

NHH

Norwegian School of Economics
Bergen, Fall 2015



What drives Financial Distress Risk and Default Rates of
Leveraged Buyout Targets?
Empirical Evidence from European Transactions

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This thesis was written as a part of the Master of Science in Economics and Business Administration at NHH. Please note that neither the institution nor the examiners are responsible - through the approval of this thesis - for the theories and methods used, or results and conclusions drawn in this work.

Abstract

Recent studies show that private equity ownership leads to increasing risk of financial distress of their target companies, yet not resulting in higher default rates. But can this be observed in all European countries? And how can potential differences be explained? Based on an extensive set of accounting data covering target companies acquired in the period between 1997 and 2014 in 16 European countries, we employ panel data regressions to answer these questions. Our results show differences among European countries and suggest that larger capital markets, in particular debt markets, and stronger creditor protection regimes are associated with lower financial distress risk. However, default rates seem not to be affected by these drivers.

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Acronyms

AT Austria.

BE Belgium.

CA Current assets.

CL Current liabilities.

DE Germany.

EEA European Economic Area.

ES Spain.

FDR Financial distress risk.

FI Finland.

FR France.

GB United Kingdom.

GR Greece.

IE Ireland.

IPO Initial public offering.

IT Italy.

LBO Leveraged buyout.

LIBOR London Interbank Offered Rate.

LU Luxembourg.

MV Market value of equity.

NI Net income.

NL Netherlands.

NO Norway.

PE Private equity.

PT Portugal.

retE Retained earnings.

SAL Sales.

SE Sweden.

TA Total assets.

TL Total liabilities.

WC Working capital.

1 Introduction

Private equity (PE) and Leveraged buyout (LBO) transactions have enjoyed great attention from academia, policy makers and curricula of corporate finance classes in business schools for more than three decades now. Whether private equity firms actually create or just transfer value is thereby still controversial. Many researchers have focused their work on potential beneficial effects of PE ownership. Typical topics include the return of PE funds, and effects on growth, innovation and employment (e.g. Goergen et al., 2014; Lerner et al., 2013; Ljunqvist and Richardson, 2003) of target firms. Others have analyzed potential negative consequences of PE involvement. Tykvova and Borell (2012), for example, raised the question whether financial distress risk and bankruptcy probability increases after a buyout. Based on data from European firms, they find that financial distress risk increases significantly, yet bankruptcy rates remain unchanged.

In this master thesis, we build on Tykvova and Borell's (2012) work and conduct a comparison between 16 European countries using panel data regressions. Motivated by our initial finding that financial distress risk of target companies changes differently in these countries, we aim to find potential drivers of these differences. We focus on two groups of explanatory variables, the size of capital markets and creditor protection regimes. Thus, we add to recent literature aiming to explain implications of private equity ownership.

Firstly, we analyze whether the size of PE, equity or debt market has a significant impact on financial distress risk and default rates. Larger capital markets may provide better access to external financing, potentially resulting in better terms for private equity firms. In particular, larger debt markets may provide better opportunities to raise lower yielding debt with longer maturities. This would result in lower interest burdens and short-term financing risk, potentially leading to less distressed target firms and lower failure rates. Additionally, larger capital markets may be an indication of a more sophisticated financial system which is better able to prevent target firms from excessive distress and defaults. Our results indeed suggest that larger capital market, particularly debt markets, are associated with an decreasing effect on financial distress risk. However, we do not find supporting results that this also leads to lower default rates.

Secondly, we examine the effect of stronger creditor protection measures on financial distress risk and default rates. In addition to a direct creditor protection score created by La Porta et al. (1998), we use the origin of countries' legal system and changes in

financial assistance legislations as explanatory variables. The origin of a country's legal system determines to a large degree its creditor protection rules (Djankov et al., 2007; Hall and Jörgenson, 2008; La Porta et al., 1998, 2008, 1997). Hence, we use the origin as an indirect proxy for the strengths of creditor protection rules. Also, financial assistance legislations are designed to protect creditors and other stakeholders in buyout situations. Stronger creditor protection generally leads to better external financing opportunities and longer debt maturities (Djankov et al., 2007; Hall and Jörgenson, 2008; La Porta et al., 1997). This should lead to reduced financing risk through lower volatility of interest payments and less short-term debt renewal decisions; eventually resulting in less distressed target companies and lower default rates. In fact, we find evidence that stronger creditor protection measures result in lower financial distress. Yet, we can not make the same conclusions for default rates in this thesis.

2 Literature Review

In this section we give a brief overview of Private Equity and Leveraged Buyout transactions, giving a generalized example of a typical structure. Thereafter, we examine two research topics most relevant for explaining capital structure choices and measurement of financial distress risk. The first topic studies how different economical conditions impact leverage ratios in buyouts. The second topic considers the impact of PE ownership on risk of financial distress and bankruptcy. Finally, we further discuss methods on how to calculate proxies for financial distress risk. We find the Zmijewski-Score and Altman's Z-score most suitable for our research purpose.

2.1 What is Private Equity?

Private Equity is risk capital provided in a variety of situations, not publicly traded on an exchange. It is mostly divided in three different categories; venture capital, specialization in industry and buyouts. Venture capitalists specialize in seed or startup companies or in emerging markets and are said to be in the "business of building businesses". Industry specialists on the other hand, offer a certain skill set for the use of companies in need of growth capital, providing expertise in either management or financing. In the buyout category however, private equity firms specialize in acquiring mostly unquoted companies for restructuring or consolidation. Only in a minority of transactions, PE firms acquire quoted companies and take them private for restructuring. Ultimately, in all three categories, the goal is to cash out when the private company is finally exited. A portfolio company can be exited through an initial public offering, a trade sale or a secondary buyout. An Initial public offering (IPO) means listing the company on a stock exchange. When doing a trade sale, the company is sold to a third party, typically operating in the same industry as the target company. In a secondary buyout, the company is sold to another PE firm.

2.1.1 Private Equity Funds

A private equity firm raises the risk capital for its investments through private equity funds. These funds are structured as limited partnerships, which include a general partner being the private equity firm and limited partners such as institutional investors like pension funds, endowments, insurance companies or high-net-worth individuals. The general partner manages the fund and usually needs to provide a certain amount of equity capital, typically 1 percent. The limited partners however, provide most of the capital,

plus management fees and cannot withdraw their funds whenever they like, unlike in typical mutual funds. This gives the private equity firm a longer perspective of investment, thereby adding more opportunities. After the lifespan of the fund, which usually lasts ten years, the fund must exit its investments and return the capital to the limited partners. The general partner is not only given management fees, but is compensated with a percentage of capital committed to the fund and capital employed as well as a percentage of the overall profits. There are several discussions whether or not PE firms are overcompensated, further discussions and empirical evidence of fee structure can be found amongst others, in Yasuda and Metrick (2007).

Private equity funds differ in strategy, structure and objective compared to other investment funds. Typically, managers of PE funds seek to control and restructure the businesses they invest in to have optimal capital structures. This gives the private equity funds much better information and stronger control and influence over the management than funds holding quoted equities. To accomplish this, they take on financial distress risk and forego liquidity in the individual investments by adding debt. The additional debt is used to give disciplined incentives to management and achieve benefits from interest tax shields. Higher amount of debt disciplines managers by imposing interest payment obligations. Thus, reducing free cash flow potentially wasted on negative net present value projects. The interest tax shield on the other hand, increases value by deducting interest from taxable income.

2.1.2 A Typical Leveraged Buyout Transaction

In the buyout category of private equity, specialized investment teams acquire either private companies or public companies which are taken private after the acquisition. These deals are usually financed with a relatively small portion of equity and a relatively large portion of outside debt financing (60-90%), hence the name “leveraged buyout” (Kaplan and Strömberg, 2008). In a typical LBO transaction, the private equity firm buys majority control of the acquired firm. This distinguishes it from venture capital firms that mostly invest in young or emerging companies, and typically do not obtain majority control. A premium of 15 to 50 percent over the current stock price is usually paid for public companies (Bargeron et al., 2008). Investment banks arrange loan packages comprising senior bank debt, junior debt and other debt securities such as mezzanine debt or high yield bonds. The private equity fund usually creates a special purpose vehicle, typically named “NewCo” to acquire the target. This acquisition vehicle is used to pay down debt

obligations, using the target companies' cash flow. This is done to reduce the overall risk in the fund. Figure 1 shows the typical structure in a PE fund.

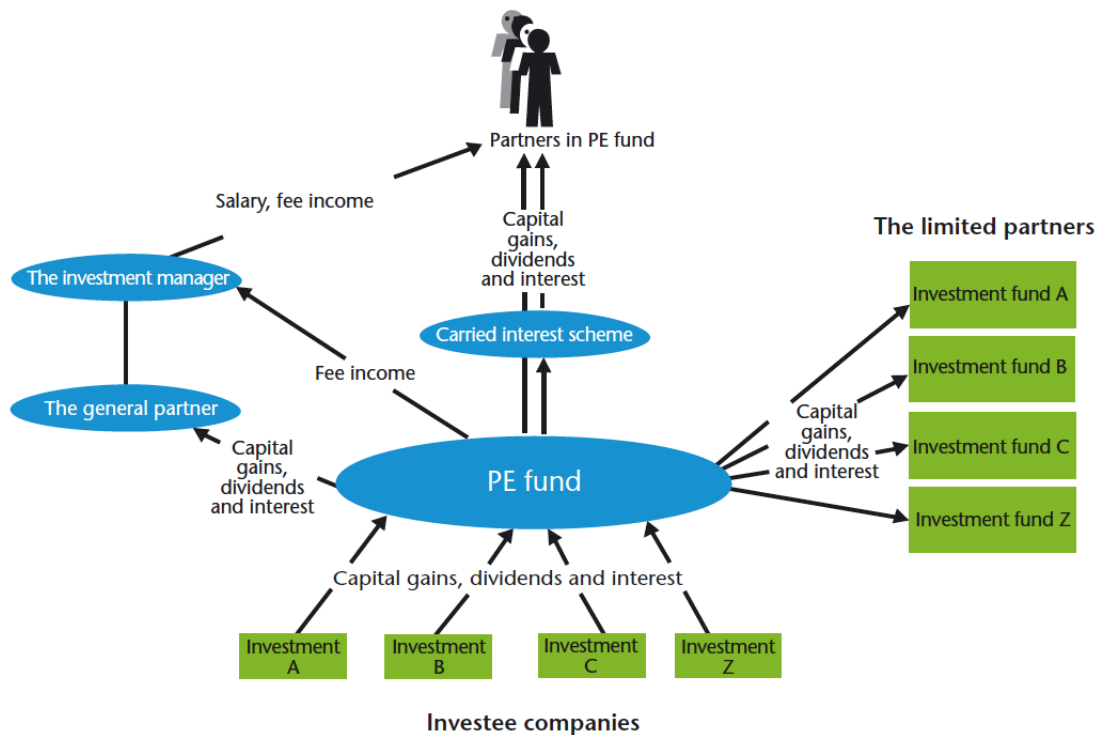


Figure 1: Typical structure of a PE fund (Source: Gilligan and Wright (2008))

