IS OPERATING PERFORMANCE DRIVING STOCK PERFORMANCE?

A study on Swedish listed real estate companies

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Abstract:

As suggested by the title, the purpose of this study is to analyse the relationship between stock performance and operating performance using a sample of Swedish listed real estate companies. In recent years, Swedish real estate companies have experienced positive development profits and stock prices, driven by favourable development in real estate prices. Moreover, real estate companies have been awarded with a unique treatment in accounting according to International Financial Reporting Standards (IFRS), as fair value adjustments of the properties are reported in the income statement. In answering my research question, I use a regression-based approach connecting accounting data to stock performance. My sample period covers the last 10 years which gives a total sample of 163 company-year observations. The results indicate a positive relationship between operating performance and stock performance, in line with theory. According to my sample, levels in operating performance exhibits highest relationship to stock performance, while value relevance of change in operating performance appears to increase in recent years. I expand to earlier studies using a homogenous sample along with the method of decomposing earnings, separating operating activities from financial activities. As an attempt to contribute in a broader context, I discuss and problematize a high degree of value relevance related to the fair value adjustments.

Keywords: Value relevance, Real estate, Operating performance, IFRS, IAS 40

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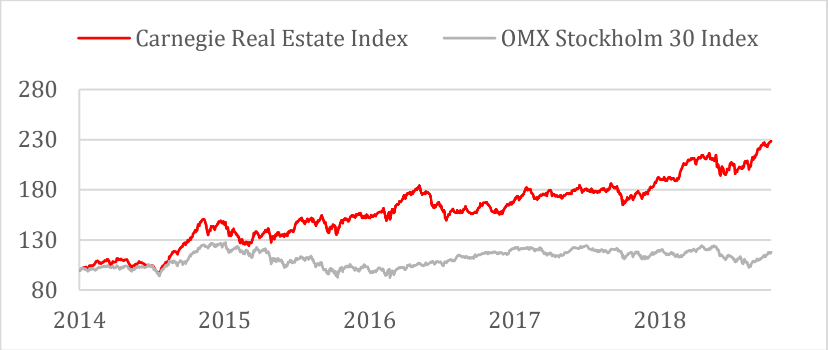
1. Introduction

By the end of 2017, total number of real estates in Sweden was estimated at approximately 3,3 Million (MN) while theoretical estimates of the combined market value exceeded 10 800 Billion Swedish krona (BSEK) (Bengtsson, 2018; SCB, 2018b; SCB, 2019). Put in a context, the Gross Domestic Product (GDP) in Sweden during 2016 was approximately 4 400 BSEK (SCB, 2018c). A second comparison can be made with the total market capitalization of all Swedish publicly listed companies, equal to approximately 7 000 BSEK by the end of 2017 (SCB, 2018a).

In Figure 1 below is a comparison between the Carnegie Real Estate Index and OMX Stockholm 30 Index acting as a benchmark. Recent development among listed real estate companies can partially be linked to the underlying development in real estate prices although this is not the only driver (Bengtsson, 2018). Since the beginning of the 1990s, development in real estate prices have increased by approximately 2.5-3.5 times, well above the development in real GDP (Bengtsson, 2018). Falling interest rates, increasing household income and rapid growth in construction costs have been identified as drivers among others (Bengtsson, 2018; Boverket, 2014).

Figure 1 – Development in a real estate index and a benchmark index between 2014 and 2018 (Carnegie, 2019; Nasdaq OMX, 2019)



The rapid development in prices on the Swedish real estate market have been spurred by favourable financial conditions. Real estates are typically perceived as safe and debt-friendly assets (Bengtsson, 2018). Issuance on the Swedish bond markets have reached new record levels in recent years and corporate bonds have become a popular funding source among real estate companies (Dickson, 2017; Landeman, 2019). A screening of the Annual Report from Handelsbanken, one of Sweden's major banks, confirms a high exposure to the industry. During 2017, about 85 % of total credit exposure was related to the property market (Handelsbanken, 2018).

However, a historical flashback reminds us why the current situation should not be taken for granted. Previous crises have typically been triggered by or been closely related to rapid fluctuations in real estate prices. As an example, the most recent global financial crisis during 2007 was triggered by complicated derivatives related to the US housing market (Berk & DeMarzo, 2013). From a Swedish perspective, the years between 1990-1994 were particularly severe for the real estate industry, shaking the credit market and forcing companies into financial problems (Jafee, 1994). Having this in mind, valuation of real estates is a popular topic for discussion in Swedish media.

The purpose of this study is to elaborate on the relationship between stock performance and accounting information, thereby expanding to the field of value relevance. By elaborating on the theoretical relationship through generic and industry-specific valuation models, it is illustrated how operating performance (e.g. profitability) is perceived as the ultimate driver of stock returns. I aim to test this relationship in a practical setting. This allows me to formulate my research question in an explorative manner:

Is operating performance driving stock performance?

In spirit of previous research within the field of value relevance I aim to extend on earlier findings using a homogenous sample during a period without any major changes in accounting standards. The choice of using real estate companies is also motivated by the unique treatment in accounting. According to International Financial Reporting Standards (IFRS) and IAS 40, real estate companies recognize fair value adjustments of their holdings in the income statement.

My sample consists of accounting data from Swedish listed real estate companies covering a period of 10 years (2008–2017). This gives me a total sample of 163 company-year observations. The study by Easton and Harris (1991) is used as a framework and allows me to define three regression models connecting levels and change in bottom-line earnings to stock performance. I expand to the study by Easton and Harris (1991) in decomposing bottom-line earnings using the leverage formula by Johansson and Runsten (2017). This allows me to separate operating activities from financial activities of the company.

My findings indicate a positive relationship between stock performance and operating variables, using the full sample and when using pooled- or even annual samples. In using the full sample combining all years, I can confirm my hypothesis of a positive relationship between levels in operating profitability and stock performance at a significance level of 1 %. According to the second model, I am unable to confirm a positive relationship between changes in Operating Net and stock performance, while I can confirm a positive relationship related to the fair value adjustments at a significance level of 1 %. For the third model, combining the first and second model, a similar pattern is observed although a negative relationship is observed related to changes in Operating Net. In turning to the pooled samples, the positive relationship between operating variables and stock performance persists according to the first and second model, although at lower levels of significance. According to the first model, using levels in earnings, estimated coefficients of operating variables are well-above 1, indicating stock return is amplified in earnings. However, for the five-period samples, I observe a significant drop in estimated coefficient related to variable capturing levels of Operating Net. According to my second model, using change in earnings as explanatory variables, estimated coefficient for Operating Net is below 1 while estimated coefficient related to the fair value adjustments is above 2, for the full sample. In contrast to findings from the first model, the relationship between stock performance and change in Operating Net appears to increase across my sample period.

The contributions of my findings are two-folded. First, I expand to earlier findings within the field of value relevance related to the unique characteristics of using a homogenous sample and the method of decomposing earnings. A positive relationship between operating performance and stock returns is consistent with theory, although the relationship is perceived as strong when compared to earlier findings and studies using a similar approach. As a final attempt to expand my findings on a general level, I discuss and problematize my findings of a positive association related to the fair value adjustments. However, the design and quantitative approach of this study limits the ability to draw any general conclusions on this matter. Consequently, I propose this as a topic for further research.

2. Previous research

2.1. Usage of accounting information for valuation purpose

In examining value relevance, a natural first step is to understand the usage of accounting information. Due to different capital providers, one would expect usage of accounting information to vary between investors. This was confirmed in a study by Cascino and Stefano (2014), providing an exhaustive overview on this topic. However, recent studies urge the increased importance and usage of alternative sources in addition to the information provided by financial statements.

Due to the large share of capital being managed by professional investors, their actions would play an important role from a valuation perspective. Holland (1998; 1999) suggest that professional investors primarily base their decisions on financial information provided by the company, in combination with interactions on company-level with management. Cascino et al. (2014) argues that earnings are perceived as most important from a valuation perspective, although they find accounting knowledge among equity investors to vary. A case study by Wömpener, Lachmann and Wöhrmann (2011) find investors to be misled by fair value accounting for liabilities which confirms the incomplete understanding as accounting becomes more complex. Information gathered is primarily incorporated into generic valuation models, such as the Discounted Cash Flow (DCF), Residual Income Valuation (RIV) or Abnormal Earnings Growth (AEG), albeit the DCF model perceived as the most simplistic tool (Barker, 1998; Barker, 1999; Cascino et al., 2014). For private and retail equity investors, alternative sources play an increasingly important role, such as public media or information from friends and family (Cascino et al., 2014). Other differences also exist. As an example, Cascino et al. (2014) finds that retail investors perceive the income statement and the balance sheet superior compared to the cash flow statement. Two experimental studies by Brooke Elliott and Frederickson and Miller (2006; 2004) indicate retail investors are more frequently misled by pro-forma statements and tend to use overly simplistic valuation models.

Given the size and value attached to listed companies in general, most of the shares is expected to be managed by professional investors. In spirit of the findings discussed above, one would expect professionals to mainly base their decisions on accounting information from annual- and interim reports. However, due to the unique treatment in accounting of investment properties according to IFRS, findings may also suggest various levels of knowledge concerning industry-specific treatment related to certain items, such as the fair value adjustments. This may offset the relationship between stock performance and accounting information.

2.2. Value relevance of accounting information from an empirical perspective

A natural starting point in examining the empirical evidence is to define the concept and understand potential interpretations of the term “value relevance”. According to Holthausen and Watts (2001) value relevance studies are typically categorized according to three interpretations. Various interpretations have been presented, although most tend to fall in one of these three categories (Aboody & Lev, 1998; Brown & Sivakumar, 2003). The first interpretation contains the *relative association studies*. Using a regression analysis, researchers test for explanatory power of the independent variables of the model. Allowing for different measures, value relevance is determined to what extent accounting numbers increases the explanatory power of the model, typically measured as adjusted R^2. Some studies elaborate on the specification of independent variables, although most studies simply uses bottom line measures, such as Net Income (Ball & Brown, 1968; Easton & Harris, 1991; Francis & Schipper, 1999). The second interpretation contains *incremental association studies*, examining the ability of accounting numbers in explaining market values or returns given a set of specified variables put in the context of other variables. As an example, Venkatachalam (1996) examines value relevance of disclosures related to derivatives on a sample of banks. The final third area covers the marginal *information content studies,* testing to what extent market is reacting on additional or new information from the financial statements. These studies typically involve earnings announcement studies, where value relevance is established if the market is reacting on new information (Ball & Brown, 1968). Based on the purpose of this study, this paper primarily falls into the *incremental association* category.

2.2.1. Evidence in value relevance of earnings and their components

Ball and Brown (1968) performed one of the earlier studies within this field which thereafter has gained much attention giving rise to an extensive amount of research on the topic of value relevance. Their study is successful in establishing the link between accounting information and stock price variations and is still today used as a benchmark. Most studies following the Ball and Brown study have been successful in confirming the value relevance of earnings using different research approaches and performed on different levels of earnings information, expanding to the initial findings. (e.g. (Ali & Hwang, 2000; Collins, Maydew, & Weiss, 1997; Easton & Harris, 1991; Francis & Schipper, 1999; Lipe, 1986; Sadka, 2007)).

Disaggregation of earnings can be made in several ways. Easton and Harris (1991) show how value relevance of earnings is increased by combining information based on both book values and observable market values. Furthermore, Sadka (2007) adds to this area by showing how earnings and accruals are more significantly associated with stock prices compared to dividends and cash flow measures. Not being limited to the statement of profit and loss, Collins et al. (1997) and Francis and Schipper (1999) observes how explanatory power of accounting information increases by including information from the statement of financial position, thus combining earnings and book values. More recently Naimah (2012) examines value relevance of earnings and book values in an Asian context. The study adds to the field by using a different sample, and value relevance is examined through the perspective of different accounting regimes. Value relevance is expected to be lower for companies applying liberal or conservative accounting, compared to those having a neutral accounting approach.

Taking a slightly different approach, Lipe (1986) and more recently Chen and Zhang (2007) examines the explanatory power of disaggregated earnings. In the Ball and Brown study, earnings are defined as "Net income" and subsequent studies have primarily used the same bottom-line approach. Lipe (1986) decompose earnings into six different components (Gross Profit, General & Administrative expenses, Depreciation, Interest costs, Tax costs and Other expenses). As anticipated, each of the components is providing additional information given the information from the five other components, and there is a lead-lag relationship between the various components. Only comparing the explanatory power of the components with the aggregated model, a decrease in explanatory power of the aggregated earnings is observed. Following their findings Chen and Zhang (2007) uses six different cash-flow-related factors for explaining returns: earnings yield, capital investment, other items, changes in profitability and growth opportunities. Rather different from earlier studies, they also incorporate changes in discount rate as an explanatory variable. The model predicts stock returns to be positively related to the four cash-flow variables, and as anticipated, negatively related to changes in discount rates.

