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Value Relevance of Accounting Information

A Study on the Evolution of Value Relevance Between Sectors

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Abstract

This study investigates the evolution of value relevance of accounting information between the years 2000-2023 in the Nordics. Specifically, the purpose of our study is to examine if the combined and individual value relevance of accounting items has changed over time. In addition, we perform an in-depth analysis of five sectors: Materials, Industrials, Consumer Discretionary, Health Care and Information Technology. We utilize a nonlinear classification and regression tree model (CART) to examine the value relevance of 13 accounting items. The results indicate an increase in combined value relevance which could be attributed to the findings of an increasing value relevance of, among other items, intangible assets and R&D. The findings also show differences in the value relevance of accounting items between the sectors, indicating that sector-specific characteristics impact the importance of accounting information.

Keywords: Value relevance, equity valuation, classification and regression trees, financial statements

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1. Introduction

Are financial statements able to keep up with the fast-paced development of businesses in today's world? The increasing importance of technological advancements and sustainability has caused criticism against the traditional accounting standards for not being able to explain firm value. For a long time, investors have relied on earnings and book value as fundamental parts of their valuations, while the substantial developments in the business landscape have called the relevance of these traditional metrics into question.

The value relevance of financial statements has been investigated for a long time and has its roots in capital markets research. The theoretical framework developed by Fama, later known as the Efficient Market Hypothesis (EMH), paved the way for researchers such as Beaver (1968) and Ball & Brown (1968) to empirically investigate the market's reaction to disclosures of financial information. Their studies, also known as information content studies, found groundbreaking results. Contrary to previous beliefs, the empirical evidence suggested the market reacted to disclosures, indicating its usefulness to investors. The EMH that asserts that all public information is reflected in the stock price, was therefore partly supported by their findings. In 1995 the Ohlson model, a valuation framework that links accounting data to the intrinsic value of the firm, was presented which allowed researchers to systematically study how accounting information contributes to firm valuation. These studies became the cornerstone of subsequent known value relevance studies.

In the majority of literature, accounting information is deemed value-relevant if it has predictive associations with stock market values (Barth et al., 2001). Specifically, if an accounting item is considered value-relevant, it indicates that investors make use of the information in their valuation of firms. The target audience of value relevance studies include standard setters by providing insights into the usefulness of accounting information for investors. However, Holthausen et al. (2001) argue that relationships between accounting variables and stock market values are mere association, lacking a solid foundation for standard setters to make use of the discoveries. The response to the critique came quickly thereafter when Barth et al. (2001) stated that while not an exact application can be made, the research can implicitly be used by standard setters. They conclude that complemented by other studies, value relevance research provides evidence on the impacts of accounting standards on equity valuation. Other than standards setters, Barth et al. justify that the

research can be used by financial statement users, firm managers, academic researchers and many more.

Over time, changes in the business landscape have raised concern about accounting standards not adequately reflecting current business operations. This has sparked an interest among researchers, and expanded the research field by examining the value relevance of more accounting items. Among others, intangible assets have become a central item of investigations. The research includes both the examination of value relevance of intangible assets over time, and how the value relevance of the item differs between accounting standards. Further expansion includes examining non-financial information such as ESG to observe how it has been valued by investors over time. More recently, Barth et al. (2023) studied the evolution in value relevance by including a larger set of 18 accounting variables. Nonetheless, these developments added to the historical research of only examining earnings and book value of equity, as they concluded several more items to be deemed value-relevant.

Simultaneously to this, researchers examined how the value relevance of different accounting items differs between and within groups. The separation allows for analysis of how operational characteristics affect the value relevance of specific items. Comparisons that have been made involve separation of groups based on different criteria, and include but are not limited to; high-tech vs low-tech (Francis and Schipper, 1999) and new economy vs old economy (Barth et al., 2023). However, the classifications of the groups are, to some extent, subjective as the author creates the criteria of which firms correspond to the categories respectively. This inconsistent treatment makes the findings less applicable in a practical context.

This thesis aims to investigate the evolution in value relevance of financial statement information between the years 2000 and 2023 in the Nordic countries. Moreover, the purpose is to investigate how the evolution in value relevance differs across five sectors classified through the Global Industry Classification Standard (GICS). The Nordics is a rather unexplored area in terms of our chosen time period, thus our results contribute with new insight into the evolution in value relevance in the market. To the best of our knowledge, no research has compared the value relevance of groups based on established classification standards nor made comparisons between all our chosen sectors; Materials, Industrials, Consumer Discretionary, Health Care and Information Technology. By using an established

classification standard our findings become more objective and hence contribute to more applicable findings.

Through our study we aim to answer the following research questions:
Research question 1: *Has the combined value relevance of all accounting items changed over time?*

To better understand which accounting items are drivers behind the evolution in the combined value relevance, we examine these items in more detail. The weighted relevance of the accounting items as well as their trends are investigated as it provides insights into the development of the items as indicators of firm value.
Research question 2: *How has the value relevance of individual accounting items changed over time?*

Research question 3 reveals additional information about the evolution of value relevance between sectors, which accounting items that drive this trend, and how sector-specific characteristics impact the weighted relevance and trend in individual items.
Research question 3: *How has the value relevance of both combined and individual accounting items changed over time between sectors?*

In this study, we employ a nonlinear CART model, recently proposed by Barth et al. (2023). The dependent variable is price per share and the independent variables are 13 accounting items: earnings, book value of equity, R&D, intangible assets, cash, revenue growth, operating cash flow, revenue, special items, dividends, cost of goods sold, SGA and assets. The sample consists of all publicly listed firms in the Nordic countries between 2000 and 2023, excluding Iceland. For the analyses of research question 1 and 2, the sample consists of 19,965 firm-year observations. For research question 3, we compare five sectors which are distinct from each other and have sufficient observations, which result in five samples consisting of between 1,283 and 5,594 firm-year observations.

The results show modest support for an increase in the combined value relevance between 2000-2023 in the Nordics, indicating that current financial statements sufficiently provide information relevant to investors when valuing firms. Looking closer into the specific items, the results show a significant decrease (increase) in the value relevance of earnings (operating

cash flow). In addition, we find significant increases in the value relevance of intangible assets, R&D and SGA expenses. The increasing trend suggests that these items have become more important for investors' decisions over time, and hence can be considered the value drivers of the increase in combined value relevance. Moreover, we find a significant decrease in the combined value relevance for all sectors over the period. In contrast to the combined value relevance, these results point towards a reduced reliance on financial statements for investors in the sectors respectively. While earnings is the overall most value-relevant item in all sectors, the other items' relevance and trend differ across sectors, likely reflecting the sector-specific characteristics.

This study is divided into six parts. The second part consists of previous literature and theories related to our study and the third part describes our method and data sample. The fourth part presents our findings, the fifth our discussions and the sixth part our conclusions.

2. Literature and Theory

In this section, we will present previous literature relevant to our study. In section 2.1 we investigate the origin and development of value relevance studies. This is followed by section 2.2 that focuses on developments of the model used in value relevance research. Lastly, section 2.3 explores the different accounting items that previously have been researched, the empirical evidence from these studies, and how the results differ between specific groups.

2.1 The Development of Value Relevance Studies

Value relevance has become a common research area within the accounting field. The definition of value relevance has been discussed by several authors in the field, with the common idea that “an accounting amount is deemed value-relevant if it has a significant association with equity market value” (Barth et al., 2001). Equity market values are regularly measured either as share prices or changes in share prices (returns). This suggests that an accounting item is value-relevant if it can explain share price variations, as it means that the item reflects information relevant to investors’ valuation of the firm (Barth et al., 2001). Even though the concept is widely recognized today, the roots of value relevance studies trace back several decades.

In the early 1960s, Miller and Modigliani (1961) criticized the previous belief that dividend policies impacted stock prices. They argued that, in a perfect capital market, firm value is determined by investment decisions and growth opportunities instead, as it provides real information about the firm's earnings potential. The theoretical framework emphasized the importance of accounting items in equity valuation and laid the groundwork for subsequent value-relevance research that focuses on how accounting information is reflected in share prices.

The developments of theoretical frameworks continued as Fama (1965) tested the random walk theory[1] and later developed the Efficient Market Hypothesis (EMH), which became a central aspect of understanding the connection between financial reporting and market behaviour. More specifically, the EMH states that all publicly available information is fully reflected in share prices. The theory is central for value relevance research as it establishes that all information, including accounting metrics relevant to investors' valuation, should influence share prices.

