for cash flow from operations until 2019. Unsurprisingly, in the 2008 financial crisis, accruals correlated better with the stock price than the cash flow from operations. As table 5.5 shows, the decline in accruals over time is still significant, whereas cash flows have not significantly been reduced. In essence, little information is gained by adding cash flow from operations to the Ohlson-model, and the model does not seem to be superior in any shape or form. However, it is important to note that accruals are just historical and expected cash flows assigned to a particular period in time. In this case, the measurement interval uses quarterly data. If the measurement interval increase to annual data, it is expected that cash flow increases their value relevance and assimilates earnings to a considerable extent. An analysis of this is found in the robustness analysis in the appendix part A2.4.

Table 5.5: Accruals and cash flow from operations explanatory power over time

	Accruals	Cashflow	Inc. Accruals	Inc. Cashflow	Total
Time	-0.00829*** (-7.37)	-0.00319 (-0.79)	-0.00600 (-1.58)	-0.000893 (-1.05)	-0.00918*** (-7.81)
Constant	17.50*** (7.73)	6.957 (0.86)	12.34 (1.62)	1.801 (1.05)	19.30*** (8.16)
Observations	15	15	15	15	15

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

5.2.2 Value relevance of comprehensive accruals and free cash flow to equity

In the following, tests based on the previously explained methodology of comprehensive accruals in Sloan et al. (2018) will be conducted. The advantage of disaggregating earnings into a cash-component and an accrual-component is that in no shape or form does the theoretical model of Ohlson change. One of the two variables in the Ohlson-model, earnings, is decomposed into two sub-components and all else remains equal. Also, in the model design by Banker et al. (2009) they use net earnings as a measure of accruals, and earnings is not a true accrual-based metric as it also contains cash flow return in the period. To avoid confusion, the name of the variables is changed, where what was previously EARN is now divided into COMPACC, which is comprehensive accruals for the period, and FCFE, which is the net free cash flow to equity holders for the period. The regression output (equation 4.9) across the time periods are shown in table 5.6. Firstly, all the variables are significant. Compared to the previous accrual model in table 3.2.2, the explanatory power has fallen marginally, but it is still at a high level. However, looking at the coefficient values of this model, COMPACC and FCFE component are now yielding a similar price effect. The coefficient of FCFE is quite a lot higher than CFO in the previous model. The coefficient book value of equity has also increased.

Table 5.6: Value relevance of comprehensive accruals and free cash flow to equity

	2005-07	2008-12	2013-16	2017	2018-19
COMPACC	3.122*** (13.97)	5.071*** (37.47)	7.179*** (28.49)	5.845*** (10.63)	8.968*** (16.68)
FCFE	3.699*** (20.66)	4.645*** (38.47)	5.632*** (32.39)	4.791*** (14.76)	7.425*** (21.25)
BVE	2.243*** (84.65)	1.190*** (108.09)	1.773*** (75.97)	2.228*** (38.89)	1.817*** (31.86)
_cons	19.46*** (3.38)	32.65*** (7.29)	70.21*** (7.76)	94.75*** (4.29)	93.80*** (4.55)
<i>N</i>	5532	10759	8639	2076	2848
<i>R</i> ²	0.851	0.809	0.788	0.789	0.754
adj. <i>R</i> ²	0.851	0.809	0.788	0.789	0.754

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

5.3 Robustness

Statistical robustness

Typical statistical tests when conducting linear regressions are tests for multicollinearity and omitted variables, which are typically tested in STATA measuring the variance inflator factor (VIF) and omitted variable test, which is a version of the Ramsey test of omitted variables. Usually, if the multicollinearity is too high, with a threshold of ten in a VIF-test, the coefficient interpretation becomes problematic. Even though a regression model with VIF over ten may work well for predictive purposes, one needs to be careful to make inferences, and the internal validity is lower. This will mainly affect the coefficient interpretation of the variables, something that is assigned weight in tests for value relevance.

Previous papers that test value relevance using the Ohlson-model devote little time to discuss statistical robustness. We assume this is most likely because words in research papers are a scarce resource and that using a theoretical model provides safety and assurance to the validity. As this paper has demonstrated, the informational overlap between the variables included in the regressions is high, implying that the VIF is expected to be quite high.

When regressing the traditional Ohlson-model over the entire time horizon as seen in the appendix figure A2.2, the VIF-factor for earnings and book value is 4.48, which indicates some co-variance but well under the threshold of 10. The level is somewhat surprising given the vast informational overlap between the two. When the model runs with disaggregated variables and industry classifications in figure A2.4, the average variance inflation factor is 6. Three variables breach the threshold of 10, being non-current and current liabilities as well as accounts receivables. Given the fact that assets and liabilities are closely intertwined, the findings are not surprising, and in all, the variance inflation factor is within acceptable limits.

Moving on, omitted variable bias needs to be adequately addressed. Omitted variable bias is a bias that occurs when relevant components for the dependent variable are excluded from the regression, and these omitted variables, in turn, correlate with included variables in the regression. A correlation with the error term will make the coefficient for the included variables unreliable, and the R-squared will wrongfully report an elevated explanatory power since the independent variables contain explanatory power from the error term, to which it correlates.

Multicollinearity between earnings and book value of equity in a regression might not be troubling. After all, the functional relationship between them is unquestionable. However, Ohlson (1995) explicitly states that "*The variable for other information satisfies a (regular) autoregressive process*", meaning that the variables should not correlate with the error term. The assumption means that if a Ramsey-test indicates that other information does *not* follow an autoregressive process, but on the contrary, correlate with either earnings or book value of equity, an assumption behind the Ohlson-model is violated.

As the figures in the appendix figure A2.3 show, the Ramsey test strongly indicates an omitted variable bias on a significance level of less than 0.01 percent. The finding holds both for the traditional Ohlson-model and the disaggregated model (equation 4.12) with industry classification variables in figure A2.5. At first glance, this appears very troubling and a fierce blow towards the validity and inferences that can be made from the analysis. However, a very likely scenario is that one of the omitted variables is the stock price in the period before. The best prediction for a stock price in t_{+1} is, if one believes incorrect

market pricing, the stock price in time t plus a required rate of return less paid out dividends. And unsurprisingly, a regression as $\text{Price } t_{+1}$ as the dependent variable and $\text{Price } t$ as independent variable yields an explanatory factor close to 100 percent.

Additionally, stock price and financial items published one period later also correlate strongly with each other, creating a natural correlation between the error term and included variables in the Ohlson-model. Even though this is the most likely reason for the result, we can not say this with 100 percent certainty, and the findings should be interpreted as a model weakness in terms of regression analysis. To the best of our knowledge, there are no cleaning or design manipulations that can be done to address this issue without fundamentally altering the regression model, and the conclusion is that this is a weakness to the construct validity of the method. Omitted variable bias is a non-mitigated weakness in the analysis despite our best efforts to solve it. This finding is perhaps best phrased in the renowned statistical book *By Design* with the infamous opening phrase *"You can't fix by analysis what you bundled by design"* (Willett et al., 1994).

Accruals measurement sensitivity

In the analysis of accruals and accruals anomaly, the new and arguably non-conventional method of Sloan et al. (2018) is used since it allows for analysis of accruals compared to cash flows without adding or removing to the Ohlson-model. Instead, it relies on a clever decomposition where net earnings are broken down into a cash-component and accrual-component. To substantiate the persistence of accruals anomaly, we run additional tests on accrual-based earnings compared to cash flow-based earnings to evaluate whether the findings were robust towards said changes. In short, the answer is no, results using the Sloan et al. (2018) method is not robust to changing the measurement to the traditional method of defining total accruals as net income less cash flow from operating activities. Regressions and visualizations can be found figure A3.2 and tables A3.12 and A3.13 in the appendix. The reason for the mismatch is due to the large difference between operating cash flow and free cash flow to equity holders, where total accruals are almost consequently negative as FCO per share is higher than EARN. Net income is an accounting result attributed to equity holders, and as such, it makes sense to compare it to the cash flows

attributed to equity holders (FCFE), where this is the same logic that Sloan et al. (2018) use. By measuring accruals by deducting free cash flow to equity holders from net income yields a metric for total accruals that show the persistence of the accruals anomaly.

6 Discussion

6.1 Hypothesis evaluation in light of findings

Hypothesis for period 1: Decreased value relevance of income statement and balance sheet

Between periods 0 and 1 we hypothesized a decrease in the value relevance of the income statement and the balance sheet due to the uncertainties regarding definitions of segments in IFRS 8 - Operating segment. As expected, a decrease in both the value relevance of the income statement and balance sheet is seen. As seen in A3.1, the total value relevance of the income statement measured in total explanatory power falls from 83.3% in 2005-2007 to 76.0% in 2008-2012. For the balance sheet, a similar trend is observed, where the fall is from 83.8% to 78.2% seen in A3.2. However, the incremental value relevance of both increased in the period as seen in A3.3, while still on low values as visualized in figure 5.1. The fall in total value relevance outweighs the incremental increase, resulting in a fall in total explanatory power from 86.8% to 82.2% seen in 5.1. Also, a significant coefficient decrease is observed. However, this may very well be caused by the financial crisis.

The discussion in section A1.2 revealed that IFRS 8 - Operating segments could potentially have a substantive impact on the value relevance of both the income statement and the balance sheet. Table A1.2 showed the substantial valuation differences between EBIT stemming from two related segments. The Standard aimed to improve investors' understanding of how revenue, profits, and assets in the balance sheet were distributed among segments. If successful, the Standard would lead to an increase in the value relevance of the income statement and the balance sheet. Our analysis indicates that the opposite happened. In essence, it seems like EY and other stakeholders were correct in their suspicions that IFRS 8 was no definite upgrade from IAS 14 which it superseded, due to the absence of adequately defined key terms, and on the contrary, appear to have resulted in less comparability.

Hypothesis for period 2: Decreased value relevance of income statement and increased

value relevance for the balance sheet

Comparing period 1 and 2, the value relevance of the income statement seen in A3.1 fall modestly as expected. With that being said, the total fall is under one percentage point, and the marginal value relevance is unchanged. However, for the balance sheet, which was expected to increase, a two percentage-points decrease is observed seen in A3.2. Both coefficients increase significantly in the Ohlson-model. The total value relevance falls by 2%, as seen in table 5.1.

This period saw the introduction of IFRS 10 - Consolidated Financial Statements, IFRS 11 - Joint Arrangements, IFRS 12 - Disclosure of Interest in Other Entities, and IFRS 13 - Fair Value Measurement, IFRS 14 - Regulatory Deferral Accounts and IAS 19R - Employee Benefits. Out of these, IFRS 10, IFRS 13, and IAS 19R were hypothesized to have the most considerable effect. IFRS 10 was hypothesized to lead to more faithful numbers by reducing intragroup balances, thus increasing the value relevance of both the income statement and the balance sheet.

A possible reason for the fall in value relevance in the balance sheet in the period is that the massive changes in the balance sheet seen for some companies due to IAS 19R are interpreted as noise in the regression model. The main reason for this is that since the information has been disclosed in the notes previously, it is public information and should, to a quite high degree, already be reflected in the stock price despite the fact that it is excluded from the balance sheet. The reason for investors' disregard of pension liabilities may stem from the fact that the payments are only to be paid out in many years, in addition to the changes not affecting the stock price as the information was previously known. Many companies using a defined benefit pension plan also switched to defined contribution risk and mitigated the risk in the aftermath of the revision, which may have further increased the changes in the balance sheet without affecting the stock price, leading to the fall in measured value relevance. In sum, it is difficult to isolate the accounting reason(s) for the fall in value relevance as this period sees a large number of changes.

