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The Value Relevance of Goodwill

A study comparing the value relevance of goodwill between small- and large-cap companies

Abstract

With the significant increase in M&A activity in recent years and the emergence of the new economy, marked by a rise in intangible assets, understanding how goodwill is valued is critical. This study examines the value relevance of goodwill across small- and large-cap firms. By employing an OLS regression analysis of European firms between 2015 and 2019, this thesis investigates whether the value relevance of goodwill differs between these two groups. The findings reveal no discrepancies, suggesting that the value relevance of goodwill is consistent across both small- and large-cap firms.

Keywords: Value Relevance, Goodwill, M&A, New Economy, Size Effect
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1 Introduction

1.1 Background

In 1975, the number of mergers and acquisitions (M&A) transactions amounted to a modest 533 across Europe. By contrast, in 2023, the number of M&A transactions skyrocketed to 20,414, an increase of 3730% (Statista, 2024). As the M&A activity continues to increase, there is a corresponding increase in the proportion of intangible assets recognized on company balance sheets. Back in 1975, intangible assets accounted for only 17% of the market value of the S&P 500. By 2020, this percentage rose dramatically to 90%, with M&A activities playing a crucial part in this shift because goodwill often represents the largest single item on companies' balance sheets (Brown, 2023; Ocean Tomo, 2020). M&A is a strategy often used to foster growth, however, large firms tend to overpay for acquisitions, indicating that goodwill can be more inflated for large firms (Moeller et al., 2004). Given this context, this thesis aims to answer the following research question:

Does the value relevance of goodwill differ between small- and large-cap firms?

Goodwill represents the present value of anticipated future benefits from intangible assets that are not individually identifiable and, therefore, are recorded separately (Just et al., 2023). The initial recognition and subsequent measurement of goodwill are highly controversial topics in accounting literature and pose challenges regarding clear definitions (Bloom, 2009; Giuliani and Brännström 2011). Indeed, Bloom (2009) posits that logically accounting for goodwill, in fact, is impossible.

In light of the preceding, research into the impact of goodwill on stock prices has become increasingly critical as both the item of goodwill itself and its proportion of total assets have grown over time (EFRAG, 2016). From 2005 to 2014, the total goodwill in companies within the S&P 350 Europe surged from 935 billion to 1,341 billion euros - an increase of approximately 43.4%. Within this cohort of companies, goodwill, on average, constituted 62% of all reported intangible assets. Goodwill represented an average of 3.7% of total assets between 2005 and 2014 (EFRAG, 2016). EFRAG (2016) confirms that this rise is attributed to a significant uptick in acquisitions, in line with the statistics presented by Statista (2024). Boennen and Glaum (2014) reinforce this view, highlighting goodwill's prominence among

intangible assets. This view aligns with that of Brown (2023) and Ocean Tomo (2020), who underscore that goodwill often represents the largest single item on the balance sheet, highlighting the substantial significance of goodwill in reflecting the value of many companies in today's economy.

The above stated is attributable to the evident emergence of the new economy, which Barth et al. (2023) describe as the economy's shift from being primarily industrial to being based on information technology and services. Lev (2019) highlights the fact that investments in intangible items such as goodwill have increased steadily between 1977 and 2016, whereas investments in tangible items have experienced the opposite effect and hence have steadily decreased. Parallel to this, intangible assets have taken on the role of serving as major value drivers. Even if the emergence of the "new economy" has brought with it structural shifts in society and the economy as a whole, the accounting principles have arguably remained frozen in time, which has resulted in a decline in the value relevance of accounting information (Balachandran & Mohanram, 2011; Brown et al., 1999; Core et al., 2003; Lev & Gu, 2016; Lev & Zarowin,1999).

Value relevance is a foundational characteristic of accounting quality (Francis et al., 2004) It refers to the ability of financial statement information to capture factors affecting share values (Francis & Schipper, 1999). This framework assumes that accounting figures are intended to mirror economic income, reflected in stock returns and economic value as represented by market prices. From an investor's point of view, relevant information is that which aids in their decisions regarding equity investments (Hellström, 2006).

When incumbents and large companies use M&A to grow, the focus tends to be on acquiring one or a few businesses to leverage economies of scale or other synergies (Berger-de Leon et al., 2022). Compared to small companies, large companies are more likely to complete M&A deals and pay more for acquisitions overall (Moeller et al., 2004). The premium paid in a transaction increases with firm size after controlling for firm and deal characteristics (Moeller et al., 2004). This could indicate that large firms' goodwill is more inflated in large firms than in small firms. Because only purchased goodwill ought to be recognized on a firm's balance sheet, larger firms will hence also have more goodwill.

In addition, firm size is often associated with creating intangible assets such as a strong brand value and other intangible values, which can give rise to goodwill. Li et al. (2023) show that brand value increases the value for large firms only and not for small ones.

Market capitalization is the differentiator between small-cap firms - typically defined as having a market capitalization between $250 million and $2 billion - and large-cap firms, whose market capitalization is between $10 billion and $200 billion (Finra, 2022). This thesis examines how a firm's size affects the value relevance of goodwill, highlighting how differences in market capitalization influence both the economic realities and the perceived value of goodwill in corporate valuations.

1.2 Purpose

The concept of value relevance has been extensively covered within the existing body of accounting literature (e.g., Al Jifri & Citron, 2009; Barth et al., 2023; Collins et al., 1997; Lev & Gu, 2016; Ohlson, 1995). The foundations of the discourse are marked by research by Ball and Brown (1968), who initiated the discourse by arguing for the value relevance of earnings. Subsequent value relevance literature has examined various contexts, including how to observe it, as emphasized by Hellström (2006) and its trends over time as explored by Collins et al. (1997) and by Barth et al. (2023). Additional studies on value relevance have studied specific items; for instance, Collins et al. (1999) and Amir and Lev (1996) examined the value relevance of non-financial information within the wireless communications industry.

Parallel to the increasing emphasis on goodwill in financial reports, numerous researchers have examined its implications. Specifically narrowing down on the value relevance of goodwill, Al Jifri and Citron (2009) explored how note disclosure and financial statement recognition of goodwill affected 243 non-financial firms within the UK regulatory framework. By comparing the relative significance of disclosed and recognized goodwill, their research found that both forms are significantly associated with share prices. This suggests that the market efficiently assimilates information regarding goodwill regardless of the treatment, underscoring the robust value relevance of goodwill across different reporting formats (Al Jifri & Citron, 2009). Research into the value relevance of goodwill across industries has also been conducted. Johansson et al. (2022) discovered a significant disparity in the value relevance of goodwill

between the telecommunication and the food production industries due to differences in market efficiency, accounting standards, and the nature of goodwill.

However, overall, research distinguishing goodwill from other accounting items remains scarce. Specifically, research is limited on the implications of company size on value relevance. To this end, this study contributes to the existing value relevance literature by distinctly focusing on size's influence on goodwill's value relevance. By comparing small- and large-cap firms, this research aims to contribute to the understanding of how investors value goodwill differently depending on the company's market capitalization. By exploring this knowledge gap, this study seeks to add to the discourse of value relevance and potentially influence the decisions of policymakers, standard-setters, and practitioners in developing accounting standards and practices that better suit companies of different sizes. This research aims to promote transparency, comparability, and accuracy in financial reporting across various types of businesses and, in that sense, enhance the understanding of the role of goodwill in financial markets for varying firm sizes.

