Capital structure and firm performance

Empirical paper exploring the impact of capital structure on firm performance over time in the Swedish real estate market

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Abstract

We have conducted an empirical study on the effects of capital structure on firm performance over time in the real estate market in Sweden. The market is characterised as a capital intense market, but has suffered with loan restrictions after previous crises. Using data from listed firms on the OMX stock exchange, we have found a positive correlation between capital structure and firm performance overall. The correlation is increasingly positive over time, meaning that capital structure has a larger impact on firm performance in latter years. During times of financial turmoil, however, the correlation is either negative or statistically insignificant. Despite the increasingly positive correlation, debt levels are decreasing over time. This reluctance towards debt can be seen either as sign of market imperfections or as a sign of firms reaching their optimum debt level, as stated in the trade-off theory.

Keywords: Capital structure, Leverage, Firm Performance
JEL Classification: G32, L25

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1. Introduction

The real estate market is characterised as a capital intense market. A lot of capital is invested initially and not realised until several years later. In order to accumulate capital for the initial investment, most firms need to raise liquidity in some way. The most common way to raise capital, when one is unable to finance it with its own equity, is through bank loans. The availability in obtaining real estate mortgage loans has varied greatly over time. After the real estate crisis in 1992, the option of issuing mortgage loans was restricted – which led to lower prices on real estate. The same situation occurred after the Lehman crisis in 2008, and some banks argued that the EU had created new directives with various equity capital requirements for different types of assets, thus the banks increased the requirement for equity in real estate loans.

There is also an in-house obstacle in the real estate industry, in terms of the ability of external debt funding. Banks are usually more willing to issue new debt to property management (holding) companies, due to the securities they have; fully leased apartments and cash flow with excess return to pay off interest and down payment. For property developers the case is different since banks are sparing in their debt policy, as they do not accept land or empty - under construction – properties as securities (deposit).

During, and after, the Lehman crisis firms in the real estate business have started to issue bond debt, as an alternative funding method – but at a higher interest cost and thus increasing the risk of bankruptcy.

According to Robin Hertéus and Simon Hilmgård (2014), who conducted a study on corporate bonds as a funding method for listed (NASDAQ OMX) Swedish real estate firms, firms started to issue bond debt during the period of 2008-2014 as a result of the restricted loan policies of the banks, there were actually no bond issuance amongst the firms before the financial crisis of 2008, and the number of issuances is still growing.

This paper thus examines the effect of leverage (capital structure) on firm performance of listed real estate firms on the OMX exchange NASDAQ during the period 1984-2014. During the observed time period the real estate market has experienced two major crises and market peaks, thus we decided to divide the time series into four groups, to achieve a better understanding of this relationship over time and during market fluctuations. The division into time periods will be as follows; 1984-95, 1996-2006, 2007-09 and 2010-14, the main reason for this particular division is that we want to isolate the two crises of 1992 and 2008, and thus create a time series which best examines the impact of capital structure of firm performance

over time. There hasn't been a lot of research done in this area amongst real estate firms in the Swedish literature, and previous literature do not evaluate how this impact has changed throughout the years and during different market conditions, but rather during a specific event in time, e.g just the financial crisis of 2008 or the market peak in 2006. It should also be said that we look to measure firm performance in terms of Return on equity (ROE) and Return on assets (ROA), since these are the most frequently used measures of performance in previous studies.

Various theories suggest that there might exist a relationship between debt level and firm performance. According to the trade-off theory an increase in the level of debt should increase the value of the firm to a certain point, which suggests that there is a concave relationship between debt-equity and firm value. Berger and Bonaccorsi di Patti (2006) found that there is a diminishing positive significance between capital structure and firm performance, but they did not find a concave relationship. Others among: Gill, et al., (2011) and Ahmad et al., (2012), found the impact of debt to be positive in relationship to firm performance.

The agency theory suggests that a cost rise when decision-makers are not acting in the best interest of the shareholders – to maximise firm value - as the need for monitoring the management is created. This would also reduce the risk of management spending free cash flow on unprofitable investments, thus lead to an increase in profitability in the long run.

Myers (1984) that there exists pecking order in which firms prefers to fund their investments due to information asymmetries, where firms firstly look to invest with internal capital, secondly by issuing debt and the issuance of equity as a last resort.

The empirical studies on this topic are however divided, where a negative correlation between total debt and firm performance have been shown by Khan (2012), Zeitun and Tian (2007) and Ebaid (2009) whilst a positive correlation was found by Abor (2007) between total debt and ROA, and by Gill, et al., (2011) when investigating in impact of capital structure on firm performance in the manufacturing industry.

As for long-term debt, the findings on the effect of long-term debt and firm performance in previous studies are also divided. Some find and argue that there is a significant negative relationship between the debt measure and performance Abor (2005), Zeitun and Tian (2007) (ROA) whilst others found it to be insignificant with performance Zeitun and Tian (2007) (ROE) and Khan (2012).

In terms of short-term debt the most striking findings among the used literature is that the impact of short-term debt on firm performance proved to have a significant correlation when evaluating the effects of debt as independent variable when trying to explain the relationship

to performance. Abor (2005), Gill, et al., (2011), Khan (2012), Ahmad et al., (2012) and Abor (2007)

Size is another potential variable that might have an impact on firm performance; Majumdar (1997) using data from 1020 Indian firmsa found that larger firms tend to be more profitable than older firms. The relationship between firm size and performance is also proven to have a significant correlation by Asimakopoulos et al., (2009) and Lee (2009).

Sales Growth could according to Asimakopoulos et al., (2009) and Majumdar (1997) affect the performance of a firm. Asimakopoulos et al., (2009) argue that firms who manage to achieve growth in sales could promote further growth and thereby improve profitability. Majumdar (1997) argues that an increase in growth could attract new entrants to the market and thereby reduce the average profit for all the firms in a particular industry.

According to Christie (1982) interest rate has a positively correlation between equity variances, thus we find it interesting to investigate whether or not this correlation exists amongst real estate firms. The interest rate can be a good indicator of performance since mortgages are usually required in order to fund a property investment – in the consumer market.

We have regressed the two performance measures on our debt variables and control variables during four time periods to investigate the effects of capital structure on firm performance over time, and how the capital structure's impact on these measures of performance have varied over the years and during both crises. The study is – in terms of the choice of regression model – fairly consistent with that used by Abor (2005), with the exception of the use of lagged debt variables when measuring performance in terms on ROA. It should be said that apart from most of the empirical literature used in this paper, we have decided to incorporate lagged debt variables into out model to check of a lag-effect between investment and realised return on profitability.

We find that all the debt measures have an insignificant relationship to firm performance during times of financial distress, which might be due to the existence of other external factors affecting firm performance. However, the debt measures do have a significant impact on performance during times of a booming economy, except during the years of 2010-14 where the relationship is rather weak – long-term debt being only significant at a confidence level of 92.3% and short-term debt on a level of 97.4% in the terms of ROE, which might be due to market imperfections since there is a higher positive correlation during this time period than previously.

When evaluating firm performance in terms of ROA, the results share the same pattern as when measured in ROE – with debt being insignificantly correlated with performance during times of financial distress and significantly correlated with the performance measure during periods of boom. During the period 2010-14 short-term debt showed to be the only significantly correlated debt measure on a 95% basis, though this relationship proved to be negative, where as the long-term debt was only significant at a 86,9% confidence level - which is not to be viewed as a variable of high influence.

As for the lagged debt variables the results indicate that long-term debt and total debt, all lagged by one year, is significantly positive in relation to ROA during the time period of the first crisis (84-95) though the findings with a debt lag of two year showed short-term debt to be significant at a 2% level. During the second crisis (07-09) we did not find the same pattern with the latter time period of financial distress, where all the lagged debt measures (t-1, t-2) showed to be insignificant with ROA. Between the years of 1996-2006 both the one year, and two year lagged debt, showed a significantly positive relation to ROA, but the same does not go for the years of 2010-14 where all measures proved to be insignificant, with short-tem debt showing a negative relationship – though not significant.

Descriptive statistics show that total debt levels have been reduced since 1984, whilst ROE is today at its highest point and ROA today is higher that the average of the total years combined.

We conclude that short-term debt does have a positive correlation with firm performance, although it does not provide a tax-shield advantage. Long-term debt proved to be positive in relationship to firm performance, even in the cases with insignificant correlation, which partly is explained by the tax-shield advantages. The positive correlation would thus in theory, as supported by various studies, mean that a firm should increase its debt in order to maximise the firm performance. We did however find a decrease in the debt levels over the entire time period and fluctuation in firm performance associated with the change in debt, which could support the concave relationship between capital structure and performance as suggested by both the trade-off theory and agency cost theory.

2. Previous literature

2.1 Capital structure

A firm can choose to invest in an opportunity either by own cash or issuing equity, debt or other securities such as bonds etc. The capital structure of a firm is generally a combination of different securities (long-term debt, short-term debt, common equity and preferred equity) issued by the firm to finance its operation. Common questions associated with this topic are usually if there is an optimal capital structure to maximise profitability, and how does a company choose- or acquire this capital structure. The following section will discuss various theories and studies associated with the question of how capital structure and firm performance are related.

