



Do Listed Real-Estate Companies Trade at a Discount to Their Net Asset Value?

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ABSTRACT

Listed real estate companies trading at a discount or premium to their net asset value has been an interesting field of study for financial analysts. Previous studies have found several company-specific variables that could potentially explain why market values are above or below the companies' underlying net asset value. However, different studies often have conflicting and inconsistent results. Hence, the close-end fund puzzle still has many unanswered questions concerning which characteristics affect the pricing in today's market. We perform a cross-sectional study of 67 listed real estate companies from Norway, Sweden, Denmark, Finland, Germany, the Netherlands, Belgium and the UK based on the fiscal year 2017. We introduce new independent variables as yield requirements used on the property portfolio, occupancy rate, interest rate on debt, average remaining lease term with tenants, EPRA-reporting and interest coverage ratio. Our findings indicate that size, shopping malls, commercial buildings, equity ratio and interest rate are positively correlated with discount to net asset value, while diversification, earnings, interest coverage ratio, REIT status and EPRA-reporting are negatively correlated with discount to net asset value.

Key words: Real Estate Companies, Net Asset Value

INTRODUCTION

Substance value from asset-based valuation is considered a good measure of fundamental values in investment companies (Rehkugler, Schindler & Zajonz, 2012) but, nevertheless, it is often observed that the market price deviates. This has provided the basis for a controversial and partly unanswered puzzle in the financial sector: what causes deviations between market value and net asset value among investment companies? The problem is often referred to as "the close-end fund puzzle" or "the discount to NAV (net asset value) puzzle" (see, for example, Morri & Benedetto, 2009; Monson, Bao & Lizieri, 2018). The phenomenon was first studied among investment companies, but the puzzle has also proved to be relevant among real estate companies. There are many indications that the answer to the puzzle is dynamic and that the results depend on both the geographical area and the time period. Findings confirm, to some extent, a lack of market efficiency in the real estate sector, which in theory can be exploited if one is able to detect these market imbalances. This study aims to find out which rational explanations can justify the market penalizing some companies with discounts to their core values.

The purpose of this study is to better understand what causes the market value to be lower or higher than the net asset value of listed real estate companies. The goal is to find the good

investment opportunities among listed real estate companies. Consequently, the following research question is formulated:

Can company-specific variables explain differences in discount to net asset value among listed real estate companies?

This study examines company-specific variables and is thus a contribution within the rational approach within the “close-end fund puzzle”. The study will be conducted as a cross-sectional analysis of 67 real estate companies from Norway, Sweden, Denmark, Finland, Germany, the Netherlands, Belgium and the UK based mainly on the annual reports from 2017. Previous research has provided many possible explanations, however, with ambiguous findings.

THEORY AND LITERATURE

Discount (and premium) to net asset value is defined as in similar studies (see, e. g. Barkham & Ward, 1999; Brounen & Laak, 2005; Morri & Benedetto, 2009).

$$\text{Discount to NAV} = \frac{\text{NAV (per share)} - \text{share price}}{\text{NAV (per share)}}$$

Various measures of substance value have been used in previous studies, but it may appear that recent studies favor EPRA NAV (see, e. g., Ke, 2015; Morri & Baccarin, 2016). EPRA NAV is a key figure prepared by the European Public Real Estate Association (EPRA) with the purpose of highlighting the real value of net assets in real estate companies, given that the companies have long-term ownership of the properties as a strategy (European Public Real Estate Association, 2016). Like other measures of net asset value, the ratio is market value of assets subtracted by market value of debt. In addition, EPRA NAV also corrects for deferred tax and derivatives. The reason is that these items have no effect on the net asset value when the companies have long-term ownership as a strategy.

Substance value is also known as value-adjusted equity, or net asset value (NAV). The net asset value is assumed to be a good indicator of the fundamental values of real estate companies that own and operate properties as a business (Rehkgugler et al., 2012). The legitimacy of the key figure can be justified by the fact that the property companies' most important component for future cash flow is precisely the properties they own. A property company with a lower share price than the net asset value per share indicates that the properties have a lower value when they are subject to the company's management than they would have had if they had been owned directly. Hence, a premium means that the properties are worthier of the company's operations than if the properties had been owned directly.

