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Investing in Distressed Firms

A study of the Swedish market

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Abstract

Title:	Investing in Distressed Firms: A study of the Swedish market
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Key words:	Financial distress, equity returns, ownership structure, Ohlson's O-score, institutional ownership, ownership concentration, and foreign ownership.
Purpose:	Investigate if probability of default can predict equity returns for Swedish firms and how the returns are affected by the ownership structure of the firm.
Theoretical perspective:	Pricing of Assets, CAPM, Fama & French Three-factor Model, Agency Theory, Ohlson's O-score.
Methodology:	Portfolios are sorted on size, probability of default, and each ownership variable. The value weighted average return of the portfolio is measured against each other using the HML-approach and afterwards tested statistically.
Empirical foundation:	194 companies from Nasdaq OMX Stockholm (large, mid and small-cap) during the time period January 2001 until December 2015
Conclusion:	No clear evidence for an equity premium for investing in distress on the Swedish market, while none of the ownership variables have a significant positive effect on returns in distress.

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Ola Dahlbom & Viktor Wahledow

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1. INTRODUCTION

The first chapter of this study will treat the background to the topic selection. This will emerge in an identification of the problems that the field of research faces, whereupon the research questions and purpose are formulated. The section also deals with how the study has been limited.

1.1. BACKGROUND

"The time to buy is when there is blood in the streets"

- Baron Rothschild

Source: Myers (2009)

As one of the wealthiest families in the world (Goff, 2010), the Rothschild family earned its fortune in a war-torn Europe after the battle of Waterloo (Myers, 2009). The famous quote by Baron Rothschild can be interpreted as a way of investing against the common perception. The strategy to invest against the stream is considered to be successful through selling high, when the market is hot and everyone else wants to buy, and buying cheap in downturns (Lo & Mackinlay, 1990). Related to investing against the crowd is investing in firms in distress or with a high probability of default. Through investing in distress, it is perceived that the investor should be compensated for the excess risk-taking through a premium, thus resulting in a positive abnormal return. However, the strategy could result in severe losses; during the last years several well-known companies have gone bankrupt in Sweden, of which two more prominent examples are SAAB Automobile (Reed, 2011) and Panaxia (Olsson, 2013).

Investing in distress is a topic that has attracted attention among both investors and financial media in recent years. Svenska Dagbladet (2013) claimed that investing in distressed companies could be costly since stockholders only have a residual claim in the case of bankruptcy, while an article by Eklund (2017) focuses on investing in high book-to-market values, which is known as the book-to-market effect and has been studied by several

prominent academics (Fama & French, 1992; Chan, Chen & Hsieh, 1985). Fama and French (1992) finds that much of the book-to-market effect can be explained by a default factor and thus the relationship between default risk and book-to-market is highly intertwined. Apart from the book-to-market effect, the size effect describes the tendency for small firms to generate higher returns compared to its larger counterparts and is also found to be explained by a priced default factor (Chan, Chen & Hsieh, 1985). In conclusion, the default factor is a variable that seem to be highly connected to equity returns, a phenomenon that was studied by Vassalou and Xing (2004) where the returns of distressed firms were investigated using the Merton model for predicting default. The authors further confirmed the findings by Fama and French (1992) and Chan, Chen and Hsieh (1985), concluding that the size effect, together with most of the book-to-market effect, can be explained by the presence of default risk. Vassalou and Xing (2004) thus argue that the risk of default is a systematic risk and should accordingly be priced by an efficient market, therefore resulting in a positive effect on the equity returns.

However, the results by Vassalou and Xing (2004) do not fully outline the relationship between investing in distressed firms and the presumed equity premium. Instead, investing in distress has given rise to highly ambiguous findings, where for example Dichev (1998) and Griffin and Lemmon (2002) finds negative relationships between investing in distressed companies and the returns received. In summary, the evidence for whether distress risk is accompanied by higher returns is fragmented and researchers seem to disagree whether default risk should be considered a systematic risk or not. One variable that has been claimed to explain some of the abnormality in the returns of distressed firms are the difficulties in pricing the real probability of default, together with the complexity for markets to price default risk without over- and under-reactions. The issue of pricing assets that are close to default is investigated by Griffin and Lemmon (2002), whereby it makes up the foundations of for this study. However, In contrast to Griffin and Lemmon (2002), this study aims to incorporate ownership structure as an explanatory variable for the returns generated by investing in highly distressed companies.

1.2. PROBLEM IDENTIFICATION

Several different studies have investigated the relationship between distress and stock returns, such as Griffin and Lemmon (2002), Garlappi, Shu and Yan (2008), Vassalou and Xing (2004), and Dichev (1998). In addition, the studies by Chan, Chen and Hsieh (1985) and Fama and French (1992) indicate that both the size effect and the book-to-market effect to a large extent are explained by a priced default factor. Previous research on the returns of firms in distress has mainly been focused on the U.S. market (Dichev, 1998; Griffin & Lemmon, 2002; Vassalou & Xing, 2004; Garlappi, Shu & Yan, 2008). In addition to the U.S. market, some studies have been performed on for example Taiwan (Lu, Lee & Yu, 2014). Through a high institutional ownership, a more concentrated ownership compared to other European countries, and an ownership structure characterized by large blockholder investors that take an active part in the management of the firm, the Swedish market is particularly interesting to investigate in this subject (Doukas, Holmén & Travlos, 2002).

Moreover, momentum effects have been a popular explanatory variable for the abnormal returns of distressed companies. The momentum effect as an explanatory variable has been extensively researched by for example Agarwal and Taffler (2008), Rouwenhorst (1998) and Gonzalez-Urtega, Muga and Santamaria (2015). In the meantime, research covering the returns of investing in distressed firms is not as comprehensive, something that is confirmed by Garlappi, Shu and Yan (2008). If research on investing in distress is considered thin, research on the Swedish market in this subject is even scarcer.

In the study by Garlappi, Shu and Yan (2008), a variable denoted as “shareholder advantage” is included. Shareholder advantage is used both as a measure of how powerful shareholders are compared to other stakeholders and how much benefits shareholders can extract at default. The authors argue that this variable would influence the returns of distressed firms, resulting from the notion that strong shareholders will be more reluctant in allowing the firm to end up in a state of bankruptcy. The study finds evidence on a positive relationship between default probability and equity returns for firms characterized by low shareholder advantage, indicating that ownership structure is a variable that should affect the returns of distressed firms (Garlappi, Shu & Yan, 2008).

Other studies have investigated the relationship between ownership structure and performance without considering a distress variable. Berle and Means (1932), for instance, argue that dispersed ownership structures tend to result in underperformance, while Jensen and Meckling (1976) claim that managerial ownership lowers agency costs by reducing management's tendency to consume perquisites and expropriate shareholder wealth, thus increasing corporate performance. Apart from these studies, the findings of Craswell, Taylor and Saywell (1997) indicate that there is a positive relationship between insider ownership and corporate performance. The relationship between ownership concentration is further researched by Thomsen and Pedersen (2000), where the authors find a non-linear, bell shaped relationship between firm performance and ownership concentration, thus resulting in a positive effect for certain levels of concentration. Based on these previous studies, there seems to be a relationship between corporate performance and ownership structure, even though the results are fragmented and not entirely conclusive.

In addition to ownership structure and performance, Tykvová and Borell (2012) studied the connection between leveraged buyouts and distress. The authors find that, despite an increase in financial distress after a buyout, companies subject to a buyout do not go bankrupt more often than non-buyout companies. Instead, by being better at managing distress through for example improved governance, experienced private equity firms lowers the bankruptcy rates compared to non-buyout counterparts (Tykvová & Borell, 2012). Additionally, Smith and Warner (1979) studies the performance of firms with different debt covenants and finds that having few and concentrated institutional investors increases the renegotiation ability of debt when firms are in distress. Ownership structure and default is also the subject of the study by Gilson, John and Lang (1990), where they find that concentrated ownership results in lower financial distress costs. Through the concentrated ownership structure, firms will according to previous research have both lower distress costs and a better ability to renegotiate bank loans, thus performing better in a distressed scenario.

On the basis of the arguments outlined above, this study will investigate both the possibility for earning higher equity returns from investing in distressed firms, as well as how differences in ownership structures affect these returns. When examining the current range of

studies on the topic, we conclude that there is a scarcity in previous literature when it comes to research on the relationship between the performance of distressed firms and ownership structure. Therefore, our aim is that this study will proceed to act as a useful contribution to existing research.

1.3. QUESTION FORMULATION

With the problem discussion in mind, this study aims to answer the following two research questions:

- *Is the probability of default a useful tool in predicting equity returns?*
- *How does the ownership structure explain differences in returns for financially distressed firms?*

1.4. PURPOSE

The purpose of this study is to investigate if the probability of default, as measured by the Ohlson O-score, possesses any explanatory power in predicting the equity returns for Swedish firms. Moreover, the ownership structure, in the terms of largest owner, foreign ownership, and the fraction of the firm owned by institutional investors, is used as explanatory variables in order to examine the influence of ownership structure on the returns of financially distressed firms.

1.5. LIMITATIONS

In order to calculate the probability of default, this study relies on the Ohlson O-score Model 1, while other studies previously applied both the Altman Z-score and the Merton Model. As stated out by Dichev (1998), the Ohlson O-score predicts delistings in a more accurate way compared to the Altman Z-score. This is the motivation for Griffin and Lemmon (2002) focusing primarily on Ohlson's O-score in their study, while using the Z-score as a robustness check in order to compare their results, thereby finding that the difference between these models are negligible. At the same time, however, they argue that the Ohlson O-score is the superior predictor of default probabilities with respect to differences in certain company-

specific conditions, such as maturity, growth, and profitability among others (Griffin & Lemmon, 2002). Based on these findings, this study relies on the distress probability as provided by Ohlson's O-score. The investigated time period spans between 2001-2015, mainly due to the fact that the ownership data provided by the database Holdings does not date back any further than 2001. Moreover, Dichev (1998) uses a time period of 15 years, which should indicate that the time period chosen will result in a satisfactory number of observations.

1.6. DISPOSITION

The structure of this study to a large extent follows that presented by Bryman and Bell (2011) for quantitative studies. The remainder of the study will be outlined as follows:

Theoretical framework - This chapter reviews the theoretical underpinnings that are needed to perform the study and analyze its findings. Furthermore, a selected range of previous research is presented that are deemed relevant for this study, which lays the foundation of the hypotheses that summarizes the chapter.

Methodology - This chapter presents the authors' methodological approach to the execution of the study together with the motivation behind different choices that needed to be made during the process.

Empirical results - In this chapter, we present a summary of our data as well as the results from the tests employed in order to answer our research questions. First, a brief summary of the most important characteristics of the portfolios are displayed, whereupon the results from the statistical tests are presented.

Analysis - In this chapter, we analyze our empirical findings in relation to the hypotheses made, the evidence presented in previous research, and the theoretical framework. Furthermore, the result of our robustness checks are presented and discussed in order to strengthen the interpretations from our main examinations.

Conclusion - In the study's final chapter, conclusions are drawn from the analysis presented in the previous chapter, which aim to answer the study's research questions. Lastly, our suggestions for future research within this topic are outlined.

2. THEORETICAL FRAMEWORK

This chapter reviews the theoretical underpinnings that are needed to perform the study and analyze its findings. Furthermore, a selected range of previous research is presented that are deemed relevant for this study, which lays the foundation of the hypotheses that summarizes the chapter.

2.1. THE PRICING OF ASSETS

In order to investigate how markets value and prices risk, it is crucial to first understand the theory behind the pricing of financial assets. Fundamentally, these theories seek to comprehend the values of claims on payments that are uncertain in its nature, thus trying to explain why the returns on some assets are higher than those of others. In essence, the pricing of assets takes into account the time value of money, i.e. the interest paid, and the risk of not receiving the asset payments. While the effect of time is quite implicit, the premiums gained from the uncertainty in holding the risk of an asset is what makes the pricing of financial assets a challenging task (Cochrane, 2001).

As a consequence of the difficulties and uncertainty in pricing assets, a broad range of models covering this subject have evolved. One of the most distinguished and broadly used frameworks is that of the Capital Asset Pricing Model (CAPM) as established by Sharpe in 1964, which has since been one of the foundations in determining the expected return of an asset and its performance relative the overall market. As a part in defining the expected returns from holding a certain asset, the CAPM serves to measure the systematic risk of that asset, i.e. its exposure to the overall, undiversifiable market risk. Since other, firm-specific risk elements can be mitigated by diversifying the portfolio asset exposure, the market risk is the only factor that affects differences in returns between assets traded in an otherwise similar market environment. The CAPM is constructed in the following way (Sharpe, 1964):

$$E(R) = r_f + \beta(R_m - r_f) \tag{1}$$

The expected return of an asset, E(R), thus depends on the risk-free rate (r_f) the market risk premium ($R_m - r_f$), and the asset's exposure to the systematic risk of the market (β). In order for the CAPM to be a valid measure of pricing financial assets, the return of a risk-free asset must equal the risk-free rate (that is, when β equals zero and the asset is not exposed to any market-wide risk). This leaves the firm-specific betas as the only determinant of the gains received from holding a risky asset (Sharpe, 1964).

In spite of its prominent status and widespread use, the impeccability of CAPM as a measure of pricing assets has historically been disputed. In several prominent articles, researchers argue that the firm-specific β:s, although relevant as an explanatory factor, are alone insufficient in explaining an asset's expected return and that other factors is of importance in determining the value of holding a risky asset. Bhandari (1988) claim that either β may be an inadequate risk measure or that the CAPM fails to account for market imperfections, such as transaction costs, while findings of Fama and French (1992) show that size and book-to-market equity combine to capture the variations in asset returns associated with the β, and thus holds explanatory power in determining the pricing of risky assets. In an attempt to incorporate a broader range of risk factors, Fama and French (1993) continued to develop the three-factor model. Building on their findings on size and market-to-book equity as risk factors that help explain the return of assets, the three-factor model is effectively an extension of the CAPM that incorporates these factors. The properties of the three-factor model are stated and described below:

$$E(R) = r_f + \beta_1(R_m - r_f) + \beta_2(SMB) + \beta_3(HML) + \alpha \qquad (2)$$

In addition to market risk exposure, the model incorporates the pricing of two other risk factors, β_2 and β_3, that measure the historical excess return on stocks with small market capitalizations over those with large market capitalization (SMB) and high book-to market over low book-to-market (HML) stocks. In essence, the model shows that the pricing of assets does not only depend on the asset's exposure to the overall market risk, but that small

and value (high book-to-market) stocks are correlated with higher returns and thus also help determine the value of holding a risky asset (Fama & French, 1993).

2.2. FINANCIAL DISTRESS

According to the Miller-Modigliani Theorem on capital structure, the cash flows available for distribution to debt and equity holders are unaffected by the firm's sources of financing. The theorem relies on a state of the financial world where there is perfectly symmetrical information and where firms cannot incur any taxes, distress costs or agency costs. Although permitting bankruptcies, the absence of distress costs suggest that the ownership and control of a firm's assets are transferred between equity and debt holders at no cost in the case of corporate failure (Miller & Modigliani, 1958). In the real world, however, the presence of market imperfections have implications on the firm's choice of capital structure, thus affecting the risk of holding an asset in the threat of facing financial distress (Berk & DeMarzo, 2014).

A firm is said to be in a state of financial distress when it incurs substantial cash-flow losses and thus has trouble meeting its contractual obligations, such as debt payments (Purnanandam, 2008; Berk & DeMarzo, 2014). As a consequence, financial distress costs may arise in many forms. As the substantial cash-flow losses puts pressure on the company's financial health, managers might be forced to liquidate assets at prices considerably lower than their viable market values in order to cover these losses. The operations of a financially distressed firm might also be severely damaged as suppliers, employees, and creditors become increasingly more restrained in their interactions with the firm. Other indirect costs include those associated to debt-equity holder conflicts of interest and the debt overhang problem, where a highly leveraged firm may have to forgo value-creating investments due to an inability to achieve sufficient funding. Based on the extent of these cost, financial distress may lead to a severe reduction of the firm's value (Berk & DeMarzo, 2014).

Due to the costs associated with ending up in a state of financial distress, equity holders might see the value of their asset decrease substantially and in the case of default all of the assets might be consumed in order to pay off debt holders, leaving equity holders with a

worthless claim. Based on this, equity holders would require a risk premium to reflect the risk they assume in holding the assets of a financially constrained firm (Almeida & Philippon, 2007).

2.3. ASSET PRICING IN FINANCIAL DISTRESS

As the probability of financial distress rises, valuing a firm becomes increasingly difficult and therefore also the pricing of its assets (Damodaran, 2009). Distressed firms are oftentimes characterized by recent losses, high leverage, low and volatile stock returns, and low liquidity (Campbell, Hilscher & Szilagyi, 2011). These features, along with an imminent threat that the firm won't survive the immediate future, decrease the reliability of traditional valuation models due to its view of firms as going concerns. Though the source of distress might vary across firms, i.e. some firms may fail to meet their contractual obligations due to too much debt while others reach distress due to an inability to meet operating expenses, the common denominator is that there is uncertainty in whether the firms will continue to generate cash flows. This uncertainty, that the firm suffers from the risk of being terminated within the coming years, is the reason for the pervasive uncertainties in how to value assets in the face of distress (Damodaran, 2009).