1.3 Delimitation

The scope of this thesis is delimited to companies with their primary listings in Europe, reporting under International Financial Reporting Standards (IFRS) between the years 2015 to 2019. This delimitation allows for a focused analysis of goodwill's value relevance within a relatively homogenous regulatory and economic context, thereby enhancing the study's coherence and applicability. The choice of European companies is strategic, given the continent's comprehensive adoption of IFRS (Hamberg & Beisland, 2014), which standardizes goodwill reporting and impairment testing practices, making cross-company comparisons more viable.

1.4 Disposition

The remainder of the paper proceeds as follows. Section two reviews the literature related to value relevance, goodwill, and size effects, followed by the development of the hypothesis of this thesis. Subsequently, section three describes the chosen research design, consisting of the model specification, sample construction and data selection. Next, section four presents descriptive statistics, the regression results followed by robustness tests. Finally, chapter five presents the analysis of the results and final conclusions.

2. Theoretical Framework and Literature

This section outlines the theoretical foundations upon which the research is built, starting with the concept of value relevance. It will explore various perspectives from which value relevance can be understood and trace the evolution of research trends in this area over time. Next, goodwill is discussed, detailing its definition, regulatory framework, and its relationship to value relevance. Following this, literature concerning size effects will be examined. Finally, the insights will be synthesized into formulating the hypothesis.

2.1 Value relevance

Ever since Ball and Brown (1968) initiated the value relevance discourse by demonstrating the usefulness of accounting earnings, numerous amounts of value relevance research have been conducted (e.g., Barth et al., 2023; Collins et al., 1999; Francis & Schipper, 1999). Value relevance studies assess the extent to which accounting items or information are associated with changes in share prices or returns, thereby determining their usefulness for investors or other stakeholders (Barth et al., 2001). Although the primary objective of studying value relevance is not to observe how investors specifically use accounting information to assess firm value, it is possible to determine which accounting items correlate more or less with share prices (Barth et al., 2001). This makes it possible to assess the extent to which financial information can explain the market value of firms. Hence, a statistical association between financial disclosures and prices or returns must exist for accounting information to have market value relevance (Barth et al., 2023). This concept is based on the premise that accounting metrics effectively elucidate market valuations, in line with the efficient market hypothesis, which suggests that price formation in markets adeptly integrates all available information (Hellström, 2006).

The conceptual framework of the Financial Accounting Standards Board (FASB) specifies what is deemed as value relevant in terms of accounting amounts. Within this framework, financial information must meet two primary criteria to be considered useful: relevance and faithfulness. In this context, relevance is defined as the ability of an accounting amount to impact the decisions of users of financial disclosures (FASB, 2018). Faithfulness refers to the accuracy with which the information represents the events it purports to depict (Barth et al., 2001). Barth et al. (2001) suggest that tests of value relevance typically serve as joint

assessments of both faithfulness and reliability. Similar to Barth et al. (2023), this study focuses on accounting information related to the new economy - specifically, goodwill. This area of accounting is not generally known for its faithful representation (Barth et al., 2023). To this end, the value relevance of goodwill, the focus of this thesis, is unlikely to reflect faithful representation (Barth et al., 2023). Consequently, the findings could determine whether goodwill is becoming more value relevant. This, in turn, might suggest that enhancing representational faithfulness might be an effective way to improve financial reporting.

Francis et al. (2004) examine various accounting- and market-based characteristics of accounting quality and conclude that value relevance is one of the most significant attributes. Although the benefits of each attribute vary by context, making it difficult to single out one attribute as dominant, Francis et al. (2004) recognize value relevance as the single most important market-based attribute. Similarly, Barth et al. (2001) emphasize that value relevance is critical not only for investors in the capital markets but also for others, including standard setters, as it offers valuable insights into accounting practices.

2.1.1 Different aspects of value relevance

Existing literature highlights various ways in which value relevance can be observed. Hellström (2006) categorizes these approaches into two perspectives: the measurement perspective and the signaling perspective. The measurement perspective assesses the correlation between financial disclosure and market value indicators, such as share price or returns. Conversely, the signaling perspective investigates how the market reacts to the disclosure of financial information (Hellström, 2006). The measurement perspective is the most commonly used method in value relevance research including Hellström (2006) and Harris et al. (1994). The present thesis will also adopt the measurement perspective to study value relevance.

A common element in value relevance studies is using valuation models to structure tests where the market value of a firm's equity is commonly benchmarked (e.g., Collins et al., 1997; Francis & Schipper, 1999). These models can use several measures, including the stock returns and the price per share. Barth et al. (2001) highlight the primary distinction between the two types of studies on value relevance. The first type seeks to determine what is reflected in a firm's value, while the second approach focuses on changes in value over a specific period of time. Landsman and Magliolo (1998) reinforce this perspective, indeed noting that the choice of

approach depends partly on the hypothesis for the present study as well as the econometric considerations. Since this thesis seeks to understand how goodwill reflects the value of a firm, the focus will be on the first approach outlined by Barth et al. (2001).

In the existing research two principal methods of measuring value relevance exist. The first method involves conducting a linear regression analysis to conclude whether the coefficients are significantly different from zero, thereby relating information to establishing a relation to the stock price. This approach is typically chosen to determine if the item or information in question is value relevant or not. For instance, Barth et al. (1998) demonstrate that brand value has value relevance by regressing price per share on the equity book value, earnings, and brand value. On the other hand, the second approach also relies on regression analysis but instead emphasizes the model's goodness-of-fit, with a higher goodness-of-fit indicating higher value relevance. This approach is particularly employed when comparing the value relevance between different time periods, accounting items, or groups of firms.

2.1.2 Trends in Value Relevance of Accounting Information

Initially, studies on value relevance trends over time focused solely on earnings. These studies reveal a decline in earnings' value relevance, which can be mainly attributed to the advent of the new economy (Barth et al., 2023). On the one hand, this shift is emphasized by the increasing prevalence of loss firms, as showcased by Collins et al. (1999), highlighting that earnings have diminished relevance for these entities. On the other hand, the shift can be attributed to investments in intangible assets, which present challenges. These challenges concern the timing mismatch between the incurrence of costs and the recognition of associated revenues (Lev & Zarowin, 1999; Dichev & Tang, 2008; Donelson et al., 2011; Srivastava, 2014).

Amir and Lev (1996) argued that financial accounting information has limited value relevance for investors in assessing the worth of technology and service-based firms that invest in intangible items. In recent years, there has been a shift from firms' propensity to make investments in tangible items towards investments in intangible items and intangible items overtaking tangible assets as the leading source of value creation (Lev & Gu, 2016). In the existing literature, the ability of current accounting standards to adequately capture the value of account items that characterize the new economy, intangible assets, is questioned (Barth et

al., 2023; Lev & Gu, 2016). Due to this specific reason, Collins et al. (1997) argued that financial information may not be feasible when assessing the values of companies with large amounts of intangible assets. Consistent with this concern, Amir and Lev (1996) found that earnings, book values, and cash flows are largely irrelevant on a stand-alone basis when valuing a company within the cellular telephone industry.

