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Is Accounting Even Relevant?

A Quantitative Study on Accounting Metrics' Explanatory Power in Nordic Stock Prices

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Abstract

This thesis investigates the value relevance of accounting metrics in the Nordic stock markets from 2018 to 2022, applying and extending the Ohlson model. Given the increasing importance of intangible assets in modern economies, we also explore how traditional accounting metrics like earnings, book value, and cash flow explain stock prices, particularly for companies with high intangible asset ratios. Using a deductive research approach, we formulated hypotheses based on existing value relevance theories and empirical literature, subsequently testing these hypotheses using a multiregression analysis on panel data.

The findings lead us to determine the explanatory power of the Ohlson model (R^2 of 45,9%) as well as the revised Ohlson model including cash flow (R^2 of 52,9%), commonly used in value relevance research. Furthermore, our findings indicate that (1st) earnings per share and (2nd) book value per share are significant predictors of market value in the Nordic context, though their explanatory power diminishes for intangible-intensive firms. The study contributes to financial reporting standards by highlighting the limitations of conventional accounting metrics in capturing the market value of such firms.

Key words: Value Relevance, Equity Valuation, Accounting Information, Financial Statements, Intangible Assets

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Sami Bedoui and Alexander Lövås

1. Background

1.1 Introduction

Major technology firms harnessing AI-driven analytics or biotech companies on the brink of pioneering the next revolutionary breakthrough exemplify instances where the accounting data of these enterprises may be perceived as inadequate by most investors (Leitner-Hanetseder & Lehner, 2022). While these examples may represent extreme cases, companies' reported financial information remains unchanged, even though the values constituting the market perception in many companies look vastly different.

In the financial analysis and equity valuation landscape, understanding the value relevance of key accounting metrics such as earnings, equity book value, and cash flow could hold important implications for standard setters, analysts, and investors. These foundational measures are the bedrock of valuation methodologies, shaping investment strategies and decision-making processes across diverse industries and markets (Forbes, 2024). For standard setters, delving into the value relevance of accounting metrics offers invaluable insights for financial reporting standards. By working out which metrics are most influential in equity valuation, standard setters can tailor accounting guidelines to meet market expectations, enhancing transparency and comparability of financial information for stakeholders (Barth et al., 2000).

Determining the true market value of a company is a challenging task involving the assessment of total economic worth and asset valuation. Various methods are used, and among the most common are book value, discounted cash flow analysis, market capitalisation, enterprise value, earnings evaluation, and the present value of a growing perpetuity formula (Harvard Business School Online, 2022). Financial professionals and investors must understand these valuation techniques to make informed decisions, navigate market complexities, and accurately assess a company's worth. This thesis examines accounting metrics relevant to these methods to understand their performance in the Nordic context.

For investors, a deep dive into the value relevance of accounting metrics provides actionable intelligence for evaluating investment opportunities and determining company performance. By establishing how these metrics correlate with market values, investors can refine their strategies on financial analysis and valuation principles (Barth et al., 2000).

The value relevance of financial statements commonly characterised by intangibles unveils an additional dimension of the subject. It is partly intriguing due to the growing importance of intangible assets in today's economy. It offers insights into how markets perceive the value of companies with significant non-physical assets and the effectiveness of traditional valuation models in capturing this value. (Lundh et al., 2023)

Over the past twenty-five years, investment in intangible assets, such as intellectual property, research, or technology, has experienced a significant and steady increase. Moreover, the emergence of the COVID-19 pandemic has expedited the dematerialised transition. (Hazan, E. et al., 2021).

The transition toward the dematerialised economy is also prevalent in today's growth. Industries showcasing high growth invest 2.6 times more than low-growers across sectors (see table 1), pointing us toward a new stage of capitalism (Hazan et al., 2021). Also, as, the amount of disclosed intangibles is increasing rapidly. (Brown, M., 2023)

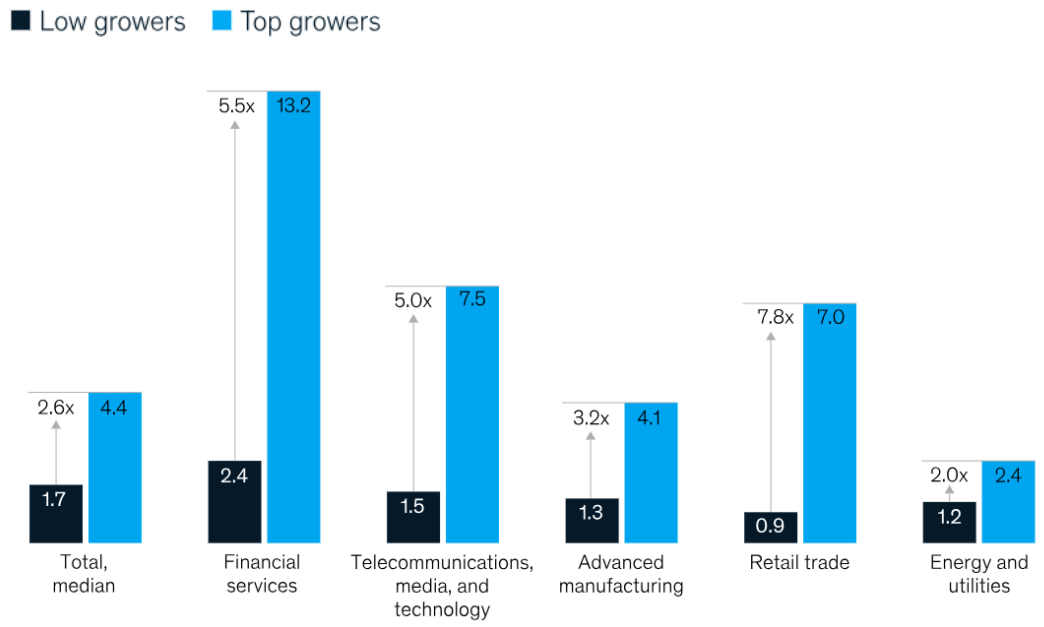

Table 1: The ratio of investment in intangibles to revenue by sector in 2019

Source: McKinsey survey (n=591), McKinsey Global Institute Analysis

In summary, understanding the value relevance of key accounting metrics such as earnings, book value, and cash flow is crucial for analysts, investors, and standard setters. This understanding could help investors and analysts refine their foundation of valuation methodologies by incorporating adjustments based on these findings, which could influence investment strategies and decision-making (Forbes, 2024).

Examining these metrics provides insights for enhancing financial reporting standards for regulatory bodies (Barth et al., 2000). The importance of accounting for intangible assets, which has increased significantly over the past twenty-five years and was accelerated by the COVID-19 pandemic, highlights the need for tailored investment strategies that fit our modern world and address companies characterised by a high ratio of intangibles. (Lundh et al., 2023; Hazan et al., 2021).

1.2 Purpose

This thesis aims to deepen the understanding of the relationship between accounting data and fair market value. The research seeks to offer insights into the investment market and contribute to standard setters, investors and analysts, providing insights that may lead to a deeper understanding of the market interpretation of financial information within the Nordic market.

After an extensive literature search (see section 2.2), only one academic article is noted within the value-relevance research in the Nordic region. The article examines value-relevance in Norwegian listed companies over 40 years before adopting IFRS (Gjerde et al., 2011).

Therefore, the study addresses an identified gap in the research regarding the value relevance of financial information in the Nordic context; furthermore, a small portion of the existing literature seems to analyse how the relevance of information deviates between industries and intangible assets.

Calls for further studies from regulatory bodies further emphasise the relevance of the chosen research topic. Firstly, the thesis aims to respond to FASB's 2023 March press conference,

where they, together with the Chookaszian Accounting Research Center of the University of Chicago Booth School of Business, call out research papers on intangible assets and their relevance in financial statements (FASB, 2023). Secondly, the thesis addresses IASB's recently initiated review of the relevance of accounting requirements for intangible assets. This initiative was published on the 23rd of April 2024 through the IFRS website, where it was stated that:

"The International Accounting Standards Board (IASB) is commencing its comprehensive review of accounting requirements for intangibles. The project will assess whether the requirements of IAS 38 Intangible Assets remain relevant and continue to fairly reflect current business models or whether the IASB should improve the requirements."
(IFRS, 2024, n.p.)

1.3 Research Question

(1) How accurately do the accounting metrics reflect companies' true market value in the Nordic context?

(2) How does an increase in an intangible assets ratio affect the value relevance?

1.4 Distribution

1. Background: The first chapter introduces the study, outlining its significance and objectives. It sets the context by discussing the importance of value relevance and the contribution the study can make.

2. Literature Review: The second chapter introduces the ground theories of this study. It then reviews existing research on value relevance. It also explores the theoretical foundations and previous findings on intangible assets and their impact on value relevance.

3. Methodology and Data: The third chapter details the research design, including the methodologies employed to test the hypotheses. It describes the data sources, sample

selection, and the statistical techniques used for analysis, ensuring the robustness and reliability of the findings.

4. Findings: The fourth chapter presents the study's empirical results. It includes descriptive statistics, regression analyses, and other relevant data interpretations that address the hypotheses concerning the relevance of earnings per share, book value per share, cash flow per share, and the influence of high intangible assets.

5. Analysis: The fifth chapter provides an in-depth analysis of the findings. It discusses the implications of the results in the context of the Nordic market, comparing them with previous studies from other regions. It also discusses the implications of high-ratio intangible asset companies and their effect on the results compared to previous literature.

6. Conclusions: The final chapter summarises the key findings and their significance. It offers conclusions based on the analysis, discusses the study's limitations, and suggests areas for future research. The chapter concludes by emphasising the study's practical relevance for stakeholders that enhance financial reporting standards and conduct investment strategies in the Nordic countries.

2. Literature review

The text includes a theoretical section discussing stakeholder theory and value relevance theory, followed by a review of empirical literature. Finally, it formulates hypotheses related to the value relevance of accounting metrics in the Nordic context.

2.1 Theoretical Literature

2.1.1 Stakeholder Theory

In exploring the complexities of accounting metrics and their value relevance, it is essential to consider the broader context within which companies operate. This brings us to the stakeholder theory, a crucial framework for understanding corporate behaviour and decision-making. The stakeholder theory, developed by Edward Freeman in 1984, argues that businesses should not only focus on maximising shareholder value but also consider the interests of all parties affected by their actions. These parties, or stakeholders, include investors, analysts and standard setters. (Parmar et al., 2010; Freeman, 1984)

Stakeholder theory contrasts with the traditional shareholder-centric view, prioritising profit maximisation and shareholder returns above everything else. Instead, it argues that a business's long-term success depends on managing stakeholder relationships. By acknowledging the needs and concerns of these stakeholder groups, companies can build trust, enhance their reputation, and create value that benefits everyone involved. (Laplume et al., 2008)

In this thesis, which examines how accurately the accounting metrics reflect companies' true market value in the Nordic context, stakeholder theory provides a valuable lens through which to view financial reporting. Because companies increasingly invest in intangible assets like intellectual property, technology, and human capital (Hazan E. et al., 2021), the importance of transparent and comprehensive reporting becomes even more pronounced. Stakeholders such as investors, analysts, and standard setters require accurate and relevant

financial information to make informed decisions and assess a company's fair value. Nair, S., & Sisodia, G. S. (2023)

As this thesis explores the value relevance of key accounting metrics, stakeholder theory will serve as a guiding principle, ensuring the interests and impacts of relevant parties.