2.2 Determinants of Leverage in LBOs

It is inevitable to think about capital structure and leverage when examining the risk of financial distress and bankruptcy. An increase of debt relative to equity implies, all else equal, an increase of distress risk. But why and under which conditions are companies increasing their leverage ratio and how do buyout companies differ in this respect to public companies? We review some traditional capital structure theories, and afterwards we present an interesting view stating that PE firms make other considerations when making capital structure choices of their target companies.

2.2.1 Capital Structure Theories

The most common view of determinants of leverage is explained by the trade-off theory (e.g. Kraus et al., 1973; Myers, 1984), which implies that the capital structure of a firm

should be tailored to its assets. Hence, capital structure decisions should reflect, among other factors, industry characteristics, stability of cash flows and potential growth opportunities. This implies that a mature car manufacturer with stable cash flows would have higher leverage than a typical biotechnology start-up with high growth potential and uncertain cash flows. A perfect tradeoff between positive and negative effects of debt should determine the amount of leverage in a company. There are several negative effects of adding debt, however, the most important being the risk of financial distress and bankruptcy. Among the positive effects is primarily the gained value through the interest tax shield and the disciplining role of debt.

The pecking order theory, explained by Myers (1984) and Myers and Majluf (1984), builds on the trade-off theory and aims to explain how a company chooses to finance its investments. It concludes that a company issues safer security before more risky alternatives. Thus, firms finance investments with retained earnings rather than by issuing new debt and issue new equity only as a “last resort”. The reasoning behind this theory is built on information asymmetries. Investors may interpret an offering of new equity as a sign that the potentially better informed management thinks that the company’s shares are overvalued. Thus, share prices might fall after a new equity offering is announced. Taking on new debt however, can be a strong signal resulting in rising share prices. Investors may believe that the company issues debt because it is strong enough to bear new debt obligations, and that the management thinks that its shares are undervalued. Therefore, the resulting leverage ratio tend to stray from the suggested leverage ratio according to the trade-off theory due to information asymmetries.

Furthermore, Baker and Wurgler (2002) find that equity market timing is considered in corporate financial policies. The market-timing theory suggests that firms try to issue new equity when their market-to-book ratio is high and correspondingly repurchase stocks when it is low. They further find that the resulting policy effects on actual capital structure are persistent. This leads to the assumption that capital structure is determined by previous attempts to time the market.

2.2.2 Capital Structure Decisions of PE Firms

While it is widely accepted that the outlined capital structure theories have reasonable explanatory power when it comes to public firms, little is certain about capital structure decisions regarding buyout targets. Axelson et al. (2013) argue that traditional theories

do not hold for buyout companies. They find that capital structure decisions of PE firms are primarily based on economy-wide credit conditions, which have little impact for policies of public firms. Higher credit risk premiums in the leverage loan market, measured as the high-yield spread over LIBOR, lead to less amount of leverage in buyouts. Consequently, leverage in LBOs is pro-cyclical. Furthermore, they show that there is no relation between leverage of private firms and that of buyout firms.

Axelson et al. (2013) explain their findings with the market-timing theory. PE firms primarily seek to exploit arbitrage opportunities between debt and equity markets, and thus, take on as much debt as possible when financing equity with debt is relatively cheap. Although the market-timing theory also applies for public companies, they usually do not have the same abilities of timing and accessing debt markets as PE firms. In addition, public companies are usually more concerned about potential negative effects of leverage. Therefore, levels of leverage ratios of buyout and non-buyout firms and their underlying dynamics behave dramatically different.

2.3 Financial Distress Risk in LBOs

In their study, Tykvova and Borell (2012) raise the question whether PE owners increase the risk of financial distress and bankruptcy of target firms. They conclude that PE firms buy companies that are less financially distressed than comparable non-buyout companies, and that the distress risk increases following the transaction. However, the selected target companies do not exhibit higher bankruptcy rates than control group companies suggesting that PE investors are better able to manage financial distress risk. Furthermore, more experienced buyout firms are better able to do so than their less experienced peers. Target companies backed by more experienced PE firms have even lower bankruptcy rates than control group companies.

Tykvova and Borell (2012) analyze transactions in the period between 2000 and 2008 calculating distress risk based on accounting data of buyout and non-buyout companies in the EU-15 countries¹. The solely reliance on accounting data is due to the focus on private companies and the resulting difficulties of non-availability of market data. This imposes the challenge of obtaining sufficient and reliable accounting data which is reported

¹EU-15: Austria (AT), Belgium (BE), Germany (DE), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Spain (ES), Sweden (SE), United Kingdom (GB)

depending on national regulations. For these reasons, the study is limited to European companies which have to report comprehensive accounting data. Thus, the study excludes the largest buyout market - the United States of America.

2.4 Financial Distress Risk Measures

Several different methods for measuring risk of financial distress and bankruptcy exist. However, many of these measures, such as the widely used credit ratings provided by rating agencies, require information that are typically not disclosed by privately held firms. Other methods are solely based on accounting data. Amongst them are the ZETA model (Altman, 2002; Altman et al., 1977), Zmijewski-score (Zmijewski, 1984), O-score (Ohlson, 1980) and the Z-Score in its extension to private companies (Altman, 1968, 2002).

As described in section 2.3, Tykvova and Borell (2012) conduct their analysis based on accounting data. We find that their choice of measures is well suitable for private companies (Altman, 2002; Bemann, 2005). Thus, we follow their approach and use the Zmijewski-Score and the Z-Score to calculate FDR. However, we decide not to use the O-score due to its lack of intuitiveness and the difficulty of obtaining required data.

The Zmijewski-Score tries to predict bankruptcy probability by using an ordinary least squares regression on a data sample of bankrupt and non-bankrupt companies and is calculated as shown in Equation 1. With TA being total assets, NI being net income, CA current assets, CL current liabilities and TL being total liabilities². The ZM-score is typically negative and a higher score indicates higher financial distress risk.

$$ZM = -4.336 - 4.513 \cdot \frac{NI}{TA} + 5.679 \cdot \frac{TL}{TA} + 0.004 \cdot \frac{CA}{CL} \quad (1)$$

The Z-Score was developed in 1968 and updated in 2002 and is defined as shown in Equation 2 (Altman, 2002). With WC standing for working capital, retE for retained earnings, MV for market value of equity and SAL for sales. Because of the lack of data, shareholder funds is used as proxy for retained earnings. Due to the examination of private companies, equity market value is approximated with equity book value. We calculate

²With Total Liabilities = Current Liabilities + Non-current Liabilities

equity book value by subtracting total liabilities from total assets, both book values. The Z-score is typically positive, opposed to the ZM-score, with a higher score indicating less financial distress risk.

$$Z = 0.717 \cdot \frac{WC}{TA} + 0.847 \cdot \frac{retE}{TA} + 3.107 \cdot \frac{EBIT}{TA} + 0.420 \cdot \frac{MV}{TL} + 0.998 \cdot \frac{SAL}{TA} \quad (2)$$

Both formulas are highly intuitive since they are built on different credit relevant ratios of a company. They consider for example both leverage and profitability ratios. Furthermore, they are widely used in both academics and by practitioners, measuring Financial distress risk (FDR) of companies.

3 Data

In this thesis, we focus on target companies of PE-backed LBO transactions in the EU-15 countries and Norway (NO). We include deals in the time period between 1997 and 2014. In the first step, we obtain all primary buyout transactions from Zephyr³. Secondly, we find three control group companies for each target firm which are based in the same country and operate in the same industry. We use a propensity score matching procedure based on total assets and leverage which we obtain from Amadeus⁴. Subsequently, we use the target and control group companies' identification numbers provided by Zephyr to download comprehensive accounting data from Amadeus. Based on this data, we calculate the FDR scores which we use for our regression analysis later on. Finally, we obtain the current status of each firm in order to identify the companies that have failed following a buyout.

3.1 LBO Transactions

Firstly, we collect all LBO transactions in Europe from Zephyr. After crossing for private equity and M&A transactions, we include all deals from 1997 to 2014. Management buyouts, management buyins and institutional buyout are obtained and only completed transactions are considered. This method provides us with data on 21,687 transactions. We verify the comprehensiveness of the obtained data by crosschecking with SDC Platinum⁵, where all non-US targets are selected combined with leveraged buyout and private equity as deal type. SDC Platinum shows 16,292 deals for the same period. Hence, we feel confident that the data provided by Zephyr is sufficiently comprehensive.

In order to obtain valid data only, we exclude secondary-, tertiary- and quaternary buyouts, leaving us with 17,965 deals. We do not know the characteristics of these transactions and the kind of FDR-affecting measures conducted by previous PE owners. Thus, including these observations might provide flawed results. Therefore, we only consider primary buyouts in the analyses. Furthermore, we exclude double entries which may exist in the

³Zephyr is a database in Orbis from Bureau van Dijk, consisting of 1 244 302 deals from 1997-2014. It provides information on M&As, IPOs and Private Equity deals worldwide.