Hypothesis for period 3: Increased value relevance for income statement and balance sheet

By comparing periods 2 and 3, the effect of IFRS 15 - Revenue Recognition comes into action. It is worth noting that due to the nature of period classification, the period only includes the effect from companies adopting IFRS 15 between the endorsement date and the early-adoption date of Standard since IFRS 16 - Leasing was endorsed at the same time as IFRS 15 became mandatory. The close time interval between the two periods makes it hard to separate the two effects wholly without using restatements. However, the data indicate a change happening in this period. The most clear effect is the increase in value relevance of BVE, seen through both an increase in R^2 (A3.2) and an increase in the coefficient of book value of equity, which as seen in table 5.3 increases by 0.43 to 1.798. While the change is not significant, it is not far from it. The expectation is that stronger revenue recognition criterion results in higher certainty that an accrual-based earning will result in a cash-transaction, increasing the coefficient for earnings on average. In the Ohlson-model, the coefficient in this period is the highest for all periods. The increase in BVE is also present and at an all-time high when including cash flow from operations, as seen in table 5.4. Despite the apparent increase in book value coefficient, we find no increased overlap between accruals and cash flows, as quarterly data report the opposite and annual data only show a very modest reduction in incremental value relevance of accruals.

Hypothesis for period 4: No change in value relevance of income statement and decreased value relevance of balance sheet

For the final period, evaluating period 4 against period 3 yields the value relevance effect from introducing the hotly debated IFRS 16 - Leases. Due to the massive implications for the balance sheet from including all leases and a minimal expected stock price reaction as most of the information is previously known, a negative value relevance effect was expected. The expectation aligned with the findings, and an overall explanatory power reduction is observed in all regressions. The explanatory power of the balance sheet fell markedly from 77.2% in 2017 to 73.6% in 2018 and 70% in 2019 (table A3.5). The fall results in an all-time low for all the periods. The explanatory variable of 70 percent in 2019 is the lowest of all years from 2005-2019 for the Ohlson-model. Such findings indicate that including more information in the balance sheet does not automatically lead to higher value relevance, but might very well lead to the opposite. The coefficient for BVE also

falls both when regressing it in a univariate regression (A3.2) and in the Ohlson-model. However, when splitting time period 4 into 2018 and 2019 tables (A3.5) and (A3.6) show an increase in the coefficient for BVE both when regressed alone and in the Ohlson-model from 2018 to 2019. The observations suggest that IFRS 16 - Leases was primarily affected by large changes in the balance sheet compared to the stock price, but that investors still put a higher emphasis on BVE than the year before. It is, however, worth noting that the emphasis on BVE was higher in both 2016 and 2017.

6.2 Discussion of findings and hypothesis

Alternative reasons for a fall in value relevance

The analysis above has shown a fall in value relevance measured through the explanatory power of our regressions. A key question is whether this is due to the effect of new IFRS regulation or other factors. The fall in interest rates which resulted in a unprecedented negative interest rate scheme appearing widespread across Europe is arguably affecting the explanatory power in a downward fashion. The effect can occur as a stock price is valued on the expected future cash flows discounted in today's value on a per-share basis. Moreover, if the interest rates decrease, the discounting factor also decreases with the effect that cash flows in the more distant future get relatively higher compared to short-term cash flows. Furthermore, Sloan (1996) and Pfeiffer and Elgers (1999) are both clear on the fact that the auto-correlation of both cash flows and earnings decreases as a function of time, meaning that earnings one year ahead is more closely correlated to today's earnings than earnings five years ahead. The implication from this is that even though the relevance of today's earnings has not changed in itself, the weighting of future cash flows in today's stock price has changed due to the lower interest rates. Since today's earnings are less correlated with distant future cash flows, the link between present stock price and present financial items decrease since the correlation between today's stock price and more distant future cash flows have increased.

Evidence of accruals anomaly

Perhaps the most surprising finding is the fact that, except for 2005-2007 and 2011-2012 in tables 6.1 and 6.2, comprehensive accruals are consistently receiving a higher stock price reaction than the free cash flow. Theoretically, it should be the opposite. The idea in brief is that a bird in the hand is better than a bird on the roof. Cash flow received today should be weighted higher than accrual-based earnings as accrual-based earnings are subject to risks and should be discounted over time. To exemplify, an outstanding claim on a company that is due in 90 days needs to be discounted by a time factor and an additional risk factor in the probability of a default on the claim — opposed to money already received from another company that is present on a bank account. This finding supports the controversial accruals anomaly debate where research indicates that equity investors seemingly overvalue accruals relative to cash flows. To appreciate this in further detail, table 6.1 and 6.2 shows the coefficients for each year.

Table 6.1: Value relevance of comprehensive accruals and free cash flow to equity 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
COMPACC	2.384*** (6.71)	2.740*** (6.11)	3.356*** (8.98)	4.474*** (13.97)	5.365*** (13.34)	3.085*** (10.87)	3.671*** (13.77)	5.763*** (13.73)
FCFE	3.346*** (12.61)	3.477*** (10.59)	3.484*** (10.19)	3.985*** (22.17)	3.733*** (12.18)	2.988*** (9.64)	4.867*** (17.63)	7.158*** (22.37)
BVE	2.098*** (53.91)	2.306*** (50.21)	2.438*** (43.22)	1.175*** (47.85)	1.462*** (54.16)	1.629*** (51.70)	1.089*** (52.89)	0.978*** (42.71)
_cons	28.28*** (3.22)	31.33*** (3.00)	3.519 (0.34)	14.41* (1.88)	21.92*** (2.61)	28.47*** (2.69)	39.61*** (4.04)	39.62*** (3.63)
<i>N</i>	1834	1989	1709	1952	2197	2222	2202	2186
<i>R</i> ²	0.854	0.852	0.856	0.832	0.848	0.832	0.813	0.801
adj. <i>R</i> ²	0.854	0.852	0.855	0.831	0.847	0.832	0.813	0.801

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Firstly, when running the regression per year, it becomes apparent that the seeming overvaluation of accruals compared to cash flows has been more persistent in recent years, with accruals receiving a higher coefficient for stock price valuation in each year since 2013. In the period between 2005-2012, however, the pattern is not as persistent, but the accruals coefficient exceeds the cash flow coefficient in four consecutive years from 2007. One possible explanation for this finding might be that there is a correlation between companies that receive a high multiple on their earnings and companies reporting a high amount of accruals.

Table 6.2: Value relevance of comprehensive accruals and cash flow 2013-2019

	2013	2014	2015	2016	2017	2018	2019
COMPACC	8.722*** (15.26)	8.314*** (14.05)	5.654*** (12.68)	5.229*** (9.21)	5.845*** (10.63)	7.623*** (11.73)	12.25*** (12.41)
FCFE	7.600*** (19.03)	5.798*** (16.72)	5.161*** (15.55)	2.849*** (7.99)	4.791*** (14.76)	6.669*** (17.98)	10.69*** (12.28)
BVE	1.277*** (33.85)	1.868*** (41.21)	1.943*** (40.31)	2.276*** (39.57)	2.228*** (38.89)	1.840*** (28.67)	1.641*** (13.35)
_cons	52.74*** (3.62)	49.66*** (2.95)	79.08*** (4.36)	96.10*** (4.61)	94.75*** (4.29)	91.43*** (3.87)	95.25*** (2.39)
<i>N</i>	2178	2177	2170	2114	2076	1961	887
<i>R</i> ²	0.792	0.816	0.803	0.781	0.789	0.765	0.747
adj. <i>R</i> ²	0.791	0.816	0.803	0.781	0.789	0.765	0.746

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These companies may receive a higher multiple on their earnings for fundamental reasons, for instance, because they operate on average in industries with lower market risk. If this is the case, the pattern should reverse when the regression is run on a sub-sample categorized by industry. In order to evaluate the robustness of the findings, regressions on two of the largest industries in the sample set portfolio are run, as defined by the GICS standard, namely Industrials and Materials. The regression output from Industrials are found in table A3.10 and Materials in table A3.11 in the appendix. The findings from these regressions show that the pattern still holds for both industries. Comprehensive accruals receive a higher coefficient, showing a pattern for a higher stock price valuation per euro than cash flow.

Sensitivity to annual data and disaggregation

To substantiate on the findings it is natural to evaluate robustness by making some alterations to the research design to see whether findings are robust to said alterations. Firstly, as previously mentioned, it is expected that cash flows increase their value relevance as the time interval increases. In the following paragraphs we discuss sensitivity to time measurement intervals.

Secondly, as Barth et al. (2001b) findings indicate that disaggregating the balance sheet into sub-components as explained in the data analysis increase the explanatory power

of the balance sheet, it is expected that this improves the Ohlson-model and reduce the incremental value relevance of earnings. The regression with disaggregated variables does not appear superior as measured by explanatory power. A deep-dive into that model and its implications can be found in the appendix in A3.14.

Time period affects on accruals and cash flows

Time period sensitivity is virtually non-existent for the traditional Ohlson-model as seen in the appendix table A3.16. However, as expected, free cash flow from operations become more closely correlated with the stock price when the time interval is expanded. Despite this, the coefficients still vary on a very low, and even negative, level. The regression in table 6.3 show regression output from using annual data. The data indicates that the earnings and cash flow from operations reveal roughly the same information, so adding free cash flow as a variable does not reveal a lot of new information. As for the other coefficients, the time period significantly affects the coefficients given to earnings and book value, as book value coefficients on average fall and earnings increase, but the explanatory power stays roughly equal to quarterly testing.

Table 6.3: Value relevance of accruals and cash flow using annual data

	2005-07	2008-12	2013-16	2017	2018-19
EARN ANNUAL	10.49*** (15.92)	4.735*** (13.71)	10.09*** (13.81)	22.30*** (10.31)	22.81*** (9.13)
BVE ANNUAL	0.903*** (8.87)	1.022*** (18.02)	1.189*** (10.98)	1.116*** (4.40)	0.0663 (0.26)
FCO ANNUAL	-0.0577 (-0.25)	0.988*** (7.38)	1.873*** (6.84)	-1.179 (-1.54)	0.812 (0.99)
_cons	34.97*** (2.78)	23.46** (2.49)	52.27*** (2.79)	52.53 (1.25)	51.03 (1.05)
<i>N</i>	1111	2401	1879	458	407
<i>R</i> ²	0.851	0.832	0.820	0.828	0.807
adj. <i>R</i> ²	0.851	0.832	0.820	0.827	0.805

