UNIVERSITY OF GOTHENBURG

SCHOOL OF BUSINESS, ECONOMICS AND LAW

“Cheap" property holding stocks: Opportunity of a lifetime or too good to be true?

An empirical test of investment strategies based on stock price / EPRA NAV multiples for Swedish property holding stocks.

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Abstract:

This thesis tests the reliability of EPRA NAV (European Public Real estate Association Net Asset Value) as a measure for stock prices in property holding firms. The law of one price dictates that the price of a listed asset should equal the price of a private asset, however, this is not the case for property holding firms as the stock prices deviate from the EPRA NAV. We test the reliability of the EPRA NAV measure by constructing two portfolio strategies. One portfolio strategy trades on cheap stock price / EPRA NAV multiples, where the majority of the portfolio's stock trades at a discount to EPRA NAV. The other portfolio strategy trades on expensive stock price / EPRA NAV multiples, where the majority of the portfolio's stock trades at a premium to EPRA NAV. We try to explain the reliability of EPRA NAV by comparing the abnormal returns, which we retrieve using OLS regressions applied to the Five-Factor model by Fama & French. We find that both investment strategies produce abnormal returns, where the strategy trading on expensive stocks outperforms the strategy trading on cheap stocks, this goes against the efficient market hypothesis as the strategies produce abnormal returns. Furthermore, we find that there is little recent research regarding net asset value and stocks for the real estate sector, where all previous research aims to explain the underlying factors behind the spreads. This thesis takes a different approach where we empirically test if abnormal returns can be achieved by investing on these spreads. Furthermore, we find no empirical research that regards stock price to EPRA NAV spreads. Our results therefore contribute to the understanding of stock price / NAV spreads for property holding firms and the understanding the quality of EPRA NAV as a measure of firm value. Moreover, our results provide interesting discussion points that regard EMH and behavioral finance.

Keywords: EPRA, EPRA NAV, NAV, property holding firms, real estate firms, efficient market hypothesis, behavioral finance, deferred tax, fair value accounting, law of one price, IFRS, IAS 40 investment property, portfolio, Value stocks, growth stocks, investment strategy.

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1. Introduction

1.1 Background

The law of one price dictates that the price of a listed asset should equal the price of a private asset. This law is not valid for listed property holding firms as there are spreads between the stock price and the Net Asset Value (NAV), where NAV is calculated by deducting liabilities from assets. Spreads occur even though movements in real estate stocks follow the real estate portfolio's underlying value, where the value of the assets is a factor of the real estate market (Dijkman, 2010; Devaney et al., 2012). Historically, spreads have shown to depend on the deferred tax to a high degree (Leimdörfer, 2001; Adams & Venmore-Rowland 1990), hence the development of the EPRA NAV measure (European Public Real estate Association Net Asset Value) which adjusts NAV for deferred tax and derivatives. EPRA developed the measure to capture the long-term market value of listed firms property portfolios (EPRA, 2019; NASDAQ, 2019), and is a fair value accounting measure based on IFRS 13; IAS 40 Investment property for asset valuation. While EPRA NAV is a voluntary disclosure measure, as of 2019, all listed Swedish property holding firms provide EPRA NAV to investors in their financial statements. Despite the adjustments for deferred tax and derivatives, spreads exist between stock price and EPRA NAV. Theoretically, if EPRA NAV was a fully efficient measurement in terms of describing the value of properties in the portfolio, the stock price should equal the EPRA NAV per share as the law of one price dictates. However, we find that the stock price / EPRA NAV spread fluctuates over time, both in terms of quarterly averages for all property holding stocks and firms individually. The spreads should indicate that investors value the properties differently, both with a discount and with a premium, when held directly compared to owning the real estate through a listed firm. Despite the spreads, EPRA NAV is the most commonly used KPI when analyzing property holding stocks (KPMG, 2014). If EPRA NAV is a reliable measurement for the long term value of the firm's assets, investing in firms with a discount to stock price should yield abnormal returns. However, this should not be possible according to the efficient market hypothesis as the stock price equals the correct price based on all available information (Fama, 1970). The theory, therefore, suggests that EPRA NAV is a poor predictor of stock prices. Based on that reasoning, we will test the predictability of stock prices by constructing two portfolios by testing the performance of “value versus growth stocks” as researched by Basu (1975, 1977, 1983) and Fama & French (1998).

1.2 Problem definition

The spreads between stock price and EPRA NAV indicates that listed property assets are priced differently compared to the same assets held privately (indicating that investors value the properties differently as opposed to the firms' valuation). Seeing as a majority of the assets in property holding firms are measured at market value as the assets consist mainly of properties, based on the law of one price, EPRA NAV should make it easier to price property stocks. According to Fama (1970), the disparities are a result of factors that impact the stock price relative to the EPRA NAV. Based on this, EPRA NAV should be an unreliable KPI for predicting property holding stock prices. However, if EPRA NAV were to be reliable in predicting stock prices, investment decisions based on EPRA NAV should yield abnormal returns.

1.3 Research question

Can an investor achieve abnormal returns when investing in property stock based on EPRA NAV / Stock price multiples?

1.4 Aim and contribution

While there are studies predicting the underlying factors of spreads in share price and NAV, we find no empirical testing on the application of the law of one price, i.e., that spreads between stock price and EPRA NAV could indicate mispricing in the market. We find little research that regards stock price / NAV spreads for property holding firms in the first place, let alone no peer-reviewed paper that analyzes investing in spreads in the Swedish market. Most previous research is old and, thus, based on NAV rather than EPRA NAV, which has later become the standardized key performance indicator for assessing property value in real estate stocks.

This study aims to determine whether EPRA NAV is a good long-term measure of the market value of property stocks and, thus, assessing the quality of EPRA NAV as a measure of firm value. Furthermore, we aim to increase the knowledge regarding the phenomenon of stock price / NAV spreads for listed property holding firms.

We find that stock price spreads to EPRA NAV are consistent over time, i.e, firms that are relatively expensive continue to be expensive, and cheap firms continue to be cheap. We therefore argue that EPRA NAV is a bad measurement for valuing property holding stocks as it is not possible to determine if a stock is over, or undervalued based solely on the stock price / EPRA NAV spread.

2. Theoretical framework and earlier research

First, we will present the theoretical framework, e.g., the Efficient Market Hypothesis and various literature in Behavioral Finance. According to the Efficient market hypothesis, our hypothesis of being able to yield abnormal returns by investing in stock price / EPRA NAV multiple, e.g., investing in historical data, should not show abnormal returns. Contrary to EMH, Behavioral finance theory allows for mispricing in the market due to irrational behavior; thus, arbitrage opportunities can exist. Seeing as our hypotheses build on the possibility of mispricing, Behavioral finance theory could offer explanations as to why mispricing exists in the market.

Following the section where we present the theoretical framework, we will present previous literature regarding stock price / NAV spreads, and a section that regards the Swedish property market.

2.1 Theoretical framework

2.1.1 Efficient Market Hypothesis

Fama states that the price of an asset reflects the aggregated value of all information regarding that asset; hence the market is efficient in its pricing (Fama, 1970). The theory was a development of the Random walk hypothesis by Kendall (1953), who observed that the assets he studied did not follow the pattern of historical prices, i.e., the stocks had a “random walk.” Fama (1970) subdivided the degree of efficiency forms into three levels. Weak form efficiency suggests that the stock prices reflect all historical data. Under this assumption, technical analysis fails to help investors identify undervalued stocks and cannot be used to produce abnormal returns. Under weak-form efficiency, fundamental analysis can yield abnormal returns. Under the semi-strong efficiency, all available public information is reflected in the asset pricing, and prices will

instantly adjust to new information. This eliminates all possibilities of using technical and fundamental analysis to yield abnormal returns; however, investing in non-public information can yield abnormal returns. It is widely accepted amongst researchers that markets are semi-strong (Lo, 2006). Under strong form efficiency markets, asset prices reflect all information, both public and non-public. Under this assumption, all information, regardless of whether public or non-public, will be included in the pricing of the stock, making it impossible for investors to make returns that exceed market returns (ibid.).

2.1.2 Behavioral Finance

While the Efficient market hypothesis states that asset prices are rational, the advocates of Behavioral finance argue that investors act irrationally on stock exchanges, making systematic errors despite assumptions of the rational market participant (Bodie et al., 2011; Lin, 2012). This behavior creates irrational fluctuations in asset prices, leading to market inefficiencies, thus creating arbitrage opportunities (ibid.) The theory focuses on market inefficiencies, primarily through studying under-or-over-reactions to trends in the market, which in extreme cases, can result in bubbles and crashes (Kahneman and Tversky, 1979, 1992). These reactions can be attributed to several factors, such as; emotions, overconfidence, overoptimism, loss aversion, herding instinct, and noise trading (Kaplanski et al., 2014; Byrne & Utkus, 2013). Kaplanski et al. (2014) found that the most recent months' return is positively correlated with investors expected return in the next month, while it is negatively correlated to risk. Overconfidence is the belief that our judgements are better than they actually are; in behavioral finance, it refers to the confidence in investment decisions (Byrne & Utkus, 2013). Investing is challenging, and involves forecasting future cash flows and financials, an overconfident investor may overestimate their ability to identify the most profitable stocks (ibid.). Furthermore, overconfidence can be fueled by previous investments, where the investor may attribute a positive outcome to skill while a negative outcome is more often attributed to bad luck (Byrne & Utkus, 2013). Taylor & Brown (1988) found that in psychology and behavioral research, overconfident people also tend to be optimistic and vice versa. An over-optimistic person will show a tendency to perceive an action or event in a manner which will result in a favorable outcome, irrespective of the likelihood of the outcome (Scheier & Carver, 1985).

Loss aversion handles the reluctance of investors to sell shares if by doing so would incur them a loss, additionally, as the loss increases, so does the reluctance to sell a share, delaying the investor to sell as a result of the potential loss (Barber & Odean, 2000). Investors facing a loss, show a strong desire to sell the position only if the investment can break even, implying investors are highly risk-averse when facing profits and become more tolerant to risk when facing losses (Kahneman & Tversky, 1979). Herding describes a social phenomenon where investors tend to follow other investors' investment decisions, which drives stock prices and increases volatility in the stock (Lam & Qiao, 2014). Banerjee (1992) defines herding as: *"doing what everyone is doing, even when their private information suggests doing something quite different."* It is argued among theorists and practitioners that widespread herding takes place in the financial markets (Devenow & Welch, 1996) and that financial crises are a result of herding behavior by investors (Chari & Kehole, 2004). Noise trading attempts to explain why investors make irrational decisions on the stock market, where noise is defined as information that has not arrived yet (Black, 1986). The noise is future uncertainty about future demand and supply in and across sectors, and according to Black (1986), there are two types of traders, information traders, and noise traders. Usually, investors trade in stocks with all available information and invest rationally, however, noise trading refers to making investments based on "noise" as if it were information (ibid.), which could help explain why some investors behave irrationally.

