

MEMOIRE

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Leveraged buyouts and financial distress:
What is driving bankruptcy among buyouts of the post
financial crisis period?

Par Simon Umflat

Directeur: Professeur Kim Oosterlinck
Assesseur: Professeur Hugues Pirotte

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Leveraged buyouts and financial distress: What is driving bankruptcy among buyouts of the post financial crisis period?

Simon Umflat

Abstract

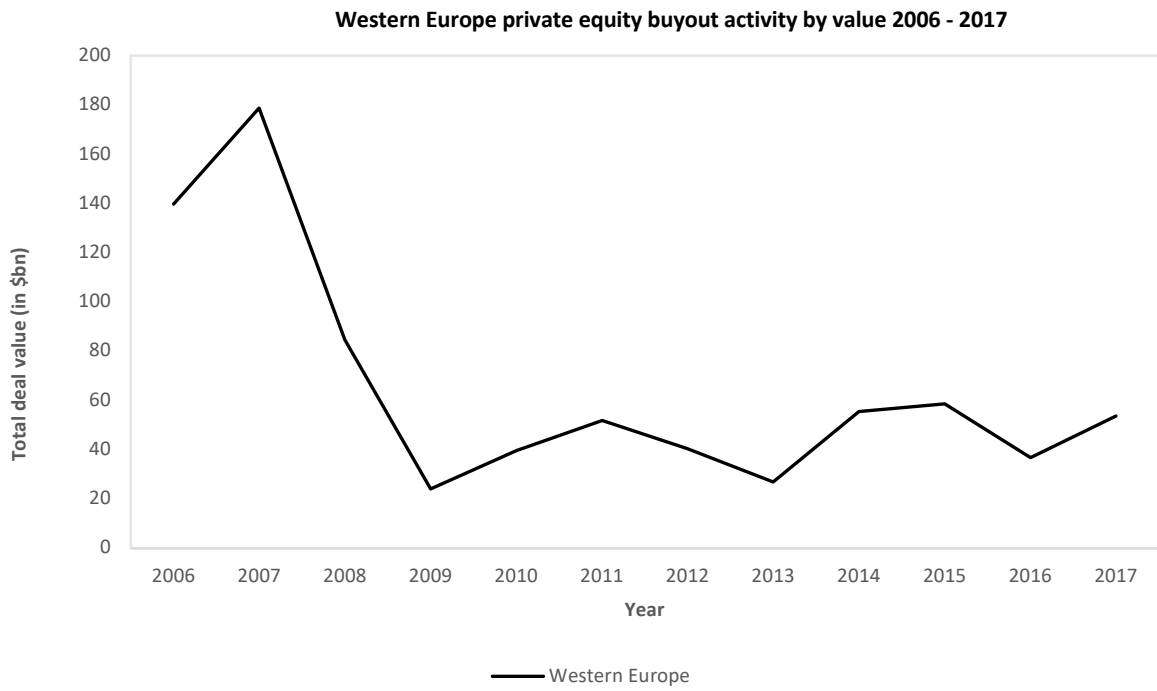
The recent upturn in European private equity activities creates a compelling framework for analysing the effects of the financial crisis on the default probabilities of buyout companies. Based on a sample of European leveraged buyouts (LBOs) from 2008 to 2018, this article demonstrates that LBOs have lower likelihoods of becoming insolvent than comparable non-buyout firms. This paper's results hence associate high levels of leverage with better management of financial distress. Moreover, the investigation of specific transaction characteristics shows that syndication appears as the only trait decreasing chances to end the going-concerned attribute of a business.

1. Introduction

After the financial crisis of 2008, the European private-equity sector (PE) total deal value and volume have both plummeted. According to the MergerMarket database, European PE companies only completed 524 leveraged buyouts (LBOs) worth \$24bn in 2009, against nearly 1046 transactions valued at \$179bn in 2007. Figures 1 and 2 present an overview of the PE activity in Western Europe. The economic downturn and the extreme credit conditions resulting from the crisis have certainly both played their part in those dramatic drops. Nevertheless, the PE industry is now reaching levels of activity similar to those of the beginning of the crisis in 2008 in terms of number of deals. Additionally, it displays a year-on-year growth rate of 13.9% in value between 2009 and 2017.

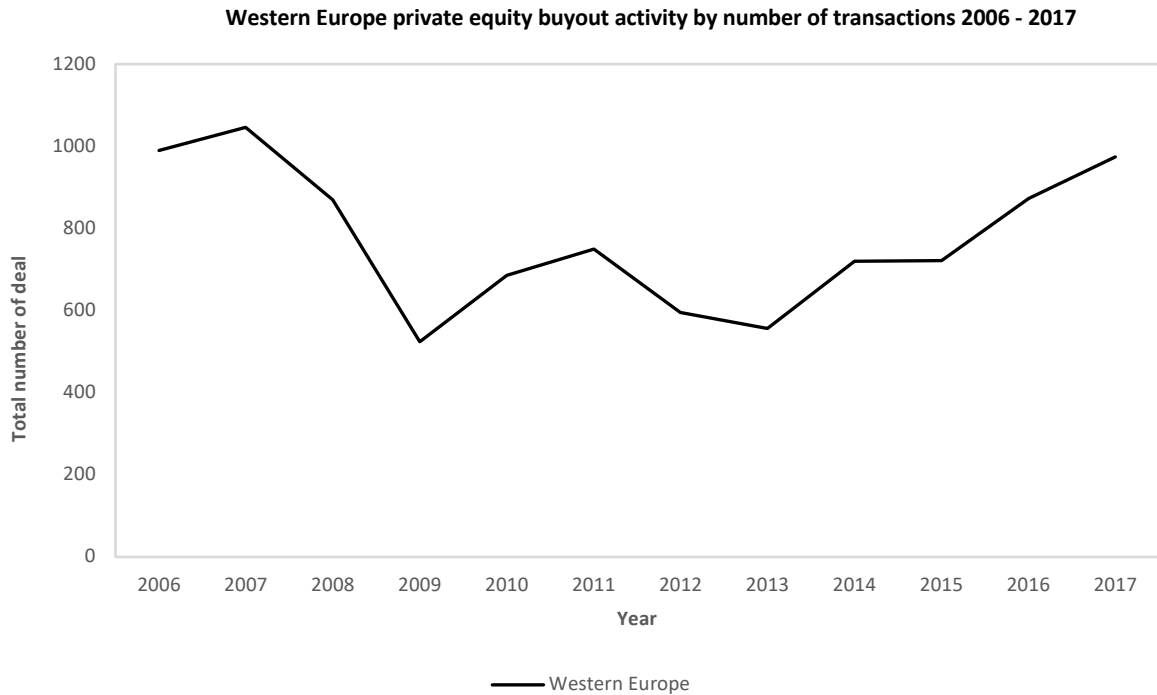
Yet, the literature provides little insight into this recent upturn. The bulk of the articles on LBOs discusses the buyout waves of the years 2000s and prior. However, many questions could emanate from this late rise. One of those points of interrogation is whether investors have changed their way of proceeding with risks of financial distress after the crisis of 2008. Are PE acquirers more cautious than in the past? Did the crisis change any pattern in managing such levels of leverage? Few of these uncertainties have been answered, and most of the studies only cover the US and the UK markets.

Figure 1



Note: Those numbers do not include secondary buyout nor exit buyout.
Source: MergerMarket

Figure 2



Note: Those numbers do not include secondary buyout nor exit buyout.
Source: MergerMarket

This paper attempts to fill this gap. It aims to provide an insight into the changes the financial crisis could have provoked on the risk of facing default in Europe. To better understand the importance of leverage towards financial distress, and the debate it triggers, two views are presented. The first perspective is the one of Jensen (1989). He alleges that a new form of organisation with higher levels of debt has risen and now outperforms publicly held corporations. Accordingly, he asserts that substantial leverage efficiently solves conflicts between managers and owners over the company free cash flows by mitigating agency problems. He argues that because of the high degree of leverage, private equity owners accomplish considerable returns on their initial stake. It also gives them strong incentives to manage their firms more profitably and efficiently, therefore lowering the risk of financial distress. Hotchkiss, Smith and Strömberg (2014) summarise the second position in a “dark side” view of LBOs. This standpoint advocates that private equity investors, by using high leverage, lead the companies they own to face financial distress with higher probabilities than comparable non-buyout firms. This rationale stresses the fact that, as a more prominent part of their revenue serves as repayment for interest expense, fewer funds are available to face a potential downturn in activities.