⁴Amadeus is a pan-European financial database from Wharton Research Data Services, containing information on 20 million public and private companies from 43 countries, including all the EU countries and Eastern Europe. Up to 10 years of detailed information (consolidated statements are also provided when available) comprising 24 balance sheet items, 25 profit and loss account items and 26 ratios, can be provided.

⁵SDC Platinum is a database from Thomson Reuters, providing financial information on more than 900,000 M&A deals worldwide.

database. The collected data gives us information about industry, deal value, deal date, target country, acquiring country, company names and deal type. Conducting these steps gave us a total of 13,992 deals. Finally, we remove all transactions in countries outside of our scope, keeping only data for EU-15 countries in addition to Norway. This leaves us with a total of 7,353 deals.

Table 1: Number of buyout transactions

	LBOs
All transactions	21,687
-Secondary buyouts	-3,722
-Double entries	-3,973
-Countries outside scope	-6,639
Used transactions	7,353

This table shows the number of transactions used in our analyses. Transactions between 1997 and 2014 are obtained from Zephyr. We eliminate secondary buyouts, double entries and buyouts outside of EU-15 and Norway.

3.2 Control Group

We choose to create two different control groups of companies that were not subjected to buyout transactions for our analyses. The first one is resampled based on the target companies' characteristics one year before the buyout (pre control group). The second control group matches the target companies three years after the transaction (post control group). This approach allows us to conduct more differentiated analyses, capturing time-varying effects.

PE firms do not choose their target firms randomly (Cressya et al., 2007). Typically, they are specialized in specific industries, geographical regions or company sizes. Therefore, we find the best fitting "twin companies", by using a propensity score matching procedure as introduced by Rosenbaum and Rubin (1983). Consequently, we use these firm characteristics along with the leverage ratio as input variables to find the best fitting control groups.

In the actual matching process, we download accounting data for all European companies from Amadeus and select the companies which fall into the same country-industry-year

group for each target firm in the buyout group. Here, we use the NACE⁶ code to classify industries. Year refers to the year before the transaction (pre control group), or three years after (post control group). However, this implies that we automatically exclude all target firms of which we do not have data in the year before, or three years after the transaction, respectively. Consequently, our control groups may contain both, different target and control firms. This is an additional reason why we use two different control groups.

After having collected all possible control companies with the same country-industry-year combination for each target firm, we employ a propensity score matching procedure based on total assets and leverage. We use the nearest neighbor method to match 3 control companies for each target firm in order to find the most similar control companies. Here, we allow each control company to be matched to more than one target firm. This procedure provides us with two control groups to match our buyout groups, one year before the transaction is performed (*Pre*), and three years after (*Post*).

3.3 Accounting Data

After having identified all target and control group companies, we use their ID number to download complete accounting data from the Amadeus database for all available years. Downloading accounting data for the companies we paired during the pre- and post-buyout matching procedures provides us with 94,778 and 90,356 observations, respectively (see Table 2). However, extensive data clean-up and processing is required in order to exclude observations that have missing or unreasonable values, double entries or other inconsistencies.

Exclude Observations with Insufficient Reporting Basis

Our analysis showed that an insufficient reporting basis falsifies the resulting FDR scores. Therefore, we exclude all observations having reporting basis “*No recent account*”, “*Limited financial data*” or “*No recent & Limited Financial data*”. We keep only observations characterized by reporting basis “*Consolidated data*” or “*Unconsolidated data*”. Both consolidated and unconsolidated data are considered to be reliable even though a consolidation might impact the results. To resolve this problem, we introduce a dummy variable controlling for reporting basis in our regression model, thus ensuring accurate measures.

⁶NACE (Nomenclature of Economic Activities in the European Community) is the European statistical classification of economic activities, grouping organizations according to their business industry.

Exclude Observations with Missing Values

Several observations do not contain all variables necessary to calculate the risk of financial distress. Therefore, we create two subsets with only the observations that contain all the values required for calculating ZM-score and Z-score, respectively. Thus, we exclude observations with missing values and produce two different subsets.

Exclude Observations with Unreasonable Values

A brief look at the data reveals that our dataset includes a small number of rather unreasonable values. In order to minimize the likelihood of falsifying our results by including incorrect data, we apply simple rules to exclude unreasonable values. Therefore, we keep only observations showing values greater than zero for total assets. For sales, current assets, current liabilities and non-current liabilities, we apply a non-negative restriction.

Apply 5% Trimming on Resulting Scores

Although we already excluded flawed observations, the dataset still contains a number of rather questionable results. After having tested a variety of different trimming and winsorizing strategies, we decide to apply a 5% trimming on the final scores.⁷ Our tests show that the final results are robust to changes in the approach of reducing extreme values. Therefore, we choose to use the straight forward way of trimming.

Delete Double Entries

Finally, we screen the dataset for double entries meaning accounting reports of the same company in the same year. We keep the most reasonable observation, while deleting the others. In the case of double entries, we choose the observations which provide consolidated accounting data. However, there might still be double entries in the dataset having the same company, year and reporting basis. In this case, we evaluate the remaining double entries based on total assets. Thereby we assume that entries with higher total assets are more comprehensive than those with lower values. Table 2 summarizes the accounting data from collection to finally cleaned, removing invalid observations.

⁷In addition we tested winsorizing and trimming of accounting data before calculating scores with varying intervals as well as combinations of different individual approaches.

Table 2: Number of observations

	ZM		Z	
	(Pre)	(Post)	(Pre)	(Post)
All observations	94,778	90,356	94,778	90,356
-Reporting basis	-526	-327	-526	-327
-Missing values	-17,674	-16,757	-26,015	-25,977
-Unreasonable values	-49	-70	-72	-80
-5% trimming	-7,654	-7,322	-6,818	-6,398
-Double entries	-3,771	-4,916	-3,511	-4,223
Used observations	65,104	60,964	57,836	53,351

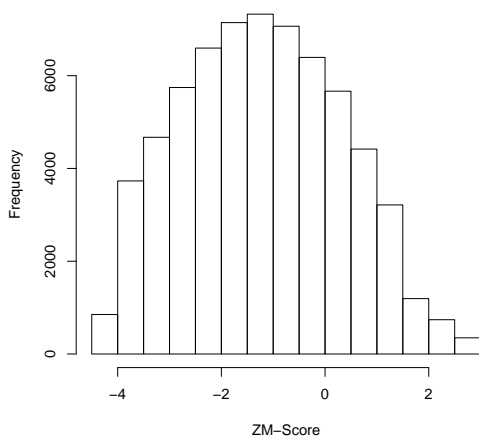
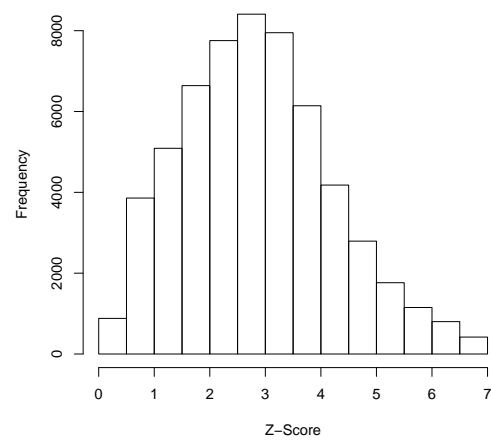
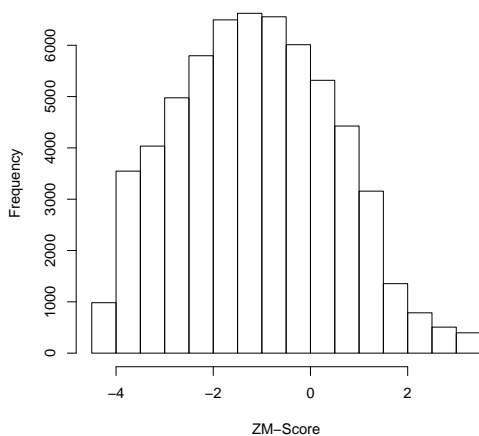
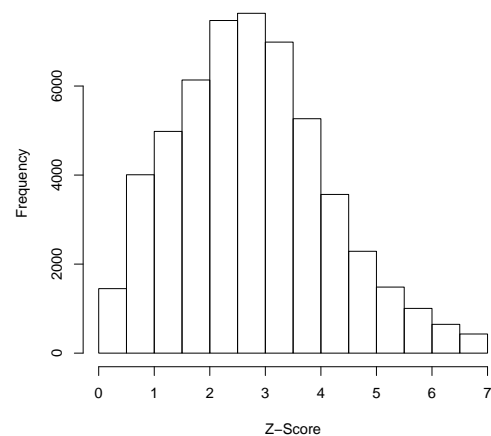
This table shows all observations of accounting data for each available year, in both the Pre and Post buyout- and control group. Observations are obtained from Amadeus. We eliminate observations with flawed reporting basis, missing or unreasonable values and double entries. In addition, we employ a 5% trimming approach.

3.4 Calculating FDR-scores

After having prepared the accounting data gathered from Amadeus, we can estimate the risk of financial distress. We calculate the FDR-scores as presented in Section 2.4. The ZM-score formula is shown in Equation 1 while the the Z-score is calculated as given by Equation 2.

For the group of companies composed during the pre-buyout control group matching, we calculate ZM-scores ranging from -4.12 to 2.84 which are approximately normally distributed as shown in the histogram in Figure 2. The mean ZM-score of all observations is -1.21, while the median is -1.23. ZM-scores calculated for the post-buyout group of control and target firms are in the range from -4.16 to 3.49 having a mean and median of -1.11 and 1.15, respectively (see Figure 4).

The distribution of Z-scores is shown in Figure 3 and 5 and can also be described as being sufficient normally distributed. We observe a potential positive skewness, which might give us reason to transform the data. However, in order for us to compare the scores and measure reasonable values, we maintain the data as is. Also, the minor difference between the mean and the median values indicates that the mean observations are valid for our regression analysis. For the pre-buyout group, we obtain Z-scores in the range from 0.35 to 6.85 with mean and median of 2.86 and 2.78, respectively. Z-scores calculated for the

Figure 2: ZM-Scores (*Pre*)Figure 3: Z-Scores (*Pre*)Figure 4: ZM-Scores (*Post*)Figure 5: Z-Scores (*Post*)

post-buyout group of control and target firms are in the range from 0.26 to 6.95 and have a mean and median of 2.76 and 2.67, respectively.