As a consequence, the market mispricing of distressed firms as well as the anomalies in the financial performance of distressed assets and its associated risk premium has been investigated. These anomalies are frequently examined by the use of variables that correlate with relative distress, such as size and book-to-market, since assets with these characteristics are more susceptible to financial distress and hence are riskier than its counterparts (Fama & French, 1996). Small and value (high book-to-market) stocks that possess a higher probability of ending up in distress tend to be firms with a lacking efficiency in its operations and characterized by higher financial leverage, thus being less prone to accessing external financing. Such constraints tend to increase the risk of these firms, a risk that, however, is somewhat unlikely to be captured by a market index that is greatly influenced by the performance of larger, more stable firms. This in turn increases the probability of mispricing anomalies in the pricing of financially distressed assets (Chan & Chen, 1991).

2.4. OWNERSHIP STRUCTURE AND FINANCIAL DISTRESS

The effect of ownership structure on firm performance is most prominently explained by the agency theory. The agency theory describes the conflicts of interest that can occur between different stakeholders and the costs that can arise as a consequence of this. Jensen and Meckling (1976), who pioneered within the field of ownership theory, sought to integrate the concept of agency costs with outside debt and equity claims on the firm's assets into a theory on corporate ownership structure. They argue that the optimal ownership structure, i.e. the relative amounts of inside and outside equity capital respectively, is determined by the agency costs that the different proportions will incur. Whenever asset prices reflect unbiased estimates of monitoring costs and the redistributions arising from the agency relationship, the optimal fraction of external ownership will be the amount that minimizes total agency costs (Jensen & Meckling, 1976).

The theories covering the impact of ownership structure on agency costs have since expanded to cover several other aspects of ownership apart from inside and outside holdings of equity. The presence of better informed investors, such as institutional owners, in the ownership structure can help mitigate the agency costs of the firm (Jensen and Meckling, 1976; Bebchuk, 1999). Institutional investors, according to the agency theory, should in terms of monitoring encourage firms that are likely to overinvest to issue higher payouts, which in turn would restrain the capital availability of management thus lowering agency costs (Scott, 2014). The extent of ownership concentration, where a firm's equity is owned by one or a few large owners, can according to Berle and Means (1932) act as a good disciplining measure for management, but also increase agency costs when the possibility for controlling owners to extract private benefits is high (Bebchuk, 1999).

The agency costs associated with ownership structure affect firm value, and are especially troublesome for firms in or close to distress. Incurring agency costs puts pressure on the firm's expected free cash flows, hence also the value of its assets. This pressure intensifies as the firm faces large contractual obligations due to high leverage, which is one of the main

characteristics of financially distressed firms. When a firm has high leverage, a conflict between equity holders and creditors will arise if the firm's investment decisions will have different consequences for the value of equity and the value of debt. In doing so, the agency costs of ownership also have consequences for the firm's cost of capital, which tend to increase as the value of the firm further falls into the face of distress and enhance the sensitivity of the firm's value to market risk (Berk & DeMarzo, 2014).

As previously mentioned, a firm's ability to renegotiate loans in distress is an important aspect in avoiding bankruptcy, since both bankruptcies and reconstructions are costly (Gilson, John & Lang, 1990; Berlin & Mester, 1992). A firm's ability to renegotiate loans increases when ownership is concentrated while the importance of renegotiating loans increases when the firm has liquidity constraints (Smith & Warner, 1979). Additionally, in the case of restructuring, banks tend to acquire large ownership stakes in the company, but more importantly, the ownership concentration typically increases through large blockholders, therefore lowering information asymmetries and increasing the ability of future renegotiation (Gilson, 1990).

2.5. PREVIOUS RESEARCH OF RELEVANCE

2.5.1. DISTRESS RISK AND EQUITY RETURNS

A range of previous studies within the field of financial distress have been conducted with the purpose of investigating whether the risk of distress is priced by the market, thus resulting in a positive effect on the equity returns. The study by Dichev (1998) seeks to ascertain whether the risk of corporate distress is one of systematic character. It builds on several previous studies suggesting that a priced distress risk factor could be the cause for the size and the book-to-market effects, both of whom are among the most prevailing predictors of stock returns. Using the Altman and Ohlson models of bankruptcy prediction, Dichev examines the subsequent realized returns as a proxy for systematic risk for a sample of U.S. industrial firms. The results show that firms with a high probability of distress earn significantly lower average returns than those with low default probabilities, implying that distress risk is rather an idiosyncratic risk than a systematic one. Dichev presents two plausible explanations for his findings, with the first being that more insolvent firms, i.e. firms that are more likely to end

up in a state of distress, inherently have lower systematic risk. The other explanation relies on the possibility of persistent biases in the pricing of securities, which might indicate that the market is unable to fully account for the financial distress information at hand and leads to insolvent firms earning lower returns when this information eventually becomes embedded in prices (Dichev, 1998).

Following Dichev, Griffin and Lemmon (2002) examines the relationship between book-to-market equity, distress risk, and equity returns. The study, conducted on non-financial U.S. firms, uses the Ohlson O-score as a measure of the probability of corporate distress. In order to separately investigate the relationship between book-to-market equity and the probability of distress, the authors employ a portfolio-based methodology where firms are classified based on their respective BE/ME-values, O-scores, and market capitalizations. Early findings show that the firms in the highest O-score portfolio, given their high probabilities of financial distress, are accompanied by surprisingly low book-to-market equity-ratios, which is similar to the findings of Dichev (1998). These high O-score, low BE/ME firms are also found to have high past stock returns, something that is inconsistent with customary concepts of distress risk and thus would suggest that these measures provide different information related to a priced distress risk factor. In order to examine whether the differences in the distress risk factor are reflected in stock returns, annual buy-and-hold returns are calculated for each O-score and BE/ME-portfolios. The results show that the book-to-market effect in returns substantially intensifies as they move upward across the O-score portfolios, which is in line with the notion that firms that faces a greater risk of distress are accompanied by a higher BE/ME-premium. These findings, according to Griffin and Lemmon, reveal that the evidence of firms with high distress risk earning lower than average returns is largely driven by an underperformance of low book-to-market equity stocks. The authors also consider the possibility that the nature of high distress risk firms make them more prone to being mispriced by the market. Looking at the three-day abnormal returns around quarterly earnings announcements, they find support for mispricing being more pronounced in high distress risk firms (Griffin & Lemmon, 2002).

Shumway (1996), however, finds that there is a positive relation between returns and distressed companies in his investigation of the U.S. market. The study builds on several

findings in preceding literature suggesting there's an equity premium in investing in distressed firms (e.g. Fama and French (1993) and Chan, Chen and Hsieh (1985)), which is also the result of Shumway's study. These findings show that both the size effect and the overreaction effect are largely driven by the risk of distress, indicating that there in fact is a priced default factor resulting in an equity premium. The study, however, fails to explain the book-to-market effect in returns, which according to the author would indicate that the size and overreaction effects should be seen as common default risks, while the book-to-market effect should rather be considered a measurement of financial distress (Shumway, 1996).

Vassalou and Xing (2004) takes a different approach to investigating the returns of distressed firms, as they use the Merton option pricing model as their predictor of distress. In their examination of the U.S. market, they present evidence of distressed firms earning positive abnormal returns, which contradicts the results provided by Dichev (1998). The authors thus argue that the size effect as well as much of the book-to-market effect is largely explained by a priced default risk factor. Following the methodology of Vassalou and Xing, Garlappi, Shu and Yan (2008) also use the Merton model as they investigate the effect of shareholder advantage on the returns of distressed firms, where shareholder advantage represents the amount of bargaining power shareholders possess relative other stakeholders and thus acts as an indicator of the benefits that shareholders can extract from renegotiating in a distressed scenario. Based on a set of non-financial U.S. firms, the study finds a positive relationship between default probability and equity returns for firms that are characterized by low shareholder advantage. The authors argue that their findings indicate that the ownership structure is a variable that affects the returns of financially distressed firms (Garlappi, Shu & Yan, 2008).

2.5.2. OWNERSHIP STRUCTURE AND CORPORATE PERFORMANCE

Demsetz and Lehn (1985) examine the relationship between ownership structure and corporate performance on a sample containing 511 large U.S. corporations. The study focuses on ownership concentration through the percentage of common equity owned by the five and 20 largest shareholders, respectively, as well as the Herfindahl measure for ownership concentration. One of the foundations of the article is that ownership structure varies together with size, which means that the structure of corporate ownership varies systematically in

ways that are consistent with value maximization. The basic idea behind the size effect on ownership structure is that larger firms realize a lower overall cost with a more diffuse ownership structure compared to smaller firms. The results of the study show that size is negatively related to ownership concentration, indicating that smaller firms more prone of being financially distressed are often characterized by a high concentration of its owners. Furthermore, ownership concentration is found to have a positive relation to the regulatory environment that the firm faces, with less stringent regulations offering dispersed owners a greater control potential through less commission monitoring of management and fewer restrictions (Demsetz & Lehn, 1985).

Craswell, Taylor and Saywell (1997) investigate how the distribution of equity ownership affects corporate performance in Australia, using a set of 349 publicly traded firms. Having been confined largely to U.S.-based evidence, the Australian setting allowed for the possibility of variations in nation-specific factors. Due to the lack of an active market for corporate debt, the cross-sectional variation in the prevailing measure of Tobin's Q was approximated by the book-to-market ratio. No clear relationship was found between the amount of institutional ownership, computed as the portion of ordinary shares owned by acknowledged institutional investors investing on the behalf of external entities, and firm performance, which contradicts the predominant view that institutional owners would be more efficient in its monitoring of management. Some weak evidence, however, are found suggesting a relationship between equity value and insider ownership, though being unstable over time and varying across size differences (Craswell, Taylor & Saywell, 1997).

In contrast to Craswell, Taylor and Saywell, McConnell and Servaes (1990) finds a positive relation between Tobin's Q and the fraction of shares owned by institutional investors in the U.S., which is consistent with the theory that corporate value is a function of the structure of equity ownership. Similar findings are reported in Cornett et al. (2007), where the effect of institutional investor involvement on the firm's operating performance is examined. The authors find significant relationships between a firm's operating returns and both the percentage of institutional ownership and the number of institutional stockholders. The relation, however, is only found for those institutional investors that are less likely to have a dependent business relationship with the firm, suggesting that institutional investors that are

dependent on the firm beyond its equity ownership are compromised as monitors of the firm (Cornett et al., 2007).

Shleifer and Vishny (1986) investigate the effect of large shareholders on the ability to effectively monitor the performance of the firm. They find that the presence of large owners can provide a solution to the free-rider problem as they, in contrast to smaller shareholders, have incentives to protect their investment by using private resources in order to monitor management (Shleifer & Vishny, 1986). Some European evidence on the impact of concentrated ownership on shareholder value is demonstrated by Thomsen and Pedersen (2000). Their study examines 435 of the largest European companies and finds a positive relationship between a concentrated ownership structure, book-to-market equity, and profitability. The authors argue that their results proposes that not only the agency relation between investors and management impact firm performance, but also that the identity of the owners has implications for their intentions and how they exercise their power, and is an equally important aspect in the relation between ownership structure and performance (Thomsen & Pedersen, 2000). Douma, George and Kabir (2006) unite institutional ownership with another distinguished element of the ownership structure, foreign ownership, as they examine the differences in impact between foreign institutional and foreign corporate ownership on firm performance. The study shows that foreign ownership positively affects firm performance, but is largely attributable to foreign corporations rather than institutional investors, as foreign corporations on average have larger shareholdings, higher commitment, and a longer investment horizon (Douma, George & Kabir, 2006).

Evidence on the relationship between different types of ownership structures and financial distress has been fairly absent in previous literature. Tykvová and Borell (2012), however, investigates the role of institutional investors in buyouts and find that private equity-backed companies are better able to cope with distress risk than their counterparts. Md-Rus, Musallam and Taufil-Mohd (2013) examine this relation on the Malaysian market and finds contradictory evidence through a negative relationship between institutional ownership and the probability of distress. The authors argue that their findings may be explained by a large concentration of institutional investors in financially distressed firms having received equity

in the firm as a consequence of financial restructurings (Md-Rus, Musallam & Taufil-Mohd 2013).

2.5.3. SUMMARY OF PREVIOUS RESEARCH

Table I

Summary of Previous Research

As can be seen, a majority of previous studies have been conducted on the U.S. market for both the ownership structure and distressed investments, with somewhat ambiguous and contradictory findings.

Default and equity returns						
Authors	**Year**	**Subject**	**Model**	**Timespan**	**Market**	**Results**
Dichev	1998	Distressed firm return	Altman Z-score & Ohlson model 1	1981-1995	U.S. (AMEX & NYSE)	Negative returns for high default firms
Griffin & Lemmon	2002	Distressed firm return	Ohlson O-score	1965-1996	U.S.	Negative returns, especially for low book-to-market values
Vassalou & Xing	2004	Default and equity returns	Merton model	1971-1999	U.S.	Postive returns for high probability of default
Shumway	1996	Default and equity returns	Shumway model	1952-1994	U.S. (AMEX & NYSE)	Positive relationship between default risk and equity returns
Garlappi, Shu & Yan	2006	Default probability and stock returns	Moodys-KMV	1969-2003	U.S.	Positive relationship between default probability and equity returns for the low shareholder advantage group
Ownership strucuture and equity returns						
Authors	**Year**	**Subject**	**Ownership variable**	**Timespan**	**Market**	**Results**
Demsetz & Lehn	1985	Shareholder concentration and profits	Shareholder concentration	1976-1980	U.S. (511 largest firm)	No significant relationship between shareholder concentration and profits
Craswell et al.	1997	Ownership structure and performance	Insider and institutional ownership	1986 & 1989	Australia	Ambiguous results but weak positive for insider ownership
McConnell & Servaes	1990	Corporate performance and ownership concentration	Insider and institutional ownership	1976 & 1986	U.S.	Non-linear relationship between insider ownership and corporate performance. Positive relationship between institutional ownership and performance
Million Cornett et al.	2007	Institutional ownership and equity returns	Institutional investor concentration	1993-2000	U.S. (S&P 100)	Postive relationship between institutional ownership and returns
Schleifer &Vishny	1986	Large shareholders and corporate control	Large minority shareholders	1980-1984	U.S. (Fortune 500)	Large shareholders mitigate free -rider problem
Thomsen & Pedersen	2000	Ownership concentration and performance	Shareholder concentration	1990-1995	European market (435 largest)	Positive relationship between onwership concentration and profitability and book-to-market equity
Douma et al.	2006	Foreign ownership and corporate performance	Foreign ownership	1999-2000	India	Positive relationship between foreign ownership and corporate performance
Tykoková & Borell	2012	Private equity and bankruptcy risk	Ownership and bankruptcy risk	2000-2008	European market	Experienced private equity owners lowers the probability of default
Md-Rus et al.	2013	Ownership structure and performance	Several different ownership variables	2000-2009	Malaysia	Negative relationship between institutional ownership and distress

2.6. HYPOTHESES

In order to conduct a proper study of whether distress results in higher returns, several different hypotheses need to be constructed and tested empirically. Hypothesis 1(a) is based on the findings by Vassalou and Xing (2004), where the authors conclude that there is a positive relationship between high probabilities of default and stock returns, thus indicating that default risk is a systematic risk. The hypothesis is also in line with the research presented by Fama and French (1992), who found that much of the book-to-market effect is explained by default risk and therefore indicating that investing in distress should result in positive abnormal returns. However, the findings by Griffin and Lemmon (2002) and Dichev (1998) indicates that the returns of distressed firms are lower than average, thus resulting in a negative abnormal return. Previous results are clearly ambiguous and therefore hypothesis 1(b) is constructed resulting in a two-sided test in order to determine the return of distressed firms:

H1(a): There is a positive equity return for investing in firms with high probability of distress compared to firms with low distress.

H1(b): There is a negative equity return for investing in firms with high probability of distress compared to firms with low distress.

As presented by several authors such as Berle and Means (1932), Jensen and Meckling (1976), and McConnell and Servaes (1990), the performance of firms is positively related to the presence of institutional owners. Additionally, as explained by Gilson, John and Lang (1990), better renegotiating power through strong institutional investors and banks could mitigate financial distress costs, thus increasing the likelihood of surviving a distressed scenario and increase the firm's performance. Therefore, strong institutional ownership concentration should mitigate agency costs and increase performance in distress, resulting in the following hypothesis:

H2: For firms with a high probability of default, the equity returns will be increasing in the presence of strong institutional ownership

Moreover, research by Berle and Means (1932) and Jensen and Meckling (1976) shows that ownership concentration influences corporate performance positively. The studies argue that a few strong owners will monitor the management in a more efficient way, thus reducing agency costs and increasing performance compared to a firm with a highly dispersed ownership. This is further discussed in the study by Smith and Warner (1979), in which they state that a concentrated ownership will result in better negotiating power when firms in distress bank loans. However, as presented by Thomsen and Pedersen (2000) the ownership concentration effect on ownership structure is positively related to a certain level, after which it will deteriorate. For firms with poor performance, Köke and Renneboog (2005) concludes that large blockholders have a positive impact on performance. Based on the previous literature, we expect that the performance of distressed firms will increase when ownership concentration is high, thus rendering in the following hypothesis:

H3: For firms with a high probability of default, the equity return will be increasing with a highly concentrated ownership.