2.1.1 MM

Modigliani and Miller's (MM's) (1958) theory of the irrelevance of capital structure, proposal 1, is perhaps one of the most known on the subject and tells us that the market value of a company is independent of its capital structure. Which means that regardless of how the company chooses to finance its investments or business, the market value of the firm will remain unchanged.

The second proposal of MM's says that capital structure does have an impact on the expected return on a stock. Equity shareholders perceive a higher risk for the company associated with an increase in debt and as a result, the shareholders expects a higher return and thus increases the cost of equity. However the shareholders are no better off since the increase in expected return is counterbalanced by an increase in risk.

The two proposals go under the assumption of a perfect capital market, where there is no transaction costs related with raising capital or risk of bankruptcy, no taxes or information asymmetries. The theory of the irrelevance of capital structure has received critics from Fama and French (1998), Masulis (1980) and Masulis and Korwar (1986) amongst others, who argue that the market value of a company in fact is dependent of the composition of their capital structure. Another note is that MM's theory does not explain the variation of debt ratios amongst industries, e.g. property development companies tend to rely quite heavy on debt issuance due to the fact that real estate is a capital intense business, than for example companies in the technology or energy business.

MM later adjusted their theory of capital structure by taking corporate tax into account. MM (1963) consider that mortgaging and issuing debt will lead to an interest deduction, which reduces the taxable amount and create a so call tax-shield. In their earlier article they stated that: "the market values of firms in each class must be proportional in equilibrium to their expected returns net of taxes" (Modigliani & Miller, 1958, p. 272). However in their later article they corrected this – what they called – error and came to the conclusion that even though one firm may have an expected return after taxes twice that of another firm, it will not be the case that the actual return after taxes of the first firm will always be twice that of the second, if the two firms have different degrees of leverage (Modigliani & Miller, 1963, p. 434). They further argue that because of this, there can be no arbitrage opportunity to adjust the value on the company to be proportional to their expected after-tax returns, thus the value increases with the present value of the tax shield that the interest reduction generates. The indication of this statement would therefore be that the more debt a company issue, the higher its value will become and therefore – at least in theory – a firm would be able to maximise firm value through solely financing with debt. However, MM also says that the tax advantages of debt financing do not necessarily mean that companies should always seek to maximise its debt in their capital structures. This, since there might be limitations imposed by the lenders, such as borrowing agreements where creditors are able to stipulate terms which limit the management's freedom to manoeuvre (Modigliani & Miller, 1958, p. 293), and higher interest associated with the increase in debt-to-equity ratio.

2.1.2 Trade-off theory

MM (1963) tells us the benefits of an increase in debt-to-equity ratio due to the tax-shields advantages it brings. However, they do not exactly investigate the real downside of an increase in a company's debt-to-equity ratio. The Trade-off theory however does look into this, as it also may explain the industry difference in capital structure. According to the theory it is a trade-off of costs and benefits of borrowing and holding the firm's assets when determining how to achieve the firm's optimal debt ratio. The firm is therefore supposed to substitute debt for equity and vice versa, in order to reach the maximum value of the firm. You could thus say that it is a matter of balancing the value of the interest tax shields against the costs of bankruptcy associated with debt financing to achieve an optimal capital structure (Myers, 1984, p. 577). However, in case of adjustment of the debt-equity ratio there will arise costs, and thus lags, associated with this adjustment making the actual debt ratio amongst firms different (Myers, 1984, p. 577). The benefit of an increase in debt is the tax

deductibility of interest, due to the tax shield, which increases the firm's net income (Fama and French, 2002, p. 1), thus in theory in order to maximise the tax shield firms may want to choose higher debt levels associated with their capital structure. But the cost of debt includes bankruptcy costs, which increase with the increase in debt, as well as the fact that conflicts between stockholders and bondholders. Therefore, firms should increase its debt-equity as long as the positive benefits overweight the negative.

2.1.3 The pecking order theory

The difference between the trade-off theory and the pecking order theory is basically that the theory of trade-off tries to explain how firms can reach their optimal capital structure. Whereas the pecking order theory explains firms' preference in different methods of financing. Myers (1984, p. 581) argues that a firm – in the need for funds – prefer internal finance as the first choice, secondly – if external finance is required, then issue debt, then go over to hybrid securities such as convertible bonds and as a last resort equity. This order of priority is based on information asymmetries where it is believed that the management of a firm posses more information about a project than potential investors (Myers & Majluf, 1984). The basic intuition of these asymmetries is that if the management decides to issue new equity, this will signal the market that the management believes that the stock is overvalued, thus investors lower the new value of the issued equity. Debt issuing however, signals a confidence that the investment will be profitable and that the current stock price is undervalued, and thereby debt is a more preferable choice than issuing equity.

2.1.4 Agency costs

Agency costs occur when decision-makers are not acting in the best interest of shareholders. The main interest of a shareholder is to maximise the value of the company and if the management does not act in compliance with these interests, agency costs occur due to the need of monitoring the management. Jensen and Meckling stated this in 1976.

An increase in debt leads management to ensure enough cash flow to cover the interest expenses of debt (Jensen, 1986). Furthermore, the risks of management spending free cash flow on unprofitable investments are reduced. This would lead to an increase in profitability in the long run.

Jensen and Meckling (1976) argue that these advantages remain, even if the increased debt generates tax shield advantages or not, as the trade-off theory suggests. A too high debt

level, however, increases costs of debts and raises the risks of bankruptcy, which increases the agency costs of debt (Jensen & Meckling, 1976). The company value decreases, thereby, when debt is too high, indicating a concave curve on company value in relation to debt ratio.

2.2 Capital structure and firm performance in previous literature

There has been some research done on the impact of capital structure on firm performance. For example Abor (2005) examined this relationship among listed companies on the Ghana stock exchange, with the findings that there was a positive correlation between short-term debt to total assets and ROE. However, the relationship with ROE between long-term debt and total debt to total assets showed to be of negative correlation. The profitability of a firm was also showed to increase with size and sales growth. The conclusion of the findings is that an increase in the total debt of the firm is associated with an increase in profitability in terms of ROE, which seems a bit contradictory since the findings in his regression table II presents a negative relationship between total debt and ROE (p, 443).

Abor (2007) conducted a study to measure the impact of capital structure on firm performance of small and medium sized enterprises in Ghana and South Africa, however in this paper the performance is measured in terms of ROA (=net profit divided by total assets) and gross profit margin (=gross profit divided by sales). The main findings of the paper were that in Ghana, there was a significant negative relationship between all the debt measures of capital structure, these being short-tem, long-term and total debt, and ROA. In the case of the South African firms, both long-term and total debt was significantly positive in relation to ROA, whereas short-term debt showed to have a significant negative relation to the ROA measure. As for performance measured by gross profit margin the findings showed a significant negative relation with short-term debt and total debt. However long-term debt proved to have a significant positive relation to this measure suggesting that an increase in the amount of long-term debt will result in an increase in the gross profit margin of the firms.

Gill, et al., (2011) developed a study that seeks to extend the findings made by Abor (2005). They investigated the impact of capital structure on firm profitability of American manufacture and service firms listen on NYSE from the years of 2005 to 2007. Empirical result of the paper was that in the service industry there showed to be a positive relationship between short-term debt to total assets, as well as long-term debt to total assets, and firm profitability measured by ROE. The findings showed a positive relationship between short-term debt to total assets, long-term debt to total assets and total debt to total assets, with firm

performance in the manufacturing industry.

Khan (2012) looked for the relationship between capital structure and firm performance in the engineering sector of Pakistan. The measures of performance being used were: ROE, ROA and gross profit margin. The findings on ROA was that there was a negative significant relation to short-term debt to total assets and total debt to total assets, where long-term debt to total assets proved to be negative – but not significantly – correlate with ROA. In contradiction to the findings of Gill, et al., (2011), the ROE proved to have a negative relation to all the debt measures with an insignificant correlation to short-term debt and long-term debt, as for total debt the relationship was quite weak. As for the gross profit margin the result supports the findings of Abor (2007) where the short-term and long-term debt both had a significant negative relation to gross profit margin.

Chiang, et al., (2002) made a study on the relationship between profitability, cost of capital and capital structure among property developers and contractors in Hong Kong. The empirical results of the study indicate that profitability and capital structure are related to each other, which is conflicting with the findings by Zeitun and Tian (2007), who found there to be an insignificant relationship between a firm's capital structure and performance measured in ROE and a significant negative relationship between all debt measures and ROA – in Jordanian firms.

Further, Ahmad, et al., (2012) made a study on Malaysian firms in the consumers and industrial sectors where they measured performance in terms of ROA and ROE with short-term, long-term and total debt. The findings showed to be that both short-term and total debt had a significant relationship with ROA (though they proved to be negative), while all the debt levels showed to be significant with ROE, with long-term debt presenting a negative relationship. They also tested for the lagged effect of debt on performance with the findings that none of the lagged debt measures had a significant relationship with performance. The findings with the debt relationship to ROE showed to support the findings of Abor (2005) for short-term debt.