The number of studies in a Nordic context is limited. Thinggaard and Damkier (2008) performed a study on Danish companies where value relevance is measured based on total market-adjusted stock return that could be earned from an investment strategy based on foreknowledge of information. Similar to the findings by Francis and Schipper (1999), they find foreknowledge of information to be positively correlated to superior return. Furthermore, they expand their findings as they show how accrual-based information is more value-relevant compared to cash-flow based information.

2.2.2. Evidence from historical development in value relevance

One possible evolution from earlier studies confirming the relationship between stock performance and accounting data is to track the development in value relevance over time. However, empirical results on the development of value relevance allow for various interpretations due to inconsistency in results. On one side, there is evidence of diminishing explanatory power of accounting information (Jinho. Chang, 1998; Lev & Zarowin, 1999). In contrast to these findings, a series of other studies observes an increasing relationship between accounting information and stock returns (Amir & Lev, 1996; Collins et al., 1997; Francis & Schipper, 1999). Collins et al. (1997) observe a decline in value relevance of earnings on a stand-alone basis and the decrease in explanatory power of earnings is absorbed by an increase in explanatory power of book values. A similar pattern was observed by Francis and Schipper (1999). Adding to their findings, Wild (1992) not only confirms the importance of book values, but also find the relevance to vary among company size and type of industry. One important take-away from the Wild (1992) study is that value relevance is influenced by individual characteristics of the business or industry along with overall development in accounting standards.

Lev and Zarowin (1999) derives the decreasing pattern in value relevance through the increasing rate of business change. This can be explained by an outdated accounting framework relying on historical discrete and transaction-based events (sales, purchases, investments etc.), while not being able to capture changes in the underlying business models. Prior to their findings, Amir and Lev (1996) investigated the explanatory power of earnings in a premature industry with similar conclusions. Using the wireless communication industry as the target of their study, they observe how accounting information can be replaced by non-financial information when the financial statements falls short of capturing value-relevant information. Ali and Hwang (2000) expand to these findings by including country-specific factors. Countries with a bank-oriented financial system, where capital supply is limited to a few homogeneous players, are found to have a lower value relevance compared to countries with a market-orientated financial system (where capital supply is not limited to a few players). Furthermore, Ali and Hwang (2000) finds value relevance to be lower when the accounting framework is closely linked to the tax system. This would entail in higher value relevance to general accounting frameworks, such as the IFRS.

One possible reason for the ambiguity in findings can be related to the design of the studies. Studies performed by Francis and Schipper (1999) and Collins et al. (1997) are based on U.S. companies covering a large time period. They contain large samples, thus being performed on a general level not controlling for company specific characteristics. The two studies performed by Lev and Zarowin (1999) and Wild (1992) uses a shorter timeframe and acknowledges industry-specific characteristics which allows them to extend their conclusions. Based on the findings by Amir and Lev (1996), accounting information from traditional industries would be expected to carry greater explanatory power from accounting information. However, this has not been tested on any larger scale. Standard setters are typically taking a conservative approach, merely trying to adapt to changes in the business environment. One possible issue in determining the development in value relevance is related to the methodology of measuring explanatory power using R^2. An increase in volatility of stock return over the time period may lead to conclusions of a weaker correlation between the variables, thus yielding a lower R^2 (Francis & Schipper, 1999). Most studies discussed above uses a large timeframe, thereby unable to control for the underlying economic situation of the market or the industry. Using a shorter time period may therefore improve the outcome on these kinds of studies.

In a Nordic context, Gjerde, Knivsflå and Sættem (2011) and Beisland and Hamberg (2013) have performed studies on Norwegian respectively Swedish companies. Beisland and Hamberg (2013) measures value relevance in the context of sustainability in earnings. Companies operating in non-traditional industries (with low level of capitalization) have more unsustainable earnings components compared to the traditional ones, thus value-relevance is perceived to be lower. This confirms the findings from earlier studies by Amir and lev (1996). The study performed by Gjerde et al. (2011) investigates value relevance from the perspective of accounting standards on Norwegian companies, prior to the adoption of IFRS. No loss in value relevance is observed during the period. Fundamental differences in accounting framework is discussed as a possible explanation, given the various results from earlier research. The Norwegian accounting framework is based on matching costs with revenues, while alternative standards as the American counterpart takes a balance-sheet approach (Gjerde et al., 2011). Not taking the balance sheet approach means the income statement contains less transitory items due to fair value revaluations, which is confirmed by empirical evidence from Hahn, Heflin et al. (2007) and Stunda and Typpo (2004).

3. Empirical background

3.1. Value relevance of accounting information from a theoretical perspective

The early findings by Modigliani and Miller (1961) are commonly perceived as a central cornerstone within security valuation (Pagano, 2012). Their findings rely on the assumption of perfect capital markets. According to the assumption, same set of securities can be traded at competitive market prices equal to the present value of their future cash flows (Berk & DeMarzo, 2013). Using cash flow as the ultimate driver is a natural starting point for a valuation framework as cash flow is ultimately what matters to an investor. A valuation based on cash flows typically relies on the DCF model where future expectations in cash flow being discounted to its present value. Thus, Present value of Expected Dividend (PVED) is a natural starting point in connecting the stock price to accounting information. However, according to the concept of dividends irrelevance by Modigliani and Miller, value of equity is ultimately explained by the value of operations. Thus, in separating operating activities from financial activities in a company, value of equity is merely perceived as a residual (Berk & DeMarzo, 2013; Penman, 2012). Valuations according to the flow approach is typically based on the present value of future expected Free Cash Flows (FCF), discounted at an interest rate appropriate to the riskiness of the business (Berk & DeMarzo, 2013; Koller, Goedhart, Wessels, & McKinsey & Company, 2015; Penman, 2012)

One alternative approach to the flow method is suggested by Penman (2012) where current market value is anchored on information directly from the financial statements. Two application of this approach are the RIV and the AEG models (Penman, 2012). Both using the simple prototype model where value is explained by current accounting data and a premium from unobservable information. The RIV model anchors on the current book value of equity while the premium being explained by present value of future residual income. Residual earnings correspond to future expected earnings above the required earnings. Rather than using book value as anchor, the AEG model is based on bottom-line earnings. Current value is explained by capitalized current earnings while the premium is derived from future abnormal earnings growth. The latter being explained by growth in earnings above those equal to the required return (Penman, 2012).

3.1.1. Industry-specific valuation methods for real estates

Valuation of real estates can be made according to various methods, although mainly the four methods listed below are commonly used in practice (Baum, Nunnington, & Mackmin, 2011; Bengtsson, 2018). My focus will be on the yield method, as this method being most attached to general theoretical valuation models while others primarily are perceived as simplifications or alternatives to the yield method.

1. *Location method*
2. *Production cost method*
3. *Hedonic method*
4. *Yield method*

The location method resembles a valuation method according to multiples, building on the law of one price and thereby excluding possible arbitrage opportunities (Berk & DeMarzo, 2013). It is an inductive method, where historical transaction prices are transferred and applied elsewhere (Bengtsson, 2018). The method involves calculation of a multiple based on comparable attributes perceived as value drivers. The location method is frequently used for residential property valuation where prices are publicly observable, and with similar characteristics of the properties (Bengtsson, 2018).

The production cost method hinges on the concept of alternative cost, ultimately mirroring the replacement value. Application of this method involves a stepwise procedure. Starting with the replacement cost of the property, one first adjusts for the current state of the property, and second for the premium in market value over replacement value (referred to as "Tobin's Q") (Bengtsson, 2018). Applying this method is time-consuming and involves several individual assumptions, why the production cost method primarily is applied for valuation of separate parts of a property where none of the other methods are appropriate or where alternative input data is unavailable (Bengtsson, 2018).

Hedonic valuation method is perceived as highly theoretical and involves usage of unobservable variables (Bengtsson, 2018). The method applies implicit prices from certain attributes of a property, aggregated into one single combined value or index. Using a residential property for illustration, a hedonic model would incur values of variables as; relative location to workplaces, proximity to nature, service stores, etc. (Bengtsson, 2018). The hedonic method may also be applied for calculating incremental values on property characteristics, e.g. the incremental value of having a balcony (Bengtsson, 2018). A third application of the method is to calculate indices that are generalizable. One example is the annual index calculated by Valueguard, using a hedonic approach (Bengtsson, 2018; Valueguard, 2019).

The yield method is primarily used for valuation for commercial purposes, where the value of the property is justified by future economic surplus from leasing revenues (Baum et al., 2011; Bengtsson, 2018). The yield method is divided into the DCF approach and the capitalization approach. Furthermore, it relies on measures from the industry-specific income statement, as examined below (Baum et al., 2011; Bengtsson, 2018).

Figure 2 – A simplified income statement for real estates (Bengtsson, 2018)

+	Rental value
-	Voids
=	Effective gross income
+	Other revenues
-	OPEX
=	***Operating net (I)***
-	Investments
=	***Operating net (II)***

The simplified income statement in Figure 2 also provides an indirect approach of the cash flow statement. Starting with revenues and expenses, "Operating Net (I)" is an earnings-based metric also reflecting operating gross cash flow similar Earnings Before Interest, Taxes, Depreciation & Amortization (EBITDA). A deduction of investments yields the "Operating Net (II)" which is a cash flow measure similar FCF, assuming no change in Net Working Capital (Koller et al., 2015).

The two versions of the yield model are only two approaches in calculating the value. According to the DCF approach, all future Operating Net being discounted to its present value. However due to simplification, the most common version follows the principle of capitalization and is based on a Normalized Operating Net representative for the future. The capitalization approach is thus expressed accordingly (Baum et al., 2011; Bengtsson, 2018):

$$V_0 = \frac{Normalized\ Operating\ Net_{t+1}}{Yield} \qquad (3.1)$$

Where: $Yield = r - g\ (r = required\ return\ and\ g = growth)$

When using the capitalization method, it is desirable to use normalized Operating Net since we are looking for a sustainable long-term Operating Net representative to the future (Baum et al., 2011; Bengtsson, 2018). Short-term Operating Net is affected by timing of investments and current gross income and may not be a fair representation of future expectations.

Comparing the yield method with the alternative methods, the location method is a simplification why it may be more convenient. However, when applying a multiple, one inherently undertakes several assumptions. For residential properties this may be more appropriate, but as commercial properties may have been built to serve a specific business this may deteriorate its usefulness. As the location method heavily relies on transaction data, it will exacerbate the sentiment of the market. The production cost method is highly theoretical and compared with the yield method, it relies on non-observable assumptions. The hedonic method uses various variables and it infers a more objective perspective as the valuation goes beyond the financial statements. Creating a hedonic valuation requires access to data, and it requires continuous calibration.

3.2. IAS 40 – Investment property

From an accounting perspective, real estates held for commercial purposes have been rewarded with a separate standard according to IFRS. Applying IFRS is typically a prerequisite for listed and publicly traded company (Nasdaq OMX, 2016).

IAS 40 was initially adopted in 2001 by the IASB (International Accounting Standards Board) albeit being effective since 2005 (International Accounting Standards Board & IFRS Foundation, 2018). IAS 40 allows companies to apply a fair value model where the assets classified as investment properties are measured at fair value on the balance sheet and changes in fair value are recorded on the income statement (International Accounting Standards Board & IFRS Foundation, 2018). Applying a fair value balance sheet is a unique characteristic going against traditional standards based on historical cost accounting rules. According to IAS 40, an entity choosing the fair value model shall measure all its investment property at fair value. A specific model in determining fair value is not articulated in the standards, however there are guidelines about the fair value concept being heavily dependent on an active market where prices are based on historical transactions. This definition provides a clear link to the location method earlier discussed. As an alternative to the location method, the standards allot the yield method.

3.3. Formulation of hypothesis

Due to the various findings in previous research, I aim to contribute to this topic by examining a specific industry. Using the real estate industry as empirical target is motivated by a high degree of maturity within the industry. Real estates are typically perceived as a traditional industry with low risk, while recent years have been characterized by large profits and positive value appraisals. Given the combined value attached to properties, the industry constitutes an important part of the financial system. A second area for motivation is the recent development within the accounting standards and the specific fair value treatment of investment properties under IFRS which allows real estate companies to apply a fair value model on their properties.

Based on earlier success in establishing the relationship between stock performance and accounting data and since using a traditional industry, I expect a high degree of value relevance related to operating performance. As evident from the examination of previous research, a large part of the dominant studies within this area were performed towards the end of the 20th century and number of new studies have lately been moderate why my results may be expected to deviate due to the development in accounting standards. The model initially specified by Easton and Harris (1991) is my starting point and is further developed based on a theoretical relationship allowing for a separation of operating activities. Considering the theoretical relationship in drivers of earnings and in light of previous findings, my hypothesis will be formulated in a directional manner. Hence, I hypothesize that stock performance is driven by both levels and change in operating profitability.