2.1.2 Value Relevance Theory

The value relevance theory is an important concept in accounting and finance that explores how reported financial information influences firms' market valuation. It examines the impact of accounting data on stock prices in capital markets, such as earnings, the book value of equity, and cash flow. This theory provides insights into the informational dynamics that shape investor perceptions and market efficiency (Imhanzenobe, 2022).

Whether the market perceives a company and its performance directly correlates with the company's valuation; this is where accounting information comes in and serves its purpose by guiding said perception (Khanna, 2014). According to the definition of value relevance, reported accounting information will thus be relevant in cases where any fluctuation in value affects the market price of a company (Juniarti et al., 2018; Hassan & Haque, 2017).

In other words, the value relevance theory illustrates how accounting-based information can motivate the true market value of a company. An extension of this is that such information extracted from financial reports leads an investor to reassess potential investment decisions. This assumes that the information is representative of the qualitative characteristics reflected in reality (Omokhudu & Ibadin, 2015).

Key metrics studied under this framework include earnings, equity book value, and cash flow performance. Understanding value relevance is essential for assessing the quality and usefulness of financial reporting in guiding investment decisions (Outa., et al. 2017).
Investors and analysts benefit significantly from the value relevance theory by gaining valuable insights into interpreting financial reports and making informed investment decisions. By evaluating the degree of value relevance in accounting information, investors and analysts can assess the reliability and predictive ability of reported data in evaluating a

company's performance and prospects. This understanding improves and contributes to effective portfolio management and investment decision-making (Okafor et al.; H., 2016).

Similarly, standard setters leverage the value relevance theory to develop and assess accounting standards that enhance the transparency and reliability of financial reporting. (Barth et al., 2001; Imhanzenobe, 2022) Aligning reporting standards with value relevance principles supports market efficiency and investor confidence.

2.1.3 Characteristics of Nordic Accounting and Financial Markets

Even though studies have been done on plenty of countries following IFRS (as the Nordics do), there is still a strong logic in investigating unresearched territories. Evidence shows that national culture influences the behaviour of individual actors (Hofstede, 1984; GLOBE, 2004). These differences in behaviour will influence the implementation and practices of IFRS in different markets (Prescott & Vann, 2015). Not only are the implementation and practices affected by the cultural differences, but the institutions in the country will also be affected and act differently based on cultural setting; this will further affect the accounting within different countries (Cieslewicz, 2014). Understanding these national responses is crucial for achieving the ultimate objective of new policy formation, which aims to enhance accounting change by improving reporting quality and comparability of financial information (Hartman et al., 2020).

Businesses in continental European countries are usually anticipated to adopt more conservative reporting practices than their counterparts in the US, UK, or Australia (Hartman et al., 2020), which will affect the results of the accounting and financial statements. Hjelström and Schuster (2011) have also demonstrated that national accounting traditions and management incentives play crucial roles in accounting choices in Sweden. They highlight instances where managers creatively interpreted standards to their advantage, justifying their positions to auditors with arguments grounded in a conservative accounting culture. Their study also emphasises the significant tax implications of accounting choices, undermining the importance of examining value relevance across different countries and regions. This is due to the numerous factors beyond legislation and standards influencing accounting practices.

Additionally, the separation between bank-centric versus market-centric financial systems is a common trend in deriving differences in value relevance. The Centre for Economic Policy Research (CEPR, 2019) conducts a study mapping EU members into distinct categories of financial systems. The CEPR mentions that an economy can be put into one of four groups, determined by the relative proportion of finance channelled through banks or markets (CEPR, 2019). These groups are bank-based, market-based, smaller and less influential economies and finally, outliers. According to CEPR all Nordic EU-countries are considered to have market-based financial systems, meaning these countries have significantly developed equity markets.

2.2 Empirical Literature

Much of the literature in this chapter revolves around the Ohlson model, which aims to explain a company's market value using accounting metrics. The Ohlson model consists of the two main explanatory variables: earnings and equity book value. The model focuses on the explanatory power, represented through R^2 rather than the coefficients. A higher R^2 means the model has a stronger explanatory power and higher fit. The research also consists of a revised Ohlson model, which has added the main explanatory variable, cash flow, to increase the model's explanatory power. (Ohlson, 1995)

2.2.1 Studying the Value Relevance of Accounting Metrics

Puspa (2006) investigates the value relevance of earnings and cash flows using a regression-variation approach on the Jakarta Stock Exchange from 1996 to 2001 with a sample of 79 companies. The findings show that earnings and cash flows from operations exhibit value relevance. Notably, the study reveals that earnings information is more value-relevant (R^2 ranged from 4% to 31%) than cash flow (R^2 ranged from 0,7% to 12,5%). While earnings and cash flows generally exhibit value relevance across the study period, there are specific years where one metric may lack value relevance (e.g., earnings in 1998, cash flows in 1998 and 2000); this is most likely due to a weak stock market, according to the author.

Camodeca et al. (2014) explore the value relevance of accounting information in the UK and Italian stock markets using Ohlson's model to look at 100 companies from the Milan Stock

Exchange and the London Stock Exchange between 2011-2013. Their findings show two things. First, accounting information appears more relevant in Italy than in the UK. Second, the study reveals that earnings are more valued in Italy (R^2 of 90,1% in Italy vs 44,8% in the UK), whereas cash flows carry greater significance in the UK (R^2 of 73,2% in UK vs 45,1% in Italy). Camodeca et al. explain these findings by referring to the differences in capital market structures between Anglo-Saxon countries like the UK and bank-centric systems like Italy. This aligns with Outa., et al. (2017), which states that previous research shows significant differences between code-law and common-law countries when examining value relevance.

Outa et al. (2017) argue that the value relevance measured as R^2 will differ between developed and developing markets. They do this by looking at previous research for developing markets such as the UAE, where they obtained 47-58% R^2 using the Ohlson model (Khanagha, 2011), and Nigeria, where Adetunji et al. (2016) got 45% in R^2, among other studies.

On the other hand, Outa et al. (2017) have found that studies in developed markets such as Italy (Silvestri and Veltri, 2012) and Canada (Okafor et al., 2016), among others, show results of 58-95%, significantly higher than those of developing markets.

These findings support other existing literature, such as Hellstrom (2006), who argues that value relevance might be lower in developing countries than in developed countries.

However, other factors could also influence the study's results. Graham et al.'s (2000) study exemplified this. It examined the impact of the financial turmoil surrounding the devaluation of the Thai baht on the value relevance of Thai accounting information. The findings indicate a decline in the value relevance of Thai book values and earnings following the currency's devaluation.

Charchafa and Kimouche (2022) investigate the comparative value relevance of equity book value, earnings, and cash flow in France and the UK using Ohlson's model and data from 115 French companies and 100 UK companies spanning 2011 to 2019. The findings reveal that equity book value and earnings are value-relevant in both countries, whereas cash flow shows no value relevance. In France, earnings demonstrate higher value relevance than equity book

value, whereas in the UK, equity book value and earnings exhibit similar levels of value relevance. This is surprising considering the results and discussion about bank-centric and market-based systems in the Camodeca et al. (2014) article. One potential explanation is the timing effect mentioned in Puspa (2006) that could have occurred due to Camodeca et al.'s (2014) shorter period.

Bolibok (2015) investigates the value relevance of financial statement items (earnings, equity book values, and cash flows) within the Polish banking sector's capital market by looking at all the public banks. The findings indicate that banks' market value is most strongly associated with equity book values (R^2 of 82,2%), followed by earnings (R^2 of 68,2%). Banks' cash flows, however, demonstrate limited informativeness for equity investors (0,2%), providing no significant incremental explanatory power beyond equity book values and net earnings.

Specifically, the analysis reveals that equity book values and earnings exhibit strong, statistically significant positive correlations with banks' market value during the study period (1997-2014). Book values of equity notably explain a higher portion of the variation in banks' stock prices, with earnings contributing additional explanatory power according to their stepwise multiple regression analysis.

In the article "A Test of the Ohlson Model on the Italian Market," Silvestri and Veltri (2012) investigate the Italian financial sector, focusing on the Italian Stock Exchange. The study employs 30 firms, including banks, insurance companies, and other financial services, with data from the 2009 fiscal year. This period was chosen to determine the validity of the Ohlson model of the 2008 financial crisis. The research aims to test the influence of current and future accounting variables on firm market value, utilising a model inspired by the original Ohlson model (1995). The regression analysis indicates a strong relationship between market value and accounting variables, with an R^2 value showing a significant explanatory power.

Black & White (2003) examines the value relevance in Germany, Japan, and the USA. The study includes a sample of 28 181 firm-year observations. The authors conclude that the equity book value is more value-relevant than earnings, a trend particularly pronounced in Germany, followed by Japan. Conversely, earnings are more value-relevant in the USA than equity book value. The authors suggest that since German capital providers prioritise balance

sheet measures, and due to accounting characteristics like conservatism and tax conformity, equity book value becomes more relevant for company valuation in Germany (Black & White, 2003). This minimizes how distinct domestic practices in different countries can significantly impact value relevance.

Similarly, Glezakos et al. (2012) conducted a study involving 38 companies listed on the Athens Stock Market, in Greece (a bank-based market, according to CEPR, 2019) from 1996 to 2008, giving 494 firm-year observations. The authors observe that earnings are less significant in influencing stock prices than book value.

Khanna (2014) analyses companies listed on the Indian S&P BSE-500 from 2006 to 2010. The paper confirms that accounting information is value-relevant. However, the author concludes that the overall value relevance of accounting information, as measured by earnings per share (R^2 of 42,6%) and book value per share (R^2 of 32,6%), has decreased over the period.

The author also mentions that cash flows are often considered less value-relevant when assessing company worth. This viewpoint is supported by several scholars (Ohlson, 1995; Barth et al., 1998; Collins et al., 1999). They argue that cash flows encounter significant challenges related to matching and timing, which diminish their reliability and relevance in valuation analysis.

Abeifaa Der et al. (2016) provide additional evidence regarding the challenges associated with the value relevance of cash flow metrics. Their study includes 389 firms from 1994 to 2013 in the Singaporean market, encompassing 7780 firm-year observations. The authors proceed to explain that their paper's findings establish the relevance of the three components of the revised Ohlson model in the following sequence: first, book value (R^2 of 49,6%); second, earnings (R^2 of 32,3%); and lastly, cash flow (R^2 of 8,2%) (Abeifaa Der et al., 2016).