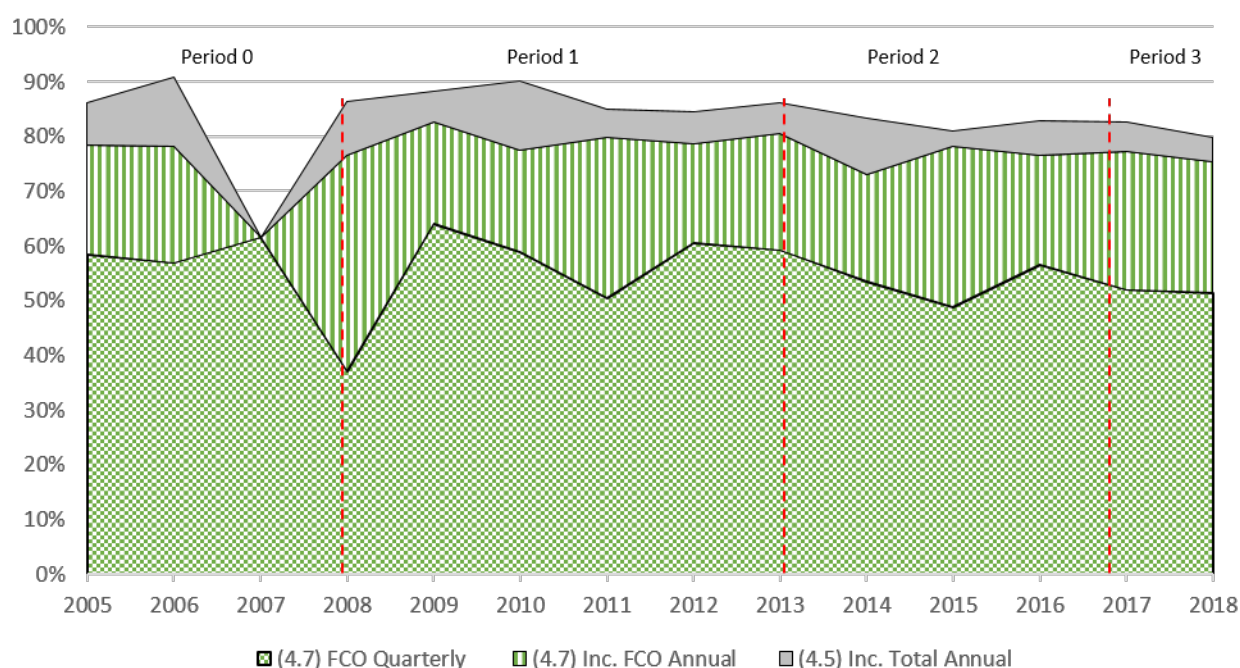
t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Cash flow sensitivity to annual data

When deciding to use quarterly observations, the hypothesis was that the difference between accruals and cash flows increases when periods decrease. After all, accruals are fundamentally a method to move cash flows across time to enable the best possible assembly between revenue and cost in any given period. As the time horizon increases, the magnitude of moving accruals between periods reduces. For instance, with a measurement interval of 20 years, the cash flow income and accrual income should be virtually identical. To highlight the sensitivity to measurement interval, we ran regressions using the same decomposition technique but with value relevance for free cash flow on a quarterly versus annual basis. As the figure 6.1 below depicts, the additional value relevance of using annual cash flows is substantially higher than using quarterly cash flows. The difference in explanatory power between cash flows quarterly and cash flows annually are markedly higher than between annual cash flows and total accruals. The implication is that the accruals have high informational value on quarterly data compared to cash flows, but in an annual time period interval, this informational value is almost obliterated.

Figure 6.1: Value relevance of accruals and cash flow using quarterly and annual data



IFRS regulation policy

A significant reduction of just under one percentage point in value relevance on average per year should raise concern both within the IASB and EFRAG. There are multiple

arguments to defend the results by pointing to the fact that increased comparability holds value in itself or that new Standards should not be assessed solely on the value relevance for equity investors, and that a complete assessment should also weigh in other stakeholders who hold interest in the capital markets. Besides, it is not possible with this research design to fully exclude alternating explanations such as interest rate effect, market risk premium, or differences in business characteristics. However, equity investors are one of the essential stakeholders in the capital markets, and viewing these findings in light of the critical views from knowledgeable market actors such as EY (2016) and KPMG (2011) in advance of the introduction of multiple Standards, the question could be raised whether critical voices are weighted sufficiently.

7 Conclusion

The overall premise for the master thesis was to evaluate to what extent new IFRS Standards improved the value relevance of financial statements. The short answer to that question is that they have likely done the opposite.

We report three main findings. The first finding is a significant reduction in the value relevance measured by the Ohlson-model of 0.83 percentage points per year. When including net cash flow from operations, the value relevance reduction increase in size to 0.92 percentage points per year. With that being said, the value relevance measured as explanatory power is around 75 percent in 2019, which is quite high compared to previous research. The central IFRS Standards driving the negative development in value relevance appear to be IFRS 8 - Operating Segments and IFRS 16 - Leasing. Common to them both, are critical views from auditing companies and stakeholders before their introduction, as seen in both EFRAG (2017) and EY (2007). Future research in this topic should address the relationship between the discounting factor used in security valuation and the value relevance of financial statements.

The second finding is that when decomposing earnings into accruals for the period and cash earnings, we observe evidence supporting the historical accruals anomaly findings dating back to (Sloan, 1996). Surprisingly, the findings that accruals are valued equally or higher than cash flows appear to increase in persistence in recent years, where accrual-based earnings achieve higher stock price reaction to cash-based earnings every year since 2013. These findings are also observed within industries and are thus robust in an industry sub-sample test.

The third finding is that the informational overlap between earnings and book value is almost complete, rendering the incremental value relevance of each statement close to zero. This finding deviates from previous research such as Collins et al. (1997) and Bowen et al. (1987), where total explanatory power usually is lower and incremental value relevance is higher than our observations. The differences hold for both quarterly and annual data. Also, for accruals compared to cash flow, the informational overlap measured as the

common explanatory power is far more extensive than the incremental value relevance, although the pattern is not as strong. Additional tests on the effect from disaggregating the balance to reveal masked information similar to Barth et al. (2001b) do not improve the total explanatory variable considerably but improve the value relevance of the balance sheet somewhat.

In essence, our findings suggest that IFRS Standards should be placed under stronger scrutiny prior to their EU endorsement. Further research should focus on the underlying mechanisms that lead to the value relevance drop. Furthermore, we expect that the accruals anomaly and its relation to the efficient market hypothesis will continue to be hotly debated going forward. Lastly, the informational overlap between earnings and book value is almost complete and with the exemption of situations with financial distress, where the incremental value relevance is close to zero for book value, earnings, and cash flow.

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Appendix

A1 Literature

A1.1 Components of the financial statement

Balance sheet

The balance sheet of a company is a snap-shot of a firm's total assets, and how they are financed through liabilities and equity at a given point in time. An asset is defined as a *"resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity"* and a liability is a *"present obligation of the entity arising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits"*. As such, equity is *"the residual interest in the assets of the entity after deducting all its liabilities"* (IASB, 2018). Assets are according to IAS 1 divided into current and non-current assets, where current assets are cash or assets expected to be converted to cash, sold, or consumed either in a year or in the operating cycle, whichever is longer. Non-current assets are, thus, assets that do not meet any of these criteria. The same basic distinction goes for liabilities, as current liabilities are liabilities which are due within 12 months after the reporting date, or if longer, payable within the term of the operating cycle. Non-current liabilities are liabilities that do not meet the aforementioned criteria (IAS, 2007). This section is limited to a discussion of definitions, while the other aspects are discussed later in the institutional background.

Income statement

This is the part of the financial statement that reports the firms' profit, which fundamentally is simply revenues less expenses. However, simply calculating the profit of a company through this formula does not give a comprehensive understanding of how the profit was created. In order to understand how the profit was created, the stakeholder needs to

understand the following four points (Kinserdal et al., 2017):

1. Definition of elements: Which revenues and costs are recognized
2. Recognition criteria: At what point in time are revenues and costs recognized
3. Measurement: How are revenues and costs measured
4. Classification issues: How are revenues and costs presented

Different IFRS Standards determine how a firm recognizes, measures and classifies both income and expenses and will be discussed in relation to the different IFRS Standards later in the institutional background. The definition for income is found in the IFRS Conceptual Framework, where income is defined as *"an increase in assets or a decrease in liabilities that result in an increase in equity, other than those related to contributions from equity holders"*. Inversely, expenses are *"decreases in assets or increases in liabilities that result in decreases in equity, other than those relating to distributions to holders of equity claims"* (IASB, 2018).

Cash flow statement

The cash flow statement became mandatory with the release of IAS 7 - Statement of Cash Flows in 1992. The cash flow statement should, according to IAS (1992), be structured into cash flow from operating, investing, and financing activities. The net cash flow is the sum of all three and explains the change in cash and cash equivalent found in the balance sheet. Equity oriented stakeholders are often interested in the cash flow from operating activities, a point we will further explore later in the thesis. Cash flow is also vitally important as the fundamental valuation of a security is the present value of all future cash dividends, which will be elaborated on later in the literature review.

A1.2 Explanation of IFRS Standards by time periods

Since 2001 when the IASB adopted the 41 IAS Standard and the Conceptual Framework developed by IASB, 17 new IFRS Standards have been issued, of which 16 have become effective. As such, IFRS is frequently updated with new and revised Standards introducing new legislation and disregarding older. Furthermore, each of the revisions has often seen multiple updates sometime after implementation as their adoption reveals major or minor things that need to be addressed.

This part of the appendix will 1) Explain issued IFRS Standards with an emphasis on those with the hypothesized largest effects (based on IASB discussion highlights, comment letters from key auditing companies, public debate and company devotion to explaining the changes in annual reports) and 2) Bundle the largest IFRS changes into time periods in a similar manner as seen in Dobija and Klimczak (2010).

Before 2005

Even though IFRS first became mandatory and was adopted by the EU in 2005, the IASB had been working on revising IAS Standards and introducing their own IFRS Standards since 2001. So by 2005, they had already issued five IFRS Standards that had received endorsements from the EU and were thus implemented for companies adopting the international accounting policy.

The first 5 IFRS Standards were effective from January 1st, 2005, and are thus effective from the beginning of our measurement period. The table A1.1 briefly explain the five standards.

Period 2005-2007 end of year

In the period of 2005-2007, two more IFRS Standards were made effective, IFRS 6 - Exploration for and Evaluation of Mineral Resources, and IFRS 7 - Financial Instruments: Disclosures. For IFRS 6, the effect should be very limited. Given the fact that an entity could continue to use its existing accounting policies provided that the policy was deemed

Table A1.1: IFRS Standards before 2005 (Deloitte, 2019)**IFRS 1 - First-time Adoption of International Financial Reporting Standards**

Sets out the procedures when an entity adopts IFRS Standards for the first time as the basis for preparing its general purpose financial statements

IFRS 2 - Share-based Payment

Sets out the accounting for transactions in which an entity receives or acquires goods or services either as consideration for its equity instruments or by incurring liabilities for amounts based on the price of its shares or other equity instruments

IFRS 3 - Business Combinations

An acquirer of a business recognises the assets acquired and liabilities assumed at their acquisition-date fair values and discloses information that enables users to evaluate the nature and financial effects of the acquisition

IFRS 4 - Insurance Contracts

Applies, with limited exceptions, to all insurance contracts (including reinsurance contracts) that an entity issues and to reinsurance contracts that it holds

IFRS 5 - Non-current Assets Held for Sale and Discontinued Operations

Sets out the accounting for non-current assets held for sale and the presentation and disclosure of discontinued operations

reliable and relevant to decision users and that this only affected companies engaged in mineral resources, the overall effect is assumed to be small. The advisory board for financial statements in the EU, EFRAG, expressed some early concern that it was not completely reconciled with the existing IAS 36 - Impairment of Assets, but the concern was addressed appropriately (EFRAG, 2007). IFRS 7 mandated specified regulations linked to the disclosures of financial instruments, where the objective was to help primary users evaluate the significance of financial instruments to the entity's financial position and performance (Deloitte, 2019). Although it involved clearer specifications, the IFRS Standard was generally a replacement of IAS 30, where IAS 32 was incorporated, which had similar requirements, meaning that the total net changes were small.