LITERATURE

A major difference between investing directly in real estate versus real estate stocks is the liquidity listed real estate companies offer. Sale and purchase of property entails large transaction costs and long transaction time, while sales and purchase of shares may be done instantly. However, the liquidity of the shares in listed real estate companies varies. It is reasonable to assume that listed real estate companies with low liquidity in the share are priced with a liquidity premium compared to more liquid companies. Several studies have also confirmed this; Clayton and MacKinnon (2002), Brounen and Laak (2005), Ke (2015), Gustafsson and Peng (2016) and Morri and Baccarin (2016) all found that liquidity had a negative correlation with discount to net asset value. This finding is in line with economic theory, where it is often considered that investors calculate a liquidity premium on less liquid

shares. However, the results are not unambiguous - for example, Rehkugler et al. (2012), find that the liquidity had no effect on the discount to net asset value.

A variable that often correlates with liquidity is the size of the companies. Capozza and Lee (1995), Brounen and Laak (2005), Ke (2015) and Gustafsson and Peng (2016) concluded in their studies that the size of the companies has a negative correlation with a discount to the net asset value. This indicates that larger real estate companies benefit from economies of scale. But there is also some uncertainty about this variable. There are studies that have come to conflicting conclusions that the larger the companies, the greater the discount to the substance value (Barkham & Ward, 1999; Morri et al., 2005).

If one buys property directly, one has control over the management of the property. As a small investor in a large real estate company, one does not have the same opportunity to decide on the operations, and one must basically accept the administration that exists. Ingesoll (1976) argues that administration costs are positively correlated with a discount to net asset value; the higher the cost, the higher the discount to the net asset value, since the cost results in less of the value returning to the owners. Several have tried to study whether the administration costs affect the discount to the net asset value, and the results are not clear. Capozza and Lee (1996) found that management costs could be a possible explanation for discount to net worth, while both Malkiel (1995) and Barkham and Ward (1999) concluded that management costs had no significant effect on discounted asset value. One of the reasons that the results are not clear could be that expensive management can be both good and bad. Gemmill and Thomas (2002) argue that administration costs can be linked to both premium and discount to net worth, and that this depends on the relationship between the quality of the management and how much it costs.

Mortgage is also a puzzling variable. Ke (2015) found that debt, measured by how much debt the companies had in relation to assets, had a positive correlation with the discount to the net asset value; the more debt, the more discount. This is also consistent with the findings of Brounen and Laak (2005) and Rehkugler et al. (2012). Barber (1996), on the other hand, found that debt was negatively correlated with the discount to the substance value; the more debt, the less the discount (he pointed out, however, that one must be careful about the interpretation of the result, since the significance of the variable was largely dependent on the specification of the model). One explanation for the fact that different studies have inconsistent results on the effect of collateral can be found in the arguments of Adams and Venmore-Rowland (1990), who believed that collateral itself does not lead to discounted rates and premiums, but that borrowing may reinforce any discounts and premiums. This argument is based on the Modigliani and Miller (1958) theorem that companies have the same value regardless of funding.

Property companies can be divided into several segments, depending on the type of property the companies are investing in. Based on the annual reports of the companies in this study, it can be argued that a common division is shopping mall, warehouse, logistics, industry and housing. Some companies have a strategy of just investing in one segment, while others follow a more diversified strategy. On a general basis, one can claim that diversified companies have lower risk, while specialized companies can possess better expertise in their segment. Benefield, Anderson and Zumpano (2009) did a study that found that diversified real estate companies performed better than specialized, but it is pointed out that the findings may be due to factors other than the diversification itself. For example, the companies with diversified portfolios had a larger holding in commercial real estate, which could mean that the overweight in this segment could be the cause of the result. Brounen and Laak (2005) and Ke

(2015) made significant findings that specialized companies had less discount to the net asset value than diversified companies. This may indicate that the market places greater emphasis on the benefit of specializing in a segment than the reduced risk of diversification. One of the reasons for this may be that investors can diversify by investing in several specialized companies. Capozza and Lee (1995) found that companies specializing in the shopping mall segment had a premium compared to other segments, while companies specializing in department stores had a discount. Rehkugler et al. (2012) found that none of the segments had a significant effect on the discount to net asset value, but they had significant findings that companies with specialized real estate portfolios had a lower discount to net asset value than companies with diversified portfolios.

Malkiel (1995) argues that concentrated ownership reduces the likelihood that a company can be bought and liquidated, and that this should lead to a greater discount to the net asset value. Barkham and Ward (1999), on the other hand, argue that large owners lead to a closer follow-up of management and company operations, which should reduce the discount to net worth. Barclay, Holderness and Pontiff (1993) found among investment companies that the companies with concentrated ownership had a greater discount on net asset value than companies with scattered ownership. Ke (2015) found that the share of shares owned by the three largest owners had a negative correlation with discount to net asset value among real estate companies, but that this variable was not significant.

