Mispricing in Financial Turbulence

A study of mispricing in public Nordic real estate companies in the 21st century

By using the present value of expected dividends model, reversed engineering and the market capitalizations of 14 public Nordic real estate companies between the years 2000-2009, the study examines the reasonableness of the implied return on equity in steady state. The results show that following the stock crash of 2000 the level of implied return on equity in steady state is below reasonable levels, whereas the period leading up to the financial crisis displays levels above historical precedents. Using reasonable levels of the return on equity in steady state the study provides a fundamental valuation alternative to the market capitalization over the time period. The comparison between the fundamental values and the market capitalization displays great mispricing of the public Nordic real estate companies with value differences culminating at the peak before the financial crisis. The study ends by discussing possible explanations for the variation in the implied return of equity in steady state and questions the notion of efficient markets and investor rationality in turbulent times. As of 2008, the results show a normalizing trend in the implied return on equity in steady state. It cannot be rejected that the normalization trend is a result of increased value relevance of accounting numbers, following the IFRS implementation in 2005.

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1 Introduction

This paper investigates the possibility that Nordic real estate companies were mispriced in the research period 2000-2009. We define mispricing as a significant deviation of the fundamental valuation, as determined by the present value of expected dividends (PVED) model, from the market capitalization at the valuation date. Through the use of actual accounting numbers and reversed engineering, we construct a model to deduct the implied levels of return on equity (ROE) in steady state (ROEss) in order to justify the market capitalization. We assess whether the ROEss figures are reasonable by comparing them to actual historical ROE figures for the portfolio of the 14 public Nordic real estate companies. The results show that the implied ROEss figures are relatively lower than historical averages in the earlier years of the research period and increases incrementally in the years leading up to the financial crisis, after which the ROEss declines to a reasonable level. The study contributes to the literature on mispricing during periods characterized by financial turbulence and changes in accounting practices. Thus, our research is relevant for policy makers aiming to deflate a potential, asset price bubble (Hunter et al. 2005), auditors working with real estate companies and for financial analysts shedding light on the debate of how well fundamental analysis explains market capitalization.

The study acknowledges that the variation in stock prices is determined by a mixture between fundamental accounting numbers and speculative components, defined as the variation of the stock price that cannot be explained by the fundamentals (Curtis 2011). Thus, the results are interpreted based on the relation between these two factors in the context of value relevance, efficient markets and behavioral finance. We show that fundamentals play a relatively smaller role in explaining the variation in stock prices during financial turbulence.

Nordic real estate companies provide an interesting study area for three reasons. Firstly, it is an asset class that has performed very well in the last years. For 2014, the index for Nordic real estate companies increased with 36 percent, whereas OMX Stockholm only increased with 12 percent (Affärsvärlden 2015). As a result of the positive trend, real estate attracts more capital. Furthermore, the development in the interest rate has increased the availability of inexpensive debt, especially in the Nordics. Thus, with both equity and debt seeking to invest and a lack of good acquisition opportunities, asset prices are pushed up (PWC 2015). Consequently,

stock prices are seemingly not driven solely by property related fundamentals, which provides for an interesting area of research.

Secondly, in accordance with IAS 40 *Investment Property*, investment property is measured in the balance sheet according to their fair values and value changes are recognized in the statement of profit and loss. Although the use of fair values in accounting is often considered more relevant than historical cost accounting, it presents some potential problems associated with asymmetrical information. It has been shown that managers may be keen on doing asset appraisals but postpones write-offs (Hilton and O'Brien 2009). Such behavior would indicate a constant overvaluation in the market. However, regarding accounting practices, the interest is to investigate if the adoption of IAS 40 in the real estate companies has led to higher value relevance of the presented accounting numbers. Since IAS 40 was introduced in 2005, the research period 2000-2009 is suitable for such analysis.

Finally, the combination of the Nordic economy and real estate is considered a very low risk investment and has been described as a safe haven. By evaluating the potential mispricing of public Nordic real estate companies in the research period, characterized by financial turbulence, the low risk associated with these assets may be evaluated.

1.1 Research Question

Do Nordic real estate stock prices reflect a reasonable level of implied ROEss, as determined by the historical ROE, over the time period 2000-2009, and what are the potential explanations for any discrepancies?

1.2 Previous Literature

We identify three particular streams of previous literature relevant for our study. Firstly, we review the value relevance literature. This area is devoted to the relation between accounting numbers and stock prices. We find that earlier studies (e.g Easton 1985, Collins and Maydew 1997, Francis and Schipper 1999) suggest that the value relevance of accounting numbers has not changed significantly over time. Curtis (2011) shows that later periods characterized by financial turbulence display no reliable co-movement between fundamental values and stock prices, which could be evidence of lower value relevance in such periods. Furthermore, different accounting practices could provide different levels of value relevance. Barth and Landsman

(2008) conclude that the adoption of International Accounting Standards increases the value relevance of financial statements.

Secondly, we review literature on the efficient market hypothesis, which is closely related to the value relevance section. The efficient market hypothesis states that the price of a security fully reflects all available information, investors are perfectly rational and that the costs of arbitrage are negligible. Thus, under efficient markets any stock price should always equal the present value of its future dividends. Previous research identifies market efficiency in three forms, i.e. weak form, semi-strong form and strong form. Finance literature is predominately based on the assumption that capital markets are semi-strong efficient (Fama 1970). The literature presents a number of explanations for mispricing under efficient markets, including misspecification of the CAPM and arbitrage costs (Bernard and Thomas 1989).

Finally, we review the literature known as behavioral finance, which argues that fundamentals play a smaller role relative to the speculative components in explaining stock prices. It has been suggested that the speculative components are larger during financial turbulence (Baker and Wurgler 2007). The literature identifies a number of market anomalies and predictable patterns that should not exist in efficient markets. The latter has been studied for example in the contexts of overreaction to new information (DeBondt and Thaler 1985, 1987) and excess volatility (Shiller 1980). The speculative components may include investor sentiment, investor recognition or other cognitive misperceptions about the variation in stock prices.

1.2.1 Value Relevance

The value relevance research area is devoted to how well accounting numbers capture or summarize information that affects stock prices and is an empirically tested statistical association between market values and accounting values (Hellström 2006). If accounting numbers have high explanatory power in the variation of stock prices, this is evidence of value relevant accounting numbers. If the opposite is true, the accounting numbers are value irrelevant. High value relevance would indicate that variation in stock prices is due to shifts in accounting fundamentals, whereas low value relevance leaves higher relative explanatory power to speculative components.

1.2.1.1 Value Relevance and Fundamental Valuation

In the accounting literature, three types of studies have received a lot of attention, i.e. the value relevance of earnings and book values, the value relevance of accruals and cash flow, and the value relevance of fundamental valuation methods such as PVED or residual income valuation (RIV) (Aboody et al. 2002). Easton (1985), Frankel and Lee (1998) and Curtis (2011) contribute to the latter studies by evaluating the value relevance in a direct comparison, through a statistical model, between fundamental values and stock prices. Easton (1985) provides empirical evidence for a strong valuation link and high value relevance. Thus, there is a strong correlation between stock prices and the PVED. Frankel and Lee (1998) investigate the value relevance of a RIV-model based on analyst forecasts and determine that the fundamental values are highly correlated with the stock prices.

Curtis (2011) studies the co-movement between fundamental values, as determined by a RIV model, and stock prices over the period 1979-2008. Curtis finds evidence of co-movement in the years 1979-1993. However, in the time period 1994-2008, there is no reliable evidence that stock prices and fundamental values co-move. The results suggest that there has been a change in the relation between stock prices and accounting fundamentals over time, which could indicate a decline in value relevance of accounting numbers in later years.

1.2.1.2 Value Relevance and Changing Accounting Principles

As variations in applied accounting principles could affect the value relevance of separate companies and industries, it is important to acknowledge changes in accounting practices within industries and regions, such as the adoption of IAS 40. Barth and Landsman (2008) investigate how the adoption of IAS changes the quality of accounting in comparison to a control sample of companies applying non-US domestic standards. The results show that the firms adopting IAS have a higher accounting quality including a higher value relevance of the accounting information. Thus, the implementation of IAS 40 in 2005 could indicate an increase in the value relevance of the accounting numbers of real estate companies.

1.2.2 Efficient Market Hypothesis

The value relevance concept is closely related to the literature stream on the efficient market hypothesis. Hence, high value relevance of accounting fundamentals implies a higher degree of efficiency in the capital markets and conversely that lower value

relevance gives more room for alternative explanatory variables in stock prices. A commonly used assumption in the finance literature is that markets are efficient in the semi-strong form, i.e. market prices fully reflect all relevant publicly available information. Furthermore, investors are perfectly rational and arbitrage costs are negligible. Under these assumptions, a fundamental valuation such as the PVED would exactly yield the market capitalization.

1.2.2.1 Levels of Market Efficiency

Previous literature within the field, described in Fama (1970), discusses three levels of efficiency, i.e. weak form efficiency, semi-strong form efficiency and strong form efficiency based on different information subsets. For weak form efficiency this subset consists of historical stock prices or return sequences. For semi-strong form efficiency all relevant publicly available information is included. Strong form efficiency holds that some investor groups have exclusive information used to determine the pricing in the stock market. Although the finance literature generally accepts semi-strong form efficiency as a common assumption, the event studies typically associated with testing efficiency in the semi-strong form give no conclusive evidence (Bernard and Thomas 1989, Bartov, Lindahl and Ricks 1998).

1.2.2.2 Mispricing under Efficient Markets

Bernard and Thomas (1989) investigate whether there is a drift in portfolio return after the announcement of quarterly earnings. Under semi-strong form efficiency, such drift should not exist. There are two potential explanations for the post-earnings-announcement drift identified in the study. Either, the market is semi-strong efficient, but there is misspecification in the CAPM, i.e. risk is not properly adjusted, and/or transaction and information costs explain the drift. Another potential interpretation is that markets are semi-strong inefficient and that there is a delayed price response to the announcements. Bartov, Lindahl and Ricks (1998) use a similar method to study the reaction to write-offs. The results show that the decline in stock prices occurs before the announcement. The study either proves that there is a mispricing in the market inconsistent with market efficiency or that disclosure requirement does not properly convey the consequences of write-offs (Bartov, Lindahl and Ricks 1998).

Hall and Hall (1993) study the relationship between stock prices and fundamental values, as explained by the PVED model and under what conditions the fundamental values and market prices converge. The Hall and Hall study provides an

example of a study explaining the deviation between fundamental values and market prices through erroneous risk adjustment. Depending on firm-specific characteristics, they alter the discount rate to obtain the stock prices.

Lee et al. (1999) and Curtis (2011) acknowledge that allowing for information and transaction costs would still imply that fundamentals and stock prices co-move under efficient markets. Thus, information and transaction costs are only a viable explanation when deviations are relatively small.