Ebaid (2009) found that when measuring performance on listed Egyptian firms, short-term debt, long-term debt and total debt had no significant impact on ROE and thus concluded that in terms of the capital structure choice – there is a weak correlation to financial performance of listed Egyptian firms (p. 485). In terms of ROA there showed to be a negative significant relationship with short-term debt and total debt, and a negative insignificant relation with long-term debt.

2.2.1 Lagged effect on debt

The majority of the previous literature described above tries to explain the relationship between firms' capital structure and performance without the potential impact of the lagged effect of debt. Ahmad, et al., (2012) uses a one and two years lag in debt with the findings that there is no a significant correlation between the lagged debt values and ROE nor ROA.

Thomas McCue and John Kling (1994) made a study to examine the relationship between macroeconomy and real estate returns, i.e. "the extent to which the macroeconomic variables explain real estate returns and how the real estate react to shocks in macroeconomy", Thomas McCue and John Kling (1994, p. 278). They use a vector autoregressive model with the ability to model the lag effect that is inherent in real estate, with the findings that shocks to investment are significantly positive and reaches a peak in four months and output in ten months, which makes the peak of the lagged response in real estate generally shorter than those reported in an earlier study on the construction industry which Thomas McCue and John Kling argue could be due to that "Securitized real estate is, by definition, liquid and so decisions to invest in it are easily reversible."(1994, p. 285). However the investment variable showed to prove very little of the variation in real estate series.

The impact of lagged debt on profitability is something that Margaritis and Psillaki (2010) take into account when trying to explain the relationship between capital structure, ownership structure and firm performance in the French manufacturing industry. They do this by time-adjusting the potential lag effects of debt variables on performance by comparing the debt in previous years with the performance of today. Ariff, et al., (2008) lagged the leverage variable in their study when trying to investigate how capital structure adjusts dynamically during financial crisis.

Berger and Bonaccorsi di Patti (2006) tested for the agency cost theory and investigated the impact of capital structure on firm performance. The results proved to be consistent with the agency cost theory proving that; "higher leverage or a lower equity capital ratio is associated profit efficiency" Berger and Bonaccorsi di Patti (2006, p. 1097). The findings are a positive and significant relation between total debt and profit efficiency, but they did not find a concave relationship on this matter.

2.2.2 Size

Numerous studies have been made on whether or not the size of a firm has a positive or negative relationship with the firm profitability. Goddard et al., (2005) find that there is

evidence of a size and profitability relationship. Asimakopoulos, et al., (2009) found a positive relationship between firm size and profitability and Majumdar (1997) using data from 1020 Indian firms found that larger firms tend to be more profitable than older firms. Lee (2009) also found a positive relationship between firm size and profitability in US publicly held firms during 1987-2006.

2.2.3 Sales growth

Sales growth is another variable that has been used in previous studies to explain the performance of a firm. Maury (2006) found a relationship between sales growth and performance. Abor (2005) does also find this relationship to be positive, as well as Asimakopoulos, et al., (2009, p. 933). Asimakopoulos examined the determinants of profitability and argues that firms that manage to achieve growth in sales, and thereby increase income, could promote further growth and thus improve profitability. The findings were consistent with his argument and firm profitability was positively affected by sales growth. However, Majumdar states that "In markets where sales growth is high, there are possibilities for firms to make larger profits; on the other hand, such growth trends may attract new entrants, quite a common occurrence in India in the post-reform period, and average profits for all players may be reduced." Majumdar (1997, p, 235)

2.3 Market cycles in real estate

Mueller (1995) refined the moves of market cycles in real estate, and discuss that the cycles of the real estate market can be broken down into four phases, based upon a combination of supply and demand. In the first recovery phase, the markets experience a state of oversupply due to negative growth in demand and previous oversupply in the form of new construction. At this stage the occupancy rate is at its lowest point, and at the market bottom is when the excess construction from previous period stops. Demand growth stars to move the market and absorbs existing oversupply. The government usually hastens the expansion with a lowering in interest rates to increase investment. The increase in demand and lower cost of investment gives the firms the ability to hire more people, start new construction, invest in machines and new buildings and so on, which in terms add demand for land, and thus buildings, and vacancy will decrease.

Phase 2 (expansion phase) is characterised as when vacancy begins to exceed the long-term average, resulting in a reduction in unoccupied buildings and the ability for landowners to increase the rental rate, which can result in so called rent spikes – when the market

experience rapid rental growth and tight supply. New supply growth will satisfy the growth in demand and they will continue to grow at similar rates and thereby new construction and development will occur due to increase in profit. This growth will continue up to a point of inflection and the market will thus move into phase 3.

In this period some construction completions from the previous period will push the growth of supply, which is now higher than the demand growth and the vacancy will thus increase. The rental growth will still rise – due to vacancy being above long-term average – but it will now start to slow down, and if the growth in supply continues, it will move the market into phase 4.

At this phase (recession) the growth in supply will be high whereas the growth in demand will be low or in the worst case, negative. New construction stops, and the even greater surplus of supply lead to even lower vacancy and forces landowners reduce their rental rate in order to compete for tenants, and to try covering the fixed expenses on buildings – resulting in even lower revenue. Eventually the market will reach the bottom of the cycle as new construction and completions cease, or if the growth in demand increases and grows at a faster rate than new supply added into the market. Eventually in a recession the government will be forced to increase the interest rate in order to fight inflation, which lowers the profits even further.

2.4 Duration of the real estate cycle

"Historically, the recession begins around two years after real estate peaks out, and it looks like the peak occurred in 2006. The last real-estate depression was in 1990. Adding 18 years to that puts the next depression in 2008." Fred E. Flodvary (2007). He also showed that the duration of the real estate market cycle has been around 18 years during previous times, with exception for the world war.

As of 2014 six years since that market crash and eight years after the market peak, Mueller in "Cycle forecast for quarterly estimates of 2015" estimates that the real estate market in the US is transitioning from the period of recovery into the expansion phase. If we are applying the findings of Flodvary (2007), the market of real estate will enjoy a rather long period of expansion with the next peak being in 2024.

3. Data and methodology

3.1 Data

The dataset contain 23 real estate firms - all listed during the years of 1984-2014 – and their leverage value, debt to total capital ratio, size, sales growth and performance measures based on ROE and ROA. We sorted the dataset based on a yearly basis – which makes the data panel unbalanced due to the fact that the number of observations is based on number of years listed on the OMX NASDAQ exchange. For example we have the most observations from Hufvudstaden AB and JM since they have been listed from 1984 up till today, and fewest observation from Hemfosa Fastigheter and Np3 Fastigheter AB that have only been listed during 2011-2014. We then divided the time period into four different time series; we will discuss the division more thoroughly in the methodology section.

We have gathered data from SCB, containing the real estate market index. This data is used in the analysis, but is not incorporated in the regression model.

3.1.1 Performance measure – dependent variables

We have decided to use the performance measures ROE and ROA since they have been commonly used among previous research Ebaid (2009), Ahmad, el al., (2012), Zeitun and Tian (2007), Abor (2005), Gill, et al., (2011) and Abor (2007), amongst others, when evaluating the effect of leverage on firm performance. The decision of using two performance measures is mostly due to the fact that we want to see whether or not the debt variables explain these measures at the same level.

ROE is defined as the percentage of net income that is returned to the shareholders. The measure is calculated according to the following formula:

$$ROE = \frac{Net\ income}{Sales} \times \frac{Sales}{Total\ assets} \times \frac{Total\ assets}{Average\ Shareholder\ Equity}$$

ROA is defined as: $ROA = \frac{Net\ income}{Total\ assets}$, and takes into account how the firm uses its assets to generate profit, it is also one of the most commonly used variable to describe firm performance amongst previous research and the viewed literature. Some empirical research also use profit margin when evaluating firm performance, we do not find the use of profit margin as dependent variable, by itself, useful – since it is incorporated in the ROA measure. Most of the empirical literature described earlier, uses ROA as a valid measure of performance, e.g. Abor (2007), Zeitun and Tian (2007) and Ebaid (2009).

3.1.2 Independent variables

The different types of debt measures have been well explained in previous sections and thus we find no scope for further definition on the difference in this section. The debt measures used to investigate the relationship with firm performance will consist of: short-term debt to total capital, long-term debt to total capital and total debt to total capital. The reason behind the usage of debt to total capital, instead of debt to equity, is basically explained by the fact that it is the most commonly used ratio in previous studies. Some studies have solely used total debt to total capital when evaluating firm performance Margaritis and Psillaki (2010) Berger and Bonaccorsi di Patti (2006), others have looked at all three debt measures (short-term, long-term and total debt) in relation to firm performance, e.g. Ahmad et al., (2012) found a significant relationship between short-term debt, long-term debt, total debt and ROE, however short-term and total-debt proved to be negatively correlated leaving long-term debt the only positively correlated debt measure with ROE. From the fact that Abor (2005) found both long-term debt and total debt to be significantly negatively correlated with ROE whilst short-term debt proved to have a positive significant correlation with ROE, can we conclude that it might be of interest to investigate each of the debt measurements separate. It should also be noted that the ROE measure of firm profitability in the examples above are just to make the illustration easy to follow, the comparable results have been found in the case of ROA.