Abdel-Khalik et al.'s (1999) study found significant differences in how earnings impacted share prices between A and B shares. A shares showed no correlation between earnings and share prices, whereas B shares exhibited a positive correlation. This gap shows the influence of information environment characteristics on market behaviour and investor response. It also strengthens Graham et al.'s (2000) argument that factors other than accounting numbers

influence share prices, further highlighting the importance of studying value relevance in different countries across the globe.

Even though empirical evidence supports a causal relationship between share price and reported accounting indicators, Ball and Brown (2014) found that up to 90 per cent of price changes occur before financial statement announcements. This suggests that numerous other factors influence share prices.

Belesis et al. (2022) studied the value relevance of accounting information using a sample of 1,645 companies from the top six European economies: France, Germany, Italy, the Netherlands, Spain, and the United Kingdom from 2010-2020. Using the Ohlson model they investigate the differences in value relevance across these countries and the impact of the COVID-19 pandemic on financial statement relevance. The research highlights how investors' reliance on financial statements changed due to the pandemic, focusing on earnings and book value before and after the crisis. The results show that financial statements' explanatory power is generally similar across countries. They also found that the pandemic reduced the explanatory power of financial statements in all countries, with earnings losing relevance to book value. The study concludes that financial statements became less influential in determining market prices after the pandemic.

Furthermore, other studies conduct results confirming a negative trend where the value relevance is declining (Black & White, 2003; Perera & Thrikawala, 2010; Khanagha, 2011).

2.2.2 Intangibles and value relevance

The following research examines the hypothesis that value relevance depends on a company's ratio of intangible assets, following the the background of this thesis. Understanding the significant surge in intangible assets on the balance sheets of S&P 500 companies, escalating from 17% in 1975 to over 90% today largely due to the dominance of software and technology firms, further underscores the critical importance of studying intangible assets in economic analysis (Brown, 2023).

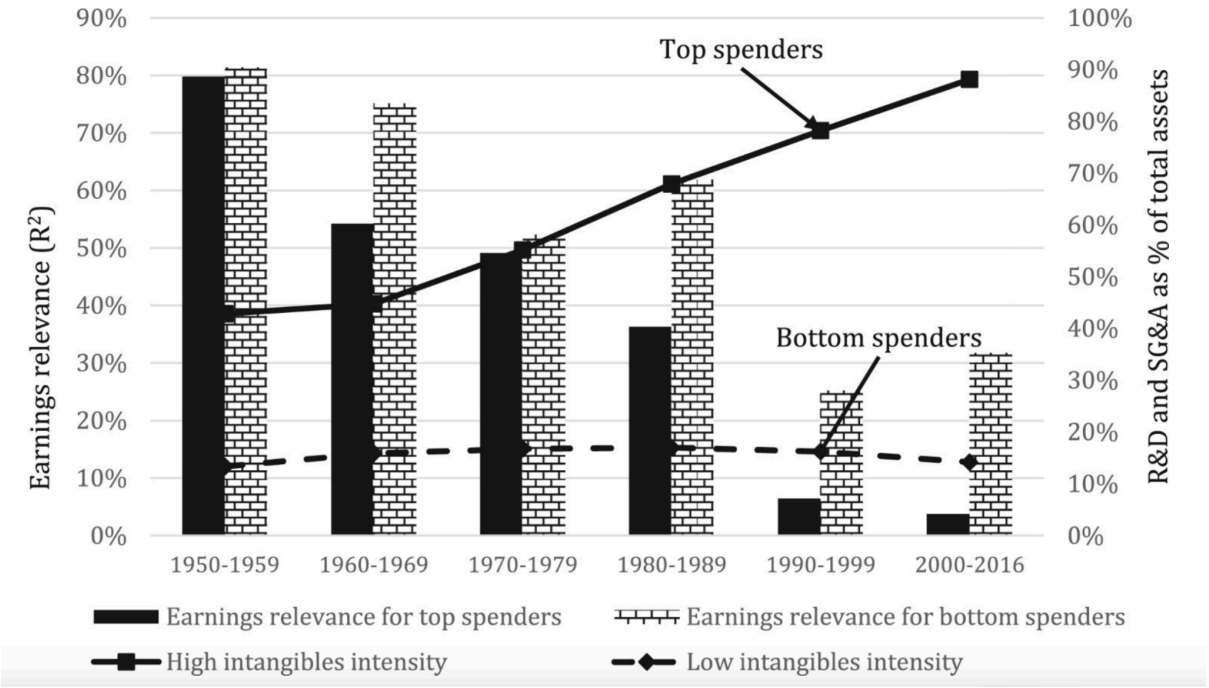

Table 2: Earnings relevance and intangibles intensity

Lev, B. (2019). Ending the Accounting-for-Intangibles Status Quo.

Table 2 shows how the relevance of earnings and book equity for investors has changed over the past 60 years in relation to firms' intangible intensity. The diagram classifies firms based on the decade they entered the capital markets (the 1950s, 1960s, etc.) and their intangible intensity, further dividing them into high and low intangible-intensity groups relative to their industry median. (Lev, B. 2019)

The figure consists of a line graph and a bar graph. The line graph shows the average intangible intensity of firms entering the public market each decade, divided into high and low intangible-intensity groups. The high-intangible-intensity curve is rising, indicating that newer firms increasingly invest in intangible assets. The bar graph presents the R^2 values, which measure how well earnings and book equity explain market value for each group of high and low intangible-intensity firms. The findings reveal a general decline in earnings and book equity value relevance for all firms, suggesting that these financial metrics have become less useful for investors.

Additionally, firms with higher investments in intangibles show a weaker correlation between their market values and earnings/equity numbers, likely due to inadequate accounting

treatment of intangible assets. This underscores the need to examine value relevance and how it differs between companies with high and low ratios of intangible assets. (Lev, B. 2019)

Cordazzo and Rossi (2020) explore companies listed on Borsa Italiana from 2000 to 2015, finding that while intellectual property, rights, and R&D have declining relevance, intangible assets such as goodwill show increased value relevance.

Several studies using the Ohlson model provide additional insights. Iñiguez and López (2005) analyse 152 companies in Spain from 1991 to 1999, revealing a significant positive relationship between recognised intangible assets and stock prices. Similarly, Oliveira et al. (2010) examined 354 non-financial companies in Portugal from 1998 to 2008, finding a positive relationship between stock prices and intangible assets. However, intellectual property and R&D investments are not relevant.

Collectively, these studies indicate that the value relevance of intangible assets can vary significantly depending on the type of the intangible assets.

Amir and Lev (1996) early noted how accounting information in rapidly growing high-technology companies has minimal value for investors. This, in turn, creates a growing issue with accounting information needing help to capture the market values for such companies. This is because companies within intense R&D industries accumulate higher values of intangible assets. While companies in such industries often generate value through product development and investments, fundamental accounting metrics may often be negative or do not reflect such value creation (Amir & Lev, 1996).

In a modern setting, a typical example of this theme is visible among companies at the forefront of AI-powered information and big data. These advancements provide companies with economic benefits; however, financial information only partially supports their value. This increases the disparity between book and market values, making it less value-relevant (Leitner-Hanetseder & Lehner, 2022).

2.2.4 Value Relevance and Accounting Principles

The following chapter is included because a large portion of research on value relevance focuses on accounting relevance during changes in accounting legislation and standards. Although this study does not examine a specific change in accounting legislation, previous studies remain valuable for understanding expected results and aligning them with existing research on value relevance

Accounting-based information often greatly affects stock prices and market capitalisation since it is the primary way of communicating with the market. However, the effect is not always consistent and could change based on several factors, one of the most important being accounting principles. (Abdel-Khalik et al., 1999; Khanagha., 2011)

This could especially be seen in China during the 1990s. During these years China initiated partial privatisation of its enterprises through the establishment of two distinct types of shares: A shares, which were exclusively sold domestically to local investors in local currency, and B shares, sold in dollars solely to foreign investors. While all listed firms offered A shares, those seeking to issue B shares were required to prepare financial statements according to International Accounting Standards (IAS), among other criteria. Companies issuing A shares were only required to follow domestic accounting regulations. (Abdel-Khalik et al., 1999)

The change in accounting principles can also be seen in other studies and countries. Khanagha (2011) investigated the value relevance of accounting information in the UAE stock market during the pre- and post-IFRS implementation. The findings suggest that accounting information remains relevant overall, but there has been a decline in its value relevance since the adoption of IFRS. This is however the exact opposite of Outa et al.'s study in 2017. They conducted a study on IFRS implementation and value relevance in East Africa where they used the same companies pre- and post-IFRS to look for changes in value relevance. Their study found a positive and significant relationship between share prices and both book values and earnings.

2.3 Hypothesis Development

Research on the theme of value relevance has been extensive since the 1990s, covering various regions across the globe, ranging from China (Abdel-Khalik et al., 1999) and Indonesia (Puspa, 2006) to parts of Europe (Camodeca, 2014; Charchafa & Kimouche, 2022; Bolibok, 2015; Glezakos et al., 2012.) and Africa (Outa et al., 2017). Despite this widespread research, there has been a notable gap in understanding the value relevance, specifically in the Nordic regions.

An exception is a study conducted in Norway by Gjerde, Knivsflå, and Sættem (2011) exploring value relevance before implementing IFRS, which is irrelevant today. Given the limited research in this context, our study aims to fill this gap by examining the value relevance in the Nordic regions. We assume that the value relevance of accounting information in Nordic countries may exhibit characteristics influenced by regional economic factors, regulatory frameworks, and market dynamics.

All this considered, we believe the mutual order of the value relevance metrics will remain the same. However, due to very inconsistent historical results concerning cash flow, we cannot predict the metric and will, therefore, focus our hypothesis solely on the other two metrics. Therefore, our first two hypothesis looks as follows:

Hypothesis 1: The revised Ohlson model will have an explanatory power (R^2) of more than 50%.

Hypothesis 2: Earnings per share have higher value relevance than book value per share for companies in the Nordic market.

Given the substantial increase in intangible assets on balance sheets, the relevance of traditional accounting metrics like earnings and book equity has been increasingly questioned (Lev, 2019; Amir & Lev, 1996). Traditional accounting information often fails to capture the market value of these firms, a trend that persists in modern sectors like AI and big data (Leitner-Hanetseder & Lehner, 2022). However, studies such as those by Cordazzo & Rossi (2020) and Iñiguez & López (2005) find supporting evidence of intangible intense companies' value relevance.

Given these insights, we can collectively motivate a hypothesis that the high prevalence of intangible asset ratios in companies will influence the value relevance of accounting metrics. Specifically, we propose:

Hypothesis 3: More intangible assets will influence the value relevance of accounting metrics in companies in Nordic countries.