2.2 Literature review

First, we will present previous research in regards to stock price / NAV spreads. We find that the literature regarding Swedish property holding firms and spreads between stock price and the NAV is very limited. However, there is literature that analyzes the spreads in firms based in the U.K. and the U.S. The section will further present the guidelines for valuing real estate according to fair value with IFRS 13 and IAS 40, how investors value and use this information, tax legislation relating to deferred tax which is lays the foundation for the usage of EPRA NAV and lastly, the concept of "value versus growth stocks" which form the basis for our portfolio strategies.

2.2.1 Stock price spreads to NAV

Seeing as stock prices deviate to the firm's net asset value, owning the real estate directly instead of indirectly can be both cheaper or more expensive depending on whether the firm trades at a premium or discount compared to the value of its property assets. Adams & Venmore-Rowland (1990) was early in researching this phenomenon for U.K. listed firms and qualitatively assessed factors that could cause spreads to NAV (this was before EPRA NAV). Their main comments regarding the prevalence of spreads were that the premiums could be motivated with high-quality management, the ability to control costs, and the tax effect on capital gains, i.e., deferred tax. The tax effect is described more in-depth in 2.2.4.

Leimdörfer (2001) showed that, at the time, price discounts to NAV in Swedish real estate stocks could be explained with 85% by the dual taxation of dividends, central administrative costs, and deferred tax liability which supports the findings of Adams & Venmore-Rowland (1990). Leimdörfer's study was performed before the development of EPRA NAV, which adjusts for the deferred tax. EPRA NAV should, therefore, provide lower spreads compared to NAV. Double taxation is experienced when owning the stock rather than the asset itself, as the firm has to pay tax on net income, and the investor has to pay taxes on their dividends, hence owning the stock is more expensive. Similarly, owning the stock instead of the asset means that administrative costs are induced, which the shareholder pays for, which further should motivate a discount. Dual taxation and central administration are not included in the NAV measurement as it is only concerned with property value. Accordingly, Leimdöfer (2001) claims that to counteract the increased costs of owning the stock instead of the assets, the real estate firm should be able to offer a higher yearly yield of 0.7% than if the investor would instead own real estate directly rather than real estate stock.

The market sentiment for real estate is also a contributing factor for differences in NAV spreads (Rehkulger et al., 2012). On the stock market, investors will evaluate the market sentiment for real estate; more specifically, investors can look at the property segments and speculate in them (ibid.). The authors provide evidence that in European property holding firms, 76% of the difference between the NAV and stock price can be explained by a constructed index that aims to

explain the national market sentiment for each country in real estate stocks. The model factors in both the sentiment for property assets and the general stock market sentiment. Further, their results show that that company type (REIT[1] versus non-REIT) is positively correlated with NAV premiums, while stock volatility is positively correlated with NAV discounts (in Sweden, there are no REIT's). Leverage, stock free float, regional and sectoral factors are statistically insignificant. They conclude that NAV spreads are determined to a larger degree by behavioral finance phenomenons such as herding rather than rational behavior, which EMH advocates. On the contrary, Eichholtz et al. (2000) provides evidence that firms with a clear sectoral focus will be awarded on the stock market with a higher valuation. Bond & Shilling (2004) found support to claim that property holding firms that choose to diversify their holdings will be valued at a higher stock price / NAV multiple. In a study on U.S. REITs by Capozza & Lee (1995), they concluded that the difference between the stock price and NAV would depend on the firms' degree of specialization on a specific property type. Moreover, they provide evidence that is also strengthened by Mackinnon (2000), which supports the finding that larger firms will tend to see smaller spreads between the stock price and NAV. An important empirical finding from Bond & Shilling's paper from 2004 is that there exists a negative trade-off between company risk and market valuation, i.e., higher firm-specific risk will motivate a higher discount rate Bond & Shilling (2004).

Adams & Venmore-Rowland (1990)	NAV premiums can be motivated by high-quality management, the ability to control costs, and the tax effect on capital gains, i.e., deferred tax.
Capozza and Lee (1995)	The difference between the stock price and NAV will depend on the firm's degree of specialization on a specific property type.
Eichholtz et al. (2000)	Firms with a clear sectoral focus will be awarded on the stock market with a higher valuation.
Mackinnon (2000)	Larger firms will tend to see smaller spreads between the stock price and NAV.

[1] A REIT is a company that owns, operates and finances income producing real estate. REIT's give investors the chance to own real estate without having to purchase properties and can own them through shares (NAREIT, 2020).

Leimdörfer (2001)	NAV spreads are explained by the dual taxation of dividends, deferred tax liability, and central administrative cost with 85 %.
Bond & Shilling (2004)	There exists a negative trade-off between company risk and market valuation, i.e., higher firm-specific risk will motivate a higher discount rate.
Rehkulger et al. (2012)	The market sentiment for real estate is also a contributing factor for differences in NAV spreads. Their main conclusion is that NAV spreads are determined to a larger degree by behavioral finance phenomenons such as herding rather than rational behavior, which EMH advocates.

Table 1: Shows a summary of the theoretical framework, and the different authors' conclusions are regarding EPRA NAV spreads.

2.2.2 IFRS, NAV, and EPRA NAV

With the introduction of IFRS, all property holding firms listed on the Swedish stock market utilize IAS 40, Investment property. Investment property is defined as "*land or a building (including part of a building) or both that is: Held to earn rentals or for capital appreciation or both, not owner-occupied, not used in production or supply of goods and services, or for administration and not held for sale in the ordinary course of business*" (IAS 40, 2005). With IAS 40, the investment property is initially measured at cost. After the initial cost, property holding firms must revalue their investment properties for each reporting period, which for listed firms becomes quarterly revaluations. The firms can choose between two models, the fair value model or the cost model, however, since 2005, all listed Swedish property holding firms utilize the fair value model, and they all follow the EPRA recommendations as of 2019 (appendix 2). The fair value is an accounting measure dictated by IFRS 13 where "*the price at which the property could be exchanged between knowledgeable, willing parties in an arm's length transaction, without deducting transaction costs*," meaning that fair value measuring is aimed to estimate the price of an asset or liability in an active market setting. With the fair value model, the property holding firms must assess the fair value of their assets, where fair value reflects the

market value of the assets at the end of the reporting period. Changes in real-estate values are thus reported in the profit and loss statement and, in turn, impact the balance sheet.

NAV is defined as a firm's assets minus its liabilities, i.e., equity. For property holding companies, a majority of the assets consist of the firm's real estate portfolio (Smythe Advisory, 2016). Profits are determined by either rental income from tenants and the net changes in value of the real estate portfolio. An increase in the value of a property portfolio increases the value of the assets. However, the increase incorporates equity partly, and in listed Swedish real firms, it also captures the deferred tax, which is not captured by the traditional NAV measurement. The deferred tax reflects the future tax payment the firm is obliged to pay when liquidating the asset if the property has increased in value (Skatteverket, 2020a). The main difference between the NAV and EPRA NAV is the effect of the deferred tax, which due to taxation laws, does not need to be paid as property holding firms package properties into subsidiaries, resulting in a transfer of financial assets rather than material. Through packaging, unrealized gains are tax-exempt, and deferred tax can, in theory, be regarded as equity, which EPRA NAV adjusts for. We further discuss the effects of taxation laws and the implications of subsidiary packaging has on the firm's financials in section 2.2.3. Over time the real estate market has seen a significant increase in value (Newsec Property Outlook, 2019) and most properties are acquired for long term use, the NAV measurement becomes a poor indicator for displaying the actual value of property holding firms assets, as it does not capture the market value of the real estate portfolio (EPRA, 2019). Hence, EPRA (European Public Real estate Association) developed EPRA NAV (ibid.).

$$EPRA\ NAV = Total\ Assets - Total\ Liabilities + Deferred\ tax + Derivatives$$

We showcase the effect of deferred tax in the balance sheet on NAV and EPRA NAV in Figure 1, where the value of the assets increases from 10 to 30. We further elaborate on the differences in 2.2.3.

Balance sheet	t	t+1
Assets	**10**	**30**
Equity	5	19
Deferred tax	0	6
Debt	5	5
NAV	5	19
EPRA NAV	5	25
Tax rate	30,00%	30,00%
D/E Ratio	100,00%	26,32%

Figure 1: Displays the impact on equity, deferred tax, NAV, EPRA NAV, and D/E ratio when the value of assets increase (in this case, the assets consist only of property assets).

2.2.3 Taxation law on Swedish property and the implications on stock price / EPRA NAV

In 2003 the Swedish government passed a new law that changed the taxation of capital gains when transferring or selling business-related shares (Riksdagen, 2003). The purpose of the amendment was to eliminate chain taxation of profits in the corporate sector, which was a problem with the old taxation system, as the government found that firms set up subsidiaries overseas to purchase companies to avoid corporate tax (ibid.). The new taxation system allowed, among other assets, properties, to be sold at lower prices by creating a subsidiary that owns the asset that will be sold. By doing so, the firms could sell the shares in the firm, which would exempt the seller from paying corporate tax and, in the case of real estate, the buyer of paying stamp duty. Further changes to Swedish accounting standards came into effect in 2005 when all European firms listed on the stock exchanges were obliged to incorporate consolidated group accounting and adhere to the IFRS standards (Finansinspektionen, 2005). As previously mentioned, the deferred tax liability is an important aspect to consider when valuing real estate. Deferred tax liability is especially important for real estate, which has been packaged into a subsidiary and purchased through the acquisition of shares. For real estate, for the property to be packaged, it must be categorized as a financial asset; otherwise, it does not fulfill the requirements to be sold through an affiliate. As previously mentioned, deferred tax liability refers to a future tax payment that could become activated by a firm if they chose to sell the asset "normally" without packaging the shares and selling the company (Skatteverket, 2020b). Since

the law was introduced in 2003, it has become commonplace in Sweden for property holding firms to sell their properties through subsidiaries, as the seller can reap tax benefits through "inkomstskattelagen" (Lodin et al., 2009). The seller achieves these tax benefits by establishing an affiliate to the parent company where the property is the only asset the affiliate owns. The property is valued in regards to the tax value to fulfill the requirements of the transfer of an underpriced asset; otherwise, the transaction will be taxed (Skatteverket, 2020b). Once the property has been packaged and transferred to the affiliate, the property can be sold tax-free as a result of the law regarding business-related shares. The buyer also reaps a benefit as it does not need to pay stamp duty of 4.25% on the property value as the affiliate remains the owner of the property (Lodin et al., 2009). There is, however, a downside for the buyer is they may not reintroduce the depreciation which the buyer may have had (ibid.).