To contribute to this debate, and to determine whether Jensen's hypothesis holds against the "dark side" view, this thesis relies on a constructed sample of 564 completed EU LBOs and 1463 comparable non-buyout companies paired with a propensity score matching procedure. All buyout transactions took place from 2008 to March 2018 (henceforth, the post-crisis period). The methodology employed is mainly inspired by Tykvová and Borell (2012). However, unlike other articles on the matter, this set of data contains only leveraged buyouts and excludes management buyouts, buy-ins and secondary buyouts. Those transactions do not display similar characteristics as first-time ones. It also includes companies' intrinsic traits such as age and total assets, and other external economic environment variables that could potentially affect the odds of insolvency.

The central point of discussion of this paper is the effect of the buyout event on the probabilities to go bankrupt. It sheds light on the performance of LBOs regarding default, in comparison with similar non-buyout firms. Contrarily to prior research on the pre-crisis period, this paper finds that the buyout event decreases the chances to go out of business. As a result, the transactions that took place during the post-crisis era outperform LBOs of the pre-crisis era regarding bankruptcy chances. This finding is consistent with the Jensen's (1989) hypothesis. A higher degree of leverage seems to appeal for better management of a business and its potential inherent issues, and to mitigate the risk of distress.

The second element of discussion is the impact of specific transaction features on the probabilities of an LBO to remain going-concerned. The selected characteristics of interest are syndication, the investors' level of experience in PE and the credit conditions in the year of the deal. By focusing investigations on the buyout group only, syndication appears as the sole factor influencing the chances of default. The presence of multiple investors seems to mitigate the risk of facing financial distress for a buyout. This finding suggests that, together, several acquirers have better resources and knowledge to handle higher levels of leverage than stand-alone acquisitions correctly. Notably, neither credit market conditions, nor the investors' level of experience in the PE area are significant variables in the measurement of default odds. The lack of effect from the acquirers' experience follows the findings of Hotchkiss, Smith and Strömberg (2014) that professional investors do not worsen the probabilities of bankruptcy. The absence of significance from the level of interest rates is consistent with Tykvová and Borell's (2012) results.

These paper's findings contribute to the literature on highly-leveraged transactions regarding the financial distress they could face. Particularly, it questions the negative perception of the "dark side" view of the LBOs has on high levels of leverage. In contrast with studies on previous buyout waves and different geographical area, this article finds that buyouts are potentially a more performant type of company than those with a lower level of leverage.

The remainder of the article is the following. Section 2 defines financial distress, discusses which factors other than leverage increases the probabilities of facing distress, and assess the costs of financial distress. Section 3 sheds light on the likelihoods of bankruptcy for buyouts and comparable non-buyout companies. Section 4 presents the data used for the empirical study. Section 5 explains the methodology employed. Section 6 discusses the results of the analysis, and section 7 concludes this thesis.

2. Theoretical background

2.1. Financial distress definitions

As the “dark side” view of leveraged buyouts suggests, high levels of leverage might cause financial distress. Before going further, it is essential to define what it is precisely. Various definitions exist in the current literature, and it is not of ease to find a unique notion. Authors define financial distress according to the subject of their research and their objectives. Contrarily to the other articles, this paper provides the three most used descriptions. It also ranks them by their degree of severity.

The first one labels it as the first year when a firm’s Earnings Before Interests, Taxes, Depreciation and Amortisation (EBITDA) is less than the expected interest expense. In other words, when cash flows are less than current maturities of long-term debts. Whitaker (1999) defines this as the entry into financial distress, suggesting that a company performance has decreased compared to previous years. This is the softest interpretation.

Andrade and Kaplan (1998) give two additional views. They designate financial distress as either the first year where a firm attempts to restructure its debt or when a firm goes bankrupt. Debt restructuring refers to when a company is on the brink of going bankrupt and when the company attempts to renegotiate the debt terms with its creditors to avoid defaulting on this particular debt. One can see a debt restructuring effort as the ultimate step before filing for bankruptcy. This type of event happens less regularly than the first definition. This second meaning is not covered in this paper. Finally, going bankrupt is an even less frequent event and is the most extreme type of financial distress. Table 1 summaries the three definitions.

Depending on which context authors have based their research, different findings are possible. Studies based on the first and second interpretation could measure the value destroyed by the distress. Research questions using the third classification might discuss the risk linked to leverage regarding default.

This last interpretation is the primary point of interest of the present thesis. It defines financial distress as bankruptcy and raises the question whether the buyout event triggers bankruptcy. It is the foundation of the empirical study undertaken in section 5. The first definition serves as the groundwork to find what makes buyouts enter financial distress at the lowest level of damage.

Table 1

Summary of financial distress definitions.

Name	Description	Possible research to be conducted
Entry into financial distress	When the firm's EBITDA of the year is less than the expected interest expense of the same year.	Value destruction.
Debt restructuring	The first year when a company renegotiates its debt before bankruptcy.	Value destruction.
Bankruptcy	When a business goes bankrupt.	The measure of the impact of the buyout event on the bankruptcy probabilities.

2.2. Factors triggering or mitigating entry into financial distress probabilities

Ahead of discussing the impact of the buyout event on a company's likelihoods to face bankruptcy and to investigate Jensen's hypothesis, this section explores circumstances that alter the odds to enter distress¹. This article does not merely address the issue of insolvency based on the buyout event. It also aims to assess whether factors generating the lowest level of distress also trigger its highest level. Table 2 recapitulates the different potential factors.

While this part compiles what dominantly induces financial distress, section 5 gauges if those same elements also play a role in bankruptcy probabilities. This paper focuses on three different elements that potentially alter those chances: syndication, the investors' experience and the credit market conditions.

There are many reasons to speculate on the role syndication can play. Wright and Lockett (2003) define syndicates as a group of more than one investor for a single transaction. The primary rationale behind forming a group of investors is risk-sharing. Syndicates target firms that would be too high-priced to be funded by a single sponsor. Moreover, syndicates often provide skilled specialists that can help better restructure deal and debts than stand-alone transactions. Syndication also allows for better selection of targets since the deal terms and the quality of the company must be approved by several parties. These findings suggest that syndicates might better handle and mitigate financial distress. In contrast, Wruck (1990) argues that a high number of creditors in a transaction increases the potential conflict of interests. Gilson, John, and Lang (1990) even assert that the renegotiation of financial distress is proportionally affected by the number of investors. Syndication appears to prompt a debate, which section 5 tries to settle.

¹. This section relies on the first definition, i.e. entry into financial distress.

Experience is often thought as beneficial. According to Opler (1993), the involvement of a PE company LBOs influences the likelihoods of encountering financial distress. He argues that the presence of experienced investors reduces those odds. Similarly, Cotter and Peck (2001) provide evidence that PE firms substantially reduce those probabilities through their efforts to change incentives and governance. Buyout specialists seem to take less debt and, hence, are less likely to experience financial distress. Moreover, Hotchkiss, Smith and Strömberg (2014) report that PE investors do not worsen the probabilities and seem to resolve it more efficiently than other types of investors. Halpern, Kieschnick and Rotenberg (2009) critic those results. They argue that the prior literature takes neither the company's debt structure into account nor the size of its debt. Accordingly, they find that PE actions do not play a role in reducing the odds of financial distress. Nevertheless, they claim that if private equity firms do have an impact, it is more in how they structure the debt rather than the changes they make in governance.