Expanding on the framework established by Ohlson (1995), which acknowledges the broader relevance of accounting items beyond earnings, subsequent research also emphasizes the book value of equity (Barth et al., 2023). This rationale stems from the idea that the transition towards technology and loss-incurring firms may underlie earnings' diminishing significance while elevating the importance of the equity book value (Collins et al., 1997). The underlying rationale is that the equity book value not only provides insight into future abnormal earnings but also captures the abandonment and liquidation options for loss firms (Barth et al., 1998; Collins et al., 1999). Collins et al. (1997) examine value relevance over a span of 41 years by conducting annual cross-sectional regressions and assessing the variations in the explanatory power (R2) of these regressions to find that an elevation in the equity book value compensates for the diminishing value relevance of net earnings. Similarly, Francis and Schipper (1999) arrive at the same conclusion, reinforcing the emphasis on the equity book value. Further research extends beyond this analysis, incorporating scale effects to find a decline in overall combined value relevance between 1958-1996 (Brown et al., 1999). Likewise, by considering the dimension of unconditional accounting conservatism, Balachandran and Mohanram (2011) find a decrease in combined value relevance between 1975-2004.

Advancing the dialogue, subsequent research recognizing even more accounting information was made, yet again concluding diminishing value relevance. Specifically, Core et al. (2003) discovered a reduction in the value relevance of a combination of earnings and the equity book value alongside four additional indicators linked to intangible assets and growth opportunities - namely R&D and advertising expenses, capital expenditure, and revenue growth, during the period from 1996 to 1999, compared to 1975 to 1995. Adding to the narrative, Lev and Gu (2016) assessed the value relevance of the book value of equity and earnings together with four financial metrics over the period 1950-2013 and found that it diminished, leading to the conclusion of the “end of accounting”.

In the most recent contribution to research on value relevance trends, Barth et al. (2023) criticizes value relevance studies that do not apply nonlinear models and proposes adopting CART (Classification and Regression Trees). This model allows for the identification of potential nonlinear relationships between the variables, which subsequently allows for better explanatory power of the model. Having conducted the test, Barth et al. (2023) conclude that there is a significant increase in combined value relevance over the entire period.

2.2 Goodwill

Since the term "goodwill" was first recognized in Crutwell v. Lye (1810, 17 Ves. 335) as the likelihood that a previous customer will return to the same location of purchase, a substantial body of academic literature has been developed (e.g., Alharony et al., 2010; Al Jifri & Citron, 2009; Hamberg & Beisland, 2014; Bloom, 2008). Not only has the literature on goodwill been academic, but standard setters and regulators have also grappled with its implications (Bloom, 2008). From a wide lens, one consistent aspect across all discussions and definitions of goodwill is that it is considered an intangible asset. Within the classification of intangible assets, a characteristic of goodwill is its difficulty being precisely specified. For this reason, other intangible items, such as patents and copyrights, are distinguished from the goodwill definition. These items can be identified precisely, similar to tangible assets on the balance sheet (Bloom, 2008). According to the definition from IFRS 3, para. 51 goodwill is defined as "any excess of the cost of the acquisition over the acquirer's interest in the net fair value of the identifiable assets, liabilities, contingent liabilities acquired as at the date of the exchange transaction". Therefore, Hamberg and Beisland (2014) notes that goodwill should be considered the anticipated future economic benefits derived from the acquired entity or combination of acquired entities.

Bloom (2008) divides goodwill into two parts: internally generated goodwill and goodwill from acquisitions. Internally generated goodwill arises from purchases or expenditures within the entity, while purchased goodwill arises whenever the entity purchases another entity for a consideration larger than the fair value of identifiable assets. Accounting regulators recognize only purchased goodwill, not internally generated goodwill. This distinction is partly due to the verifiability of acquired goodwill arising from open market transactions (Hamberg & Beisland, 2014). Internally generated goodwill is considered more difficult to identify and subsequently

measure on the balance sheet. Consequently, this thesis focuses on the value relevance of purchased goodwill.

Debate over how to account for goodwill has for long persisted among researchers, legislators, and other stakeholders (Bloom, 2009). Goodwill is commonly viewed as an ambiguous item on the balance sheet, with uncertainties surrounding its actual representation and the appropriate utilization period (Schroeder, et al., 2005). The accounting regulations for business combinations have undergone significant changes since 2000 (Hamberg & Beisland, 2014).

Before 2005, and mandatory adoption of IFRS for listed companies in the European Union and the inception of IFRS 3 in Europe, many European standard-setters provided firms with the option to choose between the purchase and pooling methods for business combinations (Van der Zanden & Nobles, 2002). The purchase method led to the recognition of goodwill and impacted future earnings, whereas the pooling method did not have these effects. The removal of the option to choose between these two accounting methods curtailed managerial discretion. Nevertheless, subsequent modifications in how the purchase method is applied might have actually expanded the scope of discretion in accounting for goodwill (Hamberg & Beisland, 2014).

Under the rules preceding IFRS 3, goodwill typically represented the difference between the purchase price and the acquired firm's equity book value. With the introduction of IFRS 3, this is no longer the case. Now, at the acquisition time, management must identify and separately capitalize specific intangible assets of the acquired entity, such as patents, licenses, and trademarks. Based on their characteristics, these assets may be held indefinitely or amortized over a lifespan of up to 20 years (Hamberg & Beisland, 2014).

Traditionally, goodwill was most often amortized over its estimated useful life, which varied widely under different local GAAP (Hamberg & Beisland, 2014). According to Van der Zanden & Nobes (2002), many European companies opted for shorter amortization periods. However, with the implementation of IFRS 3, the practice of amortizing goodwill was discontinued. Under IAS 36, the book value of goodwill must undergo regular impairment tests, where the cash-generating unit's goodwill carrying amount is assessed against its recoverable amount. Petersen and Plenborg (2010) note that firms typically calculate the

recoverable amount based on value-in-use, which depends heavily on management's own projections.

Aharony et al. (2010) analyzed the effects of IFRS 3 Business Combinations by comparing the value relevance of three accounting items: goodwill, research and development expenses, and asset revaluation. These items, where IFRS notably diverges from domestic accounting practices, were studied across 14 EU countries. The findings indicated that the transition to IFRS significantly increased the value relevance of goodwill for investors.

Al Jifri and Citron (2009) investigated whether goodwill disclosed only in notes was comparable to goodwill recognized in the balance sheet. Using the valuation model developed initially by Ohlson (1995), they analyzed the relative value relevance of both disclosed and recognized goodwill for 243 non-financial firms in the UK from their 2002 financial statements. The sample demonstrated that both variables - disclosed and recognized goodwill - are value relevant for all model specifications tested, indicating that the market, in fact, values both forms of goodwill amounts equivalently.

2.3 Size effects

According to Collins et al. (1997), existing literature highlights two scenarios in which the book values become more critical in valuations. First, the book values gain significance when current earnings are unreliable indicators of future earnings. Second, the book values become more important when there is a heightened probability that a firm will be abandoned or liquidated. Building on this, Collins et al. (1997) suggest that a firm's size may influence both circumstances.