3.1.3 Control variables

We have decided to incorporate control variables that we think hold an explanatory value to firm performance other than the value of debt, and thereby create a more sustainable model to describe corporate performance.

Various studies have proven that a significant positive relationship between firm size and profitability exists. We estimate the size of the firm as the log of sales for a firm in time t, as do Asimakopoulos, et al., (2009), Margaritis and Psillaki (2010) and Abor (2005). We use this to normalize the spread of the variable and thus decrease the effect or impact of any abnormalities in the data.

Sales growth is another variable that have been proven to have a significant impact on firm performance, Abor (2005), Asimakopoulos et al., (2009) and Maury (2006) and we thereby find this to be a variable worth testing.

Christie (1982) find interest rate to be significant and positively correlated with equity variances. Since interest rate, as cost of debt, is a cost that affects the cash flow, it should be included in our model to check for a correlation with profitability.

3.1.4 Selection bias

Some selection bias occurs, unfortunately, in our data. As mentioned previously, our dataset contains information from existing listed firms from 1984-2014. Thereby, companies who have exited the market during this period are excluded from the dataset. This includes active firms, which no longer are listed on the OMX. Furthermore, bankrupted firms are also excluded from the dataset. Retrieving accounting information from firms who have experienced bankruptcy or simply exited the market was more difficult than anticipated and we therefore concluded that excluding all these firms was a better approach than adding a few.

Non-listed companies are also excluded from the study, which enhances the selection bias further. There are major unlisted real estate companies, such as Stena fastigheter, which could have contributed to the study. As it is difficult to retrieve substantial information from all unlisted companies, we believed it was best to exclude all unlisted firms from the study.

These selection biases may affect the results in some manner. Bankrupt firms' capital structure could have provided insightful information and could have become a powerful tool when analysing.

3.2 Methodology

In this section, we describe the methodology used to conduct the study. At first, we describe our main regressions and the regressions made with regard to the possible lag effect. Thereafter, we describe our robustness test, which aims to confirm the model's suitability.

3.2.1 Main regression tests

As discussed previously, we use three measures of debt ratios: short-term debt, long-term debt and total debt to capital. To be able to test these measures with performance, we need three different models so they do not interfere with one another in the regression. These models are shown below.

$$ROE_{it} = \alpha + \beta_1 SD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \alpha + \beta_1 LD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (2)$$

$$ROE_{it} = \alpha + \beta_1 TD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (3)$$

Where:

- ROE= Return on Equity
- SD= Short-term debt to total capital
- LD= Long-term debt to total capital
- TD= Total debt to total capital
- Size= Natural logarithm of sales
- Sales growth= $(Turnover_t - Turnover_{t-1})/Turnover_{t-1}$

The regression is made in order to verify the effects of capital structure on firm performance. Since the aim of our study is to investigate the effects of capital structure over time, and how the capital structure's effects have varied over the years, we divide our dataset into four groups with regard to years: the first group is between the years 1984-1995, the second group between 1996-2006, the third between 2007-2009 and the final group consists of the years between 2010-2014. The group division might seem rather arbitrary, with some groups containing more years than others. This division is made for two reasons. The first is due to the few observations in early years, for which we need a larger time span to obtain satisfying regression results. The second reason is because of our aim to investigate the capital structure's effect during times of financial distress, thus one group consists of the years of the financial crisis.

Our second regression is made on the same basis, but regressing with regard to the ROA. The same debt and control variables are used as in the regression with ROE. In the case with ROA, we also take into account any possible lag effects that could occur. The lagged effect is being estimated by lagging all debt variables.

$$ROA_{it} = \alpha + \beta_1 SD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (4)$$

$$ROA_{it} = \alpha + \beta_1 LD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (5)$$

$$ROA_{it} = \alpha + \beta_1 TD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (6)$$

$$ROA_{it} = \alpha + \beta_1 SD_{it-1} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (7)$$

$$ROA_{it} = \alpha + \beta_1 LD_{it-1} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (8)$$

$$ROA_{it} = \alpha + \beta_1 TD_{it-1} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (9)$$

$$ROA_{it} = \alpha + \beta_1 SD_{it-2} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (10)$$

$$ROA_{it} = \alpha + \beta_1 LD_{it-2} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (11)$$

$$ROA_{it} = \alpha + \beta_1 TD_{it-2} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (12)$$

As the ROA is measured based on total assets, and not only equity, we find this measure more suitable to observe any lag effects than if we were to use the ROE. The possibility to observe the lag effect with both performance measures exists, although we believe that this would not provide substantially better results than only using the ROA. The debt variables are lagged by one year and two years respectively, to establish the effects. As Thomas McCue and John Kling (1994) suggests, a lag effect on investments experiences a peak after four months and output experiences a peak after ten months. By using one year and two years lag, we believe to have accounted for these effects. When regressing using ROA, we have divided our dataset into the same groups as when using ROE.

3.2.2 Robustness test

We undertake a few tests in order to validate our findings. Firstly, we run another regression using ROI as the dependent variable. This is done in order to ensure the capital structure's effect on another performance measure. If all results are shown to be significant statistically, then we can validate previous results. The ROI measures only the profitability of investments, and not the profitability of the operating activities. The ROI measure is not used as a dependent variable in the main regression, since we wanted to investigate the capital structure's effect on the general firm performance. It is, however, useful when checking the robustness of the test. By using lagged variables, we can also observe the impact on the lag effect on another measure. Since the lag effect most likely is linked to the investment, the ROI measure seems suitable. The robustness test is made as follows.

$$ROI_{it} = \alpha + \beta_1 SD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (13)$$

$$ROI_{it} = \alpha + \beta_1 LD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (14)$$

$$ROI_{it} = \alpha + \beta_1 TD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (15)$$

$$ROI_{it} = \alpha + \beta_1 SD_{it-1} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (16)$$

$$ROI_{it} = \alpha + \beta_1 LD_{it-1} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 InterestRate_{it} + \varepsilon_{it} \quad (17)$$

$$ROI_{it} = \alpha + \beta_1 TD_{it-1} + \beta_2 Size_{it} + \beta_3 SalesGrowth + \beta_4 InterestRate + \varepsilon_{it} \quad (18)$$

$$ROI_{it} = \alpha + \beta_1 SD_{it-2} + \beta_2 Size_{it} + \beta_3 SalesGrowth + \beta_4 InterestRate + \varepsilon_{it} \quad (19)$$

$$ROI_{it} = \alpha + \beta_1 LD_{it-2} + \beta_2 Size_{it} + \beta_3 SalesGrowth + \beta_4 InterestRate + \varepsilon_{it} \quad (20)$$

$$ROI_{it} = \alpha + \beta_1 TD_{it-2} + \beta_2 Size_{it} + \beta_3 SalesGrowth + \beta_4 InterestRate + \varepsilon_{it} \quad (21)$$

The regressions are made on all years, without division into groups based on years. The test aims to check for any flaws of the test, not to provide further answers and we therefore do not find it useful to initiate any division.

The second robustness test is made by removing control variables, to check if any multicollinearity occurs. Multicollinearity occurs when two or more predicting variables are highly correlated. By removing variables, one can observe if any change in correlation is showed on the other variables. If the remaining variables show a change in correlation towards the depending variable, multicollinearity might occur. The test is shown below.

$$ROE_{it} = \alpha + \beta_1 SD_{it} + \beta_2 Size_{it} + \beta_3 InterestRate_{it} + \varepsilon_{it} \quad (22)$$

$$ROE_{it} = \alpha + \beta_1 LD_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \varepsilon_{it} \quad (23)$$

$$ROE_{it} = \alpha + \beta_1 TD_{it} + \beta_2 Size_{it} + \varepsilon_{it} \quad (24)$$

4. Results

4.1 Descriptive statistics

Using summary statistics for all years (see table 1), we can tell that debt varies a lot between companies and, most probably, between years as well. The total debt-to total capital level ranges from 0 to 197%, with a mean of 69%. The standard deviation was around 33% for the entire period. The average ROE was around 9%, which is considerably low when comparing to the US real estate market, where the number is around 16% (Damodaran Aswath, 2015). The two crises might play a big part, as we can see by observing the minimum and maximum ROE observed (-126% and 78%). The average ROA was around 3% for the entire period, with a significantly lower maximum (26%) but with a minimum fairly close to the one of ROE (-106%). These numbers reveal great diversity among the real estate firms, where some obtain a competitive edge. From the real estate market index, one can tell that real estate prices have consistently risen since 1984, with an exception for the real estate crisis in 1992 (see figure 1).

Between the years 1984-1995, the mean of total debt-to total capital is significantly higher (87%), although the maximum is fairly close to the total maximum (see table 2). The standard deviation is less (26%) than for our entire time frame. This seems a bit odd, since after the real estate crisis in 1992, loans were harder to acquire. One reasonable explanation could be that the high debt ratio was accumulated during the years prior to the crisis. Another explanation could be a decrease of equity during the financial distress, which would also increase the ratio.