Hypothesis: Operating profitability is positively associated with stock returns

4. Method

4.1. Connecting stock performance to accounting information

4.1.1. Return and levels of earnings

The specification of the first model is based on the model initially specified by Easton and Harris (1991). This further relies on the simple prototype model used to develop the RIV and AEG models. The aim is to measure explanatory power of operating profitability over stock return; thus, the simple prototype model is reformulated on a per-share basis. As expressed by the RIV model, residual return is the driver of value in addition to the anchored book value. For full specification of all steps, see Easton and Harris (1991).

$$\Delta P_{jt} = \Delta BV_{jt} + u'_{jt} \qquad (4.1)$$

Where: $\Delta P_t = Change\ in\ price\ of\ share\ j\ between\ time\ t-1\ and\ time\ t$

$\Delta BV_t = Change\ in\ book\ value\ of\ share\ j\ between\ time\ t-1\ and\ time\ t$

$u'_t = Change\ in\ premium\ from\ unobservable\ value\ drivers$

Applying the assumption of clean surplus relationship, one gets:

$$\Delta BV_{jt} = X_{jt} - d_{jt} \qquad (4.2)$$

Where: $X_{jt} = Net\ Income\ of\ company\ j\ during\ period\ t$

$d_{jt} = Net\ Dividends\ of\ share\ j\ during\ period\ t$

According to the clean surplus relationship, changes in book value of equity is explained by Net Income during the period less Net Dividends during the same period. Net Dividends capture all transactions with owners and includes both returns paid out by the company as dividend or stock repurchases, as well as money paid in by the owners as New Issue.

In order to arrive at the final model where return is dependent on the accounting information, we must substitute (4.2) into (4.1), rearrange, and divide by beginning of the period price P_{jt-1}. This yields the final equation (Easton & Harris, 1991):

$$\frac{\Delta P_{jt}+d_{jt}}{P_{jt-1}} = \frac{X_{jt}}{P_{jt-1}} + u''_{jt} \qquad (4.3)$$

According to the theoretical relationship, total return from owning a share between year t-1 and time t is explained by Net Income divided by beginning-of-period price per share. The term $\frac{X_{jt}}{P_{jt-1}}$ deserves some further attention as earnings divided by beginning-of-period share price reminds us of the Return on Equity (ROE) formula. The traditional formula uses book values; hence this is a market-based version of the ROE formula. My primary focus is the relationship between accounting information and returns, and the premium term (u''_{jt}) is disregarded as it captures value relevant information not reflected by accounting information (Easton & Harris, 1991).

4.1.2. Return and change in earnings

One extension to the previous model is the application of the AEG model where earnings is of primary concern. Using the prototype model for the AEG model, share price is expressed as a function of growth in earnings (Easton & Harris, 1991):

$$P_{jt} = \rho X_{jt} + u_{jt} \quad (4.4)$$

Using the dividend irrelevance proposition by Miller and Modigliani (1961), Easton and Harris (1991) illustrate how total return from holding a stock is explained by the change in earnings between period t-1 and time t, divided by beginning-of-period price of the stock. The return relationship is defined accordingly (Easton & Harris, 1991):

$$\frac{\Delta P_{jt}+d_{jt}}{P_{jt-1}} = \rho \frac{\Delta X_{jt}}{P_{jt-1}} + u''_{jt} \qquad (4.5)$$

Where: $\Delta X_{jt} = X_{jt} - X_{jt-1}$

Total return is explained by change in earnings divided by beginning-of-period share price. This expression may be interpreted as the growth in current earnings in excess of earnings from previous period. Hence, growth in earnings is ultimately driving value. Constant earnings would not yield any return and value would be constant if disregarding the premium term. The term ρ is a coefficient assumed to be constant across companies and time periods (Easton & Harris, 1991).

4.1.3. Return and earnings relationship combining both levels and change

As a final elaboration of the relationship between return and earnings, Easton and Harris (1991) introduces a model combining the individual models (formulas 4.3 & 4.5). It is argued that stock price is expected to be a function of levels and change in earnings, which further motivates the increased value of combining the two models. According to the combined model, total return from owning a share is a weighted function of both levels and change in earnings. This gives us the combined model (Easton & Harris, 1991):

$$\frac{\Delta P_{jt}+d_{jt}}{P_{jt-1}} = k\rho \frac{\Delta X_{jt}}{P_{jt-1}} + (1-k)\frac{X_{jt}}{P_{jt-1}} + u''_{jt} \qquad (4.6)$$

According to the specification of the combined model, total return is explained by the weights of both level and change in earnings divided by beginning-of-period share price. Variable k is perceived as a constant used for weighting the contributions of the two independent variables. As expressed above, this model may not be as theoretically motivated compared to the individual models, it is rather based on earlier empirical evidence and general perceptions from previous research.

4.2. Decomposition of earnings

4.2.1. Decomposing drivers of return

To answer the question of this thesis, this relies on the ability to separate value drivers related to operating profitability of the company. In using bottom-line earnings, these are affected by both operating and financial activities. Thus, I need to decompose bottom-line earnings used in formula 4.3 and 4.5 into operating and financial activities. Luckily, I can rely on the relationship developed by Johansson and Runsten (2017) who elaborates on the return relationship by decomposing bottom-line earnings into operating and financial activities of the company. This relationship is illustrated by developing the leverage formula, as specified below (Johansson & Runsten, 2017):

$$R_t^E = (R_t^{ONA} + (R_t^{ONA} - R_t^{ND}) * \frac{ND_{t-1}}{E_{t-1}}) \qquad (4.7)$$

Where: $R_t^E\ (ROE) = Return\ on\ Equity\ at\ time\ t\ (after\ tax) = \frac{Net\ Income_t}{Equity_{t-1}}$

$R_t^{ONA}\ (RONA) = Return\ on\ Operating\ Net\ Assets\ at\ time\ t\ (after\ tax) = \frac{Operating\ Incomee_t}{Operating\ Net\ Assets_{t-1}}$

$R_t^{ND}\ (COND) = Net\ borrowing\ cost\ at\ time\ t\ (after\ tax) = \frac{Financial\ net_t}{Net\ Debt_{t-1}}$

As argued by Johansson and Runsten (2017), R_t^E is a measure of total risk and captures both operating and financial risk. Operating risk is captured by R_t^{ONA} and is the risk related to the operating activities of the company capturing all risk except for financial risk. Hence it captures the riskiness of investment policy, price policy, marketing policy etc. (Johansson & Runsten, 2017). The expression $(R_t^{ONA} - R_t^{ND}) * \frac{ND_{t-1}}{E_{t-1}})$ captures financial risk related to the financing policy of the company where leverage is acting as lever adding to the total risk of the company. In summary, the leverage formula illustrates the benefit of having leverage since one can increase ROE without increasing the underlying profitability. Meanwhile and illustrated with the formula, operating profitability is the ultimate driver of return.

In order to decompose bottom-line earnings using the leverage formula, one needs to switch from book values into market values. As evident from the previous section, stock performance is explained by levels and change in earnings, both being scaled by beginning-of-period market price of the shares. Thus, in switching to market values I can apply the leverage formula to decompose earnings. Recalling the restated balance sheet, if having access to market prices of the shares and assuming book value of net debt carried at market value I can calculate market value of operations, expressed as P^{NOA}, equal to the sum of market value of the shares P^{Equity} and market value of Net Debt P^{ND}. The assumption of Net Debt being carried at market value on the balance sheet is a widely used assumption used in both theory and practice (Berk & DeMarzo, 2013; Penman, Richardsson, & Tuna, 2007; Penman, 2012). Since all companies in my sample applies IFRS this framework is commonly perceived as a step towards full application of fair-value accounting (Jaijairam, 2013)

Thus, this gives me the following relationship:

$$P^{NOA} = P^{Equity} + P^{ND} \qquad (4.8)$$

In transforming the leverage formula into a per-share basis and switching to market values, I can simply substitute the two versions connecting stock performance to accounting information in formulas 4.3 and 4.5. This allows me to separate levels and change in bottom-line earnings scaled by beginning of period price by operating and financial activities according to the leverage formula.

4.2.2. Components of Operating Income

Based on the industry-specific (3.1) valuation model earlier discussed and as illustrated in Figure 2, Op Net is perceived as the ultimate value driver. In calculating Return On Net Assets (RONA), one uses Operating Income. Due to the specification of the income statement according to IAS 40, Operating Income typically includes fair value adjustments and other items related to the operations of the company. Thus, Operating income can be decomposed in the following way:

$$\text{Operating Income}_t = \text{Operating Net}_t + \text{FV}_t + \text{Other Operating Income}_t \qquad (4.9)$$

Operating Net contains revenues and expenses related to the real estates under management (illustrated in Figure 2). FV captures fair value adjustments of investment properties due to the application of IAS 40. Other Operating Income is a residual containing items related to administration and overhead costs, or alternative income or expenses not being directly related to real estate operations.

4.3. Model measuring relationship between operating profitability and stock returns

4.3.1. The Dependent Variable

The dependent variable is defined as the total return from holding the stock during the time window period, adjusted for transactions with the owners:

$$R_{jt} = \frac{P_t + d_t - P_{t-1}}{P_{t-1}} \quad (4.10)$$

Where: $P_t = Price\ per\ share\ at\ time\ t$ and $d_t = Net\ Dividends\ per\ share\ at\ time\ t$

The specification of the dependent variable is the same used by Easton and Harris (1991). Total return is measured as the sum of changes in price and net dividends, divided by beginning-of-period share price. In line with the dividend irrelevance proposition by Modigliani and Miller (1961), Net Dividends captures all transactions with owners. Capital paid out by the company involves regular dividends and share repurchases. Capital paid in by investors includes new rights issues and non-cash issues. Using total number of outstanding shares at time t means potential treasury shares are deducted. Other adjustments to the number of shares is considered individually.

4.3.2. The Independent Variable

The independent variables used to test the variability in return will follow the same approach used by Easton and Harris (1991). The first model is based on levels of earnings while the second is based on change in earnings. The third model combines the two in order to capture the effect from both variables.

Independent Variables Model 1: $\frac{X_{jt}}{P_{jt-1}}$ (4.11)

Independent Variables Model 2: $\frac{\Delta X_{jt}}{P_{jt-1}}$ (4.12)

Independent Variables Model 3: $\frac{X_{jt}}{P_{jt-1}} + \frac{\Delta X_{jt}}{P_{jt-1}}$ (4.13)

In order to separate drivers related to operating profitability, the independent variables are decomposed related to operating and financing activities. All Independent variables being decomposed according to the leverage formula and components of Operating Income. Operating performance is captured by levels and change in $R'^{P^{NOA}}_t$, while financial performance is captured by levels and change in $R'^{P^{ND}}_t$ and levels of $\frac{P^{ND}_{t-1}}{P^{E}_{t-1}}$. Operating performance is decomposed using the relationship in formula 4.9. Thus, I define the following variables:

$$Op\ Net_t = \frac{Operating\ Net\ per\ share_t}{P^{NOA}_{t-1}} \quad (4.14) \qquad FV_t = \frac{Fair\ Value\ change\ per\ share_t}{P^{NOA}_{t-1}} \quad (4.15)$$

$$Other\ OI_t = \frac{Other\ Op.\ Income\ per\ share_t}{P_{t-1}^{NOA}} \quad (4.16) \qquad COND_t = \frac{Fin.net\ per\ share_t}{P_{t-1}^{ND}} \quad (4.17)$$

$$LEV_t = \frac{P_{t-1}^{ND}}{P_{t-1}^{E}} \quad (4.18)$$

4.3.3. Control variables

The relationship between stock performance and accounting information is developed using a theoretical framework, however it is appropriate to control for other factors that potentially may drive the share price alone or in combination with the accounting information included in the models. Usage of control variables in previous value relevance studies is limited although some studies uses variables to control for negative earnings or volatility in share price (Francis & Schipper, 1999; Gjerde et al., 2011). Due to the limited size of my annual samples and the inclusion of several predictors in my models, I only include control variables that are motivated by the theoretical relationship alternatively by potential industry-specific drivers. Inclusion of too many predictors would deteriorate the results of my models, since having an overfitted model. Also, since using raw return as the dependent variable, the purpose of this study is not to elaborate on the relative return compared to a certain benchmark or risk-weighted abnormal return. It is merely to establish a relationship and to compare relative importance components in earnings. Finally, I argue inclusion of new control variables would decrease ability to compare my results to earlier studies.

Controlling for changes in the risk-free rate

In line with the earlier discussion of drivers behind the positive development on the real estate market, falling interest rates are frequently pointed out as one of the major drivers (Bengtsson, 2018; Boverket, 2014). In recalling the industry-specific valuation model (3.1), any changes in discount rates are expected to have a major influence on the value. According to theory, changes in the discount rate may be driven by changes in the underlying riskiness of the assets, alternatively by changes in the risk premium explained by market return and risk-free rate (Berk & DeMarzo, 2013). In controlling for changes in the risk-free rate, I can include any effect on share price not related to company-specific characteristics. Moreover, risk-free rate is easily approximated without own assumptions. Inclusion of interest rate has also been performed in one earlier study, with satisfactory results (Chen & Zhang, 2007). The prime rate set by Riksbanken is used as a proxy for the risk-free rate and is measured on annual basis.