Period 2008-2012 end of year

On January 1st, 2009, IFRS 8 - Operating Segments, became effective. The objective of this IFRS Standard was to *"disclose segmental information that is consistent with how it reported internally to the chief decision-making operator"* (Deloitte, 2019). An operating segment was defined in the Standard as a *"component of an entity that engages*

Table A1.2: Multiple valuation based on Operating Segment

	EBIT	Auto part	Auto & truck	EV
Company 1	100	10 %	90 %	2563,8
Company 2	100	90 %	10 %	946,2

in business activities from which it may earn revenues and incur expenses, whose operating results are regularly reviewed by the entity's chief operating decision maker and for which discrete financial information is available" (Deloitte, 2019). The general rule was that the consolidated statement had to report segmented information if *"revenue, profit or loss, or assets of a segment are 10 percent or more of the equivalent total for all of the operating segments"*, and in addition, no more than 25 percent of a companies assets could be reported not segmented. As all returns are not measured equal for equity investors, where industries have large relative valuation differences on their revenues and earnings, this information would enable important insight to investors.

The effect can be highlighted by an example, illustrated in table A1.2. The renowned valuation professor Damodaran of Stern School of Business at NYU regularly updates the average multiples across industries, the latest in January 2019. The multiple EV/EBIT on auto parts is 7.44, whereas the same multiple on a similar industry, auto & truck, is 27.66, an astounding difference of 372 percent. This means that a company with EBIT based 90 percent on auto & truck and 10 percent on auto parts should expect to be valued at EV/EBIT of 25.64 compared to EV/EBIT of 9.46 if the segment split was inverted, adding up to a 271 percent difference in valuation. As highlighted with this example, the segments to where revenue and profits are created are of great matter to equity investors.

IFRS 8 - Operating segments received criticism, and some auditors commented that it was an inferior solution to the previous IAS 14 - Segment Reporting, which was superseded by IFRS 8. The reason is that IFRS 8 lacked coherence to the general IFRS Standards, and had not properly defined key terms such as "segment revenue" and "segment assets", making the numbers less comparable between companies (EY, 2007). The IASB addressed this by requiring strict disclosures of how the segmentation was conducted for each company. As a consequence of this, the regulation of more detailed segmentation of where consolidated companies earn their profits from should affect the value relevance, thus

making the time when IFRS 8 became effective a natural break. No other IFRS Standards became effective in the period between 2009-2013 before a plethora of new rules became mandatory in January 1st, 2013, which will be highlighted in the next paragraphs.

Period 2013-2016 end of year

On January 1st, 2013, multiple IFRS Standards went became mandatory significant implications. In addition, the revision of IAS19, the IAS19R, was also made effective, which affected the balance sheet of some companies by reducing the equity share of total assets quite significantly since all pension liabilities had to be included in the balance sheet. Each of the standards is highlighted in the table below and discussed in the following paragraphs.

IFRS 10 - Consolidated Financial Statements

The IFRS Standard specifies under which circumstances an entity is required to report a consolidated statement, which is mandatory if the investor holds power over the investee. However, investment entities are exempt from the rule. The exemption has no implications for the following analysis as financial entities are excluded from the analyzed sample set, in line with previous research. One of the largest effects of the Standard is the fact that consolidated financial statements must eliminate intragroup balances, transactions, income, and expenses. Intragroup is the portion of a companies revenue, receivables, or any similar item that stems from a company that is controlled by the same legal entity. By doing so, companies are not able to inflate, for instance, revenue by having a large share of intragroup income and reporting the statements separate, thus reducing some of the potentials for earnings management.

IFRS 11 - Joint Arrangements

The IFRS Standard was meant as a regulation to enforce that companies specified two relevant questions to their primary economic users; i) Does the entity have a joint arrangement, and ii) If the entity has a joint arrangement, is it a joint venture or a joint operation (Deloitte, 2019). Firstly, the Standard sets some definitions for when a group

of activities is a joint venture and detailing the difference between joint arrangement, joint venture, and joint operation. A joint arrangement occurs if two or more parties have control over activities, whereas, in a joint venture, the venturers have rights to the net assets of the venture. In a joint operation, however, each operator has the rights of the assets, but also the obligation for the liabilities of the operation (Deloitte, 2019). This clarification is important due to the fact that it has implications for the accounting practice, where joint ventures are accounted by the equity method, opposed to joint arrangements which are accounted for according to IFRS applicable regulations for the particular asset, liability, revenue or expense.

The difference would affect the balance sheet as the assets recognized in the balance sheet is likely to be substantially higher in a joint operation where normal IFRS regulation apply, compared to using the equity method for joint ventures. Even though the line might be thin between the two definitions, the accounting effects can be large, and this faced criticism as for instance EY (2011a) stated that *"Given the diversity of views, we believe it is important for the IASB to provide additional guidance, preferably via another amendment, to reduce this."*

IFRS 12 - Disclosure of Interests in Other Entities

The objective for IFRS 12 was to assist users of the financial statements to evaluate the nature and risk linked to the interests the entity in question had in other entities, with a focus on how those interests affected the position, performance and cash flow of said entity. This IFRS Standard specifies the information that needs to be disclosed in different entity structures, for instance, would an interest in a structured entity be required to disclose *"The nature and extent of interests in structured entities, particularly the extent of potential support the parent might be required to provide"* (Deloitte, 2019). The regulation and its specifications provide clarification on the ties and interconnections between different entities. Since this is more of a risk related disclosure, with a limited direct effect on accruals, it is expected to have limited influence on the value relevance of accruals and cash flows.

IFRS 13 - Fair Value Measurement

Fair value measurement was implemented to define what fair value is, and set guidance on how entities could measure it as well as regulate the required information the entity needed to provide in the financial statements about how the fair value measurement was calculated. IFRS 13 applies when *"another Standard requires or permits fair value measurements or disclosures about fair value measurements (and measurements such as fair value less costs to sell)"* (Deloitte, 2019). Determining the fair value is not straight forward, but in its essence, it is simply the current market price of an asset, determined by market participants. Furthermore, the IFRS specifies that fair value measurement assumes that the asset is exchanged in an *"orderly transaction between market participants, under current market conditions"* (Deloitte, 2019). The latter part of the quote, *"under current market conditions"*, has been debated and is prone to uncertainties.

For instance, in the cyclical shipping industry, the fair value of a ship in an up-cycle is much higher than it is in a situation where the profits are declining, and companies actually need to sell their ships. This is often followed by substantial write-downs of assets, which in turn escalate the pressure on the companies financial position. In cyclical industries where the outlook changes fast, this results in a balance sheet that could change dramatically in a short time, creating a lot of noise in the balance sheet. In addition, the write-downs also appear in the income statement as asset write-downs impact the operating profit as the impairment gets recognized in the income statement. Implications from this is a reported income that often does not reveal the underlying profitability of the company, and a balance sheet that should not be taken at face value from a risk perspective.

However, the implication from IFRS 13 was not to regulate an increased use of fair value, but the measurement technique for how fair value should be valued and disclosed (KPMG, 2011). The regulation leads to a more common requirement to the use of fair value between US GAAP and IFRS, but would also pose significant challenges as the disclosure requirements are substantial compared to what many entities previously reported (EY, 2012). Furthermore, fair value has a hierarchy in IFRS, where the degree of an observed market price determines the level of the fair value estimate. With a higher degree of observed market price, fewer disclosures are necessary, and the inverse is also true. It is worth noting that the IFRS conducted a Post Implementation Review (PIR) on IFRS 13

and concluded that it functions as intended, leaving no pending changes (Deloitte, 2019).

IFRS 14 - Regulatory Deferral Accounts

IFRS 14 is an interim Standard with a limited time span and is specified for companies delivering products that are subject to rate regulation by the government. Examples of this are the production or delivery of oil and electricity. Rate regulation ensures that the price consumers get is fair and that the company covers its costs. This can sometimes create an accounting mismatch because the price the consumers are charged at a certain point in time is not always sufficient to cover the total costs. Overall, this is an issue that is only relevant for a small portion of companies, and is in all assumed to have little impact on the value relevance. The Standard allowed these companies to report after IFRS while still using the same regulatory deferral account technique as they used in their local GAAP but presenting it separately.

IAS 19R - Employee Benefits

Finally, it is worth noting that IAS 19R was introduced from January 1st, 2013. Even though this was merely a revision, the impact on the balance sheet was substantial for some companies. The revision meant increased balance sheet volatility for the companies that were using the corridor approach. For entities that use a defined benefit plan, meaning that the company bears the future pension payments on their balance sheets, the impact can be quite substantial. The change in the total liability of future pension payments, which is heavily influenced by the expected salary development of staff, and the pension-related assets held by the company, can vary dramatically. EY published a report on the matter in 2011 when the revision became known and concluded that *"Entities should carefully consider how these changes will impact their key balance sheet metrics or debt covenants on a continuing basis"*, highlighting the impact this could have on accounting data (EY, 2011b).

Period 2017-2017 end of year

From January 1st, 2018, IFRS 15 - Revenue from Contracts with Customers, was made

Table A1.3: Timing of revenue recognition (Kinserdal et al., 2017)

Company	Timing of recognition
MacDonalds	"...recognition at the point of sale..."
Electrolux	"...recognition at the point of shipment..."
Volvo	"Income from the sale of goods is recognised when the goods are delivered to the customers. Income from the sale of workshop services is recognised when the service is provided. Rental revenues and interest income in conjunction with financial leasing or instalment contracts is recognised over the contract period."
SAP	"Software license fee revenues are recognised when persuasive evidence of an arrangement exists, delivery has occurred, the license fee is fixed and determinable and the collection of the fee is probable."
ABB	"Sales under long-term fixed price contracts are recognised using the percentage-of-completion method."

effective. The objective of the IFRS Standard was to regulate the *"the accounting for revenue from sales of goods and rendering of services to a customer"* (IFRS, 2019). Furthermore, IFRS 15 only regulate the revenue stemming from contracts with its customers, not dividends. With revenue growth being one of the main drivers behind company valuation, revenue recognition is of great importance (Graham, 1949). The CEO of the Securities and Exchange Commission (SEC) in the US stated in 2001, after introducing stricter regulation on revenue recognition, that *"A rigorous revenue recognition Standard that is responsive to the fact that the single largest cause of restatements, the single largest issue in SEC enforcement cases, and the issue that has and continues to result in the greatest losses for investors is improper revenue recognition"* (Turner, 2001). Several European firms, such as the Swedish/Swiss firm ABB, has been involved in large revenue recognition scandals. Accounting literature also highlights the frequent use of premature revenue recognition in practice as an accounting issue (Stubben, 2010). Companies recognize revenue in different ways, as the table below highlights.

The IFRS 15 tackles the issue by providing clear specifications for what revenue is, and when it can be recognized, phrasing that the IFRS Standard cover revenue when *"it has commercial substance, the parties have approved it, the rights of the parties regarding the goods or services to be transferred and the payment terms can be identified, the parties are committed to perform their obligations and enforce their rights, and it is probable that the entity will collect the consideration to which it is entitled"* (Deloitte, 2019). Given the impact of the Standard, it was updated with further clarifications in 2016 before it came

into effect on January 1st, 2018. A more concise regulation on revenue recognition should improve the validity of the income statement and disclose more reliable information on an entities' underlying economic performance.