The short-term debt ratio varies among companies, which is plausible, and the long-term debt is more stable. This would indicate that the long-term debt level has a greater impact on a firm's performance.

The ROE varies between companies and years, which can mostly be explained by the real estate crisis. Despite the crisis, the mean of 10% is above average, but it could be explained by the period prior to the crisis. The minimum value of -63% is an indicator of the severe effects of the crisis.

The ROA shows no sign of financial distress, on the other hand, with a mean average of 7% and a minimum of 2%. As argued in the methodology section, the lag effect can most easily be observed using the ROA instead of ROE. For this reason, the effects of the real estate crisis might be shown in the consecutive years.

During our second period, 1996-2006, the mean debt ratio decreased from the previous period, but is still higher than the total average (see table 3). The mean total debt ratio during this period was 73% and the maximum 197% with a standard deviation of 23%.

Long-term debt level is around twice the size of the short-term, which seems as a fairly plausible number as long-term debt is what can drive companies forward with investments.

A minor increase in the mean average ROE is seen from the previous period, while the ROA experiences a major decrease in average. The minimum value of ROA is the lowest number of all observations. The most probable explanation is the lag effect, since the realisation of properties stretches over a large period of time. The other explanation is simply that real estate firms have either performed poorly during this period or well during the crisis. In comparison to the total ROE average of 9%, one would say that firms performed well during this period, and extremely well during the real estate crisis. Although, keeping in mind the mean ROE at 16% in the US market, one could argue otherwise as well. By observing the

major decrease in ROA, we would conclude that the lag effect is the most probable explanation.

A slight drop in debt is shown during the financial crisis of 2007-2009 (see table 4). The mean decreased to 62% with a standard deviation of 29% and a maximum of 160%.

The financial crisis played its part, although interest rates decreased during the period in order to maintain high consumption. The ROE of 3% on average, with a -124% as the lowest mark, is evidence of the hardship of financial crises. The ROA of around 2%, with a minimum of -76% is another evidence of the fact.

The debt level's impact can be hard to determine from the summary statistics, but the financial crisis may provide us with some hints. The real estate market is characterised by high debt levels and the market still manages to maintain a positive ROE. Whether the high debt levels manages to help firms to stable ROE:s or not is hard to tell. The low interest rate might have helped consumers and thereby the market, as evidenced by the increase in the real estate index (see figure 1), which would be another explanation to the performance during the financial crisis.

The lag effect does not seem to be evident during the financial crisis; the investments made in previous periods do not seem to affect the performance in a significantly positive way, which is shown by the decrease in ROE and ROA. The overall market failure could affect investments ready to be realised, leading to a lower return than expected.
An insignificant increase in the mean total debt is shown in the last period (see table 5), from 62% to 64%, the standard deviation during the same period was 26% and the debt level reached a maximum of 131%. The slight increase in debt levels can most likely have a simple explanation; loans were once again a possibility after the crisis. The reason why the increase only was minor might be due to the recent crisis; firms were reluctant to obtain high debt levels as long as uncertainty remained. Firms could also argue that they had obtained the optimal debt level already.

These years were set during an economic upswing and during a period with bond issuance, as discussed earlier. As mentioned previously, firms started to issue debt in order to obtain financing means. Although, as suggested in the pecking order theory, it was only used to substitute bank loans when they were no longer available. Thus, the debt level itself did not increase, but shift form from bank loans to issued bonds. Whether the new debt form has a more significant correlation with firm performance, will be seen in the regression results.

The ROE averaged 11%, a significant increase in comparison to previous years, and the highest number achieved in our study. Several factors can provide an explanation for the firms' performances during this period. The ROA averaged around 5%, which also indicates high performing firms during this period. The lag effect is thereby hard to measure, since the performance is significantly better during this period. Whether this depends on the investments made during the crisis, the bond issuance during this period or because of the present boom, is hard to tell. The minimum ROA of -58% and the minimum ROE of -126% suggests that some lag effect occurs.

Our study hopes to show that the debt level should provide an explanation to the performance, one we hope to confirm in our regression results. Another explanation is the real estate market in general in Sweden, without amortisation requirements. This allows consumers to obtain high loans and therefore they are able to accept a higher price range. This, in combination with low interest rates, provides a market with several potential buyers.

The summary statistics provide some useful insights, which will be valuable in combination with our regression results. The total debt to capital ratio occasionally reaches numbers north of 100%, which in all senses is extreme. This would suggest bankruptcy, since the debt in that case is larger than the equity. These are, although, rare cases in which the short-term debt level raises the total debt level over the 100% margin. The debt level stabilises the following year, but these numbers symbolise the capital intensity in the industry, and the importance of the debt structure.

One can observe a constant decrease in the mean total debt ratio, dropping from 89% to 64% between the years 1988-2014. This can be due to the bond issuance and the restrictions of bank loans, although this cannot be the only explanation. In recent years, bank loan restrictions have eased and are thereby possible to obtain. It could be due to reluctance towards loans in general, because of previous crises and the effects of them. As the trade-off theory suggests: the positive effects of obtaining new debt might no longer overweight the positive.

4.2 Regression results

Using linear regression of all years (see table 6), we can conclude that the debt level is significant at a 99% confidence level when regressing on ROE. The R-squared value indicates that around 1/3 of the model can be explained by the given variables. This provides some

space for other explanations, the political landscape and Swedish real estate market behaviour for instance. As mentioned previously, the short-term debt level variable should prove less significant than the long-term debt, for different reasons. For one, tax shields are not provided by short-term debt, since there usually are no interest payments. Despite this, the short-term debt ratio is significant at a 98,9% confidence level.

There is, however, a significant difference in magnitude between the two debt forms: a positive correlation of around 0.27 versus 0.12 in favour of the long-term debt level. The total debt variable is an accumulation of the short and long term, which explains the coefficient of 0.23.

The values when regressing on ROA are similar, with a higher R-squared, but with a lower magnitude than with the ROE. The lagged debt-variables show a statistical significance and a higher positive correlation than variables without the lag. Thus, indicating that the lag effect is present.

During the years 1984-1995 (see table 7), our model does not seem to fit. The significance level is extremely low in the case of the short-term debt level, 32.9% and is therefore difficult to say much about. It has a low positive correlation, 0.07, which is mainly irrelevant because of the significance level. The long-term debt, on the other hand, has a high negative correlation with the ROE of firms, although only at a 65.2% confidence level.

Our belief is that other factors play a big part of a firm's performance during a depression, especially when the crisis hits the specific market we are looking at. This is evident by observing the difference in the R-squared number between this period and the grand total, 0.17 versus 0.32. Another explanation could be the lack of observations in these early years, displaying only 32 observations in total. As mentioned previously, our data consists of firms who have not exited the market and thereby a selection bias does exist.

When regressing with regard to ROA, the results are once again similar: a low positive correlation, but no statistical significance, with long-term debt being the mostly significant variable, at a 7% significance level. The lagged variables, on the other hand, show a statistical significance. The long-term and total debt variables are statistically significant when lagged by a year, while the short-term debt is significant with a two-year lag. The correlation is positive, but with a small magnitude.

The model fit increases after the real estate crisis and in an economic boom (see table 8), with an R-squared of 0.71 when regressing ROE with the total debt level. A high statistical

significance is shown, with a confidence level of 99% in the cases of short-term and total debt and with a confidence level of 98.4% in the long-term debt.

These numbers astonishes to a certain degree, with short-term debt being more significant and with a bigger impact than the long-term. Our suggestion was that the significance and magnitude of, especially, the long-term debt would increase after the real estate crisis, since the long-term debt would play a bigger part during a boom. The regression results suggest otherwise, the main increase was in the short-term debt, which has a coefficient considerably higher than the coefficient when regressing all years.

Regarding the ROA, the results are more as expected. The there is a larger magnitude regarding the long-term debt than the short-term. The lag effect is occurring once again, with significance on all variables with a one-year lag as well as a two-year lag. The correlation is positive, with a larger magnitude than when using non-lagged variables and regressing on ROA, but smaller than with ROE.

The pattern of the results from the real estate crisis is evident once again (see table 9), this time during the financial crisis of 2008: a low R-squared value, with insignificant debt variables. Only around 18% of the variables are able to explain firm performance, which indicates that external factors play an important role during times of financial distress.

The correlation is seemingly positive during the crisis, although it cannot with certainty be determined. The confidence level of the long-term debt is 71.4% and 65.1% for the short-term. A decrease in significance of the debt level seems rational during a depression, where external factors have a larger impact.

The correlation is positive when regressing ROA with the debt variables, with a statistical significance on short-term debt on a 96% confidence level. The correlation is as high as in previous periods. The lagged variables provide a positive correlation as well, with a low significance level. This indicates that the lag effect is not present during times of financial distress.