Smaller firms, which often include start-ups, are more likely to be valued based on their potential for future earnings growth (i.e., abnormal earnings) rather than current earnings realizations (Collins et al., 1997). Hayn (1995) demonstrates that losses are strongly associated with firm size, with the results showing a clear monotonic relationship between firm size and the likelihood of incurring a loss. In the study, Hayn (1995) observes a significant variance in the likelihood of incurring a loss based on firm size: only 2.5% for the largest firms in the data set, compared to 50.8% for the smallest. This discrepancy may be attributed to larger firms being better diversified, which in turn helps shield them from losses incurred during economic

downturns (Collins et al, 1997). The results linking loss frequency to firm size indicate that if losses negatively impact the earnings response coefficient, the extent of this impact likely varies with firm size. It is expected to be more significant for smaller firms and vertically negligible for larger ones. Hayn (1995) suggests that these results can have important implications for research on how firm size affects the informational content of earnings. According to the Ohlson (1995) valuation framework, the reduced earnings persistence observed in smaller firms leads to an elevated reliance on the book values over earnings (Collins et al., 1997). Furthermore, Collins et al. (1997) also addressed the aspect of financial distress and argued that smaller firms are more prone to encountering financial distress than are larger firms. Consequently, investors might emphasize the book values more as a proxy for liquidation or abandonment value when valuing smaller firms (Collins et al,1997).

Moeller et al. (2004) discuss the varying characteristics of acquisitions between small and large firms by forming a sample of 12,023 representing all purchases over $1 million between the years 1980 and 2001 amongst private and public U.S. firms. In the study, it was found that large firms, on average, offer larger acquisition premiums than small firms. The evidence from the study is consistent with the theory that managerial hubris plays a larger role in larger firms. This can be motivated by the fact that the managers of large firms face fewer obstacles when deciding because the firm has large resources, is socially important, or has succeeded in growing the firm to be large. In line with the idea of hubris, large firms are likelier to complete an acquisition (Moeller et al., 2004). In addition, Demsetz and Lehn (1985) show that small firm's managers generally have more ownership in the firm than do managers in large firms. Hence it is not implausible that incentives of managers vis a vis shareholders are better aligned in smaller firms (Moeller et al., 2004).

2.4 Hypothesis development

The literature review reveals a notable gap in the understanding of how company size impacts the value relevance of goodwill, a crucial consideration given that goodwill frequently constitutes a substantial portion of a firm's assets (Boennen & Glaum, 2014).

Collins et al. (1997) note that the book values become more important in scenarios where there is a significant risk of a firm being liquidated or abandoned, and when current earnings fail to reliably predict future earnings. Hayn (1995), found that small firms in his study exhibited a

50.8% likelihood of distress, compared to just 2.5% for larger firms. This could suggest a heightened risk of liquidation or abandonment among smaller firms, as well as a possibility that their earnings are unreliable predictors of future earnings.

Moeller et al. (2004) observed that large firms generally pay higher acquisition premiums, potentially driven by hubris, and complete more acquisitions than smaller firms. These findings indicate that the size of a firm might significantly influence the value relevance of goodwill, as systematic overpayment could inflate goodwill values for large firms. Goodwill, defined by Hamberg and Beisland (2014) as the anticipated future economic benefits derived may thus reflect different levels of value relevance based on acquisition behaviors and premium payments between small and large firms.

Given this background, the following hypothesis is proposed:

H1: *A discrepancy exists in the value relevance of goodwill between small- and large-cap firms.*

This hypothesis is based on the observed differences between small and large firms, such as disparities in future economic earnings predictability and acquisition strategies. The definition of goodwill as the future economic benefits from intangible assets suggests a potential connection between firm size and the perceived reliability of these benefits. Additionally, the propensity of larger firms to pay higher acquisition premiums and undertake more acquisitions could lead to inflated goodwill values on their balance sheets, potentially making goodwill less value relevant for large-cap firms.

3. Research Design

This section will present the method chosen to investigate the hypothesis. First, the model specification will be described, detailing the statistical method's variables, explaining how each variable is defined and measured. Next, the data used in the regression analysis is reviewed, including its sources and characteristics.

3.1 Model specifications

To investigate the research question and hypothesis, a quantitative approach using panel data of financial information has been taken. The measurement perspective assesses the correlation between financial disclosure and market value indicators, such as share price or returns, and is the most commonly used method in value relevance research (Hellström, 2006). The choice between price models, where the stock price is regressed on earnings per share, and return models, where the returns are regressed on a variable of scaled earnings, is something that accounting researchers are frequently faced with (Khotari & Zimmerman, 1995). The selection of whether to use share price or returns to study value relevance should be guided by the research question being addressed, as advised by Kothari and Zimmerman (1995).

While both earnings and price methods are viable, this thesis employs a price model for several reasons. First, the price model is particularly effective for testing the value relevance of the book value of goodwill, as noted by Hamberg and Beisland (2014). This is due to the price model's direct correlation between the market value of equity (PRICE) and the accounting figures, specifically the book value of equity (BVE) and net earnings (EARN), which includes goodwill (GWILL). The price model enables the goodwill balance to be extracted from the other components of equity, which provides a focused analysis on how goodwill independently impacts market valuation. Additionally, Kothari and Zimmerman (1995) argued that the earnings response coefficient in the price model exhibits less bias compared to using a model based on earnings, and the price model itself is better specified in that the slope coefficients from the price model are unbiased.

$$PRICE = f(BVE^P, EARN^P) \quad (1)$$

The goodwill balance (GWILL) is separated from the book value of equity (BVE-GWILL). Following Collins et al. (1999) a dummy variable is interacted for negative earnings (D*EARN), enabling for separate analysis of the value relevance of positive earnings and negative earnings. As Collins et al. (1999) found no difference in the mean coefficient for the book value of equity when earnings are negative or positive, this dummy will not be interacted with the book value of equity.

$$PRICE_{it}^P = \beta_0 + \beta_1 BVE_{it}^P + \beta_2 EARN_{it}^P + \beta_3 (D * EARN^P)_{it} + \varepsilon \quad (2)$$

$$PRICE_{it}^{P} = \beta_0 + \beta_1 (BVE - GWILL)_{it}^{P} + \beta_2 GWILL_{it}^{P} + \beta_3 EARN_{it}^{P} + \beta_4 (D * EARN^{P})_{it} + \varepsilon \quad (3)$$

Lastly, to enable the comparative analysis of the value relevance of goodwill in small-cap versus large-cap firms, a dummy variable (SIZED), which takes on the value 0 for small-cap firms and 1 for large-cap firms, is introduced. The threshold for what counts as being a small-cap firm in this study is a market capitalization between $250 million to $2 billion. For large-cap, the threshold in this study is a market capitalization between $10 billion to $200 billion. Since the market capitalization varies for each firm during the tested period, the SIZED dummy variable is calculated for every firm for every time period (quarter). This dummy will be added as its own variable to control for potentially inherent valuation differences between small- and large-cap firms. It will also be interacted with goodwill to measure the added or subtracted value relevance of large-cap firms.

$$PRICE_{it}^{P} = \beta_0 + \beta_1 (BVE - GWILL)_{it}^{P} + \beta_2 GWILL_{it}^{P} + \beta_3 EARN_{it}^{P} + \beta_4 (D * EARN^{P})_{it} + \beta_5 SIZED_{it}^{P} + \beta_6 (GWILL * SIZED)_{it}^{P} + \varepsilon \quad (4)$$

Following Hamberg and Beisland (2014), the entire model is scaled by number of shares outstanding (denoted by superscript P).