Morri et al. (2005) found by examining 26 UK real estate companies between 1999 and 2004 that the dividend rate had a positive correlation with discount to net asset value. Rehkugler et al. (2012), however, found in its study that the dividend rate had no effect on discount to net asset value, but whether the companies had REIT status or not did have a major impact on the discount to the net asset value. REIT stands for "Real Estate Investment Trust", and is, in short, an organizational form that companies can achieve by satisfying certain requirements - for example, large parts of the taxable profit must be paid out as dividends each year. The advantage of having REIT status is lower corporate tax, which is probably the reason that REIT companies had lower net asset value discounts than companies that did not have REIT status.

METHODOLOGY DATA AND VARIABLES

The data consists of 67 companies from Norway, Sweden, Denmark, Finland, Germany, the Netherlands, Belgium and the UK (see list in the Appendix 1). The business activity must primarily be to own and operate properties. Some companies (about 30) were excluded since they had a fiscal year other than January-December. The choice to omit these companies was made on the basis that there are relatively large fluctuations in the average discount to net asset value over time (see, for example, Rehkugler et al., 2012). Hence, the data is secondary. The main source of the data is the annual reports of the companies for 2017. A few variables were obtained from Thomson Reuters Eikon. Studying this phenomenon based on cross-sectional data only contributes to a snapshot of the issue and does not allow one to conclude too much on a general basis.

The accounts are made according to IFRS standards with fair value in the balance sheet, for all companies in the study. There is great variation in how the annual reports of the companies are designed, and not all companies have provided information for all the variables that are examined in this study. When companies lacked data in any variable, we used the average for the variable. The annual reports of the companies are often well over a hundred pages, and each company designs the report in its own way. Although huge efforts were made to retrieve the data for all the companies, it is a relatively simple task to get the variables for a single

company. This allows the results of this study to provide relevant information for investment decisions regarding specific real estate companies. What cannot be explained by the regression model is assumed to be either omitted variables - for example, it may be conceivable that some difficultly observable factors also have an influence on pricing - or simply that the markets are not fully efficient.

THE MODEL

The dependent variable is discount to net asset value. Moreover, we use EPRA NAV to measure the substance value (the discount / premium is previously defined). EPRA NAV is stated by almost all the companies in their annual reports. In the few cases where it was not provided, it is calculated as follows:

$$\text{EPRA NAV} = \text{book equity} + \text{deferred tax} + \text{derivatives}$$

Moreover, we present the independent variables, including our hypotheses in the following:

Size. The expected outcome is uncertain, as discussed above. This variable is represented by the capitalized property portfolio in the closing balance sheet of 2017. The logarithm is used to reduce extreme values.

Liquidity. It is assumed that increased liquidity leads to lower discount to net asset value. Correlation with size is also anticipated. To measure the liquidity, daily volumes and closing prices for the shares were collected in the period November 2017 to February 2018. Daily volume and closing prices were multiplied to determine how much turnover the shares had each day. The median of all these days were used to measure liquidity.

Diversification. The hypothesis is that diversified companies have a higher discount to substantive value than specialized ones. Diversification is measured by the Herfindahl index (like e. g. Morri & Benedetto, 2009; Ke, 2015). This index expresses the degree of diversification by summing the squared stocks in each segment.

Segments. The division into different segments has been made based on what the companies report and what other studies have done. Hence, we separate into 1) shopping malls, 2) commercial buildings, 3) warehouses/logistics/industry and 4) housing. We have also a 5) other - used for property types that did not fall within these segments. It is expected that there will be different discounts and premiums in the different segments. One hypothesis is that the shopping mall segment is no longer priced at a significant premium compared to the rest of the companies, as Capozza and Lee (1996) found earlier. This hypothesis is related to the fact that e-commerce has emerged as a strong challenger to traditional outlets in recent times.

Earnings. To measure earnings, two figures are chosen at each end of the income statement: 1) operating profit before fair value adjustment of investment properties as a percentage and 2) return on equity after tax as a percentage (ROE). It is assumed that both have a negative correlation with a discount to the net asset value. The operating result is interesting since it represents the margin on the actual portfolio management. Return on equity also includes value adjustments on investment properties, financing costs, borrowing and tax. Return on equity is much more volatile than operating profit, and the hypothesis is that operating profit is the most important for investors. The operating profit is calculated manually from the income statement in the annual reports. Return on equity is derived from Thomson Reuters Eikon (ROE Total Equity%) and is calculated as profit before extraordinary items divided by average equity in 2017.