1.2.3 Behavioral Finance

Behavioral finance claims that fundamentals have limited explanatory power in the variation of stock prices. Cutler, Porterba and Summers (1989) argue that the explanatory power of fundamentals may be as low as 50 percent, where the remaining part is explained by speculative components. Earlier studies find irrational investor behavior, such as overreactions to positive news, as evidence against the efficient market hypothesis. Behavioral finance suggests that the presence of irrational investors in the market and the existence of psychological factors in determining stock prices could cause sustained mispricing.

1.2.3.1 The Overreaction Hypothesis

The overreaction hypothesis states that investors are not completely rational in their decision making but values newer information higher than old information. Thus, companies that have performed poorly in the past would be considered more attractive investments upon positive news (DeBondt and Thaler 1987). DeBondt and Thaler (1985, 1987) argue that the existence of stock market overreaction, and subsequent long-run reversals in return, is evidence that markets are inefficient. DeBondt and Thaler (1985) investigates whether the overreaction hypothesis is predictive. The results show a winner-loser effect, i.e. stocks associated with high abnormal returns at portfolio formation underperform in the measurement period and vice versa, which is consistent with the overreaction hypothesis.

1.2.3.2 Excess Volatility

The excess volatility research investigates the phenomenon that stock prices are much more volatile than fundamental values. Shiller (1980) investigates whether the volatility of the stock market is too large to be justified by subsequent dividend payments. Shiller finds observed volatilities in stock prices to be much higher than the

fundamental values and rejects the hypothesis that stock prices are set in an efficient market. Thus, rational investors making inaccurate forecasts and valuations cannot justify the discrepancy between stock prices and fundamental values.

1.2.3.3 Irrational Investors

Delong, Schleifer, Summers and Waldman (1990) investigate the role of "noise traders" and how their irrational beliefs affect stock prices. The results show that the resulting higher risk of having irrational investors in the market mean that arbitrageurs, i.e. the rational investors, will not take on the extra risk to bring stock prices toward fundamental values. Thus, fundamental values may differ from stock prices. In line with Delong, Schleifer, Summers and Waldman (1990), Vishny and Schleifer (1997), presents limits to arbitrage and claim that investors are not always quick at forcing stock prices towards fundamental values, especially not when they bet against irrational investors.

1.2.3.4 Investor Recognition

Merton (1987) describes a scenario with incomplete information in the markets, which leads to investors not having all relevant information in the pricing of stocks. The scenario shows the importance of investor recognition in the sense that well recognized stocks are priced higher relative to less well recognized stocks. Richardson, Sloan and You (2012) extend the work by Merton by investigating the role of investor recognition in explaining the variation in stock returns. The results show that investor recognition has higher explanatory power over shorter investment horizons, and fundamentals higher explanatory power over longer periods.

1.2.3.5 Investor Sentiment

Investor sentiment can be described as irrational beliefs about future stock prices, which are not determined by the information available (Baker and Wurgler 2007). Baker and Wurgler (2007) evaluate investor sentiment as well as limits to arbitrage as potential explanations for mispricing and creates a method to determine what stocks are the most likely to be affected by sentiment. The results show that smaller, unprofitable firms are more likely to be affected by sentiment, since they are costlier to arbitrage and harder to value.

2 Model

Skogsvik (2002) divides valuation models into two main groups, i.e. statistical valuation models and deduced valuation models. Statistical valuation models are based on certain accounting ratios, such as the P/E-ratio, to determine the value of a company, whereas deduced valuation models use the theory of capital value to deduce the value of a company. Deduced valuation models are not dependent on market efficiency, in contrast to statistical valuation models, and provide an explicit link between accounting numbers and stock prices. Although forecasting of future accounting numbers presents predictions problems when using deduced valuation models, such as the PVED model, this study uses actual historical accounting numbers and avoids such prediction problems.

2.1 Method

The study uses the PVED model and reversed engineering to deduct the ROEss figures implied in order to justify the market capitalizations at each valuation date. The model includes a five year explicit valuation period using actual dividends and a terminal value as determined by a Gordon-growth formula. The implied ROEss figures are compared against the five-year actual historical average ROE figures for the portfolio, which provides a reasonable level of market ROEss. When using the average market ROE as the ROEss, we obtain a proxy for the fundamental valuation. The implied ROEss to market average ROE relation is investigated over two time periods. Firstly, in the research period 2000-2009 with complete actual information for five years ahead at every valuation date. Secondly, the indication period, which provides an indication of the development after 2009. For this period, the PVED model is shortened by one year for every year post 2009, i.e. 2014 is kept as steady state for the valuations 2009 and onwards. The research period provides the main results of the study, whereas the indication period with the simplified valuation provides an indication of the development up until present date.

Even though actual historical numbers are used in the model, some prediction problems still remain. In particular, there is a need to determine a reasonable cost of equity, a steady state growth rate and other basic underlying assumptions for the model. For a generic explanation of the PVED model and techniques used, see appendix.

2.2 Assumptions

2.2.1 Timing of Financial Statements

As final financial statements for the portfolio companies are presented during the spring, we assume that the financial information from the previous year is fully reflected in the stock price by May each year. For this reason, we have used the average market capitalizations of the first week in May when calculating the implied ROEss figures. For example, this means that the ROEss figures calculated for year 2000 are based on the average market capitalizations in May 2001.

2.2.2 Dividend Payout Ratio

The payout ratios used in the explicit valuation period are based on the actual net dividends paid, consisting of common dividends paid, repurchases of common shares less any new issues on common shares. For the terminal value, we use a five-year portfolio average of the yearly portfolio median, disregarding repurchases and new issues. The reason for using the portfolio payout ratios is that this reduces the volatility and creates a reversion towards an industry standard. Repurchases and new issues are disregarded in the steady state because they cannot be considered reasonable assumptions, due to their irregular occurrence and often large magnitudes.

2.2.3 Return on Equity

The ROE in the explicit valuation period is based on the net income over last year's total common equity. The implied ROEss is a resulting output when using the PVED model and reversed engineering, given the market capitalization.

In the alternative fundamental valuation, the five-year portfolio average ROE is used in the steady state as a reasonable level. The five-year average market ROE refers to the average of the five years preceding the steady state and is assumed to reflect the industry wide level of return on equity in the steady state.

2.2.4 Cost of Equity Capital

The PVED model uses the cost of equity as discount rate. The most common way to determine the cost of equity is through the CAPM as described by Sharpe (1964) and Lintner (1965). Thus according to CAPM, the cost of equity (r_e) can be determined as follows:

$$r_e = r_f + \beta_e(E(r_m) - r_f)$$

Where r_f is the risk free rate as determined by the Swedish 10-year government bond (all calculations performed in SEK), β_e the beta value, i.e. a stock's sensitivity to changes in the value of the market portfolio (Brealey et al. 2011) and where $(E(r_m)-r_f)$ is the market risk premium. To calculate the beta, we have obtained monthly total return data for each company and regressed this on the MSCI World Index. In line with Koller et al. (2010), we have used 60-month historical data for the total return of each company and the corresponding figures for MSCI World at each valuation date. Thus, in this way we obtain raw betas for each company. The unlevered betas are derived from the following equation:

$$\beta_u = \frac{\beta_e}{\left(1 + \frac{D}{E}\right)}$$

Where β_u is the unlevered beta, β_e is the raw beta and D/E is the market debt-to-equity ratio, i.e. total debt over the applicable market capitalization. The industry beta is determined by calculating the median of the unlevered portfolio betas for each year, and relevered on the portfolio D/E-ratio. In line with a general approximation presented by Koller et al. (2010), we have set the market risk premium to 5.6%.

2.2.5 Horizon

Valuation models require a significant explicit valuation period before the steady state. We have set our horizon to five years from each valuation date respectively. In this way we are able to perform 10 valuations in the period 2000-2009. Thus, 2009 is the last valuation with five years of actual numbers used in the model and 2014 is kept as steady state for the years 2010-2014.

2.2.6 Steady State Growth Rate

In order to be able to determine the implied ROEss, the model needs a long-term growth rate for the steady state. Based on the GDP growth, industry and rate of inflation, we have used 1.0, 2.0 and 3.0 percent in three different scenarios.

2.2.7 Probability of Failure

Failing to take into consideration the risk of bankruptcy for the portfolio companies would overstate the values of the companies. Thus, we have incorporated the

probability of failure into the original PVED equation. We have used the multivariate probit analysis presented by Skogsvik (1988) and calculated the probability of failure for each company, each year in the 15-year period 2000-2014. For the complete bankruptcy prediction model, see appendix. Due to what Skogsvik (2005) refers to as "choice-based sample bias", i.e. that the sample used in the tested model is non-random, the calculated probabilities of failure will be biased. We adjust for this bias by taking into consideration the proportion of companies that fail in the total population. Thus, the formula used is:

$$P(fail)_{POP} = P(fail)_{EST}\left[\frac{\pi * (1 - prop)}{prop * (1 - \pi) + P(fail)_{EST} * (\pi - prop)}\right]$$

Where $P(fail)_{POP}$ is the unbiased probability of failure and $P(fail)_{EST}$ is the estimated probability of failure using the Skogsvik (1988) model and prop is the proportion of companies the fail in the sample. With the original study sample bankruptcy proportion of 51 companies out of 379 the prop-value is set to 13.5% and the general estimated bankruptcy rate in the industry (π) is assumed to be 2.0%.

2.3 Data Sample

The study includes 14 real estate operating companies in the Nordics, namely: Atrium Ljungberg, Castellum, Fabege, Hufvudstaden, Kungsleden, Sagax, and Wallenstam (Sweden), Jeudan and Land & Leisure (Denmark), Olav Thon (Norway), Citycon, Sponda, SSK Suomen, and Technopolis (Finland). The sample is based on real estate operating companies that have been public since at least 1999. For each company, we have retrieved the financial data from the annual reports and Capital IQ. For the market capitalizations we have obtained the data from Thomson Reuters Datastream. With ten years in the research period an initial 140 valuations are made and is followed by five years in the indication period, which results in a total of 210 company valuations.

3 Model Findings

To illustrate the results of the study, we use the PVED model with the five-year average market ROE as the reasonable level of ROEss, which provides a fundamental valuation as an alternative value to the market capitalization. The alternative valuation allows us to assess the value to price ratio (V/P) as determined by the fundamental valuation over the market capitalization. Under perfectly efficient markets, the V/P ratio should equal 1.0x. The implied ROEss figures are subsequently presented over the research and indication periods and compared to the reasonable level of the five-year average market ROE. The results are presented in their aggregated form, i.e. the results for the combined portfolio.

By illustrating the fundamental valuation and V/P-ratio, the effects of different steady state growth rates on the fundamental valuation are easily observed. The results are based on three steady state growth rate scenarios, namely 1.0, 2.0 and 3.0 percent.

The research period is divided into three different phases based on their observed, separate trend characteristics. Phase 1 includes the years 2000-2003, phase 2 includes the years 2004-2007, and phase 3 includes the years 2008-2009. The results for the indication period warrant a more cautious analysis, given that its valuations are based on less accounting information than in the research period.