Regarding credit market conditions, investors may take unforeseen risks during years where access to debt is easier. These suppositions are consistent with what De Maeseneire and Brinkhuis (2012) observe from 2000 to 2007. The credit environment appears to drive the leverage levels in LBOs. Those conditions do not affect comparable non-buyout companies, which suggests that PE investors are more sensitive to the credit market. The cheaper debt is, the more buyers borrow and the less they invest with their own funds. Kaplan and Strömberg (2009) assert that the available amount of debt stimulates more LBO activities than the potential return from them. Axelson et al. (2013) also demonstrate with a sample of buyouts from 1980 to 2008 that "the variation in economy-wide credit conditions"² determines the degree of leverage in a transaction. In their article, favourable credit conditions lead investors to acquire target firms at a substantial premium than with an unfavourable environment. An overestimated price combined with a higher amount of debt to reimburse could increase the risks for a company to face distress. Few articles are available on this specific subject. However, Tykvová and Borell (2012) do not find evidence that better credit conditions affect those chances.

These four cited elements are not the only ones present in the literature. Even though less discussed, the following ones are still worth mentioning. Wruck (1990) concludes that economic distress, a decline in the industry in which the firm operates or poor management are also significant reasons.

² Axelson et al. (2013)

Table 2

Comparison of factors affecting the probability of facing financial distress. *

Article	Factors studied	Increase/decrease odds	Sample
Opler (1993)	Presence of private equity investors in the buyout.	Decreases the chance of facing distress.	US
Cotter and Peck (2001)	Presence of private equity firms in the buyout.	Decreases through efforts to change incentives and the firm's governance.	US
Hotchkiss, Smith and Strömberg (2014)	Presence of private equity firms in the buyout.	Does not worsen the probabilities and seem to resolve it more efficiently than other types of investors.	Worldwide
Halpern, Kieschnick and Rotenberg (2009)	Presence of private equity firms in the buyout and few (private) lenders.	Decreases by the ability to restructure the debt in an easier way than with public lenders.	Worldwide
Tykvová and Borell (2012)	Favourable credit conditions during the year of the buyout.	Does not affect the probabilities of distress.	EU
Wright and Lockett (2003)	Syndication.	Decreases by selecting better targets and better restructuring the company's debt.	US
Wruck (1990) Gilson, John and Lang (1990)	Syndication.	Increases because of the higher number of creditors, which creates conflicts of interest.	US

* All the above articles rely on the first definition of financial distress.

Whitaker (1999) agrees partially with this view as he exclusively retains poor management as a potential factor for a buyout company to enter financial distress. In fact, he does not find evidence that economic distress is a cause for it. Although the earlier discussed elements could play their part, it is still to be proven that facing financial distress for buyouts is costly and affects the company's ambition to remain going-concerned.

2.3. Cost of financial distress

After analysing potential factors affecting the likelihood to enter financial distress in buyouts, it would be relevant to gauge the cost it incurs. If those elements are indeed costly, it is likely that they could also lead to bankruptcy. On the other hand, if they do not destroy value and are somewhat beneficial, it would be unlikely to prompt a company to default. Whether they are harmful or not, section 5 assesses if they also decrease the odds of remaining a going-concerned company.

2.3.1. Costs categories

Once again, definitions of costs are not straightforward. The literature uses different ways to define the same concept. Fortunately, the present section summarises the various terms and categories employed. Table 3 gives an overview of the different descriptions.

Andrade and Kaplan (1998) distinguish two types of costs; qualitative and quantitative. Quantitative costs consist of, for instance, a loss in market share, litigation fees or potential loss in profit due to the risk of bankruptcy. Qualitative costs can be characterised as the obligation to sell assets at a depressed price, to raise capital expenditure, or to delay restructuring. Within those two categories, existing articles make an additional distinction between direct and indirect costs. Altman (1984) categorise direct costs as legal, accounting, filing and administrative expenses and indirect costs as the profits a company can expect to lose due to the pressure of imminent default. Opler and Titman (1994) interpret indirect costs as loss of market share and show evidence that they are significant and positive. Shleifer and Vishny (1992) define them as inefficient asset sales. Almeida and Phillipon (2007) argue that while direct costs are easy to identify and relatively low, i.e. 3 to 5 per cent of the firm value at the time of distress, indirect costs are more important but arduous to quantify.

2.3.2. Computation of financial distress costs

Doubts remain regarding the costly aspect of financial distress. Up till today, academics computed the overall its related costs as the percentage of the firm's value disappearing at time of distress. A firm's value is usually computed from discounted future cash flows. Academics, therefore, analyse the changes in operating and net cash flow margins following an LBO. Table 4 summaries the different views.

Andrade and Kaplan (1998), based on a sample of 31 US Highly Leveraged Transactions (HLTs) that became financially distressed in the late 1980s, uses firms' equity and debt market values. They claim that costs amount to between 10 to 23 per cent of the firm's total value.

Table 3

Financial distress costs categories.

Type of cost	Examples
Quantitative	Loss in a market share, loss of profit due to risk of default.
Qualitative	Sale of assets at a depressed price, delay in restructuring.
Direct	Legal, accounting and administrative expenses.
Indirect	Expected loss of profit due to a risk of bankruptcy.

Citron and Wright (2008) observe similar results for 57 UK management buyouts. They find that the damage equal to 30 per cent of the receivership records of the firm in distress. Alternatively, Citron et al. (2003) prefer to analyse the recovery rate for creditors instead of the loss in the distressed firm's value. They find that secured creditors recover 62 per cent of their investment when a buyout company goes bankrupt, a finding that supports what the authors mentioned above state.

While the previous findings related to ex-post costs, Almeida and Phillipon (2007) show evidence that the prior literature underestimates the ex-ante costs. Graham (2000) explains that the historical probabilities of financial distress for public companies are low. When computing the ex-ante costs, authors usually multiply the ex-post ones by the historical probabilities of default. Therefore, the formers are often considered as modest. However, Almeida and Phillipon (2007) claim that financial distress is more likely to happen in bad times (i.e. when corporate bonds also default) and that multiplying by the historical probabilities of default does not consider the capital structure and discounting. They find that the Net Present Value (NPV) of the ex-ante risk-adjusted distress costs are of 4,5 per cent of the pre-distress firm's value. In contrast, methods that do not use risk-adjusted parameters find an NPV of 1,3 per cent only.

On the one hand, financial distress is indeed damaging when comparing the post-buyout firm's value to the post-distress firm's value. On the other hand, Kaplan and Strömberg (2009) notice that LBOs in difficulties are at least as valuable as they were before the transaction. Therefore, even in difficulties, buyout firms still outperform the comparable non-buyout firms in a given industry. Andrade and Kaplan (1998) confirm this, except for firms having encountered an economic shock. This finding goes against how some authors perceive the LBOs of the late 1980s. Hotchkiss (1995) and Gilson (1997) indeed argue that this particular wave is unsuccessful and therefore distressed firms should, in this view, perform even worse than comparable non-buyout

Table 4
Summary of finding on financial distress costs. *

Article	Costly?	Findings	Sample
Andrade and Kaplan (1998)	Yes.	Financial distress costs amount to between 10 and 20 per cent of the firm's value.	US
Citron and Wright (2008)	Yes.	Financial distress costs amount to 30 per cent of the receivership record of the firm in distress.	UK
Citron et al. (2003)	Yes.	Secured creditors recover, on average, 62 per cent of their stake when a buyout company goes bankrupt.	US
Almeida and Phillipon (2009)	Yes, and more than expected ex-ante.	Ex-ante financial distress costs are higher than predicted by the existing literature.	US

* All articles rely on the first provided definition of financial distress.

companies. Still, Opler and Titman (1994) claim indirect financial distress costs are significant and positive. However, the majority of the literature³ asserts that it is not as costly as expected.