This model will be employed to conduct an Ordinary Least Squares (OLS) linear regression. The regression incorporates firm fixed effects to control for idiosyncratic factors unique to each firm that could influence the dependent variable. Initially, the regression will be executed without robust standard errors to establish a baseline model. Subsequently, the model will be re-run with robust standard errors to account for potential heteroscedasticity in the residuals, ensuring more reliable estimates of the variables and generalizable results. The interaction term $(GWILL*SIZE)^{P}$ is the variable which encapsulates the research question of this study, allowing a conclusion to be drawn on the potential difference in value relevance of goodwill in small-cap firms versus large-cap firms.

3.2 Data

The study focuses on the European market and includes public small- and large-cap firms. Firms with primary listings in European countries were chosen as they all follow the guidelines and principles of IFRS 3 (Hamberg & Beisland, 2014). The definition by Finra (2022) was

used which categorizes small-cap firms as having a market value between $250 million and $2 billion and large-cap between $10 billion and $200 billion. The present thesis uses data from quarter 1 of 2015 to quarter 3 of 2019, which after data cleaning generates 17,841 data points. The time frame is motivated by the will to analyze a recent period after the Europe-wide adoption of IFRS in 2005 and not to have the results affected by the financial crash in 2008 or Covid-19 in 2020.

The data was collected from Capital IQ, a well-established database used in research and in the finance industry. Capital IQ has been used to obtain market capitalization, the book value of equity, goodwill, and net income. The data for market capitalization has been lagged one month to account for the later release of quarterly reports. For instance, the first quarter results of a firm are not disclosed exactly when the quarter ends.

Capital IQ enabled the conduct a specified filtering process for the sample. First, the number of public firms globally were filtered. Next, the filtered listing of the firms within Europe was specified. Subsequently, all firms that were not within the definition of small- and large-cap firms used in this paper were filtered out. From this filtering process, 4,144 firms were retrieved, resulting in 78,736 observations, with the data retrieved ranging between the first quarter 2015 and the third quarter 2019. Of the firms, 3,007 were small-cap firms, and 1,137 were large-cap. This data was then filtered to only consist of firms with primarily listings within Europe, resulting in 1,390 firms and consequently 26,410 observations. Out of these, 1113 firms are small-cap companies, and 277 firms are large-cap companies. Determining which firms to include was done by looking at the data from the final quarter of 2019, as some firms can move between different market capitalizations categories during the specified time period. In the final sample, a total of 1,231 firms were observed. Each quarter, however, the average number of firms where data was available was 939, the minimum was 742 and the maximum was 1,132. The number of firms varies between periods due to data in some periods not being available for some firms. Finally, to limit the impact of outliers impacting the results, outliers in the dataset were controlled by winsorizing the variables at 2.35% and 97.65% levels.

4. Results

This section will first present the descriptive statistics, providing an overview of the variables used in the regression. Subsequently, a correlation matrix showing the correlation between all the independent variables and the dependent variable will be presented. This is followed by the results of the linear regressions, first one that does not account for heteroscedasticity, and then another regression with robust standard errors to present more robust results. Next several robustness tests will be presented, starting with White's test for heteroscedasticity. Following is the presentation of the variance inflation factor (VIF) which gives an indication of potential multicollinearity between the variables. Finally, a robustness test is performed, removing the dummy variable which is interacted with earnings, to identify how the model reacts.

Table 1. Descriptive Statistics

Variables	Min	Max	Mean	Median	St. Dev
BVE	-4125.300000	18294.600000	1064.552743	392.000000	2021.918295
GWILL	0.000000	3378.600000	162.613617	4.210000	418947616
PRICE	250.000000	47113.700000	2230.619388	754.900000	4464.184888
EARN	-283.100000	349.700000	24.184641	9.110000	56.819857
SHARES	0.026000	4330.100000	185.737890	63.400000	359.802344
SIZED	0.000000	1.000000	0.157671	0.000000	0.364442
$PRICE^P$	0.137997	121826.923077	162.754700	15.242448	2439.396917
BVE^P-$GWILL^P$	-810.257732	268035.000000	92.407300	4.997775	2208.253972
$EARN^P$	-729.010239	5938.461538	1.905727	0.152941	50.953904
$GWILL^P$	0.000000	3541.880342	4.858227	0.051648	77.776225
$GWILL^P$*$SIZED^P$	0.000000	3378.6000000	91.403439	0.000000	393.829739
D	0.000000	1.000000	0.134802	0.000000	0.341521
D*$EARN^P$	-729.010239	0.000000	-0.244447	0.000000	8.323950

This table provides descriptive statistics for the baseline variables as well as the constructed variables used in the model. The baseline variables are book value of equity (BVE), goodwill (GWILL), market capitalization (PRICE), net income (EARN) and shares outstanding (SHARES). The "^{P}" denotes that the variable is scaled by shares outstanding (SHARES). The SIZED variable is the dummy variable indicating whether the firm is small- or large cap, taking the value 0 for small-cap firms and 1 for large-cap firms. The dummy variable "D" separates positive from negative earnings by taking the value 0 for positive earnings and 1 for negative earnings.

From Table 1 above, several patterns can be seen in the data. Firstly, the dataset contains 17,841 observations. The market value (PRICE) of the firms, which is the market capitalization, has a significant variation, with a mean of 2,231 and a standard deviation of 4,464. The large standard deviation indicates a large spread of company sizes, which is expected due to the sample selection containing small- and large-cap firms. This is consistent with the mean value of the SIZED variable, which is 0.1577, showing that the dataset contains both small- and large-cap firms but that there are more small-cap firms. The book value of equity (BVE) ranges from -

4,125 to 18,295. However, more noteworthy is that some of the firms during the time-frame show a negative book value of equity, indicating financial distress.

The goodwill of the firms in the dataset (GWILL) has a median of 4.21, indicating that most firms recognize at least some goodwill. Overall, the variables show high variance.

4.2 Correlation between Variables

Using a correlation matrix, the relationships between the key variables are explored. The correlation matrix gives a broad insight into the linear relationships between the variables and helps to understand the interplay of factors influencing market value.