External valuation. This variable has probably not been investigated before. The hypothesis is that companies that have hired external players to value their real estate portfolio achieve more credibility in the market, and therefore lower discount to net asset value. External valuation reduces the possibility that the balance figures are exposed to accounting manipulation. Pattitoni, Petracci and Spisni (2013) examined the differences between internal and external valuation by examining the balance of Italian REITs. Their finding was that external players are sober and favor cautious estimates of the value of the properties. Virtually all annual reports contain a comment on who had performed the valuation of the investment properties. In the few cases this did not come out clearly, it was assumed that the valuation was done internally. A dummy variable is used in the model.

Dividend ratio. This variable is included based on an assumption that many investors prefer dividend shares. If this assumption is correct, the dividend ratio should be negatively correlated with discount to net asset value, but previous studies have found that the correlation is positive, so the hypothesis of this variable is uncertain. The variable is taken from Thomson Reuters Eikon and is calculated as a dividend paid in the fiscal year 2017 divided by the share's closing price for the financial year 2017.

Length of contracts with tenants This is also a variable that has probably not been investigated earlier. The idea is that companies with a long-term repayment on their contracts are assumed to have a more reliable future cash flow than companies with a short remaining contract period, which is valued by the market. The hypothesis is therefore that companies with longer contracts achieve a lower discount to net asset value. The companies provide the average remaining contract period in their annual reports, and this is used in the analysis. The logarithm is used to reduce extreme values.

Required rate of return. We aim to uncover whether high and low estimates of required rate of return have an impact on discount to net asset value. This parameter is normally between 4 and 6 %, and the size of the real estate portfolio is affected by small changes in this required rate of return. The hypothesis is that companies that have used low discount factors and thus gained large values in the balance are traded at a larger discount to net asset value. This can be explained by the fact that the market believes the required rate of return is too low, and that the substance value stated by the company is too high. This variable has been difficult to collect, and not all companies specify the required rate of return. In some cases, the companies reported the average yield requirement for each segment, but not overall. In such cases, the total average yield requirement has been calculated by weighting the values of the different segments.

Concentrated ownership. This variable measures whether the shares have spread ownership or are concentrated around a few large owners. The share of total shares owned by the three largest owners is used as a measure. In cases where three major owners were not reported, the largest or the two largest were used. Based on previous research (mentioned above), there is uncertainty associated with this variable, since the theory indicates that concentrated ownership can be both good and bad.

Lease ratio. This is a variable that shows how much of the real estate portfolio is leased, which is another novel variable in such a study, although it is a popular key figure for the sector. The hypothesis is that low rental rates are perceived negatively by the market since one does not achieve as much rental income as one could ideally achieve. The variable is stated by the companies in the annual reports.

Equity ratio. This variable is included to see how much effect debt has on the valuation. Based on previous research, the sign is assumed to be positive, but there is a lot of uncertainty attached to the variable since previous studies are not consistent. As mentioned, this variable can be an indicator of investors' views of the future, how much debt (low equity ratio) can be assumed to be positive for the valuation in periods when the prospects are good, and negative for the valuation if the market sees many dark clouds on the horizon. It will therefore be interesting to see how the market looks at lending in 2017. The variable is calculated manually from the closing balance sheet of 2017.

Average interest rate. This is also a novel variable of this study. The real estate sector is characterized by being loan-financed, and most companies operate with an equity ratio of between 30 and 60%. The hypothesis is that companies with high interest costs have more discount to the net asset value. The reasoning is that if you buy the properties directly in the market, you can determine the financing yourself. When buying through a real estate company, one must accept the financing the company has obtained. Some companies also have fixed-rate loans, which means that there are significant differences between the companies. The variable is taken from the annual reports of the companies.

EPRA Reporting. This is a dummy variable to check the effect of reporting in accordance with EPRA's recommendations. These recommendations include some special EPRA key figures that ensure comparability across the companies. How much the companies followed EPRA's recommendations varied, and there has been a discretionary assessment as to whether the companies complied with the recommendations. Although there has been a subjective assessment, there should be little doubt that there is significant potential for improvement among the companies that have been excluded. EPRA encourages, among other things, summarizing all the EPRA numbers on a separate page in the annual report, and companies that have done this received a value of 1. Where only a few or no EPRA key figures were stated, the value was set to 0.

REIT. REITs differ from ordinary public limited companies in that they achieve tax relief and that they are required by law to pay out large parts of taxable profit as dividends. We expect, in accordance with previous studies, that REITs have a lower net asset value discount than non-REITs. A dummy variable is used where REITs get the value 1 and non-REITs get the value 0.