Controlling for changes in company tax rate
Maintaining the theoretical relationship between stock performance and accounting data requires usage of after-tax items. However, effective tax rate typically deviates from the nominal tax rate. Due to the fair value revaluations, real estate companies typically carry large amount related to deferred tax liabilities on their balance sheets. Thus, changes in corporate tax rate is expected to have an impact on value of equity why I control for variabilities in the corporate tax rate. Over the sample period, company tax rate has been reduced two times. In 2008 company tax rate was 28 % while in 2017 it was 22 %.

4.3.4. Defining the models

$$\hat{R}_{jt} = \hat{a}_{t0} + \hat{a}_{t1}Op\ Net_{jt} + \hat{a}_{t2}FV_{jt} + \hat{a}_{t3}Other\ OI_{jt} + \hat{a}_{t4}COND_{jt} + \hat{a}_{t5}LEV_{jt} + Controls + \varepsilon_{jt}^{1} \quad \text{(M1)}$$

$$\hat{R}_{jt} = \hat{a}_{t0} + \hat{a}_{t1}\Delta Op\ Net_{jt} + \hat{a}_{t2}\Delta FV_{jt} + \hat{a}_{t3}\Delta Other\ OI_{jt} + \hat{a}_{t4}\Delta COND_{jt} + \hat{a}_{t5}LEV_{jt} + Controls + \varepsilon_{jt}^{2} \quad \text{(M2)}$$

$$\hat{R}_{jt} = \hat{a}_{t0} + \hat{a}_{t1}Op\ Net_{jt} + \hat{a}_{t2}FV_{jt} + \hat{a}_{t3}Other\ OI_{jt} + \hat{a}_{t4}COND_{jt} + \hat{a}_{t5}LEV_{jt} + \hat{a}_{t6}\Delta Op\ Net_{jt} + \hat{a}_{t7}\Delta FV_{jt} + \hat{a}_{t8}\Delta Other\ OI_{jt} + \hat{a}_{t9}\Delta COND_{jt} + Controls + \varepsilon_{jt}^{3} \quad \text{(M3)}$$

Where: $\hat{a}_{t0} = Estimated\ constant$

$\hat{a}_{tn} = Estimated\ coefficient\ for\ independent\ variable\ n$

$\varepsilon_{ji} = Random\ error\ term$

4.3.5. Expected estimates of explanatory variables

The estimated variables $\hat{a}_{tn}$ should statistically deviate from 0 to confirm value relevance. In line with the theoretical discussion and the findings from previous studies I expect earnings in level and change to be positively associated with returns. Due to the theoretical extension of my model, I expect some variations among the variables. Below I will discuss expectations of the estimated coefficients for each variable.

Operating performance
As specified by the leverage formula, operating performance is expected to be associated with return in two ways. In absence of any Net Debt, RONA is equal to ROE. However, in presence of leverage, RONA is amplified by leverage. Consequently, one unit of change in operating profitability is

expected to increase return at least by one unit. In the presence of leverage, the relationship is expected to be above 1.

The estimated coefficient of $Op\ Net_{jt}$ is expected to be positively associated with return since perceived as the ultimate driver of value according to theory. As a result, I expect the estimated coefficient related to levels and change of $Op\ Net_{jt}$ to be positive, equal to or above 1.

Considering the expected value of the estimated coefficient of FV_{jt}, this can be two-folded. Changes in fair values goes straight into book value of Operating Net Assets (ONA) and equity, thus according to the first model I would expect a positive association. Increases in fair values might be interpreted as an increase in expectations about the future, although not immediately it should be reflected at some point in time by an increase in Operating Net. This would lead to an expected positive value of the estimated coefficient, at least not equal to 0. On the other hand, according to the theoretical yield model Operating Net is expected to be the ultimate value driver while fair value revaluations would not be associated with returns. Also, since I control for variability in interest rates, fair value adjustments would merely capture changes in risk of the properties other than those reflected in immediate change in Operating Net. Due to the theoretical ambiguity, I expect the estimated coefficient related to FV_{jt} to be equal to or above 0. A negative association is highly unexpected.

The third and final part of the operating performance is the residual term $Other\ OI_{jt}$, capturing all non-core activities. For some companies, Other OI only captures overhead expenses thus being negative. For other companies with non-core operations, Other OI may be more significant. In all, it is expected to be insignificant when compared to Op Net and FV. Therefore, estimated coefficient is expected to be positively associated with return since being a part of Operating Income. However, companies with more significant Other OI may cause the estimated coefficient to be distorted from its expectations.

Financial performance

Although my main focus is on the operating variables, expectations according to financial variables is briefly discussed and assessed as a control of the theoretical relationship. As specified by the leverage formula (4.7), the two variables related to financial activities are expected to be associated with returns in separate ways. The first variable $COND_{jt}$ is expected to have a negative impact on returns, while the second variable LEV_{jt} is expected to be positively related to return as long as the operating spread is positive. Thus, the estimated coefficient of $COND_{jt}$ is expected to be negative. For companies with low leverage, it is expected to be between 0 and -1. Conversely, if leverage is high it is expected to be less than -1. The final variable, LEV_{jt} is expected to be positively associated with returns. As leverage is amplifying both operating profitability and cost of Net Debt, I expect the estimated coefficient related to LEV_{jt} to be positive and greater than 0.

5. Data

5.1. Sample selection

My sample is limited to real estate companies listed on Nasdaq OMX Stockholm. Furthermore, only companies listed on any of the main markets (Large Cap, Mid Cap and Small Cap) are included. The restriction to Swedish companies is motivated by creating a homogenous sample and to avoid any potential country-specific characteristics. Using listed companies ensures equal treatment in accounting due to the compulsory application of IFRS (Nasdaq OMX, 2016). This also eliminates the risk of accounting standard bias. A final consideration has been made with regards to the time-consuming process of manual data collection. Furthermore, using a sample period of 10 years is motivated by having a period free from major changes in the accounting standards. IAS 40 was introduced in 2005, not including the years between 2005 and 2008 ensures any changes in accounting interpretations would have been settled. Including more years would decrease my sample size in earlier years.

In order to obtain a clean sample of companies classified as pure real estate companies, classification of data has been made according to The Global Industry Classification Standards (GICS). My final sample is based on the lowest level according to the GICS system, “Real Estate Operating Companies” (GICS code 60102020) (S&P Global Market Intelligence & MSCI, 2018). In Table 1 below is a summary of the selection process in obtaining my final sample. A complete list of companies and total observations for each company is presented in Table A10 in Appendix.

Table 1 – Summary of the data selection process

Sample selection real estate companies (GICS code 60102020)	No. of observations
Selection of real estate companies	
Companies currently listed on Nasdaq OMX Stockholm (Main Markets)	22
- Exclusion of companies listed in 2017 or later	-3
Total number of companies in the sample	**19**
Manual data selection	
- Theoretical amount of company-year observations based on number of companies	190
- Missing observations due to companies not listed during 2008-2017	-27
Final sample (company-year observations)	***163***

5.2. Data collection process and data quality

From the data collection process, it was noted that the specification and design of the financial reports are highly individual. Consequently, data have been collected manually from the Annual Reports published between 2007 – 2017. All companies have same fiscal year equal to the calendar year why no adjustments are made from the reported data. Annual Reports are obtained from the company's website. In a few cases of missing reports, these are collected using the database Retriever. Data is collected on annual basis, thereby not considering any interim reports.

Manual collection of accounting data from the Annual Reports increases the risk of lower data quality due to the human factor. To ensure data free from any errors, collection is performed on item-level, allowing for calculation of the bottom-line items that are compared with reported numbers in each Annual Report[1]. This allows me to double-check most numbers. Formal checks have also been carried out within the dataset, such as the clean surplus relationship and changes in balance sheet items to be explained by items in the income statement. Due to some assumptions made according to the classification of certain numbers, a definition of each variable is presented in Table A1 in Appendix.

Stock prices and market values were retrieved from the database Eikon. The dependent variable is calculated as the return from holding the stock over a twelve-month period, including any dividend paid by the company during that period. In order to capture the accounting information from the annual reports, share price is calculated April 1st to March 31st the following year. This

[1] The manually collected dataset can be obtained upon request by e-mail.

ensures any movements in stock price caused by publication of the Annual Report is captured. Stock prices and dividends per share have been adjusted for any changes by the company, such as stock splits. In dubious cases, these numbers have been confirmed from alternative sources or when reported in the Annual Report.

5.3. Statistical concerns

In applying Ordinary Least Square (OLS) regressions, one inherently undertakes certain assumptions. In testing these assumptions, one assures the robustness of the findings. Below, important assumptions will be discussed along with methods in testing for these assumptions to hold. Formal tests of robustness are performed for each model and is further discussed after presentation of my results.

Multicollinearity

One initial requirement of the OLS regression is the choice of independent variables being uncorrelated. Presence of any correlation among variables would indicate presence of multicollinearity causing misleading results and individual coefficients not being statistically significant (Newbold, Carlson, & Thorne, 2013). In studying a correlation matrix between variables used in the model, one can detect any obvious issues related to multicollinearity. Using both Pearson's correlation and Spearman's correlation allows me to test the linear and the monotonic relationship between the variables (Newbold et al., 2013). A second test to detect any symptoms of multicollinearity is to study the relationship comparing explanatory power of the variables in combination (measured through the F-statistics), against individual explanatory power of each coefficient (measured through Student's t-statistics). Moreover, a formal test using the Variance Inflation Factor (VIF) index is also employed. Using a simple rule of thumb may not always be appropriate why the VIF index is used in combination with other methods (O'Brien, 2007). For simplicity I use a cut-off value of 10, indicating severe form of multicollinearity (Wooldridge, 2016).

Heteroskedasticity

Prior research suggests heteroskedasticity may be present for return regressions when using a homogenous sample and the limitation of only including listed companies (Tsalavoutas, André, & Evans, 2012). Furthermore, due to the scale-effect, heteroskedasticity is a recurrent issue among value relevance studies although it appears as most problematic for price level regression using unscaled accounting information (Gjerde et al., 2011). Although heteroskedasticity not causing bias or inconsistencies in the OLS estimators, presence of heteroskedasticity still being an serious issue as it leaves us with the conclusion of ordinary OLS t-statistics not following the t-distribution (Wooldridge, 2016). In presence of heteroskedasticity one can adjust standard errors in obtaining heteroskedasticity-robust standard errors. Several methods have been suggested to adjust for heteroskedasticity, although Eicker-Huber-White estimator (denoted HC0) was the initially developed approach (Wooldridge, 2016). One shortcoming to the HC0 estimator is that it tends to be biased in finite samples, and a different approach denoted HC3 has been suggested as the best performing estimator (Cribari-Neto & Silva, 2011). To ensure the underlying assumption of homoskedasticity holds, two formal tests are employed; the Koenker and the Breusch-Pagan tests. The former test is considered as more simplistic and general, while the latter is a large sample test and assumes the error terms to be normally distributed (Lyon & Tsai, 1996; Wooldridge, 2016).

Autocorrelation
A third requirement in employing OLS regression is the assumption of independent error terms, while presence of uncorrelated error terms is referred to as autocorrelation (Newbold et al., 2013). In testing for presence of any autocorrelation, a Durbin-Watson test is employed. A Durbin-Watson score close to 2 is typically what one is looking for.

6. Empirical results

Each regression model is assessed using different time periods. First, regression models are tested for the full sample combining all years, followed by annual regressions. In addition, samples are pooled using two-year periods and five-year periods.

6.1. Results of value relevance according to Model 1

6.1.1. Variable descriptives

Descriptive statistics for variables used in Model 1 is presented in Table A2 in Appendix. Evidently, variations in *Return* is high while the median is equal to 19 %. *Op Net* is positive for all years and with very low variations between individual years. Variable *FV* is positive for most observations although there are some outliers. *Other OI* is mainly negative, in line with expectations and *COND* being positive in line with expectations. Variable *LEV* appears to be concentrated around 1 for most observations, indicating equal proportions of Net Debt and Equity.

6.1.2. Correlation between variables

Correlation between variables used in Model 1 for the full sample is tested using Pearson's along with Spearman's correlation test, presented in Table A4 in Appendix. The results suggest similar correlation coefficients according to both methods, although Spearman's correlation tend to be slightly higher compared to Pearson's method. Correlation between the dependent variable and the independent variables *Op Net* and *FV* are both positive 0.3 respectively 0.2, and statistically significant at the 1 % level using Pearson's correlation. According to Spearman's method, correlation between *Op Net* and *Return* is slightly higher, while correlation between the latter and *FV* is considerably lower, not being statistically significant. Variable *LEV* is positively correlated with return (0.33) and significant at the 1 % level. For correlation between independent variables, highest correlation appears between variables *COND* and *Op Net* at 0.48, while *LEV* is positively correlated to both *Op Net* and *FV* at around 0.3. All being statistically significant. Correlation between *Op Net* and *FV* appears to be negative and significant according to both methods.