In addition, it is worth noting that IFRS 9 - Financial Instruments, which was issued in 2014, was endorsed by the EU on the 22nd of November, 2016 with the same effective date as IFRS 15. The Standard included, amongst other things, that financial companies had to conduct impairments quicker, and should be seen in the light of the recent financial crisis. The effects for non-financial entities in which this thesis will analyze the effects are only minor as they impose merely slight changes to hedge accounting (EY, 2016).

Period 2018-2019 Q2

IFRS 16 - Leases

On January 1st, 2019, the IFRS 16 - Leases went into effect. The objective was to specify and set direction for *"recognition, measurement, presentation and disclosure requirements for leases"* (IFRS, 2019). Leases had been debated for a long time, and former Chairman of the IASB, Sir David Tweedie announced in 2008 that *"one of my great ambitions before I die is to fly in an aircraft that is on an airline's balance sheet"*, and he is now alive to experience this. The new IFRS Standard's most influential effect is that all leases are seen as what was previously a financial lease as *"A lessee recognizes a leased asset and lease obligation for all leases"* (IFRS, 2019). This means that both financial leases and operating leases have to be recognized in the balance sheet, whereas companies could previously exempt operating leases from the balance sheet. For some industries, such as airline companies and retail stores that lease their stores, the change represents a massive increase in the total assets. Consequently, companies will experience a lower equity share, which is a frequently used covenant in many bank loans and obligations. This would also have a substantial effect on the valuation multiples that are frequently used, as the cost from operating leases is moved from an operating expense to a financial expense, impacting, for instance, the popular EV/EBITDA multiple. As the change both impacts the equity share and the multiples, as well as forcing companies to disclose lease information in more detail, the change is plausible to affect the relevance of the accounting

data reported. For instance, the largest Nordic sports retailer, XXL, reported a 31.2 percent operating expense as a share of revenue in Q1 2019 and noted that this would have been 38 percent of the revenue if it had not been for IFRS 16. On the other hand, total liabilities amounted to 7.1 billion NOK following the implementation, compared to total liabilities of 4.1 billion NOK, excluding the effect of IFRS 16, which means that total liabilities in the balance sheet increased by 73% (XXL, 2019).

Criticism of IFRS

The implementation of IFRS has been met with some criticism. Among others, the SEC criticizes the governance structure, where the reliance on funding from large accounting firms jeopardize its actual or perceived independence, and that the IFRS lack comprehensiveness compared to other accounting policies (SEC, 2012). Some researchers have also taken a tough stance against IFRS, where Australian researchers Stephen Haswell and Langfield (2008) reports 57 serious defects of the IFRS, and there are claims that IFRS has too much flexibility to improve the comparability (Sherman and Young, 2016). Some critics also pointed fingers towards the use of fair value and market estimates in the IFRS in the aftermath of the financial crisis, claiming that the ideal of neutrality created volatility and risk (Hoogervorst, 2018).

Additionally, when it comes to neutrality, many critics claim that the IFRS Standards do not facilitate this. Examples of this include that according to IAS 37, provisions are recognized as a liability if the present obligation is probable, often interpreted above 50 percent likelihood, whereas for a similarly expected inflow of cash, the recognition of income must be virtually certain, often interpreted as above 90 percent likelihood. A similar downward bias is also found in deferred tax, where liabilities are recognized without any threshold levels of probability, but assets are only recognized if there is convincing other evidence of future income according to IAS 12.35 (Kinserdal et al., 2017). Prudence to this extent is surprising, given the fact that the Conceptual Framework issues the problem of conservatism by claiming that *"Such prudence does not imply a need for asymmetry, for example, a systematic need for more persuasive evidence to support the recognition of assets or income than the recognition of liabilities or expenses. Such asymmetry is not a qualitative characteristic of useful financial information"* (IASB, 2018).

A1.3 Valuation of a company

Determining the value of a company is the foundation of investing. Much of the current literature of investing can be traced back to what one may call the "father of value investing", namely Benjamin Graham. Graham is known for writing two books that are among the main texts in the value investing, namely *Security Analysis (1934)* and *The Intelligent Investor (1949)*. Value investing is an investment philosophy where an investor applies fundamental analyses of a company's financial statement, together with further analysis on the market, competitors, and the overall state of the economy, in order to buy securities that through the analysis appear underpriced. In *Security Analysis*, Graham claims that "*An investment operation is one which, upon thorough analysis, promises the safety of principal and an adequate return. Operations not meeting these requirements are speculative.*", clearly showing the difference between value investing and speculation (Graham and Dodd, 1934). *The Intelligent Investor (1949)* is in many ways a continuation of *Security Analysis (1934)*, where Graham introduces a character called "Mr. Market", who is indifferent as to which stock he holds from day to day as long as he buys and sells at the market price, which can be seen as the prevailing thought of the efficient market hypothesis. The point of the character is that an intelligent investor should focus on fundamental analysis of a company, and not on the often irrational behavior of the market, where the intrinsic value is often incorrectly seen as the market value (Graham, 1949).

In *The Intelligent Investor (1949)*, Graham explains the "Benjamin Graham formula" of valuing stock:

$$V = \text{Earnings}(8.5 + 2g) \tag{.1}$$

Where V = Intrinsic value, Earnings = Trailing 12 Months Earnings, 8.5 is the P/E ratio of a no-growth company, and g is the growth rate. The formula thus states that the intrinsic value of a company is based on earnings and growth.

From an accounting view, the answer to the value of a company in its simplest (and

misleading) form simply be the book value of equity. Each year, renowned auditing entities value a company's total assets and total liabilities carefully following recognized accounting policies, and then the net difference between the two is the equity value. However, due to expectations about the future, exposure to risk, and not least conservatism where, for instance, the quality of management, internally developed brands and intangible assets are excluded, the book value of earnings is not a fair measure of a company valuation. In addition, the balance sheet is a snapshot based on the historical developments of the company, whereas valuation relies on the notion of the present value of future cash flows received discounted with an appropriate discount factor (Brealey et al., 2014)

As for more recent development, the introduction of the Capital Asset Pricing Model (CAPM) during the 1960s relied on the correlation between individual stocks and the general market to assess the market risk of each stock, giving each stock a market-based risk premium which earnings could be discounted on (Mossin, 1966). This method quickly became a widespread norm as the input to the required rate of return in Gordon's growth formula developed by Shapiro and Gordon (Gordon, 1959):

$$P_0 = DIV_1 / re - g \quad (.2)$$

A2 Method

A2.1 Collecting the data

There are two main ways of gathering the data: i) annual reports and ii) databases. The advantage of using annual reports is that annual reports show restatements. Companies have to make restatements to show the difference between the financial statements using old and new Standards when a new IFRS Standard is introduced, years where multiple standards are introduced do not show the individual effect of each IFRS Standard. A good example of this is that between 2008 and 2009, one could observe the full effect of IFRS 8 - Operating Segments by comparing the end of the year 2008 balance to the

beginning of the year 2009 balance of a single company. However, the individual effect of IFRS 13 - Fair Value Measurement between 2012 and 2013 is not observable as the effect is mixed with the effect of IFRS 9 - 12. The disadvantage of this approach is that it is a manual approach and thus restricts the number of companies we can analyze.

The advantage of using a database is that it allows us to include all STOXX 600 companies in the given time period, and while the database does not include restatements, the advantage of increasing the data set is emphasized.

The database used for sampling the data is COMPUSTAT, which contains both fundamental quarterly data and daily security data. COMPUSTAT is the by far the most popular choice for company statistics within the value relevance literature and accruals anomaly literature. The raw data file downloaded from COMPUSTAT included 96038 firm-quarter observations. After filtering out the financial sector the file contained 77628. Following that, to avoid double-counting of the same stocks, we filtered on issue ID and only included primary public offerings, which gave us 37465 observations. Lastly, in order to have adjusted price in $t+1$ for all observations, we ended up with 36863 observations.

The COMPUSTAT database is more extensive on US companies, and when using EU data, the data set returned a small percentage of missing data. There was, therefore, a consideration where on the one side, lacking data could complicate the tests conducted and potentially reduce the validity as the sample size was reduced, but on the other side, conducting these tests on the European market would provide a higher degree of contribution to the literature as it is more uncharted territory. In this trade-off, we chose the latter. The decisive argument was the additional insight provided to the literature field by focusing on value relevance linked to IFRS. A full overview of the metrics extracted from COMPUSTAT can be found in tables A2.1 and A2.2.

A2.2 Merging the data

In order to develop the full data set, we have to extract the data from both COMPUSTAT sources and merge them. The data merging was done through the programming language

R. The R-script merged data based on the GVKEY, which is the company identifier and merges the stock data with the financial data based on the date of the last day of the financial quarter and has a unique value for each legal company structure on a consolidated level.

A2.3 Variable definition

Table A2.1: Financial statement variables from COMPUSTAT

Balance sheet	COMPUSTAT definition
Assets - Total	ATQ
Common / Ordinary Equity	CSTKQ
Total liabilities	LTQ
Current liabilities	LCTQ
Long-term liabilities	LLTQ
Current Assets	ACTQ
Non-Current Assets	ANCQ
Inventory	INVTQ
Receivables	RECTQ
Payables	APQ
Cash and Short-Term Investments	CHEQ
Stockholders Equity - Total	TEQQ
Common/Ordinary Stock (Capital)	CEQQ
Income statement and cash flow statement	
Gross Profit (Loss)	GPQ
Tax Payable	TXTQ
Operating Activities	OANCFY
Investing Activities	IVNCFY
Financing Activities	FINCFY

Table A2.2: Other variables from COMPUSTAT

Stock data	COMPUSTAT definition
Price	PRCCD
Shares Outstanding	CSHOC
Adjustment factor	AJEXDI
Issue ID	IID
Additional Info	
GIC Industry	GIND
GIC Sub-industry	GSUBIND
Sector identifier	GICS
Currency	CURCDQ

A2.4 Robustness

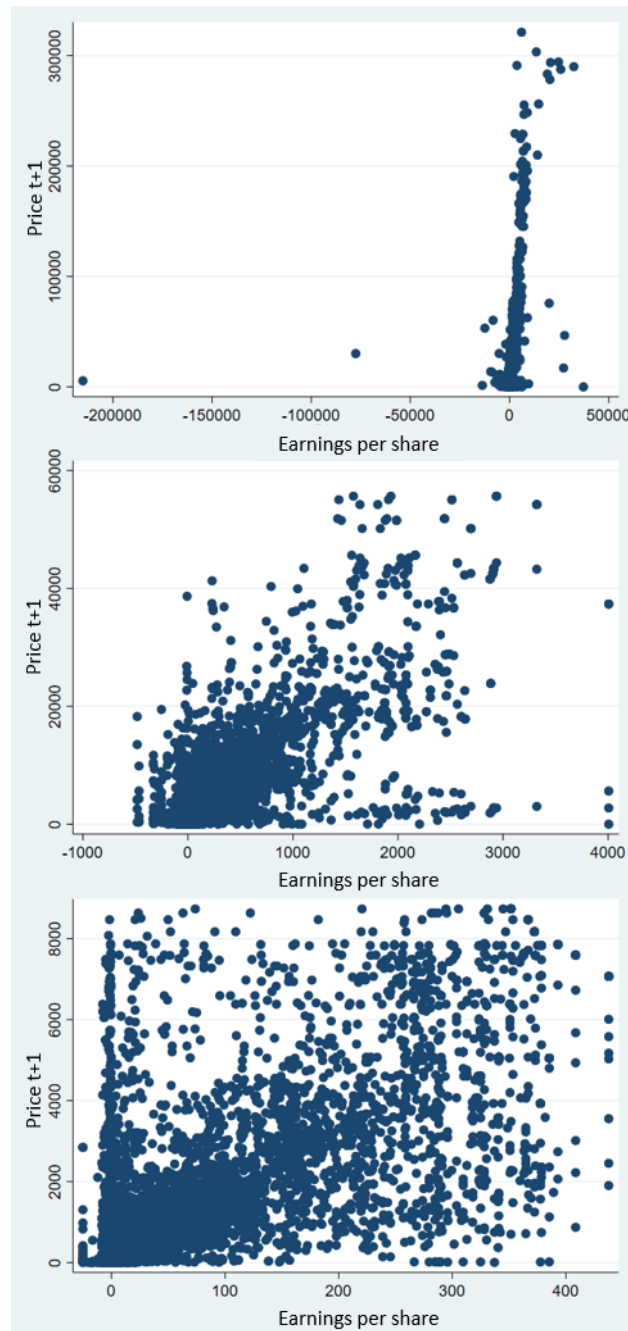


Figure A2.1: Winsorization at 0%, 1% and 5%

Figure A2.2: Variance inflation factor test of Ohlson-model (4.1)