Academics tend to show that financial distress does not cause a company to be worth less than its pre-buyout value. Still, this does not necessarily imply that they could not lead to bankruptcy anyhow. Andrade and Kaplan (1998) and Whitaker (1999) observe that most of the costs happen between the entry of distress and before filing for Chapter 11.⁴ Warner (1977), Clark and Weinstein (1983), and Gilson, John, and Lang (1990) claim as well that a substantial part of the effects appears before default. Much of the value is indeed lost before bankruptcy rather than post-distress. As such, this suggests that financial distress costs eventually lead to bankruptcy. Section 4 will assess if, despite its uncostly aspect, entry into financial distress still could drive a target firm to default.

Besides the eventual costs that it incurs, Whitaker (1999) shows evidence that financial distress triggers corrective actions that improve the firm performance. However, it only applies to firms which were poorly managed in the past, and that became distressed for another reason than poor management. Andrade and Kaplan (1998) also highlight the benefits of cost-cutting and board replacement as a source of welfare.

³ See Andrade and Kaplan (1998), Kaplan and Stromberg (2009), Cressy and Farad (2012), Tykvová and Borell (2012) and Wilson and Wright (2013).

⁴ Chapter 11 is an American law which allows firm's owners to pursue their activities and to reorganise under the oversight of the US federal court.

3. LBOs and bankruptcy

The primary objective of this thesis is to examine the effect of the buyout event on a firm's likelihoods to face bankruptcy. As it is the ultimate phase of financial distress, it is the most interesting form to observe. It is indeed the best method to know whether LBOs are, as Jensen (1989) suggests, a superior form of organisation. The following part seeks to summarise the current and previous views on the matter. Table 5 summarises each discussed finding.

Cressy and Farag (2012) explain that bankruptcy rates for highly leveraged companies such as LBOs should, in theory, be higher than for comparable non-buyout companies. Kaplan and Stein (1993) claim that a poorly structured firm can raise the likelihood and the costs of facing financial distress. Indeed, as interest expenses rise, a company will have to dedicate more of its revenues to repay its debts, all else being equal. A downturn in the economy or a particular industry should thus substantially affect businesses with higher leverage ratios.

Surprisingly, it is not what Cressy and Farag's findings reflect. Recovery rates for their sample of buyouts from 1998 to 2015 in the UK are higher than for non-buyout companies. It is, in fact, two times higher than for PLCs. It is important to note that this article does not try to match the sample of LBOs with similar firms. This could lead to a potential bias when analysing the results. The regression cannot correctly discriminate the buyout event as other factors could alter the estimation of bankruptcy likelihoods. The empirical study of section 5 corrects this.

Wilson and Wright (2013) find contradictory results. They show, based on a sample of 8 million UK private companies, that post-2003 PE-backed transactions are not more prone to face default than comparable non-buyout companies. This also holds for other types of transactions, such as management buyouts or buy-ins. Post-2003 observations are even more likely to avoid to file for receivership when facing distress. For their entire sample, however, there is a higher incidence of bankruptcy for private equity deals than for the sample of comparable corporations. This holds when controlling for the firm and industry characteristics. Nevertheless, the ex-post insolvency risk for the LBOs population is lower than expected, given their pre-buyout risk characteristics. This could mean that acquiring a company with a high level of leverage reduces the risks of going bankrupt for a firm.

Hotchkiss, Smith and Strömberg (2014), in a working paper, present two common views held by the literature about LBOs, the bright side and the dark side views. The prior assumes that private equity investors are better at managing distress when compared to other types of owner. The dark side view states that, because of their short-termism vision and their excessive risk-taking,

Table 5

Comparison of findings about bankruptcy probabilities for buyouts. *

Article	Higher probability of going bankrupt	Findings	Sample
Cressy and Farag (2012)	No.	Buyouts go less often bankrupt from 1998 to 2015 in the UK than non-buyout PLCs.	UK
Tykvová and Borell (2012)	No.	Buyout companies do not go more frequently bankrupt than comparable non-buyout companies. However, buyouts backed by experienced private equity investors do go less often bankrupt.	EU-15
Wilson and Wright (2013)	Yes, for pre-2003 and post-2003 combined. No, for the post-2003 period.	Post-2003 private-equity backed buyout are no more prone to face bankruptcy than comparable non-buyouts or other types of buyout. However, the whole sample of buyouts is more likely to go bankrupt than the control sample.	UK
Hotchkiss, Smith and Strömberg (2014)	No.	Private equity-backed buyouts (primary and secondary) are not more likely to face bankruptcy than non-buyout firms with similar leverage characteristics.	US

* All articles rely on the third definition of financial distress.

PE owners lead their portfolio of enterprises to face bankruptcy with higher probabilities. The authors are largely in favour of the bright side view and support Jensen's hypothesis. They observe a sample of buyouts that took place between 1997 and 2010 with a sample of comparable non-buyout companies. They find that LBOs are not more likely to default than their comparable corporations. However, the three authors do not exclude secondary buyouts of their sampling. Those may have different characteristics than first-time buyouts. This is mainly because they already went under the management of PE investors and might have different characteristics than first-time buyouts. For that reason, the article's conclusion could be biased. Regardless, the authors show evidence that the lower likelihoods of facing bankruptcy for PE-backed firms are due to the owners' ability to infuse capital into the company as distress threatens.

Platt and Platt (1991) and Andrade and Kaplan (1998) argue that the primary cause of financial distress in LBOs is, in fact, the high leverage. In their view, the poor firm performance (i.e. the results of poor management decisions) and the industry performance play a much smaller role in the entry into financial distress. They are part of the few academics finding that high leverage leads to higher probabilities of encountering financial distress.

The literature seems to rather focus on the US and UK markets. One of the few articles on the European market is the one of Tykvová and Borell (2012). They study 1842 EU buyouts and 5342 EU similar control firms from 2000 to 2008. They find that PE-owned firms do not go more often bankrupt than their non-buyout comparable firms.

They also discriminate for transactions done by experienced private equity investors. The probability of going bankrupt for those firms seems to be lower than for their comparable PLCs. This is consistent with the results of Opler (1993), Cotter and Peck (2001), and Hotchkiss, Smith and Strömberg (2014) and goes against Halpern, Kieschnick and Rotenberg's (2009) findings. The major caveat of this paper is that the authors do not exclude management buyouts nor buy-ins. As previously detailed, those types of transactions do not necessarily involve a presence of high leverage, which is the essence of LBOs.

Overall, buyouts do not display higher odds of facing bankruptcy. In this view, Jensen's (1989) hypothesis seems to correctly predict that advantages of leverage indeed offset its drawbacks. Higher levels of leverage seem to reduce agency problems and not to exacerbate the likelihoods of default. Yet, academics use samples that are not only composed of first-time LBOs. Some keep secondary buyouts, and management buyouts and buy-ins. As stated before, this does not ensure the presence of a high level of leverage. To correct this oversight, section 4 excludes all categories of deals that are not "pure" buyout.

4. Data

The chosen sample includes 564 EU-28⁵ LBOs that took place between January 2008 and March 2018, and 1463 comparable non-buyout companies. It is constituted of firms having defaulted during the covered period and going-concerned companies. The MergerMarket database provides information about all types of deals across the world, including first-time buyouts and secondary buyouts, and private and public transactions. Amadeus and Orbis databases, both operated by Bureau van Dijk, provide respectively accounting data, and bankruptcy information on private European companies.⁶

⁵ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

⁶ Sections 4 and 5 are mainly inspired by the methodology used in Tykvová and Borell (2012). Even though most of the parameters used are similar than theirs, the presented approach contains some improvement regarding the selection of data to better reflect the goal of this thesis.

4.1. Buyout group

From MergerMarket, it is possible to extract a list of private equity deals with the desired criteria. The sample contains completed transactions that took place between January 2008 and March 2018. All the target companies are part of the EU-28 countries. When MergerMarket indicates multiple target countries for one company, those were removed to avoid bias in the country selection. Acquirers are either strategic buyers or private equity firms.