6.1.3. Regression results

When the regression is applied over the full sample, my results indicate estimated coefficient for operating variables are positive, well above one, and significant at the 1 % level. As anticipated, *COND* is significant and negatively associated with return while *LEV* also being significant and positively associated with returns in line with my expectations. Overall explanatory power of the model (adjusted R^2) is 0.49. When regression is performed for individual years, the statistical significance for individual variables is generally lower due to the lower number observations. In recent years, statistical significance for *FV* appears to increase as I can reject the null hypothesis at the 5 % level for individual years between 2013-2017, while *Op Net* only being significant during 2015 and 2017 during the same period. Examination of annual explanatory power indicates greater volatility between individual years. For most years, adjusted R^2 is around 0.3, while four out of ten years being above 0.5. Explanatory power in 2012 is perceived as an outlier, being close to zero.

Table 2 – Pooled regression results for Model 1

Year	N	Intercept	Op Net	FV	Other OI	COND	LEV	Adjusted R^2
ALL	163	-0.35	4.26	2.65	5.05	-1.47	0.13	0.49
		*(-4.37)***	*(3.18)***	*(9.47)***	*(2.91)***	*(-3.14)***	*(4.46)***	
2008 -	73	-0.30	7.36	1.72	8.23	-3.08	0.06	0.66
2012		*(-2.61)**	*(3.76)***	*(1.90)**	*(3.06)***	*(-3.88)***	*(1.62)*	
2013 -	90	-0.34	3.03	2.06	1.68	0.00	0.08	0.67
2017		*(-4.68)***	*(2.57)***	*(9.32)***	*(1.13)*	*(0.00)*	*(2.34)**	
2008 -	28	-0.81	8.77	-1.51	13.06	-2.49	0.09	0.76
2009		*(-2.96)***	*(1.74)**	*(-0.69)*	*(1.45)*	*(-1.32)*	*(1.53)*	
2010 -	30	9.50	5.37	1.40	6.00	-1.96	0.04	0.67
2011		*(2.45)**	*(1.82)**	*(1.10)*	*(2.13)**	*(-1.68)*	*(0.59)*	
2012 -	31	0.00	0.45	2.00	0.66	0.73	0.08	0.80
2013		*(-0.07)*	*(0.27)*	*(6.36)***	*(0.24)*	*(1.04)*	*(1.68)*	
2014 -	36	-0.63	4.12	2.43	5.22	-1.75	0.02	0.73
2015		*(-5.60)***	*(2.46)***	*(6.88)***	*(2.37)**	*(-2.74)***	*(0.47)*	
2016 -	38	-0.19	3.54	1.45	1.97	0.07	0.05	0.35
2017		*(-1.85)**	*(2.23)**	*(3.21)***	*(1.23)*	*(0.06)*	*(1.05)*	

The Table summarizes pooled regression results for Model 1. Estimated coefficients and t-statistics within parenthesis. Significance levels for all variables are reported based on a one-sided test.

** Estimated coefficient is significant at the 0.01 level, ** Estimated coefficient is significant at the 0.05 level*

A summary from the results using pooled years is reported above in Table 2. A five-period test is first employed, splitting the sample in two sections. This is followed by two-period tests, pooling individual years. For the five-period regression, an increase in overall explanatory power is observed compared to the combined model using all years and for individual years. During the first period covering 2008-2012, estimated coefficients for all variables but *LEV* are significant. In the second period, estimated coefficients for all variables but *Other OI* and *COND* are positive and significant. Noteworthy, a decrease in coefficient for *Op Net* is observed over the period, while estimated coefficient for *FV* increases during second period. For the two-period tests, an increase in overall explanatory power is observed as adjusted R^2 is between 0.6-0.8 during most periods. Noteworthy during final period (2016-2017), explanatory power of the model is reduced by more than 50 % to 0.35. Coefficients for *Op Net* and *FV* are positive for all years but one, while significance level being considerably higher in recent years for *FV* compared to *Op Net*. Variable

Other OI is positive for most years, albeit at a lower significance level. As observed, estimated coefficients for operating variables are above one for most periods, although a decrease is observed over the period. For financial variables, *COND* and *LEV*, estimated coefficients are in line with expectations for most years. Coefficient for *LEV* are positive and significant according to the full sample and the five-period samples. Estimated coefficient remains positive in all periods in the pooled two-year test, albeit at lower levels of significance.

6.2. Results of value relevance according to Model 2

6.2.1. Descriptive statistics

A summary of descriptive statistics for variables used in Model 2 is presented in Table A3 in Appendix. As Model 2 incorporates changes rather than levels, variability is expected to increase in comparing to the earlier used levels-version in Model 1. Highest variability is observed for variable *ΔFV* while smallest variability for *ΔOp* Net and *ΔOther OI*. Based on the distribution of my observations, most observations appear to be concentrated around the median values. This being explained by the size and nature of the companies within my sample causing some form of inertia. Given the contractual nature of real estates, all variables are expected to have limited change between individual years, in particular related to Operating Net.

6.2.2. Correlation between variables

Correlation according to Model 2 for the full sample combining all years is displayed in Table A5 in Appendix. The results indicate low correlation between independent variables, hence a low risk of having multicollinearity. In general, higher coefficients are reported according Spearman's method compared to Pearson's method. Highest correlation among independent variables is observed between *ΔCOND* and *ΔOther OI*, equal to -0.27 and significant according to Pearson's method. Moreover, *ΔOp Net* appears to be almost uncorrelated to return according to Pearson's method, while according to Spearman's it is slightly positive while still not significant. These results go against earlier discussed expectations. The lack of correlation between *ΔOp Net* and return appears to be absorbed by *ΔFV* which shows a considerably higher and statistically significant positive correlation of 0.54 according to Pearson's method. Variable *ΔCOND* is negatively associated with return while *LEV* is positively associated with return, in line with expectations. Both being statistically significant at the 5 % level according to both methods.

6.2.3. Regression results

Table 3 – Pooled regression results for Model 2

Year	N	Intercept	ΔOp Net	ΔFV	ΔOther OI	ΔCOND	LEV	Adjusted R^2
ALL	163	-0.03	0.37	2.52	5.20	-0.08	0.11	0.53
		(-0.65)	*(0.78)*	*(10.52)***	*(2.82)***	*(-0.21)*	*(4.52)***	
2008 -	73	-0.03	0.04	1.30	5.98	-1.22	0.12	0.58
2012		*(-0.33)*	*(0.02)*	*(1.93)**	*(2.40)***	*(-1.60)*	*(3.01)***	
2013 -	90	0.02	3.14	1.72	2.31	1.24	0.06	0.62
2017		*(0.39)*	*(1.70)**	*(7.37)***	*(0.81)*	*(3.00)***	*(1.75)**	
2008 -	28	-0.55	7.45	-1.67	12.03	-2.91	0.11	0.82
2009		*(-2.16)**	*(1.28)*	*(1.38)*	*(1.81)**	*(-2.00)**	*(2.41)**	
2010 -	30	17.26	2.11	0.11	4.19	3.12	0.10	0.79
2011		*(4.17)***	*(1.08)*	*(0.13)*	*(2.08)**	*(4.45)**	*(2.35)**	
2012 -	31	0.15	1.12	1.78	-3.62	0.58	0.08	0.79
2013		*(2.22)**	*(0.97)*	*(4.60)***	*(-1.89)*	*(0.57)*	*(1.90)**	
2014 -	36	-0.43	7.02	2.05	8.03	-1.12	0.02	0.64
2015		*(-2.97)***	*(2.28)**	*(4.02)***	*(1.61)*	*(-1.24)*	*(0.42)*	
2016 -	38	0.11	5.52	0.51	9.48	0.98	0.03	0.25
2017		*(1.59)*	*(1.99)**	*(0.99)*	*(2.28)**	*(0.84)*	*(0.65)*	

The Table summarizes pooled regression results for Model 2. Estimated coefficients and t-statistics within parenthesis. Significance levels for all variables are reported based on a one-sided test.

** Estimated coefficient is significant at the 0.01 level, ** Estimated coefficient is significant at the 0.05 level*

For the full sample combining all years, total explanatory power is 0.53. Estimated coefficients for all variables but two are statistically significant at the 5 % level. The null hypothesis for *ΔOp Net* less than or equal to 0 cannot be rejected at the 5 % level, going against earlier findings from Model 1. This also holds for variable *ΔCOND*, although estimated coefficient is negative in line with expectations. Noteworthy, estimated coefficient for *ΔOp Net* is below 1 while estimated coefficient for *ΔFV* is above 2, indicating a higher return relationship for changes in fair value adjustments compared to changes in Operating Net.

For individual years, adjusted R^2 indicate greater variability in explanatory power between years compared to the full sample. In 2016 explanatory power is almost 0 while for 2013 explanatory power is equal to 0.82 indicating high explanatory power of the model. Estimated coefficients for operating variables *ΔOp Net* are positive for all years, while estimated coefficients for *ΔFV* are negative in 2008, 2009 and 2011. Meanwhile, most coefficients are not significant. To increase the robustness of the model and to control for variability in interest rate, years are pooled in a similar manner for Model 1. The regression results for pooled years are displayed in Table 8 above.

For the pooled five-year samples, explanatory power of the model increases compared to the full sample. For the two-period samples, explanatory power is around 0.8 for the first three periods while final period 2016-2017 only being 0.25. This pattern was also observed for Model 1. Despite the findings from the full sample, variable *ΔOp Net* is positive across all samples while significant during two periods (2014-2015 and 2016-2017). Meanwhile, estimated coefficient for *ΔFV* is positive for all periods and significant for both periods in the five-year sample. For the two-year samples, the null hypothesis is rejected during two out of five periods at the 1 % level. *ΔOther OI* is positive for most years in line with expectations. Estimated coefficient for *ΔCOND* is negative and not significant for the full sample, while being significant during some of the pooled periods. Estimated coefficient for *LEV* is positive for all periods and statistically significant for the full sample and during both five-year periods.

6.3. Results of value relevance according to Model 3

6.3.1. Correlation between variables

Correlation matrix for Model 3 over the full sample is provided in Table A6 in Appendix. Due to the specification of Model 3 containing nine predictors, a lower relationship among the variables is expected compared to Model 1 and 2. Since to the third model combines the first and second model, correlation between independent variables is of primary concern. Correlation between independent variables provide more uncertain results of the model. By including variables capturing both level and change means they are correlated by definition, confirmed by high and significant correlations between these variables. As shown, variable *Op Net* and *ΔOp Net* yields a score of 0.62 according to Pearson's method and 0.61 according to Spearman's method, both being statistically significant at the 1 % level. Correlation between *FV* and *ΔFV* is also positive and significant according to both methods. As a general observation, correlation between the levels- and change versions appears to be significant. In line with these findings some form of multicollinearity is expected for this model.

6.3.2. Regression results

Table 4 – Pooled regression results for Model 3

Year	N	Intercept	Op Net	FV	Other OI	COND	LEV	ΔOp Net	ΔFV	ΔOther OI	ΔCOND	Adjusted R^2
ALL	163	-0.30	5.15	1.26	4.29	-1.08	0.09	-3.36	1.63	2.08	0.36	0.55
		*(-2.96)***	*(2.95)***	*(2.48)***	*(1.97)**	*(-1.63)*	*(3.16)***	*(-1.72)*	*(3.72)***	*(0.89)*	*(0.70)*	
2008 -	73	-0.73	14.67	4.45	10.83	-2.36	0.10	-9.66	-1.73	-2.16	-1.68	0.70
2012		*(-4.23)***	*(4.97)***	*(3.03)***	*(2.98)***	*(-2.48)***	*(0.25)*	*(-3.36)*	*(-1.76)*	*(-0.71)*	*(-2.06)*	
2013 -	90	-0.36	4.86	2.35	4.39	-1.66	0.06	-1.58	-0.34	-3.67	1.58	0.69
2017		*(-3.64)***	*(2.94)***	*(4.72)***	*(2.28)**	*(-2.39)***	*(1.76)**	*(-0.67)*	*(-0.70)*	*(-1.06)*	*(3.15)***	
2008 -	28	-0.98	5.21	2.89	-20.22	4.99	0.03	-9.72	-2.43	21.82	-7.80	0.87
2009		*(-3.40)***	*(1.11)*	*(1.15)*	*(-1.50)*	*(1.60)*	*(0.61)*	*(-1.28)*	*(-1.63)*	*(1.92)**	*(-2.75)***	
2010 -	30	15.80	7.64	2.84	2.20	-1.42	0.04	-2.98	-2.08	2.24	2.06	0.85
2011		*(3.46)***	*(1.38)*	*(1.38)*	*(0.68)*	*(-0.84)*	*(0.84)*	*(-0.28)*	*(-1.52)*	*(0.73)*	*(0.93)*	
2012 -	31	-0.16	4.79	4.15	7.90	-1.41	0.08	-3.39	-2.16	-7.01	1.85	0.83
2013		*(-0.97)*	*(1.58)**	*(2.87)***	*(1.74)**	*(-1.26)*	*(1.84)**	*(-1.39)*	*(-1.47)*	*(-2.54)*	*(1.34)*	
2014 -	36	-0.47	3.23	3.08	6.57	-3.79	0.05	2.15	-1.02	1.42	1.52	0.71
2015		*(-2.29)*	*(1.19)*	*(3.05)***	*(1.65)**	*(-2.40)***	*(0.89)*	*(0.45)*	*(-0.95)*	*(0.18)*	*(1.15)*	
2016 -	38	-0.16	2.48	1.39	0.56	-0.19	0.07	3.09	-0.24	6.55	0.73	0.32
2017		*(-1.16)*	*(0.97)*	*(2.32)**	*(0.24)*	*(-0.11)*	*(1.24)*	*(0.78)*	*(-0.41)*	*(1.26)*	*(0.49)*	

The Table summarizes pooled regression results for Model 3. Estimated coefficients and t-statistics within parenthesis.