Table 2. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PRICE (1)		0.68	0.42	0.71	0.39	0.10	0.02	0.00	0.03	0.08	0.76	0.50	(0.08)
BVE (2)	0.68		0.35	0.60	0.39	0.06	0.06	(0.03)	0.05	0.05	0.59	0.39	(0.04)
GWILL (3)	0.42	0.35		0.31	0.24	0.01	(0.01)	0.01	0.01	0.09	0.43	0.90	(0.03)
EARN (4)	0.71	0.60	0.31		0.31	0.06	0.03	0.07	0.07	0.07	0.58	0.38	(0.34)
SHARES (5)	0.39	0.39	0.24	0.31		(0.03)	(0.02)	0.01	(0.02)	(0.03)	0.35	0.25	0.01
$PRICE^P$ (6)	0.10	0.06	0.01	0.06	(0.03)		0.59	(0.05)	0.62	0.62	0.08	0.02	(0.02)
BVE^P-$GWILL^P$ (7)	0.02	0.06	(0.01)	0.03	(0.02)	0.59		0.14	0.90	0.17	0.04	0.00	0.00
D*$EARN^P$ (8)	0.00	(0.03)	0.01	0.07	0.01	(0.05)	(0.14)		0.16	0.00	(0.01)	0.00	(0.07)
$EARN^P$ (9)	0.03	0.05	0.01	0.07	(0.02)	0.62	0.90	0.16		0.37	0.04	0.01	(0.03)
$GWILL^P$ (10)	0.08	0.05	0.09	0.07	(0.03)	0.62	0.17	0.00	0.37		0.07	0.08	(0.01)
SIZED (11)	0.76	0.59	0.43	0.58	0.35	0.08	0.04	(0.01)	0.04	0.07		0.54	(0.07)
$GWILL^P$*SIZED (12)	0.50	0.39	0.90	0.38	0.25	0.02	0.00	0.00	0.01	0.08	0.54		(0.05)
D (13)	(0.08)	(0.04)	(0.03)	(0.34)	0.01	(0.02)	0.00	(0.07)	(0.03)	(0.01)	(0.07)	(0.05)	

This table presents Pearson correlations.

From Table 2, which shows the correlations between the variables, a positive correlation between the market value of equity (PRICE) and all the independent variables can be observed. Higher book value of equity (BVE), goodwill (GWILL), net income (EARN), and shares outstanding (SHARES) all correlate positively and thereby generally lead to higher market capitalization (PRICE). Looking at the constructed variables, most correlation signs remain positive. The constructed dependent variable ($PRICE^P$) correlates positively with all the independent constructed variables except negative earnings ($D*EARN^P$). This means that if any of the constructed independent variables increase, except for negative earnings where the correlation is the opposite, the dependent variable increases as well. Strong positive correlations can be observed between net income per shares ($EARN^P$) and the book value of equity per share less goodwill per share (BVE^P-$GWILL^P$). This high correlation explains that these variables move together strongly, which can suggest potential multicollinearity. This will be further examined using the Variance Inflation Factor (VIF) test in the robustness section 4.4.

4.3 Regression results

This section presents the regression models used to test the hypothesis. Two sets of regression results are presented: one without robust standard errors and one with robust standard errors. The robust standard errors account for potential heteroscedasticity in the model, providing more reliable statistical results.

4.3.1 OLS Regression Output without Robust Standard Errors

Table 3. Price Regression (not robust)

Variables	Beta	*p-value*
Constant	116.61***	0.0000
BVE^P-$GWILL^P$	0.3289***	0.0000
D*$EARN^P$	-5.4473***	0.0000
$EARN^P$	5.8040***	0.0000
$GWILL^P$	-1.0256***	0.0000
SIZED	40.377***	0.0008
$GWILL^P$*SIZED	0.0217	0.0530
Adjusted R^2	0.2991	

This table shows the results from the OLS regression without robust standard errors. The beta coefficients as well as the corresponding p-values are presented. P-values less than 0.05 are denoted by (*), p-values less than 0.01 are denoted by (**), and p-values less than 0.001 are denoted by (***).

The output of this OLS regression shows significance across all variables, except the interaction term $GWILL^P$*SIZED which is almost significant at the 5% level. The beta for goodwill ($GWILL^P$) is negative and significant. However, this regression does not account for potential heteroscedasticity, which may infer unreliable results. The adjusted R^2 for this model is 0.2991.

4.3.2 OLS Regression Output with Robust Standard Errors

This section presents the OLS regression output with robust standard errors. This model accounts for heteroscedasticity in the data, providing more reliable standard errors and thereby more robust results about the relationships between the variables.

Table 4. Price Regression (robust)

Variables	Beta	*p-value*
Constant	116.61***	0.0000
BVE^P-$GWILL^P$	0.3289***	0.0000
D*$EARN^P$	-5.4473	0.3036
$EARN^P$	5.8040**	0.0086
$GWILL^P$	-1.0256	0.1976
SIZED	40.377	0.0844
$GWILL^P$*SIZED	0.0217	0.1117
Adjusted R^2	0.2991	

This table shows the results from the OLS regression with robust standard errors. The beta coefficients as well as the corresponding p-values are presented. P-values less than 0.05 are denoted by (*), p-values less than 0.01 are denoted by (**), and p-values less than 0.001 are denoted by (***).

The coefficient for the variable book value of equity less goodwill (BVE^P-$GWILL^P$) is positive and significant at the 1% level, similar to the previous OLS model. This indicates a strong and consistent relationship between the book value of equity and the market value.

The coefficient for the variable negative net income (D*$EARN^P$) is not significant in the robust model, while it was significant in the previous OLS model. This suggests that the relationship between negative net income and market value is less stable when accounting for heteroscedasticity. The beta for positive net income ($EARN^P$) however, remains positive and significant in the robust model.

The coefficient for goodwill per share ($GWILL^P$) is insignificant in the robust model with a p-value of 0.1976, while it was significantly negative in the previous, non-robust OLS model. This change in significance indicates that the relationship between goodwill and market value is less clear when accounting for heteroscedasticity.

In the robust OLS regression, the significance of the size dummy variable (SIZED) drops to being significant under a 10% significance level rather than 1% in the non-robust model. A positive coefficient for this variable suggests that there are inherent aspects of large-cap firms that investors value.

The interaction term between goodwill and firm size dummy variable ($GWILL^P$*SIZED), the variable encapsulating the research question, is not significant in the robust model, while it was significant at the 10% level in the previous OLS model.

The robust OLS model, with its adjusted R^2 of 0.2991, has the same explanatory power as the non-robust model. However, the significance levels of all key variables changed when using robust standard errors, highlighting the impact of heteroscedasticity on the reliability of the initial estimators.

4.4 Robustness tests

In this section, three different robustness tests are conducted to identify potential shortcomings in the research design. First, a White test to identify heteroscedasticity in the model is performed. Following this test, a variance inflation factor (VIF) test is performed to identify potential multicollinearity between variables. To evaluate the method of interacting a dummy variable with earnings, an additional regression is made without the separation of positive and negative earnings.

4.4.1 White test

White test	
f-value: 1,283.2477	*p-value*: 0.0000

This table presents the results of the White test with the f-value and its corresponding p-value.

A White test is performed to test for heteroscedasticity. The significant p-values of both the Lagrange multiplier and the f-value suggest that there is heteroscedasticity in the model. This validates the use of robust standard errors used in the second OLS regression.

4.4.2 VIF Test

To identify potential multicollinearity issues, the Variance Inflation Factor (VIF) can be examined for the independent variables. Multicollinearity results from highly correlated predictors in a model, resulting in an inflated variance of the coefficients and thereby making the model unpredictable. A VIF score of 1 indicates that there is no correlation, close to 5 implies that the variable is moderately correlated and greater than 10 suggests high correlation.

Variance Inflation Factors

	VIF Factor	Variables
0	1.189144	Constant
1	17.068652	BVE^{P}-$GWILL^{P}$
2	2.690540	D*$EARN^{P}$
3	19.423086	$EARN^{P}$
4	1.949457	$GWILL^{P}$
5	1.409113	SIZED
6	1.408930	$GWILL^{P}$*SIZED

This table shows the results of the variance inflation factor test when all variables in the model are included.