Through the frameworks laid out by Miller & Modigliani and Fama, the first empirical studies examining whether the market reacts to new accounting information were conducted (Ball and Brown, 1968; Beaver, 1968). These were event studies that aimed to determine if an accounting metric has any informational value, thereby also known as information content studies. Ball and Brown examined the effect of earnings announcement on stock price, and Beaver the effect on trading volume. Through their connection to the capital market, they provided evidence which partly supported the EMH. While the objective of subsequent value relevance studies is to determine if accounting items are useful for valuation, these findings contributed by empirically confirming that the market reacts to earnings announcements.

In 1995, Ohlson presented a valuation framework that links current accounting data (earnings, book values and dividends) to future profitability, and therefore, the intrinsic value of the firm. The model provided a theoretical framework which enabled researchers to empirically investigate which specific accounting items are most relevant in explaining the variations in stock prices or returns. It has since become a central model used extensively in value relevance studies.

[1] Random walk theory is based on the idea that stock price follows a random path; the future movement in the price is therefore unpredicted. This laid the foundation for the Efficient Market Hypothesis.

2.2 Methodological Approaches

In value relevance research, two common types of analyses are cross-sampling and intertemporal approaches (Brown et al., 1999). Cross-sampling is employed when evaluating changes or differences in value relevance between firms or groups. The application is made to make comparisons between, for example, industries and to evaluate differences in financial reporting standards, such as comparing the value relevance before and after implementation of IFRS. The intertemporal approach investigates the change in value relevance over time which enables an assessment of trends and impacts of market changes. As they are non-mutually exclusive, researchers can apply both approaches in the same study.

Value relevance is commonly measured as the R^2 from the regression of stock price on accounting items (Brown et al., 1999). R^2 is the explanatory power of the models and measures how much of the variations in the dependent variable (stock price or returns) are explained by the accounting variables (e.g. earnings and book value). Higher (lower) R^2 indicates that the accounting variable can explain a larger (smaller) part of the variations in stock price, suggesting that these variables are more (less) value-relevant to equity investors.

The traditional model used in value relevance studies is a linear regression model (Barth et al., 2001). The accounting variables (independent variables) are then expressed as a linear function of the share price or stock return (dependent variable). While several extensions and versions of the model have emerged the linear model still exhibits several limitations. The assumption of a linear relationship between the independent and dependent variables is an over-simplistic view of reality. Further, modifications can be done to account for potential effects of nonlinearities, but it still fails to capture the complexity of real-world data (Barth et al., 2001).

More recently, Barth et al. (2023) provided evidence that the nonlinear function Classification and Regression Tree (CART) outperforms the linear regression model. The CART estimation is advantageous as any skewness in the distribution of the variables does not affect the estimations, due to the nonparametric nature of CART. This means that the model, compared to linear models, makes no assumptions about the specific distribution of the data. Barth et al. (2023) compare the R^2 of CART with a more frequently used model in value relevance studies, ordinary-least-squares (OLS). They demonstrate that the CART model captures

increase in explanatory power, arising from unspecified nonlinearities and interactions, thereby suggesting that the model outperforms OLS.

2.3 Empirical Evidence from Value Relevance Studies

Early studies were dominated by investigation of the change in value relevance of "bottom-line" earnings. Several of these studies reported a declining value relevance of earnings over time and Lev et al., (1999) attributed the findings to, among other things, an increasing importance of intangible assets and failure of accounting standards to keep up with the change in the business environment. Developments in the studies included the examination of value relevance of both earnings and book value of equity over time. Collins et al. (1997) and Francis & Schipper (1999) examined the value relevance of these two items of U.S listed firms between a similar period, and found that the combined value relevance of earnings and book value of equity had not decreased over the period. Although the studies found a decreasing value relevance of incremental earnings, they attribute the findings of increased combined value relevance to the increasing role of book value of equity as a supportive metric.

Technological advancements have made the presence of variables such as intangible assets and R&D expenses more prominent in value relevance research. Lev and Sougiannis (1996) simulate the capitalization and amortization of R&D, instead of expensing it. The study reveals that capitalizing R&D increases the value relevance, particularly in those industries where R&D plays a central role, such as pharmaceuticals and technology industries. Similarly, Adooby and Lev (1998) examine how capitalization of software development costs provides value-relevant information. The study finds that capitalized software is positively associated with stock prices and that the relationship has strengthened over the sample period (1987–1995). However, they also find that analysts' earnings forecast errors are positively and significantly associated with the intensity of capitalization of development costs, which raises concerns about the inconsistent accounting treatment of intangibles.

The discovery of more accounting items being deemed value-relevant have made recent studies investigate a larger number of items. Barth et al. (2023) examined both the combined and individual value relevance of 18 accounting items during 1962-2018 in the U.S. The results pointed towards an increase in combined value relevance and that 13 accounting items

experienced a significant trend. Among others, they found a significant decreasing trend in the value relevance of earnings, assets, dividends and cost of goods sold while an increasing trend in intangible assets, R&D, revenue, revenue growth, operating cash flow and special items.

The increasing interest in examining value relevance of additional items, has not only been limited to accounting items but also included non-financial metrics. The growing emphasis on sustainability has aroused interest in for eg. Environmental, Social, and Governance (ESG) factors. Hassel et al. (2005) investigated the value relevance of the environmental performance of listed Swedish firms. While their results point towards environmental performance being value-relevant, it has a negative association with market value. They find the main reason for this to be the high cost of having good environmental performance. On the other hand, Castro et al. (2021) examined 16 European countries and concluded that environmental performance is value-relevant and has a positive association with market values.

Furthermore, several studies investigate the value relevance within and between specific industries or groups. The motivation behind these studies stems from the recognition of unique characteristics in an industry or group which could impact the value relevance of certain accounting items. More specifically, it can identify how investors utilize information when valuing a firm within a specific group, depending on characteristics such as their economic characteristics (e.g cyclical or stable revenue) and the nature of their operations (e.g capital intensive). Amir et al. (1996) investigated the wireless communication industry. The study examined both financial information through earnings, book value of equity and operating cash flow, and non-financial information. The results showed that the value relevance of non-financial information overwhelms that of traditional financial information in the industry. They argued that the accounting standards fail to capture the key drivers of firm value in this industry, such as intangible assets. Similarly, Francis and Schipper (1999) examined the claim that financial reporting structure does not capture the full value of high technological firms using a comparable approach. They investigated the differences between high-tech and low-tech firms but found no statistically significant change in the combined value relevance of earnings and book value between the groups. Recently, Barth et al. (2023) studied the evolution in value relevance between “new” and “old”- economy firms, where new economy firms are those operating in a technology industry. The results indicated that the combined value relevance had increased in the new economy and decreased in the old

economy. They attributed the changes to an increasing importance of intangible assets, growth opportunities, and alternative firm performance measures, which are important in the new economy.

2.4 Hypothesis Development

In prior research different conclusions have been reached regarding the trend in combined value relevance. Some studies, such as Lev et al. (1999), find a decrease in the value relevance of financial statements. However, because we study a more recent time period (2000-2023), include more accounting variables and another market, the Nordics, we anticipate that the results may vary. As previously mentioned, the research field has discovered several more items to be considered value-relevant and therefore we believe including more accounting items will affect the combined value relevance positively. To better justify our hypothesis, the recent findings of Barth et al. (2023) are more comparable as both the time period and number of variables examined are similar to our study. Worth noting is that our chosen market differs from the one being researched by Barth which could lead to a different outcome than predicted.