In Europe, property taxation is not coherent, and every country has different taxation laws, which can lead to differences in how the deferred tax, stamp duty, and other tax-related fees are calculated. Stamp duty is a property tax paid on real estate for private and corporate entities when purchasing real estate and is based on the transfer price of the property (Dagnall, 1994). In Europe, the stamp duty varies depending on the country and can vary depending on the municipality in which the property is purchased. In Sweden, the stamp duty is fixed for the whole country, and corporate entities pay 4.25% stamp duty while individuals pay 1.5%; moreover, both parties pay a fixed fee of 825 SEK (Lantmäteriet, 2020). As an example, German corporations and individuals pay stamp duty ranging between 3.5% - 6.5% depending on the municipality as the taxation is not fixed (Loanlink, 2020). In the transaction of property, corporations and individuals may need to pay tax on the increase in property value when the asset is sold if they have made a profit. Swedish corporations can avoid this corporate tax by packaging. However, in Germany, other rules apply, which dictates the taxation of value increases on the property depending on who owns the property as different taxation applies for German-based firms, as opposed to foreign investors (DLA Piper, 2020). Similar to Sweden, capital gains in Germany can be exempted from paying this tax if the corporation qualifies for trade tax exemption. As a result of the tax exemption, property holding firms in Sweden and Germany have a substantial amount of deferred taxes in their balance sheets, which reflects the future tax payment the firm might have to pay. Properties are typically held for long periods of time as the investment is not

of short-term nature, meaning that deferred tax can grow to a substantial size, which is why EPRA NAV has become the standardized measure as it adjusts for deferred tax.

To better illustrate the effect, we below (Figure 2) present two fictive balance sheets for two different property holding firms in countries with different tax rates. While the tax rate does not affect the value of the assets (in our fictive firms, there are no other assets than the property portfolio), or the EPRA NAV, there will be differences in the debt/equity ratio, as the differences in the tax rate have implications on the equity and deferred tax. This might have an effect on the cost of financing for the firm as a result of different D/E ratios, which in turn, could have an effect on the stock price as the cost of capital likely differs (Damodaran, 2016). Therefore, while the EPRA NAV has the same value despite tax rate differences, the stock price / EPRA NAV ratio is likely to differ due to differences in the cost of capital. While the D/E ratios differ as a result of differences in tax rates, it should not matter if the properties are packaged into subsidiaries as firms do not need to pay tax when liquidating a property with profit. Hence, if the property portfolio is packaged, the deferred tax could, in theory, be regarded as equity. While our sample consists of Swedish firms where the same tax rate applies, there are differences in geographical locations in their respective property portfolios where some firms in our sample have multi-national property portfolios. As a result, the cost of capital compared to EPRA NAV will differ between the firms in our sample as a result of different local tax rates applied in the locations where the properties are located, which should impact the spreads in stock price / EPRA NAV. Comparing NAV to EPRA NAV, the tax effect is prevalent in NAV, whereas for EPRA NAV, deferred tax is regarded hypothetically as equity, hence no tax effect.

Balance sheet: t	Country A	Country B
Assets	**10**	**10**
Equity	5	5
Deferred tax	0	0
Debt	5	5
NAV	5	5
EPRA NAV	5	5
Tax rate	30,00%	50,00%
D/E Ratio	100,00%	100,00%

Balance Sheet: t+1	Country A	Country B
Assets	**20**	**20**
Equity	12	10
Deferred tax	3	5
Debt	5	5
NAV	12	10
EPRA NAV	15	15
Tax rate	30,00%	50,00%
D/E Ratio	41,67%	50,00%

Figure 2: The above figure illustrates two balance sheets and how different tax rates affect NAV, EPRA NAV, and the D/E ratio when assets increase in value with 10 in t+1 (assuming assets only consist of properties). The takeaway is that there is no difference in EPRA NAV between Country A and B since it adjusts for the deferred tax measure, but that the D/E ratio is different as a result of different tax rates where higher tax rates increase the D/E ratio. While the two firms have different balance sheets in t+1, if the properties are packaged, they are, in reality, identical.

2.2.4 Fair value accounting: IFRS 13 and property valuation with IAS 40

IFRS13 defines fair value as "*The price that would be received or to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date*." To increase consistency and comparability between fair value measurement, the framework provides a three-level "*fair-value hierarchy"* based on valuation inputs. In this framework, the highest priority is given to identical assets in an active market categorized by high trading frequency and volume on an ongoing basis, and the lowest priority to unobservable outputs (IFRS 13:72). The fair value measurement is subsequently based on the lowest level that is appropriate for pricing the specific asset that fair value measurement is applied on (IFRS 13:73). The three-level hierarchy consists of the following:

"*Level 1 inputs are quoted prices in active markets for identical assets or liabilities that the entity can access at the measurement date*" (IFRS 13:76). Quoted prices in an active market are deemed as the most accurate measurement of fair value, and they are used when applicable (IFRS 13:77).

"*Level 2 inputs are inputs other than quoted market prices included within Level 1 that are observable for the asset or liability, either directly or indirectly*" (IFRS 13:81). Level 2 thus applies for assets or liabilities that are non-identical but to which an active market exists. For identical assets or liabilities traded in a market considered non-active, inputs that are observable but not necessarily quoted are used (for instance, credit spreads). If prices are not quoted, market-corroborated inputs can be used, i.e., inputs derived from observing market data, which correlate with the asset or liability.

"*Level 3 inputs are unobservable inputs for the asset or liability*" (IFRS 13:86). Level 3 applies when data is not observable, and fair-value has to be measured specifically for the asset or liability, for instance, by performing a discounted cash flow analysis.

IFRS 13 dictates that when measuring fair value, the maximum amount of relevant observable inputs should be used, with minimum focus on non-observable inputs, and that the valuation technique used for measuring fair value should reflect the amount of data available (IFRS 13:61, IFRS 13:67). IFRS 13:62 lists the three most common valuation techniques for fair value:

(1) Market approach**:** Prices on assets are derived from market transactions with identical or similar assets (for instance, stock prices).

(2) Cost approach**:** Fair value equals the replacement cost of the service capability of an asset.

(3) Income approach: Fair value reflects the expected future cash flows, i.e., valuation based on discounted cash flows.

IAS40 Investment property prescribes accounting rules for property held by the owner to gain rentals and/or capital gains (IAS 40.5). IAS 40 also encompasses property under construction that is developed to be used as an investment property; however, third party construction contracts are not included.

With the fair value model, the assets are revalued during each financial period so that the fair value reflects the actual market value at the financial reporting day (IAS 40:38). Using the three-level hierarchy in IFRS13, IAS 40 prescribes that current real estate prices give the best measurement of fair value on an active market for similar or identical properties (IAS 40:45). In the absence of recent transaction information of similar or identical properties, the valuation is either based on current prices of real estate that are of a different nature, by using current prices in less active markets (which are adjusted for differences in economic conditions, i.e., the location method) or performing a discounted cash flow valuation based on estimates of future cash flows (IAS 40:46). The property holding firms must also disclose if the property valuation has been performed by a third-party, or if no third-party valuation has taken place (IAS 40.75).

2.2.5 Usefulness of fair value accounting information, applied to property holding firms

Seeing as all listed property holding firms in Sweden utilize the fair-value model in IFRS, it is important to understand how fair-value accounting information is used and valued by investors, and how this leads to pricing in the stock market. Bischof et al., (2014) finds that analysts put a considerable amount of weight on fair-value related information, an explanation could be that fair value accounting information is deemed timely and thus, fair value measures provide more accurate financial statement information (Ball, 2006). Ayres et al., (2017) find a positive relationship between fair value intensity and analyst forecast accuracy with the reasoning that higher fair value intensity requires fewer judgements in terms of earnings by the analyst. On average, investors and analysts rely on fair value measurements for assets to a high degree; however, the reliance on the measurement depends on the market liquidity of the asset (Petroni & Wallen, 1995; Gassen & Scwedler, 2010). Thus, if the asset has an easier to determine market price, the fair value measurement is perceived as more accurate. Analysts and investors, therefore, have no standardized way of treating fair value accounting information, but rather that the usefulness of the measure is content-specific (ibid).

Different properties have different liquidities, and thus, investors should value the NAV measurement differently for different properties as the accuracy of the fair value differs. Certain types of properties are generally regarded as more liquid depending on specific factors relating to the property such as; the purpose of the building (for example housing, manufacturing, offices,

hotel, or for trade), where the property is geographically located, the condition of the technical aspects of the building, the level of vacancy, the number of tenants, the length of the contracts, and who the tenants are (Newsec, 2019). For instance, a building specialized for a specific manufacturing company in a remote location is less liquid than a building with a more general-purpose (for instance, private housing in a prime location). Geographical location is deemed as the most important characteristic for liquidity, with interest for real estate being the largest in Sweden's three largest cities (Stockholm, Gothenburg, and Malmö), leading to higher levels of liquidity for properties in locations with higher demand (ibid.). Housing real estate has been an attractive segment for several years in terms of transaction volume due to the perceived low risk involved with housing in relation to the low vacancy levels and a large number of tenants (ibid.). Leimdörfer (2001) mentions that property holding firms listed on the stock exchange can value their less liquid properties to the same levels as liquid properties. Seeing as the fair value measurement reflects the market price, liquidity risk is reflected in the valuation of the property when choosing a discount rate, with a higher discount rate being allocated to properties that are associated with higher risk, stemming from a higher yield (Newsec, 2019). With that reasoning, the usefulness of fair-value accounting measures should be indifferent depending on the liquidity of the asset, as opposed to the findings of Petroni & Wallen (1995) and Gassen & Scwedler (2010) which determines that the liquidity of the assets are a determinant for the use of fair value accounting information.

The usefulness of the fair value measurement is also dependent on the liquidity of the stock (Amihud and Mendelson, 1986). The authors imply that illiquid stocks motivate a discount in relation to the underlying assets, and conversely, more liquid stocks will be valued at a premium in relation to the underlying assets. One explanation could be that illiquid stocks have larger bid-ask spreads than liquid stocks, which will further motivate a discount compared to the NAV (Pontiff, 1996). In liquid markets, when mispricing occurs as a result of large bid/ask spreads, investors will immediately purchase shares to take advantage of the “mispricing” (Kyle, 1985).