Lastly, several studies have been conducted on the effect of foreign ownership on firm performance, where the superior monitoring ability of outside and foreign owners are found to result in lower agency costs and higher productivity (Douma, George & Kabir, 2006; Dharwadkar, George & Brandes, 2000). Douma, George and Kabir (2006), conclude that both concentrated ownership and foreign ownership will increase the performance of the firm through maximizing the benefits of risk-bearing, incentive alignment, and monitoring. These findings are confirmed by Bartram et al. (2015), who find that a 1 % increase in foreign ownership increases returns with 0,311 % in an international setting. Since previous findings are based on either emerging or aggregated international markets, inferences on the effect of foreign ownership in a Swedish context could be uncertain. However, the study by Dahlquist and Robertsson (2001) argue that foreign owners show the same characteristics as domestic institutional investors on the Swedish market. Based on these arguments, we find no reason to believe that the effect of foreign ownership will be different to that of institutional ownership, rendering in the hypothesis:

H4: Firms with a high probability of default, the equity return will be increasing with high foreign ownership.

3. METHODOLOGY

This chapter presents the authors' methodological approach to the execution of this study together with the motivation behind different choices that needed to be made during the process.

3.1. RESEARCH METHOD

The main purpose of this study is to investigate the performance of distressed firms and how ownership structure affects the returns of these firms. In order to examine this subject, a deductive approach has been applied, which essentially means that our hypotheses are based on previous theories and otherwise common perceptions on the subject (Bryman & Bell, 2011). The differences between the inductive and deductive approach has also been explained by for example (Patel & Davidson, 2003). However, as argued by Bryman & Bell (2011) there are usually inductive elements in a deductive research method, but as the inductive approach is more focused on creating new theories based on empirics, this study is using a deductive approach since existing theories are used to explain our results. When considering the perspective of the study an external stakeholder perspective is applied, since most of the data is based on historical numbers such as financial reports and economic growth reports which is easily accessible for the external stakeholder.

3.2. SAMPLE SELECTION

In constructing the sample of this study, several criteria were formed and needed to be met. The nature of, and reasons behind, these criteria are more comprehensively explained and discussed below.

3.2.1. TIME PERIOD

The research is conducted during a time period of 15 years, spanning from January 2001 to December 2015. The time frame was chosen largely due to a limitation in the accessibility of ownership data, with the Holdings database only containing information as of 2001. This is,

however, in line with the time span of several previous studies on the relationship between financial distress and corporate performance (Opler & Titman, 1994; Dichev, 1998). The latter restriction was made in order to ensure access to full-year data for all firms included in the sample. Since calculating the O-score require end-of-the-year financial figures retrieved from annual reports, a later end date would entail that those firms whose 2016 annual reports had not yet been released would not be subject to the same conditions in the sample assembly.

3.2.2. GEOGRAPHICAL SCOPE

The sample's geographical scope is limited to investigating the Swedish market. Research within the field of financial distress has historically been highly concentrated to the U.S. market (Opler & Titman, 1994; Dichev, 1998; Griffin & Lemmon, 2002; Garlappi, Shu & Yan, 2008), with limited coverage of the European markets. In examining the relationship between financial distress and ownership structure, Sweden constitutes a favorable geographical setting due to the recently launched Holdings database. Holdings contain data on a vast amount of ownership structure-related variables, providing an ideal foundation in expanding the research on financial distress to incorporate the effect of different ownership structures.

3.2.3. EXCHANGES

Another criterion states that only firms listed on the Nasdaq OMX Stockholm's three main exchanges, Large, Mid, and Small Cap, as of December 31st 2015 are to be included in the sample. Thus, firms listed on other Swedish exchanges such as First North, Aktietorget, or Nordic Growth Market are excluded. This limitation stems from a tradeoff between examining a homogenous group, thus increasing the internal validity of the study, and being able to generalize the findings across a broader population (Bryman & Bell, 2011). The excluded exchanges differ from those included on the Nasdaq OMX in several ways, including the sizes of firms and regulatory requirements. Firms listed on First North, for instance, face a less extensive rulebook in terms of e.g. accounting regulations and are to a large extent small in size and in an expansionary face, in contrast to the oftentimes larger and more mature firms on the OMX exchanges (Nasdaq, 2017a). By confining the sample to

these exchanges, the prerequisites of the included firms will be more equal and allow for a higher degree of comparability.

3.2.4. TAX RESIDENCE

As this study only seeks to investigate Swedish firms, foreign firms, as defined by the firm having its tax residence outside of Sweden, listed on Nasdaq OMX were excluded from the sample. In order to single out these foreign firms, the International Securities Identification Numbers (ISIN) was retrieved for all firms as supplied by Nasdaq. Those firms that did not possess a Swedish ISIN were subsequently excluded. Foreign firms may however be listed under a Swedish ISIN on the Nasdaq OMX given that they hold a depository receipt (SDB). An SDB allows for the trading of securities on foreign exchanges (Aktiekontrolluppgiftsutredningen, 2006). Thus, as a second measure of eliminating foreign firms, those stocks that were trading under an SDB were excluded.

3.2.5. INDUSTRY BELONGINGNESS

As is common practice in this type of research papers, firms that are operating within the financial sector has been excluded from the sample. These firms often contrast those operating in other industries as to their financial structure, accounting regulations, and bankruptcy environment. As stated out by Fama and French (1992), the high leverage that is normal for financial firms probably does not have the same implications as for non-financial firms, for whom high leverage more likely indicates distress. In addition, Ohlson (1980), when constructing the O-score, excluded financial corporations from his data collection, providing further support for our criterion. Nasdaq uses the Industry Classification Benchmark (ICB) to divide its listed firms into different sectors. The ICB in turn classifies a company based on its principal activity or the area of business that generates the company's largest proportion of revenue (Nasdaq, 2017b). All firms that are classified as being financial firms by ICB were subsequently excluded from the sample. This includes banks, insurance companies, real estate companies, and financial services companies (ICB, 2012).

3.2.6. DATA AVAILABILITY

As an ultimate requirement, the availability of data was examined. In order to create adequate and consistent portfolios, a full set of data was required for each individual, yearly firm observation. This entails that those years when the firm observations couldn't provide a full set of data for financial accounting figures, the ownership variables, market values, and total return indices, were excluded from the sample. In order to maintain the standardized classification of data obtained from the different databases, no missing values were filled in or collected from alternative databases as this might entail a certain amount of discrepancy and distortion.

3.2.7. SUMMARY OF SAMPLE SELECTION CRITERIA

The above described criteria used to compile the sample are displayed in the following list:

I. The firm should be listed on the Nasdaq OMX Stockholm exchange as of 31st December 2015.
II. The firm should have its tax residence in Sweden, thus possessing a Swedish ISIN as well as not being traded as an SDB.
III. The firm should not be operating within the financial sector, as classified by the ICB.
IV. The firm should be able to provide a complete set of data for all yearly observations.

3.3. SAMPLE COMPOSITION AND DATA COLLECTION

The data used to form portfolios and subsequently test the hypotheses is largely originating from three different sources. As a first step in constructing the sample, information about listings on the Stockholm OMX and the industry belongingness of its firms was retrieved from Nasdaq. Firm-specific financial information, such as yearly accounting figures and returns, was collected from the Thomson Reuters Datastream, while data on ownership variables were retrieved from Modular Finance's database Holdings. Additionally, the figures on Sweden's yearly GDP development have been extracted from Statistiska Centralbyrån (SCB).

Initially, a list of all the firms trading on the Nasdaq OMX Stockholm as of 31st December 2015 was compiled. This was done by subtracting new listings and adding delistings having occurred from 2016 and onwards to the firms currently trading on these exchanges. Consequently, a set of 284 firms was assembled. Among these firms, 17 were excluded due to having a foreign ISIN while seven were found to be trading under an SDB, amounting to a total of 24 firms being excluded due to not having its tax residence in Sweden. Next, the ICB-codes of all remaining firms were gathered, resulting in the exclusion of another 53 firms due to having its main operating activities within the financial sector. Thus, a set of 207 firms remained in the sample.

Yearly financial accounting figures along with the Swedish GDP development, constituting the calculations of the O-score, were subsequently collected. In the few cases where a firm reported negative liabilities, these yearly observations were removed, since the O-score cannot efficiently account for this type of occurrence without considerably distorting its output. Altogether, the data collected for these 207 firms resulted in 2493 yearly O-scores. The remaining data, containing the ownership variables, monthly market values, and monthly total return indices, were retrieved and compared to the O-scores. As the comparison of portfolio performance require a full set of data for all included observations, those firm-specific years where either ownership data were missing or a complete set of monthly returns could not be retrieved, were removed. The non-presence of full-year monthly returns led to an additional 15 firms being excluded, resulting in a final sample of 192 firms consisting of 2245 sets of intact, yearly data. A complete overview of the sample composition is presented in Figure 1, and the firms included as well as firms excluded are exhibited in Appendices 1 and 2.

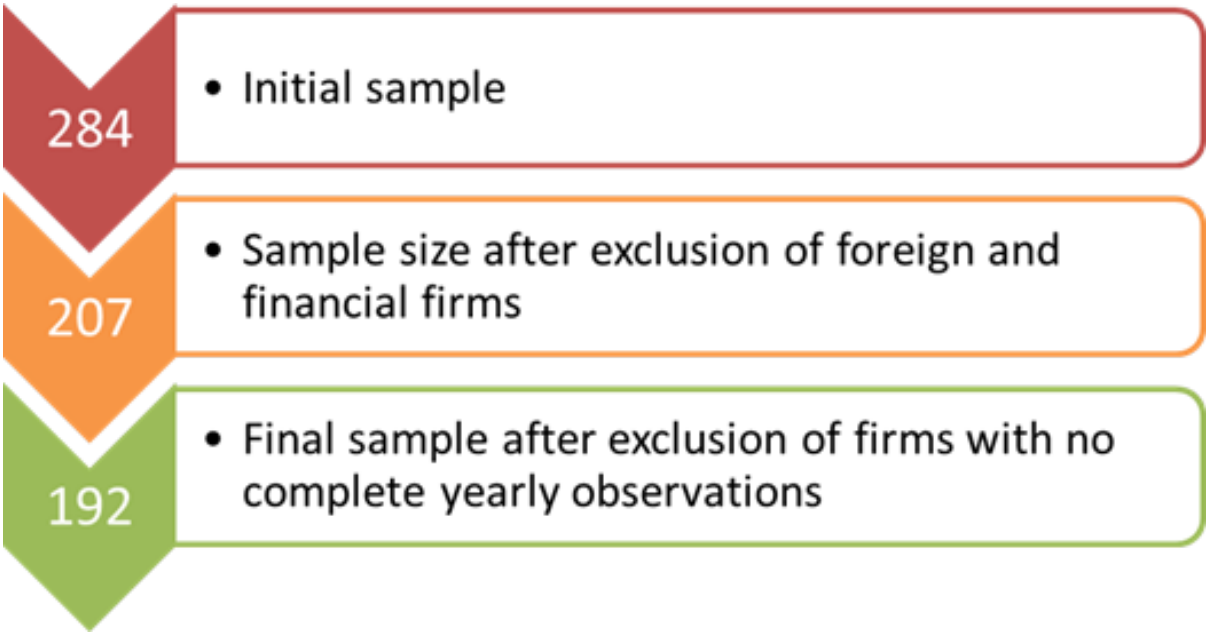

Figure 1: Overview of the sample selection

3.4. PORTFOLIO CREATION

This study relies on the creation of a number of different portfolios in order to separate the effect of different variables on each portfolio's return. The breakdown of our sample data into portfolios follows the methodology used by Griffin and Lemmon (2002) in that the sample is divided into groups based on yearly values on market capitalization and the probability of distress. Furthermore, a third separation is made based on the relative values of the ownership variables for each of the subgroups. Beneath follows the outline as well as a summary of the portfolio creation in Figure 2.

The first step in creating the portfolios was to divide the sample based on two classifications of size, where the 50% smallest yearly market values were divided into a portfolio containing small firms and the remaining half formed a portfolio for large companies. Furthermore, a third portfolio was created containing all yearly observations, irrespective of firm size. As a next step, each of these three portfolios was further divided based on the probabilities of default. In accordance with Griffin and Lemmon (2002), this classification with respect to distress risk was made using the quintile values of each subgroup. Thus, five portfolios were constructed ranging from low to high distress probabilities for each of the size-based portfolios. Although resulting in quite arbitrary and coalescent cut-off points between the

portfolios, this method allows for the creation of portfolios containing an equal amount of observations as well as a relative investigation of the differences in returns between portfolios based on the variables of interest, which relates well to the purpose of this study. The use of quintiles as opposed to a lower amount of thresholds moreover entails that there's a clear distinction between the distress probabilities of firms in the high and low ends of the portfolio groups.

In order to incorporate the effect of the ownership structure, one final classification was made based on the values of each of the chosen ownership variables. These variables were divided into three equally-sized groups using the 33rd and 66th percentiles, respectively, allowing for the same desired features in measuring the relative differences in portfolios as the distress-classifications. Altogether, this three-step classification resulted in a total of 45 portfolios being constructed.

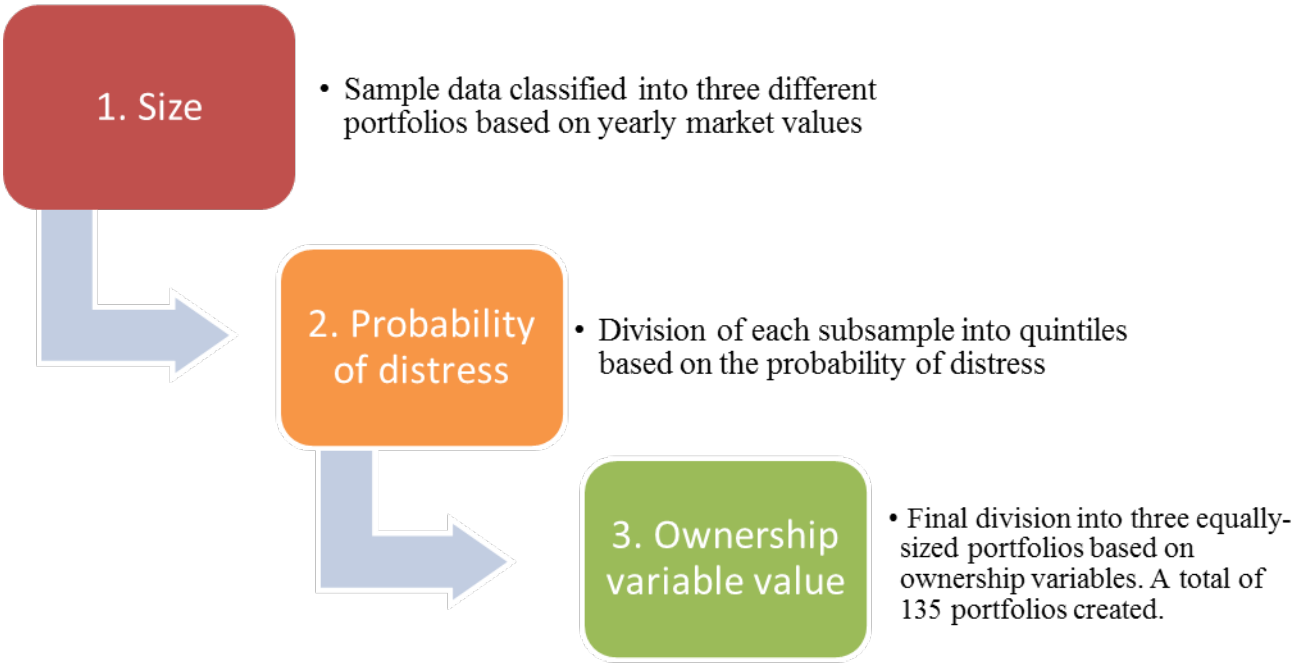

Figure 2: Outline of portfolio construction

3.5. VARIABLES

3.5.1. OHLSON O-SCORE

In the wake of Altman's Z-score, a broad range of studies have been conducted within the field of financial distress, which has rendered in the existence of a wide array of models that seek to predict the bankruptcy of firms. One of the most widespread and acknowledged of these succeeding models is the Ohlson O-score, which takes a binary approach to predicting bankruptcy. The O-score is analogous to Altman's model in that it aims to predict financial distress by examining empirical evidence from historical bankruptcies. Another prominent common denominator stems from the usage of unadjusted accounting-based information in compiling the financial ratios used as the models' predictors. The O-score, however, distinguishes itself in its choice of econometric methodology by employing a conditional logistic (logit) analysis. The majority of preceding models, including Altman's Z-score, uses a Multivariate Discriminant Analysis (MDA) approach, in which the sample is composed by grouping bankrupt and non-bankrupt firms together one-for-one. Thus, the size of the sample in Altman's study is clearly restricted by the amount of observations of firms that have entered a state of bankruptcy. The usage of a logit approach, however, effectively reduces the problems associated with MDA and enabled Ohlson to compile a more unconstrained sample containing 2163 observations of which only 105 were bankrupt firms (Ohlson, 1980).

Ohlson's logit model is composed of a range of financial accounting variables to act as predictors of corporate distress, including a set of dummy variables as an attempt to increase the reliability of the model. The independent variables and their interpretations are depicted below;

1. SIZE = log(total assets/GNP price-level index). Total assets are input as reported in the financial statements. The GNP index has the base year 1968, at which it assumes a value of 100, and the index year prior to the year of the balance sheet date is used, which assures a real-time implementation of the model. By log-transforming the ratio, i.e. using its relative distance, the balance sheet data will be independent of the price-level index, which of course is a desirable attribute.
2. TLTA = the ratio of total liabilities over total assets.
3. WCTA = the ratio of working capital over total assets.

