Tax Regimes and Leveraged Buyouts

The influence of the corporate income tax regime in a country on the amount of leverage used in a leveraged buyout.

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Sophie Vergalen
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Abstract

This paper investigates whether the presence of a general interest deduction limitation rule influences the amount of debt used by private equity firms when performing an leveraged buyout (LBO). Based on a sample of 402 buyouts completed in the years 2014 to 2022 with a target company located in the European Union, the presence of a general interest deduction limitation rule is related to an (insignificant) decrease in the amount of debt used in an LBO. A difference-in-differences model is used to investigate this effect, with the treatment being the implementation of the earnings stripping rule by the European member states 1 January 2019. An additional dataset is used that consists of 109 LBOs completed in the years 2014 to 2022 with a target company located in the United Kingdom. A multivariate regression is used to test whether the implementation of the Corporate Income Restriction on 1 January 2018 has had an influence on the amount of debt used by private equity firms when performing an LBO. Based on this sample, the presence of a general interest deduction limitation rule has a (insignificant) positive effect on the amount of debt used. Since the results change when the dataset is changed, further research is required. This paper hopefully stresses the importance of the use of the marginal corporate income tax rate of firm's, e.g. by taking into account limitations to deductions, in research instead of controlling solely for the corporate income tax rate.

Keywords: Private Equity, Tax, Interest Deduction Limitation, Corporate Income Tax, Leveraged Buyouts.

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1 Introduction

In the last few decades, the private equity industry has grown enormously. After a decline in investments, as well as exits and fund-raising, in 2020 due to Covid-19, the private equity industry reached new heights in 2021 (Bain & Company, 2023). The sector however did not manage to maintain this upward trend in the years after due to the current macro economic environment that brings great challenges to private equity firms, as can be seen in figure 1. Due to the rapidly rising interest rates, companies that are taken over by private equity firms are at risk of collapsing under the burden of their interest expenses, which have surged into the billions (Financieel Dagblad, 2023). Many private equity funds did not hedge the risk of interest rate increases, since it was deemed as a waste of time and money.

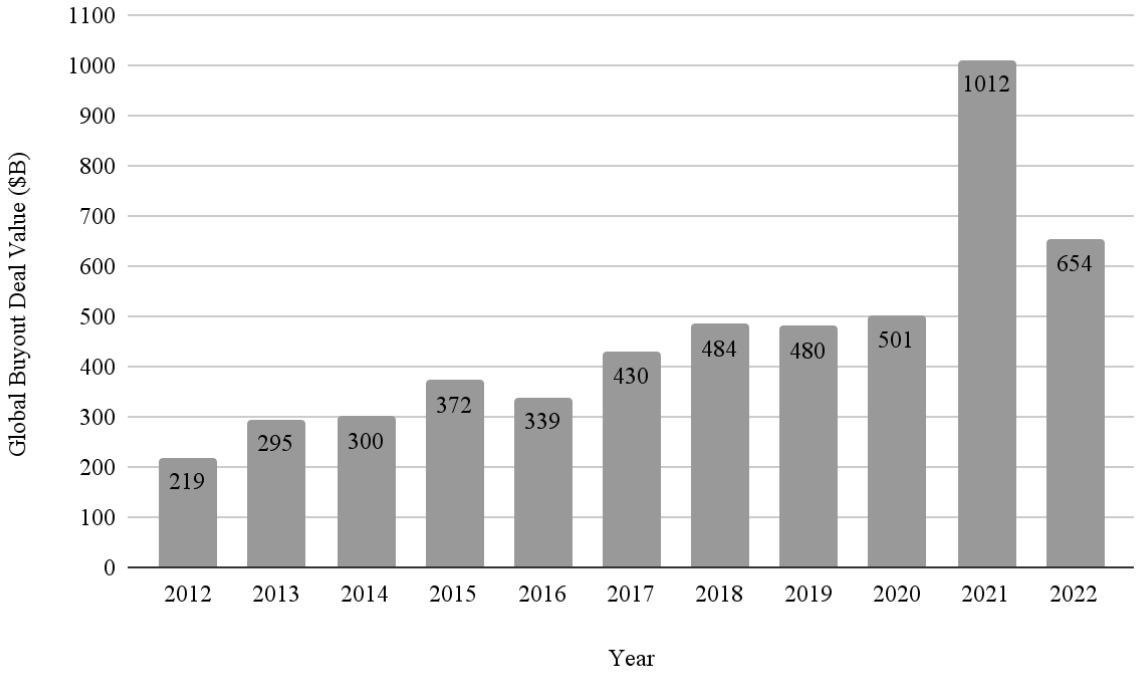

Figure 1. The Global Buyout Deal Value in the Last Decade. Source: Bain & Company, 2023.