2.2.6 Value investing versus premium investing

A common research problem in the field of finance is investment strategies on accounting measures. By analyzing value multiples such as market to book (P/B), price to earnings (P/E), or

price to cash flow (P/C), one can divide stocks into two subsequent groups, value stocks and growth stocks (Fama & French, 1998). Value stocks are stocks with lower multiples, whereas growth stocks trade at higher multiples as a result of having a value premium. The value premium can stem from high expectations in future earnings growth, hence trading at a premium as investors speculate in them having a higher relative future value (Bourguignon & De Jong, 2003). Basu (1975) was early in comparing value stocks against growth stocks, where he created stock portfolios based on high and low P/E ratios, where the portfolio strategy of value stocks yielded abnormal returns. Basu conducted two more studies in 1977 and 1983 (Basu, 1977, 1983) where he tested risk-adjusted portfolios of high and low P/E ratio stocks which further supported the superior returns of value stocks. Newer studies have further proven that value stocks outperform growth stocks (Pätäri & Leivo, 2009; Sareewiwatthana, 2011). Fama & French (1998) argue that value stocks tend to outperform growth stocks as a result of value stocks often being in distress, leading to mispricing, which, when corrected, results in higher stock returns. While value investing aims to invest in companies that could be deemed "undervalued," the advocates of market efficiency argue that investing in highly-valued firms is a winning strategy due to poorly performing firms being more likely to perform poorly, and firms with strong performance will have a premium valuation as the market expects them to be high performers (ibid.).

The concept of value versus growth stocks will be applied as we construct our two stock portfolios, with low stock price / EPRA NAV multiple will denote value stocks, and high stock price / EPRA NAV multiple denoting growth stocks (We will more in-depth discuss the creation of our portfolios in section 3.4). The concept lays the foundation for Hypothesis 2 which we present in section 2.3

2.3 Concluding remarks and hypotheses

To conclude, we find it difficult to find any coherent explanations as to why stock price/ EPRA NAV spreads exist and fluctuate over time, with a limited amount of previous literature on the subject. Moreover, EPRA NAV is widely recognized and is frequently used by investors and analysts when valuing property holding stocks despite the inconsistency of the spreads. However, if EPRA NAV is an accurate measure of company value, stock price deviations from NAV should indicate mispricing and irrational behavior from analysts and investors. If the deviations

can be explained by rational behavior, i.e., efficient pricing, EPRA NAV should not be a KPI that effectively reflects firm value. Thus, by investing using EPRA NAV as an investment determinant to test for abnormal returns, it should indicate if stock price / EPRA NAV spreads can be explained by market efficiency. Hypothesis 1 is based on the reasoning that EPRA NAV is a representative KPI of the long term value of the firm, and that a value investing strategy, i.e., investing in a relatively low market stock price / EPRA NAV ratios over time will generate abnormal returns.

Hypothesis 1

H0 = A stock portfolio consisting of stocks with lower or higher stock price / EPRA NAV multiple will not yield abnormal returns.

Ha = A stock portfolio consisting of stocks with lower or higher stock price / EPRA NAV multiple will yield abnormal returns.

Hypothesis 2 is based on the law of one price, and the argument that value stocks outperform growth stocks (Fama & French, 1998; Basu, 1975, 1977, 1983; Pätäri & Leivo 2009; Sareewiwatthana, 2011).

Hypothesis 2

H0 = The strategy of investing in value stocks will not outperform the strategy of investing in growth stocks.

Ha = The strategy of investing in value stocks will outperform the strategy of investing in growth stocks.

3. Method

3.1 Research design

To answer our research question, we will perform empirical testing by applying OLS-regressions. In order for the tests to be valid and reliable to draw conclusions from, it is essential that the underlying assumptions of the OLS-regressions are met (Crawley & Whalen, 2014). Therefore,

we control that the underlying assumptions are met, more of which we go into detail in the result section. Without the assumptions for OLS-regressions being fulfilled, the results are unreliable, and thus, no conclusions can be drawn (Dzemski, 2017). As we measure abnormal stock returns, we apply multivariate regression analysis, more specifically the Five-Factor model by Fama & French (2015) (see section 3.3), to check for factors that explain asset pricing and, thus, movements in stock price. Two regressions are performed to examine whether we can achieve abnormal returns for our two respective portfolio strategies (see 2.3 for hypotheses and 3.4 for the construction of our portfolios). The results of the two regressions will answer Hypothesis 1; however, the regressions can answer the hypothesis independently. For Hypothesis 2, the two regressions will be compared to one another. Regressions are useful for our research question as we examine an abnormality in asset pricing, which can be measured by controlling stock returns for the expected return (see section 3.3). In our sample, we take survivorship bias into account as we include Victoria Park, which was delisted during the sample period. Survivorship bias refers to the phenomenon that the firms that are currently listed on the stock exchange will be the only firms included in the sample, and the firms that were purchased of the stock exchange, went bankrupt or disappeared will not be included (Sherman, 2014). The motivation for us to include all stocks is that during the investment period it would not be possible for us as investors, to know which firms will not exist in the future. Without considerations of survivorship bias, our sample would be biased and less reliable (Linnainmaa, 2013). No firms in our sample filed for insolvency during the sample period.

3.2 Data description

The sample consists of all property holding firms listed on NASDAQ OMX Stockholm between 2005 - 2019, consisting of 23 firms. We chose companies exclusively listed on NASDAQ OMX Stockholm as the firms included in the index follow IFRS (Nasdaq, 2020). Markets such as First North, Multilateral Trading Facility (MTF), and Spotlight have been excluded. Eight firms have been listed on the stock exchange during the whole period, while the remaining 15 were added to the sample after becoming listed (see appendix 1). The only firm that was delisted during the period was Victoria Park. While Balder and SBB had stock data for the whole period, they performed reversed acquisitions to become listed. Hence they were excluded when the listing position did not reflect their current operations. K-Fastigheter and K2A Knaust & Andersson

Fastigheter AB were excluded in the sample as they were listed on the Nasdaq stock exchange during 2019 Q3 and Q4.

The data consists of Swedish firms which eliminates the potential issue of local risk factors that might lead to different pricing of similar assets between different local markets. As an example, both Fama & French (2012, 2017) and Griffin (2002) find that local multivariate models are more useful in pricing assets compared to global models, with the argument that local risk factors lead to differences in local returns. This is a significant factor, as the real estate and stock market sentiment differs between local markets (Rehkulger et al., 2012). The application of a local multivariate model should thus strengthen the results compared to applying the model on a regional or global market (Fama & French, 2017).

Q1 2005 has been chosen as this is the first quarter as listed property holding firms started to apply IFRS. Q4 2019 was chosen as the final quarter as EPRA introduced new rules for reporting on EPRA NAV as of Q1 2020 (EPRA, 2019). The period includes the 2008 financial crisis and ends right before the major stock market turmoil that started Q1 2020 during the Corona-virus pandemic. Noteworthy is the abnormal volatility on the market during 2007-2008, which returned to more normal levels during 2009 (Schwert, 2011; Karaunayake, Valadkhani & O'Brien, 2010). Starting or ending in a period of abnormal volatility could hurt the reliability of the study (Bryman & Bell 2016). Similar to the turmoil during the financial crisis, we would expect abnormal volatility during the first two quarters of 2020 due to the Coronavirus; hence Q1 2020 is excluded despite data being available. For stock returns, we used daily returns, which we retrieved from Bloomberg.

The data for EPRA NAV was collected from Bloomberg, and when missing, it was manually collected from each firm's quarterly report and manually inputted into our datasheet. For firms that did not report on EPRA NAV, we calculated EPRA NAV by summing the equity, deferred tax liability, and interest from derivatives (EPRA, 2019). While all firms adopted EPRA NAV at some point during the sample period, firms started using the measure at different quarters as they joined EPRA (see appendix 1 for EPRA NAV adoption). When necessary equity, deferred tax liability, and interest from derivatives were retrieved from Bloomberg and the annual reports.

When calculating the EPRA NAV for some firms during the earlier years, there were cases where there were discrepancies between our calculated EPRA NAV and the firms disclosed EPRA NAV of around 2%, which could be due to the information disparity present on Bloomberg. All firm-specific KPIs were collected quarterly as new information arose with the quarterly reports. As Figure 3 displays, the stock price / EPRA NAV multiples fluctuate.

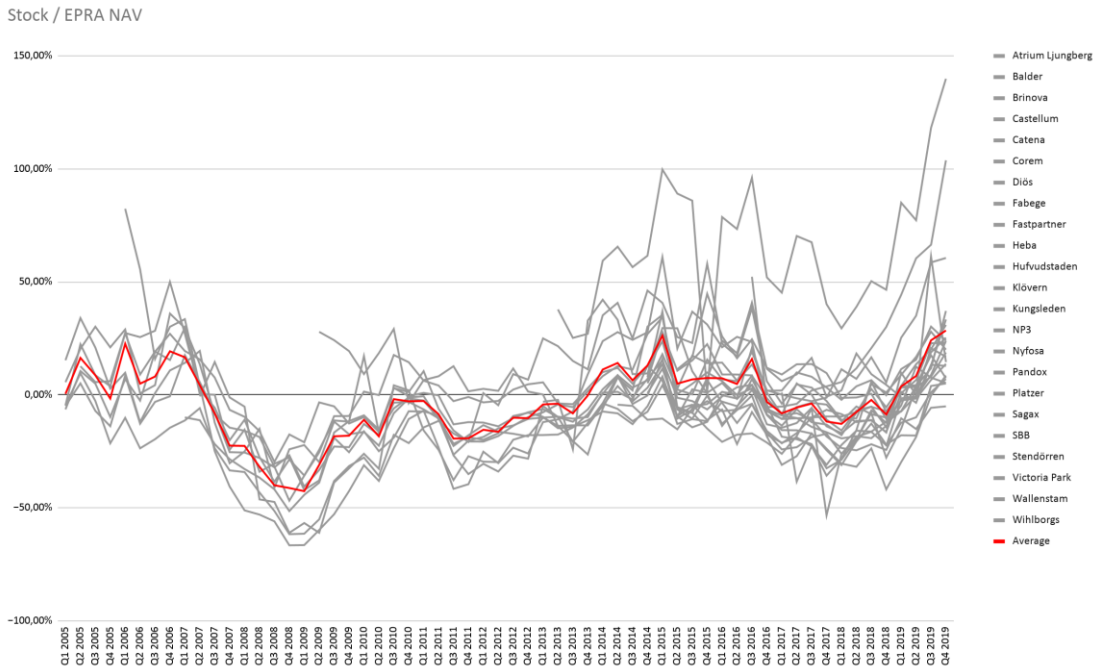

Figure 3: Displays the stock price / EPRA NAV spreads for all firms over the period, where red denotes the average spread.