The final regression results show some alarming figures (see table 10). We hoped to find results similar to the years of 1996-2006. Instead a quite low R-squared indicates a slow return after the financial crisis, with external factors still explain the major part of the model. The confidence levels of the short- and long-term debts are fairly high, 97.4% and 92.3%. The correlation is negative regarding the short-term debt, which is fairly surprising. The correlation has previously, when significant over 95%, been positive. Since the short-term

debt does not provide any tax shield advantage, the result itself is not too alarming. The long-term debt level shows a positive correlation, although not statistically significant at a 95% confidence level.

A negative correlation between short-term debt and ROA is shown in the other regression. The other debt variables are not significant at a high confidence level, although they indicate a positive correlation. A positive correlation is shown with the lagged long-term debt variable, but not with statistical significance. The magnitude is fairly small as well. We cannot conclude the lag effects with statistical significance during this period, but by observing previous years we can confidently conclude that there is an effect.

The results indicate signs of Mueller (1995) cycle theory in the real estate market. The market is still recovering from the previous crisis, and is not in a boom as we had suggested earlier. If this is the case, then the market is still slightly acting as if in a crisis. This would indicate that we would achieve the same numbers as in our time period of 1996-2006 if we were to conduct our study in the future, for example with a new time period of 2014-2024.

4.3 Robustness Test

In order to test the robustness of our model, we regressed our variables with concern to the ROI instead of the ROE for the entire data set (see table 11), as well as including lagged debt variables. The regression shows statistical significance on all independent variables, which shows that the model is persistent even with the ROI measure.

The lagged variables indicate that investments experience some lag effect, but not in such a strong way as we suspected initially. The un-lagged debt variables show a greater positive correlation with ROI than the lagged variables.

By excluding the control variables, where interest rate had showed no statistical significance, in our regression, we tested for multicollinearity (see table 12 & 13). By removing the variables, the correlation of our debt variables decreased by a minor fraction. This has been shown in previous regressions as well, where the control variables' correlation has shifted slightly when using different independent variables.

We can therefore conclude that some minor multicollinearity does exist, but is not large enough to alter our data in any significant manner.

5. Implications, conclusions and suggestions for future research

5.1 Conclusion

The results have not been particularly shocking; the real estate market has been acting in a similar manner as previous literature has shown in other markets. There is a positive correlation between the debt level and firm performance, as opposed to the Modigliani-Miller theorem. As perfect markets do not exist in reality, these findings are not in any way news. There has, although, been some findings which seem a bit contradictory.

Our summary statistics have shown a consistently decreasing debt level, with a slight exception after the financial crisis. Despite the decrease, the correlation between firm performance and debt level has been increasingly positive. Firm performance has improved in the period after the financial crisis as well, following the market index. This would imply that managers, in order to improve performance further, should acquire more debt, but that has not been the case. This indicates some signs of market imperfections, for example could the restrictions of bank loans be one. The risk of bankruptcy, leading to reluctance towards debt could provide another explanation. One could argue that the lower debt ratio is closer to the optimum debt level for a real estate firm, which would maximise firm value. This would suggest a concave relationship between firm performance and capital structure, as the trade-off theory suggests.

Capital structure's effect on firm performance differs somewhat during different time periods. Our study shows less significance when the market is experiencing a downturn, with differing effects of capital structure. During the first time period, long-term debt showed a negative, alternatively insignificant, correlation with firm performance, while the correlation was seemingly positive during the financial crisis of 2008. From our study, we can conclude that the effects of capital structure are much less significant during periods of crisis.

We have also observed that the it takes a significant amount of time to recover from times of financial distress, since the significance is much lower during the last time period, 2010-2014. The correlation, although, is still seemingly positive.

The correlation of short-term debt has varied over time, being positive with statistical significance in the period of 1996-2006, but with a negative correlation in 2010-2014. As previous studies have shown various result of the short-term debt effect, it is hard to draw any conclusions from the differences in our results.

Long-term debt has shown a positive correlation throughout, except for the first time period with ROE as dependent variable. Thereafter, the correlation has been increasingly

positive, from which we can conclude that the debt-level has become more important over time. The effect on firm performance is attributable partly to the tax shield and show support for the trade-off and agency cost theory. The results of 2010-2014 can be proof of Mueller (1995) study of time cycles in the real estate market, which still would be in a state of recovery and reach its peak in 2024.

Our findings do not support any larger debt levels after bond issuance was initiated, which is consistent with the pecking order theory. There was a minor increase in correlation between the long-term debt and firm performance after the real estate crisis, but it is hard to attribute to the bond issuance.

Previous literature have shown that the lagged effect reached its peak after four months, and our study shows that long-term debt is highly correlated with ROA when lagged by one year, while short-term debt is more significant when lagged by two years. From our result, we can conclude that the real estate market experiences a lagged effect, although it does not seem to be current during times of financial crisis.

5.2 Implications for theory

In contrary to the findings of Abor (2005), we found a positive correlation between long-term debt and firm performance. The contradictory findings could be due to the market differences between Ghana and Sweden. With short-term debt, we found it to be positively correlated with firm performance, in line with the findings of Abor.

Our findings are similar to the ones conducted by Gill, et al., (2011) and some similarities with the South African firms in the study by Abor (2007).

Unlike Ahmad, et al., (2012) we have found a positive correlation between lagged debt variables and firm performance, where long-term debt was found positively correlated with ROA when lagged by one year and short-term debt was found positively correlated with ROA on a two-year lag.

The main differences in our study compared to previous empirical papers, is the division into time periods in order to analyse the different effects during several time periods.

Our study implies that debt financing generates a higher performance than equity financing in the Swedish real estate market, as suggested in theory. It also provides an insight on how capital structure affects the Swedish real estate market, where capital is fundamental in order to obtain high returns. We have also shown that there is a lag effect to take into consideration when analysing the impact of debt on firm performance. Furthermore, we have

shown the difference in effect of capital structure during different economic times, which could provide further knowledge of the effects of capital structure.

5.3 Suggestions for future research

Our data, as mentioned in the methodology section, consists of active and OMX listed Swedish firms in the real estate market between 1984 and today. This means that firms who have exited the market for bankruptcy, or other, reasons are not taken into account. This could lead to a misleading result, since their capital structure or performance is not taken into account. Unlisted real estate firms are also neglected, which provides an even larger selection bias.

For further research in the area, regarding the Swedish real estate market, a deeper data research would be preferable. Being able to increase the data sample could provide new insights regarding the market behaviour. The debt structure of firms forced into bankruptcy during the financial crises would be interesting as well as useful. Listed firms in the late 80's or early 90's, which are still listed, are quite few and an increase of observations during these years could provide more useful insights. Since the bond issuance took place after the financial crisis in 2008, some future research could provide more certain answers in a few years. Most real estate investments are not realised until several years later and the effect could therefore prove to be greater in a few years.

Our study has not been able to show causality, i.e. explaining why the effects of capital structure differ during different economic states. Though this has been proven in some studies on different industries, future researchers could provide an explanation to why a statistical significance between capital structure and firm performance cannot be found in a financial crisis in the real estate market. Conducting such a study, and proving causality, would develop the area further.

Appendix:

This study contains data gathered from Datastream, where we downloaded and used a dataset consistent of all the listed real estate firms (Real Estate and developing services) on OMX NASDAQ. “The industry name was: Real estate investments & services”. Some listed firms were excluded, since they hade only been listed for one year and were missing fundamental data. One other firm, Reinhold Europe, was also excluded since this firm was Polish, and despite being listed on the OMX, we did not find it suitable for a study in the Swedish real estate market.

In terms of debt, we have screened the dataset for deviations between the values given by Datastream and Retriever, with the findings of a slight difference in the data. There might be some mismatch between the data in Retriever and Datastream since Swedish firms account for both business concern and subsidiaries, and Datastream uses data from the business concern. We find this deviation to be minor, and not to be misleading since it might be due to firm structure and accrual basis, and thus a screening of all the firms and active years in order to allocate these small deviations is simply not worth the time.

Table 1: Descriptive statistics of all years, 1984-2014

	Mean	*Max*	*Min*	*Sd*
ROE	9.670423	78.08	-126.5	25.62844
ROA	3.771192	26.28	-105.91	15.93877
SD	19.29432	179.7412	0	31.05621
LD	50.52477	96.85	0	23.39867
TD	69.40937	197.208	0	33.50996

Table 2: Descriptive statistics of the years 1984-1995

	Mean	*Max*	*Min*	*Sd*
ROE	10.42087	40.95	-63.55	19.0032
ROA	7.266087	19.57	2.19	3.670889
SD	23.7286	115.7491	.2141022	31.12984
LD	63.55565	96.85	30.91	18.79376
TD	87.28448	156.9652	38.99711	26.40548

Table 3: Descriptive statistics of the years 1996-2006

	Mean	*Max*	*Min*	*Sd*
ROE	10.63284	58.5	-125.3	29.25034
ROA	2.534314	19.46	-105.91	21.59548
SD	21.90576	179.7412	0	35.55038
LD	52.3852	87.51	0	23.83245
TD	73.31663	197.208	0	39.86635

Table 4: Descriptive statistics of the years 2007-2009

	Mean	*Max*	*Min*	*Sd*
ROE	3.827059	49.27	-124	26.85404
ROA	1.973137	18.45	-76.41	14.69209
SD	14.29142	160.3019	0	25.76861
LD	47.67353	78.48	0	23.59541
TD	62.04857	160.3019	3.433465	29.21027

Table 5: Descriptive statistics of the years 2010-2014

	Mean	*Max*	*Min*	*Sd*
ROE	11.84405	78.08	-126.5	21.24284
ROA	5.407857	26.28	-58.52	9.037008
SD	17.94659	112.4856	0	27.99704
LD	46.42881	74.58	0	22.69371
TD	64.23953	131.1761	0	26.52521

Table 6

Regression based on all years in the dataset, with ROE and ROA as dependent variables to check for significance between regular debt and lagged debt variables with each performance measure. Lagged debt is only tested against ROA since this measures the return on all assets.