3. Methodology and Data

The following section covers the main model description, research design, data and sample description, variable definitions, descriptive statistics, pre-regression diagnostics, estimation method, relevant modelling decisions, and key characteristic controls.

3.1 Main Model Description

3.1.1 Ohlson's Model (OM)

Since most previous research in value relevance uses Ohlson's (1995) model to measure value relevance, this study will follow in its footsteps for comparability reasons. The theoretical foundation of the Ohlson model is well-established (Collins et al. (1997). As illustrated in the empirical literature review, the Ohlson model (1995) is utilised widely in modern value-relevance research (Camodeca, 2014; Charchafa & Komouche, 2022; Bolibok, 2015; Abeifaa Der, 2016; Silvestri, 2012; Belesis, 2022; Chen-Yin Kuo, 2016, etc).

The rationale for the enthusiasm behind the Ohlson model is multiple. The main reason is the consensus among accounting researchers regarding the formal interconnection between valuation and financial accounting. Compared to traditional approaches that usually result in weaker linkages (R^2) between the valuation domain and accounting information, the Ohlson model has been shown to provide stronger linkages in empirical research (Lo & Lys, 2000).

The Ohlson model is one of several models for equity valuation. Its purpose is to link market value with accounting metrics, relying solely on accounting data for valuation (Lo & Lys, 2000). The model has various configurations as seen in previous studies in chapter 2.2. However, in this thesis, inspired by similar previous studies, we test the explanatory power of the Ohlson model using historical data. This approach contributes to understanding how well the model fits within our chosen parameters.

As illustrated in the equation below, the Ohlson model posits that market valuation is influenced by a combination of earnings and equity book value.

$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 EAR_{it} + \in_t$

Where:

P_{it}: is the stock price of company i at the end of fiscal year t;

BV_{it} : book value of equity of company i at the end of fiscal year t;

EAR_{it} : book value of earnings of the company i at the end of fiscal year t;

$\in_t$: error term

(Ohlson, 1995)

Some authors examine the Ohlson model in its original form, which includes only earnings and equity book value, while others incorporate cash flow (Abeifaa Der et al., 2016; Camodeca et al., 2014; Charchafa and Kimouche, 2022 etc.). We have chosen to revise the model to include cash flow, partly inspired by previous studies that have done the same. However, the Ohlson model in its original format will also be applied for analysis.

3.2 Research Design

3.2.1 Methodological Overview

This thesis follows the deductive research approach, illustrated in table 3. The theory this thesis will be built upon is the Value Relevance Theory and Ohlson's model. Based on these theories and previous studies, three hypotheses were created. From there, data was collected and a multivariate analysis was performed to test the hypotheses. Finally, the thesis ends with an analysis and conclusion regarding the results and relevant theories.

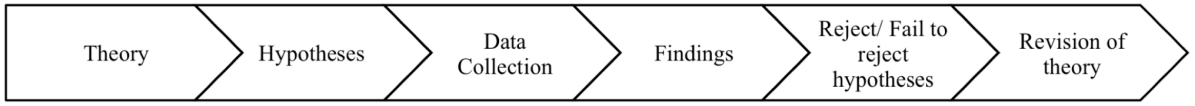

Table 3: Deductive research approach; Source: Bryman and Bell (2015, p 23)

3.2.2 Coefficient of determination (R^2)

Our thesis examines the fit of the Ohlson model on the data set. Similar to previous research as illustrated in section 2.2, R^2 is the common way of exploring the explanatory power of the model. A high R^2 would prove the Ohlson model to have a solid capability to capture the market's perception of a company's worth. The Ohlson model is designed for this purpose rather than to effectively explain changes and accurately provide informative coefficients between the variables.

"Within R^2" refers to the proportion of variance explained within groups or clusters, such as individuals or periods. Adjusted R^2 penalises the model for excessive complexity by considering the number of predictors and the sample size. Adjusted R^2 offers a more conservative estimate of model fit, helping researchers avoid overfitting and ensuring that the model's explanatory power is not inflated by including unnecessary variables. The adjusted R^2 used in the main model (4) is per default based on the within R^2. (Bailey, 2016)

3.2.3 Ordinary Least Squares

OLS (Ordinary Least Squares) is a widely used method for estimating parameters in linear regression models. By minimizing the sum of squared differences between observed and predicted values of the dependent variable, OLS finds the best-fitting line (or plane) for the data. We employ OLS in all our regressions for its established research track record and versatility across different data types and research questions. We use OLS to ensure our results can be compared with prior studies and contribute to the ongoing scientific discourse.

3.3 Data and Sample Description

The Data sample consists of accounting figures and share price data from all Nordic stock exchanges between 2018 and 2022. The chosen period is motivated by a desire to study the value relevance in a modern context, since data were not available for the 2023 year at the start of this study, 2022 was determined as the starting year. The decision to look for a 5 year period is since it helps smooth out short-term fluctuations (such as Covid-19), providing a clearer picture of the underlying long-term relationships.

All data is gathered using Capital IQ, a comprehensive research database that provides quantitative and qualitative data sets. It profiles over 99% of the world's market capitalisation, offering coverage of financial data and company information (S&P Capital IQ, 2024).

Every currency used in the dataset was converted to Swedish Krona (SEK) based on the historical exchange rates of the gathered data. This standardisation allows a consistent comparison of financial metrics across companies denominated in different currencies within the Nordic region. Using historical exchange rates eliminates the impact of short-term currency fluctuations, ensuring a more stable analysis. This improves comparability over time, preventing inconsistencies arising from current exchange rates.

The data set excludes companies with standard industrial classifications (SIC) classified as financial companies because of their inflated assets. Excluding financial companies from the dataset aligns with established research norms in accounting and finance and is consistent with prior studies. Furthermore, data observations with missing industry classifications have been excluded. This is necessary because the regression model includes a crucial industry dummy variable, and prior research shows value relevance varies significantly between industries (Chen-Yin Kuo, 2016). Therefore, to ensure robust results, these samples are dropped. After this exclusion, before the data was put into STATA, sample observations went down from 9329 to 6269 firm-year observations.

Earnings per share, cash flow per share and equity book value per share are three of four logarithmic variables in the regression. Due to the prevalence of negative values in earnings and equity book values, the logarithmic transformation automatically removed 2925 data points on earnings with negative values, 3011 data points on cash flow and 145 data points with negative equity book values. Finally, due to listwise deletion, our final number of observations in our regressions amounted to a minimum of 2241 firm-year observations, depending on the regression structure.

3.4 Variable Definition

Below in table 4, all relevant variables for the study is presented.

Variable category	Variable	Abbr.	Description
Dependent variable	Share price	P	Logarithmized stock price (per share) incorporating data from March 31st with a one-quarter lag.
Explanatory independent variable	Earnings per share	EPS	Logarithmized earnings per share from the last day of each fiscal year. Earnings are measured as the remaining profit after all expenses including taxes.
	Equity Book Value per share	EBVPS	Logarithmized equity book value per share from the last day of each fiscal year. The equity book value is measured as the net of total assets and total liabilities.
	Cash flow per share	CFPS	Logarithmized cash flow per share from the last day of each fiscal year. Cash flow measured as the free cash flow.
Control variable	Leverage Ratio	-	Leverage ratio calculated as total debt divided by total assets.
	Growth Ratio	-	Growth ratio measured as capital expenditures divided by total assets, used as a control variable.
	Total Assets	-	Total assets, an proxy for firm size, used on a logarithmic scale.

Table 4: Variable list

3.4.1 Dependent Variable

The choice of *Price per share* includes data from March 31st and incorporates a one-quarter lag to accommodate the delayed availability of accounting information, following previous research, for example Hellstrom (2006). This adjustment allows for a more accurate reflection of market sentiment regarding a company's value. The reason for using stock price instead of market capitalisation is to be consistent with the main explanatory variables, which will also be per-share based, aligning with previous research and the applied Ohlson model. The dependent variable is logarithmic.

3.4.2 Main Explanatory Variables

The main explanatory variables are based on the revised Ohlson model and previous research. For comparability reasons, all variables are per-share based and collected for all companies during the fiscal years from 2018 to 2022. Following previous studies, the explanatory variables are logarithmised for comparability, enabling better comparability.

Earnings per share: Earnings per share is the first explanatory variable. The variable is logarithmic, which means that all negative values are dropped. The rationale behind

logarithmic earnings per share stems from the structure of the Ohlson (1995) model. Ohlson (1995) states that the underlying linear dynamics assume non-negative earnings. Therefore, to maintain the validity of our model and adhere to this assumption.

Equity Book Value per share: Equity book value per share is the second explanatory variable included in the regression. Equity per share is also logarithmised.

Cash flow per share: The incorporation of cash flow as a primary explanatory variable is consistent with prior research, wherein the Ohlson model has been frequently revised to include this metric. (Puspa, 2006; Camodeca et al. 2014; Charchafa and Kimouche, 2022; Bolibok, 2015; Abeifaa Der et al. 2016) The variable is logarithmic, which means that all negative values are dropped.

3.4.3 Control Variables

The control variables used in the regression models are gathered based on common practice in previous literature on value relevance. (Barth et al. 2008; Iatridis, 2010; Chua et al. 2012; Okafor et al. 2016).

Leverage Ratio: The leverage ratio will be used as a control variable. The leverage ratio will be calculated by taking total debt / total assets.

Growth ratio: The ratio measured as capex / total assets is used as a control variable.

Total Assets: This proxy for firm size has been used as a control variable in almost all previous literature. It is used with a logarithmic scale to ensure a more symmetric variable and avoid skewness.

3.5 Descriptive Statistics

3.5.1 Summary Statistics

The initial summary statistics (appendix 1) include each variable's minimum, maximum, mean, median, and number of observations. These metrics offer a comprehensive

understanding of the dataset's characteristics, encompassing central tendency and extremities, based on a realistic range of values.

- Share price exhibits a mean of 217 and a median value of 27. This showcases that the sample is highly skewed to the right. The min/max interval at .01 - 136 230 indicates a substantial disparity.

- The variable EPS has a mean of -52 and a positive median of .06, with a substantial disparity. The minimum value of -88,682 was found to be due to data from the company called Goodbye Kansas Group, where a reverse split ratio of 10,000:1 resulted in particularly high values.

- Similarly, EBVPS and CFPS show extreme min/max values to the mean, coupled with visible skewness. Finally, total assets exhibit skewness to the right and a strong disparity; however, this is considered as expected in the case of total assets.

These notations justify the process of winsorising all variables. The subsequent summary statistics (appendix 1) illustrates the effects of logarithmic transformation and winsorising the extreme values at both ends of the distribution, setting them to the value at the 1st and 99th percentile.