Variable	VIF	1/VIF
BVE_w5	4.48	0.223409
EPS_w5	4.48	0.223409
Mean VIF	4.48	

Figure A2.3: Omitted variable test of Ohlson-model (4.1)

Ramsey RESET test using powers of the fitted values of Adjustedpricet1_w5
 Ho: model has no omitted variables
 $F(3, 31939) = 402.65$
 Prob > F = 0.0000

Figure A2.4: Variance in inflation factor test of disaggregated model (4.14)

Variable	VIF	1/VIF
NonCurrent~5	17.42	0.057401
CurrentLia~5	16.08	0.062208
Receivable~5	15.35	0.065133
LongtermLi~5	9.35	0.106989
Inventory_w5	6.23	0.160547
CashandSho~5	4.82	0.207370
Industry	4.00	0.249954
ConsumerDi~y	3.12	0.320230
FCFE_w5	3.03	0.329770
Materials	2.94	0.339969
Communicat~s	2.59	0.385420
HealthCare	2.46	0.406528
COMPACC_w5	2.39	0.419035
ConsumerSt~s	2.13	0.470039
Information~y	2.06	0.485092
Energy	1.97	0.506721
Mean VIF	6.00	

Figure A2.5: Omitted variable test of disaggregated model (4.14)

Ramsey RESET test using powers of the fitted values of Adjustedpricet1_w5
 Ho: model has no omitted variables
 $F(3, 26413) = 59.76$
 Prob > F = 0.0000

A3 Data analysis

A3.1 Value relevance of income statement and balance sheet

Table A3.1: Value relevance of income statement

	2005-07	2008-12	2013-16	2017	2018-19
EARN	16.36*** (173.38)	12.81*** (190.53)	18.95*** (165.33)	19.17*** (79.24)	18.89*** (87.60)
_cons	35.91*** (6.22)	67.44*** (13.67)	111.1*** (11.66)	139.1*** (5.87)	148.9*** (7.00)
<i>N</i>	6013	11472	8940	2141	2953
<i>R</i> ²	0.833	0.760	0.754	0.746	0.722
adj. <i>R</i> ²	0.833	0.760	0.754	0.746	0.722

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.2: Value relevance of balance sheet

	2005-07	2008-12	2013-16	2017	2018-19
BVE	2.646*** (181.29)	1.559*** (207.40)	2.411*** (172.83)	2.916*** (86.63)	2.855*** (88.71)
_cons	31.13*** (5.58)	49.42*** (10.89)	85.81*** (9.54)	105.7*** (4.88)	115.1*** (5.53)
<i>N</i>	6362	11984	9340	2217	3041
<i>R</i> ²	0.838	0.782	0.762	0.772	0.721
adj. <i>R</i> ²	0.838	0.782	0.762	0.772	0.721

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.3: Incremental value relevance of income statement and balance sheet

	2005-07	2008-12	2013-2016	2017	2018-2019
Inc. EARN	0,030	0,041	0,042	0,021	0,034
Inc. BVE	0,035	0,063	0,050	0,048	0,033
Common	0,803	0,719	0,712	0,725	0,688
Total	0,868	0,823	0,803	0,793	0,756

Table A3.4: Value relevance of income statement 2016 - 2019

	2016	2017	2018	2019
EARN	20.15*** (81.69)	19.17*** (79.24)	18.00*** (75.58)	21.34*** (47.26)
_cons	127.4*** (5.87)	139.1*** (5.87)	138.8*** (5.73)	163.8*** (3.96)
<i>N</i>	2184	2141	2032	921
<i>R</i> ²	0.754	0.746	0.738	0.708
adj. <i>R</i> ²	0.753	0.746	0.738	0.708

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.5: Value relevance of balance sheet 2016 - 2019

	2016	2017	2018	2019
BVE	2.749*** (87.32)	2.916*** (86.63)	2.765*** (76.49)	3.077*** (46.72)
_cons	103.8*** (5.15)	105.7*** (4.88)	112.3*** (4.74)	118.2*** (2.86)
<i>N</i>	2277	2217	2105	936
<i>R</i> ²	0.770	0.772	0.736	0.700
adj. <i>R</i> ²	0.770	0.772	0.735	0.700

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.6: Value relevance of income statement and balance sheet 2016 - 2019

	2016	2017	2018	2019
EARN	9.146*** (18.79)	8.198*** (15.49)	9.784*** (18.56)	11.59*** (12.24)
BVE	1.646*** (25.31)	1.798*** (22.71)	1.400*** (17.22)	1.575*** (11.46)
_cons	82.20*** (4.24)	93.82*** (4.34)	98.34*** (4.26)	107.3*** (2.69)
<i>N</i>	2156	2113	2000	902
<i>R</i> ²	0.807	0.793	0.769	0.742
adj. <i>R</i> ²	0.807	0.793	0.769	0.741

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

A3.2 Value relevance of accruals and cash flow from operations

Table A3.7: Significance of change in coefficients in value relevance of accruals and cash flow from operations

	2005-07	2008-12	2013-16	2017	2018-2019
EARN	8,795	6,19	9,387	8,860	10,96
EARN change		-2,607**	3,199**	-0,527**	2,10
BVE	1,301	0,795	1,224	1,633	1,296
BVE change		-0,51**	0,43**	0,41	-0,34
FCO	0,208	0,458	0,664	0,491	0,394
		0,25**	0,21**	-0,17**	-0,10

A3.3 Value relevance of comprehensive accruals and free cash flow to equity

Table A3.8: Significance of change in coefficients for comprehensive accruals and free cash flow to equity

	2005-07	2008-12	2013-16	2017	2018-2019
COMPACC	3,12	5,07	7,18	5,85	8,97
Delta COMPACC		1,95**	2,11**	-1,33	3,12*
FCFE	3,70	4,64	5,63	4,79	7,43
Delta FCFE		0,95	0,99*	-0,84	2,63**
BVE	2,24	1,19	1,77	2,23	1,82
Delta BVE		-1,1**	0,6**	0,5**	-0,4**

Table A3.9: Comprehensive accruals and free cash flow to equity explanatory power over time

	Comprehensive accruals	Comprehensive cash	Inc. comprehensive accruals	Inc. comprehensive cash	Total
Time	-0.00863* (-6.73)	0.00950 (1.20)	-0.0166+ (-2.06)	0.00149+ (1.97)	-0.00713* (-10.46)
Constant	18.15* (7.03)	-18.79 (-1.18)	33.96+ (2.09)	-2.979+ (-1.95)	15.17* (11.05)
Observations	15	15	15	15	15

t statistics in parentheses

+ $p < 0.10$, * $p < 0.05$

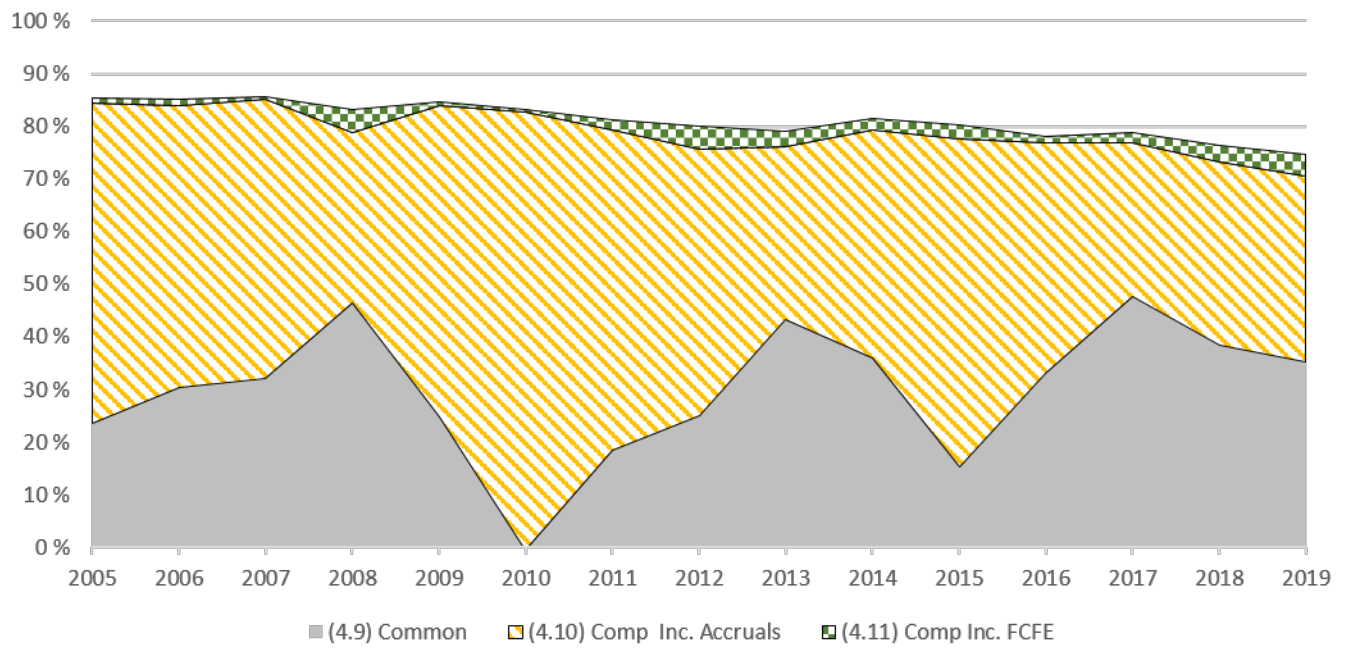
Figure A3.1: Value relevance of comprehensive accruals and free cash flow to equity

Table A3.10: Value relevance of comprehensive accruals and free cash flow to equity by year for Industrials