Interest coverage ratio. This is also probably a variable that has not been studied before. The hypothesis is that companies that have a good interest coverage ratio have a lower discount to net asset value, since these are more robust to interest rate increase.

Two-year return. This variable (2YTD return) shows the return of owning shares in the various companies over the past two years (31.12.2015-31.12.2017). This can be linked to the phenomenon of investor sentiment. It is therefore interesting to see if discount to net asset value can be explained by the last 2 years' returns, and that including the variable can improve the results of the other variables in that a relevant variable is not omitted from the model. A possible consequence of omitting a variable that is relevant is that the model is incorrectly specified. It is also conceivable that this variable manages to capture which companies the market believes have improved the most over the past two years, which can also justify lower discounts of the net asset value.

FINDINGS AND ANALYSIS

Some of the descriptive statistics of the study is found in Appendix 2, where we have operationalized the findings on average discount to NAV in both segment and geography

(Nordic countries, Central Europe and UK.). Although there are several interesting aspects in the descriptive data, we chose to focus on the analysis in the following. Table 1 presents the results from that analysis. Model 1 contains all the independent variables, while model 2 contains only the variables that cannot be concluded as irrelevant. Model 1 has an adjusted R² of 0.450, while model 2 has an adjusted R² of 0.505. We find this satisfactory. White's test and VIF indexes confirm that the models do not have problems with heteroscedasticity or multi-collinearity.

Table 1. Results from the regression estimation for both models. *, ** and * indicate the significance level at 1%, 5% and 10%, respectively (two-tailed). All numbers reported in NOK million.**

	Model 1		Model 2	
Adjusted R ²	0.45		0.505	
	Coefficient	t-value	Coefficient	t-value
Constant	-0.855	-0.916	-0.961 *	-1.86
LnSize	0.062 *	1.923	0.045 **	2.261
LnLiquidity	-0.06	-0.508		
Herfindahl index	-0.191	-1.537	-0.208 **	-2.375
Shopping malls	0.22 **	2.453	0.212 ***	3.992
Commercial buildings	0.108	1.406	0.104 **	2.223
Warehouse/logistics/industry	0.052	0.628		
Housing	0.018	0.201		
Operational margin	-0.21	-1.207	-0.232 *	-1.672
ROE	-0.01 **	-2.032	-0.007 *	-1.864
External valuation	0.018	0.322		
Dividend ratio	0.021	1.025		
LnContracts	0.064	0.813		
Required rate of return	-2.788	-0.903		
Concentrated ownership	0.109	0.778		
Lease ratio	-0.006	-0.779		
Equity ratio	0.728 ***	2.993	0.695 ***	3.446
Interest rate	4.788	1.410	4.641 *	1.809
EPRA	-0.106	-1.667	-0.096 *	-1.855
REIT	-0.241 ***	-3.895	-0.212 ***	-3.92
Interest coverage ratio	-0.008	-1.428	-0.008	-1.508
2YTD return	0.001	0.704		

One problem with model 1 is that it contains several irrelevant variables, which may be the reason that the significance of the variables is generally weak. We specify model 2 by removing

variables, without lowering the adjusted R^2 . The following variables were considered as irrelevant: "Ln liquidity", "warehouse", "housing", "external valuation", "dividend ratio", "ln contract", "required rate of return", "concentrated ownership", "leasing ratio" and "2YTD return". The coefficients of the remaining variables are not so different from the coefficients in model 1, which substantiate that the variables removed are actually irrelevant. The significance of the remaining variables, on the other hand, is much stronger in model 2, where all variables are now significant except for "interest coverage ratio". Table 2 summarizes the findings.

Table 2. The findings summarized of the regression estimation.

Independent variable	Hypothesis (sign)	Result (sign)	Significance (model 2)
LnSize	Negative	Positive	5 %-level
LnLiquidity	Negative	Negative	Irrelevant variable
Herfindahl index	Negative	Negative	5 %-level
Shopping malls	Positive	Positive	1 %-level
Commercial build.	-	Positive	5 %-level
Warehouse/logistics/ind.	-	Positive	Irrelevant variable
Housing	-	Positive	Irrelevant variable
Operational margin	Negative	Negative	10 %-level
ROE	Negative	Negative	10 %-level
External valuation	Negative	Positive	Irrelevant variable
Dividend ratio	-	Positive	Irrelevant variable
LnContracts	Negative	Positive	Irrelevant variable
Required rate of return	Negative	Negative	Irrelevant variable
Concentrated own.	-	Positive	Irrelevant variable
Lease ratio	Negative	Negative	Irrelevant variable
Equity ratio	-	Positive	1 %-level
Interest rate	Positive	Positive	10 %-level
EPRA	Negative	Negative	10 %-level
REIT	Negative	Negative	1 %-level
Interest coverage ratio	Negative	Negative	Not significant
2YTD return	-	Positive	Irrelevant variable

Previous studies are clear regarding that REIT status, specialization within a segment and earning figures are negatively correlated with discount to net asset value. The most interesting findings from this study are 1) that the shopping mall segment is associated with a large discount to net asset value and that the market prefers companies with a lot of debt - given that the companies manage to handle their debt, 2) the new variables tested, EPRA reporting and interest rate, were significant explanatory variables.