Hypothesis 1: *The combined value relevance of accounting items has increased over time.*

In order to obtain which accounting items are drivers behind the trend in the combined value relevance, we examine the individual items in detail which is the objective of research question 2. We build the following reasoning of hypothesis 2 from the literature review. Most studies have found a decreasing trend of value relevance in earnings, which they have attributed to an increasing trend in book value of equity (Collins et al., 1997; Francis & Schipper, 1999). The substantial research suggesting the same findings, will be the basis of our prediction of these two items. Capitalization of development costs are permitted under IFRS, which all the Nordic countries follow, if certain criteria are fulfilled (EY, 2019). Previous literature argue that the capitalization of development costs provides more value-relevant information (Lev et al., 1996; Adooby et al., 1998) which is why we predict that intangible assets have become more value-relevant. For the remaining accounting items, we will base our predictions from the results of Barth et al. (2023) which shows most of the variables experience a positive trend, also in line with hypothesis 1 of a combined increasing trend. Therefore, in addition to book value of equity and intangible assets, the seven following variables are predicted to experience an increasing trend: R&D, selling, general and

administrative expenses, operating cash flow, cash, revenue, revenue growth, and special items. In addition to earnings, the remaining three variables are predicted to show a negative trend: assets, cost of goods sold and dividends.

Hypothesis 2: *The value relevance of individual accounting items has developed differently over time.*

Lastly, our third hypothesis is an extension of the previous ones by focusing on the implications of sector-specific attributes. We believe that the evolution of value relevance between sectors will differ due to their individual characteristics, both in their combined value relevance and the individual items'. Previous studies have not investigated our chosen sectors and therefore we have no clear findings to base our predictions on. However, Barth et al. (2023) found that an increase in combined value relevance of the new economy, which can be compared to our sectors Health Care and Information Technology. As the operations of these sectors revolve around innovation and emphasise intangible assets as an important item, we predict the value relevance will increase for these. Furthermore, Barth et al. found support for a decreasing trend in combined value relevance of the old economy, and therefore, we anticipate that "traditional" sectors, such as Materials and Industrials, reliant on metrics such as earnings and assets will experience a decreasing value relevance as the value relevance of the items are predicted to decrease. The basis of our predictions is that the combined value relevance is dependent on the inherent trend in value relevance of individual accounting items central to the sector.

Hypothesis 3: *The evolution in value relevance of combined and individual accounting items differs between sectors.*

3. Method

In section 3.1 we will first describe our research design and the equations. This is followed by section 3.2 where we present the variables and their definitions. Lastly, in section 3.3 the sample and data collection is introduced.

3.1 Research Design

Our method is composed of three parts: the first part assesses the evolution of the combined value relevance of all accounting items; the second part investigates the change in value relevance of individual accounting items; and the third part compares the evolution in value relevance of accounting items, both combined and individually, between five sectors. The division is made to answer the three research questions, separately.

3.1.1 Part 1: Combined Value Relevance

To assess the evolution in the combined value relevance of all accounting items we estimate Equation (1) per year:

(Eq. 1) $$P_i = CART\,(VAR_i, GICS_i)$$

Where P_i is the price per share, *CART* is the nonparametric model, VAR_i is the 13 accounting items and $GICS_i$ is the indicator variable consisting of 9 different GICS sectors. The subscript *i* is the firm observation. The indicator variable allows the relation between price and the accounting items to vary across sectors, which is in line with previous research.

We utilize a Classification And Regression Tree (CART) function to derive the value relevance of the accounting items, mostly following the approach outlined by Barth et al. (2023). The CART model is a decision tree method frequently used in Machine learning that can be applied to regression or classification problems. As we are predicting a continuous quantitative value (share price), we use the regression approach. CART is a nonparametric model that does not assume that the data follows a specific distribution. This is advantageous as we lack insights into how investors use accounting information in firm valuation. Our measure of value relevance is the out-of-bag R^2, which reduces the risk of overfitting and improves the predictive power of the model.

Following the recommendations of Liaw and Weiner (2002), we include all independent variables as predictors in the CART model. We also set the number of trees to 500 and the node size to 5, which is the minimum number of observations allowed in each leaf. The model allows for bootstrap aggregating also known as bagging. This process includes creating repeated bootstrap samples for each tree, with the size of each training set being the same as

the original dataset, but the observations are being randomly selected with equal probability and replacement. We then train the regression tree on the bootstrapped training sets. To get the out-of-bag (OOB) prediction, we instead make use of the observations that were not included in the bootstrapped sample for each tree, and average these predictions to get one prediction for each observation. According to James et al. (2013), each bagged tree makes use of approximately two-thirds of the observations, leaving one-third of the observations which are called the out-of-bag observations.

Lastly, to obtain the OOB R^2 per year we follow the method by Liaw and Wiener (2002):

$$OOBR2 = 1 - \frac{SSE}{SST}$$

$$SSE = \sum_{i=1}^{n} \left\{ y_i - \hat{y}_i^{OOB} \right\}^2$$

$$SST = \sum_{i=1}^{n} \left\{ y_i - \bar{y}_i \right\}^2$$

Where *SSE* is the sum of squared errors, *SST* is the total sum of squares, y_i is the observed share price, $\hat{y}_i^{OOB}$ is the out-of-bag predicted share price and $\bar{y}_i$ is the mean of observed share prices, per year.

By regressing the OOBR2 on year, a linear model captures if the combined value relevance has increased or decreased over time. To test for this trend in combined value relevance, we estimate Equation (2):

(Eq. 2) $$OOBR2_t = b_0 + b_1 YEAR_t + \varepsilon_t$$

Where $OOBR2_t$ is the R^2 of Equation (1), $YEAR_t$ is the year 2000,…, 2023, and *t* denotes the observation year. A positive b_1 indicates an increasing trend value relevance, while a negative b_1 shows a decreasing trend.

3.1.2 Part 2: Value Relevance of Individual Accounting Items

To test for the value relevance of individual accounting items, we use the CART model again and get the contribution of each accounting item to the overall predictive power of the model. For each accounting item, we create a modified dataset which randomly permutes the values of the item. This removes the relationship between price per share (*P*) and the accounting item and allows us to obtain the reduction in OOBR2 attributable to each accounting item *k*. We estimate Equation (3) to derive the value relevance of each item:

(Eq. 3) $$VR_{kt} = OOBR2 - OOBR2_{perm}$$

Where *OOBR2* is the out-of-bag R^2 derived from the dataset in Equation (1). $OOBR2_{perm}$ is the recalculated out-of-bag R^2 derived from the permuted dataset. VR_{kt} is the OOBR2 attributable to accounting item *k.* We also scale the reductions in OOBR2 by the sum of reductions for all accounting items in a given year, and get the weighted relevance of each item in explaining *P*.

We next regress VR_{kt} on year to test whether the item's value relevance increases or decreases and estimate Equation (4):

(Eq. 4) $$VR_{kt} = b_0 + b_1 YEAR_t + \varepsilon_t$$

A positive (negative) b_1 indicates that the accounting item has become more (less) value-relevant over the period.

3.1.3 Part 3: Value Relevance Between Sectors

Part 3 of our method, the sector analyses, are conducted on five sectors; Materials, Industrials, Consumer Discretionary, Health Care and Information Technology. We have selected these sectors because of their distinct characteristics, which provides insight into the impact of sector-specific characteristics on value relevance. Since the value relevance is calculated per year, the sectors must include sufficient observations each year dating back to the beginning of the time period, which also provides reason for our choice of sectors.

Equation (1) and (2) are applied on the five sectors separately to assess whether the evolution in the combined value relevance varies between the sectors, and the trend is computed to derive each sector's increase or decrease in combined value relevance, respectively:

$$P_i = CART\,(VAR_i)$$

$$OOBR2_t = b_0 + b_1 YEAR_t + \varepsilon_t$$

The GICS sector indicator variable is excluded from the CART model, as the regression is performed on each chosen sector separately.

Equation (3) and (4) are also applied within each sector to analyze which accounting items are most predictive of firm value and to examine how the value relevance of individual accounting variables changes over time:

$$VR_{kt} = OOBR2 - OOBR2_{perm}$$

$$VR_{kt} = b_0 + b_1 YEAR_t + \varepsilon_t$$

3.2 Choice of Variables

In our model, we set the price per share, *P*, as the dependent variable. Barth et al. (2023) assert that the 18 accounting items included in their model have been demonstrated to be value-relevant in various previous studies. Their study is the first one considering all these variables, and claim that an extensive set of variables is required to draw conclusions about the combined value relevance of accounting information. We include the same independent variables proposed by Barth et al., with a few adjustments. Firstly, we exclude advertising expenses because the data is not available on Compustat for our markets. Secondly, income taxes are excluded as other variables, such as earnings, already capture its value-relevant information. Lastly, earnings growth, capex and OCI are excluded in line with Barth et al. findings of insignificant trends. Although excluding some variables, our model still consists of 13 independent variables, and as far as we are concerned, no study has previously investigated the combined value relevance of such a comprehensive set of items in the Nordic market. The definitions of the variables included in our model can be found in table 1.