Using a two-tailed T-test the significance of the results is tested. Firstly, we test whether the V/P-ratios significantly deviate from 1.0x for each year in the research and indication periods. Secondly, we test whether the implied ROEss figures are significantly different from the five-year average market ROE figures. Finally, the actual ROE figures at each valuation date are tested to see whether they are significantly different from the implied ROEss. The first two tests check the statistical validity of the results, whereas the latter gives an indication of what kind of information investors use in their valuations.

Based on the empirical results we conduct a discussion on possible underlying reasons for the development of the implied ROEss over the research period. The underlying reasons are discussed in the context of value relevance, efficient markets and behavioral finance.

3.1 Steady State Growth Scenario 1.0 Percent

3.1.1 Valuation and Market Capitalization

Under the assumption of 1.0 percent steady state growth, we observe discrepancies between the fundamental valuation and market capitalization in the three phases of our research period. These discrepancies are most notable in phase 1 and 2. In these periods, the correlation between the fundamental valuation and the market capitalization movements appears to be negative. Phase 3 shows indications of co-movement, i.e. a positive correlation in the movement between fundamentals and market prices. During the indication period, the market capitalization increases relatively more than the fundamental valuation, creating an increasing discrepancy. However, both curves move in the same direction. The results lead us to believe that the fundamental valuation does not equal the market capitalization in the two initial phases, i.e. there is an undervaluation in phase 1 and an overvaluation in phase 2. The observed peak value of the fundamental valuation in 2002 is not regained until the end of phase 3 in 2009. Between these years, the fundamental valuation is relatively lower than the market capitalization, and the market capitalization reaches its peak value in the research period.

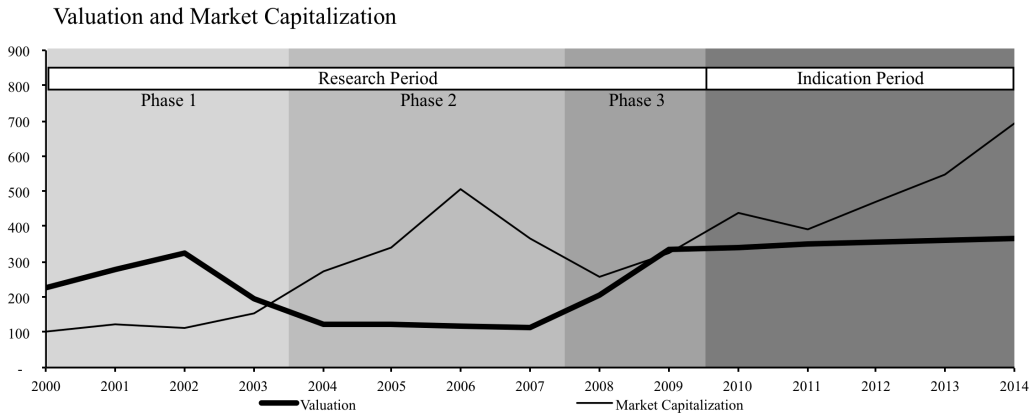

Figure 1: Shows the fundamental valuation, as determined by the PVED model, of the aggregated portfolio of Nordic real estate companies in relation to its market capitalization. The PVED valuation is based on 5 year actual accounting numbers with 5 year average market ROE as an approximation for ROEss and 1.0 percent steady state growth. The indication period retains 2014 as the steady state, shortening the valuation period with one year for every year post 2009. The market capitalization reflects the average first week of May t+1 and is indexed to 100.

3.1.2 Valuation-to-Market Capitalization Ratio

Under perfectly efficient capital markets, the relation between value, as explained by the PVED model, and price, as explained by the market capitalization should always be 1.0x. Thus, fundamentals would exactly reflect the share price. Figure 2 shows the development of the V/P-ratio over the research and indication periods. In phase 1, the high valuation relative to the market capitalization yields high V/P-ratios, except in

the transition year 2003 (1.26x), where the fundamental valuation goes from relatively higher to relatively lower than the market capitalization. Phase 2, with low fundamental valuations displays less-than-one V/P-ratios and bottoms out in 2006 at 0.23x, the same year as the market capitalization peaks in the research period. Phase 3 suggests a convergence between fundamentals and market prices as indicated by V/P-ratios close to 1.0x with 0.80x and 1.03x for 2008 and 2009 respectively. The normalization trend continues in the indication period and drops in the later years as a result of the increasing discrepancy between fundamentals and market values.

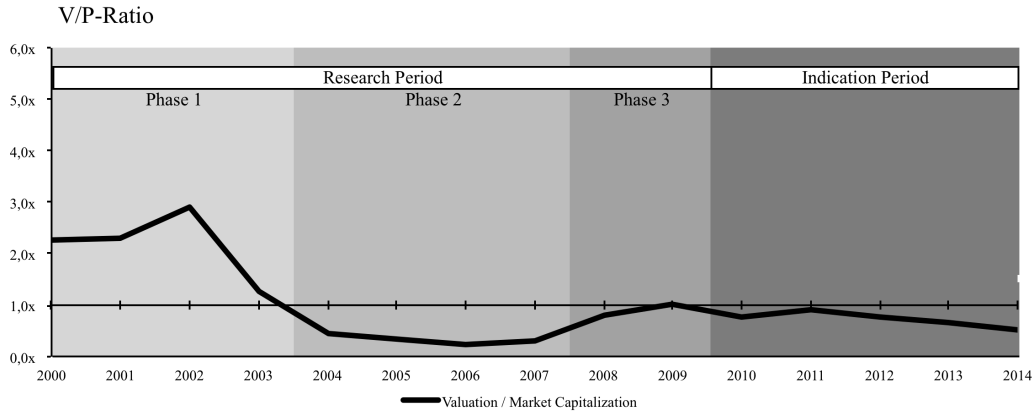

Figure 2: Shows the V/P-ratio as determined by the PVED valuation of the aggregate portfolio of Nordic real estate companies over its market capitalization. The PVED valuation is based on 5 year actual accounting numbers with 5 year average market ROE as an approximation for ROEss and 1.0 percent steady state growth. The indication period retains 2014 as the year of steady state, shortening the valuation period with one year for every year post 2009. The market capitalizations reflects the average first week of May t+1.

3.1.3 Implied ROEss and Five-Year Average Market ROE

In the 1.0 percent steady state growth rate scenario, the implied ROEss figures, presented in figure 3 shifts drastically. In phase 1, the implied ROEss is relatively lower than the five-year average market ROE, except for in year 2003 when the two curves almost intersect. In phase 2, the implied ROEss continues to increase and peaks in 2006 at 50.6 percent, while the five-year average market ROE decreases to 5.9 percent in 2007. In phase 3, the five-year average market ROE and implied ROEss converge and the trend continues in the first years of the indication period, whereas in the later years in the indication period the implied ROEss increases and hits 18.0 percent in 2014.

Implied ROEss and Five-Year Average Market ROE

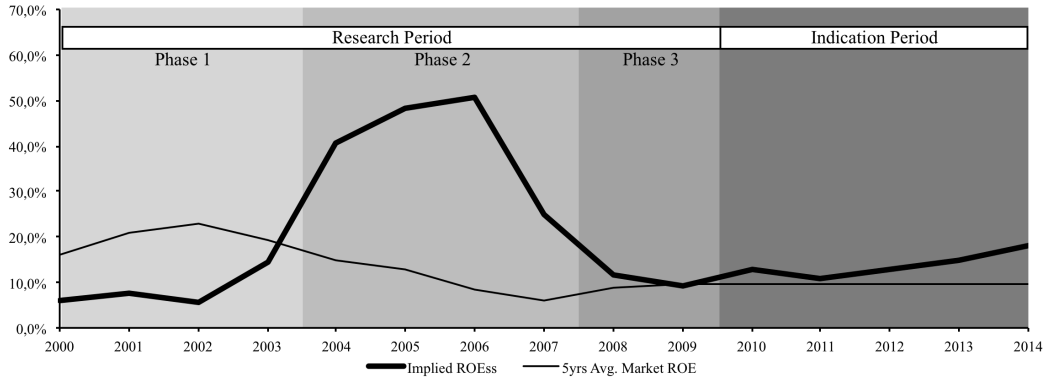

Figure 3: Shows the implied ROEss of the aggregated portfolio of Nordic real estate companies in relation to the five-year average market ROE. The implied ROEss is calculated through the use of the PVED model and reversed engineering, given the market capitalization. The implied ROEss has been determined under the assumption that the steady state growth is 1.0 percent. The 5 year average market ROE is the historical average ROE figure for the aggregate portfolio of Nordic real estate companies for the 5 preceeding years at the steady state.

3.2 Steady State Growth Scenario 2.0 Percent

3.2.1 Valuation and Market Capitalization

Under the assumption of 2.0 percent steady state growth, the fundamental valuation curve shifts slightly upwards in comparison to the 1.0 percent growth scenario. Naturally, this means that the discrepancies in periods when the fundamental valuation is higher than the market capitalization become larger and conversely that the discrepancies, in periods with relatively higher market capitalization than fundamental valuation, become smaller. The development is similar to the 1.0 percent scenario in terms of fluctuations over the phases in the research period. Thus, the correlation in movement appears to be negative in the first and second phases, whereas the third phase displays a normalization trend and positive correlation. However, unlike the 1.0 percent scenario, the normalization in Phase 3 appears to remain longer into the indication period.

Valuation and Market Capitalization

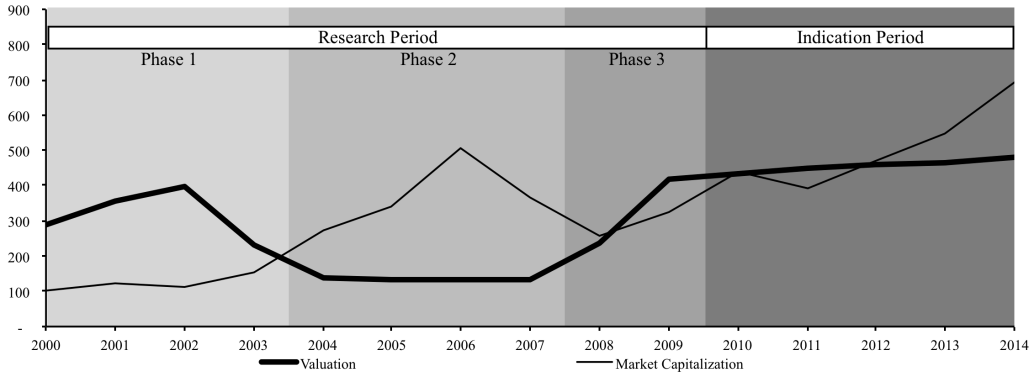

Figure 4: Shows the fundamental valuation, as determined by the PVED model, of the aggregated portfolio of Nordic real estate companies in relation to its market capitalization. The PVED valuation is based on 5 year actual accounting numbers with 5 year average market ROE as an approximation for ROEss and 2.0 percent steady state growth. The indication period retains 2014 as the steady state, shortening the valuation period with one year for every year post 2009. The market capitalization reflects the average first week of May t+1 and is indexed to 100.