3.5.2 Multicollinearity Concerns

3.5.2.1 Correlation Matrix

The correlation matrix in appendix 2 shows significant relationships among some of the explanatory variables analysed in this study. Some variables show correlations above 0.7, which could indicate a risk of multicollinearity. The dependent variable, share price, strongly correlates positively with EPS (0.77), EBVPS (0.84), and CFPS (0.74). Moreover, EBVPS (0.80) and CFPS (0.75) correlate towards EPS. Lastly, CFPS (0.77) and total assets (0.70) show signs of correlation with EBVPS.

Hence, the dependent variable and the explanatory variables exhibit significant correlations. However, this is somewhat expected. These are all fundamental financial metrics that

investors use to assess the value of a company's shares. As such, they are inherently interconnected.

3.5.2.2 Variance Inflation Factor

In light of the above, a variance inflation factor (VIF) test was also conducted. The result indicates that multicollinearity is not a significant concern in the relevant regression models. The VIF tests measure the extent to which the variance of each regression coefficient is inflated due to linear relationships with other variables in the model. Our VIF results, as shown in Appendix 3, are well below the threshold of 10, and under 5 which is considered as low. This indicates that multicollinearity is not a significant concern in our designed regression models. (Bailey, 2016)

It's important to understand the risk of multicollinearity. However, multicollinearity is often getting too much attention from authors. Multicollinearity doesn't cause bias, but simply indicates that variances in estimates increases in case an independent variable is closely related to other variables (Bailey, 2016). Also, in the case of this study, it wouldn't be theoretically justifiable to remove any of the variables since they are part of the Ohlson model construction. Additionally, while a potential linear relation could risk making the coefficients and standard errors less reliable, the main focus of this study is on the R^2 results.

3.5.3 Univariate Analysis

Initially, a test was conducted to determine the differences in means for share price against dummy variables on Earnings per share, Equity Book Value per share, and Cash Flow per share above and below the median values of the variables. All t-tests demonstrate significant differences in means, as anticipated, thereby initially confirming the utility of the Ohlson model. See Appendix 5-7 for the test results.

3.6 Main Model Description

Below in table 5, we present the main regression equations used in our analysis. Each model examines either combinations of the Ohlson model or separate components. Each regression includes the dependent variable and the stock price (P) lagging by one quarter. The control variables are not included in the table.

- Regression 1 includes all the components of our revised Ohlson model: EPS, EBVPS, and CFPS.
- Regression 2 is the Ohlson model, containing EPS and EBVPS as the explanatory variables to examine its joint R^2.
- Regression 3 only includes EPS as the explanatory variable.
- Regression 4 only includes EBVPS as the explanatory variable.
- Regression 5 only includes CFPS as the explanatory variable.
- Regression 6: Includes all components of our revised Ohlson model for the data sample with the upper 70th percentile of the reported intangibles ratio (intangible assets / total assets).
- Regression 7: Includes all components of our revised Ohlson model for the data sample with the upper 90th percentile of the reported intangibles ratio.

Ohlson model and revised Ohlson model - Hypothesis 1
(1) $P_i = \alpha_0 + \beta_1 \cdot BVP_t + \beta_2 \cdot EPS_t + \varepsilon_i$
(2) $P_i = \alpha_0 + \beta_3 \cdot BVP_t + \beta_4 \cdot CFS_t + \beta_5 \cdot EPS_t + \varepsilon_i$
Ohlson model's separate components - Hypothesis 2
(3) $P_i = \alpha_0 + \beta_6 \cdot EPS_t + \varepsilon_i$
(4) $P_i = \alpha_0 + \beta_7 \cdot BVP_t + \varepsilon_i$
(5) $P_i = \alpha_0 + \beta_8 \cdot CFS_t + \varepsilon_i$
Revised Ohlson model and high intangible ratio - Hypothesis 3
(6) $P_{upper\,70} = \alpha_0 + \beta_9 \cdot BVP_t + \beta_{10} \cdot CFS_t + \beta_{11} \cdot EPS_t + \varepsilon_i$
(7) $P_{upper\,90} = \alpha_0 + \beta_{12} \cdot BVP_t + \beta_{13} \cdot CFS_t + \beta_{14} \cdot EPS_t + \varepsilon_i$

Table 5: Regression equations

3.7 Pre-regression Diagnostics

3.7.1 White Test

The White test was conducted to test for heteroscedasticity. When heteroscedasticity is notably present, it indicates that the variance of residuals changes across the values of the explanatory variables. This dispersion of residuals fluctuates in response to one or more independent variables. If present, heteroskedasticity can lead to biassed estimates and inefficient inference. Performing the White test on our data sample was essential to verify the validity and reliability of our regression results. (Bailey, 2016)

The test result of the White test indicates significant evidence against the assumption of homoscedasticity, suggesting the presence of unrestricted heteroskedasticity in our data. The White test's strong significance with p-value of 0.00 counters the need for additional testing, such as the Breusch-Pagan test. This variance in error terms across observations can distort coefficient estimates and inflate standard errors, compromising the reliability of our model's inference. Therefore, robustifying the standard errors is suitable.

3.7.2 Hausman Test and Fixed Effects

A Hausman test was conducted to decide between fixed effects and random effects. The results rejected the null hypothesis (H0) of random effects, indicating systematic differences between the models and thereby suggesting the presence of endogeneity. Consequently, fixed-effects models, which control for individual heterogeneity and address endogeneity concerns, were included in the analysis (Roberts & Whited, 2013).

3.8 Estimation Method

The following steps illustrate the work process for all 7 regression models. This enabled the isolated analysis of any changes in the results due to specific model adjustments. Each model is sequentially developed, building upon the previous one.

Step 1

In Model 1, Ordinary Least Squares (OLS) regression is employed without any adjustments for endogeneity. This initial model assumes that the independent variables are exogenous and uncorrelated with the error term.

Step 2

Model 2 progresses by incorporating robust standard errors within the OLS framework to account for potential heteroscedasticity in the data.

Step 3

Model 3 incorporates dummy variables for industry, year, and country effects. This approach involves creating binary variables for each industry, year, and country level, effectively considering the effects associated with these categories.

Step 4 (Main model)

Building upon the previous models, Model 4 adds Fixed Effects (FE) for individual firms using Stata's panel data capabilities. Stata controls for firm-specific effects throughout the entire period of observation. This approach helps to address endogeneity concerns by accounting for unobserved heterogeneity at the firm level.

Step 5

The last step was added to analyse the isolated effect of implementing fixed effects without controlling for year.

3.9 Relevant Modelling Decisions

3.9.1 Functional Form

One modelling decision is the choice of log-log as the functional form of the regressions. Firstly, the log-log model allows us to interpret the coefficients as elasticities. This means we can understand the percentage change in the price. This is providing a clearer interpretation of how changes in the financial metrics included proportionally affect share prices.

Secondly, the log transformation helps to stabilise the variance and normalise the distribution of the variables, which can improve the accuracy and reliability of our regression estimates. This is especially important given the wide range of values financial variables can take.

3.9.2 Standard Errors

The White test revealed the presence of heteroscedasticity in our data sample, prompting us to use robust standard errors in the second and third regression models to address this issue. In the fourth model, we implemented Fixed Effects to control for unobserved heterogeneity across firms. As a result, we applied clustered standard errors in the fourth model to account for within-firm correlation over time, enhancing the robustness of our inference. This approach ensures that our standard errors are robust to heteroscedasticity and serial correlation, providing more reliable and accurate results. (Bailey, 2016)

3.9.3 Dummy variables

Our regression analysis employs dummy variables for country effects, year effects, and industry effects across all seven regressions in Models 3, 4 and 5 . Previous studies on value relevance drives this methodological choice, namely that the three dimensions—industry, year, and country—can significantly influence the outcomes of our variables of interest.

Dummy variable for year effects are employed to control for simultaneous influences affecting all firms, such as macroeconomic trends and regulatory changes. For example, the 2020 pandemic likely significantly affected all firms.

Considering our Nordic region data sample, controlling for country-specific effects is crucial. While Nordic countries share similarities, differences in economic environments, regulations, or tax policies can influence firm performance and accounting practices.

Lastly, potential industry effects are also considered. This choice accounts for the diverse dynamics across industries, such as technological advancements, regulatory frameworks, and unique market conditions.

4. Findings

The text discusses the Ohlson model's value relevance through different sections: first, the combined capability of the Ohlson model, followed by each variable: EPS, EBVPS, and CFPS. It also presents the value relevance of the Ohlson model under varying intangible ratios.

Regarding the first three steps, the general trend shows that R^2 increases in step 3 when controlling for year, industry, and country effects, showcasing a better fit. However, the results drop below all three previous steps when also controlling for fixed effects, suggesting variability in the dependent variable initially inflated by unobserved heterogeneity across the companies. This is a common trend observed throughout all of our regressions.

In the last and fifth step, we chose to remove time effects to assess the impact of fixed effects in isolation, without controlling for year. In all regressions, we observe a trend where R^2 decreases drastically after this adjustment. The significant change in the adjusted R^2 between step 4 and step 5 suggest that the inclusion or exclusion of year fixed effects has a notable impact on the model's explanatory power. Therefore, when capturing time-specific variance, the model demonstrates a better fit. For further information about the results in the other steps, see Appendix 8-14.

As mentioned in earlier chapters, the relevant results are gathered from the main model in step 4. Therefore, this chapter will focus on these results, as illustrated in table 6.

Model	Variable	Coefficient	Standard Error	Adj. R^2
Revised Ohlson model	Earnings (PS)	0.142***	(0.016)	0.529
	Equity Book Value (PS)	0.307***	(0.110)	
	Cash flow (PS)	0.018	(0.012)	
Ohlson model	Earnings (PS)	0.126***	(0.018)	0.459
	Equity Book Value (PS)	0.289**	(0.119)	
Earnings	Earnings (PS)	0.134***	(0.019)	0.442
Equity Book Value	Equity Book Value (PS)	0.583***	(0.047)	0.332
Cash Flow	Cash flow (PS)	0.092***	(0.023)	0.375
Upper 70th percentile Intangible Ratio	Earnings (PS)	0.161***	(0.032)	0.486
	Equity Book Value (PS)	0.382*	(0.209)	
	Cash flow (PS)	0.032	(0.024)	
Upper 90th percentile Intangible Ratio	Earnings (PS)	0.141**	(0.068)	0.470
	Equity Book Value (PS)	0.813***	(0.282)	
	Cash flow (PS)	0.050	(0.063)	

Table 6: Regression results

4.1 The Value Relevance of the Ohlson Model

The adjusted R^2 for our main model is 0.459, indicating that approximately 45.9% of the variability in the dependent variable is explained by the model after accounting for fixed effects. The coefficient for *earnings per share* is 0.126. It is statistically significant at the 1% level ($p < 0.01$). From this we can see that a 1% increase in the variable is associated with a 0.126 % increase in the dependent variable of *price per share*. Further on, the coefficient for *equity book value per share* is 0.289 and statistically significant at the 5% level ($p < 0.05$), this translates into a 0.289 % increase in *price per share* for a 1% increase in *equity book value per share*.