Table 1: Variable definitions

Variable	Definition (Compustat Data Item)
P	Price per share 3 months after fiscal year-end (prccd)
EARN	Income before extraordinary items/earnings per share (ib/cshoc)
BVE	Common/Ordinary equity (book value of equity) per share (ceq/cshoc)
RD	Research and development expense per share (xrd/cshoc)
INTAN	Intangible assets per share (intan/cshoc)
CASH	Cash and short-term investments per share (che/cshoc)
REVGR	Revenue growth per share ((change in revt)/cshoc)
CF	Operating cash flow per share (oancf/cshoc). If missing, calculated as (earnings (ib) - accruals)/cshoc. Where accruals = (change in current assets (act) - change in cash (che)) - (change in current liabilities (lct) - change in short-term debt (dlc) - change in income taxes payable (txp))
REV	Revenue per share (revt/cshoc)
SPI	Special items per share (spi/cshoc)
DIV	Dividends per share (dvc/cshoc)
COGS	Cost of goods sold per share (cogs/cshoc)
SGA	Selling, general and administrative expense per share (xsga/cshoc)
ASSETS	Total assets per share (at/cshoc)
GICS	GICS Sector classification, indicator variable (gsector)

All non-indicator variables, the 13 accounting items, are deflated by shares outstanding following the approach of several prior studies. Also, deflating the variables is according to Barth and Clinch (2009) an effective way of reducing the scale effects.

We utilize sectors both as an indicator variable and as a basis for the sector analyses. These sectors are based on the Global Industry Classification Standard (GICS). GICS is an industry analysis framework developed by MSCI and S&P Dow Jones to provide investors with consistent and exhaustive industry definitions. We have utilized the first tier, sectors, as the basis for dividing our groups. The 11 sectors, according to the GICS framework, are; Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Health Care, Financials, Information Technology, Communication Services, Utilities and Real Estate. In parts 1 and 2 of our method we make use of nine GICS sectors as an indicator variable. We have excluded two sectors, Financials and Real Estate, from the sample as their accounting reporting differs from the remaining sectors. In part 3 of the method, we investigate the value relevance of five of the sectors; Materials, Industrials, Consumer Discretionary, Health Care, and Information Technology.

3.3 Sample and Data Collection

The sample consists of all listed companies in the Nordics; Sweden, Norway, Finland and Denmark but excluding Iceland because of their limited number of listed companies, between the years 2000 and 2023. This results in a sample consisting of 19,965 firm-year observations. The Nordic market is chosen because it is a rather unexplored region, and it also contains sufficient observations for the sector analyses in part 3 of the method (see table 2 for number of observations within each sector). The time period is motivated by the fact that the study aims to analyze the evolution of value relevance in recent years. The period also covers economic events; the dot-com bubble and its collapse around 2000, and the financial crisis in 2008. It also includes the implementation of new and changing accounting standards e.g. IFRS in the EU in the beginning of the 2000s. We extend to 2023 to analyze the effects of recent economic events, such as the Covid-19 crisis.

Table 2: Sample size of the sectors in part 3 of the method

Sector	Number of firm-year observations
Materials	1,283
Industrials	5,594
Consumer Discretionary	2,326
Health Care	3,160
Information Technology	3,956

We use the Compustat Global Fundamentals Annual database to collect the financial statement data. This includes the 13 accounting items and the GICS sector, while the price per share and shares outstanding are gathered from the Compustat Global Security Daily database. The price per share variable is collected three months after fiscal year-end, to ensure the accounting information is available.

The data collected from Compustat Global Fundamentals Annual includes observations where the consolidation level is *"Consolidated"*, the industry format is *"Industrial"*, the data format is *"Standardized data collected from the company's original filing"*, and the company status is both *"Active"* and *"Inactive"*. The industry format *"Industrial"* removes companies belonging to the Financials and Real Estate sectors, as their accounting reporting differentiates from the remaining sectors. By setting the company status to both *"Active"* and

"Inactive" the sample includes companies that have been both delisted and introduced to the exchanges during the period.

The financial information is standardized from all local currencies to USD. This is done to neutralize the effect of exchange rate variations, ensuring that the associations between stock price and accounting items reflect actual value relevance. The daily currency translation rate is collected from Compustat Global - Exchange Rates for all years (2000-2023). The items from the annual reports and price per share are converted to USD using the exchange rate applicable at the close of the day on which the financial statement and share price were reported.

We discard observations where International Security Identification Number (*isin*) or Data Year - Fiscal (*fyear*) are missing. This is because it identifies each observation, which is needed to merge the accounting data and stock price data. If *gsector* (*GICS*) is missing we remove those rows, as the company's sector must be assigned, both as an indicator variable and for the sector analyses. We remove those observations where the variables price per share (*P*), shares outstanding (cshoc), earnings (*EARN*), the book value of equity (*BVE*), revenue (*REV*) and total assets (*ASSETS*) are missing. We set the remaining variables equal to zero if missing, following the adjustments made by Barth et al. (2023). We winsorize all variables, excluding the GICS indicator variable, at the 2nd and 98th percentile per year, to mitigate the effect of outliers.

4. Results

Section 4.1 presents the descriptive statistics of the variables. Then we present the findings from the combined value relevance in section 4.2, followed by the value relevance of the individual accounting items in section 4.3. Lastly, the findings from the different sectors are demonstrated, both their combined value relevance and that of individual items.

4.1 Descriptive Statistics

In table 3 descriptive statistics of the dependent variable, *P,* and independent variables for the entire sample are presented. Several of the variables exhibit a higher mean compared to their median, suggesting a positive skewness. The mean of total assets is 896.36 with a high standard deviation of 2431.63, which indicates that it varies largely between the firms. R&D

has a median of 0 and mean of 9.44 which indicates that many firms do not or have previously not reported any R&D expenses, most likely because they do not engage in any significant R&D activity. Those firms that engage in R&D probably do so at high levels, suggested by the high standard deviation of 29.82, which aligns with the expectation that our sample consists of sectors with different R&D intensity.

Table 3: Descriptive statistics of the variables for the entire sample

Variable	*Mean*	*Median*	*Std. Dev.*
P	14.77	4.14	30.66
EARN	39.11	0.77	139.95
BVE	365.54	34.32	1017.23
CF	79.21	2.94	242.58
ASSETS	896.36	75.86	2431.63
CASH	76.37	8.86	216.83
DIV	19.54	0.00	66.10
REV	772.19	64.86	2104.53
RD	9.44	0.00	29.82
INTAN	164.67	5.67	486.32
REVGR	32.71	1.00	251.12
SGA	107.84	7.68	294.35
COGS	421.70	19.29	1218.73
SPI	-3.75	0.00	20.91

Note: 1) All variables are expressed in MUSD, except for the Price per share variable which is in USD. 2) The variables presented have already been winsorized at the 2nd and 98th percentile. These numbers have not been deflated by shares outstanding yet, because it better illustrates the values of the variables.

In table 4 we also present the descriptive statistics of a selection of variables for each sector (the entire descriptive table can be found in Appendix 1). These variables have been featured as they provide insights into the distinct characteristics of the sectors.

The Materials sector has the highest mean in total assets of 2269.92 (median of 206.43) exceeding all other sectors by far. This is followed by the Industrials sector with a mean of 1144.11 (median of 165.67). The Materials sector includes industries such as metals & mining and chemicals, while the Industrials sector includes industries such as machinery, construction & engineering and transportation infrastructure. These sectors are identified as capital intensive as both require lots of PPE, which is visible by the high values of total

assets. Consumer Discretionary could, to some extent, also be considered capital intensive with a corresponding mean of 612.94 and median of 103.51.

Materials, Industrials and Consumer Discretionary have the highest mean and median in both revenue and earnings (all have median in REV>130 and EARN>2). In contrast to this, Health Care and Information Technology experience significantly lower mean and median in the corresponding categories (both have median in REV<35 and EARN<0.5). This suggests that firms within the Materials, Industrial and Consumer Discretionary sectors experience higher profitability than the other two.