3.3 Fama & French Five-Factor model

The Five-Factor model by Fama & French (2015) will be used to test the hypotheses and find any potential abnormal returns in the investment strategies. The model is based on the traditional CAPM (Capital Asset Pricing Model) developed by Sharpe (1964) and Lintner (1965), which aimed to price stocks compared to risk, where risk equals Beta, which equals the movement of the individual stock compared to a market index. A higher Beta means larger movements compared to the market, thus, higher risk and higher potential return (DeMuth, 2014). Whereas CAPM adjusts stock returns for risk, it does not adjust for further outperformance tendencies, hence the development of CAPM leading to the Three-Factor model, which takes size and market value into account (Fama & French, 1993). While the Three-Factor model was an improvement

over CAPM, it overlooked the effects of returns stemming from profitability and investment rate, hence leading to the development of the Five-Factor model (Fama & French, 2015). Fama & French provide evidence that the Five-Factor model explains the cross-section of stock returns better than the Three-Factor model. The improvement of the Five-Factor model is supported by Chiah et al. (2016), which finds that model is superior at explaining asset pricing anomalies compared to other multivariate models such as the Three-Factor model and the Carhart Four-Factor model. On the contrary, Kubota & Takehara (2017) do not find the model to be statistically significant when applied to the Japanese stock market. Foye (2018) finds that the Five-Factor model is an improvement over the Three-Factor model when applied to Eastern Europe and South America, but that the model is not an improvement when explaining Asian stock returns. Fama & French further found that the Five-Factor model provides a better explanation of average returns in Europe, North America, and Asia Pacific (Fama & French, 2017). According to Fama & French (2015), the main disadvantage of the model is that it fails to capture the returns for small stocks, with low profitability but with a high investment rate. Despite there being disagreements in the improvement of the Five-Factor model compared to other multivariate models, the model is less established as it is a newer model and less empirically proven compared to, for instance, the Three-Factor model, we decided on using the Five-Factor model for all regressions.

The Five-Factor model regression is shown below:

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + e_{it}$$

Rit equals the quarterly return of a portfolio.

RFt equals the risk-free rate.

RMt - R*tf* equals the risk premium.

SMB equals the size effect, i.e., the return spread between small and large stocks (market cap).

HML equals the value effect, i.e., the return spread between cheap and expensive stocks (market to book).

RMW equals the profitability effect, i.e., the return spread between most and least profitable firms.

CMA equals the investment rate factor, i.e., the return spread between more aggressively investing firms and firms with less aggressive investment strategies.

e equals the error term.

To compile the data to carry out the Fama & French Five-Factor test, all factors in the model were downloaded from Kenneth R. French's database for all European firms (Kenneth R. French, 2020).

3.4 Construction of real-estate stock portfolios

The portfolios are constructed based on stock price / EPRA NAV multiples, where the value portfolio will be compared to the growth portfolio (see the previous section 2.2.6, where we discuss the value versus growth concept). Quarterly stock data and EPRA NAV were downloaded from Bloomberg; thereafter, we calculated the stock price / EPRA NAV multiple for each firm in each quarter and ranked the firms from lowest to highest multiple, which in turn we based the portfolios on. The portfolios were weighted to match the equal weight for the coming quarter, the weights were only adjusted as the stocks in the respective portfolios were altered in each quarter. The reasoning we used in this approach was to use all the new available information regarding EPRA NAV to base our investment on strategy on. Over the period, the number of firms ranged from 6 to 23 (see appendix 1 for what firms we included in the sample). During the first year between Q1 2005 - Q4 2005 the portfolio consisted of three firms in each portfolio, between Q1 2006 - Q1 2007 four firms were included in the portfolios and after Q2 2007 the respective portfolios increased to five firms for the rest of the period (see appendix 2 for a complete overview of the portfolios).

No firms disclosed their EPRA NAV value during the whole period, with the exception of Wallenstam. The remaining companies implemented the EPRA NAV KPI during later years ranging from 2011 - 2015, depending on how long they had been listed on the stock exchange and how far back they chose to disclose the data in the latter reports (see appendix 1 for EPRA NAV implementation). For the firms which did not provide EPRA NAV in specific quarters, we calculated the EPRA NAV by adding deferred tax and derivative to the firm's equity according to EPRA standards (EPRA, 2019)**.** The returns for the cheap portfolio and premium portfolio were then calculated using risk-adjusted daily returns, which were then aggregated into quarterly returns, which formed the basis for the portfolio returns. Rather than nominal stock price data, we used dividend adjusted stock price data to capture dividends as dividend is a part of shareholder returns.

The portfolios were constructed with equal weights rather than weights adjusted for market size. Choosing an equally weighted portfolio would be problematic if the differences in market size were large, which would lead to assigning a proportionally larger amount of weight in the portfolio to the smaller stocks. Choosing to value weight portfolios removes the issue of smaller firms getting a disproportionate impact on the portfolio returns; however, increasing the amount of weight to certain stocks increases unsystematic risk and leads to increased volatility (Markowitz, 1952). On the contrary, using equally weighted portfolios provides a higher return for bearing systematic risk (Plyakha et al., 2012).

There are periods where the majority of firms trade at either a discount or a premium compared to what could be excluded for each portfolio, e.g., for certain periods, the value portfolio includes stocks trading at a premium to EPRA NAV, and vice versa for the growth portfolio. However, if both portfolios on average trade at a discount, we expect a higher abnormal positive return for the value portfolio as they trade at higher average discounts. Similarly, if both portfolios trade at an average premium compared to EPRA NAV, we expect a larger negative abnormal return for the growth portfolio, as the average premiums are higher.

3.5 Regressions

In order to run the regressions for the Fama and French Five-Factor model, the respective portfolios' excess return had to be calculated; this was done by subtracting the risk-free daily rate from the portfolios' daily returns. The portfolio's daily excess return, the daily values for Mkt-RF, SMB, HML, RMW, and CMA were input into Stata. We ran two OLS-regressions in accordance with Fama and French's Five-Factor model on the daily data for all the variables with the daily excess return as the dependent variable. One regression was carried out for the excess returns in the value portfolio for the whole period, and another regression for the growth portfolio for the whole period.

After the regressions were carried out, we looked at the values in a scatter plot to determine if there were any outliers that needed to be removed from the sample. As a result of the vast number of observations we had in our sample, we chose to trim the data to remove any outstanding

outliers which could potentially harm the reliability of our results. Therefore, we chose to remove the 1st and 99th percentile of values from our sample to remove outliers. The residuals in the regressions were subsequently plotted to determine the heteroskedasticity of the sample data. To check for autocorrelation in the error terms, we performed a Durbin-Watson robustness test on the regressions.

3.6 Limitations

Due to the small amount of property holding firms on the stock exchange during the period, diversification is difficult to achieve, hence an increased risk for unsystematic risk appearing in the portfolios stemming from company-specific events that might appear during the period the stock is included in the portfolio. In order to diversify away unsystematic risk, the portfolios should include a larger sample of stocks (Elton & Gruber, 1977; Markowitz, 1952) which becomes a limitation in this study as the amount of firms in this study ranges from 6 to 23 during the period, hence making us unable to have a satisfactory amount of firms included in each portfolio. While a global or regional sample could have been used, it would mean the inclusion of local risk, which decreases the strength of multivariate analysis (Griffin, 2002; Fama & French, 2012; Fama & French, 2017). However, to decrease the unsystematic risk, as more real estate stocks were listed on the market, we increased the size of the portfolios but capped the size at five stocks. As the amount of property holding firms increased during the period, we decided to increase the number of firms included in each portfolio to decrease the impact of firm-specific risk over time; the portfolios are displayed in appendix 2. All firms in the portfolios act in the same sector, and because they were not randomly chosen, systematic risk is expected. Further, the Five-Factor model is less empirically proven than other multivariate models, which could pose implications for our results reliability.

4. Results

First, we will present the descriptive data for the two portfolios (4.1); we then present the results from the regressions, which we will base our findings on (4.2). While total returns are not relevant for our regressions, the growth portfolio significantly outperformed the value portfolio. For the total return of the investment strategies, see appendix 4.

4.1 Descriptive data

Figure 4 shows the descriptive data for the OLS regressions for the two portfolios. *ER_Growth* denotes the growth portfolio, *ER_Value* denotes the value portfolio, and *mktrf* denotes the market risk premium. The variables for *smb*, *hml*, *rmw*, and *cma* denotes the spreads in percent. The values in figure 4 are presented after the data was winsorized, where we cut 1st and 99th percentile in the value and growth portfolio to avoid extreme values. We do not see any issues with removing these values considering the number of observations in our sample. In the descriptive statistics, we did not winsorize the control variables, as this was not of importance for our regressions. When comparing the two portfolios, we observe almost identical minimum and maximum daily returns, with the growth portfolio having a return spread of -3.09% to 3.09%, and the value portfolio having a spread of -3.17% to 3.13%. The growth strategy had a standard deviation of 1,08, while the value portfolio has a standard deviation of 1,07. The main observable difference is in the mean daily return, which for the growth portfolio equals 0.10%, and 0.055% for the value portfolio, hence growth outperforming value over the sample period. Furthermore, we controlled the distribution of the residuals in the data for both the regressions. The data in both the value and growth portfolios are normally distributed, which can be observed in the appendix (see appendix 6 and 7). Seeing as the amount of observations equals 3 912 for all variables, we had no missing values.

Variable	Observations	Mean	Std.Dev.	Min	Max
mktrf	3912	0,0246	1,123	−8,98	10,76
smb	3912	0,0029	0,5134	−5,32	3,21
hml	3912	−0,0032	0,442	−4,18	3,76
rmw	3912	0,0169	0,2965	−2,35	4,3
cma	3912	0,0025	0,2716	−2	1,89
ER_Growth	3912	0,1025	1,081	−3,0919	3,09
ER_Value	3912	0,0547	1,0777	−3,1744	3,1358

Figure 4: *ER_Growth* denotes the growth portfolio, *ER_Value* denotes the value portfolio, *mktrf* denotes excessive return, *smb* denotes the size effect, *hml* denotes the value effect, *rmw* denotes the profitability effect, and *cma* denotes the investment factor.

4.2 Results from the regression

In both regressions, heteroscedasticity was checked with a Breush-Pagan test, and autocorrelation was checked with the Durbin-Watson test. For *ER_Growth*, all assumptions for OLS regressions were met, and all variables were statistically significant.

Number of obs	3912
R-Squared	0,2857

ER_Growth	Coef.	Std. Err.	t	P>t	[95 % Conf.	Intervall]
mktrf	0,5588	0,1997	27,98	0,000***	0,5196	0,5979
smb	0,2626	0,0428	6,14	0,000***	0,1787	0,3465
hml	−0,3999	0,0498	−8,01	0,000***	−0,4965	−0,3013
rmw	−0,4927	0,0701	−7,02	0,000***	−0,6303	−0,3551
cma	−0,4639	0,068	−6,82	0,000***	−0,5973	−0,3305
_cons	0,0986	0,0159	6,17	0,000***	0,0673	0,1299

* = p<0,1 ** = p<0,05 *** = p<0,01

Figure 5: Displays the OLS-regression for the growth portfolio, where _cons denotes the abnormal return.