3.2.2 Valuation-to-Market Capitalization Ratio

Under the 2.0 percent growth scenario, we can observe the same trends in the V/P-ratio as in the 1.0 percent growth scenario. However, the periods of high fundamental valuations are more pronounced, whereas the periods of high market capitalizations display lower V/P-ratios relative to the same periods in the 1.0 percent growth scenario. For 2003, the V/P-ratio increases to 1.51x from 1.26x in the 1.0 percent scenario. Phase 2, displays increased, but less-than-one, V/P-ratios and bottoms out in 2006 at 0.23x, the same year as the market capitalization peaks. In contrast to the 1.0 percent scenario, the V/P-ratio reaches well above 1.0x in phase 3 with 1.29x in 2009. The indication period continues to show V/P-ratios about 1.0x, but the levels drop in the later years of the period.

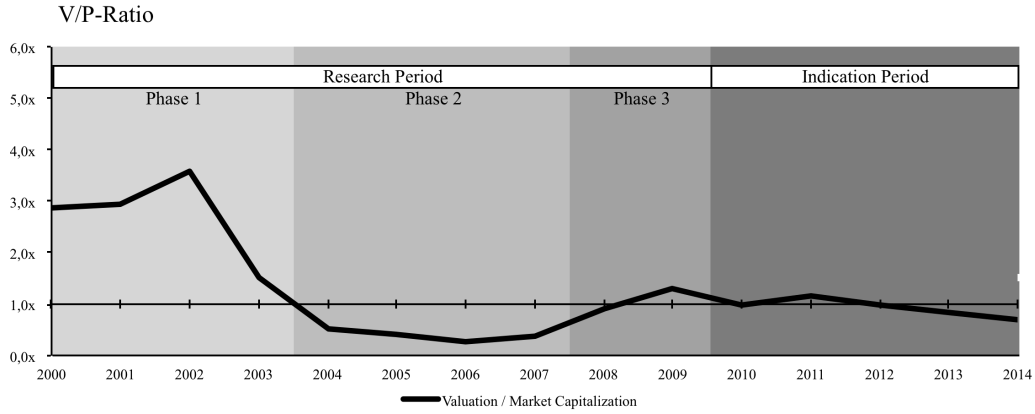

Figure 5: Shows the V/P-ratio as determined by the PVED valuation of the aggregate portfolio of Nordic real estate companies over its market capitalization. The PVED valuation is based on 5 year actual accounting numbers with 5 year average market ROE as an approximation for ROEss and 2.0 percent steady state growth. The indication period retains 2014 as the year of steady state, shortening the valuation period with one year for every year post 2009. The market capitalizations reflects the average first week of May t+1.

3.2.3 Implied ROEss and Five-Year Average Market ROE

Figure 6 presents the result under the 2.0 percent steady state growth scenario. The implied ROEss levels are lower for all years compared to the 1.0 percent scenario. This means that the discrepancy between the five-year average market ROE and the implied ROEss is larger in phase 1 where the implied ROEss figures are lower than the five-year market average. The implied ROEss curve has the same shape as in the 1.0 percent scenario and peaks in phase 2. However, the peak of implied ROEss has now decreased from 50.6 percent in the 1.0 percent scenario to 42.4 percent in the 2.0 percent scenario. The implied ROEss still peaks in 2006, whereas the five-year average market ROE hits its low point in 2007 at 5.9 percent. Phase 3 still suggests

that the two curves converge. The trend continues in the first years of the indication period, with a smaller discrepancy in the later years. This discrepancy is lower than in the 1.0 percent growth scenario.

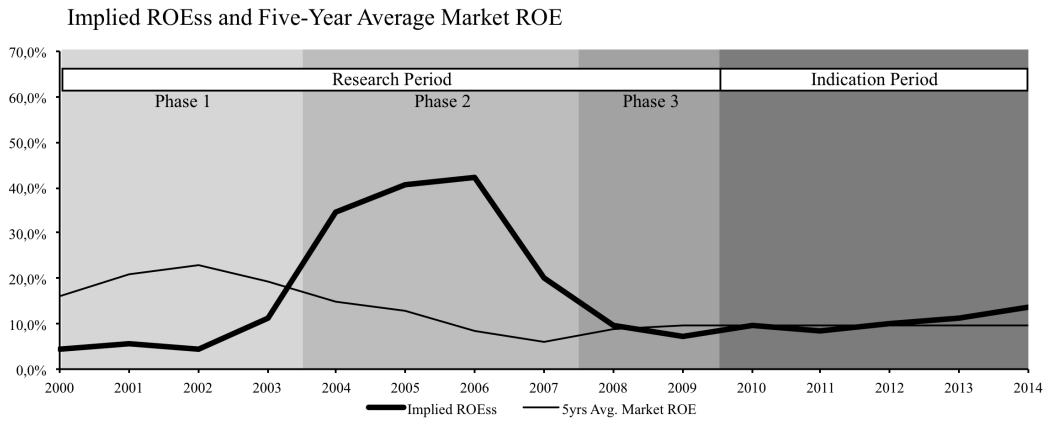

Figure 6: Shows the implied ROEss of the aggregated portfolio of Nordic real estate companies in relation to the five-year average market ROE. The implied ROEss is calculated through the use of the PVED model and reversed engineering, given the market capitalization. The implied ROEss has been determined under the assumption that the steady state growth is 2.0 percent. The 5 year average market ROE is the historical average ROE figure for the aggregate portfolio of Nordic real estate companies for the 5 preceeding years at the steady state.

3.3 Steady State Growth Scenario 3.0 Percent

3.3.1 Valuation and Market Capitalization

The final scenario assumes that the growth in steady state is 3.0 percent. Thus, this means that the fundamental valuation curve shifts further upward from the two previous scenarios. This means that the discrepancy between the fundamental valuation and the market capitalization is further enlarged in the periods where fundamental valuations exceed the market capitalization and conversely that the discrepancy becomes smaller in the periods where the market capitalization is relatively higher than the fundamental valuation. The shape of the curve stays almost the same for the three growth assumptions and similarly to the previous scenarios the correlation appears to be negative in the first and second phase. However, the normalizing trend observed in the two first scenarios is not as strong under the 3 percent growth assumption but can still be observed throughout the indication period.

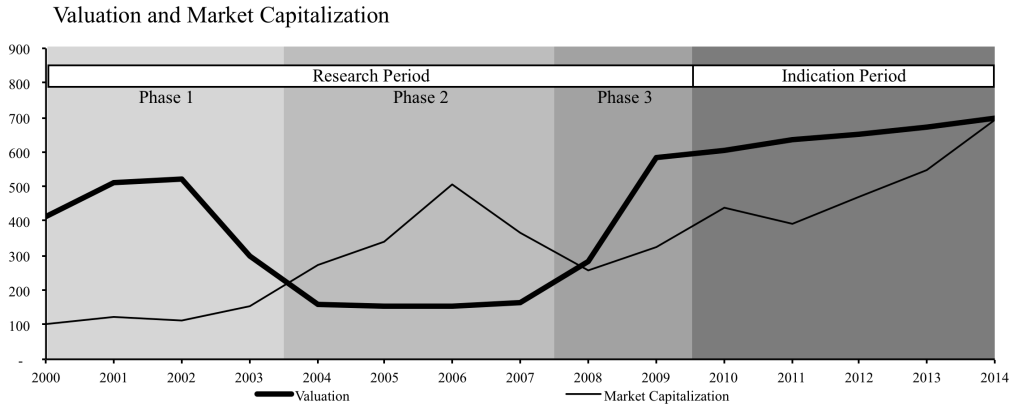

Figure 7: Shows the fundamental valuation, as determined by the PVED model, of the aggregated portfolio of Nordic real estate companies in relation to its market capitalization. The PVED valuation is based on 5 year actual accounting numbers with 5 year average market ROE as an approximation for ROEss and 3.0 percent steady state growth. The indication period retains 2014 as the steady state, shortening the valuation period with one year for every year post 2009. The market capitalization reflects the average first week of May t+1 and is indexed to 100.

3.3.2 Valuation-to-Market Capitalization Ratio

The results for the V/P-ratios under the 3.0 percent steady state growth scenario are presented in figure 8. The increased fundamental valuation means that V/P-ratios increase in phase 1, with maintained trend shift in 2003, where the V/P-ratio is 1.91x in comparison to 1.26x and 1.51x for the 1.0 and 2.0 percent growth scenarios respectively. Phase 2 displays, compared to previous scenarios, an increased but still less-than-one V/P-ratio and bottoms out in 2006 at 0.30x, the same year as the market capitalization peaks. In phase 3, the 3.0 percent growth scenario leads to V/P-ratios of 1.11x and 1.79x in 2008 and 2009 respectively. The indication period provides some evidence of the normalization trend seen in the previous scenarios.

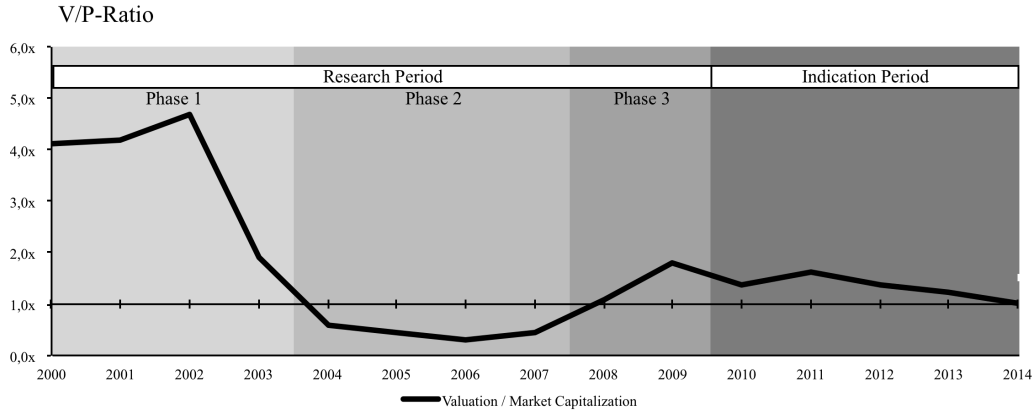

Figure 8: Shows the V/P-ratio as determined by the PVED valuation of the aggregate portfolio of Nordic real estate companies over its market capitalization. The PVED valuation is based on 5 year actual accounting numbers with 5 year average market ROE as an approximation for ROEss and 3.0 percent steady state growth. The indication period retains 2014 as the year of steady state, shortening the valuation period with one year for every year post 2009. The market capitalizations reflects the average first week of May t+1.