Finally, we calculate the correlation based on the pre-group between these two measures of financial distress risk. We measure a correlation of -0.33 between the ZM-score and the Z-score based on the observations where both scores are available. This suggests that both scores tend to provide similar information about companies' risk of financial distress. The correlation is negative because a higher ZM-score indicates higher risk while a higher Z-score points to lower risk. However, it can also be seen that methods solely

based on accounting data are rather rough approximations and thus, can lead to different conclusions depending on the specific measure employed. Therefore, we are conducting all further analyses based on both, the ZM-scores and the Z-scores.

3.5 Default Data

In order to cope with real default effects and not only with the risk of financial distress, we collect information on the legal status of the companies in our control and buyout groups. We use the ID numbers collected, and upload them to the Orbis database in order to download all available data on these firms' legal statuses. We assume all “*bankrupt*”, “*dissolved*”, “*insolvent*” and “*in liquidation*” as failed companies. The collected data is summarized in Table 3.

Table 3: Default rates

	<i>(Pre)</i>		<i>(Post)</i>	
	Buyout	Control	Buyout	Control
Active	2,562	7,231	1,743	4,724
Failed	173	344	136	189
% Failed	6,7%	4,8%	7,8%	4,0%

This table shows the number of active and failed companies in both the Pre and Post buyout- and control group. All companies listed as bankrupt, insolvent, in liquidation or defaulted, in the period between 1997 and 2014, are categorized as “Failed”. Observations are obtained from Orbis.

4 Financial Distress Risk in LBO Transactions

Tykvova and Borell (2012) showed that target companies are at higher financial distress risk after a leveraged buyout. We aim to expand upon these findings by analyzing potential differences across the EU-15 and Norway. The question to be answered in this section is whether or not Tykvova and Borell’s findings are equally true in all European countries. We also check if their findings still hold with our expanded and more recent data. Further, we check upon Axelson’s findings (Axelson et al., 2013) and the research consensus that PE does not increase bankruptcy probability in target-companies. Thus, we aim to verify whether Hypotheses H1, H2 and H3 hold.

H1: Target firms suffer from higher FDR post buyout

H2: Target firms suffer from higher failure rates post buyout

H3: Target firms’ FDR increases equally in all European countries

This chapter starts by partly reproducing Tykvova and Borell’s (2012) findings with our data set; thereby verifying if their conclusion still holds by expanding the time horizon to 1997–2014. To do so, we formulate a linear regression analysis in section 4.1. Section 4.2 shows the results of the performed regression analysis. Further, we analyze whether the probability of real default effects is impacted by buyout transactions in section 4.3. Finally, we use the linear regression model and add interaction terms to get a clearer picture of possible differences across countries.

4.1 Linear Regression Model

In our linear regression model⁸, the FDR-score of a particular target company in year t is explained by the lagged score at $t - 1$ and the effect of the LBO is captured with the dummy variable $POST$. In this analysis, we control for leverage as well as country-, year- and industry fixed effects, macroeconomic conditions and the reporting basis of underlying accounting data (as described in Section 3.3).

$$ZM_t \sim ZM_{t-1} + L_{t-1} + POST + Year + Country + Industry + REPBAS + \sum CV_{t-1} \quad (3)$$

Equation 3 shows the regression model for the ZM-score. ZM_t is the ZM-score at time t , ZM_{t-1} the score at $t - 1$, $POST$ a dummy variable having the value 1 if the observation

⁸Ordinary Least Squares method

was after the buyout, and 0 otherwise. L_{t-1} represents the leverage ratio defined as book value of liabilities to book value of total asset at $t - 1$. *Year*, *Country* and *Industry* represent year, country and industry fixed effects, respectively. *REPAS* is a dummy variable controlling for reporting basis and has the value 1 if the observation is based on consolidated data, and 0 otherwise. $\sum CV_{t-1}$ represents the macroeconomic control variables at time $t - 1$. This aims to capture systematic differences of FDR independently of buyout activities. We choose total GDP, GDP growth, inflation and market capitalization as percentage of GDP in order to account for macroeconomic conditions.⁹ The corresponding model for Z-scores is shown in Equation 4. All regressions include their respective control group (Pre and Post).

$$Z_t \sim Z_{t-1} + L_{t-1} + POST + Year + Country + Industry + REPBAS + \sum CV_{t-1} \quad (4)$$

4.2 Financial Distress Risk post LBO

We confirm that target companies suffer from higher distress risk after being bought out by employing the linear regression models shown in the Equations 3 and 4, respectively. Table 4 shows the key regression results, whereby *POST* captures the change of financial distress risk after the transaction. All four regressions (I - IV) performed on financial distress risk reveal an increase at the 0.1% significance level. This leads us to accept Hypothesis H1, that target firms suffer from higher FDR post buyout. The result is consistent with Tykvova and Borell's (2012) findings and provide us with a framework for further analyses.

⁹Variable descriptions and sources are summarized in Appendix A.

Table 4: FDR and default rates post buyout

	ZM		Z		RDE	
	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>POST</i>	0.099*** (0.011)	0.072*** (0.009)	-0.093*** (0.010)	-0.089*** (0.009)	0.441*** (0.001)	0.722*** (0.119)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Lagged dep. var.	Yes	Yes	Yes	Yes	No	No
Lagged leverage	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.701	0.697	0.660	0.670	NA	NA
No. observations	53,796	50,427	47,823	43,998	9,606	6,467
No. BO firms	2,215	2,109	2,080	1,940	2,562	1,743
No. control firms	5,819	5,410	5,147	4,730	7,044	4,724
Control group	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>

This table shows coefficients (and standard errors) from regression analyses with FDR-scores and failure rates as dependent variables. *POST* is a dummy variable with a value equal 1 for buyout firms after the transaction, and 0 otherwise. Positive (negative) ZM-coefficients (Z-coefficients) imply an increase of FDR post buyouts. Adj. R-squared for RDE (Real Default Effects) are NA due to the generalized linear model used. ***, **, *, and . denote statistical significance at the 0.1%, 1%, 5% and 10% level, respectively.

4.3 Failure Rates post LBO

So far, we have looked at financial distress risk effects of companies following a leveraged buyout. However, in order to fully understand real effects of buyouts, we analyze failure rate differences between our control- and buyout groups. We also follow Axelson et al.'s (2013) findings, implying that leverage in LBOs increase during times of financial turmoil, and therefore control for leverage in our regressions. Similar to the previous regression model, we control for economical environmental variables in addition to year, country and industry fixed effects. Furthermore, we add total assets to test the second hypothesis.

Our initial default effects are shown in Table 4 (V) and (VI) using the Equation 5. The results show that buyout companies have a higher probability of failing compared to the two different control groups (*Pre* and *Post*). The results are highly significant using a generalized logistic regression model with a binomial dependent variable.

$$FAILED \sim POST + L_{t-1} + TOAS + Year + Country + Industry + \sum CV_{t-1} \quad (5)$$

In this equation, the dummy variable FAILED takes the value of 0, if classified as active, and 1 if the company defaults. In this case, POST is a dummy variable taking the value of 1 if it is a buyout firm, and 0 if it is a control firm. We also add the size (TOAS) to compare our results with those of Tykvova and Borell (2012).

In order to make sure our results are robust, we classify the data collected as described in section 3.5 differently. Initially, we categorized all “*dissolved*”, “*liquidated*”, “*bankrupt*” or “*insolvent*” companies as bankrupt. By only looking at the data categorized as “*bankrupt*”, we still find a significant increase in defaults for buyout- compared to our control group companies, thus ensuring our analyses are reliable.

4.4 Country Differences of FDR post LBO

Turning back to the question whether country specific differences can be observed, we analyze the effect of each country separately. This is done by adding the interaction term of *POST* and a dummy variable representing the country to be analyzed successively. That is, for United Kingdom for example, we add the term $GB * POST$ to the initial regression models. Note that both individual terms are already included by accounting for country fixed effects and by including *POST* separately. With this analysis we test Hypothesis H3, whether target firms suffer equally from higher FDR in all European countries.

Table 5 summarizes the results of the individual regressions by displaying the estimate of the interaction term. These estimates represent the country specific effects on the change of financial distress risk after a LBO. We can observe that financial distress risk changes significantly different in some countries compared the others leading to the rejection of Hypothesis H3. For example, target companies in Great Britain experience less financial distress after an buyout. Target companies in countries such as Spain, on the other hand, suffer from greater increase of financial distress following a buyout.

4.5 Summary of Chapter 4

We confirm that target firms of leverage buyout transactions suffer from higher financial distress risk after being acquired. This finding is in line with Tykvova and Borell (2012) and leads us to accept Hypothesis H1. Our results also point to higher default rates among target companies compared to our control firms. This result however, is in conflict with those of Tykvova and Borell (2012). Possible reasons for the conflicting conclusion

are discussed in Chapter 7.

Moreover, our results provide a strong indication that target companies are effected differently by LBOs in the European countries in terms of financial distress risk. Considering the three largest countries by GDP (nominal), Germany and United Kingdom seem to have decreasing effects while France exhibits mixed results. Other countries, Sweden and Spain in particular, show a significant increasing effect of financial distress risk after a LBO. Hence, we can reject the Hypothesis H3, that FDR increases equally in all European countries following a leveraged buyout. In the following chapters, we analyze possible reasons for the differences in FDR across countries and try to explain possible drivers.