Contrarily to Tykvová and Borell (2012), the present sample contains only “pure” buyouts. This is done by applying different and more restrictive filters. The first filter excludes secondary buyouts.⁷ Those might indeed present characteristics that are different from first-time ones. For instance, the amount of debt could be significantly higher in a firm already owned by PE investors than in a regular corporation. This could bias bankruptcy probabilities when accounting for the size of the company. The second filter excludes all transactions that did not provide majority stakes for the acquirers. Removing non-majority stakes ensures the new owner has the absolute control over the company. This aspect particularly matters as it guarantees that all taken decisions come from the PE management. Even though it is possible to retain control with minority interests, this cannot be verified here.

Finally, all management buyouts and buy-ins, which do not necessarily have the high leverage essence of LBOs, were also taken out of the sample. Only buyouts conducted by private equity or institutional investors were kept. As opposed to the present data selection process, Tykvová and Borell’s (2012) include management buyouts and buy-ins as part of their sample. They also retain transactions that did not give a majority interest to the private equity owners.

After obtaining the list of buyouts in MergerMarket, Amadeus and Orbis databases retrieve the accounting and bankruptcy data. Unfortunately, many target companies do not appear on the list of results from neither Amadeus nor Orbis. This is either because they are not reported or because companies have changed their names between the time of the transaction and the search date. Moreover, some outputs provide multiple companies with no possibility to distinguish which one went through the buyout. Companies for which no sufficient data were available do not make part of the final sample. The final sample size decreases to 564 buyouts when accounting for those constraints. This lower number attests of the usage of more restrictive filters than precedent articles.

⁷ Even though MergerMarket offers the possibility to remove secondary buyouts from the results, some remained in the output. Those had to be removed for the reasons mentioned.

Table 6 displays the buyout sample characteristics. The year 2017 saw the highest number of deals while the year 2018 had the lowest. This is because the period covered goes until March 2018 and only a few companies have released the necessary accounting data for the current year. As perhaps a consequence of the financial crisis, the number of transactions decreases between 2008 and 2009 and then increases gradually until 2017. The four largest markets of the sample are the United Kingdom, France, Spain and Germany. The “manufacturing”, “information and communication”, and “wholesale and trade retail” industries, as classified by the 1-digit NACE Rev. 2 classification, are the most represented sectors where transactions take place. In comparison with Tykvová and Borell’s article, the UK is now the most significant market ahead of France. Buyouts seem to take place predominantly in the same sectors.

The buyout sample is divided into four categories. This is to observe whether Opler (1993), Cotter and Peck (2001) and Hotchkiss, Smith and Strömberg (2014) results regarding the benefit of the presence of private equity firms still stand for the current buyout wave. The first two classes of deals are “experienced” and “inexperienced”. A buyout is considered as being conducted by experienced investors when its acquirers are private equity firms. Otherwise, the buyout is considered to be conducted by inexperienced acquirers, mostly strategic buyers. Nearly 86% of the transactions gathered are falling into the first category. Experienced investors seem to dominate the market. The data convey the impression that only a few strategic buyers acquire companies through an LBO.

The two other categories classify transactions as either syndicated, where more than one investor acquires the target company, or as stand-alone, where only one buyer is involved. This separation allows investigating two points of view. Whether syndicates better mitigate financial distress than stand-alone acquires as Wright and Lockett (2013) assert, or whether Wruck (1990) and Gilson, John and Lang (1990) correctly predict the potential conflicts of interest arising from the number of investors. A considerable majority (75%) of investors conduct transactions alone. While this could be interpreted as a bad indicator for syndication, it might be that finding syndicate partners is not straightforward. The size of the sample varies widely among articles. Some authors⁸ use large sets of data, from millions of companies to a few thousand and others⁹ rather rely on very narrow ones, between 20 and 50. As such, using a group of 564 transactions does not seem to be inadequate nor leading to the impossibility to draw conclusions. Moreover, as explained previously, this thesis uses more restrictive filters than previous articles on the matter.

⁸ See Opler and Titman (1984), Tykvová and Borell (2012) and Wilson and Wright (2013),

⁹ See Andrade and Kaplan (1998) and Citron and Wright (2008)

Table 6

Number of buyouts per year, country and industry

Year	Full Sample	Syndicated	Stand-Alone	Experienced	Inexperienced
2008	35	10	25	33	2
2009	29	8	21	22	7
2010	39	9	30	36	3
2011	40	8	32	37	3
2012	45	12	33	40	5
2013	53	10	43	42	11
2014	60	17	43	55	5
2015	71	9	62	58	13
2016	86	24	62	72	14
2017	103	36	67	85	18
2018	3	0	3	3	0
Total	564	143	421	483	81
Country					
Austria	3	1	2	3	0
Belgium	15	1	14	14	1
Denmark	21	3	18	19	2
Finland	8	2	6	7	1
France	69	23	46	58	11
Germany	51	15	36	39	12
Italy	40	13	27	37	3
Netherlands	42	13	29	35	7
Poland	20	5	15	15	5
Portugal	7	2	5	5	2
Spain	56	13	43	53	3
Sweden	26	5	21	22	4
United Kingdom	206	47	159	176	30
Total	564	143	421	483	81
Industry					
Accommodation and food activities	14	3	11	12	2
Administrative, support activities	39	8	31	37	2
Agriculture, forestry and fishing	1	0	1	0	1
Arts, entertainment and recreation	7	2	5	2	5
Construction	16	0	16	11	5
Education	5	1	4	4	1
Electricity, gas and steam	9	1	8	5	4
Financial and insurance activities	39	7	32	33	6
Human health and social work	16	3	13	15	1
Information and communication	110	43	67	101	9
Manufacturing	133	30	103	116	17
Mining and quarrying	5	1	4	4	1
Professional and scientific activities	73	22	51	61	12
Real estate activities	3	1	2	3	0
Transportation and storage	14	5	9	9	5
Water supply, waste management	5	1	4	4	1
Wholesale and retail trade	75	15	60	66	9
Total	564	143	421	483	81

4.2. Control group

To observe the result of the buyout event on bankruptcy likelihoods, it is necessary to find non-PE-owned firms with similar characteristics. As Tykvořá and Borell (2012) explain, the selection of companies by investors is not random. PE investors target specific industries and regions. Additionally, they select potential investments based on several criteria such as the cash flow generation abilities, the strength of the asset base, the acquisition price, the possible EBITDA multiple expansion, and the current management team.¹⁰ All those traits might influence the probability of a target to go bankrupt. A matching procedure using the propensity score method help to find a relevant sample of comparable companies, mitigating the potential selection bias.

The propensity score matching method, as described by Rosenbaum and Rubin (1985), allows to pair companies with similar characteristics than buyouts, but that were not acquired through such method over the period of interest. To avoid non-random country/industry/year distribution, it is necessary to split the sample into 507 country-industry-year subsamples and to run a separate propensity score logit regression on each of them. All subsamples go through a three-to-one nearest neighbour matching procedure with replacement. The three-to-one ratio ensures that there are enough companies available to perform the regressions.

Replacement allows having companies that have already been matched to be re-matched. This guarantees that each buyout is paired with its optimal “twin”.

The `matchit` function from the `MatchIt` package in R identifies three control firms for each buyout, based on their size (proxied by the firm’s total assets) and their age at the year of the subsample. The buyout event is used as the dependent variable¹¹ of the logistic regression. Table 7 provides a summary of both groups statistics. Table 8 reports the balancing property of the total sample.

To ensure that companies matched are not also part of the buyout sample, a manual check has been necessary to avoid any double counting. All subsample models displaying a complete or a quasi-complete separation in the distribution have been removed. This is to ensure that the program does not make unrealistic nor extreme assumptions that could decrease the quality of the control group.

¹⁰ Pearl, J. and Rosenbaum, J. (2013). *Investment banking: valuation, leveraged buyouts, and mergers and acquisitions*. John Wiley & Sons, pp. 192-195.

¹¹ The buyout variable takes a value of 1 if the company is a buyout and 0 otherwise.

Table 7
Summary statistics of buyouts and control firms.