DISCUSSION

It is not abnormal to hear about investment strategies that are based on buying companies with low multiples. The discount to the net asset value can be termed a variant of Price/Book (P/B), since one looks at how much value you get in the purchase for the price you pay. An investment strategy where you buy companies with low P/B, or companies with a large discount to the net asset value, sounds intuitively sound as a logical and good strategy since you pay little compared to the value you get. A potential problem with this strategy is that you risk ending up buying companies that perform poorly, rather than companies that are wrongly priced in the market. The purpose of this study is to identify the properties of real estate companies that can justify the market price deviating from the substance value. When identifying a real estate company with a large discount to net asset value, it is tempting to think

that it is a nice investment opportunity. The results of this study will hopefully help determine whether such a company is priced incorrectly in the market or whether the market has rational reasons to punish the company with a discount to the net asset value. The findings from this study will also be of importance when assessing real estate companies with a large premium to their net asset value. If one is to assess whether a real estate company is overpriced or not, it can provide valuable insights to analyze how the market generally perceives and considers the properties and characteristics that the company holds.

Studies of "the close-end fund puzzle" can be termed as studies on actual market efficiency. The studies want to reveal why it is that some companies achieve a relatively more expensive or cheaper price in the stock market. Significant findings contribute to understanding which company characteristics the investors are emphasizing.

Concerning the findings, we chose to discuss some of the most interesting results:

Size

The size of the companies - measured by the logarithm of the capitalized real estate portfolio - was significant at the 5% level in model 2. The larger the companies, the greater the discount. This result partly contradicts previous research, but Barkham and Ward (1999) and Morri et al. (2005) also found the same. Adams and Venmore-Rowland (1990) argue that large and exclusive buildings are costly, creating an entry barrier to the market. The fact that the size is positively correlated with the discount to the net asset value may indicate that the market is more concerned with the liquidation value than the replacement value. In other words, the cause of the result whereby larger companies have a larger discount to net worth is not unambiguous, and the size of their companies in the "close-end fund puzzle" remains difficult to comprehend.

Liquidity

Interestingly, the liquidity of the shares does not contribute to explain discounts and premiums to the net asset value. This contradicts much of earlier literature and economic theory, but Rehkugler et al. (2012) also had similar results. This finding is probably due to the specification of the models and the correlation between size and liquidity, rather than liquidity being irrelevant for investors. The correlation matrix shows that there is a positive correlation between size and liquidity, and that this is significant at a 1% level. This suggests that liquidity still plays a major role, but the effect of it is captured in the variable "LnSize".

Segment

Our findings show that companies specialized in the shopping mall segment have a large discount in the discount to net asset value, compared with diversified companies. Model 2 shows that companies in this segment should have a discount of 21.2%, while companies in the "commercial buildings" segment should have a discount of 10.4% - with everything else equal. The reason for this large discount markup may be that investors are more concerned about the predicted shopping mall death and increased competition from e-commerce than those who value the real estate portfolios. If one compares the average required rate of return used to value the portfolios in the different segments, this parameter for the shopping malls is approximately the same as for the other segments. At the same time, many are skeptical about the shopping malls' future when online shopping is increasingly taking larger market shares and stores are being closed. In the short term, this could be a major threat to the value of the shopping malls. In the long term, on the other hand, it can be argued that these properties still

have good alternative applications, so that they can adapt to other customers and trading patterns.

It is interesting to see how discounts and premiums among the segments have changed compared to previous studies. Compared to the findings of Capozza and Lee (1996) who studied the period 1985-1992, there have been two major changes: department stores are no longer a segment associated with discount, and shopping malls have gone from having a premium to a substantial discount. Rehkugler et al. (2012) studied companies in the period 2000-2007 and found that there were no significant differences between the different segments. The development suggests that the market should have a skeptical attitude to the shopping malls' future.