Table 5: Country specific effects on FDR

	ZM		Z	
	(I)	(II)	(III)	(IV)
<i>AT</i> × <i>POST</i>	-0.085	0.037	0.189.	0.095
<i>BE</i> × <i>POST</i>	0.047	0.024	-0.028	-0.006
<i>DE</i> × <i>POST</i>	-0.048	-0.007	0.105*	0.076.
<i>DK</i> × <i>POST</i>	0.150	-0.118	-0.207	0.150
<i>ES</i> × <i>POST</i>	0.131**	0.079.	-0.133**	-0.083*
<i>FI</i> × <i>POST</i>	0.233***	0.126*	-0.036	0.038
<i>FR</i> × <i>POST</i>	0.040.	0.035	0.018	0.022
<i>GB</i> × <i>POST</i>	-0.151***	-0.096***	0.048*	0.004
<i>GR</i> × <i>POST</i>	0.360.	-0.699.	-0.055	-0.286
<i>IE</i> × <i>POST</i>	-0.304.	-0.179	0.387*	0.057
<i>IT</i> × <i>POST</i>	0.039	0.099**	0.017	-0.014
<i>LU</i> × <i>POST</i>	0.057	-0.864*	-0.585.	0.405
<i>NL</i> × <i>POST</i>	-0.021	-0.059	-0.087	0.004
<i>NO</i> × <i>POST</i>	-0.091	0.074	0.036	0.020
<i>PT</i> × <i>POST</i>	-0.029	0.009	-0.171.	-0.118
<i>SE</i> × <i>POST</i>	0.112**	0.054	-0.114**	-0.089**
No. observations	53,796	50,426	47,823	43,998
No. BO firms	2,215	2,109	2,080	1,940
No. control firms	5,819	5,410	5,147	4,730
Control group	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>

This table shows coefficients from 16 independent regressions with FDR-scores as the dependent variable. *POST* is a dummy variable with a value equal 1 for buyout firms after the transaction, and 0 otherwise. Positive (negative) ZM-coefficients (Z-coefficients) imply an increase of FDR post buyouts. Countries' effect on FDR post buyout are measured by using interaction terms of *POST* and a country dummy. ***, **, *, and . denote statistical significance at the 0.1%, 1%, 5% and 10% level, respectively.

5 Capital Market Size

In the previous chapter we showed that financial distress risk of target companies changes differently among our 16 European countries following a buyout. This raises the question of what the countries where financial distress risk decreases have in common, and what distinguishes them from the ones where it increases?

To answer this question, we separately add interaction terms of the *POST* dummy variable and different explanatory variables to the regression models introduced in Section 4.1 and 4.3. Both terms are thereby also included as stand-alone terms.

In this chapter we examine which effect the size of capital markets has on financial distress risk and default rates. We analyze the size of equity-, private debt- and LBO markets, as total size per country and year, and relative to GDP. These tests are motivated by the general assumption that larger markets lead to better access to external finances and more sophisticated participants resulting in lower financial distress risk and default rates. Thus, we develop and test the following hypotheses:

H4: Larger capital markets decrease FDR post LBOs

H5: Larger capital markets decrease failure rates post LBOs

Therefore, we firstly analyze the impact of the size of public equity markets in Section 5.1. Here, we use the total market capitalization of listed companies obtained from the World Bank as the explanatory variable. Successively, we use this measure relative to the countries' GDP.

Secondly, in section 5.2, we use private sector debt outstanding in each country and year as possible explanatory factors. We conduct this test also in terms of absolute size and relative to GDP. We collect data on outstanding debt from the Bank for International Settlements.

Finally, we analyze how the size of a country's LBO market affects financial distress risk and default rates (5.3). Here, we use the number of LBOs in the collected transaction data as proxy for the size of the buyout market.

5.1 Size of Equity Markets

Firstly, we analyse whether the size of the equity market has a significant impact. Larger equity markets may hint to more sophisticated financial systems, and actors who might be better able to prevent excessive financial distress risk and default rates. Additionally, larger public equity markets might lead to better buyout- as well as exit opportunities, which also possibly help prevent distress.

We obtain the market capitalization of listed companies as percentage of GDP and relative GDP-values for each country-year combination from the World Bank. Based on these values, we create the two explanatory variables, Market-Capitalization (*MktCap*) and Market-Capitalization-to-GDP ($\frac{MktCap}{GDP}$), which we use in two independent sets of regressions. The results are summarized in Panel A and B of Table 6.

We find a statistically significant negative correlation of total market capitalization interacting with the *POST* dummy and financial distress risk with three of our four regressions (rows I, II, and III). The fourth, which employs the Z-score and the post buyout control group (row IV) points in the same direction without being statistically significant. Default rates of target companies seem to be slightly reduced in countries with higher market capitalization of listed companies as well (row V and VI). However, this result is not significant.

Market-Capitalization-to-GDP does not have a clear effect on target companies post buyout FDR or default probability. The two regressions using the ZM-score show a negative estimate of the interaction term, while the ones using the Z-score point to increased financial distress risk. Both regressions for default rates point in different directions and are not statistically significant.

5.2 Size of Debt Markets

Secondly, we analyze whether target companies in countries with larger debt markets suffer less from financial distress risk and default rates. We choose to take private sector debt outstanding as a proxy, excluding government debt. Larger debt markets may lead to better access to external debt financing, potentially resulting in lower financing cost and longer debt maturities. This would decrease the interest burden and short term financing risk assuming similar leverage.

As summarized in Panel C of Table 6, we find a decreasing effect of larger debt markets on financial distress risk post buyout in all four regressions (I - IV). The results are highly significant in regressions I, II and III. Solely, regression IV which employs the Z-score and the post-buyout control group does not show any significance. However, the estimation of the explanatory variable points in the same direction. The results for real default effects are not statistically significant and point into different directions.

When looking at private debt outstanding relative to GDP, we do not see consistent effects on financial distress risk (see Panel D of Table 6). Only regressions I and II employing the ZM-score show a significant decrease of distress risk. The two Z-score regressions (III and IV) do not show significant results and point in opposing directions. Default rates seem to be somewhat higher in markets with more debt outstanding relative to GDP, but these results are not significant.

5.3 Size of LBO Markets

Finally, we test in the same way whether the size of the LBO market has a significant and decreasing impact on financial distress and default rates of target companies. We approximate the size of the LBO market based on our transaction data; we simply count all observations occurred in each of the countries in each year. Larger buyout markets may be associated with more sophisticated actors being better able to handle highly leveraged target companies resulting in less distress and default rates.

Here we see a very similar pattern as in the debt market size analysis. Financial distress risk is lower in countries with more buyouts on all measures. Again, regressions I, II and III show highly significant results, while the estimation of interaction term in regression IV is not significant. Also, real default effects point into different directions and the estimation is not significant. The number of LBOs relative to GDP does not provide any significant results.

Table 6: Effect of capital market size on FDR and default rates

	ZM		Z		RDE	
	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Panel A: Market capitalization of listed companies</i>						
<i>MktCap</i> × <i>POST</i>	-0.00046*** (0.00009)	-0.00030*** (0.00008)	0.00021* (0.00010)	0.00003 (0.00008)	-0.00008 (0.00090)	-0.00132 (0.00109)
<i>POST</i>	0.16699*** (0.08025)	0.12201*** (0.01680)	-0.12408*** (0.017757)	-0.09371*** (0.01575)	0.45350** (0.16500)	0.94350*** (0.21740)
<i>MktCap</i>	0.00028 (0.00020)	0.00021 (0.00022)	-0.00063** (0.00020)	-0.00036. (0.00021)	0.00244 (0.00289)	0.00216 (0.00355)
<i>Panel B: Market capitalization of listed companies relative to GDP</i>						
$\frac{MktCap}{GDP}$ × <i>POST</i>	-0.00049 (0.00031)	-0.00054* (0.00027)	-0.00032 (0.00029)	-0.00038 (0.00025)	0.00291 (0.00282)	-0.00063 (0.00349)
<i>POST</i>	0.13718*** (0.02648)	0.11816*** (0.02445)	-0.06717** (0.02564)	-0.05714* (0.02259)	0.20030 (0.25470)	0.77930* (0.34030)
$\frac{MktCap}{GDP}$	-0.00003 (0.00040)	-0.00106* (0.00045)	-0.00042 (0.00040)	0.00001 (0.00042)	-0.00846 (0.00521)	-0.01056 (0.00835)
<i>Panel C: Private sector debt outstanding</i>						
<i>Debt</i> × <i>POST</i>	-0.05553*** (0.00902)	-0.03905*** (0.00796)	0.02775** (0.00874)	0.00535 (0.00743)	0.07717 (0.09092)	-0.09634 (0.11020)
<i>POST</i>	0.21043*** (0.02112)	0.15540*** (0.01929)	-0.14928*** (0.02056)	-0.10046*** (0.01780)	0.31120 (0.19060)	0.89840*** (0.23290)
<i>Debt</i>	0.03719. (0.01898)	0.06386** (0.02109)	-0.04945* (0.01930)	-0.06658*** (0.02012)	-0.88440*** (0.25490)	-0.54610 (0.40950)
<i>Panel D: Private sector debt outstanding relative to GDP</i>						
$\frac{Debt}{GDP}$ × <i>POST</i>	-0.06778*** (0.01792)	-0.09064*** (0.01710)	-0.01133 (0.01823)	0.01292 (0.01655)	0.13390 (0.18490)	0.29080 (0.25780)
<i>POST</i>	0.17520*** (0.02296)	0.17554*** (0.02157)	-0.08029*** (0.02266)	-0.10317*** (0.02012)	0.30700 (0.22290)	0.43590 (0.28440)
$\frac{Debt}{GDP}$	0.06686* (0.02925)	0.04873 (0.03362)	-0.07768** (0.03003)	-0.03597 (0.03246)	-1.54700*** (0.46780)	-0.69160 (0.63980)
<i>Panel E: Number of LBO transactions</i>						
# <i>LBO</i> × <i>POST</i>	-0.00114*** (0.00023)	-0.00065*** (0.00020)	0.00066** (0.00023)	0.00024 (0.00019)	0.00125 (0.00207)	-0.00201 (0.00226)
<i>POST</i>	0.16665*** (0.01764)	0.11612*** (0.01620)	-0.13300*** (0.01744)	-0.10540*** (0.01524)	0.37290* (0.15130)	0.85470*** (0.18980)
# <i>LBO</i>	0.00041 (0.00029)	-0.00033 (0.00031)	-0.00006 (0.00029)	-0.00005 (0.00030)	-0.00163 (0.00394)	0.00386 (0.00659)
<i>Panel F: Number of LBO transactions relative to GDP</i>						
$\frac{\#LBO}{GDP}$ × <i>POST</i>	-0.00087 (0.00068)	-0.00075 (0.00058)	0.00001 (0.00066)	-0.00001 (0.00055)	0.01066. (0.00578)	0.00047 (0.00646)
<i>POST</i>	0.12715*** (0.02464)	0.09847*** (0.02233)	-0.09297*** (0.02410)	-0.08898*** (0.02079)	0.11310 (0.20580)	0.70590** (0.24960)
$\frac{\#LBO}{GDP}$	0.00034 (0.00052)	-0.00066 (0.00060)	0.00013 (0.00052)	0.00023 (0.00057)	-0.00791 (0.00725)	-0.00347 (0.01224)
No. observations	53,796	50,426	47,823	43,998	9,796	6,467
No. BO firms	2,215	2,109	2,080	1,940	2,562	1,743
No. control firms	5,819	5,410	5,147	4,730	7,231	4,724
Control group	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>