The median in R&D for Materials, Industrials and Consumer Discretionary is 0, which suggests that most firms in these sectors report no R&D expenses. While the median of Health Care and Information Technology is 0.47 and 0.14 respectively. This aligns with our belief that the Health Care and Information Technology sectors are more R&D intensive.

Table 4: Descriptive statistics of selected variables for each sector

Variable	**Sector**	*Mean*	*Median*	*Std. Dev.*
ASSETS	Materials	2269.92	206.43	3996.50
ASSETS	Industrials	1144.11	165.67	2539.02
ASSETS	Consumer Discretionary	612.94	103.51	1691.32
ASSETS	Health Care	297.61	16.26	1190.07
ASSETS	Information Technology	324.06	30.87	1632.61
EARN	Materials	93.11	2.19	214.55
EARN	Industrials	51.75	3.74	148.78
EARN	Consumer Discretionary	32.76	3.34	111.00
EARN	Health Care	14.27	-1.26	90.78
EARN	Information Technology	10.63	0.10	85.31
REV	Materials	1874.10	220.88	3347.22
REV	Industrials	1081.45	166.23	2344.78
REV	Consumer Discretionary	638.33	131.76	1733.14
REV	Health Care	218.69	3.03	962.38
REV	Information Technology	283.37	31.24	1318.85
INTAN	Materials	232.84	11.46	504.36
INTAN	Industrials	212.86	12.36	546.14
INTAN	Consumer Discretionary	118.49	9.39	323.03
INTAN	Health Care	84.86	0.62	360.11
INTAN	Information Technology	81.33	4.38	369.28

RD	Materials	16.47	0.00	248.72
RD	Industrials	11.30	0.00	35.21
RD	Consumer Discretionary	6.08	0.00	25.02
RD	Health Care	12.05	0.47	32.32
RD	Information Technology	7.52	0.14	24.65

Note: 1) All variables are expressed in MUSD. 2) The variables presented have already been winsorized at the 2nd and 98th percentile. These numbers have not been deflated by shares outstanding yet, because it better illustrates the values of the variables.

4.2 Combined Value Relevance

Hypothesis 1: *The combined value relevance of accounting items has increased over time.*

Figure 1 shows the out-of-bag R^2 per year for our period, the overall trend and a 95% confidence interval. The results seem to capture the setback of value relevance during the burst of the dot-com bubble in the early 2000s, the financial crisis in 2008 and the Covid pandemic in 2020. This means that the combined explanatory power of all our accounting items decreased during these crises. Excluding the years of crises, the explanatory power seems to be at a quite steady level, ranging between 60-80 percent.

Table 5 displays the results of the combined value relevance by decade highlighting the mean, standard deviation, the trend and its significance of value relevance. The mean OOBR2 demonstrates the average level in which the combined accounting items explain stock price and trend is the direction in which value relevance moves within decades and throughout the time period (for All years). The trends within all decades are insignificant with a t-stat of 1.81 in the 2000s, -0.62 in the 2010s and 2.09 in the 2020s.

We can observe that the overall trend in combined value relevance is positive (trend of 0.008) and significant at the 10% level. While this indicates that the explanatory power of our accounting items combined has increased over the period, the 95% confidence interval is moderately wide (displayed in figure 1), implying that the slope might not be significantly different from zero. Given the uncertainty in the trend and its marginal statistical significance, we cannot confidently find support for hypothesis 1.

Figure 1: Trend in value relevance over time

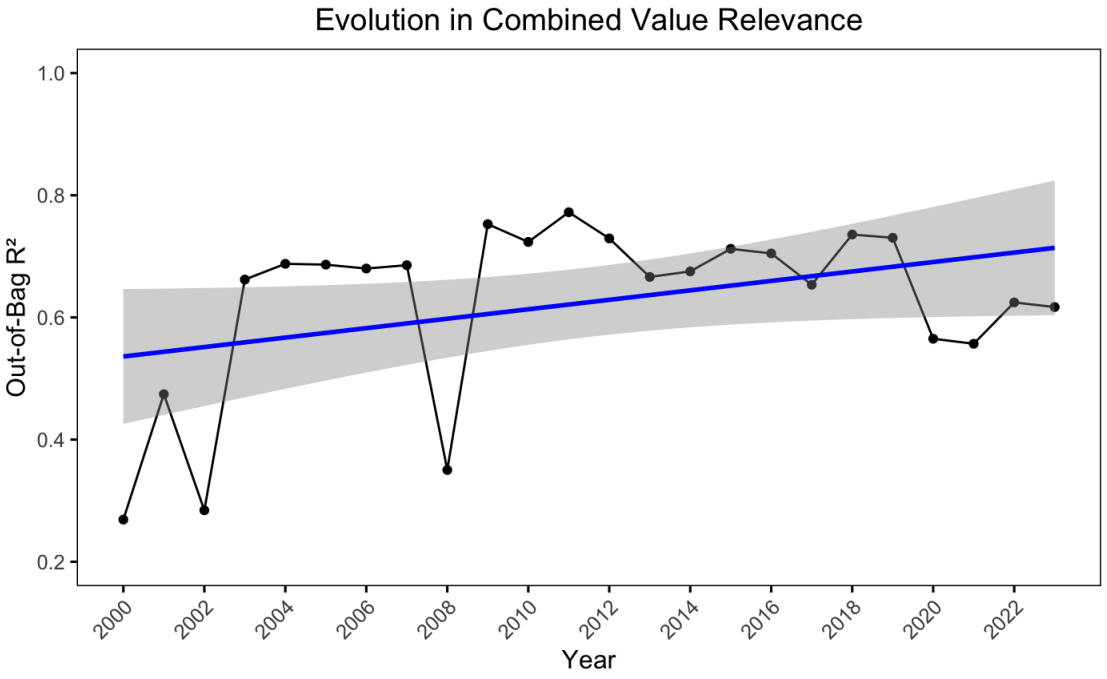

Table 5: Mean, standard deviation and trend of combined value relevance

	Mean	Std. Dev	Trend	t-stat
All years	62.50	14.24	0.008*	1.95
2000s	55.32	18.90	0.034	1.81
2010s	71.03	3.63	-0.003	-0.62
2020s	59.09	3.48	0.022	2.09

Note: We report significance at the 10%, 5% and 1% level as *, **, ***, respectively

4.3 Value Relevance of Individual Accounting Items

Hypothesis 2: *The value relevance of individual accounting items has developed differently over time.*

Table 6 shows the weighted value relevance, trend and its significance of the individual accounting items. The table shows that 9 out of the 13 accounting items (excluding the GICS sector) have significant trends and we are therefore able to present our results with confidence. The two items having the most explanatory power between 2000-2023 in our sample are earnings (31.26%) and book value of equity (21.25%). We find a significant declining trend for earnings (t-stat of -1.75), while an insignificant downward trend for book

value of equity (t-stat of -1.24). This suggests that, while they still hold the most importance overall, their explanatory power is decreasing during the time period. However, we can not statistically confirm the declining trend in book value equity as the trend is not significant.

Unlike earnings and book value of equity, we find an increasing significant trend in intangible assets of 0.06 (t-stat of 2.25) and R&D of 0.07 (t-stat of 4.03). Operating cash flow shows the largest increase in value relevance throughout the whole period with a significant trend of 0.60, while earnings has the largest significant decrease of -0.65. Other items having a significant positive trend are COGS (t-stat of 3.40), special items (t-stat of 3.54), revenue (t-stat of 1.80) and SGA (t-stat of 5.59) meanwhile dividends experience a significant negative trend (t-stat of -2.93). The findings show that the trends in value relevance of our chosen accounting variables are different, with some variables experiencing an increasing trend and others decreasing. Therefore, we find some evidence to support hypothesis 2.