Concentrated ownership

The results indicate that the market is not so concerned about whether the ownership is concentrated around a few large owners or spread. Malkiel (1995) argued that concentrated ownership should lead to a higher discount on the net asset value since it reduces the likelihood of acquisition, while Barkham and Ward (1999) believed that concentrated ownership could lead to a closer follow-up of management and company operations and should therefore reduce discounts for substance value. Ke (2015), like this study, found that this variable was not significant. If concentrated ownership brings both advantages and disadvantages, it may indicate that these are about as strong and equalize each other.

However, based on the correlation matrix, one can read that concentrated ownership is negatively correlated with liquidity and that this is significant at a 1% level. This indicates that when companies have large owners, they also have lower liquidity. This is probably since large owners often have long-term perspectives, which means that the number of shares in circulation is reduced. "Free float", briefly explained to mean that the shares are in free flow among investors, is often used as a measure of liquidity. According to Ding, Ni and Zhong (2016), companies with larger "free float" have better liquidity. This may be a possible explanation for why concentrated ownership has a positive sign. If it is the case that a larger share of large owners leads to lower liquidity, it is logical that concentrated ownership is positively correlated with a discount to net asset value - given that the market prizes liquidity premiums. The companies with concentrated ownership will have a higher liquidity premium than companies with more dispersed ownership.

Occupancy rate

The proportion that were leased was concluded to be an irrelevant variable. One possible reason may be that other variables capture the effect that better occupancy rates provide. Given that it is true that higher occupancy rates lead to higher earnings, this can be caught up in, for example, operating profit.

REIT status

REIT status proved to provide a large reduction in discount to net asset value. This is probably due to comparing companies with low tax rates to companies with ordinary tax rates. Otherwise, the difference between the companies is not so great depending on whether they are REITs or not. The correlation matrix shows that there is a significant positive correlation between REITs and the dividend ratio. The companies in the data that are REITs had an average dividend ratio of 4.03%, compared to 2.95% for non-REITs. As mentioned earlier, REIT's statutory obligation is to pay out large parts of the taxable result as dividends.

This means that it is valuable to check whether the company has REIT status or not. A company with a large discount to net asset value, which is also REIT, appears to be a much better purchase candidate than an otherwise equal company.

Equity ratio

The findings in this study show that the equity ratio is significant and has a positive sign. This means that the market feels more debt is preferable to less debt. Hence, the sector seems to be well suited for debt, since properties are known as a good hedge against inflation and that properties generate good cash flows. This result contradicts most of the previous findings. One possible explanation could be shown by the argument of Adams and Venmore-Rowland (1990) who believed that in times of positive prospects, debt would be more desirable than with gloomy expectations of the future. The finding in this study may indicate that the market is optimistic for the future at this time, which was not necessarily the case at the time of previous studies.

EPRA reporting

EPRA reporting means that the companies try to report in accordance with EPRA to other real estate companies, thus ensuring some transparency and simplifying the comparison of the companies in the sector. The model suggests that this is considered a positive feature of the companies by the market. Reporting in accordance with EPRA can therefore give lower discounts to net asset value. An explanation may be that it reduces uncertainty about the key figures of the company, and this reduced uncertainty leads to a higher valuation of the company. It can also lead to more investors becoming interested in investing in the company, which increases the demand of the shares and pushes up prices. Reporting in compliance with EPRA can also signal that one wants to be compared to other companies in the sector.

LIMITATIONS

A weakness of the study may be that geography and location are not included in the explanation of discount to net asset value. It cannot be ruled out that the market considers some cities to be more attractive than others. On the other hand, it is assumed that those who value the real estate portfolios have the same view as the market on the different geographical variables, so this should not have any effect. Most companies own many properties that are spread around, and there is no unified reporting that can be used as an independent variable in such a study. Therefore, geography was considered a variable that was too difficult to collect.

Another potential challenge of the study is the time period that share prices have been compared to the substance value. Share prices from 31.12.2017 were used against the net asset value that was published in the annual reports from the fiscal year 2017. These annual reports were not published for the market until a few months into 2018. This means that the market only had information from the quarterly reports in the third quarter, and therefore, it is conceivable that the market made mistakes in its estimates of the direction in which the substance values were moving until 31.12.2017. Nevertheless, it is assumed that there are no such large fluctuations in property prices from quarter to quarter that this should represent a bigger problem.