This table shows coefficients (and standard errors) from regression analysis with FDR-scores and failure rates as dependent variables. *POST* is a dummy variable with a value equal 1 for buyout firms after the transaction, and 0 otherwise. Positive (negative) ZM-coefficients (Z-coefficients) imply an increase of FDR post buyouts. *MktCap*, *GDP* and *LBO* are measured in trillion USD. RDE (Real Default Effects) shows the effect of buyouts compared to the control groups measured by the variable *POST*. ***, **, *, and . denote statistical significance at the 0.1%, 1%, 5% and 10% level, respectively.

5.4 Summary of Chapter 5

In this chapter we have analyzed whether the country specific differences in financial distress risk changes can be explained by the size of capital markets. Our tests reveal a negative correlation between the absolute size of equity-, debt- and LBO market with financial distress risk. However, it is reasonable to assume that these three measures are correlated. In order to analyze which market size is driving the results, we conduct additional regressions containing all three explanatory variables interacting with the *POST* dummy. The results of these regressions, shown in Table 7, suggest that the market size of private sector debt is the most important determinant of financial distress risk. The four regressions produce consistent estimates for this explanatory variable. Regressions I, II and III show statistically significant effects of the interaction terms of *POST* and *Debt*.

On the other hand, the market size measures relative to GDP do not produce a clear picture. Solely the size of debt markets relative to GDP is consistent and significantly negatively correlated with financial distress risk after the transaction. However, this is only true for the regressions employing the ZM-score. This leads us to accept the H4 hypothesis when considering absolute market sizes, in particular debt market size, but reject it for relative measures. Failure rates on the other hand seem not be driven by market sizes in any way. Hence, the Hypothesis H5 can be rejected.

Table 7: Comparison of size effects of different capital markets

	ZM		Z		RDE	
	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>MktCap</i> × <i>POST</i>	0.00042. (0.00024)	0.00011 (0.00020)	-0.00032 (0.00024)	-0.00019 (0.00019)	-0.00509* (0.00242)	-0.00357 (0.00317)
<i>Debt</i> × <i>POST</i>	-0.06884*** (0.01814)	-0.04603** (0.01476)	0.03205. (0.01761)	0.00320 (0.01379)	0.27230. (0.16750)	0.04113 (0.21110)
# <i>LBO</i> × <i>POST</i>	-0.00065 (0.00044)	-0.00009 (0.00037)	0.00070. (0.00043)	0.00059. (0.00034)	0.00681 (0.00487)	0.00416 (0.00634)
<i>POST</i>	0.21460*** (0.02144)	0.15745*** (0.01947)	-0.15340*** (0.02086)	-0.10367*** (0.01799)	0.33830. (0.19230)	0.97690*** (0.24870)
<i>MktCap</i>	0.00014 (0.00021)	0.00019 (0.00024)	-0.00075*** (0.00021)	-0.00034 (0.00023)	0.00440 (0.00327)	0.00300 (0.00425)
<i>Debt</i>	0.04208* (0.01920)	0.06105** (0.02135)	-0.05517** (0.01954)	-0.06865*** (0.02036)	-0.95470*** (0.26280)	-0.60660 (0.42960)
# <i>LBO</i>	0.00034 (0.00030)	-0.00046 (0.00034)	0.00011 (0.00030)	-0.000167 (0.000322)	-0.00551 (0.00446)	-0.00207 (0.00804)
No. observations	53,796	50,426	47,823	43,998	9,796	6,467
No. BO firms	2,215	2,109	2,080	1,940	2,562	1,743
No. control firms	5,819	5,410	5,147	4,730	7,231	4,724
Control group	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>

This table shows coefficients (and standard errors) from regression analysis with FDR-scores and failure rates as dependent variables. *POST* is a dummy variable with a value equal 1 for buyout firms after the transaction, and 0 otherwise. Positive (negative) ZM-coefficients (Z-coefficients) imply an increase of FDR post buyouts. *MktCap*, *GDP* and *LBO* are measured in trillion USD. RDE (Real Default Effects) shows the effect of buyouts compared to the control groups measured by the variable *POST*. ***, **, *, and . denote statistical significance at the 0.1%, 1%, 5% and 10% level, respectively.

6 Creditor Protection Regimes

In this section we analyze the effect of creditor protection rules on financial distress risk changes and default rates following a buyout. Pervious studies show that stronger creditor protection leads to higher debt levels and better external financing opportunities (Djankov et al., 2007; Hall and Jörgenson, 2008; La Porta et al., 1997). Additionally, better creditor protection is associated with longer debt maturities, reducing financing risk through lower volatility of interest payments and less short-term debt renewal decisions (Giannetti, 2003; Hall and Jörgenson, 2008). Furthermore, Giannetti (2003) finds that stronger creditor rights improve financing opportunities primarily for privately held companies. Better access to external debt financing with potentially lower financing costs and longer maturities should lead to less distressed target companies and lower default rates. Therefore, we formulate the hypothesis that better creditor protection has a decreasing effect on financial distress risk and default probability of target companies.

H6: Stronger creditor protection laws decrease FDR post LBOs

H7: Stronger creditor protection laws decrease default rates post LBOs

We employ three different measures for creditor protection: the origin of the countries' legal system (Section 6.1), a creditor score created by La Porta et al. (1998) (Section 6.2) and changes in financial assistance legislations (Section 6.3).

6.1 Origin of Legal Systems

A country's creditor protection rules are highly dependent on the origin of its legal system (Djankov et al., 2007; Hall and Jörgenson, 2008; La Porta et al., 1998, 2008, 1997).¹⁰ According to these studies, countries using English common law typically have the strongest creditor protection regimes and countries using French civil law the lowest. German and Scandinavian civil law are in between, while countries using German civil law tend to offer slightly better creditor protection than their Scandinavian peers. Based on these results, we use the origins of legal systems as proxies for creditor protection. Thereby, we implicitly use the finding of Djankov et al. (2007) that creditor protection rules tend to be remarkable stable over time, contradicting the hypothesis of converging

¹⁰Legal systems in the EU-15 + Norway have the following origins:

English common law: Ireland and Great Britain

German civil law: Austria and Germany

Scandinavian civil law: Denmark, Finland, Norway and Sweden

French civil law: Belgium, France, Greece, Italy, Luxembourg, Netherlands, Portugal and Spain

legal systems.

We use the regression models introduced in Section 4.1 and add an interaction term of the legal system and the *POST* variable ($Legal \times POST$). *Legal* is a categorical variable having the value *English*, *German*, *Scandinavian* or *French*, depending on the respective legal system. We use a dummy coding method for this categorical variable where German, Scandinavian and French civil law countries are compared to the base case of English common law countries in the regression.

A summary of the results is given in Panel A of Table 9 showing the estimated values and standard errors of the interaction terms and the respective stand alone terms. We find clear evidence that target companies domiciled in French and Scandinavian civil law countries suffer from greater financial distress risk increases following a buyout, than countries using English common law. However, this effect is higher in Scandinavian- than in French civil law countries. German civil law countries do not differ consistent and statistically significant from English common law countries. Default rates of buyout companies seem to be somewhat higher in civil law countries compared to English common law countries. However, we only find a significant increase in default rates for German civil law countries using the pre-buyout control group.

6.2 Creditor Protection Score

In the previous section we show that a country's legal origin, which we used as a proxy for creditor protection, impacts financial distress risk and default rates of target companies. Now, we employ a more direct measure of creditor protection to refine this analysis. We use a creditor protection score developed by La Porta et al. (1997). This score constitutes four legal characteristics of creditor rights, whereby 1 is assigned if the right is found in the law, and 0 otherwise. These characteristics are “*no automatic stay on assets*”, “*secured creditor first paid*”, “*restrictions for going into reorganization*” and “*management does not stay in reorganization*”. The overall score is the sum of these four binary variables. Consequently, these creditor protection scores range from 0 to 4, with 4 being the highest.¹¹

¹¹Creditor Protection Scores:

Austria (3), Belgium (2), Denmark (3), Finland (1), France (0), Germany (3), Greece (1), Ireland (1), Italy (2), Luxembourg (NA), Netherlands (2), Norway (2), Portugal (1), Spain (2), Sweden (2), Great Britain (4)

Using these static scores has the major drawback that, in addition to being somewhat simplistic, they do not account for potential legal changes over time. However, considering Djankov et al.'s (2007) finding that creditor protection rules tend to be stable over time, we find it reasonable to use them for the purpose of our analysis.

Panel B of Table 9 summarizes the results of the six independent regressions. Regressions I and II show a significant decreasing effect of stronger creditor protection laws on financial distress risk in terms of ZM-scores after the buyout. However, using Z-scores as proxy for financial distress risk, does not give us a clear picture. Regression III, using the pre-buyout control group, indicates a decreasing effect which is not statistically significant. Regression IV on the other side, which uses the post-buyout control group, points to a increasing effect. However, this result has no significance at all. Furthermore, regressions V and VI indicate lower default rates, yet not statistically significant, in countries with stronger creditor protection.