	Total Assets (th. of Euros)	Age (years)
Buyouts (median)	19,298	14
Control firms (median)	19,031	14
Ranksum test	0.7397	0.9047
Number of buyouts	564	564
Number of control firms	1,463	1,463

This table shows the median of the variables total assets and age, for both the buyout group and the control group. All values correspond to the year before the transaction. The Wilcoxon-Mann-Whitney Ranksum test value for both variables are also displayed.

Table 8
Balancing property.

	Median	Mean
Buyouts	0.0002	0.0158
Control firms	0.0002	0.0183
Test	0.9478	0.5850

This table displays the propensity score mean and median for both the buyout group and the control group. Values for the Student test (equality of means) and the Wilcoxon-Mann-Whitney Ranksum test (equality of distribution) are shown for each type of statistic.

5. Methodology

As detailed in section 2, three definitions of financial distress exist in the literature.¹² The following study exclusively sheds light on the third one. The subsequent empirical work has two objectives. The first one is to measure the impact of the buyout event on default probabilities among LBOs. The second is to verify whether factors provoking the entry into financial distress also affect insolvency chances. The investigated elements are syndication, the investors' experience level and the credit conditions during the year of the transaction.

While Tykvová and Borell (2012) work with data from 2000 to 2008, this thesis' sample covers the transactions that took place between 2008 and 2018. This new set of data allows the comparison between conclusions made on the pre-crisis era with results for buyouts taking place during the period of the post-crisis era. As previously stated, buyouts for the post-crisis era were not more prone to face bankruptcy than comparable non-buyout companies. Whether the financial crisis altered those findings is discussed in the results.

The dependent variable of each regression is BANKRUPTCY. It is a dummy variable taking the value of 1 if the studied buyout went bankrupt during the period of 2008 to 2018 and 0 if it did

¹² 1° EBITDA cannot cover interest expenses, 2° Necessity for debt restructuring and 3° Bankruptcy.

not. The Orbis database gives information about companies' status and its date of occurrence. When the status given by Orbis was either "active (insolvency proceedings)", "active (default of payment)", "bankruptcy", "dissolved (bankruptcy)", "dissolved (liquidation)", "in liquidation" or "inactive (no precision)", the buyout falls into the bankrupt group.

The following elements account for the intrinsic characteristics of the buyouts. The principal variable of interest is the BUYOUT dummy, which takes a value of 1 in case the company went through a buyout, and 0 otherwise. Age is the value for the number of years between the creation date and the considered buyout event. The total assets (Size) variable is used as a proxy for the size of the company. For the control firms, total assets and age are value for the year when matched with a buyout. Both values have a one-year lag prior to the transaction. This is to capture the unaffected pre-buyout characteristics only.

Regarding syndicates, such transactions might be less likely to become a failure than when conducted by a stand-alone because of their risk-sharing aspect. For this purpose, separated regressions are done by group of investors and type of syndication. To observe the impact of syndication on insolvency probabilities, the binary variable SYNDICATED each takes a value of 1 when the buyout type corresponds to the variable and 0 otherwise.

The empirical study also considers the acquirers' experience. Private equity investors might be capable to better mitigate bankruptcies likelihoods than inexperienced ones. Hotchkiss, Smith and Strömberg (2014) identify that there is no difference in default frequencies for PE-backed buyouts and non-PE-backed buyouts. The EXPERIENCED dummy equals 1 when the transaction counted multiple acquirers.

For the credit environment, Axelson et al. (2013) note that when debt market conditions are favourable, private equity investors tend to increase their debt level when acquiring a new target. Including credit market conditions variable allows questioning the belief that buyouts transactions experiencing favourable interest rates are more inclined to bankruptcy.¹³ Credit market conditions are given by the high-yield spread, which is defined as the Europe high-yield rate for the corresponding year, i.e. the Merrill Lynch High-Yield index minus LIBOR.¹⁴ A year is considered as favourable if the spread for the year is lower than the median of the whole considered period. According to this definition, the years 2014 to 2018 had a favourable credit

¹³ See Platt and Platt (1991) and Andrade and Kaplan (1998).

¹⁴ The St. Louis FED website provides both Merrill Lynch High-Yield index (denominated in Euros) and LIBOR (denominated in Euros) for the period of 2008 to 2018.

environment. The years 2008 to 2013 had an unfavourable situation. This corresponds to the year of the financial crisis and of its recovery. The binary variable FAVOURABLE takes a value of 1 when credit market conditions are favourable and 0 otherwise.

Each regression controls for the effect of exogenous economic variables such as credit accessibility for private investors, real economic growth and business confidence indicator.¹⁵ This is because, all other factors being equal, exogenous parameters could also alter a company's chances to remain going-concerned.¹⁶ Industry fixed effects are considered as well.

6. Results and analysis

Table 9 provides the results of the analysis. Column (1) displays the coefficients from a logit regression including the whole sample of buyouts and the control group. Firm characteristics and economic environment features are not meaningful regarding the odds of insolvency. Buyout is the only significant variable, and its marginal effect is negative. This means that companies that underwent an LBO during the post-crisis period are less likely to experience bankruptcy than comparable non-buyout companies.

These results point in favour of the Jensen's (1989) hypothesis and contradict those of Platt and Platt (1991) and Andrade and Kaplan (1998).¹⁷ Leverage in LBOs might indeed outweigh its drawbacks. For the period of 2008 to 2018, LBOs actually outperform comparable non-buyout companies in terms of survival. The "dark side" view seems to underestimate the capacity of PE owners' target selection and reorganisation skills, and the reduction of agency problems leverage brings. Wilson and Wright (2013) tend to show that those important abilities allow buyout investors to face distress more comfortably and to reduce the chances to cease business. Lower odds of distress are also consistent with Kaplan and Strömberg's (2009) results for the period of 1970 to 2002. It insinuates that the current 2010s buyout wave has similar default patterns than the first big wave of the 1970s and 1980s. In comparison with Tykvová and Borell's (2012) results, post-crisis investors' picks are more meticulous than the last decade. It may also be that, when discriminating for "pure" LBOs only, the buyout event becomes negatively significant. High leverage would work as Jensen (1989) predicts. MBOs and MBIs acquirers are potentially less skilled and could have biased the authors' findings.

¹⁵ Credit accessibility for private investors, real economic growth and business confidence indicator were respectively retrieved from the World Bank, the World Competitiveness Yearbook and the OECD websites.

¹⁶ All economic variables are clustered per year and country.

¹⁷ See section 2.

Table 9
Bankruptcy probabilities.

	All buyouts and controls	All buyouts and controls	Only buyouts	Only buyouts	Only buyouts
	Logit	Logit	Logit	Logit	Logit
	(1)	(2)	(3)	(4)	(5)
<i>Buyout and buyout characteristics</i>					
Buyout	-1,5463 *** (0,2108)				
Favourable		0,1169 (0,2385)	0,2399 (0,3123)		
Syndicated				-0,5379 ** (0,2996)	
Experienced					-0,3880 (0,4614)
<i>Firm characteristics</i>					
Age	0.0000 (0.0054)	-0.0117 (0.0269)	0,0066 (0,0082)	0,0044 (0,0080)	0,0066 (0,0084)
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
<i>Economic environment</i>					
Credit	-0,0013 (0,0033)	0.0157 (0.0131)	0,0032 (0,0043)	0,0024 (0,0043)	0,0031 (0,0043)
Confidence	-0,0899 (0,1919)	-0.3613 (0.5591)	-0,0926 (0,2449)	-0,0435 (0,2428)	-0,0535 (0,2406)
Growth	2,9789 (8,0977)	0.5363 (26.0118)	5,9242 (10,4008)	7,9357 (10,3919)	7,9013 (10,2109)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Number of observations	2,027	2,027	564	564	564

This table displays the coefficient and their level of significance for each logit regressions from column (1) to (5). The dependent variable for each regression is BANKRUPTCY and is binary. It takes the value of 1 if the considered company went bankrupt from 2008 to 2018, and 0 otherwise. Each regression includes industry fixed effects, which are not shown, and a constant.

Level of significance: *, **, *** respectively denote significance at the 1%, 5% and 10% level.