Table 6: The weighted value relevance of individual accounting items, their trend and its significance

Item	Weighted VR (%)	Prediction	Trend	t-stat
EARN	31.26	-	-0.647*	-1.75
BVE	21.25	+	-0.375	-1.24
CF	17.31	+	0.596**	2.17
ASSETS	5.58	-	-0.187	-1.16
REV	3.74	+	0.119*	1.80
COGS	3.72	-	0.267***	3.40
CASH	3.13	+	-0.014	-0.32
DIV	2.23	-	-0.122***	-2.93
REVGR	2.14	+	-0.006	-0.13
INTAN	1.93	+	0.056**	2.25
SPI	1.52	+	0.120***	3.54
RD	1.15	+	0.066***	4.03
SGA	1.08	+	0.068***	5.59
GIC	3.95		0.058	1.08

Note: We report significance at the 10%, 5% and 1% level as *, **, ***, respectively

4.4 Value Relevance Between Sectors

Hypothesis 3: *The evolution in value relevance of combined and individual accounting items differs between sectors.*

From table 7, all of our chosen sectors demonstrate significant negative trends which means that the value relevance of all variables combined have decreased between 2000-2023. The highest mean in value relevance is found in Industrials (56.32%) and Health Care (54.02%). On the contrary, the lowest overall mean is reported in Materials (37.51%) and Information Technology (38.33%).

Figure 2 visualizes the out-of-bag R^2 (OOBR2) per year for each sector, the trend and a 95% confidence interval. All sectors experience large fluctuations between most years, not only during the aforementioned crises. While the fluctuations are evident in all sectors, the size and direction of these differ. For example, between 2017 and 2018 the Information Technology sector experienced a rise in OOBR2 (from below 40% to over 60%), while Materials moved substantially in the opposite direction (from over 30% to below 10%). Likewise, between 2004 and 2005, Consumer Discretionary and Health Care experienced increases in the combined explanatory power, while Information Technology experienced a large drop. This means that there are large variations in the combined explanatory power of the accounting variables, and the timing and direction of these differ between sectors.

Table 7: Mean, standard deviation, and the trend of combined value relevance per sector

	Sector	Mean	Std. Dev	Trend	t-stat
All years	Materials	37.51	17.42	-0.011**	-2.42
All years	Industrials	56.32	9.67	-0.007**	-2.74
All years	Consumer Discretionary	50.66	23.05	-0.022***	-4.40
All years	Health Care	54.02	15.31	-0.010**	-2.56
All years	Information Technology	38.33	17.59	-0.009*	-1.82

Note: We report significance at the 10%, 5% and 1% level as *, **, ***, respectively

Figure 2: Trend in value relevance over time by sector

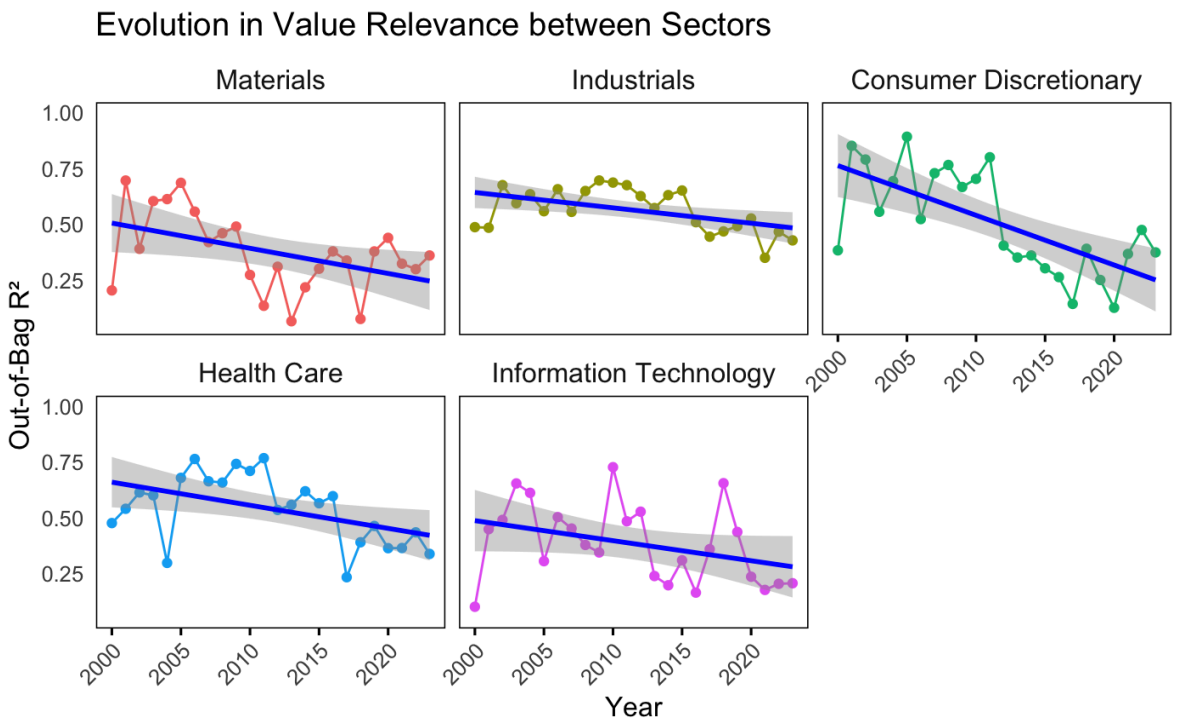

Table 8 displays the weighted value relevance of all accounting items, separated by sector. It also contains information about the trend and its significance of individual variables. Earnings is the accounting variable with the highest weighted explanatory power in all sectors, but the degree of the relevance varies between sectors. Information Technology has the highest explanatory power of earnings (47.96%) while Health Care has the lowest (25.30%). Furthermore, the trend in earnings differs as Materials, Industrials and Health Care experience insignificant negative trends (t-stat of -0.81, -1.08 and -0.80) and Consumer Discretionary and Information Technology have significant positive trends (t-stat of 3.10 and 2.88). Besides earnings, book value of equity and operating cash flow have the highest relevance in Industrials (BVE 25.53% and CF 10.55%) as well as in Consumer Discretionary (BVE 20.51% and CF 12.0%). For the other sectors, both variables are also highly relevant and are among the 6th most relevant items.

The weighted relevance of R&D varies a lot between the sectors. In Health Care, Materials, and Information Technology, R&D has a high weighted relevance of 14.20%, 12.41% and 4.74% respectively. However, Materials is the only one experiencing a significant trend (t-stat of 5.68). Both Industrials and Consumer Discretionary have the lowest relative weight on

R&D (0.81% and 0.45%). Furthermore, intangible assets have a low weighted value relevance (<4%) in all sectors except Materials, which have weighted value relevance of 9.36%. All sectors experience a positive trend in intangible assets, which is significant for Materials, Industrials and Information Technology.

Our results show that while the sectors all experience a significant decrease in the combined value relevance over time, the fluctuations between the years are unalike for all sectors. Moreover, the trend and weighted value relevance of the accounting items within the sectors differs largely. We can therefore find some evidence to support hypothesis 3.

Table 8: The weighted value relevance of individual items within the sectors, their trend and its significance

Materials				**Industrials**			
Item	**Weighted VR (%)**	**Trend**	**t-stat**	**Item**	**Weighted VR (%)**	**Trend**	**t-stat**
EARN	26.18	-0.562	-0.81	*EARN*	31.18	-0.503	-1.08
CF	12.78	-1.010**	-2.51	*BVE*	25.53	0.372	0.70
RD	12.41	2.018***	5.68	*CF*	10.55	0.384*	1.98
DIV	11.25	0.171	0.37	*ASSETS*	6.95	-0.130	-0.49
INTAN	9.36	0.716**	2.80	*CASH*	6.31	-0.359*	-1.82
BVE	7.88	-0.618***	-3.49	*DIV*	3.97	-0.317***	-3.39
REVGR	6.10	-0.228	-0.82	*INTAN*	3.62	0.165*	1.97
REV	4.29	-0.378**	-2.67	*REVGR*	3.18	-0.154*	-1.85
CASH	3.45	-0.259*	-1.85	*SPI*	2.71	0.244***	3.36
ASSETS	2.49	0.057	0.80	*REV*	2.32	-0.014	-0.26
SGA	0.01	0.120***	0.01	*COGS*	1.62	0.162***	7.05
COGS	1.27	0.033	7.05	*SGA*	1.23	0.074***	4.30
SPI	0.06	0.068***	0.88	*RD*	0.81	0.075***	3.60