The VIF test shows high values for positive net income per share ($EARN^{P}$) and the book value of equity per share less goodwill per share (BVE^{P}-$GWILL^{P}$). The elevated VIF scores align with what the correlation matrix showed, suggesting that the model might suffer from multicollinearity issues when these variables are included in the model simultaneously. To confirm that the potential multicollinearity issue regards $EARN^{P}$ and BVE^{P}-$GWILL^{P}$, $EARN^{P}$ is removed from the variables to present the new VIF.

Removing the variable $EARN^{P}$ from the model results in low VIF scores across all remaining variables. This shows that the multicollinearity issues are related to the positive earnings per share ($EARN^{P}$) and the book value of equity per share less goodwill per share (BVE^{P}-$GWILL^{P}$).

Variance Inflation Factors		
	VIF Factor	**Variables**
0	1.189032	Constant
1	1.052942	BVE^P-$GWILL^P$
2	1.020881	D*$EARN^P$
3	1.037219	$GWILL^P$
4	1.408478	SIZED
5	1.408777	$GWILL^P$*SIZED

This table shows the results of the variance inflation factor test with the variable $EARN^P$ removed.

4.4.3 OLS Regression without Separated Earnings

Table 5. Price Regression (Robust - without Separated Earnings)

Variables	Beta	*p-value*
Constant	115.88***	0.0000
BVE^P-$GWILL^P$	0.3734***	0.0000
$EARN^P$	3.7701***	0.0000
$GWILL^P$	-0.6351	0.3914
SIZED	42.686	0.0709
$GWILL^P$*SIZED	0.0169	0.1888
Adjusted R^2	0.3067	

This table shows the results from the OLS regression with robust standard errors and without the separation of positive and negative earnings. The beta coefficients as well as the corresponding p-values are presented. P-values less than 0.05 are denoted by (*), p-values less than 0.01 are denoted by (**), and p-values less than 0.001 are denoted by (***).

Removing the dummy variable for negative earnings makes the $EARN^P$ variable capture both negative and positive net earnings. The coefficient is significantly positive, although slightly

lower than the previous regression since it includes negative values. Overall, the model without a dummy has a slightly higher R^2 than the original model. However, removing the dummy removes the ability to identify the separate value relevance of positive and negative earnings which the original model provided.

5. Discussion

In this section, the results will be analyzed. First, the findings from the study and implications are presented, including a discussion of the hypothesis. Subsequently, the robustness of this study is discussed. Finally, conclusions are presented, including limitations and suggestions for future research.

5.1 Findings

When testing the hypothesis: *A discrepancy exists in the value relevance of goodwill between small- and large-cap firms* by running an OLS-regression using the specified model, no support was found that the value relevance of goodwill differs between small- and large-cap firms. This is marked by the insignificant p-value of the interaction term ($GWILL^P*SIZED^P$). This result infers that investors do not value goodwill differently depending on whether the firm is categorized as a small- or large-cap firm. This outcome is somewhat inconsistent with what could be expected from the literature, such as Moeller et al. (2004) who noted that large firms often pay higher goodwill premiums potentially due to managerial overconfidence. The findings from Moeller et al. (2004) suggest that the premiums paid by large firms may lead to goodwill being less value relevant. This is because goodwill should reflect the anticipated future economic benefits (Hamberg & Beisland, 2014). When acquisitions result in overpayments, the recorded goodwill may not align fully with future expected benefits, distorting the value relevance of the book value of goodwill for larger companies.

The regression output indicates that the value relevance of goodwill is insignificant. This is not in line with the previous literature, as Al Jifri and Citron (2009) have previously found that goodwill is value relevant, regardless of whether goodwill is recognized in the balance sheet or disclosed in the notes. This output is further surprising considering the results of Aharony et al. (2010), who express the increased value relevance of goodwill under IFRS reporting, which is the adopted accounting standard in this study's data set. From a practical viewpoint, this result can be plausible. Depending on the industry, investors might not heavily emphasize

goodwill when assessing a company's value. This reflects a broader skepticism or caution due to the difficulties in quantifying the actual economic benefits of goodwill. Given the challenges in reliably deriving goodwill's value as highlighted by Bloom (2009), it is expected that investors approach goodwill with caution during equity valuation.

In addition to testing the main research question *Does the value relevance of goodwill differ between small- and large-cap firms?,* the output also showed the importance of the equity book value in determining firm value, evidenced by the positive and significant coefficient for the book value of equity per share in the robust regression model. This result aligns with the literature, emphasizing the importance of the equity book value as a key determinant of firm value (Francis & Schipper, 1999; Ohlson, 1995). Comparing this to the insignificance of goodwill's value relevance, it is to be expected that the book value of equity should have a larger impact on investors' valuations. In contrast to goodwill, the book value of equity, excluding goodwill, is more straightforward to calculate due to its clear representation of assets and liabilities.

The positive relationship between positive earnings per share ($EARN^P$) and market capitalization per share ($PRICE^P$) was found to be stable, having a significant beta at a 1% significance level in the robust regression. This aligns with a large body of literature, such as Collins et al. (1999) and that of Hamberg and Beisland (2014). Furthermore, the insignificant beta of negative earnings ($D*EARN^P$) is also supported by previous literature, specifically Collins et al. (1999), who state that loss firms are to a lesser extent valued by their earnings and rather valued based on their book value of equity. Hence, a negative coefficient for negative net incomes' effect on market value is a relationship to expect, but the insignificance of this relationship further confirms previous literature.

Finally, the positive coefficient of the binary size variable (SIZED), which is significant at the 10% level, indicates that large-cap firms are valued higher due to their size. The added value associated with larger company sizes, though not explicitly tested in this study, could potentially be attributed to several inherent advantages. For instance, Collins et al. (1997) note that larger firms may exhibit lower risk levels due to better diversification. Additionally, investments in large companies could generally be seen as less risky due to their more predictable and stable earnings (Collins et al., 1999).

5.2 Robustness

The robustness of the results can be questioned and therefore, it is important to evaluate the model and the data to find potential shortcomings in the method. First, the variance inflation factor test revealed possible issues with multicollinearity in two of the independent variables, particularly between positive earnings per share ($EARN^P$) and the book value of equity less goodwill (BVE^P-$GWILL^P$). Performing the VIF test, excluding the independent variable ($EARN^P$), further highlights that the issue is associated with the collinearity between positive earnings per share ($EARN^P$) and the book value of equity less goodwill (BVE^P-$GWILL^P$). Considering that net income is an integral part of the movement of the book value of equity between periods, this collinearity can be expected.

Second, conducting a White test and obtaining significant p-values supports that heteroscedasticity exists within the model. What causes this can either be a shortcoming in the model or the data. The residual plots (see appendix) provide clues about the root of the problem. The residual distribution plot suggests that most residuals are close to zero but that there are a few extreme outliers, making the curve's tails very long on either side. This indicates potential outliers that the method has failed to remove. The Residuals versus Fitted plot supports the existence of heteroscedasticity but also further visualizes that most residuals in the lower fitted values revolve around zero, with a few outliers with higher fitted values having a much wider spread in residuals. This again suggests that the heteroscedasticity might be a consequence of the data. This variability, marked by the presence of large residuals particularly in cases of high fitted values, could be reflective of underlying economic volatilities discussed by Lev and Zarowin (1999). They express that shifts in economic conditions can impact the volatility of financial metrics, suggesting that external economic changes can explain the variance in financial modeling. This relationship between external factors and the variance of the model underscores the potential distortion in predictive accuracy due to economic dynamics. This argumentation highlights the need to consider such external factors when evaluating model robustness.