The control variables show less impact; the coefficient for the logarithm of *total assets* is 0.130 but not statistically significant, implying that *total assets* do not significantly impact the dependent variable. The coefficient for *leverage* is -0.263 and is not statistically significant. Similarly, the coefficient for *growth* is -0.418 without being statistically significant.

4.2 The Value Relevance of the Revised Ohlson Model

Our main model shows an adjusted R^2 of 0.529; this means that the model explains approximately 52.9% of the variability in the dependent variable *price per share* after accounting for fixed effects. We can also see that the coefficient for *earnings per share* is 0.142, and statistically significant at the 1% level ($p < 0.01$), indicating that a 1% increase in *earnings per share* leads to a 0.142 % increase in *price per share*. Similarly, the coefficient for the *equity book value per share* logarithm is 0.307 and statistically significant at the 1% level ($p < 0.01$), this suggests that a 1% increase in the variable is associated with a 0.307 % increase in *price per share.* Lastly, the coefficient for *cash flow per share* is 0.018, however, without statistical significance.

The control variables show mixed impacts. The coefficient for *total assets* is 0.126 but not statistically significant, implying that *total assets* do not significantly impact the dependent variable in this model. The coefficient for *leverage* is -0.520 and is statistically significant at the 10% level ($p < 0.1$), indicating a negative relationship between *leverage* and *price per share*. The coefficient for *growth* is 0.410 but not statistically significant, suggesting that *growth* does not significantly affect the dependent variable in this model.

4.3 The Value Relevance of Earnings

When looking at *earnings per share* the adjusted R^2 for our main model is 0.442, indicating that approximately 44.2% of the variability in the dependent variable, *earnings per share*, is explained by the model after accounting for fixed effects. The coefficient for *earnings per share* is 0.134. It is statistically significant at the 1% level ($p < 0.01$), indicating that a 1% increase in *earnings per share* leads to a 0.134% increase in *price per share*.

The control variables show varied impacts. The coefficient for *total assets* is 0.400. It is statistically significant at the 1% level ($p < 0.01$), implying that *total assets* positively and significantly impact *price per share* in the model. The coefficient for *leverage* is -0.560 and is statistically significant at the 5% level ($p < 0.05$), indicating a negative relationship between *leverage* and *earnings per share*. The coefficient for *growth* is -0.821 but it is not statistically significant.

4.4 The Value Relevance of Equity Book Value

The adjusted R^2 for our main model is 0.332, indicating that approximately 33.2% of the variability in the dependent variable *price per share* is explained by the model after accounting for fixed effects. The coefficient for the logarithm of *equity book value per share* is 0.583 and statistically significant at the 1% level ($p < 0.01$), indicating that a 1% increase in *equity book value per share* is associated with an increase in *price per share* of 0.582%.

The control variables show varied impacts. The coefficient for *total assets* is -0.181, being statistically significant at the 1% level ($p < 0.01$). This implies that *total assets* negatively and significantly impact *price per share*. The coefficient for *leverage* is 0.272 but is not statistically significant. The coefficient for *growth* is 0.533, but also without statistical significance.

4.5 The Value Relevance of Cash Flow

The adjusted R^2 for our main model is 0.375, indicating that the model explains approximately 37.5% of the variability in the dependent variable after accounting for fixed effects. The coefficient for the logarithm of *cash flow per share* is 0.092. It is statistically significant at the 1% level ($p < 0.01$), indicating that a 1% increase in *cash flow per share* is associated with a 0.09% increase in *price per Share.*

The coefficient for the control variable *total assets* is 0.517 and statistically significant at the 1% level ($p < 0.01$), implying that *total assets* positively impact *price per share* in this model. The coefficient for *leverage* is -1.153, also being significant at the 1% level ($p < 0.01$). This indicates that *leverage* negatively impacts *cash flow per share*. The coefficient for *growth* is 0.546, but lacks statistical significance.

4.6 The Ohlson Model in Intangible-intense Companies

4.6.1 Upper 70th percentile

For companies with an intangible assets ratio in the upper 70th percentile, the adjusted R^2 for Model 4 is 0.486, indicating that the model explains approximately 48.6% of the dependent

variable's variability after accounting for fixed effects. The coefficient for *earnings per share* is 0.161, and is statistically significant at the 1% level ($p < 0.01$), meaning that a 1% increase in *earnings per share* equals a 0.161% increase in *price per share*. The coefficient for the *equity book value per share* is 0.382, but with weak statistical significance at the 10% level ($p < 0.1$). Lastly, the coefficient for *cash flow per share* is 0.032, but lacks statistical significance.

Among the control variables, the coefficients for *total assets*, *leverage*, and *growth* are not statistically significant.

4.6.2 Upper 90th percentile

For companies with an intangible assets ratio in the upper 90th percentile, the adjusted R^2 is dropping to 0.47, indicating that the model explains approximately 47.0% of the variability in the *price per share* after accounting for fixed effects. The coefficient for *earnings per share* is 0.141 and is statistically significant at the 5% level ($p < 0.05$), suggesting that a 1% increase in *earnings per share* equals a 0.141% increase in the *price per share*. The coefficient for *equity book value per share* is 0.813 with high statistical significance at the 1% level ($p < 0.01$), translating to a 0.813% increase in *price per share* for a 1% increase in the variable. The coefficient for *cash flow per share* is 0.050 but doesn't exhibit statistical significance.

Among the control variables, *total assets* have a negative and statistically significant coefficient of -0.515 ($p < 0.05$), indicating how a 1% increase in *total assets* would decrease *price per share* by 0.515%. The coefficients for *leverage* and *growth* are not statistically significant.

4.7 Implication for the hypothesis

The findings allow us to evaluate our positions in hypothesis formulation. We can accept hypothesis 1 since the regression containing the revised Ohlson model's variables exhibits an R^2 over 50%, specifically 52.9%.

Based on our findings, the second hypothesis is also accepted. We hypothesised that *earnings per share* would exhibit higher explanatory power than *equity book value per share*, as

finding from our results confirms. *Earnings per share* had an R^2 of 44.2%, compared to *equity book value per share* with an explanatory power of 33.2%.

Our third and last hypothesis declared how a higher ratio of intangible assets would lead to a decreased value relevance when applying the revised Ohlson model. The explanatory power decreases from the total data sample to the upper 70th percentile and then to the upper 90th percentile, with values of 52.9%, 48.6%, and 47%, respectively. The findings lead us to accept the hypothesis; however, it should be emphasised that the trend is somewhat weak.

5. Analysis

The following chapter aims to analyse the results of our study in the context of previous findings. Partly focusing on the Ohlson model's combined ability and the separate components in the model, and also the identified trend in intangible ratios.

As previously mentioned, the Ohlson model is not intended to provide accurate coefficients for analysis. However, after presenting the coefficients for our regressions, logical signs can still be observed in each coefficient. The order of coefficient values among our explanatory variables, from largest to smallest, is Equity Book Value, Earnings, and Cash Flow. This does not contribute to the evaluation of hypothesis 2, as R^2 is our reference. However, the ranking is similar to previous research.

5.1 Analysis of the Ohlson Model

The study has examined the value relevance in the Nordic markets by separately analysing Earnings, Equity book value, and Cash flow and using the Ohlson Model in combination. The results provide significant insights into the factors affecting market share prices. The full Ohlson model, with an R^2 of 52,9%, indicates that it is highly relevant in the Nordic region. This high R^2 value demonstrates the model's substantial explanatory power regarding the variance in companies' share prices.

Our results align with the findings of previous research in this domain. This consistency was anticipated despite cultural and regional differences concerns (Hofstede 1984; GLOBE, 2004; Cieslewicz, 2014). For instance, studies conducted in developed markets such as Italy (Silvestri and Veltri, 2012) and Canada (Okafor et al., 2016) have reported R^2 values ranging from 58% to 95%. Although these figures are somewhat higher than our results, it is essential to consider the contextual differences. One notable distinction is that many high-relevance studies (Silvestri and Veltri, 2012; Bolibok, 2015) focus exclusively on the banking sector, which tends to exhibit higher relevance.

One should also be careful when making direct comparisons between different countries and continents since different generally accepted accounting principles (GAAP) could affect the accounting choices in different countries (Abdel-Khalik et al., 1999) as a result of cultural and implementation differences (Prescott & Vann, 2015; Hofstede, 1984; GLOBE).

Several external factors might have influenced our results. The extreme stock volatility caused by Covid-19 occurred midway through our study period, is a significant consideration. According to Puspa (2006), such events can lead to lower statistical significance in financial analyses. This finding is corroborated by Belesis et al. (2022), who observed a decrease in the explanatory power of financial statements post-COVID-19. These factors further validate our R^2 value 52,9% in the Nordic context as a reliable outcome.

When comparing our findings to older studies, it is crucial to recognise the documented decline in value relevance over time (Black & White, 2003; Perera & Thrikawala, 2010; Khanagha, 2011). Provided that this trend is still valid, it supports our slightly lower R^2 value, as our study is the most recent in this area.

One should also remember that many effects could affect the results outside the regression, as seen in Puspa's (2006) timing effects. Camodeca et al. (2014) and Charchafa and Kimouche (2022) studied the UK during slightly different periods. One studies the period of 2011-2013, whilst the other studies the period of 2011-2019 and the effects observed on cash flow by example are distinguishably different. This could be a result of the timing effect making a big difference. Similar timing effects may have affected our results due to the time period in our study that has shown record-high multiple valuations and remarkably high levels of optimism in the market (Bain, 2024). During an economic boom such as the one occurring during our period, this optimism could undermine the fit of the Ohlson model due to unprecedented pricing. However, it could also result from other variables affecting the result, as Graham et al. (2000) argued.

5.2 Analysis of the Main Explanatory Variables

5.2.1 Value Relevance of Earnings and Equity Book Value

The results of our earnings and equity book value reveal significant findings. The R^2 for earnings is or 44.2%, while the R^2 for equity book value is or 33.2%. These results exceed those reported by Puspa (2006), whose findings ranged from 4% to 31%. This discrepancy can be attributed to Indonesia being a developing market, which, according to Hellstrom (2006) and Outa (2007), shows signs of lower R^2 values.

Camodecca et al. (2014) found earnings R^2 of 90,1% in Italy and 44,8% in the UK, illustrating the differences between market structures: Italy is more bank-centred, and the UK is market-based. This logic can also be applied to the Nordic countries, which are classified as market-based (CEPR, 2019). This classification likely explains the similarity between our findings and those observed in the UK rather than Italy.