	2005	2006	2007	2008	2009	2010	2011	2012
COMPACC	5.035*** (8.81)	3.630*** (4.36)	5.625*** (6.32)	3.533*** (4.98)	4.548*** (4.99)	2.822*** (5.67)	2.056*** (4.65)	3.862*** (5.86)
FCFE	4.971*** (12.05)	4.143*** (6.49)	5.801*** (7.09)	3.769*** (9.50)	3.438*** (5.10)	1.794*** (3.56)	3.702*** (8.17)	6.234*** (12.43)
BVE	1.951*** (29.55)	2.378*** (25.83)	2.261*** (15.97)	1.226*** (20.35)	1.558*** (26.40)	1.800*** (33.46)	1.266*** (36.95)	1.105*** (31.10)
_cons	18.12 (1.05)	49.06** (2.17)	33.23 (1.28)	26.76 (1.38)	39.47** (1.99)	37.31* (1.96)	47.12*** (2.77)	41.01** (2.12)
<i>N</i>	441	469	408	448	505	502	504	521
<i>R</i> ²	0.899	0.888	0.851	0.824	0.861	0.901	0.896	0.882
adj. <i>R</i> ²	0.899	0.887	0.850	0.822	0.860	0.900	0.895	0.881

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

	2013	2014	2015	2016	2017	2018	2019
COMPACC	7.146*** (7.45)	4.331*** (5.86)	4.130*** (5.37)	3.290*** (3.59)	4.279*** (4.84)	6.654*** (7.93)	11.24*** (7.10)
FCFE	6.348*** (9.66)	4.198*** (9.73)	3.752*** (6.59)	0.906* (1.77)	2.587*** (4.69)	4.751*** (8.24)	10.15*** (7.49)
BVE	1.501*** (23.43)	2.352*** (40.25)	2.394*** (28.94)	2.908*** (32.69)	2.913*** (30.86)	2.376*** (24.51)	1.977*** (9.99)
_cons	58.49** (2.19)	33.79 (1.48)	82.95*** (2.86)	105.6*** (3.05)	98.36** (2.58)	44.88 (1.24)	50.49 (0.79)
<i>N</i>	519	528	533	529	521	499	228
<i>R</i> ²	0.860	0.933	0.900	0.878	0.874	0.888	0.868
adj. <i>R</i> ²	0.859	0.933	0.900	0.877	0.873	0.887	0.866

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.11: Value relevance of comprehensive accruals and free cash flow to equity by year for Materials

	2005	2006	2007	2008	2009	2010	2011	2012
COMPACC	-5.332*** (-5.35)	0.132 (0.12)	8.485*** (10.77)	4.697*** (4.44)	6.782*** (5.16)	7.560*** (7.21)	2.954*** (3.40)	12.52*** (7.14)
FCFE	-1.481* (-1.97)	0.447 (0.60)	7.055*** (10.60)	4.786*** (8.05)	4.338*** (4.60)	7.563*** (6.63)	2.398** (2.34)	8.626*** (6.36)
BVE	2.314*** (22.49)	2.387*** (23.02)	1.536*** (12.91)	0.859*** (12.50)	1.070*** (14.02)	0.834*** (7.51)	0.918*** (14.19)	0.546*** (6.40)
_cons	13.05 (0.42)	-4.157 (-0.14)	-34.55 (-1.48)	-6.147 (-0.26)	15.44 (0.52)	11.73 (0.31)	57.95 (1.49)	41.19 (1.05)
<i>N</i>	203	225	175	217	253	251	258	262
<i>R</i> ²	0.844	0.881	0.936	0.824	0.789	0.789	0.690	0.718
adj. <i>R</i> ²	0.842	0.879	0.935	0.822	0.786	0.786	0.687	0.715

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

	2013	2014	2015	2016	2017	2018	2019
COMPACC	14.31*** (7.29)	12.87*** (6.05)	10.57*** (8.53)	6.604*** (3.28)	8.890*** (4.75)	10.15*** (3.99)	25.05*** (5.53)
FCFE	11.04*** (6.98)	7.514*** (5.69)	7.811*** (8.40)	2.768** (2.40)	6.963*** (6.18)	11.55*** (8.57)	13.99*** (3.83)
BVE	0.584*** (4.19)	1.124*** (6.64)	1.063*** (7.67)	1.808*** (9.69)	1.650*** (9.43)	0.784*** (3.30)	0.662 (1.30)
_cons	70.83 (1.47)	76.46 (1.35)	95.11 (1.64)	103.7 (1.51)	104.2 (1.45)	157.4* (1.86)	250.7* (1.68)
<i>N</i>	268	270	266	257	257	246	112
<i>R</i> ²	0.727	0.740	0.753	0.714	0.741	0.629	0.643
adj. <i>R</i> ²	0.724	0.737	0.750	0.711	0.738	0.624	0.633

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.12: Conventional measure of total accruals

	2005-07	2008-12	2013-16	2017	2018-19
Total accruals - Conventional	-0.0689 (-0.99)	-0.308*** (-9.54)	-0.815*** (-14.35)	-0.203 (-1.31)	-0.386*** (-2.62)
FCFE	1.979*** (14.96)	1.250*** (12.98)	1.849*** (13.55)	2.123*** (7.88)	3.813*** (11.76)
BVE	2.534*** (115.84)	1.446*** (129.18)	2.139*** (97.45)	2.601*** (45.91)	2.466*** (46.84)
_cons	35.02*** (5.88)	50.12*** (10.53)	87.79*** (9.23)	121.3*** (5.16)	125.0*** (5.57)
<i>N</i>	5198	9983	8026	1920	2631
<i>R</i> ²	0.851	0.787	0.766	0.765	0.706
adj. <i>R</i> ²	0.851	0.787	0.766	0.765	0.706

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

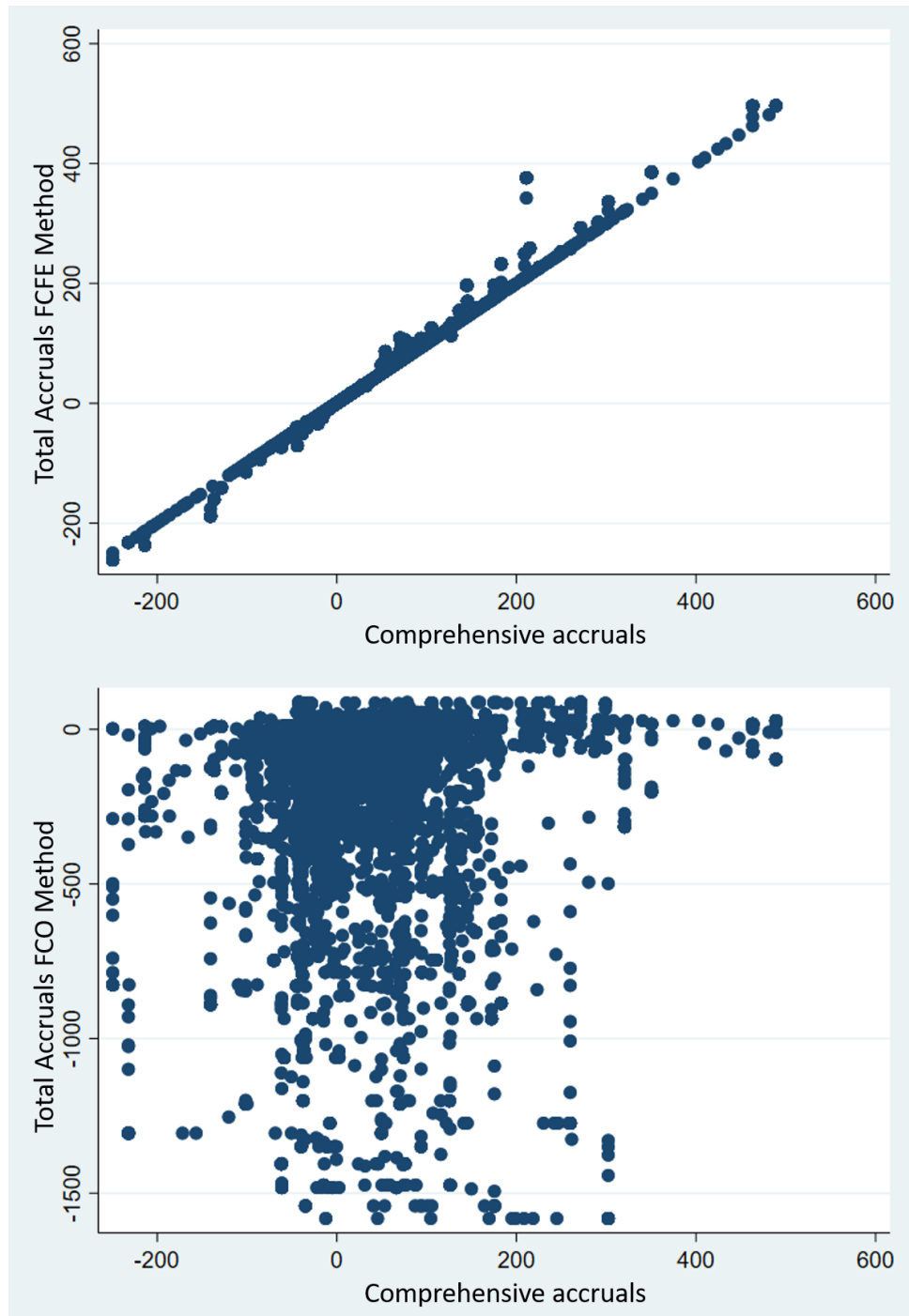
Table A3.13: Alternative measure of total accruals

	2005-07	2008-12	2013-16	2017	2018-19
Total accruals - Alternative	2.457*** (12.77)	4.744*** (36.69)	6.890*** (28.34)	5.359*** (10.87)	8.419*** (16.28)
FCFE	3.508*** (19.79)	4.694*** (38.14)	5.583*** (32.25)	4.840*** (14.95)	7.455*** (21.06)
BVE	2.265*** (85.08)	1.188*** (106.16)	1.778*** (76.39)	2.212*** (38.37)	1.806*** (31.00)
_cons	21.61*** (3.75)	33.32*** (7.42)	70.85*** (7.83)	94.73*** (4.29)	94.61*** (4.58)
<i>N</i>	5532	10759	8639	2076	2848
<i>R</i> ²	0.850	0.808	0.788	0.790	0.753
adj. <i>R</i> ²	0.850	0.808	0.788	0.789	0.753

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Figure A3.2: Alternative and conventional method of measuring accruals



A3.4 Value relevance of comprehensive earnings and disaggregated balance sheet

Disaggregated accruals

It is expected that the total explanatory power of the balance sheet increases when it is disaggregated. This is because it is a difference between the financial stability of cash equivalents compared to, for instance, Inventory or Goodwill due to the risk of write-downs and the time value of money, but when we regress solely on the book value of Equity they are treated as if they are the same. In addition, previous research has shown an increase in the value relevance measured as explanatory power when decomposing book value of Equity to its sub-components and the table below shows the regression output from doing so.

Firstly, the coefficient of both comprehensive accruals and free cash flow to equity holders reduce, but their relative relationship remains stable, with a higher coefficient given to accruals compared to cash flows. Both variables are strongly significant in each period. The overall trend with a falling explanatory power is still present. Compared to previous regressions, the constant is now often not significant despite the large sample size, and the period-by-period increase in the constant has stopped. Long term liabilities observe a sharp uptick in the period of 2013-2016, which happens to coincide with when IAS 19R - Pension liabilities were introduced, which caused balance sheet troubles for some companies with a defined contribution plan - which many companies subsequently abandoned. Arguably the most interesting finding is that the total explanatory power does not increase particularly much and that all prior inferences made on previous regressions are robust to the alterations seen in this regression.