3.3.3 Implied ROEss and Five-Year Average Market ROE

The results for the implied ROEss figures under the 3.0 percent steady state growth scenario are presented in figure 9. On the aggregate, this scenario has lower deviation between implied ROEss figures and the five-year average market ROE. In particular, the peak of the implied ROEss in phase 2 is now lower at 34.2 percent in comparison to 50.6 percent and 42.4 percent in the 1.0 and 2.0 percent growth scenarios respectively. In phase 1, the implied ROEss values are lower than in the other two scenarios, and the deviation from the average ROE figures is larger. Phase 2 displays increasing values of implied ROEss until the peak in 2006 while the five-year average market ROE decreases to 5.9% in 2007. Phase 3 indicates implied ROEss values lower than the five-year average market ROE in 2008 and 2009. The normalization trend appears in the indication period as seen in the 1.0 and 2.0 percent growth scenarios as well.

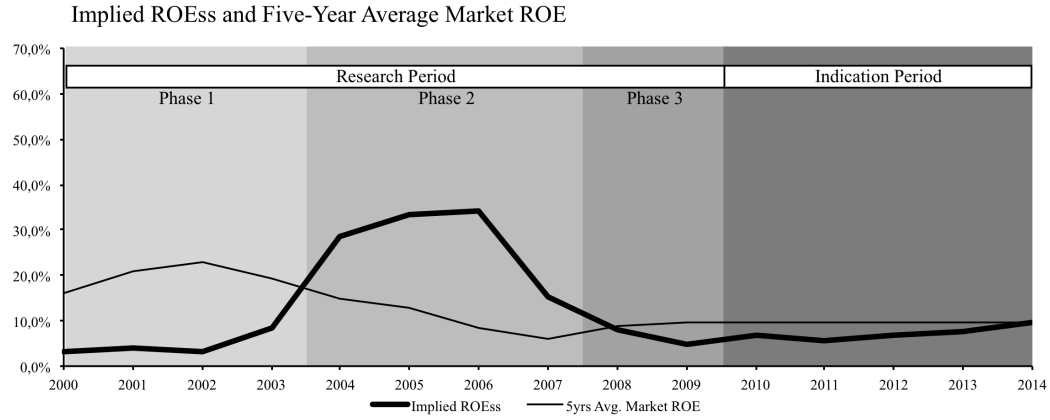

Figure 9: Shows the implied ROEss of the aggregated portfolio of Nordic real estate companies in relation to the five-year average market ROE. The implied ROEss is calculated through the use of the PVED model and reversed engineering, given the market capitalization. The implied ROEss has been determined under the assumption that the steady state growth is 3.0 percent. The 5 year average market ROE is the historical average ROE figure for the aggregate portfolio of Nordic real estate companies for the 5 preceeding years at the steady state.

3.4 Hypothesis Testing

We use a two-tailed T-test in order to test the statistical significance of the results. The test builds on the assumption that the sample data is normally distributed, or the sample sufficiently large to use the central limit theorem (Newbold, Carlson and Thorne 2013). Since our sample consists of 14 companies, this cannot be considered a large enough sample to assume normal distribution. Thus we have plotted the relevant values in histograms in order to check the normality of the data. Based on a visual inspection of the histograms, and a comparison between the mean and the median, we believe that the T-test will be able to provide reliable results. We formulate

hypotheses around three different tests. Firstly, we test whether the V/P-ratio is significantly different from 1.0x for each year in the research and indication periods. A significant deviation of the V/P-ratio from 1.0x means that there is significant statistical evidence of over or undervaluation of the portfolio. Secondly, we test whether the implied ROEss as calculated by the PVED are significantly different from the five-year average market ROE figures. This test will help us determine whether expectations on ROEss are too low or exaggerated. The first two tests are similar in nature, but given the distribution of the samples will not necessarily yield the same results. Finally, we test whether the actual ROE figures at the valuation date are significantly different from the implied ROEss as calculated by the PVED. This test is conducted to investigate the shortsightedness of investors in conducting their fundamental valuations. It shows how much explanatory power investors attribute to current ROE when determining ROEss in their valuation models.

3.4.1 Hypothesis 1 – Valuation-to-Price

We test whether the valuation-to-price ratio is significantly different from 1.0x for each year in the research and indication periods in the three steady state growth rate scenarios. The hypothesis is stated as follows, where the hypothesis mean, μ, is set to 1.0x:

$$H_0: \mu = 1.0x$$
$$H_1: \mu \neq 1.0x$$

Thus, the null hypothesis H_0 states that the V/P-ratio equals 1.0x and the alternative hypothesis H_1 states that the V/P-ratio is significantly different from 1.0x. The results are presented in table 1 using a 95 percent confidence interval.

3.4.2 Hypothesis 2 – Implied ROEss

We test whether the implied ROEss is significantly different from the five-year average market ROE for each year in the research and indication periods in the three steady state growth scenarios. The hypothesis is stated as follows, where the hypothesis mean, μ, is the five-year average market ROE:

$$H_0: \mu = 5yr\ Avg.Market\ ROE$$
$$H_1: \mu \neq 5yr\ Avg.Market\ ROE$$

The null hypothesis H_0 states that the implied ROEss figures equal the five-year average market ROE figures and the alternative hypothesis H_1 states that the implied ROEss figures are significantly different from the five-year average market ROE figures. The results are presented in table 2 using a 95 percent confidence interval.

3.4.3 Hypothesis 3 – Actual ROE

Finally we test whether actual ROE figures at the valuation date are significantly different from the implied ROEss figures in the three steady state growth scenarios. The hypothesis is stated as follows, where the hypothesis mean, μ, is the implied ROEss:

$$H_0: \mu = Implied\ ROEss$$
$$H_1: \mu \neq Implied\ ROEss$$

The null hypothesis H_0 states that the actual ROE figures at each valuation date equal the implied ROEss figures and the alternative hypothesis H_1 states that the actual ROE figures at each valuation date are significantly different from the implied ROEss figures. The results are presented in table 3 using a 95 percent confidence interval.

Table 1

Summary Statistics and T-test Hypothesis 1

The summary statistics is calculated using the firm specific V/P-ratios, as determined at the valuation date as the fundamental valuation from the PVED model over the average market capitalization. Market capitalizations reflects the average first week of May t+1. The results are presented for each growth rate 1.0, 2.0 and 3.0 percent. Each year contains a sample of 14 V/P observations. The results are presented under the assumption that the data sample at each year is normally distributed. The T-test is performed under the null hypothesis H_0 that the sample mean is equal to 1.The alternative hypothesis H_1 states that the sample mean is significantly different from 1.

		Phase 1				**Phase 2**				**Phase 3**		**Indication Period**				
Year		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Steady State Growth	**1%**															
Count		14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Mean		2,436	2,745	3,892	1,377	0,507	0,409	0,253	0,325	0,899	1,124	0,830	0,944	0,817	0,730	0,623
Standard Deviation		1,561	1,691	2,853	1,066	0,521	0,469	0,246	0,254	0,829	0,784	0,449	0,480	0,382	0,270	0,216
Standard Error		0,417	0,452	0,762	0,285	0,139	0,125	0,066	0,068	0,222	0,210	0,120	0,128	0,102	0,072	0,058
Hyp Mean		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		3,443	3,860	3,794	1,323	(3,536)	(4,720)	(11,380)	(9,946)	(0,456)	0,590	(1,413)	(0,435)	(1,788)	(3,745)	(6,522)
P Value		0,004	0,002	0,002	0,208	0,004	0,000	0,000	0,000	0,656	0,565	0,181	0,670	0,097	0,002	0,000
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	YES	YES	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES
Steady State Growth	**2%**															
Mean		3,054	3,412	4,691	1,660	0,596	0,472	0,302	0,404	1,109	1,494	1,103	1,268	1,106	0,975	0,826
Standard Deviation		1,448	1,582	3,149	1,207	0,571	0,511	0,291	0,324	1,078	1,067	0,597	0,675	0,577	0,402	0,329
Standard Error		0,387	0,423	0,842	0,323	0,153	0,137	0,078	0,087	0,288	0,285	0,160	0,180	0,154	0,107	0,088
Hyp Mean		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		5,310	5,705	4,386	2,047	(2,648)	(3,862)	(8,985)	(6,884)	0,379	1,733	0,648	1,488	0,686	(0,234)	(1,975)
P Value		0,000	0,000	0,001	0,061	0,020	0,002	0,000	0,000	0,711	0,107	0,528	0,161	0,504	0,819	0,070
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	YES	YES	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
Steady State Growth	**3%**															
Mean		4,329	4,725	6,064	2,169	0,740	0,579	0,397	0,622	1,511	2,597	1,885	2,199	1,938	1,664	1,401
Standard Deviation		1,388	1,524	3,694	1,561	0,678	0,594	0,419	0,690	1,744	2,892	1,710	2,013	1,767	1,281	1,093
Standard Error		0,371	0,407	0,987	0,417	0,181	0,159	0,112	0,184	0,466	0,773	0,457	0,538	0,472	0,342	0,292
Hyp Mean		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		8,972	9,147	5,130	2,803	(1,438)	(2,652)	(5,379)	(2,048)	1,096	2,066	1,937	2,229	1,985	1,939	1,371
P Value		0,000	0,000	0,000	0,015	0,174	0,020	0,000	0,061	0,293	0,059	0,075	0,044	0,069	0,075	0,194
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	YES	YES	YES	NO	YES	YES	NO	NO	NO	NO	YES	NO	NO	NO

Table 2

Summary Statistics and T-test Hypothesis 2

The summary statistics is calculated using the firm specific implied ROEss figures as calculated by the PVED model using reversed engineering. The results are presented for each growth rate 1, 2 and 3 percent. Each year contains a sample of 14 implied ROEss observations. The results are presented under the assumption that the data sample at each year has univariate normal distribution. For normality checks see Appendix. The T-test is performed under the null hypothesis H_0 that the sample mean is equal to the 5 year average market ROE, as calculated by the average 5 year historical ROE figures in the steady state. The alternative hypothesis H_1 states that the sample mean is significantly different from the 5 year average