4. CLCA = the ratio of current liabilities over current assets.
5. OENEG = a dummy variable which assumes a value of one if total liabilities exceeds total assets, and zero otherwise.
6. NITA = the ratio of net income over total assets.
7. FUTL = the ratio of funds provided by operations over total liabilities.
8. INTWO = a dummy variable which assumes a value of one if the cumulative net income for the last two years was negative, and zero otherwise.
9. CHIN = $(NI_t - NI_{t-1})/(|NI_t| + |NI_{t-1}|)$, where NI_t is the net income for the most recent accounting period. The denominator contains the cumulative absolute value of the net income for the last two years and acts as a level indicator, meaning that the variable intends to measure the change in net income.

In Ohlson's study, three different sets of estimates for the logit model were retrieved from the computation of the above described set of prediction variables. The first model is used to predict bankruptcies within the first year, while Model 2 predicts bankruptcies within two years, given that the company did not fail during the first year. Lastly, Model 3 predicts bankruptcies within one or two years, unconditional on whether it will default during the first or the second year. Given the purpose of this study, the prediction of bankruptcy within the first year is of sufficient scope and will thus be the only model of further interest. The formula for calculating the O-score of Ohlson's first model as described in his study is presented below:

$$O - score = -1.32 - 0.407SIZE + 6.03TLTA - 1.43WCTA + 0.0757CLCA - 2.37NITA - 1.83FUTL + 0.285INTWO - 1.72OENEG - 0.521CHIN \quad (3)$$

Ohlson identifies a cut-off point at a score of >0.5, meaning that companies with an O-score higher than 0.5 would be predicted to reach bankruptcy within the coming year. The effect of the different prediction coefficients on the probability of default, i.e. the signs of the coefficients, can be intuitively interpreted by the nature of their economic impact. TLTA, CLCA and INTWO all have positive effects on the outcome of the O-score, meaning that an increase of these ratios will lead to a higher probability of default, which is inherently logical given the fact that higher leverage, current and overall, as well as negative earnings typically

have negative effects on a firm's prosperity. In the same manner, a relative increase of the drivers behind the ratios of SIZE, WCTA, NITA, FUTL, and CHIN typically implies a greater maturity, stability, and liquidity within the firm, all factors that will move the entity further away from a state of distress. The last variable, OENEG, was added as a discontinuity correction for the extreme events when total liabilities exceed total assets, i.e. that the firm has a negative book value of equity (Ohlson, 1980).

As this study investigates distress risk, the accompanying probabilities of default have been calculated for each yearly O-score notation. In order to move from the O-score to the probability of default (PD), Ohlson uses the following logit model:

$$PD = (1 + \exp(-y_i)^{-1}) \tag{4}$$

Where y_i denotes the O-score calculated for company i and PD is increasing in y, meaning a larger O-score implies a higher probability of default. Thus, a highly certain case of pending bankruptcy would result in a score corresponding to a probability of default equal to 1, while a firm at the opposite extreme would have a probability of 0 (Ohlson, 1980).

3.5.2. OWNERSHIP VARIABLES; FOREIGN, INSTITUTIONAL, AND LARGEST OWNER

The three variables used to examine the effect of ownership structure on firm performance are collected from Holdings's database. Following Douma, George and Kabir (2006), foreign ownership is defined as the percentage of common stocks owned by foreign investors. As for institutional ownership, the approach to measure this variable has been quite versatile in previous research. Cornett et al. (2007) uses data on institutional investors owning more than $100 million of the equity in any firm, while Craswell, Taylor and Saywell (1997) estimates institutional holdings from the firm's 20 largest shareholders, with institutions classified as those investors investing on the behalf of others. Pound (1988) and McConnell and Servaes (1990) uses classifications as presented in monthly survey reports. Unfortunately, the data provided by Holdings does not contain any streamlined measurement of institutional

ownership. Instead, equity held by juridical persons is used as a proxy for institutions. A juridical person incorporates all entities that are subject to legal proceedings as well as capable of holding obligations and that is not a natural (physical) person, thus it is not a pure measurement of institutional holdings as it incorporates all other types of corporations and organizations that invests in their own interests. However, ownership by juridical persons should be a viable substitute for institutional ownership, considering that institutional owners accounts for a vast majority of the equity ownership in Sweden (Sjöström, 2010) and thus should consume a lot of the explanatory power in our variable. The final variable, largest owner, is simply a measure of the percentage of total capital held by the owner in possession of the single largest ownership stake.

3.5.3. TOTAL RETURN INDEX

To measure the impact of distress risk and ownership structure on the equity returns, the total return index (RI) as a measure of firm performance is applied. The total return index differs from a regular price index, and is thus oftentimes the preferred measure, since it incorporates dividends as if they were to be reinvested upon receiving, whereas a price index only considers price movements. Total return indices for the firms covered are retrieved from Datastream and its calculations are identical to those of regular price indices except for periods when dividends are paid, for which the index is calculated as:

$$RI_t = RI_{t-1}\left(\frac{P_t + D_t}{P_{t-1}}\right) \tag{5}$$

Where P denotes the stock price, D is the dividends paid, and t is a time subscript (Thomson Reuters, 2017). To convert the index into percentage returns the following simple return equation is applied:

$$Return\ in\ \% = \frac{(R_t - R_{t-1})}{R_{t-1}} \tag{6}$$

The returns are subsequently value-weighted to reflect the total returns of the portfolio with respect to each firm's relative contribution in terms of size. Both average yearly value-weighted and monthly value-weighted returns are calculated for all portfolios, which is in line with the method used in Griffin and Lemmon (2002).

3.6. HYPOTHESIS TESTING: PAIRED T-TEST

In order to test the difference between portfolio returns, the paired t-test is employed. A paired t-test allows for testing for differences between a sample of matched distributions or similar units that are dependent of one another, such as a pair of portfolio returns. In order to test for differences in returns, we let:

$$W = X - Y \tag{7}$$

Where X and Y are two different sets of portfolio returns. What we want to test is whether there is any significant difference in return between the two portfolios, i.e. the null hypothesis that:

$$H_0: \mu_w = 0 \tag{8}$$

A rejection of the null hypothesis would imply that W is different from zero, meaning that there's a statistically significant difference in the returns of the different portfolios. The test statistic of the paired t-test is given by:

$$t = \frac{\bar{w}}{\sigma_w/\sqrt{n}} \tag{9}$$

Where $\bar{w}$ is the average difference for the observed time series values, σ_w is the sample standard deviation and n is the sample size. The null hypothesis is rejected if the test statistic

exceeds its critical value, as determined by the chosen significance level (Hogg, Tanis & Zimmerman, 2015). An example of the output produced from running the t-tests is exhibited in Appendix 3.

3.7. VALIDITY AND RELIABILITY

When assessing the quality of an empirical study, it is mainly measured by internal and external validity as well as reliability. As described by Bryman and Bell (2011), validity is defined as whether or not a measure really measures the concept of interest. To clarify, validity is when the study has been able to measure what was initially intended. In terms of validity, this study uses the Ohlson O-score to calculate probability of default. The O-score is a conventional model for calculating distress probabilities and has been tested for its predictive power in several previous studies (Hillegeist et al., 2004; Kumar & Kumar, 2012; Griffin & Lemmon, 2002). The extensive testing of the model and the fact that it has a well-documented performance in terms of predicting default indicates a high validity. Furthermore, the fact that our study to a large extent follows the methodology used in the well-cited work of Griffin and Lemmon (2002) should further serve to increase its validity.

In terms of external validity, which is a measure of the generalizability of the research, this study has focused on the Swedish market and the results should therefore mainly be generalizable for the Swedish, Nordic, and parts of the European markets since the ownership structure is probable to be affected by several different, regional factors such as regulations and traditions. The sample consists of nearly 200 companies, which is fewer than similar studies made on the US market, but as this study incorporates a new approach to investigate distress in its use of the ownership structure it is quite natural for the sample to be of smaller scope.

The reliability of a study is concerned with whether its findings are reproducible. In particular, reliability is of importance when conducting quantitative research, as the researcher is likely to be concerned with whether the measures used are consistent or not (Bryman & Bell, 2011). In order to facilitate the study's reliability, all methodological steps

taken and measures used have been carefully outlined in order for the research to be suitable for replication purposes.

The data collected has been retrieved from well-renowned and reliable sources throughout. The sample is composed with the use of information accessed directly from the Nasdaq exchanges, while financial figures are retrieved from Datastream and Holdings, both of which have access to primary data about the firms and use standardized classifications of their data to maintain consistency. As a measure of ensuring the reliability of our sources of choice, several observations have been randomly selected and cross-referenced with financial reports and stock market quotes and were all found to be consistent with the data collected. Additionally, no missing observations were retrieved from alternative sources, whereby the data collection should not be subject to any randomized elements.

3.8. METHODOLOGICAL DISCUSSION

As Ohlson's O-Score was created in order to determine the probability of default for U.S. companies (Ohlson, 1980), one could argue that making inferences from this model on the Swedish market would possibly result in a decreased accuracy. However, as investigated by Altman et al. (2016), the Altman Z-score performs very well in an international setting when 31 European countries and three non-European countries were investigated. Similar studies have been performed for the Ohlson O-score, such as Xu and Zhang (2009), where the O-score was found useful in predicting defaults in the Japanese market. Since the Altman and Ohlson models are closely related and the fact that both have been able to predict bankruptcies in an international environment, the Ohlson O-score is expected to be a well-functioning model for predicting bankruptcy on the Swedish market as well.

The possible exposure to survivorship bias is another area where the empirical soundness of this study could be questioned. Due to the constraints in ownership data supplied by Holdings, the study risks to suffer from not including firms that have been delisted from the Nasdaq OMX during the examined time period. The consequences of survivorship bias is described by Brown et al. (1992) and Ross (1994), who argue that the conclusions drawn from studies suffering from survivorship bias are to be interpreted with caution. The presence

of survivorship bias would naturally imply that historical performance should act as a worse predictor of future performance (Brown et al., 1992). To what extent survivorship bias will affect the results depends on how the study is constructed and what actions are taken to mitigate the effect of this bias. In order to investigate the possible effect of survivorship bias, we incorporate an examination of the robustness of the relationships found in our original tests by narrowing the timeframe to five years. Through limiting the time period to the most recent years, the sample moves closer to mimicking a current state of the market and thus minimizing the risk of survivorship bias in the sample.

4. EMPIRICAL RESULTS

In this chapter, we present a summary of our data as well as the results from the tests employed in order to answer our research questions. First, a brief summary of the most important characteristics of the portfolios are displayed, whereupon the results from the statistical tests are presented.

4.1. DESCRIPTIVE STATISTICS

Table II shows the summary statistics of our sample firms, containing median values on the probability of distress, market capitalization, and the respective ownership variables for all portfolios. As can be clearly seen, the market capitalization almost exclusively decreases as we move from the low to high quintiles of the O-score. The portfolio sorts therefore reveal that the probability of default is negatively related to firm size, as measured by the market capitalization. This is consistent with the common notion that there is an inverse relationship between firm size and the O-score. Furthermore, there's a persistently positive relationship between the concentration of foreign and institutional ownership and firm size, suggesting that larger firms are more prone to attract the interest of these types of investors. The amount of capital held by the single largest owner of equity, however, seem to demonstrate the opposite, with large shareholders owning greater stakes in smaller-sized firms, which intuitively would be the expected outcome given the differences in capital needed to attain substantial ownerships stakes in smaller companies compared to its larger counterparts.

Furthermore, the probability of distress is increasing in the amount of foreign investors for those firms within the highest O-score quintile, while this relationship holds for the three highest quintiles of the portfolios examining institutional investments. This is in line with the findings of previous studies suggesting that both foreign and institutional investors are superior in its monitoring of the firm, and might indicate an awareness of such investors to invest in financially distressed firms in order to extract default premiums. For large ownership, however, no clear relation of this sort can be found.

Table II

Summary Statistics for Portfolios Sorted on the Probability of Financial Distress and Ownership Variables

Summary statistics for median values of probability of distress, market capitalization (in SEK millions), and foreign ownership for all portfolios sorted on O-score values and each of the three investigated ownership variables. No classification on size has been made, whereas the statistic contains information from all observations in the sample.

	Foreign Ownership								
O-Score	L	M	H	L	M	H	L	M	H
	Probability of Distress			Market Capitalization			Foreign Ownership		
L	0,0153	0,0080	0,0161	969	2 559	18 803	7,87%	26,20%	44,92%
2	0,0605	0,0642	0,0584	828	7 669	22 579	8,02%	24,86%	44,56%
3	0,1350	0,1362	0,1265	1 029	2 789	6 229	7,77%	19,29%	38,27%
4	0,3051	0,2978	0,3038	274	718	1 495	4,27%	16,82%	40,50%
H	0,8161	0,8439	0,8670	159	347	400	7,43%	19,34%	41,89%

	Institutional Ownership								
O-Score	L	M	H	L	M	H	L	M	H
	Probability of Distress			Market Capitalization			Institutional Ownership		
L	0,0117	0,0127	0,0174	1 230	13 021	84 857	60,07%	79,53%	90,13%
2	0,0624	0,0616	0,0646	2 201	21 407	25 150	59,90%	86,16%	93,26%
3	0,1416	0,1385	0,1307	1 439	12 990	17 080	60,04%	80,91%	91,99%
4	0,3223	0,3219	0,3173	571	1 444	6 961	50,12%	76,09%	89,84%
H	0,8330	0,8254	0,7763	299	391	1 808	45,70%	70,63%	86,50%

	Largest Owners								
O-Score	L	M	H	L	M	H	L	M	H
	Probability of Distress			Market Capitalization			Largest Owner		
L	0,0147	0,0146	0,0114	2 387	1 370	1 654	8,68%	15,25%	31,23%
2	0,0562	0,0636	0,0611	8 987	1 833	2 890	10,04%	18,37%	33,69%
3	0,1305	0,1335	0,1329	2 511	2 350	1 953	9,29%	16,24%	32,56%
4	0,3027	0,2994	0,3072	641	719	573	10,03%	17,55%	30,36%
H	0,8786	0,7968	0,8346	329	266	250	8,26%	16,53%	29,20%

4.2. RETURNS AND DISTRESS PROBABILITY

In order to determine the relation between the probability of distress and equity returns, table III is examined where the average annual value-weighted buy-and-hold returns for each portfolio classified with respect to size and O-score are presented. Our sorts show that the average returns from investing in small firms within the high O-score quintiles are substantially lower than those in the portfolios characterized by low probabilities of default. For firms in the large firm portfolio, however, the differences in returns are minor and no clear pattern can be detected. The tests for significance between portfolios in the high and low end of the O-score quintiles, displayed by the p-values, shows that the differences in returns with respect to default probability are indistinguishable from zero, hence no indication of a priced default risk factor can be found.

Table III

Average Annual Returns for Portfolios Sorted on the Probability of Distress

Percentage value-weighted average annual returns are displayed for portfolios sorted on size and O-score. The tests for statistical differences between groups with a high probability of distress and those with a low probability of distress are based on the time series of monthly returns.

O-Score	Small	Large	All
L	20,04	16,15	16,19
2	20,86	18,52	18,29
3	14,37	16,83	15,20
4	-2,83	15,75	18,07
H	4,20	17,37	7,15
HML	-15,84	1,22	-9,04
(p-value)	(0,118)	(0,811)	(0,214)

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

4.2 FOREIGN OWNERSHIP IN DISTRESSED FIRMS

Table IV presents the average annual returns of portfolios with respect to differences in the magnitude of foreign ownership. The HML-portfolios with respect to the amount of foreign ownership are almost consistently negative, indicating that firms with a high amount of

Table IV

Average Annual Returns for Portfolios Sorted on the Probability of Distress and Foreign Ownership

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and foreign ownership. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Foreign Ownership				
O-Score	L	M	H	HML	(p-value)
	All firms				
L	19,69	17,31	17,06	-2,63	(0,661)
2	22,76	16,69	19,66	-3,10	(0,715)
3	20,50	23,09	14,67	-5,83	(0,762)
4	20,45	16,91	14,89	-5,56	(0,804)
H	11,14	10,64	-0,97	-12,11	(0,889)
HML	-8,55	-6,67	-18,03		
(p-value)	(0,339)	(0,515)	(0,064)		
	Small firms				
L	18,80	14,19	21,68	2,88	(0,294)
2	23,09	21,09	15,89	-7,20	(0,852)
3	22,40	15,83	11,91	-10,49	(0,717)
4	0,32	-0,49	-2,43	-2,75	(0,625)
H	24,62	-0,55	-8,44	-33,06	(0,983)
HML	5,82	-14,74	-30,12		
(p-value)	(0,682)	(0,284)	(0,023**)		
	Large firms				
L	19,65	15,17	9,29	-10,36	(0,905)
2	17,17	12,44	23,49	6,32	(0,139)
3	19,80	20,60	17,52	-2,28	(0,644)
4	29,82	20,83	15,82	-14,00	(0,822)
H	24,30	19,99	13,04	-11,26	(0,923)
HML	4,65	4,82	3,75		
(p-value)	(0,545)	(0,562)	(0,655)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

foreign owners underperform those with a higher magnitude of domestic investors, irrespective of the firms' default probabilities. The differences in returns are also most pronounced in the high distress risk-portfolios, most of which for small firms where the high O-score quintile with low foreign ownership-portfolio excels the firms in the high portfolio by on average roughly 33 percent annually. Furthermore, the returns of small, high O-score firms underperform those with a low probability of distress for portfolios with a high degree of foreign ownership.