The model construction can potentially also be the cause of heteroscedasticity. The nature of the OLS regression is to assume a linear relationship between the independent variables and the dependent variable. It might be the case that some independent variables might have a nonlinear relationship with the dependent variable, which would explain the heteroscedasticity.

Collins et al. (1999) suggest that negative earnings have lower value relevance than positive earnings, implying that the relationship between earnings and the dependent variable is nonlinear. This motivates the use of a dummy variable interaction with earnings in the thesis' linear regression, which separates the effects of positive and negative earnings. The differing p-values for negative and positive net earnings validate the potential for nonlinearity. However, the robustness test in Table 5, which consolidates the earnings categories, resulted in a higher R^2. This suggests that the relationship between the earnings variable and the market value of equity may be more complex than a mere binary distinction, indicating a nonlinear relationship. This is possibly a limitation of this study, as non-linear relationships are not presented reliably in linear regression models. To ensure that this linear assumption does not affect the study, different models that do not rely on this assumption could enhance the investigation. As used by Barth et al. (2023), the CART (Classification and Regression Trees) model could help mitigate the heteroscedasticity by finding a better model fit, making the model's predictive power better and possibly finding more significant relationships between the independent variables and the dependent variable.

5.3 Conclusions

This thesis investigated and answered the research question *Does the value relevance of goodwill differ between small- and large-cap firms?* by testing the hypothesis *A discrepancy exists in the value relevance of goodwill between small- and large-cap firms.* This research was primarily motivated by the increasing importance of goodwill in the valuation of firms as concluded by Boennen and Glaum (2014), Brown (2023), and Ocean Tomo (2020) and the absence of studies concerning size's effect on value relevance. To examine and answer the research question, an OLS regression was performed. The results challenge the hypothesis, suggesting that there does not exist a discrepancy in the value relevance of goodwill between small- and large-cap firms. Thereby the research question was answered. This was expressed in the regression results as insignificance of the beta for the interaction term between size and goodwill. As the value relevance of goodwill across firm sizes presents a research gap, comparing the results to previous research is difficult. However, the result challenges the hypothesis, motivated by the findings of Moeller et al, (2004), Collins et al (1997), and Hayn (1995). These findings, based on the varying acquisition behaviors between small and large firms and large firms' propensity for premium payments suggest that the value relevance of goodwill should differ.

These findings contribute both from a theoretical and practical perspective. Theoretically, the thesis adds the effects of size on the value relevance of accounting parameters to the academic discourse. Finding no significant discrepancy in the value relevance of goodwill between the firm sizes has practical interpretations. Specifically, the finding suggests that investors may not value goodwill differently depending on the size of the firm.

5.3.1 Limitations

The data set of this study was geographically confined to European firms which potentially limits the ability to apply these findings to other regions where different regulatory environments (differing from IFRS) and economic conditions prevail.

Additionally, the analysis did not account for industry fixed effects. Since there is a potential discrepancy in the valuation of goodwill between different industries, applying industry fixed effects could yield more robust and generalizable results. This is because industry trends in relation to goodwill accounting would be absorbed, enabling the model to generate results that are more representative of all industries.

Furthermore, the study relied on a linear regression model to investigate the relationship between firm size and goodwill valuation which is potentially oversimplifying the dynamics at play. Barth et al. (2023) criticize value relevance studies that do not apply nonlinear models.

5.3.2 Future Research

This thesis offers insights into the European market, suggesting avenues for future research to include firms from various geographical regions. Additionally, future studies could explore countries with diverse economic conditions, such as those with different economic systems, for instance, countries in transition phases whose accounting standards may not yet be adapted to the dynamics of a modern economy could be investigated. The research of this thesis did not explore potential variations in the treatment of goodwill across different industries. Including industry fixed effects could be a valuable focus for further investigation.

Future research could benefit from focusing on specific industries; for instance, as Amir and Lev (1996) observed, high-tech sector firms possess relatively large amounts of intangibles compared to other industries, which could influence the value relevance of goodwill. Finally, as the research is limited to testing for linear relationships and suggesting that nonlinear

relationships between the variables might exist, future research could employ more advanced models, such as the CART machine learning model, potentially revealing nonlinear relationships.

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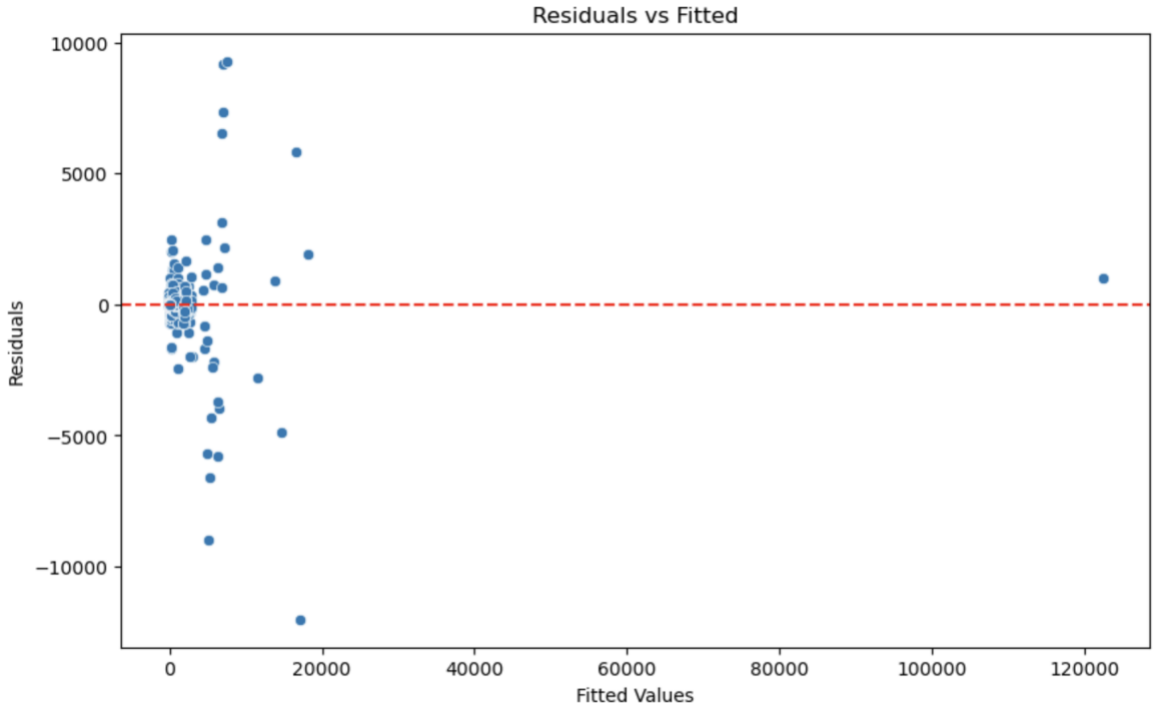
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Appendices

Appendix 1



Appendix 2