Table A3.14: Value relevance of comprehensive earnings and disaggregated balance sheet

	2005-07	2008-12	2013-16	2017	2018-19
COMPACC	3.255*** (12.98)	4.887*** (34.78)	6.114*** (22.52)	4.587*** (7.78)	7.142*** (12.34)
FCFE	3.672*** (18.63)	4.011*** (31.10)	4.623*** (24.65)	2.624*** (7.30)	5.544*** (14.59)
Non Current tAssets	1.300*** (17.33)	1.015*** (24.99)	1.697*** (22.91)	1.862*** (11.31)	1.431*** (11.18)
Current Liabilities	-0.390*** (-2.66)	0.759*** (10.07)	0.632*** (4.46)	-0.107 (-0.37)	-0.257 (-1.13)
Inventory	0.547*** (2.73)	-1.338*** (-10.69)	2.357*** (9.28)	4.109*** (6.92)	2.322*** (4.49)
Cash and Short Term Investment	7.583*** (38.86)	4.463*** (58.26)	7.079*** (40.25)	6.651*** (15.22)	5.299*** (13.96)
Long-term Liabilities	-1.606*** (-13.27)	-1.379*** (-19.81)	-2.984*** (-22.57)	-1.838*** (-6.45)	-1.014*** (-5.84)
Receivables	0.845*** (3.46)	-0.216 (-1.53)	-0.852*** (-4.02)	-0.925** (-2.09)	-0.0750 (-0.18)
_cons	5.268 (0.91)	11.62*** (2.76)	23.43*** (2.72)	32.15 (1.54)	24.95 (1.30)
<i>N</i>	4901	9355	7429	1768	2427
<i>R</i> ²	0.859	0.835	0.808	0.812	0.780
adj. <i>R</i> ²	0.859	0.835	0.808	0.811	0.779

t statistics in parentheses

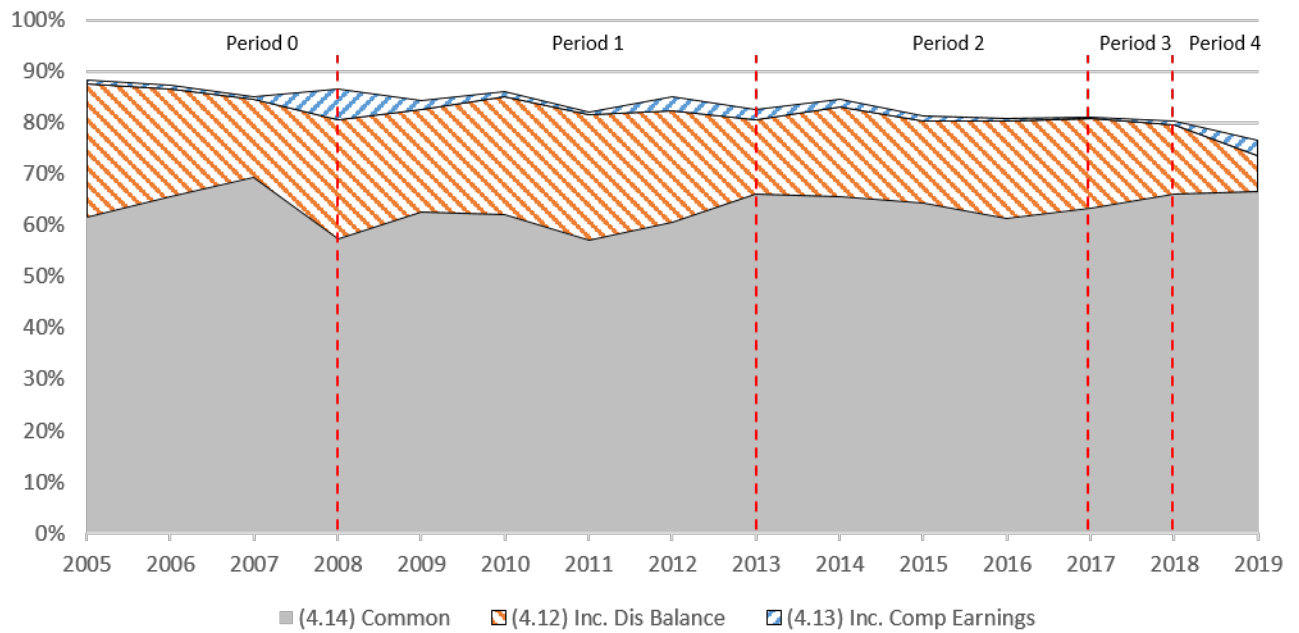
* $p < .10$, ** $p < .05$, *** $p < .01$

Table A3.15: Comprehensive earnings and disaggregated balance sheet explanatory power over time

	Comprehensive earnings	Disaggregated Balance	Inc. Comprehensive Earnings	Inc. Disaggregated Balance	Total
Time	0.00137 (0.69)	-0.00613* (-5.03)	-0.000281 (-0.30)	-0.00778* (-3.49)	-0.00641* (-7.50)
Constant	-2.110 (-0.53)	13.14* (5.37)	0.581 (0.30)	15.83* (3.53)	13.72* (7.98)
Observations	15	15	15	15	15

t statistics in parentheses

+ $p < 0.10$, * $p < 0.05$

Figure A3.3: Value relevance of comprehensive earnings and disaggregated balance sheet

A3.5 Effect of annual data

Table A3.16: Value relevance of income statement and balance sheet using annual data

	2005-07	2008-12	2013-16	2017	2018-19
EARN ANNUAL	9.841*** (17.50)	5.817*** (18.34)	11.09*** (17.61)	18.30*** (11.32)	19.02*** (12.43)
BVE ANNUAL	0.981*** (12.21)	1.268*** (29.92)	1.732*** (20.14)	1.017*** (4.49)	0.923*** (4.16)
_cons	29.31** (2.56)	22.14** (2.40)	49.53*** (2.67)	41.28 (1.00)	42.37 (0.87)
<i>N</i>	1255	2696	2104	515	460
<i>R</i> ²	0.852	0.831	0.813	0.820	0.793
adj. <i>R</i> ²	0.852	0.831	0.813	0.819	0.792

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

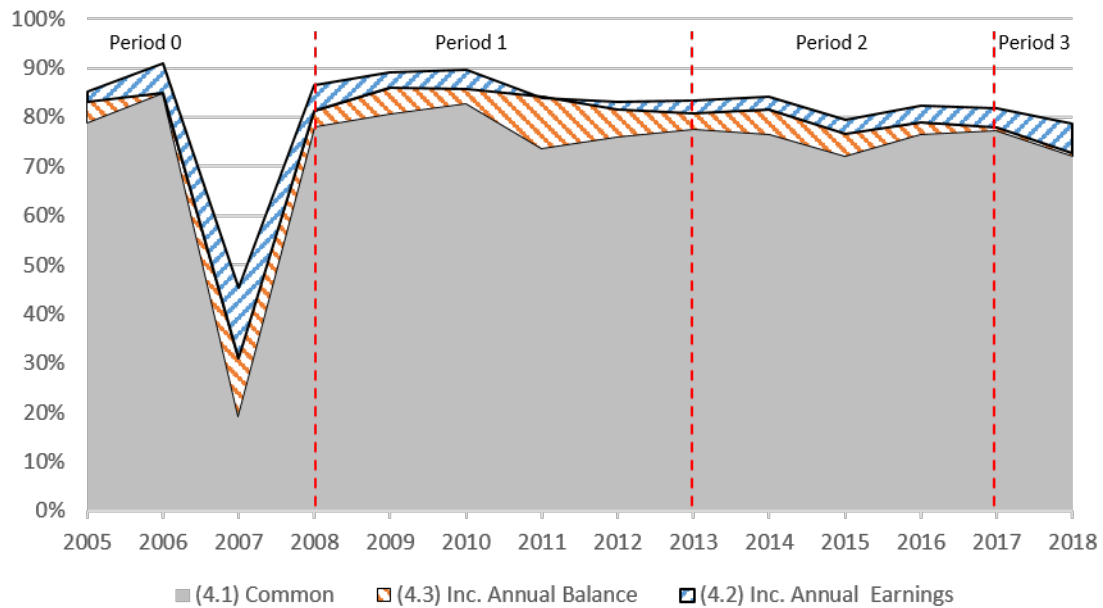


Figure A3.4: Value relevance of income statement and balance sheet using annual data

A3.6 Effect from change in equity market risk premium and interest rates

Below are visualisations of the market risk premium for STOXX 600 in particular, the European market in general a European proxy for risk free interest rate. A change in equity market risk premium would affect the value relevance by being an excluded variable from the regression and create unexplained variance in the Ohlson-model. As long as it stays stable, it does not interfere with the stock price as it is in so case a constant and not a variable. As the evidence below show, the variation has been quite modest in the last years, and show no clear direction. This means that the possibility for the market risk premium to affect the inferences that can be made is somewhat limited. A similar story can be told of the risk free rate, although the direction in this case has been less arbitrary. As explained in the thesis, this could possibly be an alternating reason for why the value relevance has fallen, and future research doing a specific study on the impact of interest rate changes to value relevance would be interesting.

Figure A3.5: Equity market risk premium (KPMG, 2019)

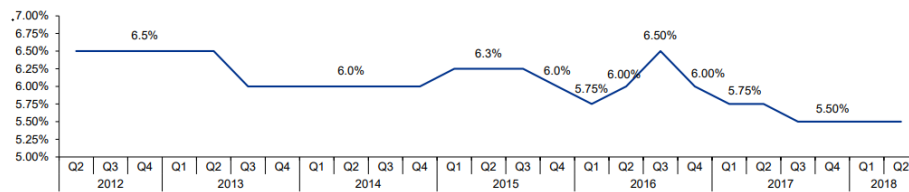


Figure A3.6: Equity market risk premium (ValueTrust, 2018)

Implied Market Risk Premium
European Market – STOXX Europe 600

Knowing the **implied market return** and the daily measured risk-free rate (cf. slide 16 in this study) of the European capital market, we can determine the implied **market risk premium**.

In the years from 2012 to 2018 the **implied market returns** were within a range of **7.6% to 9.8%** (cf. slide 16 in this study). Subtracting the risk-free rate from the implied market return, we derive a **market risk premium** within the range of **5.4% to 7.3%**.

The **implied market return** lies at **8.4%** as of the reference date 30 June 2018. Taking the **risk-free rate of 1.3%** (cf. slide 12) into account, we determine a **market risk premium of 7.2%**.

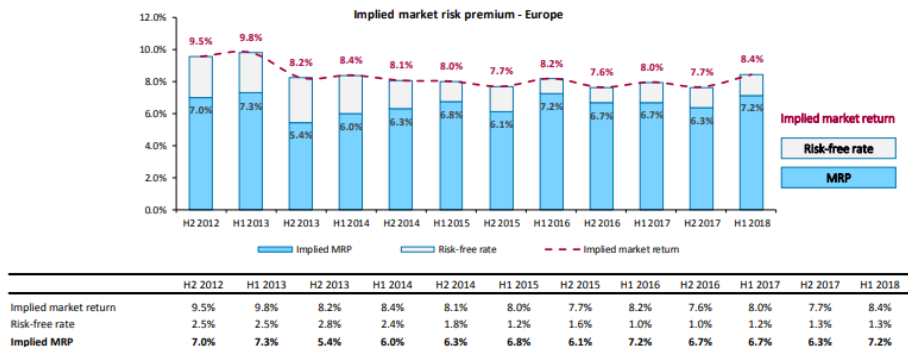


Figure A3.7: Euro area interest rate (Economics, 2019)