For *ER_Value*, the data is heteroscedastic; therefore, the result of the regression is not reliable (see appendix 5 for the Breush-Pagan test). As we experienced heteroskedasticity for the value portfolio, we performed a robustness test to run the regression in order to trim the residuals. All variables are statistically significant for figure 6 and thus have an effect on abnormal return (_cons).

Number of obs	3912
R-Squared	0,2609

ER_Value	Coef.	Std. Err.	t	P>t	[95 % Conf.	Intervall]
mktrf	0,4519	0,0218	20,72	0,000***	0,4092	0,4947
smb	0,2592	0,0469	5,52	0,000***	0,1672	0,3513
hml	−0,0609	0,0662	−0,92	0,357	−0,1908	0,0688
rmw	−0,3551	0,1	−3,55	0,000***	−0,5513	−0,1589
cma	−0,5796	0,0732	−7,92	0,000***	−0,723	−0,4362
_cons	0,0502	0,0149	3,37	0,001***	0,021	0,0793

* = p<0,1 ** = p<0,05 *** = p<0,01

Figure 6: Displays the regression for the value portfolio after the robustness tests were carried. _cons denote the abnormal return.

The R-squared equals 0.2609 for the value portfolio and 0.2857 for the growth portfolio, which shows that the independent variables explain the variability in the dependent variables to a limited degree of 26.09% and 28.57% respectively. All variables included in the regressions show statistical significance, i.e., they have an effect on the excess returns except for the size effect (hml) in the value portfolio. Both portfolios show significant alphas (_cons), and we can

reject the null hypothesis for hypothesis 1 regarding abnormal returns. For the value portfolio, we can see daily abnormal returns of 0.050% and daily abnormal returns of 0.099% for the growth portfolio. We can, therefore, not reject the null hypothesis for hypothesis 2 as the daily abnormal return for the value strategy does not exceed the abnormal returns for the growth strategy. We instead see a result opposite to hypothesis 2, i.e., the abnormal returns of the growth strategy exceed the abnormal returns of the value strategy.

5. Discussion and analysis

Both portfolios yielded abnormal returns and could be argued to be successful investment strategies. In terms of daily abnormal returns, the value portfolio yielded an abnormal return of 0.050%, whereas growth yielded an abnormal return of 0.099%. Our findings contradict the EMH as we find inefficiencies in the market for both investment strategies, as the portfolios provided abnormal returns during the period (Fama, 1970). While we expected abnormal returns for the value strategy, we were not expecting higher abnormal returns for the growth strategy. This result went against our expectations of value outperforming growth based on previous research (Fama & French, 1998; Basu, 1975, 1977, 1983; Pätäri & Leivo 2009; Sareewiwatthana, 2011). There could be several explanations for this phenomenon. Seeing as growth stocks could be considered “winners" as they are priced with a value premium, we think the higher total return could be a result along with the findings of Rehkulger et al., (2012), i.e., that the size of the spreads is a result of herding, where investors flock to “winning” stocks as they expect them to continue to overperform. This is supported by the notion that the firms which traded at a relatively higher stock price / EPRA NAV multiple continued to be traded relatively higher during the sample period, hence continuously having a value premium. Therefore, the market does not consider them to be overvalued, indicating that there are other factors that play a part other than EPRA NAV that investors value. Overconfidence and overoptimism could also be possible explanations as to why investors flock to winning stocks, as they believe the stocks will keep performing well and are optimistic about the future performance. Adams & Venmore-Rowland (1990) point out that value premiums can be motivated by high-quality management and cost control, which we believe can explain the notion that investors seem to value certain property stocks higher compared to EPRA NAV over an extended period compared to other stocks. We also note that EPRA NAV is a KPI that is dependent on transactional data; however, the market could deem the

true value to differ from the book value, despite the book value being based on the actual market value, hence leading to spreads. Furthermore, the effect of different tax rates where the firms have their properties is likely to impact the spreads due to deferred tax and the effect on the cost of capital. To analyze this effect, it is necessary to assess the effective tax effect for each firm and the effect on the cost of capital, and in turn, which is beyond the scope of this thesis.

While we would expect abnormal returns for the value strategy due to the law of one price, we find that to be an unreasonable explanation to our result as we find it is inconsistent with the result of the higher abnormal returns in the growth portfolio strategy. Based on these results, we find it difficult to explain the abnormal returns present in both strategies, as we think the higher abnormal returns in the growth strategy display that the abnormal returns in the value strategy does not stem from undervalued stocks compared to EPRA NAV.

6. Conclusion

This thesis aimed to test the reliability of EPRA NAV as a predictor for stock prices. The results show that while both strategies produced abnormal returns, the strategy of investing in high stock price / EPRA NAV firms outperformed the strategy of investing in low stock / EPRA NAV. The growth strategy provided a daily abnormal return of 0.099%, whereas the value strategy provided a daily abnormal return of 0.050%; the results are therefore not aligned with EMH as we find abnormal returns. While we hypothesized that abnormal returns for the value strategy would occur due to the law of one price, we find that to be an unreasonable explanation as we find it inconsistent with the higher abnormal returns in the growth portfolio strategy. Therefore, we find it difficult to explain the abnormal returns for both strategies. We accomplished our primary goal of testing the reliability of EPRA NAV as a predictor of stock prices, where our results show that EPRA NAV is inconsistent at explaining stock returns. The outcome of our strategies show that while both are successful, “winning” stocks will continue to “win.” Our findings suggest that investors include other factors than the value of the real estate portfolios when pricing real estate stocks and that the law of one price does not hold for properties. This study contributes to the field of finance and the understanding of pricing property stocks. We also contribute to the literature regarding the pricing of Swedish property holding stocks compared to the value of their real estate portfolios, which we find to be limited.

As we observe that there is a limited amount of previous research regarding the pricing of property holding stock compared to the NAV, we think there is more room for future research. We think it would be interesting to expand the sample to include a broader range of property holding stocks to compare different countries, making it possible to test with larger portfolios as our paper was limited to Swedish property holding stocks only.

As we were not able to explain our abnormal returns, we think it would be interesting to research why both strategies could yield abnormal results, and if the result would be the same when applying our portfolio strategies to a multi-national sample.

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Appendix

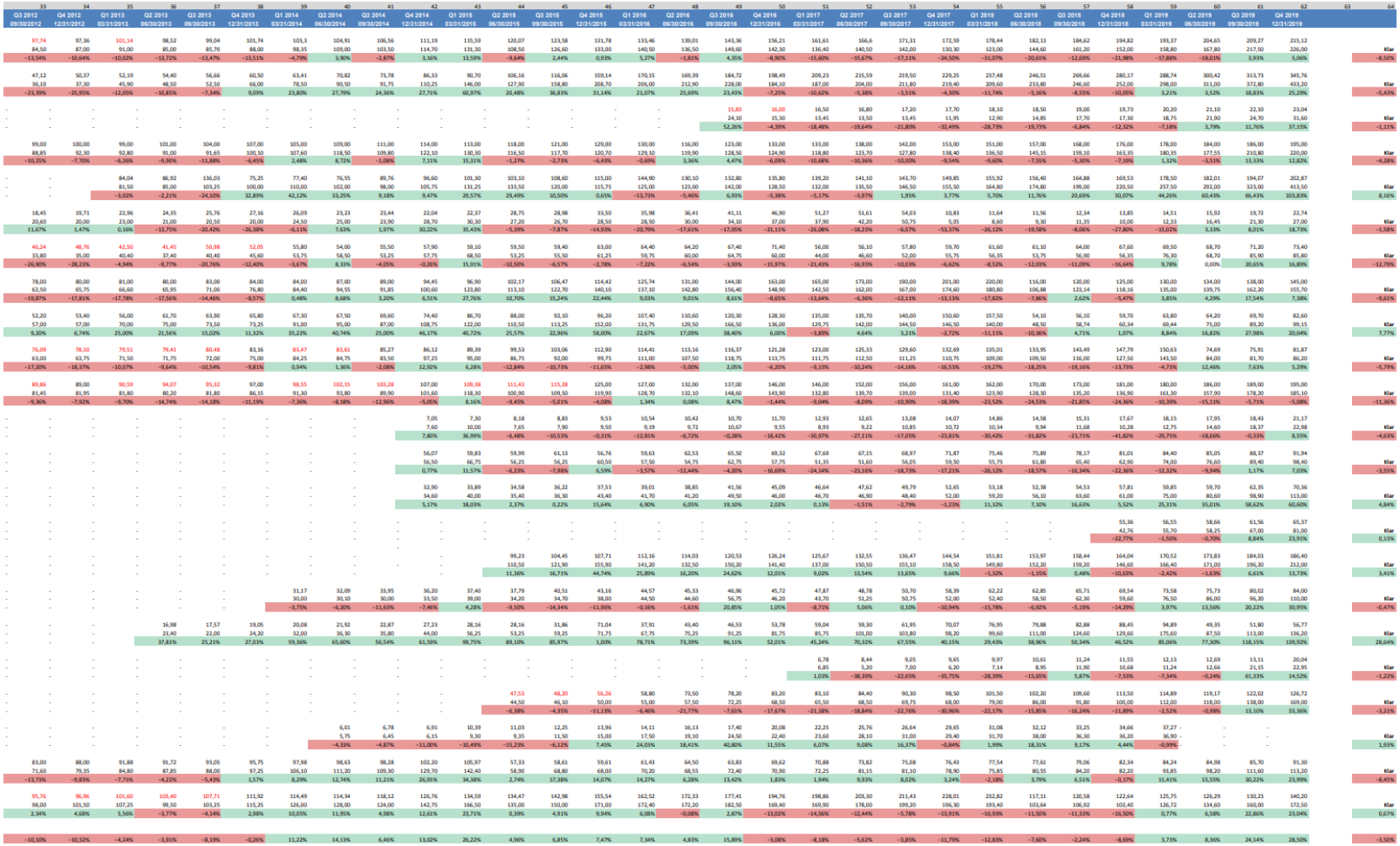
Appendix 1 - Displays the tickers for the companies included the portfolios, at which date they were listed on the stock market and/or delisted. During the period, the number of firms increased from 6 to 23. The table also displays the adoption of EPRA NAV rules.