		Phase 1				**Phase 2**				**Phase 3**		**Indication Period**				
Year		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Steady State Growth	**1%**															
Count		14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Mean		0,074	0,084	0,072	0,168	0,401	0,508	0,479	0,256	0,136	0,108	0,131	0,114	0,131	0,146	0,173
Standard Deviation		0,036	0,032	0,063	0,115	0,239	0,291	0,225	0,124	0,080	0,064	0,046	0,043	0,049	0,051	0,063
Standard Error		0,010	0,008	0,017	0,031	0,064	0,078	0,060	0,033	0,021	0,017	0,012	0,011	0,013	0,014	0,017
Hyp Mean		16,0%	21,0%	22,7%	19,4%	14,7%	13,0%	8,3%	5,9%	8,9%	9,6%	9,6%	9,6%	9,6%	9,6%	9,6%
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		(8,878)	(14,893)	(9,242)	(0,872)	3,979	4,870	6,599	5,927	2,196	0,729	2,836	1,584	2,660	3,664	4,552
P Value		0,000	0,000	0,000	0,399	0,002	0,000	0,000	0,000	0,047	0,479	0,014	0,137	0,020	0,003	0,001
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	YES	YES	NO	YES	YES	YES	YES	YES	NO	YES	NO	YES	YES	YES
Steady State Growth	**2%**															
Mean		0,056	0,064	0,057	0,136	0,343	0,436	0,408	0,210	0,114	0,084	0,101	0,088	0,101	0,113	0,133
Standard Deviation		0,029	0,024	0,050	0,096	0,210	0,257	0,200	0,110	0,070	0,054	0,039	0,037	0,042	0,044	0,052
Standard Error		0,008	0,006	0,013	0,026	0,056	0,069	0,053	0,029	0,019	0,014	0,010	0,010	0,011	0,012	0,014
Hyp Mean		16,0%	21,0%	22,7%	19,4%	14,7%	13,0%	8,3%	5,9%	8,9%	9,6%	9,6%	9,6%	9,6%	9,6%	9,6%
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		(13,386)	(22,950)	(12,824)	(2,292)	3,500	4,445	6,078	5,130	1,384	(0,817)	0,487	(0,772)	0,486	1,427	2,676
P Value		0,000	0,000	0,000	0,039	0,004	0,001	0,000	0,000	0,190	0,429	0,634	0,454	0,635	0,177	0,019
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES
Steady State Growth	**3%**															
Mean		0,038	0,044	0,041	0,104	0,285	0,363	0,336	0,163	0,093	0,060	0,071	0,063	0,072	0,080	0,093
Standard Deviation		0,022	0,016	0,037	0,077	0,183	0,225	0,177	0,097	0,060	0,045	0,034	0,032	0,037	0,039	0,044
Standard Error		0,006	0,004	0,010	0,021	0,049	0,060	0,047	0,026	0,016	0,012	0,009	0,009	0,010	0,010	0,012
Hyp Mean		16,0%	21,0%	22,7%	19,4%	14,7%	13,0%	8,3%	5,9%	8,9%	9,6%	9,6%	9,6%	9,6%	9,6%	9,6%
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		(20,463)	(37,877)	(18,910)	(4,371)	2,830	3,872	5,353	4,040	0,287	(3,013)	(2,743)	(3,874)	(2,384)	(1,574)	(0,218)
P Value		0,000	0,000	0,000	0,001	0,014	0,002	0,000	0,001	0,779	0,010	0,017	0,002	0,033	0,140	0,831
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	NO	NO

Table 3

Summary Statistics and T-test Hypothesis 3

The summary statistics is calculated using the firm specific actual ROE figures. The results are presented for each growth rate 1.0, 2.0 and 3.0 percent. Each year contains a sample of 14 actual ROE observations. The results are presented under the assumption that the data sample at each year is normally distributed. The T-test is performed under the null hypothesis H_0 that the sample mean is equal to the implied ROEss figures as calculated by the PVED model. The alternative hypothesis H_1 states that the sample mean is significantly different from the implied ROEss figures.

		Phase 1				**Phase 2**				**Phase 3**		**Indication Period**				
Year		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Steady State Growth	**1%**															
Count		14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Mean		0,106	0,054	0,127	0,132	0,258	0,230	0,303	0,215	(0,034)	0,021	0,144	0,069	0,093	0,116	0,057
Standard Deviation		0,098	0,152	0,182	0,148	0,302	0,137	0,188	0,162	0,068	0,052	0,074	0,056	0,057	0,060	0,077
Standard Error		0,026	0,041	0,049	0,040	0,081	0,037	0,050	0,043	0,018	0,014	0,020	0,015	0,015	0,016	0,020
Hyp Mean		5,9%	7,6%	5,5%	14,3%	40,8%	48,2%	50,6%	24,8%	11,8%	9,3%	12,7%	10,8%	13,0%	14,8%	18,0%
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		1,797	(0,538)	1,474	(0,273)	(1,859)	(6,859)	(4,050)	(0,757)	(8,312)	(5,209)	0,864	(2,565)	(2,413)	(1,938)	(6,001)
P Value		0,096	0,599	0,164	0,789	0,086	0,000	0,001	0,463	0,000	0,000	0,403	0,024	0,031	0,075	0,000
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		NO	NO	NO	NO	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES
Steady State Growth	**2%**															
Mean		0,106	0,054	0,127	0,132	0,258	0,230	0,303	0,215	(0,034)	0,021	0,144	0,069	0,093	0,116	0,057
Standard Deviation		0,098	0,152	0,182	0,148	0,302	0,137	0,188	0,162	0,068	0,052	0,074	0,056	0,057	0,060	0,077
Standard Error		0,026	0,041	0,049	0,040	0,081	0,037	0,050	0,043	0,018	0,014	0,020	0,015	0,015	0,016	0,020
Hyp Mean		4,4%	5,7%	4,4%	11,4%	34,7%	40,8%	42,4%	20,1%	9,8%	7,1%	9,7%	8,2%	9,9%	11,3%	13,7%
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		2,343	(0,089)	1,707	0,445	(1,103)	(4,845)	(2,415)	0,341	(7,226)	(3,622)	2,389	(0,869)	(0,402)	0,229	(3,920)
P Value		0,036	0,931	0,112	0,664	0,290	0,000	0,031	0,739	0,000	0,003	0,033	0,401	0,694	0,822	0,002
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	NO	NO	NO	NO	YES	YES	NO	YES	YES	YES	NO	NO	NO	YES
Steady State Growth	**3%**															
Mean		0,106	0,054	0,127	0,132	0,258	0,230	0,303	0,215	(0,034)	0,021	0,144	0,069	0,093	0,116	0,057
Standard Deviation		0,098	0,152	0,182	0,148	0,302	0,137	0,188	0,162	0,068	0,052	0,074	0,056	0,057	0,060	0,077
Standard Error		0,026	0,041	0,049	0,040	0,081	0,037	0,050	0,043	0,018	0,014	0,020	0,015	0,015	0,016	0,020
Hyp Mean		3,0%	3,9%	3,2%	8,6%	28,6%	33,4%	34,2%	15,3%	7,8%	4,9%	6,7%	5,7%	6,8%	7,8%	9,5%
Significance Level		0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Tails		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Degrees of Freedom		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
T Stat		2,889	0,361	1,940	1,163	(0,346)	(2,832)	(0,780)	1,439	(6,140)	(2,035)	3,914	0,828	1,608	2,396	(1,840)
P Value		0,013	0,724	0,074	0,266	0,735	0,014	0,449	0,174	0,000	0,063	0,002	0,423	0,132	0,032	0,089
T Critical		2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Significant		YES	NO	NO	NO	NO	YES	NO	NO	YES	NO	YES	NO	NO	YES	NO

3.5 Test Findings

Summing up the results from the T-tests for the three different steady state growth rate scenarios, table 4 and 5 show similar results in the three different scenarios. For the V/P hypothesis, the null hypothesis can be rejected at very low significance levels for the first three years for all growth rates. In 2003 the fundamental valuation and market capitalization converge, and the T-test indicates that there is not enough evidence to reject H_0. However, judging from the continuing development of the V/P-ratio after 2003, we interpret this to be a trend shift, i.e. an inevitable crossing and unsustainable state of the V/P-ratio. Note that this effect is delayed until year 2004 when using 3.0 percent steady state growth. In phase 2, H_0 can be rejected at low significance levels for all years and growth rates, except for the delayed trend shift in 2004 at 3.0 percent growth. For phase 3, H_0 cannot be rejected for any of the growth scenarios, coinciding with the normalization trend observed in the results. The trend continues in the indication period, which is based on less accounting information and should be interpreted with caution, and displays insufficient ability to reject H_0 throughout almost the entire period.

The null hypothesis that implied ROEss equals the five-year market average ROE can be rejected at very low significance levels in the years 2000-2002 for all growth rates. Similar to the V/P hypothesis, 2003 presents a trend shift with implied ROEss going from levels relatively lower than the five-year average market ROE to levels relatively higher than the five-year average market ROE. However in contrast to the V/P hypothesis, H_0 can be rejected in this year except for in the 1.0 percent steady state growth scenario. For phase 2, H_0 can be rejected at low significant levels for all years and growth rates. In phase 3, the results confirm the previously identified normalization trend.

The final test provides an indication of the input data used by investors when assessing potential investment opportunities. The results show that the null hypothesis that actual ROE equals implied ROEss cannot be rejected for the majority of years in the research period, except for 2005-2006 and 2008-2009. Hence, the results indicate that investors have put current ROE as ROEss in all years except for 2005-2006, when the market is having a strong development, and 2008-2009, when the market is normalizing.

Table 4
T-Test Significance, Research Period Phase 1 and 2
Showing the significance of T-tests for; V/P-ratio = 1.0x, implied ROEss = 5 year average market ROE and ROE = implied ROEss. The results are presented for each growth rate 1.0, 2.0 and 3.0 percent. Each year contains a sample of 14 observations. The results are presented under the assumption that the data sample at each year is normally distributed.

		Phase 1				Phase 2			
Year		2000	2001	2002	2003	2004	2005	2006	2007
V/P-ratio (H_0: μ = 1.0x)									
Significant	**1%**	YES	YES	YES	NO	YES	YES	YES	YES
Significant	**2%**	YES	YES	YES	NO	YES	YES	YES	YES
Significant	**3%**	YES	YES	YES	YES	NO	YES	YES	NO
Implied ROEss (H_0: μ = 5yr Avg Market ROE)									
Significant	**1%**	YES	YES	YES	NO	YES	YES	YES	YES
Significant	**2%**	YES	YES	YES	YES	YES	YES	YES	YES
Significant	**3%**	YES	YES	YES	YES	YES	YES	YES	YES
ROE (H_0: μ = Implied ROEss)									
Significant	**1%**	NO	NO	NO	NO	NO	YES	YES	NO
Significant	**2%**	YES	NO	NO	NO	NO	YES	YES	NO
Significant	**3%**	YES	NO	NO	NO	NO	YES	NO	NO

Table 5
T-test Significance, Research Period Phase 3 and Indication Period
Showing the significance of T-tests for; V/P-ratio = 1.0x, implied ROEss = 5 year average market ROE and ROE = implied ROEss. The results are presented for each growth rate 1.0, 2.0 and 3.0 percent. Each year contains a sample of 14 observations. The results are presented under the assumption that the data sample at each year is normally distributed.