6.3 Financial Assistance

In this section we examine the impact of financial assistance legislations aiming to protect creditors in buyout situations. Financial assistance refers to the assistance given by a target company for the purchase of its own shares or shares in its holding companies. Most commonly, the acquirer uses the target company's assets to secure debt taken on for the purpose of acquiring shares in the target company.

In most jurisdictions in the European Economic Area (EEA), such assistance is prohibited or highly restricted. Laws prohibiting or restricting financial assistance aim primarily to serve creditor protection and to limit so-called asset stripping practice. However, actual benefits of financial assistance rules have been highly controversial for many years. On one hand, partitioners such as private equity firms have been very innovative in bypassing such regulations, making potential beneficial effect negligible (Ferran, 2005, 2007). On the other hand, financial assistance rules are accused of creating legal barriers to efficient market-based corporate governance systems. It is often claimed that the restriction primarily increases transaction costs in buyouts without serving creditors nor other stakeholders. Due to these unclear effects, many different legal settings exist within the European Union, reaching from highly restricted to widely permitted. In addition, some countries have adopted a so called "whitewash" procedure which gives shareholders of the target company the right to authorize transactions otherwise being voided by financial

assistance laws.

However, a general trend towards relaxation of financial assistance rules can be observed among the European countries. The 2006 directive of the European Parliament and council, a guideline for EU member states and associated countries, recommends the allowance of financial assistance:

“Member States should be able to permit public limited liability companies to grant financial assistance with a view to the acquisition of their shares by a third party up to the limit of the companys distributable reserves so as to increase flexibility with regard to changes in the ownership structure of the share capital of companies. This possibility should be subject to safeguards, having regard to this Directives objective of protecting both shareholders and third parties” The European Parliament (2006).

The Directive was implemented into national law of some EEA countries to a varying degree. Table 8 gives a rough overview of the recent changes of financial assistance restrictions we could identify among these countries.

Table 8: Date of financial assistance legislations

Country	Date	New restriction
AT	01/01/2009*	Limited to the amount of dividends
BE	01/01/2009	Target can grant loans or guarantees
DK	01/01/2009*	Only distributable reserves
GB	10/01/2008	Financial assistance allowed
GR	01/01/2009*	Waived if certain conditions are met
IE	01/01/2009*	Whitewash procedure
IT	09/30/2008	Target can grant loans to acquirer
LU	06/10/2009	Whitewash procedure allowed
NL	10/01/2012	Management board can grant loans
NO	07/01/2013	Allowed to use distributable reserves

* Exact date of change unknown, therefore, January 1 assumed

Financial assistance and financial distress risk

Whether financial assistance laws are effective measures for creditor protections is as of today primarily discussed based on juridical arguments without empirical evidence

from corporate finance. We therefore aim to add to the existing literature by analyzing financial assistance's impact based on our transaction data. For that purpose, we adjust the Equation 3 by adding a dummy for financial assistance (FA), using the model shown in Equation 6.

$$DEP_t \sim DEP_{t-1} + L_{t-1} + POST * FA + Year + Country + Industry + REPBAS + \sum CV_{t-1} \quad (6)$$

DEP represents the respective dependent variable; ZM-score, Z-score or FAILED. *FA* is a dummy variable having a value of 1 if the buyout occurred in a country in which a relaxation to some degree has taken place, and 0 otherwise. Identified relaxations are shown in Table 8. Stand alone terms of *POST* and *FA* are included in the model as well.

The results of our regression are shown in Panel C of Table 9. We find an inconsistent pattern of financial assistance relaxations on financial distress risk and buyout probabilities post buyout. Also, other regression set-ups, such as only considering Great Britain where the biggest change occurred, or only the countries where we identified changes, did not show any significant results. Solely the regression IV shows a significant decreasing effect of more relaxed financial assistance rules on financial distress risk.

6.4 Summary of Chapter 6

Our results suggest that stronger creditor protection rules have a decreasing effect on the risk of financial distress following a buyout. We find evidence for this by using both legal origins and the creditor protection score of La Porta et al. (1997). This leads us to accept Hypothesis H6. Furthermore, we find indications that failure rates are somewhat lower in high creditor protection regimes. However, the verification Hypothesis H7 is not conclusive due to the lack of statistical significance.

Financial assistance legislations on the other hand, do not seem to have consistent and significant effects on neither financial distress risk nor failure rates. Even though our analysis of financial assistance law is a rather rough attempt to identify effects on FDR, it supports the thesis that the law is rather weak and has little or no impact Ferran (2005). Noteworthy in this context are also findings of Cumming and Zambelli (2010), who showed that a prohibition of leveraged buyouts prior to 2004 in Italy failed to exclude them entirely. Instead, the prohibition only caused less efficient LBO markets due to PE firms being forced to focus on bypassing regulations.

Table 9: Effect of creditor protection on FDR post LBO

	ZM		Z		RDE	
	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Panel A: Origin of legal systems</i>						
<i>German</i> × <i>POST</i>	0.06167 (0.04673)	0.06392 (0.04176)	0.07249 (0.04618)	0.07222. (0.03912)	1.10900** (0.40490)	0.29329 (0.45350)
<i>French</i> × <i>POST</i>	0.15319*** (0.02471)	0.09741*** (0.02085)	-0.05540* (0.02396)	-0.00693 (0.01964)	0.33570 (0.24720)	0.22390 (0.28090)
<i>Scand.</i> × <i>POST</i>	0.20382*** (0.03440)	0.11931*** (0.03054)	-0.10066** (0.03294)	-0.03097 (0.02826)	0.47560 (0.33010)	0.68880 (0.45260)
<i>POST</i>	-0.01390 (0.02013)	0.00792 (0.01587)	-0.05339** (0.01945)	-0.08602*** (0.01525)	0.10890 (0.20390)	0.51130* (0.02278)
<i>German</i>	0.02862 (0.07778)	0.07399 (0.06485)	-0.08187 (0.08514)	-0.11451. (0.06202)	-0.78860 (0.88100)	1.78300 (1.20900)
<i>French</i>	0.08420 (0.06455)	0.03568 (0.05152)	-0.07822 (0.07215)	-0.18037*** (0.05013)	0.60090 (0.69820)	1.40900 (1.20000)
<i>Scand.</i>	-0.10374 (0.06858)	0.08947. (0.05379)	0.17272* (0.07586)	0.06459 (0.05216)	-0.55360 (0.79990)	1.27800 (1.34300)
<i>Panel B: Creditor protection score</i>						
<i>Creditor</i> × <i>POST</i>	-0.03622*** (0.00690)	-0.02429*** (0.00590)	0.00813 (0.00656)	-0.00105 (0.00542)	-0.11430 (0.07272)	-0.10460 (0.08237)
<i>POST</i>	0.17170*** (0.01755)	0.12618*** (0.01602)	-0.10795*** (0.01655)	-0.08749*** (0.01428)	0.67330*** (0.18660)	0.98010*** (0.21830)
<i>Creditor</i>	0.09908. (0.05944)	-0.02103 (0.06418)	-0.19699** (0.06004)	-0.14729* (0.05925)	-0.16460 (0.75730)	-0.67900 (1.02200)
<i>Panel C: Financial assistance legislations</i>						
<i>FA</i> × <i>POST</i>	-0.02817 (0.04307)	0.02182 (0.07323)	-0.05641 (0.03867)	-0.13799* (0.06290)	0.00595 (0.40400)	-0.46140 (0.46140)
<i>POST</i>	0.11695*** (0.02011)	0.11820*** (0.02601)	-0.06448*** (0.01786)	-0.03263 (0.02201)	0.44020*** (0.10390)	0.75680*** (0.12430)
<i>FA</i>	0.04051 (0.02717)	0.05888 (0.05587)	0.00456 (0.02484)	0.08153. (0.04869)	0.06700 (0.28220)	0.33410 (0.35630)
No. observations	53,796	50,426	47,823	43,998	9,796	6,467
No. BO firms	2,215	2,109	2,080	1,940	2,562	1,743
No. control firms	5,819	5,410	5,147	4,730	7,231	4,724
Control group	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>

This table shows coefficients (and standard errors) from regression analysis with FDR-scores and failure rates as dependent variables. *POST* is a dummy variable with a value equal 1 for buyout firms after the transaction, and 0 otherwise. Positive (negative) ZM-coefficients (Z-coefficients) imply an increase of FDR post buyouts. *German*, *French* and *Scand.* represent German, French and Scandinavian civil law, respectively. *Creditor* refers to the creditor protection score. *FA* is a dummy variable having a value of 1 if the buyout occurred in a country in which a relaxation to some degree has taken place, and 0 otherwise. RDE (Real Default Effects) shows the effect of buyouts compared to the control groups measured by the variable *POST*. ***, **, *, and . denote statistical significance at the 0.1%, 1%, 5% and 10% level, respectively.

7 Discussion and Limitations

Based on extensive accounting data of European target companies, we show that the risk of financial distress increases on average after a buyout transaction. This is in line with Tykvova and Borell (2012), who used a different time span as well as a slightly different choice of countries and design of regression models. At the same time, we find substantial differences among the countries we analyze. While the risk of financial distress increases on average in some countries, other countries exhibit the opposite effects. These findings are until now not described in published literature and are the starting point for our further analysis. We find that these differences seem to be at least partly driven by the size of capital markets, in particular debt markets, and the strengths of creditor protection laws. On the other hand, we only find inconsistent evidence that financial assistance rules impact target companies' risk of financial distress.

The major drawback of our analyses on financial distress risk is the solely reliance on publicly available accounting data of private companies. This limitation, in addition to the usage of somewhat simplistic explanatory variables, introduce potential flaws which we discuss in the following.