Ticker/Company	Added to sample	Removed	Adoption of EPRA Rules	EPRA Adoption during the whole sample period (y/n)
ATRLJB SS Equity	Q1 2005	-	Q2 2013	N
BALDB SS Equity	Q1 2006	-	Q4 2011	N
BRINB SS Equity	Q4 2016	-	Q1 2017	N
CAST SS Equity	Q1 2005	-	Q1 2005	Y
CATE SS Equity	Q1 2013	-	Q1 2013	Y
COREB SS Equity	Q2 2009	-	Q2 2009	Y
DIOS SS Equity	Q1 2007	-	Q1 2014	N
FABG SS Equity	Q2 2007	-	Q2 2007	Y
FPARD SS Equity	Q1 2005	-	Q1 2012	N
HEBAB SS Equity	Q1 2005	-	Q3 2014	N
HUFVA SS Equity	Q1 2005	-	Q4 2015	N
KLOVB SS Equity	Q4 2014	-	Q4 2014	Y
KLED SS Equity	Q4 2014	-	Q4 2014	Y
NP3 SS Equity	Q4 2014	-	Q4 2014	Y
NYF SS Equity	Q4 2018	-	Q4 2018	Y
PNDXB SS Equity	Q2 2015	-	Q2 2015	Y
PLAZB SS Equity	Q1 2014	-	Q1 2014	Y
SAGAB SS Equity	Q2 2013	-	Q2 2013	Y
SBBB SS Equity	Q1 2017	-	Q1 2017	Y
STEFB SS Equity	Q2 2015	-	Q1 2016	N
VICPB SS Equity	Q2 2014	Q2 2019	Q2 2014	Y
WALLB SS Equity	Q1 2005	-	Q1 2005	Y
WIHL SS Equity	Q2 2005	-	Q4 2013	N

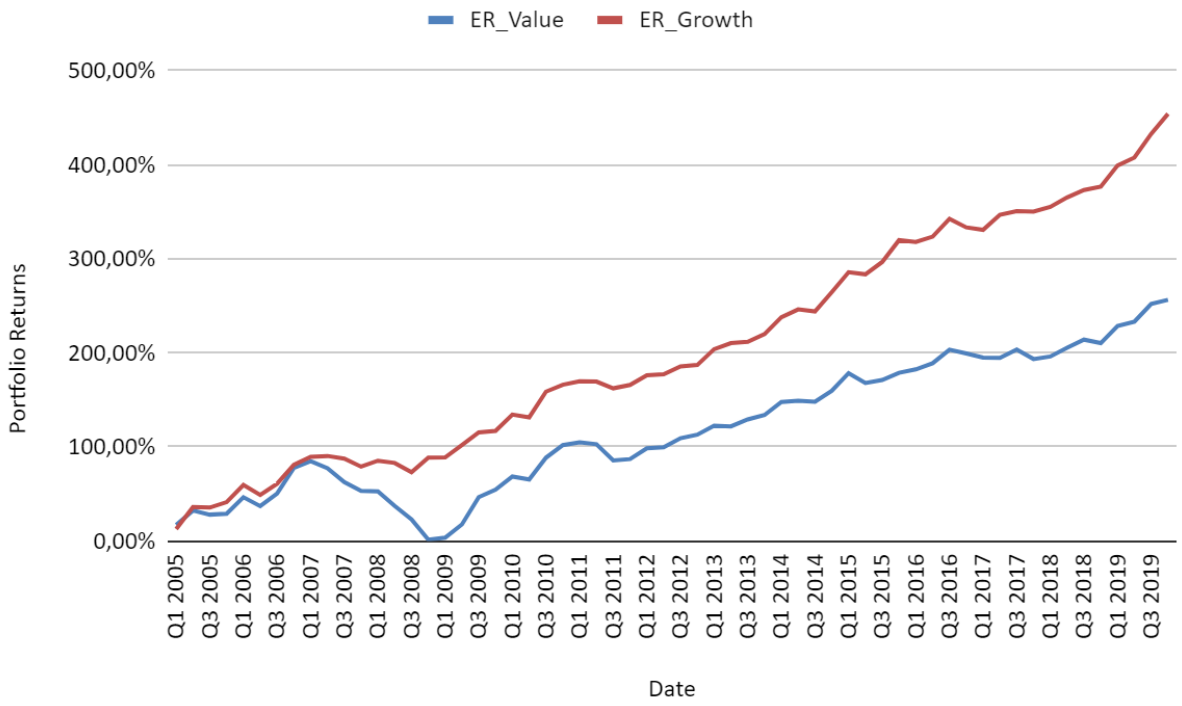
Appendix 2 - Displays the portfolios for each quarter, the value portfolios consist of the red cells, and the growth portfolios equals the green cells. The white cells are companies that are not included in any portfolio.