Column (2) also includes the entire sample of buyout and comparable non-buyout firms. It merely measures the overall effect of an advantageous credit environment on bankruptcy probabilities. The marginal effect of the Favourable variable is not significant. It is not surprising as good credit conditions only drive buyout activities.¹⁸ Regular companies do not follow the same pattern.

Column (3) to (5) only include the buyout observations. Column (3) focuses on the effect of favourable credit conditions during the year of the deal. According to De Maeseneire and

¹⁸ De Maeseneire and Brinkhuis (2012)

Brinkhuis (2012), favourable years should see LBOs with a higher level of leverage. Platt and Platt (1991), and Andrade and Kaplan (1998) argue that the primary cause of financial distress in LBOs is, in fact, the high leverage. In that sense, the higher the leverage, the higher the risk of bankruptcy. Years when credit is more easily accessible should see a higher number of LBO companies defaulting. It is not the case for the post financial crisis period. It was not for the pre-crisis era either. The non-significance of the Favourable variable coefficient confirms the previous finding. It indicates that a convenient credit environment does not affect the probabilities of an LBO company to disappear. If better conditions of borrowing drive the buyout activity, they do not reinforce the risk of bankruptcy nor mitigate it. Other factors possibly offset the additional risk taken by investors suggested by Axelson et al. (2013). Those are not covered in this thesis. However, Tykvová and Borell's (2012) definition of favourable credit years is ambiguous. It does not distinguish between years when conditions were really favourable from those which were barely below the median of the sample. This might bias the results and a more precise definition would be needed to assess more thoroughly the effect of lower interest rates.

Column (4) studies the effect of syndication in a transaction. Syndicated is the only other significant variable besides buyout. Its coefficient is negative and indicates that target companies with more than one acquirer have better chances to survive than stand-alone deals. This result is coherent with Wright and Lockett (2013). The risk-sharing rationale for buyouts of the post-crisis era probably achieves its objectives. A higher number of acquirers appears to bring more skilled professional capable of better handling distress together than individual buyers alone. Also, as the deal terms and target attributes must satisfy every backer, syndicates perhaps select only the best and safest opportunities. Such practice may also allow to avoid financial distress and to reach a point where conflicts of interests arise. The arduousness to build a strong syndicate group and to reach an agreement on which companies to target could explain the low proportion of such transactions in the PE sector.

Finally, column (5) measures the impact of the the investors' level of experience in a deal. Surprisingly, experience does not seem to have a role in the company's survival in the period considered and with the chosen set of control variables and data. The non-significance of the coefficient is however consistent with Hotchkiss, Smith and Strömberg's (2014) findings that experience does not, at least, worsen the fate of a target. Cotter and Peck (2001) argue that experience should decrease the probabilities to enter financial distress. If efforts to change incentive and firm's governance influence the entry to financial distress, it does not matter for bankruptcy odds. Halpern, Kieschnick and Rotenberg (2009) defend that more experienced financiers' ability to restructure debt is a factor decreasing financial distress. However, it seems

that investors with a better private equity background cannot use their more advanced skills to avoid default. What can save from the first definition of financial distress does not necessarily apply to the third definition. It is in fact not aberrant since default is the most severe form of financial distress, and hence the most difficult to resolve.

It is important to note that the discussed findings of reference are all applicable to previous buyout waves. For the post-crisis era, syndication is the only characteristic that makes a difference concerning chances of default. Pre-crisis era only saw investors' experience as a determining factor. Two suppositions can partly explain this. First, syndication might be better at handling such a massive amount of debt and renegotiating debt terms than private equity firms alone. The financial crisis aftermath may also have made all investors more careful, where only experienced financiers were mature enough to be so in the last decade. Secondly, contrarily to other papers, this particular sample only contains highly-leveraged transactions.

7. Conclusion

This thesis constructs a sample of EU 564 leveraged buyout transactions that occurred between 2008 and March 2018. Its objective is to measure the effect of the buyout event and other deal characteristics such as syndication, favourable credit conditions and the investors' experience on the probabilities of an LBO to default. The central finding of this paper contradicts previous investigations on the subject. This article demonstrates that the buyout event does play a role on default odds of LBOs in the period of interest. As the Jensen's (1989) hypothesis suggests, the higher the level of leverage does not aggravate those likelihoods. In fact, it even mitigates the chances of bankruptcy. Those results contrast with those of the pre-crisis period. Previously, the buyout did not affect odds of going bankrupt in any manner.

The financial crisis aftermath and its appeal to caution are potential reasons why private equity transactions outperform their non-buyout comparable companies in that field. These divergent observations might also be explained by the difference in the data employed. The sample used in this paper is the only one exclusively including first-time LBOs. Other articles retain management buyouts and buy-ins, and secondary buyouts which all have different characteristics than first-time LBOs.

The present empirical study also finds evidence that syndication is the only studied transaction feature that influences the odds of default. This conclusion is consistent with the results of Wright and Lockett (2013) regarding the risk-sharing rationale of syndicates. The results show that

groups of multiple investors better handle distress than stand-alone investors. Additionally, favourable credit conditions, which could affect the entry into financial distress, does not exacerbate nor diminish the probabilities of bankruptcy among buyouts. Similar results are found for the investors' level of experience. This is however coherent with Halpern, Kieschnick and Rotenberg (2009) that states that experience does not worsen prospects of distress. It is cautious to say that what triggers the entry into relatively harmful levels of distress does not automatically worsen nor improve chances to remain a going-concerned business.

One of the significant caveats of this analysis is that it employs only essential buyout intrinsic traits. Aside from age and total assets, other elements could undoubtedly influence a company to default. As the matching procedure solely relies on those two attributes (besides the country, year and industry), the matched firms could lead to a misrepresentation of a genuine comparable set of comparable companies. Conclusions drawn might need additional variables to confirm the results thoroughly. Regarding the sample, half of the transactions take place in the UK. This certainly affects the results and conclusions drawn might not be representative of the whole European market. Also, some part of the methodology, such as how to define favourable credit conditions, need improvements. Using the median as the limit between favourable and unfavourable conditions is indeed questionable. For example, a value of 0.1% above the median might be considered as unfavourable as much as another 3% above the median. Moreover, other transaction features could alter the odds of bankruptcy. These are not covered in the present paper and should be addressed in other investigations. Finally, the present paper lacks sufficient data and other supporting pieces of evidence to alternatively explain discrepancies between the pre-crisis and post-crisis eras regarding the effect of leverage, and of the (non-)significance of the other studied buyout features. Only suppositions and inferences from global economic and financial knowledge can help to interpret the previous results. Further research is therefore needed to shed light on those matters.

References

Acharya, V., Gottschalg, O., Hahn, M. and Kehoe, C. (2013). Corporate Governance and Value Creation: Evidence from Private Equity. *The Review of Financial Studies*, 26(2), pp. 368-402.

Achleitner, A., Braun, R. and Engel, N. (2011). Value Creation and Pricing in Buyouts: Empirical Evidence from Europe and North America. *Review of Financial Economics*, 20, pp. 146-161.

Almeida, H. and Philippon, T. (2007). The Risk-Adjusted Cost of Financial Distress. *The Journal of Finance*, 62(6), pp. 2557-2586.

Altman, E. and Hotchkiss, E. (2006). *Corporate Financial Distress and Bankruptcy: Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt*. 3rd ed. Hoboken, USA: John Wiley & Sons, Inc.

Andrade, G. and Kaplan, S. (1998). How Costly is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed. *The Journal of Finance*, 53(5), pp.1443-1493.

Axelson, U., Strömberg, P., and Weisbach, M. (2009). Why are buyouts levered? The financial structure of private equity funds. *The Journal of Finance*, 64(4), pp. 1549-1582.

Axelson, U., Jenkinson, T., Strömberg, P. and Weisbach, M. (2013). Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts. *The Journal of Finance*, 68(5), pp.2223-2267.