Firstly, empirical corporate finance studies on private companies are invariably constraint by data availability issues. On one hand, market data is per definition not available. On the other hand, the availability of accounting data depends on country specific disclosure regulations and the quality of the used data source. Thus, our analyses are limited to publicly disclosed accounting data of privately held companies which are correctly stored in an available data base. Therefore, market data is not possible to include in the estimations of financial distress risk measures (ZM- and Z-score). Additionally, we were not able to include major buyout markets, such as the United States and Canada in our study because private companies do not need to disclose the required information in these countries. Moreover, many of the obtained observations comprise missing or unreasonable values, such as negative values for total assets. These circumstances lead us to exclude many observations (see Table 2) in order to produce reasonable results. Consequently, a reduced set of observations automatically leads to lower explanatory power and potentially introduces biases.

Secondly, we only use the ZM- and Z-scores in our study. We choose these measures because they are widely used and fairly straightforward. However, other methods such

as the O-score could have been used additionally. Other scores, building on market data, are not feasible for privately held companies due to the issues mentioned above.

Last but not least, our study is to a large degree limited to the explanatory variables we have used to test our hypotheses. For example, we could have used better and more updated creditor protection scores. However, this drawback is particularly crucial in connection with our financial assistance analysis. Here, we conduct a rather rough overview of the different regulations across Europe. A more sophisticated study of European financial assistance laws would possibly improve the explanatory power of this particular analysis. Having said that, it is reasonable that such a study is outside the scope of empirical corporate finance thesis.

In addition to the risk of financial distress of buyout companies, we also conducted analyses of default rates of buyout and control group firms. We find that LBO target firms suffer from higher failure rates compared to our sample of control group firms. However, this finding is conflictive to the finding of Tykvova and Borell (2012), who showed that companies inflicted of buyouts does not increase the probability of bankruptcy compared to their control groups. We find some potential differences in our method and data. Firstly, we use more recent and a greater data sample, which might have been updated with more recent legal statuses of companies defaulted in the aftermath of the financial crisis of 2008/2009. In terms of limitations however, we use data based on yearly observations, thus not capturing in-year effects of changes in the economic environment. This was done due to a limitation of data-collection in terms of missing or inaccurate status dates as of when exactly during the year the bankruptcy occurred. Therefore, we are limited to the year of the default. Due to this limitation, a Cox Hazard model could not be performed to capture the time-varying effects of defaults. In order to have a best fitting statistical method for default probability, this would improve statistical explanation. Also, we do not test for the age as an control variable, which would possibly give us a better understanding of the effects of the life cycle of companies in our analyses as well as firm fixed effects. Lastly, analysis of real default effects may be better conducted on a sample of all obtainable companies, instead of using control groups.

8 Suggestion for Further Studies

In this thesis we aimed to identify potential determinants of financial distress risk and failure rates of buyout target firms. In order to further analyze this question, we see the highest potential in testing additional explanatory variables. Particularly interesting would be to explicitly test the effect of the sophistication of financial systems and the impact of better corporate governance systems. Additionally, an improved study of financial assistance legislations supported by corporate law experts could yield interesting findings. Other interesting studies could be based on exploiting more sophisticated statistical models. For example, the analysis of failure rates could employ a hazard model and compare target firms to the whole population of firms. However, this would be dependent on the possibility to obtain more detailed legal status comprising exact dates of failure. Potential improvements in the dependent variables are unfortunately very limited due to inevitable reliance on publicly disclosed data of private firms. Possible improvements would be primarily limited to other or updated financial distress risk scores based on the same data.

9 Conclusion

The results presented in this thesis suggest that larger capital markets, in particular debt markets, and stronger creditor protection laws have a decreasing effect on risk of financial distress on LBO target companies post acquisition. However, we cannot conclude that these two factors also lead to lower failure rates. Greater debt markets as well as stronger creditor protection legislations are assumed to provide better external (debt) financing opportunities leading to lower yields and longer debt maturities. This is particularly true for private companies and leads to lower interest burdens and short term financing risk. Thus, larger debt markets and stronger creditor protection legislations may allow buyout firms to better handle the large amounts of debt usually taken on in LBO transactions resulting in less financial distressed target companies. These results add to the ongoing controversy on potential negative effects of private equity ownership, suggesting that market and legislative factors can influence the stakeholder value significantly.

Appendix

Appendix A: Variable Description

Dependent Variables	<i>Description</i>
ZM- and Z-score	Measures of financial distress risk. <i>Source: Amadeus</i>
Failed	Binary variable taking a value of 1 if the firm fails, 0 otherwise. <i>Source: Amadeus and Zephyr</i>
Independent Variables	<i>Description</i>
POST	Dummy variable taking the value of 1 for buyout firms in the years after a buyout transaction and 0 otherwise. <i>Source: Zephyr</i>
TOAS	Total assets of the firm. <i>Source: Amadeus</i>
Leverage	Total liabilities to total assets. <i>Source: Amadeus</i>
Industry	Industry (2–Digits NACE Rev. 2 classification). <i>Source: Amadeus</i>
Country	Country in which the firm is domiciled in. <i>Source: Amadeus</i>
Year	Reporting year of accounting data. <i>Source: Amadeus</i>
Inflation	Inflation, GDP deflator (annual %). <i>Source: World Bank Data</i>
GDP	GDP (constant 2005 US\$). <i>Source: World Bank Data</i>
GDP growth	GDP growth (annual %). <i>Source: World Bank Data</i>
MktCap	Market capitalization of listed companies. <i>Source: World Bank Data</i>
Debt	Debt of private sector companies. <i>Source: Bank for International Settlements</i>
#LBO	Number of LBOs per country and year. <i>Source: Zephyr</i>
Law	Origin of a countries legal system. <i>Source: La Porta (1997)</i>
Creditor	Creditor protection score. <i>Source: La Porta (1997)</i>
FA	Dummy variable taking the value 1 after a relaxation of financial assistance rules, 0 otherwise. <i>Source: Legislation documents for each country and the European Commission</i>
REPBAS	Dummy variable taking the value 1 if consolidated accounting date, 0 otherwise. <i>Source: Amadeus</i>

References

- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4):589–609.
- Altman, E. I. (2002). Corporate distress prediction models in a turbulent economic and basel 2 environment. *NYU Working Paper*.
- Altman, E. I., Haldeman, R. G., and Narayanan, P. (1977). Zeta tm analysis a new model to identify bankruptcy risk of corporations. *Journal of Banking & Finance*, 1(1):29–54.
- Axelson, U., Jenkinson, T., Strömberg, P., and Weisbach, M. S. (2013). Borrow cheap, buy high? the determinants of leverage and pricing in buyouts. *The Journal of Finance*, 68(6):2223–2267.
- Baker, M. and Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance*, 57(1):1–32.
- Bargeron, L. L., Schlingemann, F. P., Stulz, R. M., and Zutter, C. J. (2008). Why do private acquirers pay so little compared to public acquirers? *Journal of Financial Economics*, 89(3):375–390.
- Bemmann, M. (2005). Improving the comparability of insolvency predictions. *TU Dresden Working Paper*.
- Cressya, R., Munarib, F., and Malipieroc, A. (2007). Playing to their strengths? evidence that specialization in the private equity industry confers competitive advantage. *Journal of Corporate Finance*.
- Cumming, D. and Zambelli, S. (2010). Illegal buyouts. *Journal of Banking & Finance*, 34(2):441–456.
- Djankov, S., McLiesh, C., and Shleifer, A. (2007). Private credit in 129 countries. *Journal of Financial Economics*, 84(2):299–329.
- Ferran, E. (2005). Simplification of european company law on financial assistance. *European Business Organization Law Review*, 6(01):93–99.
- Ferran, E. (2007). Regulation of private equity-backed leveraged buyout activity in europe. *ECGI-Law Working Paper*, (84).

- Giannetti, M. (2003). Do better institutions mitigate agency problems? evidence from corporate finance choices. *Journal of Financial and Quantitative Analysis*, 38(01):185–212.
- Gilligan, J. and Wright, M. (2008). *Private equity demystified: An explanatory guide*. Institute of Chartered Accountants in England and Wales, Centre for Business Performance.
- Goergen, M., O’Sullivan, N., and Wood, G. (2014). The consequences of private equity acquisitions for employees: new evidence on the impact on wages, employment and productivity. *Human Resource Management Journal*, 24(2):145–158.
- Hall, T. and Jörgenson, F. (2008). Legal rights matter: Evidence from panel data on creditor protection and debt. *International Finance Review*, 9:303–336.
- Kaplan, S. N. and Strömberg, P. (2008). Leveraged buyouts and private equity. *Journal of Economic Perspectives*, 22(4).
- Kraus, A., Litzenberger, and H, R. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, 28(4):911–922.
- La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106 (6):1113–1155.
- La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2008). The economic consequences of legal origins. *Journal of Economic Literature*, 46(2):285–322.
- La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. W. (1997). Legal determinants of external finance. *Journal of Finance*, pages 1131–1150.
- Lerner, J., Sorensen, M., and Stromberg, P. (2013). Private equity and investment in innovation: Evidence from patents. *Journal of Applied Corporate Finance*, 25(2):95–102.
- Ljunqvist, A. and Richardson, M. (2003). The cash flow, return and risk characteristics of private equity. *NYU Working Paper*.
- Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, 39(3):574–592.
- Myers, S. C. and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2):187–221.

- Ohlson, J. A. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research*, pages 109–131.
- Rosenbaum, P. R. and Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*.
- The European Parliament (2006). Directive 2006/68/ec of the european parliament and of the council of 6 september 2006 amending council directive 77/91/eec as regards the formation of public limited liability companies and the maintenance and alteration of their capital. *Official Journal of the European Union*.
- Tykvova, T. and Borell, M. (2012). Do private equity owners increase risk of financial distress and bankruptcy? *Journal of Corporate Finance*, 18(1):138–150.
- Yasuda, A. and Metrick, A. (2007). The economics of private equity funds. In *Federal Reserve Bank of San Francisco Proceedings*.
- Zmijewski, M. E. (1984). Methodological issues related to the estimation of financial distress prediction models. *Journal of Accounting Research*, pages 59–82.