CONCLUSIONS AND IMPLICATIONS

This study has investigated differences in discount to net asset value among 67 real estate companies in Norway, Sweden, Denmark, Finland, the UK, Germany, the Netherlands and Belgium - in a cross-sectional study based on data from the fiscal year 2017. Partial motivation for the study was a curiosity around whether companies with large discounts at net asset value

are good buying candidates, or if the market has rational reasons to assess some companies lower in terms of their net asset value. It has therefore been examined whether company-specific variables can be looked at to justify differences in discount to the net asset value between the various companies. Based on previous studies of the “close-end fund puzzle”, variables such as size, liquidity, property segments, degree of diversification, earnings ratios, dividend ratio, leverage, concentrated ownership and REIT status have been investigated. This study has also included several variables that have probably not been studied before: external valuation, yield requirements, occupancy rate, interest rate, contract length, EPRA reporting and interest rate coverage.

The results show that size, shopping malls, commercial buildings, equity ratio and loan interest are positively correlated with discount to net asset value. On the other hand, degree of diversification, earnings, interest rate coverage, REIT status and EPRA reporting are negatively correlated with discount to net asset value. Other variables are concluded as irrelevant to the pricing of the companies measured against the net asset value.

The main finding of the study is that the shopping mall segment in today's market has a large discount to net worth and that the market prefers companies with a lot of debt - given that the companies can handle this debt. Much of the previous research was done in the 1990s and 2000s, which means that the market may have changed. This study contributes a temperature check within the “close-end fund puzzle” in the real estate market in 2017.

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APPENDIX 1. LIST OF THE COMPANIES INCLUDED IN THE STUDY.

1. Olav Thon Eiendomsselskap ASA
2. Entra ASA
3. Norwegian Property ASA
4. Castellum AB
5. Hemfosa fastigheter AB
6. Fastighets AB Balder
7. Hufvudstaden AB
8. Fabege AB
9. Wallenstam AB
10. Wihlborgs Fastigheter AB
11. NP3 Fastigheter AB
12. Corem Property Group AB
13. Hembra AB
14. Catena AB
15. Diös Fastigheter AB
16. FastPartner AB
17. Stendörren Fastigheter AB
18. AB Sagax
19. Victoria Park AB
20. Atrium Ljungberg AB
21. Klöver AB
22. Kungsleden AB
23. HEBA Fastighets AB
24. Prime Office A/S
25. Aroundtown SA
26. Deutsche Wohnen SE
27. LEG Immobilien AG
28. Grand City Properties S.A.
29. ADLER Real Estate AG
30. Deutsche EuroShop AG
31. ADO Properties S.A.
32. TAG Immobilien AG
33. Vonovia SE
34. Citycon Oyj
35. Technopolis Plc
36. Wereldhave N.V.
37. Capital & Regional Plc
38. Derwent London Plc
39. Empiric Student Property Plc
40. Hammerson Plc
41. Hansteen Holdings Plc
42. UK Commercial Property REIT Limited
43. Highcroft Investments Plc
44. Intu Properties Plc
45. Primary Health Properties Plc
46. Real Estate Investors Plc
47. Regional REIT Limited
48. Segro Plc
49. Secure Income REIT Plc

50. Standard Life Investments Property Income Trust Limited
51. Tritax Big Box REIT Plc
52. The Unite Group Plc
53. NSI NV Nieuwe Steen Investments
54. Fair Value REIT-AG
55. Alstria Office REIT-AG
56. Xior Student Housing NV
57. Wereldhave Belgium Comm. VA
58. Warehouses de Pauw Comm. VA
59. Vastned Retail Belgium SA
60. QRF Comm. VA
61. Montea Comm. VA
62. Leasinvest Real Estate SCA
63. Intervest Offices & Warehouses NV
64. Home Invest Belgium S.A.
65. Care Property Invest NV
66. Cofinimmo SA
67. Befimmo SA

APPENDIX 2. DESCRIPTIVE STATISTICS.

Table 3. Number of companies in the different segments and in the Nordic countries, Central-Europe (Germany, the Netherlands, Belgium) and UK, respectively.

	Nordic Countries	Central Europe	UK	Sum
Shopping malls	2	8	3	13
Commercial build.	9	3	2	14
Warehouse	4	3	5	12
Housing	5	9	2	16
Diversified	6	2	4	12
Sum	26	25	16	67

Table 4. Average discount to Net Asset Value.

	Nordic Countries	Central Europe	UK	Average
Shopping Malls	34 %	6 %	26 %	15,07 %
Commercial build.	19 %	2 %	9 %	13,74 %
Warehouse	0 %	-38 %	4 %	-7,86 %
Housing	7 %	-7 %	-6 %	-2,63 %
Diversified	13 %	-16 %	2 %	4,48 %
Average	13,50 %	-6,21 %	6,87 %	4,56 %