Bedu, N. and Palard, J. L'impact des LBO sur la Défaillance des Entreprises – Le Cas des Cibles Française (2000 – 2010). *Finance Contrôle Stratégie*, 17(2).

Berk, J. and Demarzo, P. (2013). *Corporate Finance*. 3rd ed. Global ed. Stanford, USA: Pearson Education Edition.

Bernanke, B. and Gertler, M. (1989). Agency costs, collateral, and business fluctuations. *The American Economic Review*, 79 (1), pp. 14-31.

Bernstein, S., Lerner, J., Sørensen, M. and Strömberg, P. (2016). Private Equity and Industry Performance. *Management Science*, 63(4), pp. 1198-1213.

Brealey, R. A., Myers, S. C., Allen, F., and Mohanty, P. (2017). *Principles of corporate finance*. 12th ed. Tata McGraw-Hill Education.

Caliendo, M. and Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of economic surveys*, 22(1), pp. 31-72.

Citron, D., Wright, M., Ball, R., and Rippington, F. (2003). Secured Creditor Recovery Rates from Management Buy-outs in Distress. *European Financial Management*, 9(2), pp. 141-161.

Citron, D., and Wright, M. (2008). Bankruptcy costs, leverage and multiple secured creditors: The case of management buy-outs. *Accounting and Business Research*, 38(1), pp. 71-89.

Cotter, J. and Peck, S. (2001). The Structure of Debt and Active Equity Investors: The Case of Buyout Specialist. *Journal of Financial Economics*, 59(1), pp. 101-147.

Cressy, R. and Farag, H. (2012). Do Private Equity-Backed Buyouts Respond Better to Financial Distress than Plcs?. *The European Journal of Finance*, 18(3-4), pp. 239-259.

Cumming, D., Siegel, D. and Wright, M. (2007). Private equity, leveraged buyouts and governance. *Journal of Corporate Finance*, 13(4), pp. 439-460.

De Maeseneire, W. and Brinkhuis, S. (2012). What Drives Leverage in Leveraged Buyouts? An Analysis of European Leveraged Buyouts' Capital Structure. *Accounting and Finance*, 52(S1), pp. 155-182.

Denis, D. and Denis, D. (1995). Causes of Financial Distress Following Leveraged Recapitalizations. *Journal of Finance Economics*, 37(2), pp. 129-157.

European Central Bank. (2006). Recent Trends in Leveraged Buyouts Transactions in the Euro Area. *Monetary Bulletin of December 2006*, pp. 41-43.

Gilligan, J. and Wright, M. (2014). *Private Equity Demystified – An Explanatory Guide*. 3rd ed. ICAEW Corporate Finance Faculty.

Gilson, S., John, K. and Lang, L. (1990). Troubled debt restructurings: An empirical study of private reorganization of firms in default. *Journal of financial economics*, 27(2), pp. 315-353.

- Graham, J. (2000). How big are the tax benefits of debt?. *The Journal of Finance*, 55(5), pp. 1901-1941.
- Groh, A. and Gottschalg, O. (2011). The Effect of Leverage on the Cost of Capital of US Buyouts. *Journal of Banking & Finance*, 35(8), pp. 2099-2110.
- Guo, S. Hotchkiss, E. and Song, W. (2011). Do Buyouts (Still) Create Value?. *The Journal of Finance*, 66(2), pp. 479-517.
- Halpern, P. Kieschnick, R. and Rotenberg, W. (2009). Determinant of Financial Distress and Bankruptcy in Highly Levered Transactions. *The Quarterly Review of Economics and Finance*, 49(3), pp. 772-783.
- Harford, J. and Kolasinski, A. (2013). Do private equity returns result from wealth transfers and short-termism? Evidence from a comprehensive sample of large buyouts. *Management Science*, 60(4), pp. 888-902.
- Ho, D. E., Imai, K., King, G., and Stuart, E. A. (2011). MatchIt: nonparametric preprocessing for parametric causal inference. *Journal of Statistical Software*, 42(8), pp. 1-28.
- Hotchkiss, E. Smith, D. and Strömberg, P. (2014). Private Equity and the Resolution of Financial Distress. ECGI – Finance Working Paper No. 331.
- Jensen, M. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, 76(2), pp. 323-329.
- Jensen, M. (1989). Eclipse of the Public Corporation. *Harvard Business Review*, 67(5), pp. 61-74.
- John, K. (1993). Managing Financial Distress and Valuing Distressed Securities: A Survey and a Research Agenda. *Financial Management*, 22(3), pp. 60-78.
- Kaplan, S. (1989). The Effects of Management Buyouts on Operating Performance and Value. *Journal of Financial Economics*, 24(2), pp. 217-254.
- Kaplan, S. and Shcoar, A. (2005). Private Equity Performance: Returns, Persistence and Capital Flows. *The Journal of Finance*, 60(4), pp. 1791-1823.

Kaplan, S. and Stein, J. (1993). The Evolution of Buyout Pricing and Financial Structure in the 1980s. *The Quarterly Journal of Economics*, 108(2), pp. 313-357.

Kaplan, S. and Strömberg, P. (2009). Leveraged Buyouts and Private Equity. *Journal of Economics Perspectives*, 22(4), pp. 121-146.

Kaplan, S. and Zingales, L. (1997). Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?. *The Quarterly Journal of Economics*, 112(1), pp. 169-215.

Lai, J. and Sudarsanam, S. (2001). Corporate Financial Distress and Turnaround Strategies: An Empirical Analysis. *British Journal of Management*, 12(3), pp. 183-199.

Nikoskelainen, E. and Wright, M. (2007). The Impact of Corporate Governance Mechanisms on Value Increase in Leveraged Buyouts. *Journal of Corporate Finance*, 13(4), pp. 511-537.

Palepu, K. (1990). Consequences of Leverage Buyout. *Journal of Financial Economics*, 27(1), pp. 247-262.

Pearl, J. and Rosenbaum, J. (2013). Investment banking: valuation, leveraged buyouts, and mergers and acquisitions. John Wiley & Sons.

Platt, H. and Platt, M. (1991). A note on the use of industry-relative ratios in bankruptcy prediction. *Journal of Banking & Finance*, 15(6), pp. 1183-1194.

Purnanandam, A. (2008). Financial Distress and Corporate Risk Management: Theory & Evidence. *Journal of Financial Economics*, 87(3), pp. 706-739.

Ohlson, J. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of accounting research*, 18(1), pp. 109-131.

Olmos, A. and Govindasamy, P. (2015). Propensity scores: a practical introduction using R. *Journal of MultiDisciplinary Evaluation*, 11(25), pp. 68-88.

Opler, T. (1993). Controlling Financial Distress Costs in Leveraged Buyouts with Financial Innovations. *Financial Management*, 22(3), pp. 77-90.

Opler, T. and Titman, S. (1993). The determinants of leveraged buyout activity: Free cash flow vs. financial distress costs. *The Journal of Finance*, 48(5), pp. 1985-1999.

Opler, T. and Titman, S. (1994). Financial Distress and Corporate Performance. *The Journal of Finance*, 49(3), pp. 1015-1040.

Rosenbaum, P. and Rubin, D. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), pp. 41-55.

Rosenbaum, P. and Rubin, D. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician*, 39(1), pp. 33-38.

Tykvová, T. and Borell, M. (2012). Do Private Equity Owners Increase Risk of Financial Distress and Bankruptcy?. *Journal of Corporate Finance*, 18(1), pp. 138-150.

Whitaker, B. (1999). The Early Stages of Financial Distress. *Journal of Economics and Finance*, 23(2), pp. 123-133.

Wilson, N. and Wright, M. (2013). Private Equity, Buy-outs and Insolvency Risk. *Journal of Business Finance and Accounting*, 40(7-8), pp. 949-990.

Wruck, K. (1990). Financial distress, reorganization, and organizational efficiency. *Journal of Financial Economics*, 27(2), pp. 419-444.

Zmijewski, M. (1984). Methodological issues related to the estimation of financial distress prediction models. *Journal of Accounting research*, 22, pp. 59-82.