4.3 INSTITUTIONAL OWNERSHIP IN DISTRESSED FIRMS

The results for portfolios sorted on institutional ownership are shown in Table V. For all O-score quintiles, the portfolios containing firms with a high degree of institutional investors have generated lower average returns than the low institutional ownership-portfolios during the sample time period. Just as for foreign ownership, no significant relationship between institutional ownership and returns can be found for any of the sample portfolios, which means that inferences about its effect on returns in distressed companies cannot be made.

Table V

Average Annual Returns for Portfolios Sorted on the Probability of Distress and Institutional Ownership

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and institutional ownership. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Institutional Ownership				
O-Score	L	M	H	HML	(p-value)
	All firms				
L	36,35	24,62	14,00	-22,35	(0,999)
2	25,20	17,34	19,11	-6,09	(0,856)
3	37,35	15,33	18,56	-18,79	(0,997)
4	21,93	21,43	14,64	-7,29	(0,867)
H	25,78	-3,15	4,38	-21,40	(0,966)
HML	-10,57	-27,77	-9,62		
(p-value)	(0,407)	(0,006**)	(0,222)		
	Small firms				
L	23,34	20,21	11,54	-11,80	(0,926)
2	20,42	26,29	7,54	-12,88	(0,830)
3	23,30	25,76	0,22	-23,08	(0,999)
4	4,00	-8,86	-5,14	-9,14	(0,876)
H	14,73	5,97	-14,23	-28,96	(0,982)
HML	-8,61	-14,24	-25,77		
(p-value)	(0,567)	(0,345)	(0,015**)		
	Large firms				
L	35,59	18,17	12,45	-23,14	(0,999)
2	25,67	16,45	18,64	-7,03	(0,864)
3	22,81	14,62	13,50	-9,31	(0,921)
4	27,17	16,28	22,13	-5,04	(0,836)
H	27,10	19,95	9,45	-17,65	(0,986)
HML	-8,49	1,78	-3,00		
(p-value)	(0,257)	(0,849)	(0,608)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

The HML-portfolios with respect to the probability of distress are also persistently negative, with findings of negative relationships between default risk and returns for small firms characterized by a high degree of institutional ownership as well as the all market value-portfolio with a moderate level of institutional investors. This suggests that there are no default premiums compensating institutional investors for the risk they bear in holding assets with a high probability of ending up in financial distress.

4.4 LARGEST OWNER IN DISTRESSED FIRMS

The results for portfolios sorted with respect to the percentage of capital owned by the single largest holder of equity are shown in Table VI. Compared to institutional and foreign ownership, the largest owner variable stands out with a majority of the HML-values being positive. Interestingly, the HML for the portfolios containing all market values is rising with a higher level of ownership when the probability of distress is high. Therefore, the returns indicate that a high ownership concentration of the largest owner could be beneficial for firms in distress. We, however, only find a significant positive relationship for the returns of large firms with a moderate risk of distress, revealing little about any persistent effect of large ownership stakes in firms that have a high probability of distress.

Table VI

Average Annual Returns for Portfolios Sorted on the Probability of Distress and Largest Owner

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and largest owner. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Largest Owner % of Capital				
O-Score	L	M	H	HML	(p-value)
	All firms				
L	15,45	25,73	13,74	-1,71	(0,613)
2	16,52	21,47	20,75	4,23	(0,237)
3	12,02	28,87	21,93	9,91	(0,129)
4	17,65	10,74	24,74	7,09	(0,184)
H	3,30	7,03	15,72	12,42	(0,126)
HML	-12,15	-18,70	1,98		
(p-value)	(0,207)	(0,052)	(0,823)		
	Small firms				
L	23,48	14,01	19,92	-3,56	(0,889)
2	24,83	11,16	25,49	0,66	(0,197)
3	25,60	3,41	15,18	-10,42	(0,762)
4	2,59	-3,18	-3,58	-6,17	(0,715)
H	1,89	2,47	3,63	1,74	(0,340)
HML	-21,59	-11,54	-16,29		
(p-value)	(0,220)	(0,505)	(0,201)		
	Large firms				
L	12,52	24,76	15,66	3,14	(0,321)
2	21,87	20,89	12,39	-9,48	(0,937)
3	14,14	16,58	25,51	11,37	(0,058*)
4	14,13	30,95	25,16	11,03	(0,141)
H	21,21	15,72	24,19	2,98	(0,376)
HML	8,69	-9,04	8,53		
(p-value)	(0,305)	(0,221)	(0,353)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

5. ANALYSIS

In this chapter, we analyze our empirical findings in relation to the hypotheses made, the evidence presented in previous research, and the theoretical framework. Furthermore, the result of our robustness checks are presented and discussed in order to strengthen the interpretations from our main examinations.

5.1. PROBABILITY OF DISTRESS

The initial objective of this study has been to investigate if there's a relationship between the equity return of firm's and its distress probability. The outputs in Table III provide results from the tests of significance performed between the returns of firms with an immediate threat of facing bankruptcy and firms with a low default probability. We find that the differences in returns of these portfolios are indistinguishable from zero and thus we are unable to determine whether the probability of distress affects the returns of Swedish firms, which holds for all firm sizes in the sample. The portfolio containing small firms, however, exhibits a negative HML with a p-value close of being significant, indicating that there might be a negative relationship between distress and returns, which would confirm the findings of Griffin and Lemmon (2002) on a negative relationship between the O-score and book-to-market equity.

Our findings on the effect of distress probability on returns stand in contrast to the evidence provided by Vassalou and Xing (2006), Shumway (1996) and Garlappi, Shu and Yan (2006), where positive relationships between firms characterized by high distress risk and subsequent realized returns are found. Hence, there seems to be an absence of a priced default risk factor in the pricing of assets on the Swedish market. This could indicate that the evidence provided by Dichev (1998) of bankruptcy risk in U.S. firms being an idiosyncratic risk rather than a priced, systematic risk might hold for the Swedish market as well. In conclusion, any inferences about the relationship between default risk and equity returns cannot be made and hence the null hypothesis of no difference in returns for firms within the highest and lowest distress risk-portfolios cannot be rejected.

5.2. OWNERSHIP STRUCTURE

The remaining part of the empirical investigations of this study examines the effect of foreign, institutional, and concentrated ownership structures on the equity returns. Firstly, the results of an effect on firms in distress from our sorts on institutional ownership are highly insignificant and we are thus unable to determine any relationship between the equity returns in distress and the presence of institutional investors. Based on the HML-differences of portfolios with respect to high and low degrees of institutional owners, there are indications that increased institutional ownership decrease returns when the firm is in distress. Our findings are inconsistent with the evidence from U.S. firms presented by Cornett et al. (2007) and McConnell and Servaes (1990), suggesting the contradictory results are at least in part due to differences in geographical or market characteristics. Given the persistently high p-values throughout all classifications on size, the results show no indications of the effect of ownership structure varying according to the size of the firm, thereby inconsistent with the ownership structure and value maximization theory presented by McConnell and Servaes (1990). As we are unable to distinguish any positive relation between institutional ownership and returns, the null hypothesis of no difference in the returns of distressed firms with respect to institutional ownership cannot be rejected.

Since institutional ownership is a wide concept containing a broad range of different types of organizations, even more so when using equity held by juridical persons as a proxy, the ability and willingness to effectively monitor and renegotiate contractual terms for distressed firms might vary substantially within the measure itself. Especially in a Swedish context, where institutional ownership is substantial, the results might be biased through e.g. endowment insurance funds such as Avanza Pension and Nordnet Pensionsförsäkring. These funds are compounded by oftentimes minimal contributions made by a vast amount of private, passive investors that together represents substantial parts of the institutional investments made on the Swedish market. This is especially the fact in smaller companies such as eWork Group, Enea, Sinter Cast, and C-Rad, where the ownership stakes of these entities for instance varied between 9-18 percent of the firms' total equity outstanding at the end of our sample period (Holdings, 2017). Since these type of investors arguably don't provide the same advantages in terms of monitoring and mitigation of agency costs as

expected from institutional owners, the results in especially the small portfolios could potentially suffer from this issue and partially explain the contradictory results.

When analyzing the ownership concentration, we find that firms in which the largest owner holds a substantial stake of the total equity outstanding have on average generated higher annual returns during our sample period. This indicates that the evidence presented by Thomsen and Pedersen (2000) and Jensen and Meckling (1976), who finds a positive relationship between ownership concentration and performance, might be valid in a Swedish context. Compared to our foreign and institutional ownership variables, the p-values for HML-portfolios with respect to largest owners are substantially lower and we find a positive relationship between firms in the mid-range of financial distress risk and the equity stake held by the largest owner. This alone, however, is insufficient in order to make any inferences about the effect of large ownership in highly distressed firms, given the fact that we cannot determine any relationship between the variable and firms within the portfolio of high default risk. We are therefore unable to reject the null hypothesis of no difference in returns for highly distressed firms in the high and low ownership concentration-groups.

Our findings contradict those of Smith and Warner (1979), who concluded that firms with concentrated ownership are better suited to outlast a highly distressed scenario through more advantageous renegotiating powers. Having a substantial equity stake in the company, however, does not necessary entail that the owner possesses the voting power needed to actually implement change when in a distressed state. The theoretical edge that large owners have been found to possess in terms of better monitoring and renegotiating abilities when facing distress, might thus be captive by the incapability of exploiting these features. In such a state, there clearly exists a trade-off for firms in high distress between having strong owners in terms of capital resources and having the mandate to implement the changes needed. As it is hard to coordinate the wills of highly dispersed shareholders, the presence of capital strong owners might be inadequate to affect the performance in financially distressed situations without an accompanying influence in enforcing decision-making.

Several of the previous studies on shareholder concentration that find positive relationships between returns and large ownership concentrations are performed on a sample of firms with

large market capitalization (Cornett et al., 2007; Thomsen & Pedersen 2000; Schleifer & Vishny, 1986). One possible explanation to the insignificant and nonlinear results for our large portfolios is that the portfolio construction follows the methodology by Griffin and Lemmon (2002), where a 50/50 distinction between small and large firms is made. Thus, the sample of large companies consists of several companies with market values of just above 1 bSEK such as Anoto Group, MQ, Acando, and Swedol, all of whom could be considered small firms with a different size classification. In order to address this issue, a more complex size distinction would be needed such as dividing the sample into quartiles, similar to that of Vassalou and Xing (2006).

Our final ownership variable examines the effect of foreign investors. The foreign ownership variable shows similar indications as for institutional investors, with mainly negative HML-coefficients followed by high p-values. As a result, we cannot establish any positive relationship between the degree of foreign ownership and returns in firms with a high probability of distress, whereas our null hypothesis with respect to foreign ownership cannot be rejected. Our results stand in contrast to the findings of Douma, George and Kabir (2006) and Dharwadkar, George and Brandes (2000), where foreign ownership were found to facilitate greater monitoring abilities and lower agency costs, thus increasing productivity with a positive effect on equity returns as a result. The transferability of these findings may however be questioned as the studies were conducted on emerging markets, where the implication of attracting foreign investors with experience and knowledge from larger, more mature markets are probable to differ from its impact in a Swedish setting. This, however, does not explain the evidence presented by Bartram et al. (2015), who found that there's a positive relationship between foreign ownership and returns in an international setting, with a majority of investigated firms operating in the U.S. market. The reason for our findings contradicting previous research is therefore difficult to deduce.

5.3. ROBUSTNESS CHECKS

Several robustness checks have been made in order to allow for a more thorough analysis of the results found in the study. The different measures are outlined and discussed in detail below.

5.3.1. SURVIVORSHIP BIAS

Due to the inability in attaining ownership data for companies that for different reasons have been delisted during our sample period, there's a probability that the examined data suffers from survivorship bias and therefore leads to erroneous results. Since bankruptcies and financial constraints represents one of the main reasons for stocks being delisted from the Nasdaq OMX exchanges, an exclusion of these firms is probable to underestimate the overall distress environment of the Swedish market during the investigated time period. In order to test for possible misrepresentations in the data as caused by survivorship bias, the time period is limited to 2011-2015 in order to minimize the potential for delisted firms to affect our output, as well as allowing for new and presumably more risky firms to have a greater impact within the sample as we move in the direction of the final year of our time period. The results from our sorts with respect to size and probability of distress are shown in Table VII, while a summary containing all firms sorted on each respective ownership variable is presented in Table VIII. The full results from all portfolios with respect to the ownership variables are displayed in Appendices 4-6.

Table VII

Comparison Between Average Annual Returns for Full Sample and 2011-2015 Subsample Portfolios Sorted on The Probability of Distress

Percentage value-weighted average annual returns are displayed for portfolios sorted on size and O-Score for the full sample and 2011-2015 subsample. The tests for statistical differences between groups with a high probability of distress and those with a low probability of distress are based on the time series of monthly returns.

	2011-2015 Subsample			Full Sample		
O-Score	Small	Large	All	Small	Large	All
L	-0,37	4,70	4,90	20,04	16,15	16,19
2	-0,39	4,69	5,49	20,86	18,52	18,29
3	-0,41	5,66	3,96	14,37	16,83	15,20
4	-0,34	5,00	5,95	-2,83	15,75	18,07
H	-0,11	5,75	3,93	4,20	17,37	7,15
HML	0,26	1,05	-0,97	-15,84	1,22	-9,04
(p-value)	(0,114)	(0,585)	(0,640)	(0,118)	(0,811)	(0,214)

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

Table VIII

Comparison Between Average Annual Returns for Full Sample and 2011-2015 Subsample Portfolios Sorted on The Probability of Distress and Ownership Variables

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and foreign ownership for the full sample and 2011-2015 subsample. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	2011-2015 Subsample					Full sample				
O-Score	L	M	H	HML	(p-value)	L	M	H	HML	(p-value)
	Foreign Ownership, all market values					Foreign Ownership, all market values				
L	26,32	15,74	13,28	-13,04	(0,979)	19,69	17,31	17,06	-2,63	(0,661)
2	20,63	12,43	16,98	-3,65	(0,717)	22,76	16,69	19,66	-3,10	(0,715)
3	23,84	21,75	11,52	-12,32	(0,920)	20,50	23,09	14,67	-5,83	(0,762)
4	23,62	12,73	15,93	-7,69	(0,781)	20,45	16,91	14,89	-5,56	(0,804)
H	13,08	8,42	17,43	4,35	(0,370)	11,14	10,64	-0,97	-12,11	(0,889)
HML	-13,24	-7,32	4,15			-8,55	-6,67	-18,03		
(p-value)	(0,220)	(0,600)	(0,730)			(0,339)	(0,515)	(0,064)		
O-Score	L	M	H	HML	(p-value)	L	M	H	HML	(p-value)
	Institutional Ownership, all market values					Institutional Ownership, all market values				
L	56,81	25,34	13,71	-43,10	(0,999)	36,35	24,62	14,00	-22,35	(0,999)
2	27,16	10,84	19,14	-8,02	(0,911)	25,20	17,34	19,11	-6,09	(0,856)
3	46,11	7,67	14,59	-31,52	(0,992)	37,35	15,33	18,56	-18,79	(0,997)
4	31,58	14,25	16,28	-15,30	(0,931)	21,93	21,43	14,64	-7,29	(0,867)
H	10,24	-18,19	19,43	9,19	(0,309)	25,78	-3,15	4,38	-21,40	(0,966)
HML	-46,57	-43,53	5,72			-10,57	-27,77	-9,62		
(p-value)	(0,021**)	(0,001***)	(0,575)			(0,407)	(0,006**)	(0,222)		
O-Score	L	M	H	HML	(p-value)	L	M	H	HML	(p-value)
	Largest Owner, all market values					Largest Owner, all market values				
L	16,46	15,92	12,14	-4,32	(0,708)	15,45	25,73	13,74	-1,71	(0,613)
2	12,25	24,18	21,85	9,60	(0,086*)	16,52	21,47	20,75	4,23	(0,237)
3	11,51	14,76	13,75	2,24	(0,361)	12,02	28,87	21,93	9,91	(0,129)
4	25,97	5,16	16,70	-9,27	(0,805)	17,65	10,74	24,74	7,09	(0,184)
H	13,11	0,84	13,82	0,71	(0,483)	3,30	7,03	15,72	12,42	(0,126)
HML	-3,35	-15,08	1,68			-12,15	-18,70	1,98		
(p-value)	(0,812)	(0,266)	(0,898)			(0,207)	(0,052)	(0,823)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

The tests when attempting to control for survivorship bias shows similar features as those from the full sample time period in that we observe no positive relationships between the returns and ownership structure when examining foreign and institutional ownership. Similar to our original results, we find a weak positive effect of ownership concentration on the returns of firms with a moderate probability of distress. Furthermore, no difference in the effect of distress risk on equity returns can be found between the two sample sets, as shown in Table VII. In summary, our tests show that the sorts present similar features when controlling for excluded observations as when running the full sample, thus demonstrating that our variables are largely robust to a narrowing of the starting point of the estimation.

Thus, we conclude that survivorship bias does not appear to pose any major threat to the validity of our results.