Consumer Discretionary			
Item	**Weighted VR (%)**	**Trend**	**t-stat**
EARN	33.89	1.648***	3.10
BVE	20.51	-1.937***	-3.96
CF	12.00	-0.242	-0.66
DIV	9.66	0.610**	2.39
ASSETS	6.45	-0.557***	-2.90
SGA	4.05	0.128	0.83
REV	3.40	-0.063	-0.68
COGS	2.56	0.278***	4.70
REVGR	2.52	-0.041	-0.41
CASH	2.36	0.046	0.63
INTAN	1.31	0.053	0.99
SPI	0.84	0.021	0.81
RD	0.45	0.057***	3.65

Health Care			
Item	**Weighted VR (%)**	**Trend**	**t-stat**
EARN	25.30	-0.518	-0.80
CF	18.82	0.191	0.38
RD	14.20	-0.823	-1.63
BVE	10.74	0.313	0.89
SGA	10.31	0.028	0.08
ASSETS	5.23	0.289*	2.06
CASH	4.21	0.203	1.32
REVGR	2.60	0.158*	1.87
DIV	2.50	-0.175*	-2.02
REV	2.29	0.164***	2.94
SPI	1.55	0.156***	2.96
INTAN	1.27	0.006	0.20
COGS	0.98	0.023	1.01

Information Technology			
Item	**Weighted VR (%)**	**Trend**	**t-stat**
EARN	47.96	1.619***	2.88
BVE	10.38	-0.164	-0.54
CASH	7.92	-0.599**	-2.09
CF	7.63	-0.403	-1.13
DIV	5.06	-0.327	-1.58
RD	4.74	0.023	0.09
REV	4.38	-0.467*	-1.91
ASSETS	2.85	-0.189*	-1.90
INTAN	2.36	0.121**	2.19
COGS	1.89	0.299**	2.54
REVGR	1.84	-0.001	-0.01
SGA	1.50	0.001	0.01
SPI	1.47	0.087	1.19

Note: We report significance at the 10%, 5% and 1% level as *, **, ***, respectively

5. Discussion

In this section we will analyze our results from the previous section and provide possible explanations of these. First, the results of the combined value relevance is discussed, followed by the value relevance of individual accounting items, and then the sector analyses. Lastly, we provide a discussion of the robustness of our method and data.

5.1 Combined Value Relevance

The results of a slight increase in combined value relevance indicate that investors continue to rely on financial statements when valuing firms, with a modest indication of growing utilization. This contradicts some studies but aligns with several others (e.g Barth et al., 2023; Collins et al., 1997). While there is evidence which suggests that non-financial information such as ESG performance has become value-relevant, our results indicate that the value relevance of accounting items has not been replaced in the eyes of investors.

Our study captures the effect of three crises, where it seems investors were driven more by speculations rather than fundamentals as they faced market uncertainty and rapidly changing economic conditions. Disclosed financial information of businesses did not adequately reflect firm value as it was disrupted by macroeconomic shocks. Among other things, rapid changes in customer demand and disruption in supply chains arose, affecting the financial performance of firms. Instead of using traditional valuation methods, investors' decisions might have relied on the short-term outlook and the anticipation of market recovery.

5.2 Value Relevance of Individual Accounting Items

The high explanatory power of earnings and book value of equity, implies that investors' decisions are mostly based on these items. However, the declining trend in their respective value relevance suggests that investors have put less emphasis on these variables over our time period. While several previous studies attribute the decline in value relevance of earnings to an increase in book value of equity, our results do not support this. However, since the combined value relevance of all items still increases this is compensated by an increase in value relevance of other items, including operating cash flow.

Operating cash flow, among other things, reflects a firm's capacity to fund its operations. The item is, compared to earnings, not affected by non-cash items such as impairment,

amortization and depreciation. During years of economic volatility, operating cash flow becomes an even more important item as investors need to assess the firm's ability to persist which is a potential reason we find a positive trend over our time period.

Additionally, the increasing trend in intangible assets and R&D could partly compensate for the decline in earnings and book value of equity. The adoption of IFRS in 2005 in the EU provided a more standardized and less conservative approach regarding the capitalization of development costs. On one hand, the criteria required to be fulfilled to capitalize development costs under IFRS have been criticized to be somewhat subjective. On the other hand, capitalization has been proven to be associated with higher value relevance. In order to capitalize development costs, the firm must be able to prove that the assets will likely generate future economic benefits. The R&D that does not meet the capitalization criteria is then expensed. This clearer differentiation between the items could improve investors' ability to assess future earning potential. This could explain why we find an increasing trend in the value relevance of intangible assets and R&D.

5.3 Combined and Individual Value Relevance Between Sectors

The combined value relevance for all sectors show a statistically significant negative trend, and they experience differences in volatility between years. In other words, (1) for all individual sectors selected, investors seem to place less importance on financial information over time when making decisions and (2) it appears that investors look at financial information differently throughout the time period depending on the sector. The first statement contradicts our results from the entire sample, where we suggest that investors place more emphasis on the accounting variables combined throughout the time period. One reason for this could be that only 5 out of the 9 sectors are examined in this section, leaving out parts of the sample. Another potential reason for this is connected to the second statement. The yearly variations of most sectors' value relevance is larger than the entire sample's, which could be explained by sector-specific attributes being more highlighted. The stable increasing trend in the combined value relevance of the entire sample could be due to the sector-specific attributes balancing out each other.

Industrials have the highest overall mean, indicating that the chosen accounting items are used in investors' decisions more compared to the other sectors. This could be supported by

the “traditional” characteristics of the sector, which consist of core operations mostly reliant on tangible assets. Established accounting metrics such as earnings, cash flow and book value of equity therefore capture the firm value to a larger extent. In combination with the historically well-known business model, this could explain why the financial information of the sector is more central in the decision making process of investors. In contrast to Industrials, Information Technology is characterised as being innovative and having a lot of intangible assets tied to their core operations. Since the intangible assets metric could be considered somewhat diffuse among investors, it could explain the low overall mean.

Besides Information Technology, Materials experience a low mean in value relevance. While Materials is a capital intensive sector, the argument of having a traditional business model does not seem to hold. Looking closer into the operations of the industries within the Materials sector, most are engaged in mining and chemicals, which have a large environmental impact. Investors might place a larger emphasis on non-financial information within the Materials sector, which potentially explains the low mean. However, as this study does not include environmental performance measurements, further investigation in this area needs to be done in order to be able to draw any conclusions.

Looking at the individual items per sector, earnings is the most relevant item for all sectors. This suggests that profitability is the key valuation driver for investors regardless of sector characteristics. Investors’ emphasis on earnings throughout the time period seem to vary based on sector specific factors, since some sectors experience an increase and others a decrease in trend.

The business nature of both Health Care and Information Technology include large investments in the development of drugs and software, respectively. This provides an explanation for why R&D expenses are highly relevant in these sectors. On the contrary, Industrials and Consumer Discretionary have a lower weighted value relevance of R&D and instead traditional items consisting of earnings, book value of equity and operating cash flow are more central for investors' decisions. The substantial amount of assets in Industrials and Consumer Discretionary might explain why these accounting items are more relevant, since they can provide insights into how effectively firms manage the assets and ensure liquidity for such capital-intensive operations. However, these arguments do not seem to hold for the Materials sector. Materials can be seen to have high assets, similarly to Industrials and

Consumer Discretionary, but R&D is the third most relevant item more in line with Health Care and Information Technology. Therefore, we are not able to conclude a reason as to why R&D differs across sectors.

Intangible assets include patents, software, goodwill arising from acquisitions and development costs that meet the capitalization criteria. The weighted value relevance of intangible assets in Health Care and Information Technology is quite low. This is not as expected as both sectors rely on innovation and the value of proprietary technologies. However, the trend in intangible assets is positive for all sectors, and suggests that the accounting treatment of intangible assets could have improved its value relevance, thereby becoming increasingly important for investors' decision regardless of the specific sectors.

5.4 Discussion of Data and Method

Our data is gathered from Compustat Global, a well-known database developed by S&P Capital IQ, commonly used in professional settings. The reliability of the data can therefore be argued to be high. By analysing the time period 2000-2023 and the five sectors with the most observations in part 3 of the method, we have ensured that enough observations are included, which also argues for the reliability of the results as a larger sample size increases the statistical power of the analysis.