		Phase 3		Indication Period				
Year		2008	2009	2010	2011	2012	2013	2014
V/P-ratio (H_0: μ = 1.0x)								
Significant	**1%**	NO	NO	NO	NO	NO	YES	YES
Significant	**2%**	NO	NO	NO	NO	NO	NO	NO
Significant	**3%**	NO	NO	NO	YES	NO	NO	NO
Implied ROEss (H_0: μ = 5yr Avg Market ROE)								
Significant	**1%**	YES	NO	YES	NO	YES	YES	YES
Significant	**2%**	NO	NO	NO	NO	NO	NO	YES
Significant	**3%**	NO	YES	YES	YES	YES	NO	NO
ROE (H_0: μ = Implied ROEss)								
Significant	**1%**	YES	YES	NO	YES	YES	NO	YES
Significant	**2%**	YES	YES	YES	NO	NO	NO	YES
Significant	**3%**	YES	NO	YES	NO	NO	YES	NO

3.6 Robustness

The robustness analysis aims to exclude the possibility that the results are a consequence of misspecification of the parameters in the model. We believe that the portfolio approach helps to limit such misspecifications. The portfolio formation is suitable in the sense that all sample companies are Nordic real estate companies with similar firm characteristics and risk levels, assessed by the individual company beta values. Calculating a CAPM cost of equity for each individual company involves the risk of measurement error in determining the company specific betas. For this reason an aggregated analysis of the combined portfolio using the portfolio beta provides a more robust measure.

The payout ratio used in steady state is the five-year average of the portfolio median. In the same way, the ROEss figures used in the fundamental valuation are the five-year average market ROE. Using these numbers on the portfolio creates a normalizing effect towards a typical industry company and reduces the volatility of the average numbers that would have been obtained on a firm-specific level.

Based on the T-tests, we see that the results are robust under different steady state growth assumptions, implying that the results we obtain are not due to misspecification in the steady state growth rate. Naturally, the way that the PVED model is constructed, the expected growth rate in steady state cannot exceed the cost of equity and since the risk free rate is low, especially in the later years of the study, this limits the span of possible growth rates in the steady state. However, we assess that given the GDP growth, industry and current inflation, a steady state growth above 3.0 percent is unlikely.

3.7 Research Findings

Based on the results, we find large deviations between the implied ROEss and the reasonable level of ROE, as determined by the five-year average market ROE, in phase 1 and 2. The first two phases are therefore identified as periods of financial turbulence. In phase 3 there is a convergence between the implied ROEss and the reasonable level. The convergence continues in the indication period and provides evidence of a normalizing trend as of 2008. Hence, the years 2000-2007 display mispricing with unreasonable levels of implied ROEss. To analyze the potential reasons for the mispricing, we initially assess whether markets can be said to be efficient or not in the different phases. Depending on the assessment of market efficiency, we assess how much of the variation in stock prices that can be explained by fundamentals and speculative components respectively. This relation will determine the viability of the explanations for mispricing presented under efficient markets and by behavioral finance. The tested hypothesis that actual ROE equals implied ROEss is used as an indicator of investor uncertainty.

3.7.1 Financial Turbulence

Under efficient markets, investors are perfectly rational (Fama 1970) and fundamental valuations and market capitalizations should co-move (Lee et al 1999, Curtis 2011). Easton (1985) and Frankel and Lee (1998) find a strong link between fundamental valuations and the market capitalization, but we do not observe such correlation in

phase 1. Instead based on the large deviation between the fundamental valuation and market capitalization, we question the efficiency of the market and investor rationality. The fact that we cannot reject the hypothesis that actual ROE equals implied ROEss strengthens the case for investor irrationality in phase 1. We believe that due to high uncertainty about the future, investors kept low expectations on future return, as shown by the low implied ROEss, and high expectations about future interest rates. The pessimistic view of the investors could potentially be a result of a negative long-term drift effect of negative return announcements in the 90s, similar to the drift effects found in the studies by Bernard and Thomas (1989) and Bartov, Lindahl and Ricks (1998). As a consequence of the uncertainty in phase 1, investors anchor their valuations on the latest earnings measure. There are two possible reasons for this. Firstly investors do not use fundamental analyses when assessing the Nordic real estate companies and due to negative general market sentiment they believe that the depressed market prices are correct. Secondly, they use the available information in their fundamental valuations, but due to low value relevance of the available information, the fundamental valuation does not match the market capitalization. The general state of the economy in phase 1 would suggest that the former is true, whereas the failure to reject the hypothesis that actual ROE figures equal the ROEss indicates that investors use weak form efficiency information in their valuations of Nordic real estate companies and that the latter is true. Lower value relevance of accounting numbers in phase 1 is consistent with the findings of Curtis (2011), that accounting numbers could be less value relevant in turbulent times. We believe that there is a high viability for both explanations and that they both lead to a setting with irrational investors who overstate the discount rate, as determined by the CAPM (Bernard and Thomas 1989) leading to the suppressed market capitalizations during phase 1. Hall and Hall (1993) discuss the importance of the discount rate in bringing fundamental values and stock prices together. Due to the large discrepancy between the fundamental valuation and market capitalization and low ability of actual ROE to determine stock prices we determine that speculative components have high explanatory power in determining the market capitalizations in phase 1.

In phase 2, we observe that implied ROEss figures highly exceed the average market ROE. Furthermore, in this phase, the standard deviation of the market capitalization is significantly higher than the fundamental valuation, implying excess volatility (Shiller 1980). Thus, we believe that there is even more reason to question

the notion of efficient markets in phase 2 in comparisons to phase 1. With perfect hindsight, we know that phase 2 includes the years leading up to the financial crisis. Interestingly, in the years 2005-2006 we can reject the hypothesis that actual ROE equals the implied ROEss. Thus, the results suggest that investors now have left the safe option to set ROEss equal to the ROE figures of the valuation dates. Malkiel (2003) emphasizes the role of psychological factors in explaining stock prices in the years leading up to financial crashes and Baker and Wurgler (2007) claim that traditional financial valuation models have troubles explaining the variation in stock prices during booms and busts. This proves a compelling case for the explanations of mispricing presented by behavioral finance and indicates large speculative components in phase 2. Given the state of the economy in phase 1, it is possible that the upward trend in stock prices in phase 2 is triggered by an overreaction to positive return announcements following years of low returns, in line with the findings of DeBondt and Thaler (1985, 1987).

The years leading up to the crisis are possibly explained by what behavioral finance calls the bandwagon effect, i.e. investors acknowledge that stock prices are rising and thus enter the market. The bandwagon effect leads to a generally higher level of irrational investors in the market, which leads to higher risk for the rational investors (Delong, Schleifer, Summers and Waldman 1990). Furthermore, increased irrationality in the market increases the probability that arbitrageurs, i.e. the rational investors, will not bet against the market and bring the market capitalization to the fundamental valuation (Vishny and Schleifer 1997). A similar situation could be observed in the years leading up to the crash in the late 90s, where fundamentals were left in favor of a bandwagon effect (Malkiel 2003).

In an upward market, it is also possible that highly recognized Nordic real estate companies benefit from investor recognition, which increases the market capitalizations further (Merton 1987 and Richardson, Sloan and You 2012). The size of the companies in the portfolio could also determine investors' valuations with some of the newly established real estate companies in the portfolio more likely to be affected by investor sentiment (Baker and Wurgler 2007).

Interestingly, in 2007 after the peak, we cannot reject the hypothesis that actual ROE is equal to the implied ROEss, which could potentially be explained by investors having realized the economic reality of the fundamentals, i.e. that ROEss are excessively higher than the market average as illustrated by the largest gap between

fundamental values and the market capitalization in our research period (2006). Thus, investors are returning to the safe option of setting ROEss to actual ROE in their valuations. To conclude the analysis on phase 2, we believe that given the high discrepancies between fundamental values and market capitalization, the large volatility in market capitalization and the viability of the reasons for mispricing discussed, speculative components play a large role in the variation of stock prices in phase 2.

3.7.2 Convergence

In phase 3, there is a convergence between the implied ROEss and the five-year market average ROE. Further, phase 3 presents the first period with observable co-movement between fundamental valuation and market capitalization. During this phase, we cannot reject the hypotheses that V/P is equal to 1.0x and that the implied ROEss is equal to the five-year average market ROE. The results imply that fundamentals play a bigger relative role in explaining the variation in stock prices. Thus, in phase 3 we do not question market efficiency. In line with Curtis (2011) and Lee et al. (1999) we attribute the small divergences between the fundamental value and market prices to arbitrage costs. Furthermore, we can now reject the hypothesis that actual ROE figures equal implied ROEss, which we believe is a result of better accounting information. Better accounting practices imply higher value relevance of accounting information (Barth and Landsmann 2008).

IFRS accounting and IAS 40 in particular was implemented in 2005, and led to new accounting practices for the public Nordic real estate companies. Thus, this meant that historical cost accounting was left in favor of fair value accounting. For the companies in the sample, the market values of investment property were presented in the notes already before the implementation of IFRS, and we thus believe that this was taken into consideration by the investors. In assessing whether the new accounting practices has led to better value relevance, it is important to acknowledge that the years following the implementation of IFRS led up to the financial crisis, and thus it would not be fair to evaluate potential changes in value relevance when the market prices are determined to a larger extent by speculative components. However, in phase 3, we cannot reject that the convergence is not a result of better accounting quality as a result of the implementation of IFRS.

The indication period provides potential evidence of a lasting convergence trend and that financial statements have become more value relevant since the implementation of IFRS, in line with the results of Barth and Landsmann (2008).

4 Conclusion

Based on the results, we observe that the implied ROEss does not reflect a reasonable level over the research period, except for the years 2008-2009, where we identify a convergence between the implied ROEss and the reasonable level. In phase 1 (2000-2003), the implied ROEss is below the reasonable level, whereas phase 2 (2004-2007) displays extreme levels of implied ROEss in excess of the reasonable level. Phase 1 and 2 are therefore considered periods of financial turbulence with investor uncertainty and post-crash irrationality in phase 1, and irrational sentimental investors in phase 2. Furthermore, phase 3 represents a convergence trend, which might be a result of better accounting practices, following the implementation of IFRS in 2005.

The results indicate that investors become irrational in times of financial turbulence, especially in the years leading up to a crisis. A prolonged period of positive development, not supported by accounting fundamentals, also increases the risk of arbitrageurs not betting against the market, which serves to further worsen the irrationality.

The discussion whether stock prices in the public Nordic real estate market are set in an efficient market remains unclear. In the efficient market literature, it is often concluded that deviations from efficient markets may occur occasionally, but that markets are efficient in the long run. However, previous literature has also provided evidence of the importance of speculative components in determining stock prices. Hence, we believe that stock prices are set by an ever-changing mixture between accounting fundamentals and speculative components. Although our study does not provide any answer to how efficient markets are in the long run, we conclude that the speculative components are relatively larger in years of financial turbulence, during which fundamentals have less explanatory power in the variation of stock prices in the public Nordic real estate market.