Significance levels for all variables are reported based on a one-sided test.

** Estimated coefficient is significant at the 0.01 level, ** Estimated coefficient is significant at the 0.05 level*

Combining the individual models into Model 3, the results indicate somewhat inconsistent results when compared to results of the stand-alone models. For the full sample, overall explanatory power is equal to 0.55 being slightly above the explanatory power of Model 2. In line with expectations, operating variables *Op Net*, *FV*, *ΔFV* and *Other OI* are all positive and significant at the 5 % level. Surprisingly, *ΔOp Net* is negative and not significant, in line with earlier findings from Model 2. Estimated coefficient for *Op Net* is well above 1 as anticipated, while estimated coefficients for both *FV* and *ΔFV* being just above 1. Variable *LEV* is positive and significant, while both *COND* and *ΔCOND* being negative while not significant.

Explanatory power of annual regressions is generally high, although explanatory power for individual years 2012 and 2014 is close to zero or even negative. Operating variables *Op Net* and *FV* are mainly positive while not being significant. Meanwhile, estimated coefficients for *ΔOp Net* and *ΔFV* provide no consistency being negative for some years and not significant, except for 2017 where *ΔFV* is both positive and significant at the 5 % level. Thus, based on the annual samples one can conclude the limited sample sizes reduces statistical certainty, thus having an overfitted model.

Results from the pooled regressions are provided in Table 4 above. In pooling the samples, an increase in explanatory power is observed for all periods. All periods except for years 2016-2017 having an adjusted R^2 above 0.6. A better fit of the model is also confirmed on variable-level as several estimated coefficients being statistically significant for the pooled samples compared to the annual samples. A decrease in estimated coefficients for most variables is observed when comparing the first and second period the five-period samples. Coefficients for variables *FV* and *Op* Net are both positive and significant at the 1 % level during both five-period samples. Meanwhile, variables *ΔOp* Net and *ΔFV* are both negative during both periods. In turning to the two-period samples, *Op Net* remains positive while a decrease in estimated coefficient is observed. However, at low significance level since I can only confirm a positive relationship during 2012-2013 at the 5 %-level. For variable *FV*, a similar pattern is observed as estimated coefficient decreases across the period while still being above 1 for all periods. In contrast to *Op Net*, an increase in significance level is observed as I can confirm the hypothesis during the last three periods. Both change versions of the operating variables *ΔOp Net* and *ΔFV* are negative for all two-period samples, going against my expectations. Financial variables *COND* and *ΔCOND* provide mixed conclusions as not negative across all samples. However, *LEV* is positive for all periods in line with expectations while not significant for most years.

6.4. Robustness of the results

The results from formal tests employed in testing for the assumption of the OLS regression is presented in tables A6, A7 and A8 in Appendix. Due to low t-values in the annual regressions for individual coefficients, formal tests are based on the pooled samples. Below is a brief discussion of the results. As a final consideration related to the robustness of my results, I examine earlier issues related to the risk of market inefficiencies causing bias in my estimated coefficients.

Multicollinearity

For the full sample combining all years and for the five-year samples, there is little evidence of any severe form of multicollinearity in any of the models. For model 1 and 2, maximal VIF score in any of these periods is below 5 while for Model 3 maximal VIF score is just below the cut-off value of 10. In general, this conclusion also appears to hold for the pooled two-period samples for individual models. For Model 1, maximal VIF score is 3.9 while for Model 2 maximal VIF score is 10.6 during 2008-2009. In turning to the third model, obtained VIF scores increases significantly. However, in recalling the results from the correlation analysis these results are somewhat expected as the inclusion of both levels and change in variables means they are correlated by definition. A score above 5 may indicate some form of collinearity, although being considerably below the cut-off value of 10 which would indicate severe form of multicollinearity. Based on the VIF scores and correlation matrix I can exclude the risk of having severe multicollinearity in the full sample according to all three models.

Heteroskedasticity

The results based on the Breusch-Pagan and the Koenker tests provides some indications of heteroskedasticity being present. For the full sample I can reject the null hypothesis of homoskedasticity at a 1 % level according to both methods and across all models. This observation is somewhat repeated for the five-period samples during the first period (2008 – 2012). In turning to the two-period samples, there is limited evidence related to heteroskedasticity since I can accept the hypothesis of homoskedasticity according to both methods during all observations for Model 2 and 3. Regarding the first model, I can reject the null hypothesis of homoskedasticity during two periods. In applying the HC3 estimator, a decrease in significance level is observed although it does not affect the conclusion of my results.

Autocorrelation

According to the results from the Durbin-Watson analysis, scores hover around 2 for most observations during the full sample and for the five-period samples across all three models. A score around 2 is typically what one is looking for. For the second part of the five-period sample for Model 1 and 3, I was not able to reject nor accept the null hypothesis of no autocorrelation as the score of 1.8 being just below the upper cut-off value. In turning to the two-period samples, my results are more inconclusive as several observations for all three models lies in between the upper and lower cut-off values. Thus, in conclusion there is little evidence of autocorrelation being an issue during the full sample and for the five-period samples. However, for the pooled two-period samples my results are somewhat inconclusive for some observations.

Market inefficiency bias

One earlier study by Aboody, Hughes and Liu (2002) raises the concern of market inefficiencies causing the estimated coefficients to be underestimated in value relevance studies. They find underestimation to be most pronounced in return regressions. Based on their findings, estimated coefficients for variables used in my models may therefore be underestimated. In using panel data over a period of 10 years, I can test my regression for individual and pooled years which is expected to mitigate some effect from potential market-inefficiencies.

7. Analysis

7.1. Interpretation of the results

In comparing the results of my regression models, initial analysis is performed on variable-level followed by a comparison of goodness of fit among the models. The comparison of the independent variables is based on the statistical significance of each variable, thus evaluating the ability to confirm my hypothesis. The goodness of fit analysis is based on the aggregated explanatory power of each model. In the empirical section, combined explanatory power was reported for each regression model using adjusted R^2. Usage of R^2 for comparison to other studies have been criticized in earlier value relevance studies since failing to capture variability in returns (Francis & Schipper, 1999). Having a small sample along with many explanatory variables increases the risk of overfitting the model and automatically yields high values of $R^{2.}$ In recognizing these limitations, comparison to previous studies should be made with some caution, hence the ability to draw any general conclusion only based on R^2 is limited.

In comparing my results to previous studies, I recall the uniqueness of this study is two-folded. The main differences compared to previous research is related to the method of decomposing earnings whilst still maintaining the theoretical relationship between stock return and accounting information. Moreover, it is also unique as my sample is based on a single industry with unique accounting treatment. In analysing my results compared to previous research, my focus will mainly be related on any of these characteristics.

Table A9 in Appendix provides an overview of the results for each model based on the ability to confirm individual hypotheses for each predictor. As a general observation, Model 1 appears to be superior compared to Model 2. This is evident for the annual samples as the ability to statically confirm the independent variables is reduced in Model 2. In turning to the pooled samples, the two models provide somewhat similar results, although operating variables *Op Net* and *FV* being more frequently significant using the levels model (Model 1). For the combined model where number of predictors increases, the risk of overfitting the model becomes evident. Considering all samples, Model 3 appears to perform considerably worse considering all variables as whole or in only comparing operating variables. However, as the combined model does not rely on a theoretical framework one would not expect any major improvements given a limited sample. Thus, based on a comparison of the statistical significance of each variable used within my models, these findings indicate there is no further value in combining the individual models as Model 3 yields lower results compared to the stand-alone versions. Although all estimated coefficients not being statistically significant and in line with expectations for every observation, an assessment on the coefficient based on theory is still appropriate as it allows me to compare the results to the theoretical relationship. From the full sample, all variables in Model 1 and 2 appears to behave according to theory. Operating variables all being positive in both levels and change according to both models. Financial variables *LEV* and *COND* follows the theoretical relationship as the first being positive while the latter is negative in both versions in line with expectations. The theoretical relationship does not hold for all pooled samples as the estimated coefficient deviate from the expectations during some years. In using pooled samples, number of observations are reduced, and the inclusion of more variables increases the risk of model tracking “noise” and thus overfitting the model.

In the empirical section it was noted that most coefficients related to operating variables being above 1, indicating the relationship is amplified in stock return. Thus, in understanding the coefficients we must return to the initial theoretical relationship in the method section. Recalling models 4.11, 4.12 and 4.13, relationship between aggregated earnings and the dependent variable is illustrated, where one percentage in bottom-line earnings is expected to result in a similar change in return, thus the relationship is one-to-one. However, due to the method of decomposing earnings according to the leverage formula (4.7), return is expected to be amplified by leverage. In Model 1 for the full sample, *Op Net* and *FV* being close to 4 respectively 3 which means the relationship is highly amplified. A 1 % profit-level yields a stock return amplified up to five times. In comparing with the observed median value of *LEV* in Tables A2 and A3 in Appendix, these results are somewhat inconsistent with theory indicating a greater relationship than suggested by theory. In turning to Model 2 using the change version of the variables, estimated coefficients for the pooled samples are lower compared to Model 1 and variable *ΔOp Net* being close to zero while *ΔFV* being above 2. For Model 3 and as earlier reported, *ΔOp Net* is negative for the full sample while both *ΔOp Net* and *ΔFV* being negative during some of the pooled periods. Hence, these results being somewhat inconsistent to theory why this are deserves further elaboration.

In observing development in estimated coefficients, it is difficult to draw any general conclusions. For Model 1, a reduction in estimated coefficients is observed for operating variables during the sample period using both five-period samples and the two-period samples. Financial variable *LEV* is constant during the pooled samples, while a drop in *COND* is observed, similar to the operating variables. For Model 2, it is difficult to observe any pattern although the results indicate a reduction in estimated coefficients, at least for variable *ΔFV*. For financial variable *LEV* a decreasing pattern is also observed, while for *ΔCOND* it is difficult to draw any conclusions. A decreasing pattern for operating variables also holds for Model 3, although variables *ΔOp Net* and *ΔFV* being negative during several periods as earlier discussed. For variable *ΔCOND* it is difficult to draw any conclusions.

Turning to the comparison of combined explanatory power of the models, my results suggest somewhat different conclusions compared to the assessment of individual coefficients. For the full sample, Model 3 appears to outperform the individual models, adjusted R^2 is about 0.5 for Model 1 and 2 while 0.55 for Model 3. The same conclusion appears to hold for the pooled five-period and two-period samples as Model 1 and 2 exhibit similar explanatory power. All periods of the two-year samples being above 0.6 for all models except for final period 2016-2017 where a significant drop in explanatory power is observed across all models. Thus, the two individual models appear to perform in a similar manner. Consequently, based on the comparison of overall explanatory power across the various samples I can conclude accounting information appears to be more value relevant in the short run compared to the full sample of 10 years.

In comparing my results to earlier studies, a few observations are made. As a general observation, my results appear as highly competitive when considering overall explanatory power, although such comparison not being theoretically justified. In comparing performance of the individual models in my study to the framework study by Easton and Harris, my results indicate similar results. According to their findings, the levels model appears to outperform the change model when comparing t-statistics of the independent variables. Like my findings, the individual models also appear as superior when compared to the combined model. Despite having considerably greater sample, estimated coefficients for the levels model were not statistically significant for more than about half of the periods compared to the change model. In line with my findings, explanatory power of the combined model not being significantly greater compared to the best performing individual model. Across all samples, explanatory power for all models only being above 0.1 for a few years, why the results from my models are perceived as high. When comparing estimated coefficients, these are considerably lower compared to the operating variables in my model. One general observation related to other value relevance studies, R^2 typically being less than 0.1 with estimated coefficients of levels and change of earnings around 1. Those including change in earnings typically obtain lower estimated coefficients compared to the levels coefficient (Gjerde et al., 2011; Lev & Zarowin, 1999). However, as noted in earlier chapters, value relevance studies typically elaborate on inclusion of alternative variables or comparing against price level regressions. In price level regressions, dependent variable is typically market value of equity. Using price level regression has been motivated by a theoretical relationship in combination with empirical results in comparing the two. Studies comparing price-level regression with a return-based approach, typically obtain higher statistical results for the price-level regression both for individual coefficients as well for total explanatory power of the model. Although using large samples over a large time period, total explanatory power is typically found above 0,5 (Collins et al., 1997; Gjerde et al., 2011; Naimah, 2012).