5.3.2. OHLSON'S THRESHOLD

When constructing the O-score, Ohlson (1980) identified a cut-off point of 0.5 and above for which errors in predicting bankruptcies were minimized. This cut-off would then act as the limit for classifying whether a company is financially distressed or not. In order to test for whether the classification identified by Ohlson is a more suitable separator for the probability of financial distress, i.e. that the market reacts to a certain point of distress risk rather than a relative measure, this threshold is applied and tested on our original sample. The tests for differences in returns for high and low distress risk-firms are shown in Table IX, while the effect of ownership structure on the returns of financially distressed firms are displayed in Tables X-XII .

Table IX

Average Annual Returns for Portfolios Sorted on Ohlson's Threshold for Firms in Distress

Percentage value-weighted average annual returns are displayed for portfolios sorted on size and O-score. The tests for statistical differences between groups with a high probability of distress and those with a low probability of distress are based on the time series of monthly returns.

O-Score	Small	Large	All
L	-0,31	15,29	-0,14
H	-1,39	17,41	10,26
HML	-1,08	2,12	10,40
(p-value)	(0,034*)	(0,824)	(0,478)

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

Table X

Average Annual Returns for Portfolios Sorted on the Probability of Distress and Foreign Ownership

ercentage value-weighted average annual returns are displayed for portfolios sorted on size, Ohlson' hreshold for the O-Score, and foreign ownership. The tests for statistical differences between group in the high and low portfolios are based on the time series of monthly returns.

	Foreign Ownership				
O-Score	L	M	H	HML	(p-value)
	All				
L	22,56	17,33	14,20	-8,36	(0,944)
H	13,16	19,30	-0,53	-13,69	(0,904)
HML	-9,40	1,97	-14,73		
(p-value)	(0,322)	(0,856)	(0,079)		
	Small firms				
L	19,15	14,69	17,28	-1,87	(0,601)
H	9,93	4,74	-10,77	-20,70	(0,958)
HML	-9,22	-9,95	-28,05		
(p-value)	(0,292)	(0,385)	(0,028*)		
	Large firms				
L	19,94	16,35	15,71	-4,23	(0,846)
H	2,27	23,60	28,40	26,13	(0,120)
HML	-17,67	7,25	12,69		
(p-value)	(0,290)	(0,662)	(0,434)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

The results from running our tests based on Ohlson's threshold are in most aspects similar to those of our original investigation. Two of the findings, however, stand out. Looking at Table XI, we find a positive relation between ownership concentration and equity returns for large firms with a high probability of distress, which would confirm our expectations of firms with large owners being able to better withstand a highly distressed scenario. We also find evidence to support our first hypothesis in that there's a significant difference in the returns of firms with high and low distress risk in the portfolio for small firms. By using a standardized separator for classifying the distress risk of firms, we thus find some evidence of the market reacting to and pricing distressed assets according to a fixed limit unraveling the firms in distress from those that are not, rather than relying on the relative state of the market.

Table XI

Average Annual Returns for Portfolios Sorted on the Probability of Distress and Institutional Ownership

'ercentage value-weighted average annual returns are displayed for portfolios sorted on size, Ohlson' threshold for the O-Score, and institutional ownership. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Institutional Ownership				
O-Score	L	M	H	HML	(p-value)
			All		
L	30,24	17,21	14,30	-15,94	(1,000)
H	22,54	2,23	5,28	-17,26	(0,906)
HML	-7,70	-14,98	-9,02		
(p-value)	(0,538)	(0,126)	(0,295)		
			Small firms		
L	19,77	24,66	8,33	-11,44	(0,999)
H	10,30	-3,67	-18,86	-29,16	(0,988)
HML	-9,47	-28,33	-27,19		
(p-value)	(0,434)	(0,015**)	(0,004***)		
			Large firms		
L	26,31	13,99	15,90	-10,41	(0,933)
H	41,64	7,77	18,67	-22,97	(0,890)
HML					
(p-value)	(0,984)	(0,875)	(0,930)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

When conducting the sorts for small and large firms, we find that there is a largely disproportional distribution of observations between the portfolios, where for instance the portfolio containing large firms with O-scores above the threshold is limited to merely 49 yearly observations for the entire period. The fact that very few large companies have a probability of default above the threshold further indicates that size is a good predictor of distress, which is in line with previous research by Vassalou and Xing (2006), Griffin and Lemmon (2002) and Chan, Chen and Hsieh (1985). This disproportional distribution of observation between the different size portfolios also constitutes one of the main issues with the threshold approach, resulting in a possible skewness of the results not being able to conduct viable inferences. This means that few companies may have large influences on the value-weighted returns of the portfolio and therefore not being representative for the group as a whole. Thus, the positive relation found for the effect of large owners on the returns of highly distressed firms is to be interpreted with increased caution.

Table XII

Average Annual Returns for Portfolios Sorted on the Probability of Distress and Largest Owner

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, Ohlson's threshold for the O-Score, and largest owner. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Largest Owner % of Capital				
O-Score	L	M	H	HML	(p-value)
			All		
L	14,28	19,89	15,67	1,39	(0,386)
H	5,29	3,89	19,12	13,83	(0,132)
HML	-8,99	-16,00	3,45		
(p-value)	(0,355)	(0,079)	(0,727)		
			Small firms		
L	20,47	11,74	18,37	-2,10	(0,632)
H	1,24	-6,79	-2,18	-3,42	(0,606)
HML	-19,23	-18,53	-20,55		
(p-value)	(0,111)	(0,033*)	(0,019**)		
			Large firms		
L	13,99	22,05	15,42	1,43	(0,382)
H	12,35	41,78	46,72	34,37	(0,039*)
HML	-1,64	19,73	31,30		
(p-value)	(0,785)	(0,433)	(0,048*)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

5.3.3. FAMA AND FRENCH'S THREE-FACTOR MODEL

As a last measure in testing the robustness of our data, the Fama and French (1993) three-factor model has been applied to our portfolios, with the post-ranking factor loadings for the portfolios in each ownership variable, O-score, and size group being displayed in Appendices 7-9. The three-factor model allows us to test the portfolios' excess returns (α) against the model's estimated factor loadings on a value-weighted market index (m), size (s), and book-to-market (h), where the last two variables are presumed to be highly correlated with the probability of distress. The regressions thus provide four different coefficients that aim to explain the returns of the portfolios in a more comprehensive way.

The market loadings constitute the traditional betas of the portfolios. We find a largely fragmented dispersion in the betas of all ownership variable-portfolios, with no indication of

the betas increasing as we move up through the O-score quintiles. This is consistent with the findings of our original tests, which indicates that firm's with a higher distress risk are not accompanied by a higher market beta in order to compensate the investors for assuming this risk. As presented in Appendices 7-9, the most prominent results are the negative α for the high distress group within the small portfolios, where α decrease in a linear manner as distress rises. This relationship is particularly true for the institutional ownership resulting in a negative α of -1.8 monthly, which is in line with the findings by Dichev (1998) and the indications from our previous results. Furthermore, the size factor is mimicking the return of a portfolio that is long in small stocks and short in large stocks. Surprisingly, both the SMB-loadings for small and large firms are tilted toward smaller market values, which could be attributable to the coalescent border that follows from our narrow specification on size as was also found when analyzing the results of the ownership concentration. We also note the absence of any relationship between the size loadings and distress probability, which is surprising given the clear relationship between the two when sorting on threshold values.

Compared to our main investigations, the three-factor model indicates similar results with no clear statistical relationships between the ownership variables and the returns of distressed firms. One possible drawback with the three-factor model is the low adjusted R^2-values, indicating a low explanatory power of the model. This might be due to the fact that Kenneth French's (2017) data for European factors aren't fully applicable on the Swedish market and because of the relatively concentrated portfolios, thus resulting in few firms in each portfolio. Due to the low R^2, inferences on the portfolio returns suffer from the risk of being inaccurate which has to be taken into account.

6. CONCLUSION

In the study's final chapter, conclusions are drawn from the analysis presented in the previous chapter, which aim to answer the study's research questions. Lastly, our suggestions for future research within this topic are outlined.

Using the Ohlson O-score as a predictor for financial distress, the purpose of this study has been to investigate the relationship between distress, stock returns, and ownership structure. In order to fulfil this, our aim has been to answer the following research questions:

- *Is the probability of default a useful tool in predicting equity returns?*
- *How does the ownership structure help explain differences in return for financially distressed firms?*

In order to conduct an investigation of these questions, four hypotheses were formed based on relevant theoretical frameworks and the evidence from previous studies within or associated to the topic. Having thoroughly examined and analyzed the results, we can conclude that the findings are undisputed as we neither observe any clear relationship between equity returns and distress probabilities, nor any positive effect of differences in the ownership structure on firm performance for firms characterized by high default risk.

Our findings stand in stark contrast to the majority of previous evidence presented within the fields of financial distress and ownership structure. In order to test the robustness of our sample data and further strengthen the analysis of our findings, a range of supplementary tests were conducted. The test using a narrowed time period in order to mitigate exposure toward survivorship bias as well as the investigation of the portfolios' exposure to factor loadings using the Fama and French three-factor model both produce similar results to those of our main empirical examination, indicating that the contradictory findings are not attributable to sampling or data errors. Using Ohlson's threshold for classifying firms in high risk of distress, however, reveal partial relationships between both distress probabilities and equity returns and differences in ownership structure and firm performance in highly distressed firms. The results imply that the market prices the risk of distress with respect to certain levels of probability rather than relying on relative measures.

Due to the largely contradictory evidence on the Swedish market found in this study, several different possibilities for further research have been identified. First of all, Holdings is a novel database that would be expected to expand its data range in the future. Even though our tests for survivorship bias showed that the effect of excluding delisted companies should not be of immediate threat to the validity of the data, access to a larger sample and thus including dead stocks and expanding the time span would allow for a more unhampered and thorough investigation on the subject. Furthermore, we find indications on a negative relationship between the returns of distressed firms and both institutional and foreign ownership, given the persistently negative HML-values and high p-values. As previous research have found this relation to be positive, this study have employed a one-sided investigation of this relationship and we are thus unable to determine whether there actually is a negative effect instead. Hence, an investigation of the opposite relation would be of interest.

In addition, our sorts on especially the Ohlson threshold confirms that there is a large size effect in the probability of distress, as found by several previous studies. Our classification on size is however quite direct and we can see indications of the size effect not being captioned properly as a result. Thus, a narrower portfolio division with respect to size would be beneficial in order to capture the full effect of differences in size. Finally, the presence of institutional ownership on the Swedish stock market is very strong and captures a broad range of different institutions that oftentimes differ in terms of scope, intent, and clientele. We therefore consider an investigation solely based on determining the relationship between firm performance and institutional holdings in distressed firms, where different institutions instead can be classified according to their respective characteristics, to be a justified platform for further studies.

7. LIST OF REFERENCES

Agarwal, V. & Taffler, R. (2008). Does Financial Distress Risk Drive the Momentum Anomaly?, *Financial Management,* vol. 37, no. 3, pp. 461-484, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 27 March 2017]

Aktiekontrolluppgiftsutredningen (2006). Värdepapper och kontrolluppgifter: betänkande, Stockholm: Fritze

Almeida, H. & Philippon, T. (2007). The Risk-Adjusted Cost of Financial Distress, *The Journal of Finance,* vol. 62, no. 6, pp. 2557-2586, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 8 May 2017]

Altman, E. I., Iwanicz-Drozdowska, M., Laitinen, E. K. & Suvas, A. (2016). Financial Distress Prediction in an International Context: A Review and Empirical Analysis of Altman's Z-Score Model, *Journal of International Financial Management & Accounting,* vol. 28, no. 2, pp. 131-171, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 21 April 2017]

Bartram, S. M., Griffin, J. M., Lim, T-H. & Ng, D. T. (2015). How Important Are Foreign Ownership Linkages for International Stock Returns?, *The Review of Financial Studies,* vol. 28, no. 11, pp. 3036-3072, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 29 April 2017]

Bebchuk, L. A. (1999). A Rent-protection Theory of Corporate Ownership and Control, working paper, no. 7203, National Bureau of Economic Research, Available Online: http://www.nber.org/papers/w7203 [Accessed 8 May 2017]

Berk, J. & DeMarzo, P. (2014). Corporate Finance, 3rd edn, Boston: Pearson Education

Berlin, M. & Mester, L. J. (1992). Debt Covenants and Renegotiation, *Journal of Financial Intermediation,* vol. 2, no. 2, pp. 95-133, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 29 April 2017]

Berle, A. A. & Means, G. C. (1932). The Modern Corporation and Private Property, New York: MacMillan

Bhandari, L. C. (1988). Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence, *The Journal of Finance*, vol. 43, no. 2, pp. 507-528, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 4 May 2017]

Brown, S. J., Goetzmann, W., Ibbotson, R. G. & Ross, S. A. (1992). Survivorship Bias in Performance Studies, *A Review of Financial Studies,* vol. 5, no. 4, pp. 553-580, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 15 April 2017]

Bryman, A. & Bell, E. (2011). Business Research Methods, 3rd edn, New York: Oxford University Press

Campbell, J. Y., Hilscher, J. D. & Szilagyi, J. (2011). Predicting Financial Distress and the Performance of Distressed Stocks, *Journal of Investment Management,* vol. 9, no. 2, pp. 14-34, [pdf] Available Online:

https://dash.harvard.edu/bitstream/handle/1/9887619/JOIM_predicting_financial_11.pdf [Accessed 5 May 2017]

Chan, K. C. & Chen, N-F. (1991). Structural and Return Characteristics of Small and Large Firms, *The Journal of Finance,* vol. 46, no. 4, pp. 1467-1484, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 5 May 2017]

Chan, K. C., Chen, N-F. & Hsieh, D. A. (1985). An Exploratory Investigation of the Firm Size Effect, *Journal of Financial Economics,* vol. 14, no. 3, pp. 451-471, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 2 April 2017]

Cochrane, J. H. (2001). Asset Pricing, Princeton, N.J.: Princeton University Press

Cornett, M. M., Marcus, A. J., Saunders, A. & Tehranian, H. (2007). The Impact of Institutional Ownership on Corporate Operating Performance, *Journal of Banking & Finance,* vol. 31, no. 6, pp. 1771-1794, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 8 May 2017]

Craswell, A. T., Taylor, S. L. & Saywell, R. A. (1997). Ownership Structure and Corporate Performance: Australian Evidence, *Pacific-Basin Finance Journal*, vol. 5, no. 3, pp. 301-323, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 17 April 2017]

Dahlquist, M. & Robertsson, G. (2001). Direct Foreign Ownership, Institutional Investors, and Firm Characteristics, *Journal of Financial Economics,* vol. 59, no. 3, pp. 413-440, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 11 May 2017]

Damodaran, A. (2006). Damodaran on Valuation, 2nd edn, Hoboken, N.J.: John Wiley

Demsetz, H. & Lehn, K. (1985). The Structure of Corporate Ownership: Causes and Consequences, *Journal of Political Economy*, vol. 93, no. 6, pp. 1155-1177, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 17 April 2017]

Dharwadkar, B., George, G. & Brandes, P. (2000). Privatization in Emerging Economies: An Agency Theory Perspective, *Academy of Management Review,* vol. 25, no. 3, pp. 650-669, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 5 May 2017]

Dichev, I. D. (1998). Is the Risk of Bankruptcy a Systematic Risk?, *The Journal of Finance,* vol. 53, no. 3, pp. 1131-1147, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 14 April 2017]

Doukas, J., Holmén, L. & Travlos, N. (2002) Diversification, Ownership and Control of *Swedish Corporations. European Financial Management*. Vol 8, no 3, pp 281-314, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 March 2017]

Douma, S., George, R. & Kabir, R. (2006). Foreign and Domestic Ownership, Business Groups, and Firm Performance: Evidence From a Large Emerging Market, *Strategic*

Management Journal, vol. 27, no. 7, pp. 637-657, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 5 May 2017]

Eklund, J. (2017). Vänd blickarna mot Norge, *Affärsvärlden*, 21 February, http://www.affarsvarlden.se/bors-ekonominyheter/vand-blickarna-mot-norge-6825239 [Accessed 27 March 2017]

Fama, E. F. & French, K. R. (1992). The Cross-Section of Expected Stock Returns, *The Journal of Finance,* vol. 47, no. 2, pp. 427-465, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 24 April 2017]

Fama, E. F. & French, K. R. (1993). Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics*, vol. 33, no. 1, pp. 355-387, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 April 2017]

Fama, E. F. & French, K. R. (1996). Multifactor Explanations of Asset Pricing Anomalies, *The Journal of Finance,* vol. 51, no. 1, pp. 55-84, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 April 2017]

French, K. R. (2017). Fama/French European three-factor loadings, Available for download: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html [Accessed 16 May 2017]

Garlappi, L., Shu, T. & Yan, H. (2008). Default Risk, Shareholder Advantage, and Stock Returns, *Review of Financial Studies,* vol. 21, no. 6, pp. 2743-2778, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 27 March 2017]

Gilson, S. C. (1990). Bankruptcy, Boards, Banks, and Blockholders: Evidence on Changes in Corporate Ownership and Control When Firms Default, *Journal of Financial Economics*. vol. 27, no. 2, pp 355-387, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 5May 2017]