	1	2	3	4	5	6	7	8	9	10	11	12
VARIABLES	ROE	ROE	ROE	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
SD	0.102**			0.0571***								
	(0.0396)			(0.0199)								
LD		0.265***			0.193***							
		(0.0809)			(0.0440)							
TD			0.226***			0.147***						
			(0.0519)			(0.0325)						
SDt-1							0.0638***					
							(0.0211)					
LDt-1								0.202***				
								(0.0490)				
TDt-1									0.158***			
									(0.0350)			
SDt-2										0.0948***		
										(0.0205)		
LDt-2											0.144***	
											(0.0486)	
TDt-2												0.160***
												(0.0336)
Size	7.736***	6.857***	6.924***	5.811***	5.168***	5.283***	5.841***	5.223***	5.325***	5.863***	5.499***	5.487***
	(1.548)	(1.354)	(1.322)	(1.199)	(1.022)	(1.006)	(1.193)	(0.999)	(0.980)	(1.180)	(1.059)	(0.993)
Sales growth	0.0112***	0.0151***	0.00872**	0.00547***	0.00782***	0.00361**	0.00668***	0.00982***	0.00842***	0.00757***	0.00882***	0.0101***
	(0.00392)	(0.00394)	(0.00352)	(0.00175)	(0.00271)	(0.00150)	(0.00223)	(0.00214)	(0.00286)	(0.00192)	(0.00233)	(0.00222)
Interest rate	-0.412	-0.758	-0.893	0.194	-0.0768	-0.128	0.107	0.00232	-0.0603	0.0705	0.103	0.0199
	(0.570)	(0.574)	(0.580)	(0.276)	(0.279)	(0.268)	(0.256)	(0.265)	(0.237)	(0.256)	(0.271)	(0.243)
Constant	-96.47***	-94.36***	-97.12***	-78.45***	-77.11***	-78.98***	-78.64***	-79.15***	-81.17***	-79.52***	-80.22***	-84.03***
	(22.77)	(20.78)	(20.55)	(17.42)	(15.74)	(15.63)	(17.34)	(15.76)	(15.52)	(17.15)	(16.67)	(15.82)
Observations	260	260	260	260	260	260	259	259	259	258	258	258
R-squared	0.264	0.302	0.326	0.373	0.433	0.445	0.381	0.444	0.465	0.399	0.407	0.470

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7
Regression of debt variables between the years of 1984-1995 with ROE and ROA as dependent variables, to check for significant relationship. Lagged debt variable is only tested against ROA.

	1	2	3	4	5	6	7	8	9	10	11	12
VARIABLES	ROE	ROE	ROE	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
SD	0.0741			-0.0251								
	(0.171)			(0.0240)								
LD		-0.477			0.0678*							
		(0.495)			(0.0351)							
TD			-0.115			-0.00685						
			(0.107)			(0.0424)						
SDt-1							0.0181					
							(0.0198)					
LDt-1								0.0668**				
								(0.0248)				
TDt-1									0.0468***			
									(0.0152)			
SDt-2										0.0646**		
										(0.0238)		
LDt-2											0.0290	
											(0.0297)	
TDt-2												0.0390*
												(0.0211)
Size	2.220	10.64	2.432	-3.273	-4.315*	-2.947	-0.320	-0.954	-0.514	-0.870	-0.993	-0.688
	(8.533)	(9.558)	(6.507)	(2.721)	(2.402)	(2.432)	(1.647)	(1.137)	(0.978)	(1.652)	(1.894)	(1.470)
Sales Growth	0.0869	0.0493	0.0683	0.00505	0.0112	0.00559	-0.0129	-0.0229	-0.0121	0.00379	-0.0127	-0.000185
	(0.120)	(0.130)	(0.107)	(0.0273)	(0.0256)	(0.0283)	(0.0291)	(0.0161)	(0.0190)	(0.0294)	(0.0226)	(0.0182)
Interest rate	0.375	-1.236	-0.590	-0.209	0.0687	-0.167	-0.185	0.149	0.00819	-0.382	0.115	-0.0705
	(1.674)	(2.306)	(1.814)	(0.450)	(0.349)	(0.444)	(0.437)	(0.246)	(0.342)	(0.433)	(0.456)	(0.374)
Constant	-28.41	-89.45	-5.797	55.54	61.03*	50.44	13.70	15.38	10.51	22.17	18.62	14.96
	(116.5)	(105.1)	(97.01)	(36.77)	(31.96)	(36.15)	(22.81)	(14.95)	(13.87)	(21.72)	(24.64)	(18.98)
Observations	23	23	23	23	23	23	22	22	22	21	21	21
R-squared	0.033	0.170	0.039	0.308	0.353	0.274	0.250	0.520	0.522	0.426	0.310	0.436

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8
Regression of debt variables between the years of 1996-2006, with ROE and ROA as dependent variables to check for significant relationship. Lagged debt variable is only tested against ROA.

	1	2	3	4	5	6	7	8	9	10	11	12
VARIABLES	ROE	ROE	ROE	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
SD	0.231***			0.109***								
	(0.0465)			(0.0285)								
LD		0.216**			0.181***							
		(0.0878)			(0.0572)							
TD			0.279***			0.151***						
			(0.0522)			(0.0339)						
SDt-1							0.110***					
							(0.0270)					
LDt-1								0.176***				
								(0.0665)				
TDt-1									0.170***			
									(0.0367)			
SDt-2										0.104***		
										(0.0258)		
LDt-2											0.154**	
											(0.0658)	
TDt-2												0.172***
												(0.0380)
Size	11.28***	9.982***	9.354***	8.943***	7.810***	7.887***	8.939***	7.926***	7.918***	8.984***	8.180***	8.212***
	(1.774)	(1.631)	(1.547)	(1.360)	(1.193)	(1.169)	(1.328)	(1.105)	(1.047)	(1.329)	(1.124)	(1.027)
Sales Growth	0.0205	0.0144	0.0189	-0.00597	-0.0102	-0.00666	-0.0102	-0.00380	-0.00642	-0.0106	-0.00692	-0.00872
	(0.0189)	(0.0153)	(0.0162)	(0.0122)	(0.00893)	(0.0107)	(0.0107)	(0.0141)	(0.0116)	(0.00990)	(0.0133)	(0.00953)
Interest rate	-3.292**	-2.696*	-3.636***	-0.825	-0.733	-1.091	-0.534	-0.439	-0.652	-0.576	-0.302	-0.750
	(1.288)	(1.360)	(1.237)	(0.953)	(0.925)	(0.919)	(0.923)	(0.942)	(0.803)	(0.941)	(0.974)	(0.833)
Constant	-124.9***	-117.5***	-114.4***	-112.6***	-105.6***	-106.8***	-114.5***	-108.8***	-111.6***	-114.7***	-111.6***	-114.7***
	(26.70)	(25.89)	(24.19)	(20.62)	(19.34)	(18.86)	(20.37)	(18.90)	(17.66)	(20.32)	(19.24)	(17.31)
Observations	102	102	102	102	102	102	102	102	102	102	102	102
R-squared	0.673	0.620	0.715	0.689	0.687	0.722	0.693	0.685	0.739	0.694	0.680	0.745

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9

Regression of debt variables between the years of 2007-2009, with ROE and ROA as dependent variables to check for significant relationship. Lagged debt variable is only tested against ROA.