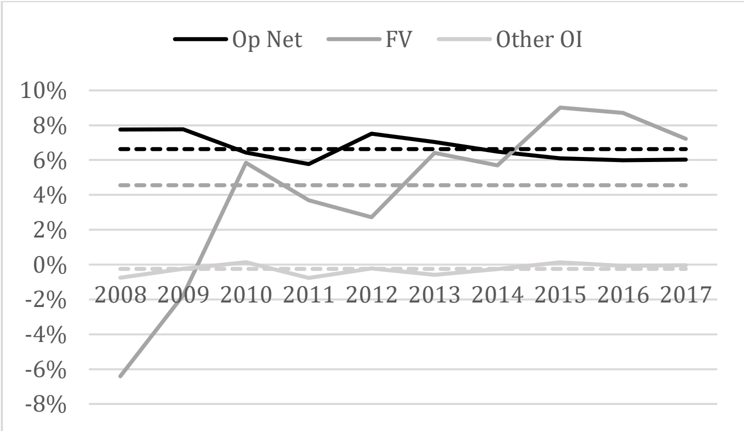
The uniqueness of this study being related to decomposition of earnings and a narrow sample, the two studies by Amir and Lev (1996) and more recently Chen and Zhang (2007) are perceived as a benchmark. The study by Amir and Lev being somewhat outdated but due to few studies using a single industry it is still important. Using both return and price regression on the wireless communication industry their results indicate higher statistical relationship more in line with my findings. For the quarterly windows, adjusted R^2 climbs up to 0.2 for the return regression while corresponding score for price-level regression is around 0.8. Hence, their findings confirm a higher statistical relationship can be expected when using a homogenous sample. Related to the method of decomposing earnings, this was also performed in the study by Chen and Zhang (2007). Although, not using the same theoretical relationship they show how explanatory power of the model is increased by comparing to the benchmark model of combining both levels and change of aggregated earnings. Thus, when comparing my findings to studies with similar characteristics related to sample selection and decomposition of earnings, these results confirm higher statistical relationship can be expected although estimated coefficients and overall explanatory power of my models appears to be surprisingly high.

7.2. Value relevance of operating performance

Based on the empirical findings, I was able to confirm my hypothesis for all operating variables using the first model for the full sample, while for the second model I was able to confirm my hypothesis for all variables but Δ*Op Net.* For the third model, a similar pattern was observed although the levels version of operating variables yielded negative coefficients and low t-statistics. Due to the various results related to operating variables, this area deserves further attention.

In owning a real estate, economic return is two-folded. On one hand, there is continuous return obtained through economic surplus from rental revenues less expenses related to the property, captured through Operating Net. On the other hand, annual return may be spurred or offset by changes in the market value, captured in the fair value adjustments. Thus, the inclusion of fair value adjustments in the income statement is considered as value-relevant from an intuitive perspective although this unique treatment goes against historical accounting standards based on principles of conservatism and prudence. In order to further understand the relationship between stock performance and the operating variables, its essential to further elaborate on the dynamics of the income statement and the drivers of the fair value adjustments.

Figure 3 – Average values for operating variables from my sample



In Figure 3 above, annual average values of operating variables from my sample are displayed. In line with expectations, *Op Net* appears to be stable with little variability between individual years. Meanwhile, observations of *FV* indicate somewhat different pattern being more volatile between individual years, while *Other OI* on average is very small and insignificant, thus having low impact on stock return. Consequently, this leaves variability in operating profitability to be explained by fair value adjustments, at least from a short-term perspective. Stability in *Op Net* is explained by the contractual nature in owning a real estate. Leasing contracts are typically signed for several years and there is little uncertainty related to operating expenses. Since scaled by beginning of period price of the assets, this causes some inertia in the income statement where changes and improvements related to operations are gradually realized and translated into higher Operating Net. In studying my sample and Figure 3 above, two observations are made related to variables *Op Net* and *FV*. First, in studying the pattern this is positive over my sample period and since 2015 *FV* has on average been above *Op Net*. Meanwhile, development in *Op Net* over the sample period appears to be negative. During the first two years, *Op Net* being just below 8 % while approaching 6 % during final years. My second observation is related to the covariance of the sign in fair value revaluations how they appear to be closely linked across companies for individual years. During first two years of my sample, most companies have a negative *FV*, while the following eight years have almost been uniformly positive for all companies. Since 2009, importance of *FV* has increased, as the majority of total profits in recent years are linked to value appraisals. To further understand the drivers of fair value adjustments, I return to the Annual Reports used for data collection.

> *"Fair value adjustments being explained by a combination of a decrease in yield, value-adding investments and new leasing contracts." – Corem Annual Report 2017, p. 67 (translated from Swedish)*

The valuation process is briefly described in the following quote:

> *"The valuation was carried out in a uniform manner, and was based on a 10-year cash flow model…" – Castellum Annual Report 2017, p. 83 (translated from Swedish)*

For most companies, the internal valuation appears to be based on the industry-specific yield model, while the location method is rather used as a complement or when found more appropriate. Moreover, the internal valuation is typically validated or accompanied by an external valuation to verify the assumptions made in the internal valuation.

According to the industry-specific yield model (3.1), Operating Net is discounted at a rate appropriate to the riskiness of the real estates. By separating Operating Income into its components, value relevance of the fair value adjustments is merely related to changes in discount rates due to the separate inclusion of *Op Net.* In order to fully determine whether the fair value adjustments are perceived as value relevant, one wants to control for all levels of risk, however this is difficult to obtain and by controlling for individual characteristics of the portfolio for each company I would have to make several assumptions that may deteriorate the reliability of my results. In controlling for changes in the risk-free rate, any changes in the discount rate general to the market is removed from the fair value adjustments. This leaves the discount rate to vary upon changes in company- or industry-specific changes in the risk, alternatively by changes in expectations of the growth rate. Recalling from the introduction of IAS 40 and confirmed in the Annual Reports, value of the combined portfolio is calculated as the sum of the stand-alone values of each property. As a result, changes in risk may be driven by changes in the portfolio either through acquisitions or divestments of individual real estates, or alternatively by external factors. Due to the size of the portfolios held by the companies in my sample, changes in risk is expected to develop slowly. Thus, taking a short-term perspective one would expect little short-term variations in the discount rate related to movements in risk.

Based on the findings from the empirical section, I was able to confirm value relevance of the fair value adjustments according to all three models for the full sample, while the pooled and annual results yielded various results. All operating variables yielded high coefficients above 1, although when comparing variable *FV* to *Op Net*, the latter had generally higher estimated coefficients while both being well above 1. Moreover, in comparing ability to confirm value relevance of individual coefficients as illustrated in Table A9 in Appendix, variable *FV* appears to outperform *Op Net*. Thus, a natural conclusion based on these findings is the fair value adjustments are perceived as value relevant both taking a long-term as for a short-term perspective. Moreover, value relevance appears to have increased during my sample period, which may be linked to the sign of the fair value adjustments. This is most evident from the results of Model 1 and 2. From Figure 3 above, during the first two years in my sample average values related to the fair value adjustments were negative while ever since they have been almost uniformly across all companies. Estimated coefficients related to FV were negative during 2008 according to the first model while negative in both 2008 and 2009 according to the second model.

Based on the scope and method of this study, it is difficult to draw any general conclusions when comparing the operating variables. Although I have been able to confirm the relationship between operating variables and stock performance, any conclusions related to what is right or wrong may alone be subject for further research. The purpose of this section is merely to elaborate on the operating variables in the context of historical patterns. My main observation is related to the high fair value adjustments in recent years and one may question the perseverance in the magnitude of these adjustments. Since 2009, the sample period is characterized of positive economic development spurring the positive value development and value creation. Thus, one possible interpretations of the development concerning the fair value adjustments is that the positive development during many years has increased the value relevance of fair value adjustments at the expense on Operating Net. Thus, based on the examination of usage of accounting information, the fair value adjustments may be perceived as value relevant due to the recent positive pattern. If the fair value adjustments would switch into a negative pattern, value relevance of operating variables might shift. However, it is difficult to make such prediction only based on the data used in my sample.

8. Concluding remarks

The purpose of this study is to examine the relationship between accounting data and stock performance. Thus, the overall question of this thesis is formulated in an explorative manner:

Is operating performance driving stock performance?

I answer this question by using accounting data over the last ten years from a sample of Swedish listed real estate companies. This leaves me with a total sample size of 163 company-year observations. I use a regression-based approach where stock performance is linked to accounting data combining information from the income statement and the balance sheet. My regression models are based on a framework earlier used by Easton and Harris (1991), where stock performance is explained by levels and change in bottom-line earnings, scaled by beginning of period price. I expand by decomposing earnings and applying the leverage formula specified by Johansson and Runsten (2017). Using the leverage formula allows me to separate operating activities from financing activities whilst maintaining the theoretical relationship between stock performance and accounting information. Consequently, I develop three regression models where the first is based on levels in earnings, second being based on change in earnings and the third model is a combination of the two independent models. The two independent models being based on a theoretical relationship, while the combined model rather being based on earlier findings and intuition. The choice of using a homogenous sample is motivated by a unique accounting treatment according to IFRS, allowing real estate companies to record value appraisals on the income statement. Moreover, listed Swedish real estate companies have experienced high stock returns which further fortifies the practical abutment of this study.

In the empirical section I was able to confirm a positive relationship between operating variables and stock performance, although at various levels of significance. According to the first model, using levels in earnings as explanatory variable, I can confirm the theoretical relationship from the leverage formula for the full sample and for various pooled samples. In turning to the second model, using change in earnings as explanatory variable, my results are somewhat weaker related to individual coefficients and more interestingly, I cannot confirm my hypothesis related to variable capturing changes in Operating Net. According to the third model, combining the first and second model, statistical significance is further reduced and based on the ability to confirm my hypothesis for individual variables there is no further value in combining the two individual models. However, based on the comparison of overall explanatory power of the models (measured as adjusted R^2), my findings suggest almost reverse conclusion as the third model exhibit highest predictive power. As a final observation, my findings suggest a significant drop in predicative power across all models related to final years in my sample. Estimated coefficients related to the first model also suggest a decline in value relevance over my sample period, in particular related to variable capturing levels in Operating Net. However, this appears to be somewhat absorbed by higher estimated coefficients related to changes in operating variables, used in the second model.

The contributions of this study are two-folded. First, I expand to previous research as my results are perceived as competitive when compared to earlier studies. This is confirmed by ability to confirm my hypothesis related to operating variables combined with explanatory power of my models. Thus, the choice of using homogenous sample and decomposing earnings appears as successful. Moreover, by taking a wider perspective related to the positive development in earnings and the components of operating profitability, I discuss and problematize the high degree of value-relevance related to the fair value adjustments. My sample period is characterized by positive economic development and falling interest rates spurring development in market values on debt-friendly assets. For real estates applying IFRS, this development has translated into large fair value appraisals in the income statement and has gained the upper hand in the share of total profits. Consequently, I question the sustainability in this pattern as a decade of positive value appraisals may at some point come to an end. However, it is difficult to connect these observations to any theoretical framework why I argue this area deserves further attention.

8.1. Limitations

Generalizability of my results is limited by the choice of using a homogenous sample in a specific setting. Consequently, I acknowledge data biases may be present from the data selection process. By only including Swedish listed companies, average values may be somewhat skewed when compared to private companies or to a greater sample. All companies in my sample applies IFRS and the inclusion of companies under different standards is likely to change the results. Meanwhile, no observations have been excluded due to extreme values or missing observations which increases the objectiveness of my study.

Based on the formal tests of robustness, my results are in general perceived as robust. As discussed in the empirical section, results related to the full sample appears to be distorted by heteroskedasticity. Presence of heteroskedasticity is a recurring issue among value-relevance studies why this is not unique to my study. Moreover, the third model indicated severe form of multicollinearity. This was also expected due to the specification of the model when using both levels and change in earnings.

As a final limitation, I acknowledge the risk of my results being distorted by human errors. Due to the choice in using manual data collection, there is a risk related to this area. Several formal checks have been employed although this is not any guarantee of a sample completely free from any errors.

8.2. Suggestion for further research

Related to the uniqueness of decomposing earnings and using a homogenous sample, one obvious extension of this study is to test this on a different sample. In using the real estate industry, one may expand to this study by using a different sample covering other countries or using a different period. As earlier argued, my findings related to the fair value adjustments may be perceived as somewhat inconsistent to intuition and theory why this area deserves further attention. This would also allow for a qualitative study where data being based on in-depth data collection from individual companies. Furthermore, it would be interesting to compare development in real estate companies based on the choice of accounting standards. This would allow for further conclusions about the effect from IAS 40 and the fair value adjustments versus national accounting principles.