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APPENDICES

A.1 The Present Value of Expected Dividends Model

Under the neoclassical framework, the value of a company equals the present value of expected dividends. Thus, in the most fundamental form, the valuation formula underlying the PVED model looks as follows:

$$V_0 = \sum_{t=1}^{T} \frac{D_t - N_t}{(1 + r_e)^t} + \frac{V_T}{(1 + r_e)^T}$$

Where: V_0 = value of owners' equity at time 0

D_t = expected total dividends paid to shareholders at time t

N_t = expected new issue of equity at time t

r_e = cost of equity capital

V_T = expected value of owners' equity at time T (horizon)

Thus, the formula includes the sum of net dividends over an explicit forecasting period of *t* years and a terminal value expression for the steady state. In order to be able to isolate values for ROE_{SS} and g_{SS}, we break down the valuation formula into its components. Thus, the formula used in the paper is:

$$PVED = \sum_{t=1}^{T} \frac{BV_{t-1} * ROE_t * pr_t}{(1 + r_e)^t} + \frac{\frac{BV_{T-1} * ROE_{SS} * pr_{SS}}{r_e - g_{SS}}}{(1 + r_e)^T}$$

Where: BV_{t-1} = opening book value of owners' equity

ROE_t = book return on owner's equity = net income$_t$ / BV_{t-1}

ROE_{SS} = implied ROE steady state

PR_t = payout ratio = total net dividend$_t$ / net income$_t$

PR_{SS} = payout ratio steady state

r_e = cost of equity capital

g_{SS} = long-term growth rate

A.3 Bankruptcy Prediction Model

Calculating the probability of bankruptcy we use the 1-5 year formulas presented by Skogsvik (1988) for all valuation periods. Hence we conduct 15 separate 1-year bankruptcy rate calculations, 15 separate 2-year bankruptcy rate calculations and so on to receive the most accurate bankruptcy prediction possible for the companies and the portfolio. The formula is as follows:

$$V_0 = Constant_t + R_{A,t} * R_{A,company} + R_{L,t} * R_{L,company} + t(1)_t * t(1)_{company} + TIV_t * TIV_{company} + LI_t * LI_{company} + ER_t * ER_{company} + E'_t * E'_{company} + Diff(R_L)_t * Diff(R_L)_{company}$$

Financial Ratio	**Numerator**		**Denominator**		
R_A	EBIT		Average Assets		
R_L	Interest Cost		Average Liabilities		
t(1)	Tax Cost		Earnings before tax cost		
TIV	Average Inventory		Sales		
LI	Cash		Current Liabilities		
ER	Owners' Equity		Assets		
E'	Growth in Owners' Equity		Owners' Equity		
Financial Ratio	**Forecast Horizon**				
Year, t	**1**	**2**	**3**	**4**	**5**
R_A	- 4.3	- 3.8			
R_L	+22.6	+14.5	+13.2	+16.1	+13.5
t(1)			+0.2		
TIV	+1.6	+0.7	+1.3	+0.8	+0.9
LI			- 0.5	- 0.8	- 1.0
ER	- 4.5	- 2.9	- 3.3	- 2.5	- 1.8
E'	+0.2				
Diff(R_L)	- 0.1				
Constant	- 1.5	- 1.1	- 1.1	- 1.0	- 1.1

To adjust for the sample and industry bias we have used:

$$P(fail)_{POP} = P(fail)_{EST}\left[\frac{\pi * (1 - prop)}{prop * (1 - \pi) + P(fail)_{EST} * (\pi - prop)}\right]$$

$P(fail)_{POP}$ is the unbiased probability of failure, $P(fail)_{EST}$ is the estimated probability of failure and prop is the proportion of companies the fail in the sample. With sample bankruptcy level of 51 companies out of 379 the prop-value is set to 13.5% and the general estimated bankruptcy rate in the industry (π) is assumed to be 2.0%.

A.3 PVED – Adjusted for Probability of Failure

Adjusting the PVED-formula for the probability of failure the unbiased rate of survival is multiplied with each year's present value of future dividend. Thus the equation at each valuation date is as follows:

$$PVED_{Adjusted} = \frac{(1 - Pfail_1)BV_0 * ROE_1 * pr_1}{(1 + r_e)^1}$$
$$+ \frac{(1 - Pfail_1)(1 - Pfail_2)BV_1 * ROE_2 * pr_2}{(1 + r_e)^2}$$
$$+ \frac{(1 - Pfail_1)(1 - Pfail_2)(1 - Pfail_3)BV_2 * ROE_3 * pr_3}{(1 + r_e)^3}$$
$$+ \frac{(1 - Pfail_1)(1 - Pfail_2)(1 - Pfail_3)(1 - Pfail_4)BV_3 * ROE_4 * pr_4}{(1 + r_e)^4}$$
$$+ \frac{(1 - Pfail_1)(1 - Pfail_2)(1 - Pfail_3)(1 - Pfail_4)(1 - Pfail_5)BV_4 * ROE_5 * pr_5}{(1 + r_e)^5}$$
$$+ \frac{\frac{(1 - Pfail_1)(1 - Pfail_2)(1 - Pfail_3)(1 - Pfail_4)(1 - Pfail_5)BV_4 * ROE_{SS} * pr_{SS}}{r_e - g}}{(1 + r_e)^5}$$

A.4 ROE & Implied ROEss – 2.0 Percent Steady State Growth Rate Scenario

ROE

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Company															
Atrium Ljungberg		12,5%	13,1%	11,8%	22,0%	25,8%	70,6%	21,0%	(4,3%)	2,2%	10,9%	9,9%	10,8%	10,8%	5,9%
Castellum		11,7%	22,7%	11,8%	19,5%	16,1%	18,7%	14,6%	(5,9%)	1,6%	20,3%	6,4%	13,1%	14,1%	9,2%
Citycon		4,8%	5,2%	5,2%	7,2%	24,9%	35,0%	35,4%	(12,6%)	(4,3%)	10,7%	1,5%	8,6%	9,3%	6,8%
Fabege		10,3%	17,7%	11,6%	20,6%	23,9%	21,0%	14,9%	(4,5%)	4,3%	17,0%	10,1%	(0,7%)	13,4%	13,8%
Hufvudstaden		11,1%	7,2%	7,7%	16,1%	16,4%	39,7%	20,4%	(3,8%)	(3,3%)	17,0%	12,5%	15,5%	13,5%	13,1%
Jeudan		12,6%	33,8%	12,5%	8,8%	41,3%	16,7%	11,2%	(11,6%)	6,8%	7,0%	(5,7%)	0,6%	14,6%	(4,0%)
Kungsleden		12,7%	14,7%	32,3%	31,0%	50,2%	53,7%	24,7%	(10,6%)	3,5%	11,9%	8,7%	4,6%	11,2%	(8,9%)
Land & Leisure		0,0%	0,0%	(3,2%)	(6,7%)	3,0%	2,6%	3,1%	0,1%	1,6%	8,6%	9,1%	9,1%	6,0%	7,6%
Olav Thon		17,2%	15,0%	15,1%	44,2%	25,6%	25,6%	32,2%	(1,6%)	7,6%	16,1%	7,8%	11,2%	15,2%	9,1%
Sagax		(44,5%)	(33,2%)	(6,2%)	60,5%	33,2%	52,1%	68,0%	(12,4%)	2,7%	35,6%	5,5%	16,7%	27,8%	20,1%
Sponda		6,5%	15,7%	5,6%	0,6%	5,0%	8,4%	23,1%	3,1%	(8,1%)	10,8%	9,8%	8,9%	7,1%	5,2%
SSK		0,0%	6,6%	14,1%	11,7%	7,7%	25,8%	5,1%	4,9%	11,0%	8,9%	(1,9%)	4,9%	1,4%	(0,6%)
Technopolis		12,0%	10,2%	12,2%	12,9%	14,2%	19,5%	15,0%	7,7%	(2,7%)	8,9%	15,7%	7,8%	7,7%	(2,1%)
Wallenstam		8,7%	48,8%	54,2%	112,2%	34,3%	34,0%	13,0%	4,5%	6,1%	18,6%	7,5%	18,7%	10,7%	4,6%
Average		5,4%	12,7%	13,2%	25,8%	23,0%	30,3%	21,5%	(3,4%)	2,1%	14,4%	6,9%	9,3%	11,6%	5,7%
ROEss (Market ROE avg. 5 yrs.)	16,0%	21,0%	22,7%	19,4%	14,7%	13,0%	8,3%	5,9%	8,9%	9,6%	9,6%	9,6%	9,6%	9,6%	9,6%

Implied ROEss

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Company															
Atrium Ljungberg		5,4%	(1,4%)	(1,2%)	1,6%	1,7%	33,7%	17,5%	15,1%	7,5%	10,0%	9,6%	10,4%	11,7%	12,9%
Castellum		6,4%	6,8%	16,9%	44,7%	45,0%	44,1%	20,0%	10,6%	8,0%	12,3%	11,0%	12,5%	14,2%	15,8%
Citycon		8,2%	13,1%	20,9%	42,5%	68,6%	75,7%	27,4%	12,5%	9,4%	10,6%	9,1%	11,5%	10,8%	11,4%
Fabege		3,4%	1,5%	8,2%	90,3%	53,1%	51,9%	20,8%	9,0%	5,8%	9,3%	7,7%	9,5%	12,4%	16,4%
Hufvudstaden		7,1%	3,1%	7,5%	19,7%	22,7%	21,5%	10,0%	6,7%	4,5%	6,6%	6,2%	7,3%	8,1%	9,4%
Jeudan		7,0%	12,9%	21,8%	50,7%	100,2%	51,2%	43,6%	27,3%	24,2%	18,0%	17,5%	20,8%	22,3%	22,7%
Kungsleden		5,0%	0,1%	4,1%	30,7%	61,1%	64,9%	26,5%	16,8%	10,5%	14,4%	9,8%	10,6%	11,7%	13,8%
Land & Leisure		10,5%	9,0%	15,1%	11,2%	16,5%	8,4%	4,6%	0,8%	1,1%	2,7%	2,4%	3,2%	4,8%	5,7%
Olav Thon		6,8%	5,1%	11,6%	28,3%	47,3%	31,7%	23,1%	10,6%	8,5%	9,3%	8,7%	8,7%	10,2%	14,0%
Sagax		7,6%	2,7%	11,3%	27,7%	38,3%	29,4%	19,6%	8,5%	7,6%	11,7%	10,3%	10,8%	15,1%	24,2%
Sponda		8,9%	13,3%	35,9%	44,4%	40,7%	60,0%	20,4%	7,7%	7,8%	11,6%	8,2%	11,3%	10,0%	10,2%
SSK		5,2%	5,5%	12,2%	30,8%	23,4%	18,0%	11,0%	7,5%	7,8%	7,7%	5,7%	5,2%	5,9%	8,9%
Technopolis		6,5%	7,2%	22,1%	34,4%	67,9%	56,9%	39,5%	22,1%	12,0%	12,2%	12,8%	13,5%	12,9%	11,5%
Wallenstam		0,8%	0,3%	3,8%	23,6%	23,4%	23,3%	9,2%	5,0%	3,2%	5,0%	4,9%	6,7%	7,5%	9,4%
Average		6,4%	5,7%	13,6%	34,3%	43,6%	40,8%	21,0%	11,4%	8,4%	10,1%	8,8%	10,1%	11,3%	13,3%
Portfolio Implied ROEss	4,4%	5,7%	4,4%	11,4%	34,7%	40,8%	42,4%	20,1%	9,8%	7,1%	9,7%	8,2%	9,9%	11,3%	13,7%