Appendix 3 - Displays all firms and their respective quarterly stock prices and EPRA NAVs. Red displays when stock price is trading below EPRA NAV, green displays when stock price is trading above EPRA NAV. The red NAV values are calculated whereas the black NAV values are provided by the firms.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		Q1 2005 03/31/2005	Q2 2005 06/30/2005	Q3 2005 09/30/2005	Q4 2005 12/31/2005	Q1 2006 03/31/2006	Q2 2006 06/30/2006	Q3 2006 09/30/2006	Q4 2006 12/31/2006	Q1 2007 03/31/2007	Q2 2007 06/30/2007	Q3 2007 09/30/2007	Q4 2007 12/31/2007	Q1 2008 03/31/2008	Q2 2008 06/30/2008	Q3 2008 09/30/2008	Q4 2008 12/31/2008	Q1 2009 03/31/2009	Q2 2009 06/30/2009	Q3 2009 09/30/2009	Q4 2009 12/31/2009	Q1 2010 03/31/2010	Q2 2010 06/30/2010	Q3 2010 09/30/2010	Q4 2010 12/31/2010	Q1 2011 03/31/2011	Q2 2011 06/30/2011	Q3 2011 09/30/2011	Q4 2011 12/31/2011	Q1 2012 03/31/2012	Q2 2012 06/30/2012
Atrium Ljungberg																															
	Net asset value	162,13	161,20	162,46	194,14	198,09	204,67	208,91	304,53	315,34	81,21	82,35	91,41	92,06	91,79	86,58	82,33	82,27	82,27	78,80	81,14	81,32	81,29	82,73	87,87	89,25	89,35	89,80	91,88	96,71	96,12
	Stock price	187,00	215,00	196,50	199,50	217,50	180,00	210,50	337,50	360,00	97,00	72,25	63,75	69,00	78,00	51,00	62,50	64,00	57,75	69,50	67,00	68,00	63,00	76,00	86,50	87,00	80,00	66,00	73,25	78,70	81,85
	S/NAV	15,34%	34,30%	20,95%	2,76%	9,80%	-12,05%	0,76%	10,83%	14,16%	19,44%	-12,26%	-30,26%	-25,05%	-15,03%	-41,09%	-24,09%	-22,21%	-29,81%	-11,80%	-17,43%	-16,38%	-22,50%	-8,13%	-1,56%	-2,52%	-10,47%	-26,50%	-20,28%	-18,63%	-14,84%
Balder																															
	Net asset value	-	-	-	-	56,21	51,43	71,19	78,37	83,88	100,92	124,53	134,65	137,57	141,98	136,29	125,69	127,69	134,31	129,33	130,65	150,27	39,90	45,05	49,38	51,07	41,29	42,80	41,84	43,42	44,85
	Stock price	-	-	-	-	102,50	80,00	82,50	102,00	112,00	105,00	93,50	80,00	67,25	66,75	60,00	42,00	42,80	54,00	61,00	75,00	103,50	24,70	34,40	44,10	47,50	31,70	25,00	25,30	32,50	31,30
	S/NAV	-	-	-	-	82,36%	55,55%	15,89%	30,16%	33,52%	4,04%	-24,92%	-40,58%	-51,12%	-52,99%	-55,98%	-66,58%	-66,48%	-59,80%	-52,83%	-42,60%	-31,13%	-38,09%	-23,65%	-10,69%	-7,00%	-23,23%	-41,59%	-39,53%	-25,15%	-30,21%
Brinova																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Castellum																															
	Net asset value	242,02	253,80	263,05	275,59	258,73	67,66	69,22	79,04	77,82	82,45	80,20	88,84	85,69	87,15	85,59	84,00	80,00	79,00	81,00	82,00	80,00	84,00	87,00	92,00	91,00	95,00	97,00	97,00	95,00	97,00
	Stock price	231,00	318,00	286,00	286,00	329,50	73,75	82,50	91,25	101,00	82,75	80,25	67,25	72,50	57,50	59,50	60,75	46,30	49,10	67,50	72,50	72,75	71,10	89,65	91,55	91,80	94,80	84,35	85,30	83,35	83,50
	S/NAV	-4,56%	22,40%	8,73%	3,78%	27,35%	9,00%	19,18%	15,45%	29,79%	0,36%	0,06%	-24,30%	-15,39%	-34,02%	-30,48%	-27,68%	-42,13%	-37,85%	-16,67%	-11,59%	-9,06%	-15,36%	3,05%	-0,49%	0,88%	-0,21%	-13,04%	-12,06%	-12,26%	-13,92%
Catena																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Corem																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35,42	37,36	38,20	33,61	29,79	34,84	47,73	46,74	22,17	18,19	19,69	21,23	19,26
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45,30	46,40	45,60	36,70	35,30	45,00	46,00	49,80	24,00	20,50	20,00	21,80	19,60
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27,90%	24,21%	19,38%	9,20%	18,50%	29,15%	-3,63%	6,55%	8,24%	12,70%	1,59%	2,67%	1,79%
Diös																															
	Net asset value	-	-	-	-	-	-	-	-	40,21	40,32	41,81	42,77	43,62	39,13	39,36	35,42	36,40	36,30	37,02	37,52	37,79	37,03	40,83	41,62	43,60	42,87	42,61	43,88	46,62	46,62
	Stock price	-	-	-	-	-	-	-	-	36,20	35,80	32,70	30,60	29,30	24,80	22,90	17,20	20,30	22,20	30,00	28,00	31,70	27,80	33,10	38,60	40,40	39,00	31,20	28,50	32,40	30,80
	S/NAV	-	-	-	-	-	-	-	-	-9,98%	-11,21%	-21,79%	-28,45%	-32,83%	-36,61%	-41,82%	-51,45%	-44,24%	-38,84%	-18,96%	-25,38%	-16,13%	-24,94%	-18,93%	-7,25%	-7,35%	-9,04%	-26,78%	-35,06%	-30,51%	-33,93%
Fabege																															
	Net asset value	-	-	-	-	-	-	-	-	-	76,00	67,00	67,00	67,00	75,00	73,00	77,00	67,00	67,00	67,00	67,00	66,00	69,00	65,00	77,00	81,00	84,00	84,00	74,00	81,00	77,00
	Stock price	-	-	-	-	-	-	-	-	-	75,50	76,75	66,25	63,50	40,30	38,40	30,00	29,00	26,10	41,00	45,20	48,80	46,44	67,75	78,55	68,25	63,55	52,30	53,90	57,05	54,10
	S/NAV	-	-	-	-	-	-	-	-	-	-0,66%	14,55%	-1,12%	-5,22%	-46,27%	-47,40%	-61,04%	-56,72%	-61,04%	-38,81%	-32,54%	-26,06%	-32,70%	4,23%	2,01%	-15,74%	-24,35%	-37,74%	-27,16%	-29,57%	-29,74%
Fastpartner																															
	Net asset value	19,60	23,10	21,51	25,61	26,52	26,43	29,24	30,81	32,87	34,26	38,28	38,36	38,63	36,99	35,17	34,61	35,33	33,95	35,30	36,07	37,04	43,04	44,66	46,32	44,34	46,13	46,63	50,50	51,60	52,40
	Stock price	20,70	24,20	28,00	31,00	34,20	26,60	30,50	41,90	42,60	38,90	35,00	32,80	32,50	30,10	24,00	18,40	22,70	25,70	31,30	31,80	43,40	35,80	46,00	46,90	49,00	43,30	39,30	40,00	52,00	50,00
	S/NAV	5,63%	20,41%	30,19%	21,04%	28,96%	0,64%	4,30%	35,98%	29,59%	13,54%	-8,57%	-14,49%	-15,88%	-18,63%	-31,75%	-46,83%	-35,75%	-24,31%	-11,32%	-11,84%	17,19%	-16,82%	3,00%	1,24%	10,51%	-6,13%	-15,73%	-20,79%	0,78%	-4,58%
Heba																															
	Net asset value	127,14	117,57	126,67	144,11	144,85	153,91	155,35	170,04	170,85	177,17	178,35	187,96	188,83	62,24	62,55	59,41	59,72	60,00	60,58	62,97	63,75	64,58	66,48	68,55	69,41	72,35	73,00	73,07	74,18	74,99
	Stock price	119,00	130,00	133,00	130,00	155,00	150,00	185,00	216,00	204,00	205,00	192,00	175,50	170,50	52,25	44,00	49,00	47,20	58,00	57,50	55,00	57,50	54,00	62,50	67,75	69,00	64,50	56,50	60,00	64,25	62,75
	S/NAV	-6,41%	10,58%	5,00%	-9,79%	7,01%	-2,54%	19,09%	27,03%	19,40%	15,71%	7,65%	-6,63%	-9,71%	-16,05%	-29,66%	-17,53%	-20,97%	-3,33%	-5,08%	-12,66%	-9,81%	-16,38%	-5,99%	-1,17%	-0,59%	-10,86%	-22,60%	-17,89%	-13,39%	-16,32%
Hufvudstaden																															
	Net asset value	52,56	55,18	55,97	60,37	59,66	63,34	63,99	77,98	68,03	74,78	75,41	83,06	83,92	80,48	78,01	75,42	71,39	71,75	72,59	70,60	70,88	72,52	75,23	81,06	80,31	84,59	85,07	86,23	87,31	89,15
	Stock price	50,00	58,00	52,00	52,00	64,75	55,25	62,00	77,50	80,00	79,00	69,50	62,00	62,50	58,00	53,00	55,25	42,40	47,90	56,00	54,25	61,75	59,65	72,65	78,55	75,15	75,80	66,70	70,05	69,95	74,00
	S/NAV	-4,87%	5,10%	-7,08%	-13,87%	8,54%	-12,77%	-3,11%	-0,62%	17,59%	5,65%	-7,84%	-25,35%	-25,52%	-27,93%	-32,06%	-26,74%	-40,61%	-33,24%	-22,86%	-23,16%	-12,88%	-17,75%	-3,43%	-3,10%	-6,42%	-10,39%	-21,60%	-18,76%	-19,88%	-16,99%
Klövern																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Kungsleden																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NP3																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nyfosa																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pandox																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platzer																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sagax																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SBB																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stendörren																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Victoria Park																															
	Net asset value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stock price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S/NAV	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wallenstam																															
	Net asset value	438,00	89,00	93,00	119,00	123,00	129,00	135,00	165,00	168,00	170,00	174,00	181,00	183,00	184,00	178,00	176,00	177,00	177,00	179,00	188,00	191,00	205,00	209,00	225,00	229,00	76,00	76,00	80,00	81,00	82,00
	Stock price	417,50	97,50	90,50	93,50	110,50	98,50	108,50	141,00	149,00	160,00	133,00	120,50	120,50	104,50	86,50	67,50	68,25	79,50	110,75	128,75	138,00	131,50	172,00	177,00	196,00	67,25	63,00	63,50	64,25	67,05
	S/NAV	-4,68%	9,55%	-2,69%	-21,43%	-10,16%	-23,64%	-19,63%	-14,55%	-11,31%	-5,88%	-23,56%	-33,43%	-34,15%	-43,21%	-51,40%	-61,65%	-61,44%	-55,08%	-38,13%	-31,52%	-27,75%	-35,85%	-17,70%	-21,33%	-14,41%	-11,51%	-17,11%	-20,63%	-20,68%	-18,23%
Wihlborgs																															
	Net asset value	-	163,65	171,80	180,99	186,06	98,76	102,82	95,16	118,12	118,69	126,73	144,84	152,52	149,37	153,09	140,08	143,07	139,23	142,68	146,16	150,33	148,64	157,67	170,36	176,88	87,85	89,74	91,85	96,73	95,29
	Stock price	-	190,00	181,50	192,00	237,00	124,00	132,00	142,75	150,00	121,25	119,50	115,75	135,75	108,25	94,25	100,00	92,00	103,75	129,25	132,50	152,50	148,50	185,50	195,00	188,00	91,50	87,25	91,00	93,50	92,75
	S/NAV	-	12,56%	5,64%	6,08%	27,38%	25,56%	28,39%	50,00%	26,99%	2,16%	-5,71%	-20,08%	-11,00%	-27,53%	-38,43%	-28,61%	-35,69%	-25,48%	-9,41%	-9,35%	1,44%	-0,10%	17,65%	14,46%	6,29%	4,15%	-2,77%	-0,92%	-3,33%	-2,67%
	S/NAV current quarter	0,46%	16,38%	8,68%	-1,63%	22,65%	4,97%	8,11%	19,29%	16,64%	4,32%	-8,24%	-22,47%	-22,59%	-31,83%	-40,01%	-41,22%	-42,62%	-30,99%	-18,33%	-18,06%	-11,03%	-18,36%	-1,89%	-2,86%	-2,71%	-8,53%	-19,34%	-19,23%	-15,45%	-16,33%



Appendix 4 - Displays the quarterly aggregated returns for each respective portfolio over the period.

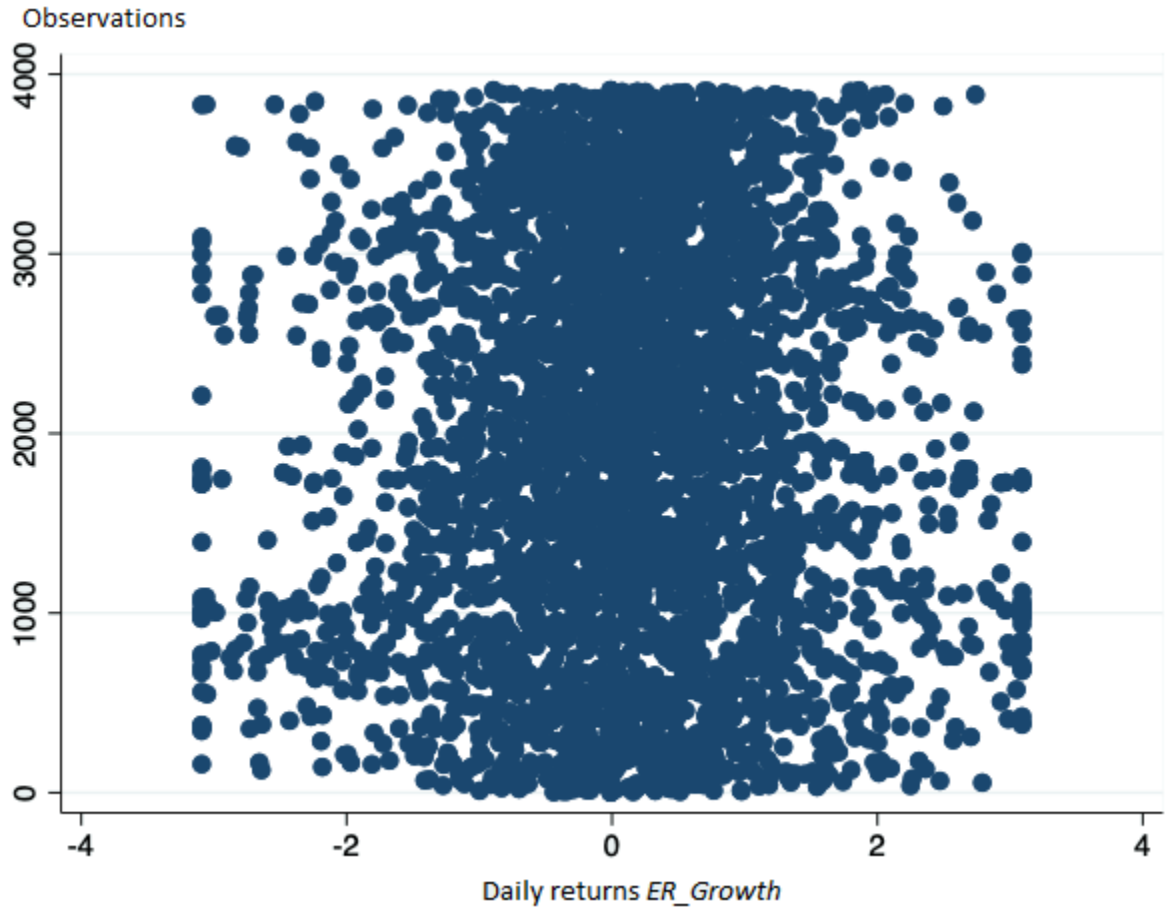


Appendix 5 - Results from the Breusch-Pagan test for the value portfolio

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted valued of *ER_Value*

chi2 (1)	-	0,03
Prob > chi2	-	0,8554

Appendix 6 - The winsorized daily returns for our 3912 observations in the growth portfolio.



Appendix 7 - The winsorized daily returns for our 3912 observations in the value portfolio.