Besides the interest rates rising, the corporate tax legislation has changed drastically in numerous countries over the recent years, aiming to fight tax avoidance. Based on the Base Erosion and Profit Shifting Report (BEPS-Report) of the Organization for Economic Cooperation and Development (OECD) published in 2013, many countries limited the base erosion possibilities for companies arising through interest deduction possibilities (OECD, 2013). In 2019, 67 countries had interest deduction limitation rules in place (OECD, 2020). The implementation of such a general interest deduction limitation rule negatively influences the revenue model of private equity firms. The large amounts of debt used when buying a company generate generous amounts of interest expenses. A company can deduct these interest expenses from its corporate income tax base, leading to less or even no taxes that have to be paid and more profit remaining. The general interest deduction limitation rule limits the amount of interest expenses that can be deducted, lowering the after tax profits of a

company and eventually the revenues of the private equity fund. This research will examine if, and to what extent, the presence of a general interest deduction limitation rule influences the amount of debt used by private equity companies in a leveraged buyout (LBO).

Alongside the upcoming popularity of private equity in the capital market, the research done in the private equity field has expanded over the years. The amount of leverage used in an LBO is determined by many firm specific and macro economic factors, such as the profitability of a company and the leveraged loan spread (Maeseneire and Brinkhuis, 2012; Colla et al., 2012). Research regarding the influence of the tax regime on the amount of debt used in an LBO is scarce. Maeseneire and Brinkhuis (2012) expected a positive relationship between the corporate income tax rate in the country where the target company is located and the amount of debt used. However, the authors either find a significant negative relationship or an insignificant positive relationship. The influence of the tax regime on the debt level of companies in general has been studied extensively, with ambiguous effects as a result. De Jong et al. (2008) and Axelson et al. (2010) fail to find a significant relationship between the corporate income tax rate and the debt level. Ivanov et al. (2020) find that the corporate income tax rate is negatively correlated with the debt level of a company, whereas Graham (1996) finds the corporate income tax rate is of positive influence. A reason why previous research fails to find significant and unambiguous results can lie in the use of the corporate income tax rate as a proxy for the tax shield that can be obtained with debt. The tax shield that a specific company can obtain does not solely depend on the corporate income tax rate, due to many interest deduction limitation rules being effective to prevent base erosion. Taking these rules into account when investigating the influence of the tax regime on the amount of debt used in an LBO will bring the researcher closer to the marginal corporate income tax rate of the company.

In this thesis, the effect of taking the presence of a general interest deduction limitation rule into account when testing the influence of a country's tax regime on the amount of debt used in an LBO will be examined. This rule restricts the tax deductibility of interest expenses on debt, thereby impacting the overall cost of borrowing and the financial structure of LBO transactions. With more and more countries implementing a general interest deduction limitation rule, understanding the influence of these limitation rules on the amount of debt used in LBOs has emerged as an interesting area of research. A difference-in-differences model will be performed in a dataset that consists of LBOs performed in the European Union (EU) in the years 2014 until 2022. On 1 January 2019, the member states of the EU had to implement a general interest deduction limitation rule; the earnings stripping rule. Some EU member states, e.g. Germany, already had an earnings stripping rule in their legislation, making it possible to form a control and treatment group. In line with previous research in this field, no significant results are found. However, the model shows that the earnings stripping rule has a negative influence on the amount of debt used in an LBO. In addition, taking into account the possible presence of the earnings stripping rule dampens the effect of the corporate income tax rate on the debt used. To test for robustness, multivariate regressions are performed in a different dataset with LBOs performed in the United Kingdom (UK) in the years 2014 until 2022. The results obtained in the EU-dataset differ from the results obtained in the UK-dataset. In the UK-dataset, the effect of the general interest deduction limitation rule on the amount of debt used is positive. In addition, the

corporate income tax rate has a negative effect on the amount of debt used in an LBO. However, one can not rule out that there is no relationship between the tax regime of a country and the amount of debt used in an LBO, since the coefficients of the tax variables are again not statistically significant.