The relationship between earnings and equity book value is consistent with the findings of Black and White (2003), who noted that earnings tend to have higher relevance than equity book value in the US, a market-based system, whereas the opposite is true for Germany, a bank based country (CEPR, 2019). This relationship is also evident in our study, although not as pronounced as in Black and White's research. Furthermore, Glezakos et al. (2014) observed this same relationship in Greece, a bank-based country, further confirming that bank-based systems show higher R^2 with equity book value compared to earnings and vice versa.

Interestingly, our results are also remarkably similar to those of Khanna’s (2014) study of India. However, the reasons for these similarities are unclear, emphasising the importance of further studies in this area, particularly comparing the Nordics and India. This undermines the need for continued research to understand better the factors influencing value relevance in different market contexts.

5.2.2 Value Relevance of Cash Flow

Our analysis of cash flow reveals an R^2 of 37,5%. Earlier studies examining the revised Ohlson model, which includes cash flow, have produced varying results. Puspa (2006) observed very limited relevance of cash flow, noting this as a contradictory finding compared to previous studies. In contrast, Camodeca et al. (2014) found that cash flows carry greater significance in the UK, with an R^2 of 73,2 % versus 45,1 % in Italy. These results align with our study and can likely be attributed to the differences between market-based and bank-based financial markets, as previously discussed regarding earnings.

However, several previous papers argue that cash flows are often considered less value-relevant for assessing company worth (Ohlson, 1995; Barth et al., 1998; Collins et al., 1999). Some authors suggest this may be due to timing issues when measuring cash flow, which could make the results less reliable and less important. Bolibok (2015) found very low relevance of cash flow (0.2%). However, his study focused solely on the banking sector, which tends to produce more extreme results than other studies that examine a broader market spectrum, such as ours.

One of the largest studies on the value relevance of cash flow, conducted by Abeifaa Der et al. (2016), reported an R^2 of 8.19% for cash flow. This is considerably lower than our study and other studies, highlighting the volatility in results when measuring cash flow relevance. These variations underscore cash flow relevance's complexity and context-specific nature in financial markets.

5.3 Intangibles assets and Value Relevance

Our study examined companies within the upper 70th percentile of the intangibles-to-total-assets ratio, where the revised Ohlson model shows an R^2 of 48,6%. We also analysed companies within the upper 90th percentile of the same ratio, revealing an R^2 of 47%. Although the difference from the revised Ohlson model's full sample (52.9%) is not substantial, the results indicate a tendency towards decreased value relevance of the Ohlson model as intangible assets increase.

Similar tendencies can be observed in other studies. Amir and Lev (1996) argue that industries with more intangible assets exhibit lower value relevance. This is further confirmed by Leitner-Hanetseder and Lehner (2022), who found comparable results in companies at the forefront of AI and Big Data and made similar arguments regarding intangible assets.

This correlation between increased intangible assets and lower value relevance might also support studies suggesting a decline in value relevance over time, due to the relatively late period we study. For instance, Brown (2023) highlights that intangible assets on the balance sheets of S&P 500 companies have surged from 17% in 1975 to over 90%. Lev (2019) also supports this trend, underscoring the increasing prevalence of intangible assets.

While our study does not explore the inverse hypothesis—that companies with fewer intangible assets show higher value relevance—however, such a finding could explain the results of earlier studies like Bolibok (2015). Bolibok focused on the banking sector, which, according to Brown (2023), has one of the lowest intangible assets-to-total-assets ratios. This could account for the higher value relevance observed in sectors with fewer intangible assets. If this would be true, it could also be used in other research to understand the effects of intangible assets in other contexts, such as the industry-integrating methodology used by Chen-Yin Kuo (2016).

To further develop the analysis of intangible assets, several studies have found that there is a difference between different sorts of intangible assets (Iñiguez and López, 2005; Oliveira et al., 2010), where goodwill is value relevance contributing (Cordazzo and Rossi, 2020). Assuming this relationship is transferable to the Nordics, this could have increased the R^2 in our results since the M&A activity was unusually high during our observed period (Bain, 2024), which would have led to an increase in Goodwill. All this considered, there is an argument to be made that there, during another time period, could be an even wider gap between high-ratio intangible companies' value relevance compared to the full sample.

While some of the above-mentioned authors examine value relevance related to intangible-intensive companies exclusively, they do not necessarily compare the value relevance to companies without intangible assets, as we do, comparing the relative fit of the model. However, as seen in our findings, the value relevance of companies with a high ratio

of intangibles is still intact, aligning with previous research that finds intangibles value relevant. (Iñiguez and López, 2005; Cordazzo and Rossi, 2020)

6. Conclusions

In the following section we will shortly conclude our analysis, thereafter potential contributions connected to the stakeholder theory will be discusses. After that, the limitations of the study are discussed and finally we suggest avenues for further studies.

6.1 Conclusion

Aligning with previous research, we found that both the Ohlson model and the revised Ohlson model are relevant for explaining changes in stock prices. This result aligns with previous research in the area and hypothesis 1. The study also finds that the main explanatory variables of earnings, equity book value and cash flow all show significance and value relevance in the Nordic markets. The results from earnings and equity book value aligned with our hypothesis 2 as well as with previous research. Especially when considering the dynamics and characteristics of the examined markets (eg bank vs market-based). Cash flow shows varying results in previous research.

The study also shows that the value relevance of the Ohlson model decreases as the ratio of intangible assets / total assets increases, which agrees with hypothesis 3.

Even though the study results are compelling, we realise that there are many other factors behind the results that potentially affect both this and other studies that should be considered upon analysing and comparing the results of value relevance in the Nordic markets.

6.2 Contributions

Our study contributes to deepening the understanding of the relationship between accounting data and changes in stock prices in the Nordic context. It also offers valuable insights for stakeholders, such as investors, analysts and standard setters. (FASB, 2023; IFRS, 2024).

Standard setters like FASB, who explicitly called out for further studies in the field of value relevance and intangibles, may gain a deeper understanding of their concerns in the Nordic

market. The same applies to IASB, which recently commenced a comprehensive review of accounting standards regarding intangibles due to questioned value relevance. Our findings demonstrate that the explanatory fit does not appear to be significantly impaired by intangibles from a broader perspective. However, a declining value relevance is still evident.

From an investor's and analyst's perspective, a contribution of our study could be that earnings best explain a company's market value in the Nordic market. Furthermore, our study has demonstrated that a company's cash flow has relatively high explanatory power than equity book value, which is valuable since previous research has had mixed results in other markets. This result can for example support various cash flow-based valuation methods. The result also indicates that the Nordic market resembles other countries with market-based financial systems, which may encourage further analysis of potential investment strategies in similar markets.

6.3 Limitations

Our study has several limitations that should be acknowledged. Firstly, many previous studies on value relevance have focused on examining changes in value relevance before and after significant shifts in accounting legislation, such as the transition from IAS to IFRS. Our research, however, does not address such legislative changes, potentially limiting the comparability of our findings with those of other studies in the field. Secondly, there may be inherent differences between the Nordic countries that our study does not capture. These differences could influence the value relevance of accounting metrics in ways that our study does not account for, potentially affecting the generalizability of our conclusions across the entire Nordic region.

Moreover, the analysis does not fully capture dynamic changes over a longer time. The reliance on the Ohlson model for a limited period may restrict the findings. Further, the reliance on R^2 values for model assessment could be complemented with additional metrics for a more nuanced evaluation. Finally, the thesis also suffers from survivorship bias since companies that left the public market during the studied period will not be included in the dataset.

6.4 Further Research

As avenues for further research, future studies could explore both spectrums of the intangible assets ratio effect on the Ohlson model and its value relevance in different markets. This research could also be done industry specific to create more practical contributions.

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Appendix

Summary statistics 1	Mean	Median	SD	Min	Max	N
Shareprice	217.733	27.3	2 990.621	.01	136 229.99	6 269
EPS	-52.271	.059	1 655.120	-88 682.479	16 677.106	6 097
EBVPS	89.7	10.985	1 840.277	-94 467.195	52 733.125	6 180
CFPS	-13.808	-.032	764.774	-27 256.363	17 313.964	6 046
Totalassets (m sek)	14 089.403	641.971	63 904.583	.189	1 647 217.2	6 181
Leverage ratio	.216	.164	0.238	0	3.389	6 169
Growth ratio	.039	.015	0.076	0	1.113	5 076
Summary statistics 2	**Mean**	**Median**	**SD**	**Min**	**Max**	**N**
Shareprice [ln(Shareprice_win)]	3.111	3.307	1.898	-1.581	7.201	6269
EPS [In(EPS_win)]	.992	1.262	1.824	-10.82	4.279	3172
EBVPS [In(EBVPS_win)]	2.251	2.476	2.025	-5.997	6.462	6035
CFPS [In(CFPS_win)]	1.049	1.332	1.770	-9.721	4.286	2946
Totalassets [In(Totalassets_sin)]	6.632	6.465	2.526	1.864	12.381	6181
Leverage ratio_win	.211	.164	0.204	0	.876	6169
Growth ratio_win	.037	.015	0.062	0	.391	5076

Appendix 1 - Summary statistics

Pairwise correlations							
Variables	-1	-2	-3	-4	-5	-6	-7
(1) Shareprice_log	1.000						
(2) EPS_log	0.770***	1.000					
(3) EBVPS_log	0.841***	0.800***	1.000				
(4) CFPS_log	0.741***	0.751***	0.770***	1.000			
(5) Totalassets_log	0.585***	0.529***	0.704***	0.479***	1.000		
(6) Leverage_win	0.163***	0.146***	0.281***	0.158***	0.405***	1.000	
(7) Growth_win	-0.029**	0.041**	-0.001	0.087***	0.006	0.093***	1.000
*** $p<0.01$, ** $p<0.05$, * $p<0.1$							

Appendix 2 - Correlation matrix

Variance inflation factor		
	VIF	1/VIF
EBVPS log	3.544	.282
EPS log	3.261	.307
CFPS log	2.663	.376
Totalassets log	1.671	.599
Leverage win	1.155	.865
Growth win	1.044	.958
Mean VIF	2.223	.