Gilson, S. C., John, K. & Lang, L. H. P. (1990). Troubled Debt Restructurings: An Empirical Study of Private Reorganization of Firms in Default, *Journal of Financial Economics,* vol. 27, no. 2, pp. 315-353, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 5 May 2017]

Goff, S. (2010). The Rothschilds' family fortune, *Financial Times,* 25 March, Avaliable Online: https://www.ft.com/content/f159e16a-3610-11df-aa43-00144feabdc0 [Accessed 27 March 2017]

Gonzalez-Urtega, A., Muga, L. & Santamaria, R. (2015). Momentum and Default Risk. Some Results Using the Jump Component, *International Review of Financial Analysis*, vol. 40, pp. 185-193, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 March 2017]

Griffin, J. M. & Lemmon, M. L. (2002). Book-to-Market Equity, Distress Risk, and Stock Returns, *The Journal of Finance,* vol. 57, no. 5, pp. 2317-2336, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 March 2017]

Hillegeist, S. A., Keating, E. K., Cram, D. P. & Lundstedt, K. G. (2004). Assessing the Probability of Bankruptcy, *Review of Accounting Studies*, vol. 9, no. 1, pp. 5-34, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 18 April 2017]

Hogg, R. V., Tanis, E. A. & Zimmerman, D. L. (2015). Probability and Statistical Inference, 9th edn, Harlow: Pearson Education

Holdings (2017). *Modular Finance's Holdings,* [online] Available through subscription, [Accessed 2 April month 2017]

ICB (2012). Industry Structure and Definitions [pdf] Available at: http://www.ftse.com/products/downloads/ICBStructure-Eng.pdf [Accessed 4 May 2017]

Jensen, M. C. & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics,* vol. 3, no. 4, pp. 305-360, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 17 April 2017]

Köke, J. & Renneboog, L. (2005). Do Corporate Control and Product Market Competition Lead to Stronger Productivity Growth? Evidence From Market-oriented and Blockholder-based Governance Regimes, *The Journal of Law and Economics,* vol. 48, no. 2, pp. 475-516, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 2 May 2017]

Kumar, R. G. & Kumar, K. (2012). A Comparison of Bankruptcy Models, *International Journal of Marketing, Financial Services & Management Research,* vol. 1, no. 4, pp. 76-86, [pdf] Available Online: https://pdfs.semanticscholar.org/723a/e9c3d8f1b79ed84e331363f9cbeb216e92ee.pdf [Accessed 18 April 2017]

Lo, A. W. & Mackinlay, A. C. (1990). When Are Contrarian Profits Due to Stock Market Overreaction?, *Review of Financial Studies,* vol. 3, no. 2, pp 175-205, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 27 March 2017]

Lu, S-L., Lee, K-J. & Yu, C-C. (2014). Momentum Strategy and Credit Risk, *Applied Financial Economics,* vol. 24, no. 11, pp. 753-762, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 27 March 2017]

McConnell, J. J. & Servaes, H. (1990). Additional Evidence on Equity Ownership and Corporate Value, *Journal of Financial Economics,* vol. 27, no. 2, pp. 595-612, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 April 2017]

Md-Rus, R., Musallam, S. R. M. & Taufil-Mohd, K. N. (2013). The Effect of Ownership Structure on Firm Performance in Malaysia, *International Journal of Finance and Accounting',* vol. 2, no. 2, pp. 75-81, Available for download: http://article.sapub.org/10.5923.j.ijfa.20130202.04.html [Accessed 5 May 2017]

Miller, M. H. & Modigliani, F. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment, *The American Economic Review,* vol. 48, no. 3, pp. 261-297, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 24 April 2017]

Myers, D. (2009). Buy When There's Blood In The Streets, *Forbes,* 23 February, Available Online: https://www.forbes.com/2009/02/23/contrarian-markets-boeing-personal-finance_investopedia.html [Accessed 27 March 2017]

Nasdaq (2017a). First North, Available Online: http://www.nasdaqomxnordic.com/about_us/firstnorth?languageId=1&Instrument=SSE101 [Accessed 4 May 2017]

Nasdaq (2017b). Industries, Segment and Indexes, Available Online: http://business.nasdaq.com/list/listing-options/European-Markets/nordic-main-market/industries-segment-indexes [Accessed 4 May 2017]

Ohlson, J. A. (1980). Financial Ratios and the Probabilistic Prediction of Bankruptcy, *Journal of Accouting Research*, vol. 18, no. 1, pp. 109-131, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 March 2017]

Olsson, M. (2013). En halv miljard borta i Panaxiakonkurs, *Dagens Nyheter*, 5 June, Avaliable Online: http://www.dn.se/ekonomi/halv-miljard-borta-i-panaxiakonkurs/ [Accessed 29 March 2017]

Opler, T. C. & Titman, S. (1994). Financial Distress and Corporate Performance, *The Journal of Finance,* vol. 49, no. 3, pp. 1015- 1040, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 14 April 2017]

Patel, R. & Davidson, B. (2003). Forskningsmetodikens Grunder: Att Planera, Genomföra och Rapportera en Undersökning, 3rd edn, Lund: Studentlitteratur

Pound, J. (1988). Proxy Contests and the Efficiency of Shareholder Oversight, *Journal of Financial Economics,* vol. 20, pp. 237-265, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 13 May 2017]

Purnanandam, A. (2008). Financial Distress and Corporate Risk Management: Theory and Evidence, *Journal of Financial Economics,* vol. 87, no. 3, pp. 706-739, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 8 May 2017]

Reed, J. (2011). SAAB files for bankruptcy after GM veto, *Financial Times,* 19 December, Avaliable Online: https://www.ft.com/content/11efd28e-2a22-11e1-8f04-00144feabdc0 [29 March 2017]

Ross, S. A. (1994). Survivorship Bias in Performance Studies, *AIMR Conference Proceedings,* no. 9, pp. 67-72, Available Online: http://www.cfapubs.org/toc/cp.1/1994/1994/9 [Accessed 8 May 2017]

Rouwenhorst, K. G. (1998). International Momentum Strategies, *The Journal of Finance,* vol. 53, no. 1, pp. 267-284, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 2 April 2017]

Scott, R. W. (2014). Do Institutional Investors Alleviate Agency Problems by Influencing Payout Policy in Firms with Poor Investment Opportunities?, *Accounting and Finance Research,* vol. 3, no. 3, pp. 43-57, Available for download:

http://www.sciedu.ca/journal/index.php/afr/article/download/5113/3050 [Accessed 3 May 2017]

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, *The Journal of Finance,* vol. 19, no. 3, pp. 425-442, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 2 May 2017]

Shleifer, A. & Vishny, R. W. (1986). Large Shareholders and Corporate Control, *Journal of Political Economy,* vol. 94, no. 3, pp 461-488, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 13 April 2017]

Shumway, T. (1996). Size, Overreaction, and Book-to-market Effect as Default Premia, working paper, University of Michigan Business School, [pdf] Available online: http://www-personal.umich.edu/~shumway/papers.dir/defprm1.pdf [Accessed 20 April 2017]

Sjöström, E. (2010). Ansiktslösa men Ansvarsfulla?: Institutionella Ägare och en Hållbar Utveckling, Stockholm: Economic Research Institute

Smith, C. W. & Warner, J. B. (1979). On Financial Contracting: An Analysis of Bond Covenants, *Journal of Financial Economics,* vol. 7, no. 2, pp 117-161, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 13 May 2017]

Svenska Dagbladet, no author (2013). Därför kan den billiga aktien stå dig dyrt, *Svenska Dagbladet,* 5 August, Available Online: https://www.svd.se/darfor-kan-den-billiga-aktien-sta-dig-dyrt [Accessed 27 March 2017]

Thomsen, S. & Pedersen, T. (2000). Ownership Structure and Economic Performance in the Largest European Companies, *Strategic Management Journal*, vol. 21, no. 6, pp. 689-705, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 13 May 2017]

Thomson Reuters (2017). *Thomson Reuters Datastream,* [online] Available through subscription, [Accessed 22 April month 2017]

Tykvová, T. & Borell, M. (2012). Do Private Equity Qwners Increase Risk of Financial Distress and Bankruptcy?, *Journal of Corporate Finance*, vol. 18, no. 1, pp. 138-150, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 13 May 2017]

Vassalou, M. & Xing, Y. (2004). Default Risk in Equity Returns, *The Journal of Finance,* vol. 59, no. 2, pp. 831-868, Available through: LUSEM Library website's Full Text Finder http://www.lusem.lu.se/library [Accessed 27 March 2017]

Xu, M. & Zhang, C. (2009). Bankruptcy Prediction: The Case of Japanese Listed Companies, *Review of Accounting Studies,* vol. 14, no. 4, pp. 534-558, Available through: LUSEM Library website http://www.lusem.lu.se/library [Accessed 22 April 2017]

8. APPENDIX

Appendix 1: Firm sample

	Years		Years		Years		Years
AAK	2006-15	**Doro**	2001-15	**Lammhults**	2001-15	**Rejlers**	2005-15
Acando	2001-15	**Duni**	2008-15	**Lifco**	2015	**Rezidor**	2007-15
Active Biotech	2003-15	**Duroc**	2001-15	**Lindab**	2007-15	**RNB Retail and Bra**	2002-15
Addnode	2001-15	**Elanders**	2001-15	**Loomis**	2010-15	**Rottneros**	2001-15
Addtech	2002-15	**ElectraGruppen**	2007-15	**Lundin Petroleum**	2002-15	**SAAB**	2001-15
Alfa Laval	2003-15	**Electrolux**	2001-15	**Malmbergs**	2001-15	**Sandvik**	2001-15
Allenex AB	2008-15	**Elekta**	2001-15	**MEDA AB**	2001-15	**SAS**	2001-15
AllTele	2008-15	**Elos Medtech**	2001-15	**Medivir**	2001-15	**SCA**	2001-15
Anoto Group	2002-15	**Endomines**	2008-15	**Mekonomen**	2001-15	**Scandi Standard**	2015
Arcam	2003-15	**Enea**	2001-15	**MicroSystemation AB**	2006-15	**Seamless**	2007-15
Arise	2011-15	**Enrio**	2001-15	**Midsona**	2001-15	**Sectra**	2001-15
Assa Abloy	2001-15	**Eolus Vind**	2010-15	**Moberg Pharma**	2012-15	**Securitas**	2001-15
Atlas Copco	2001-15	**Episurf**	2011-15	**MQ Holding**	2011-15	**Semcon**	2001-15
Avega Group	2008-15	**Ericsson**	2001-15	**MSC Group**	2001-15	**Sensys Gatso**	02-04, 08-09, 14-15
Axfood	2001-15	**eWork Group**	2009-15	**MTG**	2001-15	**Shelton Petroleum**	2003-15
Axis	2001-15	**Fagerhult**	2001-15	**MultiQ**	2001-15	**SinterCast**	02-09, 12
B&B	2001-15	**FeelGood**	2001-15	**Mycronic**	2001-15	**Skanska**	2001-15
Bactiguard	2015	**Fingerprint**	2001-15	**NCC**	2001-15	**SKF**	2001-15
BE Group	2007-15	**FormPipe**	2006-15	**Nederman Holding**	2008-15	**SkiStar**	2001-15
Beijer Alma	2001-15	**G5 Entertainment**	2009-15	**Net Insight**	2001-15	**Softronic**	2001-15
Beijer Electronics	2002-15	**Getinge**	2001-15	**NetEnt**	2008-15	**Sportamore**	2013-15
Beijer Ref	2001-15	**GHP Specialty Care**	2009-15	**NeuroVive**	2009-15	**SSAB**	2001-15
Bergs Timber	2002-15	**Gränges**	2015	**New Wave**	2001-15	**Stockwik**	2004-15
Betsson	2001-15	**Gunnebo**	2001-15	**NIBE**	2001-15	**Studsvik**	2002-15
Bilia	2001-15	**H&M**	2001-15	**Nobia**	2003-15	**Sweco**	2001-15
BillerudKorsnäs	2002-15	**Haldex**	2001-15	**Nolato**	2001-15	**Svedbergs**	2001-15
BioGaia	2001-15	**Hansa Medical**	2008-15	**Nordic Mines**	2008-15	**Swedish Match**	2001-15
BioInvent	2002-15	**Hexagon**	2001-15	**Note**	2005-15	**Swedish Orphan Bio**	2007-15
Biotage	2001-15	**Hexpol**	2009-15	**Novotek**	2001-15	**Swedol**	2007-15
Björn Borg	2006-15	**HiQ**	2001-15	**Oasmia**	2008-15	**Systemair**	2008-15
Boliden	2001-15	**HMS Networks**	2008-15	**Odd Molly**	2008-15	**Tele2**	2001-15
Bong	2001-15	**Holmen**	2001-15	**OEM**	2001-15	**Telia**	2001-15
Boule Diagnostics	2012-15	**Husqvarna**	2007-15	**Opus Group**	2007-15	**Tethys Oil**	2006-15
BTS Group	2002-15	**IAR Systems**	01-10, 12-15	**Orexo**	2006-15	**Thule Group**	2015
Bufab	2015	**ICA**	2007-15	**Ortivus**	01, 03-15	**Tradedoubler**	2006-15
Bulten	2012-15	**IFS AB**	2001-15	**PA Resources AB**	2002-14	**Transcom**	2015
Byggmax	2011-15	**Image Systems**	2001-15	**PEAB**	2001-15	**Trelleborg**	2001-15
CellaVision	08-09, 11-15	**Indutrade**	2006-15	**Poolia**	2001-15	**Trention**	2001-15
Clas Ohlson	2001-15	**Intellecta**	2001-15	**Precise**	2001-15	**Uniflex**	2005-15
Cloetta	2010-15	**Inwido**	2015	**Prevas**	2001-15	**VBG Group**	2001-15
Com Hem	2015	**INVISIO**	2005-15	**Pricer**	2001-15	**Venue Retail**	2001-15
Concentric	2012-15	**ITAB**	2005-15	**ProAct IT**	2001-15	**Viking Supply Ships**	2001-15
Concordia	2001-15	**Kabe**	2001-15	**Probi**	04-06, 10-15	**Wise Group**	2008-15
Consilium	2001-15	**Kappahl**	2007-15	**Proffice AB**	2001-14	**Vitec**	2001-15
C-Rad	2008-15	**Karo Pharma**	2001-15	**Profilgruppen**	2001-15	**Vitrolife**	2002-15
CTT Systems	2001-15	**Karolinska Dev**	2012-15	**Qliro Group**	2012-15	**Volvo**	2001-15
Dedicare Group	2012-15	**KnowIt**	2001-15	**Raysearch**	2003-15	**Xano Industri**	2001-15
DGC One	2009-15	**Lagercrantz**	2002-15	**Recipharm**	2015	**ÅF**	2001-15

Appendix 2: Excluded firms

	Code*		Code*
ABB	ISIN	**JM**	ICB
Africa Oil Corp	ISIN	**Kindred Group**	ISIN
Alimak Group	DATA	**Kinnevik**	ICB
Arctic Paper	ISIN	**Klövern**	ICB
AstraZeneca	ISIN	**Kungsleden**	ICB
Atrium Ljungberg	ICB	**Latour**	ICB
Attendo	DATA	**Lucara Diamond**	ISIN
Autoliv	SDB	**Lundbergföretagen**	ICB
Avanza Bank Holding	ICB	**Lundin Gold**	ISIN
Balder	ICB	**Lundin Mining Corporation**	SDB
Besqab	ICB	**Melker Schörling**	ICB
Black Earth Farming	SDB	**Midway Holding**	ICB
Black Pearl Resources	ISIN	**Millicom International Cellular**	SDB
Bravida	DATA	**Munksjö**	ISIN
Bure Equity	ICB	**NAXS**	ICB
Camurus	DATA	**NGEx Resources**	ISIN
Capio	DATA	**Nobina**	DATA
Castellum	ICB	**Nordax Group**	ICB
Catena	ICB	**Nordea Bank**	ICB
Cavotec	ISIN	**Nordnet**	ICB
CLX	DATA	**NP3 Fastigheter**	ICB
Collector	ICB	**NSP Holding**	ICB
Coor Service	DATA	**Oriflame Holding**	ISIN
Corem Property Group	ICB	**Oscar Properties Holding**	ICB
Creades	ICB	**Pandox**	ICB
D. Carnegie & Co	ICB	**Platzer Fastigheter Holding**	ICB
Diös Fastigheter	ICB	**Ratos**	ICB
Dometic	DATA	**Sagax**	ICB
Dustin	DATA	**Scandic**	DATA
East Capital Explorer	ICB	**SEB**	ICB
Eltel	DATA	**SEMAFO**	ISIN
EnQuest	ISIN	**Stora Enso**	ISIN
Etrion	ISIN	**Strax**	ICB
Fabege	ICB	**Swedbank**	ICB
Fast Partner	ICB	**Svolder**	ICB
Fenix Outdoor International	ISIN	**Tieto**	ISIN
Handelsbanken	ICB	**Tobii**	DATA
Havsfrun Investment	ICB	**Traction**	ICB
Heba Fastighets AB	ICB	**Tribona**	ICB
Hemfosa Fastigheter	ICB	**Trigon Agri**	ISIN
Hexatronics	DATA	**Troax**	DATA
Hoist Finance	ICB	**Wallenstam**	ICB
Hufvudstaden	ICB	**Victoria Park**	ICB
Industrivärden	ICB	**Wihlborgs Fastigheter**	ICB
Intrum Justitia	ICB	**Vostok New Ventures**	SDB
Investor	ICB	**Öresund, Investment**	ICB

* ISIN = firms excluded due to having a non-swedish ISIN
SDB = firms excluded due to being traded under an SDB
ICB = firms excluded due to being classified as financials
DATA = firms excluded due to a lack of complete data

Appendix 3: T-test statistics example

Example Showing Output for T-test run in Excel

The table shows the output from the t-test run on the HML for Largest owner in the large firm segment. Monthly values on the returns of the high ownership concentration-portfolio minus the low are tested against a hypothesized mean difference of zero. For our first hypothesis, the two-tailed p-values are display, whereas for the hypotheses predicting positive relationships between our ownership variables and returns, the two-tailed p-values are presented.