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10. Appendices

Table A1 – Variable definitions and sources

Variable	Definition	Source
Return	Return from holding a share over a 12-month period (1 April - 31 March). Change in share price plus dividends scaled by beginning of period share price	Eikon
Op Net	Reported Operating Net, scaled by beginning of period market value of Net Operating Assets (NOA)	Annual Report & Eikon
FV	Reported unrealized and realized fair value change of investment properties, scaled by beginning of period market value of NOA	Annual Report & Eikon
Other OI	Operating Income less Operating Net and Fair Value changes, scaled by beginning of period market value NOA	Annual Report & Eikon
COND	Financial Net (including any preferred dividends), scaled by beginning of period market value of Net Debt (ND). All items not classified as operating are treated as financial.	Annual Report & Eikon
LEV	Beginning of period market value of Net Debt scaled by beginning of period market value of Equity	Annual Report & Eikon
ΔOp Net	Change in Operating Net between t and t-1, scaled by beginning of period market value of NOA	Annual Report & Eikon
ΔFV	Change in fair value adjustments between t and t-1, scaled by beginning of period market value of NOA	Annual Report & Eikon
ΔOther OI	Change in Other OI between t and t-1, scaled by beginning of period market value NOA	Annual Report & Eikon
ΔCOND	Change in COND between t and t-1, scaled by beginning of period market value of NOA	Annual Report & Eikon

The Table provides a definition of the variables used in the study along with information of the sources used

Table A2 – Descriptive statistics for variables in Model 1

Variable	N	Median	Min	Max	Std. Dev	Percentile 25	Percentile 50	Percentile 75
Return	163	19.0%	-66.0%	218.0%	37.4%	0.7%	19.0%	36.2%
Op Net	163	6.6%	1.0%	14.0%	2.0%	5.5%	6.6%	7.6%
FV	163	4.0%	-11.0%	76.0%	8.6%	1.0%	4.0%	6.4%
Other OI	163	-0.3%	-7.0%	5.0%	1.3%	-0.7%	-0.3%	-0.2%
COND	163	5.0%	-18.0%	30.0%	5.6%	2.3%	5.0%	7.7%
LEV	163	1.23	0.14	5.07	0.84	0.81	1.23	1.66

The Table provides descriptive statistics from variables used in Model 1

Table A3 – Descriptive statistics for variables in Model 2

Variable	N	Median	Min	Max	Std. Dev	Percentile 25	Percentile 50	Percentile 75
Return	163	19.0%	-66.0%	218.0%	37.4%	0.7%	19.0%	36.2%
ΔOp Net	163	0.5%	-8.0%	10.6%	1.6%	0.2%	0.5%	1.2%
ΔFV	163	0.6%	-25.6%	69.0%	8.8%	-1.6%	0.6%	3.8%
ΔOther OI	163	0.0%	-5.6%	6.5%	1.2%	-0.2%	0.0%	0.2%
ΔCOND	163	0.0%	-12.8%	22.0%	6.1%	-2.9%	0.0%	4.2%
LEV	163	1.23	0.14	5.07	0.84	0.81	1.23	1.66

The Table provides descriptive statistics from variables used in Model 2

Table A4 – Correlation matrix Model 1 for pooled sample (all years)

	Return	Op Net	FV	Other OI	COND	LEV
Return	--	.25**	.11	.09	-.09	.28**
Op Net	.21**	--	-.42**	-.06	.36**	.39**
FV	.31**	-.20**	--	.09	-.18**	-.38**
Other OI	.01	-.02	-.28**	--	-.01	.00
COND	-.11	.48**	.04	-.13	--	-.08
LEV	.33**	.32**	-.29**	.04	-.13*	--

The Table reports correlation between variables in Model 1 for all company-year observations (N=163). Pearson correlations are presented in the lower diagonal, and Spearman correlations in the upper diagonal.

** Correlation is significant at the 0,01 level (1-tailed)*

*** Correlation is significant at the 0,05 level (1-tailed)*

Table A5 – Correlation matrix Model 2 for pooled sample (all years)

	Return	ΔOp Net	ΔFV	ΔOther OI	ΔCOND	LEV
Return	--	.11	.47**	.22**	-.18*	.28**
ΔOp Net	-.01	--	-.07	-.15*	.22**	-.06
ΔFV	.54**	-.01	--	.07	-.12	.08
ΔOther OI	.12	-.03	-.17*	--	-.31**	.15*
ΔCOND	-.16*	.13	-.03	-.27**	--	-.15*
LEV	.33**	-.10	-.03	.08	-.18*	--

The Table reports correlation between variables in Model 2 for all company-year observations (N=163). Pearson correlations are presented in the lower diagonal, and Spearman correlations in the upper diagonal.

** Correlation is significant at the 0,01 level (1-tailed)*

*** Correlation is significant at the 0,05 level (1-tailed)*

Table A5 – Correlation matrix Model 3 for full sample (all years)

	Return	Op Net	FV	Other OI	COND	ΔOp Net	ΔFV	ΔOther OI	ΔCOND	LEV
Return	--	.25**	.11	.09	-.09	.11	.47**	.22**	-.18*	.28**
Op Net	.21**	--	-.42**	-.06	.36**	.61**	.00	.01	.05	.39**
FV	.31**	-.20**	--	.09	-.18**	.03	.46**	-.01	.04	-.38**
Other OI	.01	-.02	-.28**	--	-.01	.01	.02	.52**	-.21**	.00
COND	-.11	.48**	.04	-.13	--	.41**	-.21**	-.19**	.72**	-.08
ΔOp Net	-.01	.62**	.11	.03	.45**	--	-.07	-.15*	.21**	-.06
ΔFV	.54**	-.05	.79**	-.20**	-.11	-.01	--	.07	-.12	.08
ΔOther OI	.12	-.01	-.22**	.61**	-.26**	-.03	-.17*	--	-.31**	.15*
ΔCOND	-.16*	.12	.16*	-.25**	.68**	.13	-.04	-.27**	--	-.15*
LEV	.33**	.32**	-.29**	.04	-.13*	-.10	-.03	.08	-.18*	--

The Table reports correlation between variables in Model 3 for all company-year observations (N=163) Pearson correlations are presented in the lower diagonal, Spearman correlations in the upper diagonal.

** Correlation is significant at the 0,01 level (1-tailed), ** Correlation is significant at the 0,05 level (1-tailed)*

Table A6 – Formal tests of OLS regression assumptions for Model 1

		ANOVA	Autocorr.	Multicollinearity		Heteroskedasticity		Normal distr. error terms	
Year	N	F-value	D-W	VIF - Min	VIF - Max	B-P	Koenker	K-S	S-W
ALL	163	23.6**	2.2	1.1	1.7	95.18**	31.38**	0.05	0.96**
2008-2012	73	20.9**	2.2	1.0	4.1	31.61**	11.13	0.08	0.94**
2013-2017	90	26.6**	1.8	1.1	2.4	4.73	6.63	0.09	0.98
2008-2009	28	15.1**	2.2	1.4	3.9	11.75	6.99	0.15	0.92*
2010-2011	30	10.9**	2.2	1.3	3.8	46.06**	18.77**	0.11	0.93*

2012-2013	31	21.0**	1.2	1.1	3.1	4.94	2.77	0.15	0.93*
2014-2015	36	16.8**	1.4	1.2	2.8	6.87	12.53	0.11	0.96
2016-2017	38	4.3**	2.0	1.2	2.0	14.82*	15.56*	0.10	0.97

For the F-value, one wants a statistically significant value. In testing for heteroskedasticity and normal distribution one doesn't want a significant value. Definitions: Durbin-Watson (D-W), Variance Inflation Index (VIF), Breusch-Pagan (B-P), Kolmogorov-Smirnov (K-S), Shapiro-Wilk (S-W)

** Significant at the 0.01 level, ** Significant at the 0.05 level*

Table A7 – Formal tests of OLS regression assumptions for Model 2

		ANOVA	Autocorr.	Multicollinearity		Heteroskedasticity		Normal distr. error terms	
Year	N	F-value	D-W	VIF - Min	VIF - Max	B-P	Koenker	K-S	S-W
ALL	163	26.7**	2.3	1.0	1.4	95.18**	31.38**	0.07	0.94**
2008-2012	73	15.5**	2.4	1.0	2.6	31.62**	11.13	0.11*	0.94**
2013-2017	90	22.1**	1.9	1.2	2.1	4.73	6.63	0.09	0.98
2008-2009	28	21.7**	2.3	1.2	10.6	11.75	6.99	0.16	0.93*
2010-2011	30	19.6**	2.1	1.3	2.9	4.15	5.92	0.09	0.96
2012-2013	31	19.4**	1.0	1.1	3.8	4.94	2.77	0.17*	0.89**
2014-2015	36	11.5**	1.5	1.2	8.2	5.05	5.05	0.11	0.97
2016-2017	38	3.0*	1.4	1.1	2.4	6.79	8.55	0.09	0.99

For the F-value, one wants a statistically significant value. In testing for heteroskedasticity and normal distribution one doesn't want a significant value. Definitions: Durbin-Watson (D-W), Variance Inflation Index (VIF), Breusch-Pagan (B-P), Kolmogorov-Smirnov (K-S), Shapiro-Wilk (S-W)

** Significant at the 0.01 level, ** Significant at the 0.05 level*

Table A8 – Formal tests of OLS regression assumptions for Model 3

		ANOVA	Autocorr.	Multicollinearity		Heteroskedasticity		Normal distr. error terms	
Year	N	F-value	D-W	VIF - Min	VIF - Max	B-P	Koenker	K-S	S-W
ALL	163	19.0**	2.3	1.2	4.9	147.97**	37.51**	0.06	0.94**
2008-2012	73	16.1**	2.2	1.6	7.6	39.77**	20.36*	0.11*	0.97*
2013-2017	90	19.4**	1.8	1.7	9.8	5.29	7.42	0.09*	0.99
2008-2009	28	18.4**	2.2	2.2	23.3	5.15	8.65	0.13	0.96
2010-2011	30	17.0**	1.8	2.4	60.4	7.73	8.71	0.12	0.95
2012-2013	31	15.5**	1.2	1.8	71.5	7.16	5.61	0.25**	0.87**
2014-2015	36	9.6**	1.4	1.8	21.8	8.67	14.18	0.14	0.95
2016-2017	38	2.8*	1.7	1.6	5.2	16.37	18.25	0.09	0.98

For the F-value, one wants a statistically significant value. In testing for heteroskedasticity and normal distribution one doesn't want a significant value. Definitions: Durbin-Watson (D-W), Variance Inflation Index (VIF), Breusch-Pagan (B-P), Kolmogorov-Smirnov (K-S), Shapiro-Wilk (S-W)

** Significant at the 0.01 level, ** Significant at the 0.05 level*

Table A9 – Summary of empirical results and ability to confirm hypothesis for individual variables

Model	Sample	Op Net	FV	Other OI	COND	LEV	ΔOp Net	ΔFV	ΔOther OI	ΔCOND
Model 1	All years	1/1	1/1	1/1	1/1	1/1				
	Five-years	2/2	2/2	1/2	1/2	1/2				
	Two-years	4/5	3/5	2/5	1/5	0/5				
	Annual	4/10	6/10	2/10	3/10	0/10				
Model 2	All years					1/1	0/1	1/1	1/1	0/1
	Five-years					2/2	1/2	2/2	1/2	1/2
	Two-years					3/5	2/5	2/5	3/5	2/5
	Annual					1/10	1/10	1/10	1/10	1/10
Model 3	All years	1/1	1/1	1/1	0/1	1/1	0/1	1/1	0/1	0/1
	Five-years	2/2	2/2	2/2	2/2	1/2	0/2	0/2	0/2	1/2
	Two-years	1/5	3/5	2/5	1/5	2/5	0/5	0/5	1/5	1/5
	Annual	0/10	4/10	0/10	0/10	1/10	0/10	0/10	0/10	0/10

The Table summarizes the findings from the empirical section in testing the hypotheses.
For each variable and sample, number of periods being able to reject the null hypothesis is reported over the total periods for each sample at a significance level of 5 %. A score of 4/10 means that the null hypothesis was rejected for four out of total 10 periods at a significance level of 5 %

Table A10 – Summary companies in my dataset and total observations for each company

Company name	List	Observations
Atrium Ljungberg	Large Cap	10
Castellum	Large Cap	10
Catena Fastigheter	Mid Cap	10
Corem Property Group	Mid Cap	8
Diös Fastigheter	Mid Cap	10
Fabege	Large Cap	10
Fast Partner	Mid Cap	10
Fastighets AB Balder	Large Cap	10
Heba Fastighets	Mid Cap	10
Hemfosa Fastigheter	Large Cap	3
Hufvudstaden	Large Cap	10
Klövern	Large Cap	10
Kungsleden	Large Cap	10
NP3 Fastigheter	Mid Cap	3
Platzer Fastigheter	Mid Cap	4
Sagax	Large Cap	10
Victoria Park	Mid Cap	5
Wallenstam	Large Cap	10
Wihlborgs Fastigheter	Large Cap	10

Annual reports retrieved from company website or from database Retriever