	1	2	3	4	5	6	7	8	9	10	11	12
VARIABLES	ROE	ROE	ROE	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
SD	0.151			0.120								
	(0.160)			(0.0898)								
LD		0.244			0.198							
		(0.226)			(0.132)							
TD			0.241			0.195						
			(0.206)			(0.122)						
SDt-1							0.0137					
							(0.0466)					
LDt-1								0.211				
								(0.155)				
TDt-1									0.153			
									(0.136)			
SDt-2										0.126*		
										(0.0733)		
LDt-2											0.0527	
											(0.129)	
TDt-2												0.151
												(0.127)
Size	2.196	3.117	2.285	1.053	1.791	1.116	1.417	2.227	1.693	1.619	1.567	2.042
	(2.159)	(2.763)	(2.605)	(0.961)	(1.481)	(1.301)	(0.990)	(1.782)	(1.440)	(1.049)	(1.283)	(1.586)
Sales Growth	0.00555	0.0157**	0.00528	1.85e-05	0.00814**	-0.000309	0.00511**	0.00918*	0.00726*	0.00603**	0.00603	0.00862*
	(0.00632)	(0.00651)	(0.00583)	(0.00322)	(0.00377)	(0.00299)	(0.00205)	(0.00458)	(0.00416)	(0.00224)	(0.00377)	(0.00448)
Interest rate	-15.83	-16.73*	-15.70	-4.190	-4.914	-4.077	-4.711	-2.967	-4.223	-3.538	-4.877	-3.968
	(10.12)	(9.801)	(9.746)	(6.242)	(5.803)	(5.646)	(6.385)	(6.295)	(6.046)	(6.439)	(5.939)	(6.633)
Constant	38.63	20.22	23.98	1.429	-13.46	-10.42	0.122	-29.37	-15.30	-10.000	-3.385	-21.03
	(64.25)	(74.64)	(70.31)	(38.00)	(43.05)	(39.98)	(38.46)	(53.08)	(46.25)	(40.45)	(45.26)	(52.46)
Observations	51	51	51	51	51	51	51	51	51	51	51	51
R-squared	0.141	0.175	0.187	0.121	0.196	0.223	0.104	0.213	0.187	0.150	0.111	0.180

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10
Regression of debt variables between the years of 2010-2014, with ROE and ROA as dependent variables to check for significant relationship. Lagged debt variable is only tested against ROA.

	1	2	3	4	5	6	7	8	9	10	11	12
VARIABLES	ROE	ROE	ROE	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
SD	-0.112**			-0.0398**								
	(0.0496)			(0.0196)								
LD		0.291*			0.115							
		(0.162)			(0.0755)							
TD			0.0783			0.0362						
			(0.117)			(0.0542)						
SDt-1							-0.0152					
							(0.0209)					
LDt-1								0.120				
								(0.0724)				
TDt-1									0.0696			
									(0.0607)			
SDt-2										0.0419		
										(0.0399)		
LDt-2											0.0805	
											(0.0756)	
TDt-2												0.0929
												(0.0643)
Size	1.940	2.098	1.751	1.002	1.071	0.932	0.979	1.027	0.826	0.849	1.034	0.834
	(2.887)	(2.891)	(2.916)	(1.256)	(1.267)	(1.257)	(1.255)	(1.222)	(1.162)	(1.252)	(1.297)	(1.163)
Sales Growth	0.0139	0.00657	0.0150	0.00330	0.000319	0.00360	0.00446	0.00539	0.00309	0.00422	0.00472	0.00512
	(0.0185)	(0.0178)	(0.0186)	(0.00628)	(0.00555)	(0.00619)	(0.00675)	(0.00747)	(0.00503)	(0.00625)	(0.00750)	(0.00719)
Interest rate	-5.482	-5.314	-5.705	-2.292	-2.217	-2.373	-2.377	-2.092	-2.139	-2.260	-2.426	-2.258
	(3.797)	(3.565)	(3.920)	(1.567)	(1.459)	(1.612)	(1.597)	(1.396)	(1.431)	(1.540)	(1.626)	(1.475)
Constant	7.604	-11.88	3.473	0.615	-7.130	-1.387	0.769	-7.556	-3.284	1.063	-4.224	-4.447
	(41.56)	(46.44)	(46.55)	(16.42)	(19.66)	(19.15)	(16.55)	(18.85)	(18.61)	(16.34)	(19.89)	(17.96)
Observations	84	84	84	84	84	84	84	84	84	84	84	84
R-squared	0.108	0.176	0.096	0.108	0.171	0.104	0.095	0.176	0.133	0.104	0.130	0.160

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11. Robustness test:
Regressing debt variables, including lagged debt, with ROI as dependent variable to check if the lagged value of debt is significant with investment returns.

	1	2	3	4	5	6	7	8	9
VARIABLES	ROI	ROI	ROI	ROI	ROI	ROI	ROI	ROI	ROI
SD	0.0558**								
	(0.0240)								
LD		0.185***							
		(0.0606)							
TD			0.138***						
			(0.0401)						
SDt-1				0.0683***					
				(0.0248)					
LDt-1					0.201***				
					(0.0643)				
TDt-1						0.158***			
						(0.0433)			
SDt-2							0.104***		
							(0.0249)		
LDt-2								0.144**	
								(0.0615)	
TDt-2									0.166***
									(0.0419)
Size	7.502***	6.927***	7.099***	7.539***	6.994***	7.152***	7.590***	7.222***	7.297***
	(1.374)	(1.204)	(1.212)	(1.366)	(1.181)	(1.178)	(1.356)	(1.225)	(1.182)
Sales Growth	0.00665***	0.00891***	0.00490**	0.00779***	0.0109***	0.00949***	0.00874***	0.00995***	0.0113***
	(0.00233)	(0.00297)	(0.00198)	(0.00264)	(0.00271)	(0.00316)	(0.00240)	(0.00289)	(0.00276)
Interest rate	0.157	-0.137	-0.227	0.0449	-0.114	-0.229	-0.0251	0.0158	-0.159
	(0.275)	(0.291)	(0.279)	(0.249)	(0.266)	(0.240)	(0.247)	(0.262)	(0.238)
Constant	-100.3***	-99.11***	-101.1***	-100.5***	-101.2***	-103.4***	-101.6***	-102.1***	-106.5***
	(20.29)	(18.85)	(18.97)	(20.21)	(18.82)	(18.78)	(20.04)	(19.70)	(19.04)
Observations	260	260	260	259	259	259	258	258	258
R-squared	0.369	0.403	0.409	0.376	0.415	0.430	0.391	0.392	0.437

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12. Robustness test:
Regressing on based on all years, but removing interest rate to check for multicollinearity.

VARIABLES	(1) ROE	(2) ROE	(3) ROE
SD	0.0955**		
	(0.0382)		
LD		0.241***	
		(0.0791)	
TD			0.199***
			(0.0479)
Size	7.810***	7.051***	7.224***
	(1.522)	(1.330)	(1.319)
Sales Growth	0.0116***	0.0154***	0.00979***
	(0.00384)	(0.00370)	(0.00349)
Constant	-99.27***	-99.41***	-103.2***
	(21.93)	(20.44)	(20.46)
Observations	260	260	260
R-squared	0.262	0.295	0.314

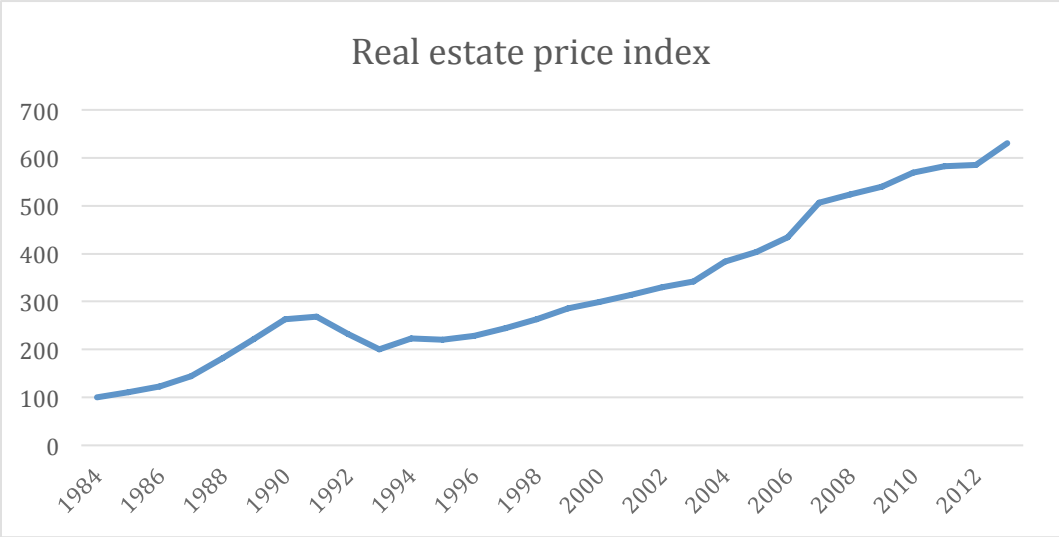
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13. Robustness test:
Regressing the debt variables, with ROE as the dependent variable, but removing the control variables interest rate and sales growth. This is done in order to check for multicollinearity.

VARIABLES	(1) ROE	(2) ROE	(3) ROE
SD	0.114*** (0.0402)		
LD		0.233*** (0.0807)	
TD			0.210*** (0.0485)
Size	7.635*** (1.518)	6.828*** (1.339)	7.039*** (1.308)
Constant	-96.76*** (21.86)	-95.33*** (20.62)	-101.0*** (20.33)
Observations	260	260	260
R-squared	0.251	0.275	0.306

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 1
Graph displaying the real estate market index over time, data taken from SCB. The index was from 1980 initially, so we recalculated it to match the start of our dataset (1984).



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