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	0,002486234	0
Variance	0,01112773	0
Observations	180	180
Pearson Correlation		
Hypothesized Mean Difference	0	
df	179	
t Stat	0,316209577	
P(T<=t) one-tail	0,376105932	
t Critical one-tail	1,6534108	
P(T<=t) two-tail	0,752211863	
t Critical two-tail	1,973305434	

Appendix 4: Survivorship bias robustness check for institutional ownership variable

Average Annual Returns for 2011-2015 Portfolios Sorted on the Probability of Distress and Institutional Ownership

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and institutional ownership. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Institutional Ownership 2011-2015				
O-Score	L	M	H	HML	(p-value)
			All		
L	56,81	25,34	13,71	-43,10	(0,999)
2	27,16	10,84	19,14	-8,02	(0,911)
3	46,11	7,67	14,59	-31,52	(0,992)
4	31,58	14,25	16,28	-15,30	(0,931)
H	10,24	-18,19	19,43	9,19	(0,309)
HML	-46,57	-43,53	5,72		
(p-value)	(0,021**)	(0,001***)	(0,575)		
			Small firms		
L	27,63	24,83	25,83	-1,80	(0,555)
2	18,36	15,31	15,12	-3,24	(0,670)
3	26,84	38,69	7,66	-19,18	(0,975)
4	14,09	-6,49	-21,72	-35,81	(0,995)
H	24,20	-20,56	-9,42	-33,62	(0,914)
HML	-3,43	-45,39	-35,25		
(p-value)	(0,886)	(0,049*)	(0,024**)		
			Large firms		
L	46,10	14,05	12,12	-33,98	(0,998)
2	17,40	8,47	19,71	2,31	(0,380)
3	13,78	21,20	17,02	3,24	(0,364)
4	19,29	4,11	24,01	4,72	(0,281)
H	20,63	18,94	16,47	-4,16	(0,660)
HML	-25,47	4,89	4,35		
(p-value)	(0,036*)	(0,294)	(0,543)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

Appendix 5: Survivorship bias robustness check for foreign ownership variable

Average Annual Returns for 2011-2015 Portfolios Sorted on the Probability of Distress and Foreign Ownership

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and foreign ownership. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Foreign Ownership 2011-2015				
O-Score	L	M	H	HML	(p-value)
			All		
L	26,32	15,74	13,28	-13,04	(0,979)
2	20,63	12,43	16,98	-3,65	(0,717)
3	23,84	21,75	11,52	-12,32	(0,920)
4	23,62	12,73	15,93	-7,69	(0,781)
H	13,08	8,42	17,43	4,35	(0,370)
HML	-13,24	-7,32	4,15		
(p-value)	(0,220)	(0,600)	(0,730)		
			Small firms		
L	17,05	23,81	33,16	16,11	(0,132)
2	15,90	22,03	11,82	-4,08	(0,663)
3	35,20	10,99	61,55	26,35	(0,357)
4	10,93	5,27	-30,98	-41,91	(0,994)
H	22,04	18,77	-41,90	-63,94	(0,998)
HML	4,99	-5,04	-75,06		
(p-value)	(0,780)	(0,847)	(0,001***)		
			Large firms		
L	16,28	28,81	12,80	-3,48	(0,665)
2	19,49	4,71	18,55	-0,94	(0,563)
3	26,63	23,21	12,87	-13,76	(0,914)
4	20,07	21,25	11,21	-8,86	(0,850)
H	13,76	30,03	16,18	2,42	(0,399)
HML	-2,52	1,22	3,38		
(p-value)	(0,768)	(0,917)	(0,706)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

Appendix 6: Survivorship bias robustness check for largest owner variable

Average Annual Returns for 2011-2015 Portfolios Sorted on the Probability of Distress and Largest Owner

Percentage value-weighted average annual returns are displayed for portfolios sorted on size, O-Score, and largest owner. The tests for statistical differences between groups in the high and low portfolios are based on the time series of monthly returns.

	Largest Owner % of Capital 2011-2015				
O-Score	L	M	H	HML	(p-value)
			All		
L	16,46	15,92	12,14	-4,32	(0,708)
2	12,25	24,18	21,85	9,60	(0,086*)
3	11,51	14,76	13,75	2,24	(0,361)
4	25,97	5,16	16,70	-9,27	(0,805)
H	13,11	0,84	13,82	0,71	(0,483)
HML	-3,35	-15,08	1,68		
(p-value)	(0,812)	(0,266)	(0,898)		
			Small firms		
L	35,13	19,17	25,63	-9,50	(0,703)
2	11,80	20,36	17,63	5,83	(0,230)
3	33,36	1,40	24,88	-8,48	(0,601)
4	-8,05	-18,14	-19,29	-11,24	(0,743)
H	-12,34	11,49	-9,26	3,08	(0,447)
HML	-47,47	-7,68	-34,89		
(p-value)	(0,124)	(0,652)	(0,046*)		
			Large firms		
L	11,90	19,24	12,64	0,74	(0,466)
2	21,78	9,83	14,51	-7,27	(0,854)
3	8,28	21,94	27,20	18,92	(0,020**)
4	15,50	21,76	11,80	-3,70	(0,677)
H	31,59	12,06	16,07	-15,52	(0,905)
HML	19,69	-7,18	3,43		
(p-value)	(0,051)	(0,481)	(0,760)		

* indicates a statistically significant difference on the 10%-level, ** on the 5%-level, and *** on the 1%-level.

Appendix 7: Fama & French three-factor regression for the foreign ownership portfolio

Three-factor Regressions Sorted on Foreign Ownership and Probability of Financial Distress

The below regressions are based on monthly value-weighted average returns for the portfolio sorted by foreign ownership and distress. Fama & French european factors are used to retrieve coeficients for each of the variables where α represents the abnormal return, m is the market β, s is the SMB factor for small minus big stocks and h is the HML factor reprsenting high minus low book-to-market. Below are the coefficients for each variable and their respective t-statistics presented.

Foreign ownership

	Small Firms						Large Firms					
	L	M	H	L	M	H	L	M	H	L	M	H
O-score	*α*			*t(a)*			*α*			*t(a)*		
L	0,012	0,008	0,012	2,749	1,597	1,640	0,011	0,009	0,004	2,150	1,599	0,684
2	0,014	0,012	0,008	2,928	2,227	1,191	0,009	0,005	0,014	1,478	0,894	2,728
3	0,015	0,008	0,001	3,117	1,422	0,041	0,012	0,014	0,007	2,297	2,825	1,234
4	-0,004	-0,008	-0,007	-0,767	-1,165	-1,013	0,020	0,012	0,009	3,790	2,141	0,950
H	0,015	-0,008	-0,013	1,185	-0,632	-1,488	0,014	0,009	0,007	2,388	1,349	1,335
	m			*t(m)*			*m*			*t(m)*		
L	0,303	0,267	0,229	3,762	2,714	1,488	0,068	0,143	0,146	0,696	1,417	1,213
2	0,270	0,317	0,396	2,945	3,049	3,223	0,271	0,174	0,157	2,500	1,752	1,638
3	0,236	0,258	0,287	2,620	2,337	0,979	0,081	0,098	0,443	0,816	0,993	3,934
4	0,380	0,492	0,176	3,629	3,623	1,337	0,217	0,183	0,326	1,992	1,756	1,891
H	0,470	0,298	0,358	1,996	1,288	2,151	0,386	0,447	0,045	3,454	3,483	0,432
	s			*t(s)*			*s*			*t(s)*		
L	0,715	1,314	1,713	3,405	5,132	4,517	1,029	0,911	1,035	4,045	3,464	3,292
2	1,220	1,072	1,118	5,110	3,963	3,489	1,127	1,451	1,205	3,996	5,601	4,819
3	0,905	1,532	3,191	3,861	5,331	4,176	1,276	0,892	1,502	4,939	3,684	5,115
4	1,336	1,458	1,455	4,894	4,355	4,237	1,209	1,344	1,256	4,507	4,934	2,799
H	1,204	2,264	1,408	1,964	3,749	3,247	1,510	1,788	0,920	5,191	5,344	3,397
	h			*t(h)*			*h*			*t(h)*		
L	-0,098	-0,525	-0,370	0,597	-2,316	-0,967	0,359	0,033	-0,231	1,593	0,144	-0,829
2	-0,075	0,048	-0,012	0,722	0,200	-0,042	0,227	0,112	0,260	0,911	0,488	1,177
3	-0,180	-0,266	-0,066	0,386	-1,048	-0,098	-0,034	-0,074	0,180	-0,151	-0,302	0,692
4	-0,341	-0,096	-0,010	0,159	-0,285	-0,034	-0,266	0,095	-0,280	-0,982	0,394	-0,707
H	-0,111	-0,026	0,110	0,838	-0,049	0,287	-0,089	0,063	-0,008	-0,347	0,212	-0,035
	Adjusted R square						*Adjusted R squared*					
L	0,102	0,14	0,097				0,091	0,055	0,045			
2	0,139	0,105	0,092				0,103	0,148	0,148			
3	0,084	0,135	0,076				0,107	0,061	0,178			
4	0,143	0,142	0,082				0,102	0,118	0,038			
H	0,023	0,063	0,062				0,154	0,154	0,046			

Appendix 8: Fama & French three-factor regression for the institutional ownership portfolio

Three-factor Regressions Sorted on Insitutional Ownership and Probability of Financial Distress

The below regressions are based on monthly value-weighted average returns for the portfolio sorted by institutional ownership and distress. Fama & French european factors are used to retrieve coeficients for each of the variables where α represents the abnormal return, m is the market β, s is the SMB factor for small minus big stocks and h is the HML factor reprsenting high minus low book-to-market. Below are the coefficients for each variable and their respective t-statistics presented.

Institutional ownership

	Small Firms						Large Firms					
	L	M	H	L	M	H	L	M	H	L	M	H
O-score	*α*			*t(a)*			*α*			*t(a)*		
L	0,016	0,013	0,005	3,188	2,298	0,765	0,026	0,011	0,006	4,338	1,978	1,440
2	0,013	0,016	0,004	1,846	2,740	0,631	0,016	0,008	0,011	2,747	1,711	2,113
3	0,015	0,015	-0,006	2,920	0,940	-0,980	0,013	0,007	0,005	1,858	1,343	1,018
4	-0,002	-0,014	-0,008	-0,259	-2,209	-1,266	0,017	0,008	0,014	3,099	0,815	2,684
H	0,006	-0,001	-0,018	0,431	-0,111	-2,159	0,017	0,009	0,004	2,565	1,125	0,860
	m			*t(m)*			*m*			*t(m)*		
L	0,335	0,270	0,140	3,617	2,572	1,099	0,244	-0,025	0,110	2,193	-0,249	1,399
2	0,351	0,211	0,314	2,812	1,962	3,058	0,262	0,231	0,176	2,500	2,581	1,862
3	0,270	0,238	0,313	2,746	0,821	2,631	0,355	0,078	0,381	2,757	0,801	3,834
4	0,295	0,189	0,337	2,403	1,561	2,773	0,168	0,389	0,145	1,475	2,093	1,497
H	0,778	0,303	0,217	3,247	1,284	1,245	0,339	0,306	0,095	2,799	2,169	1,024
	s			*t(s)*			*s*			*t(s)*		
L	0,950	0,938	1,147	3,940	3,425	3,464	1,122	0,674	0,938	3,869	2,535	4,587
2	1,376	1,209	1,002	4,149	4,313	3,684	1,191	1,165	1,371	4,354	5,001	5,560
3	1,208	2,495	1,749	4,721	3,301	5,635	1,727	0,927	1,399	5,144	3,669	5,404
4	1,371	1,531	1,139	4,284	4,851	3,600	1,492	1,469	0,880	5,318	3,036	3,494
H	1,545	2,365	1,318	2,474	3,842	3,073	1,268	1,621	1,022	4,017	4,406	4,240
	h			*t(h)*			*h*			*t(h)*		
L	-0,330	-0,169	0,009	-1,545	-0,698	0,030	-0,292	0,469	0,148	-1,139	1,995	0,816
2	-0,221	0,347	-0,109	-0,754	1,402	-0,475	0,249	0,191	-0,064	1,027	0,929	-0,293
3	-0,292	-0,266	0,005	-1,292	-0,397	0,017	-0,121	0,435	-0,043	-0,407	1,948	-0,188
4	-0,133	0,438	-0,335	-0,471	1,568	-1,197	-0,102	-0,202	0,195	-0,360	-0,472	0,878
H	-0,363	-0,382	0,484	-0,657	-0,701	1,119	0,107	0,539	-0,079	0,382	1,656	-0,369
	Adjusted R square						Adjusted R squared					
L	0,11	0,069	0,051				0,077	0,045	0,105			
2	0,105	0,113	0,105				0,143	0,143	0,141			
3	0,117	0,043	0,158				0,136	0,086	0,173			
4	0,095	0,131	0,078				0,134	0,049	0,066			
H	0,062	0,065	0,063				0,103	0,127	0,078			

Appendix 9: Fama & French three-factor regression for the largest owner portfolio

Three-factor Regressions Sorted on Largest Owner and Probability of Financial Distress

The below regressions are based on monthly value-weighted average returns for the portfolio sorted by largest owner and distress. Fama & French european factors are used to retrieve coeficients for each of the variables where α represents the abnormal return, m is the market β, s is the SMB factor for small minus big stocks and h is the HML factor reprsenting high minus low book-to-market. Below are the coefficients for each variable and their respective t-statistics presented.

Largest owner

	Small Firms						Large Firms					
	L	M	H	L	M	H	L	M	H	L	M	H
O-score	*α*			*t(a)*			*α*			*t(a)*		
L	0,016	0,007	0,012	2,254	1,434	2,532	0,007	0,017	0,008	1,126	2,854	1,887
2	0,014	0,005	0,017	2,290	0,969	2,932	0,013	0,011	0,006	2,781	1,988	1,030
3	0,013	-0,004	0,008	0,682	-0,645	1,450	0,006	0,010	0,018	0,939	1,473	3,563
4	-0,004	-0,008	-0,004	-0,413	-1,054	-0,680	0,007	0,020	0,017	0,755	3,683	3,346
H	-0,008	-0,004	-0,003	-1,674	-0,413	-0,296	0,013	0,008	0,013	2,133	1,279	1,830
	m			*t(m)*			*m*			*t(m)*		
L	0,298	0,322	0,223	2,284	3,463	2,447	0,053	0,337	0,011	0,483	3,041	0,135
2	0,383	0,213	0,386	3,277	2,281	3,490	0,180	0,139	0,281	2,094	1,324	2,437
3	0,222	0,323	0,200	0,608	2,995	1,967	0,282	0,156	0,115	2,444	1,214	1,027
4	0,239	0,336	0,005	1,507	2,380	0,039	0,350	0,089	0,110	2,059	0,868	1,193
H	0,219	0,518	0,450	2,204	2,656	2,136	0,193	0,063	0,444	1,673	0,559	3,318
	s			*t(s)*			*s*			*t(s)*		
L	0,989	1,251	0,798	2,873	5,451	3,361	1,023	0,649	0,811	3,581	2,249	3,901
2	1,397	1,397	0,918	4,581	4,248	3,182	1,123	1,444	1,129	5,009	5,295	3,780
3	3,209	3,209	1,139	3,365	6,529	4,304	1,533	0,781	0,782	5,107	2,329	2,928
4	1,612	1,612	0,163	3,895	3,603	0,551	1,403	1,279	0,792	3,171	4,776	3,304
H	1,109	1,109	1,371	4,520	2,801	2,498	1,122	1,391	1,407	3,725	4,698	4,039
	h			*t(h)*			*h*			*t(h)*		
L	-0,296	-0,408	0,069	-0,986	-1,761	0,329	0,026	-0,131	0,525	0,101	-0,512	2,853
2	0,084	0,007	-0,315	0,312	-0,105	-1,234	0,243	0,335	-0,016	1,226	1,386	-0,062
3	-0,379	-0,026	0,037	-0,449	-0,105	0,158	0,038	0,003	-0,032	0,142	0,009	-0,115
4	-0,037	-0,071	0,187	-0,102	-0,219	0,624	-0,264	0,281	0,270	-0,675	1,188	1,274
H	0,062	-0,064	0,047	0,252	-0,143	0,098	-0,034	0,199	0,207	-0,126	0,760	0,672
	Adjusted R square						*Adjusted R squared*					
L	0,055	0,167	0,072				0,053	0,052	0,114			
2	0,134	0,111	0,085				0,139	0,144	0,087			
3	0,045	0,202	0,093				0,133	0,019	0,045			
4	0,07	0,073	-0,01				0,052	0,114	0,063			
H	0,117	0,057	0,039				0,066	0,114	0,122			