Appendix 3 - Variance inflation factor

Test	H0	Chi^2	P-value	Decision	HA
White's test	Homoscedasticity	277.11	0.0000	Reject	Heteroscedasticity
Hausman's test	Random effects	140.61	0.0000	Reject	Fixed effects

Appendix 4 - White's test and Hausman' test

Share price - EPS ttest

```
Two-sample t test with equal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
       0 |   1,586    3.035732    .0356115    1.418216    2.965881    3.105583
       1 |   1,586    4.948212    .0245878    .9792005    4.899984     4.99644
---------+--------------------------------------------------------------------
Combined |   3,172    3.991972    .0275027    1.548967    3.938047    4.045897
---------+--------------------------------------------------------------------
    diff |           -1.91248    .0432752               -1.99733   -1.82763
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t = -44.1934
H0: diff = 0                     Degrees of freedom =     3170

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

Appendix 5 - EPS t-test

Share price - EBVPS ttest

```
Two-sample t test with equal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
       0 |   3,017    1.828107    .0274247    1.506365    1.774334     1.88188
       1 |   3,018      4.4538    .0213161    1.171031    4.412004    4.495596
---------+--------------------------------------------------------------------
Combined |   6,035    3.141171     .024232    1.882472    3.093668    3.188674
---------+--------------------------------------------------------------------
    diff |           -2.625693    .0347332               -2.693782   -2.557603
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t = -75.5960
H0: diff = 0                     Degrees of freedom =     6033

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

Appendix 6 - EBVPS t-test

Share price - CFPS ttest

```
Two-sample t test with equal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
       0 |   1,473    3.045611    .0395009    1.516034    2.968127    3.123096
       1 |   1,473    4.863933     .026918    1.033106    4.811131    4.916735
---------+--------------------------------------------------------------------
Combined |   2,946    3.954772    .0291839    1.584019    3.897549    4.011995
---------+--------------------------------------------------------------------
    diff |           -1.818322    .0478007               -1.912048   -1.724595
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t = -38.0397
H0: diff = 0                     Degrees of freedom =     2944

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

Appendix 7 - CFPS t-test

(1) Regression results - Ohlson model				(Main)	
	Model_1	Model_2	Model_3	Model_4	Model_5
EPS_log	0.323***	0.323***	0.293***	0.126***	0.134***
	(0.015)	(0.021)	(0.019)	(0.018)	(0.018)
EBVPS_log	0.497***	0.497***	0.490***	0.289**	0.241**
	(0.018)	(0.024)	(0.024)	(0.119)	(0.119)
Totalassets_log	0.018*	0.018*	0.062***	0.130	0.317***
	(0.010)	(0.010)	(0.010)	(0.112)	(0.111)
Leverage	-1.028***	-1.028***	-0.492***	-0.263	-0.459
	(0.102)	(0.112)	(0.115)	(0.284)	(0.295)
Growth	-1.604***	-1.604***	0.620	-0.418	1.233**
	(0.332)	(0.402)	(0.457)	(0.623)	(0.587)
_cons	2.318***	2.318***	0.417*	2.046***	0.789
	(0.070)	(0.075)	(0.217)	(0.573)	(0.544)
Observations	2807	2807	2807	2807	2807
Adj. R-squared	0.694	0.694	0.794	0.459	0.258
Year effects	No	No	Yes	Yes	No
Industry effects	No	No	Yes	Yes	Yes
Country effects	No	No	Yes	Yes	Yes
Standard errors	Standard	Robust	Robust	Clustered	Clustered
Method	OLS	OLS	OLS	FE	FE

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Appendix 8 - Regression results (1): Ohlson model

(2) Regression results - Revised Ohlson model				(Main)	
	Model_1	Model_2	Model_3	Model_4	Model_5
EPS_log	0.309***	0.309***	0.290***	0.142***	0.129***
	(0.019)	(0.024)	(0.023)	(0.016)	(0.018)
EBVPS_log	0.342***	0.342***	0.375***	0.307***	0.290***
	(0.021)	(0.026)	(0.025)	(0.110)	(0.098)
CFPS_log	0.192***	0.192***	0.139***	0.018	0.072***
	(0.017)	(0.019)	(0.018)	(0.012)	(0.013)
Totalassets_log	0.034***	0.034***	0.060***	0.126	0.315***
	(0.010)	(0.010)	(0.010)	(0.109)	(0.101)
Leverage	-1.291***	-1.291***	-0.647***	-0.520*	-0.748***
	(0.108)	(0.118)	(0.124)	(0.274)	(0.273)
Growth	-1.254**	-1.254	2.445**	0.410	1.067
	(0.582)	(0.887)	(1.124)	(0.702)	(0.836)
_cons	2.537***	2.537***	0.924***	2.089***	0.653
	(0.075)	(0.080)	(0.122)	(0.585)	(0.555)
Observations	2241	2241	2241	2241	2241
Adj. R-squared	0.711	0.711	0.805	0.529	0.318
Year effects	No	No	Yes	Yes	No
Industry effects	No	No	Yes	Yes	Yes
Country effects	No	No	Yes	Yes	Yes
Standard errors	Standard	Robust	Robust	Clustered	Clustered
Method	OLS	OLS	OLS	FE	FE

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Appendix 9 - Regression results: Revised Ohlson model

(3) Regression results - Earnings				(Main)	
	Model_1	Model_2	Model_3	Model_4	Model_5
EPS_log	0.612***	0.612***	0.526***	0.134***	0.140***
	(0.012)	(0.018)	(0.019)	(0.019)	(0.019)
Totalassets_log	0.110***	0.110***	0.170***	0.400***	0.522***
	(0.010)	(0.011)	(0.012)	(0.065)	(0.052)
Leverage	-1.078***	-1.078***	-0.674***	-0.560**	-0.666***
	(0.112)	(0.129)	(0.133)	(0.229)	(0.240)
Growth	-1.284***	-1.284***	0.919*	-0.821	1.550**
	(0.374)	(0.480)	(0.520)	(0.659)	(0.611)
_cons	2.860***	2.860***	0.441*	0.857	-0.048
	(0.076)	(0.075)	(0.259)	(0.530)	(0.406)
Observations	2824	2824	2824	2824	2824
Adj. R-squared	0.609	0.609	0.726	0.442	0.249
Year effects	No	No	Yes	Yes	No
Industry effects	No	No	Yes	Yes	Yes
Country effects	No	No	Yes	Yes	Yes
Standard errors	Standard	Robust	Robust	Clustered	Clustered
Method	OLS	OLS	OLS	FE	FE

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Appendix 10 - Regression results: Earnings

(4) Regression results - Equity Book Value				(Main)	
	Model_1	Model_2	Model_3	Model_4	Model_5
EBVPS_log	0.780***	0.780***	0.755***	0.583***	0.586***
	(0.010)	(0.012)	(0.013)	(0.047)	(0.050)
Totalassets_log	0.026***	0.026***	0.089***	-0.181***	-0.151***
	(0.009)	(0.009)	(0.009)	(0.049)	(0.045)
Leverage	-0.717***	-0.717***	-0.144	0.272	0.127
	(0.086)	(0.102)	(0.104)	(0.174)	(0.185)
Growth	-0.782***	-0.782***	0.765***	0.533	-0.091
	(0.227)	(0.239)	(0.270)	(0.342)	(0.374)
_cons	1.446***	1.446***	0.955**	2.994***	2.957***
	(0.046)	(0.046)	(0.393)	(0.272)	(0.233)
Observations	4972	4972	4972	4972	4972
Adj. R-squared	0.701	0.701	0.764	0.332	0.201
Year effects	No	No	Yes	Yes	No
Industry effects	No	No	Yes	Yes	Yes
Country effects	No	No	Yes	Yes	Yes
Standard errors	Standard	Robust	Robust	Clustered	Clustered
Method	OLS	OLS	OLS	FE	FE

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Appendix 11 - Regression results: Equity book value

(5) Regression results - Cash Flow				(Main)	
	Model_1	Model_2	Model_3	Model_4	Model_5
CFPS_log	0.568***	0.568***	0.487***	0.092***	0.119***
	(0.013)	(0.017)	(0.017)	(0.023)	(0.020)
Totalassets_log	0.169***	0.169***	0.210***	0.517***	0.577***
	(0.011)	(0.011)	(0.012)	(0.070)	(0.056)
Leverage	-1.888***	-1.888***	-1.123***	-1.153***	-1.290***
	(0.113)	(0.127)	(0.138)	(0.224)	(0.242)
Growth	0.556	0.556	4.126***	0.546	1.007
	(0.668)	(1.028)	(1.373)	(1.187)	(1.171)
_cons	2.479***	2.479***	3.198***	-0.050	-0.418
	(0.081)	(0.080)	(0.200)	(0.577)	(0.441)
Observations	2630	2630	2630	2630	2630
Adj. R-squared	0.580	0.580	0.691	0.375	0.222
Year effects	No	No	Yes	Yes	No
Industry effects	No	No	Yes	Yes	Yes
Country effects	No	No	Yes	Yes	Yes
Standard errors	Standard	Robust	Robust	Clustered	Clustered
Method	OLS	OLS	OLS	FE	FE

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Appendix 12 - Regression results: Cash flow

(6) Regression results - Intangible ratio: upper 70th percentile				(Main)
	Model_1	Model_2	Model_3	Model_4
EPS_log	0.320***	0.320***	0.337***	0.161***
	(0.034)	(0.050)	(0.047)	(0.032)
EBVPS_log	0.305***	0.305***	0.305***	0.382*
	(0.045)	(0.055)	(0.055)	(0.209)
CFPS_log	0.226***	0.226***	0.189***	0.032
	(0.034)	(0.040)	(0.039)	(0.024)
Totalassets_log	0.057***	0.057***	0.045**	0.010
	(0.018)	(0.019)	(0.021)	(0.208)
Leverage	-0.689***	-0.689***	-0.200	-0.388
	(0.212)	(0.229)	(0.246)	(0.522)
Growth	1.314	1.314	4.676***	3.716
	(1.487)	(2.163)	(1.712)	(3.170)
_cons	2.326***	2.326***	1.735***	2.731***
	(0.154)	(0.175)	(0.340)	(1.048)
Observations	773	773	773	773
Adj. R-squared	0.699	0.699	0.789	0.486
Standard errors	Standard	Robust	Robust	Clustered
Method	OLS	OLS	OLS	FE

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Appendix 13 - Regression results: Upper 70th percentile of intangibles ratio

(7) Regression results - Intangible ratio: upper 90th percentile				(Main)
	Model_1	Model_2	Model_3	Model_4
EPS_log	0.228***	0.228***	0.200**	0.141**
	(0.075)	(0.077)	(0.088)	(0.068)
EBVPS_log	0.310***	0.310***	0.441***	0.813***
	(0.090)	(0.090)	(0.112)	(0.282)
CFPS_log	0.176**	0.176***	0.153***	0.050
	(0.068)	(0.055)	(0.055)	(0.063)
Totalassets_log	0.112***	0.112***	0.039	-0.515**
	(0.035)	(0.031)	(0.051)	(0.252)
Leverage	-0.658	-0.658	0.391	1.139
	(0.444)	(0.470)	(0.532)	(0.775)
Growth	6.681**	6.681**	5.661**	-15.275*
	(2.713)	(2.663)	(2.419)	(8.180)
_cons	1.973***	1.973***	2.288***	5.430***
	(0.306)	(0.307)	(0.640)	(1.322)
Observations	227	227	227	227
Adj. R-squared	0.583	0.583	0.717	0.470
Standard errors	Standard	Robust	Robust	Clustered
Method	OLS	OLS	OLS	FE

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Appendix 14 - Regression results: Upper 90th percentile of intangibles ratio