Converting all local currencies to USD introduces some variability due to fluctuating exchange rates, which potentially skew results if significant currency depreciation or appreciation against the USD occurs unevenly between the local currencies during the period. However, not standardizing the currencies could distort the value relevance to a greater extent as the currencies otherwise would be mixed in the model, creating inconsistencies in the relationship between stock price and accounting items. Therefore, we argue that translating all financial data to USD provides the most reliable representation of underlying performance and ensures the most accurate results.

Barth et al. (2023) demonstrate that the CART model captures increases in explanatory power arising from unspecified nonlinearities and interactions. Therefore, we refrain from comparing it with OLS and rely our approach entirely on the CART model, as it is better suited to the nonlinearity of the data. Since we employ bootstrapping, which averages out the

predictions of multiple trees that use different subsets of data to make one final prediction, the predictions become more stable and the risk of overfitting is reduced.

6. Conclusions

To conclude, this study's findings indicate that the combined value relevance has slightly increased between the years 2000-2023 in the Nordics. When investigating the different accounting items, we find a significant decrease (increase) in the value relevance of earnings (operating cash flow). We also find increases in the value relevance of items such as intangible assets and R&D, which aligns with previous studies concluding that technological advancements have made their presence and relevance to investors increasingly significant. This indicates that current financial statements sufficiently provide information relevant to investors when valuing firms.

Additionally, the results show that the combined value relevance of financial statements has decreased over the period in all selected sectors. Within each sector, earnings is the most value-relevant item. However, the trend in its relevance differs between the sectors, where we find a negative trend in Materials, Industrials and Health Care and a positive trend in Consumer Discretionary and Information Technology. The relative value relevance and the trend of the other accounting items differs largely between the sectors. Therefore, we argue that there is a possibility that financial statements do not provide enough valuable information to investors in the examined sectors which could be caused by sector-specific characteristics. This suggests that while accounting standards are sufficient to reflect operations of the "general" firm, they are not adapted to the characteristics of the different sectors. However, it is up to standard setters to decide if this is the case.

Our study contributes to the understanding of the evolution in value relevance in recent years. We have identified a gap in previous research when it comes to comparing value relevance between groups. As we compare the value relevance between sectors using the GICS classification standard, a globally established standard, the findings become more objective and hence contribute to more applicable findings. Our results become more relevant for investors, standard setters and other stakeholders who depend on sector-based financial insights.

While some previous studies have examined similar time periods, the Nordic market is rather unexplored. Due to differences in accounting standards and regulatory environments, it contributes to researchers by understanding how these aspects could affect the outcome. In addition, the large number of accounting items included has not been done by many researchers, nonetheless in the Nordics. Many previous studies discuss the value relevance of the financial statements, but only include a few items, not representing a comprehensive view of the statements. Our findings contribute to a more extensive view of the value relevance of financial statements, specifically in the Nordics, which gives us the opportunity to identify which accounting variables have become the value drivers over time.

There are certain limitations in this study that we want to highlight. The GICS sectors being analyzed each consist of multiple industries which possess quite distinct characteristics. For e.g. Consumer Discretionary include retail, automobile manufacturers and hotels. This raises concerns about the validity of our conclusions, and suggested further research would include analyses of the different industries within the sectors. For our sample, this was not possible as there were insufficient amounts of observations for each industry, which suggest expanding the sample size through investigating a different market or time period would be beneficial.

Future research could be extended to include analysis of how the information in financial statements can be improved to better reflect the operations of specific sectors. It would also be of interest to further analyze which specific factors that are driving the changes in the evolution, especially within the sectors. As previous research finds that non-financial information is value-relevant, it would be of interest to further investigate whether non-financial information in regards to each sector would result in different conclusions of the evolution in value relevance.

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Appendix

Appendix 1: Descriptive statistics of the sectors

Variable	Sector	*Mean*	*Median*	*Std. Dev.*
P	Materials	15.91	6.13	28.98
P	Industrials	20.56	7.89	37.14
P	Consumer Discretionary	15.49	6.43	29.37
P	Health Care	8.96	1.70	21.70
P	Information Technology	7.54	1.88	20.41
ASSETS	Materials	2269.92	206.43	3996.50
ASSETS	Industrials	1144.11	165.67	2539.02
ASSETS	Consumer Discretionary	612.94	103.51	1691.32
ASSETS	Health Care	297.61	16.26	1190.07
ASSETS	Information Technology	324.06	30.87	1632.61
EARN	Materials	93.11	2.19	214.55
EARN	Industrials	51.75	3.74	148.78
EARN	Consumer Discretionary	32.76	3.34	111.00
EARN	Health Care	14.27	-1.26	90.78
EARN	Information Technology	10.63	0.10	85.31
REV	Materials	1874.10	220.88	3347.22
REV	Industrials	1081.45	166.23	2344.78
REV	Consumer Discretionary	638.33	131.76	1733.14
REV	Health Care	218.69	3.03	962.38
REV	Information Technology	283.37	31.24	1318.85
INTAN	Materials	232.84	11.46	504.36
INTAN	Industrials	212.86	12.36	546.14
INTAN	Consumer Discretionary	118.49	9.39	323.03
INTAN	Health Care	84.86	0.62	360.11
INTAN	Information Technology	81.33	4.38	369.28
RD	Materials	16.47	0.00	248.72
RD	Industrials	11.30	0.00	35.21
RD	Consumer Discretionary	6.08	0.00	25.02
RD	Health Care	12.05	0.47	32.32
RD	Information Technology	7.52	0.14	24.65
DIV	Materials	48.59	0.00	214.55
DIV	Industrials	24.77	0.00	71.02
DIV	Consumer Discretionary	15.83	0.00	52.08
DIV	Health Care	7.58	0.00	42.48

DIV	Information Technology	5.55	0.00	36.26
CF	Materials	196.65	11.82	376.57
CF	Industrials	94.49	8.53	245.29
CF	Consumer Discretionary	61.25	7.11	192.74
CF	Health Care	26.46	-0.96	138.02
CF	Information Technology	26.17	0.92	154.39
CASH	Materials	133.14	14.51	284.04
CASH	Industrials	106.19	14.19	255.76
CASH	Consumer Discretionary	57.80	8.24	188.91
CASH	Health Care	37.69	4.82	131.21
CASH	Information Technology	32.90	5.44	141.14
REVGR	Materials	32.71	1.00	251.12
REVGR	Industrials	48.21	2.94	293.68
REVGR	Consumer Discretionary	28.98	3.20	186.19
REVGR	Health Care	15.99	0.08	112.46
REVGR	Information Technology	14.16	1.23	151.79
BVE	Materials	365.54	34.32	1017.23
BVE	Industrials	420.73	65.80	967.43
BVE	Consumer Discretionary	247.46	44.19	685.61
BVE	Health Care	145.41	11.32	579.00
BVE	Information Technology	147.73	15.61	718.87
SPI	Materials	-5.48	0.00	29.35
SPI	Industrials	-3.45	0.00	19.33
SPI	Consumer Discretionary	-2.13	0.00	14.07
SPI	Health Care	-1.69	0.00	11.80
SPI	Information Technology	-2.53	0.00	16.32
COGS	Materials	1037.79	83.75	2041.84
COGS	Industrials	650.63	70.43	1449.90
COGS	Consumer Discretionary	336.66	56.46	966.40
COGS	Health Care	78.97	1.18	292.51
COGS	Information Technology	158.80	9.14	774.60
SGA	Materials	192.24	23.83	298.40
SGA	Industrials	146.40	16.29	326.69
SGA	Consumer Discretionary	128.39	21.54	303.73
SGA	Health Care	51.81	3.53	194.04
SGA	Information Technology	40.14	186.30	4.06

Note: 1) All variables are expressed in MUSD. 2) The variables presented have already been winsorized at the 2nd and 98th percentile. These numbers have not been deflated by shares outstanding yet, because it better illustrates the values of the variables.

Appendix 2: The use of generative AI

In this thesis, we have taken some assistance with generative AI. When used, we have utilized it to get support with some details regarding our code in RStudio. This includes troubleshooting and assistance with formatting. However, we critically reviewed the answers before taking any actions and in some cases, the response was not always useful as we noticed several mistakes in the answer provided to us. Therefore, we made sure to troubleshoot ourselves before and after using AI for the code. We have also used ChatGPT for the assistance of finding synonyms and checking for some spelling mistakes. This has been combined with other websites able to provide answers, such as Thesaurus. This has guided us to make the thesis clear and easy to read.