The remainder of this paper is structured as follows. In chapter 2, the existing literature is reviewed to create a basic understanding of how private equity, especially LBOs work. In addition, previous research regarding the influence of tax regimes on the amount of debt used by private equity firms will be discussed. Based on the existing literature, three hypotheses are formulated. In chapter 3 and 4, the data and methodology used to test the hypotheses are introduced. In chapter 5, the results obtained in the EU-dataset are presented and interpreted. Chapter 6 will discuss the results obtained by performing the regressions in the UK-dataset. In the final chapter, chapter 7, a conclusion is provided. Furthermore, the limitations of this research are discussed and recommendations for further research are given.

2 Literature Review

In this chapter, an overview of the relevant literature is given. First, the different types of private equity investments are discussed. Thereafter, the process of performing an LBO will be set out into more depth and an overview will be given regarding the ways an LBO creates value. In the following paragraph, a basic understanding of the tax regime of a country will be created, focusing on the interest deduction limitation rules. Lastly, research performed regarding the effect of tax regimes on the amount of debt taken on by firms or debt used in an LBO will be analyzed, leading to three hypotheses that will be tested in this thesis.

2.1. Private Equity

2.1.1. Types of Investments

Besides the well-known public equity, such as the New York Stock Exchange (NYSE) or Standard & Poor's 500 (S&P 500), capital can also be provided to companies privately, e.g. by the use of private equity firms. The investments done by private equity firms can be divided into buyouts, venture capital and growth capital. When performing a buyout, a large stake of a mature company is obtained, often a majority stake. The company that is bought either already is a private company or becomes a private company after the buyout (Kaplan & Sensoy, 2015; Wood & Wright, 2009). When talking about venture capital, capital is provided to small companies and startups with high levels of uncertainty. A characteristic of these firms is that their growth potential is long-term (Gompers and Lerner, 2001). When a private equity firm invests through growth capital, a (usually) minority stake is obtained in a profitable company with growth potential that wants to attract capital to expand its operations or enter a new market (Demaria, 2013).

Buyouts done by private equity firms can be further distinguished into different sub categories. First, buyouts can be insider-driven, meaning that the current management of the firm takes control of the company, often with the assistance of a private equity firm (Wood and Wright, 2009). Insider-driven buyouts can for instance be management buyouts (MBOs) or management-led employee buyouts (MEBOs). The difference between an MBO and an MEBO is that in an MEBO the employees of the company, in addition to the management, also receive an equity stake in the company (Wright, Hoskisson and Busenitz, 2001). The second sub category is outside-driven buyouts, which include management buy-ins (MBIs), investor-led buyouts (IBOs) and LBOs (Wood and Wright, 2009). When performing an MBI, an external management team takes control of the company and replaces the current management (Robbie et al., 1992). An IBO occurs when a private equity investor instead of a company's management initiates the buyout of a company's business unit or assets (Wright et al., 2001). An LBO, as the name already implies, is a buyout in which a large part of the deal is financed with debt (Axelson et al., 2010). In the following paragraph, the process of performing an LBO will be discussed in more depth.

2.1.2. Performing an LBO

Private equity transactions are structured in a relatively complex way. Before being able to invest in a company, capital must be raised. Private equity firms raise capital through a closed-end fund, with closed-end meaning that the investors in the fund cannot withdraw the capital provided to the fund before the fund is terminated (Chertok and Braendel, 2010). Funds established to raise the capital needed typically have a fixed life of usually ten years, with the possibility to extend to 13 years (Kaplan and Stromberg, 2009). The fund that is established, is a limited partnership with the general partner being the private equity firm and the limited partners being institutional investors such as pension funds or wealthy individuals (Arundale and Mason, 2020). The general partner manages the fund while the limited partners have no say in the management of the fund (Hamilton, 1997). Another important difference between the general partner and the limited partners is that the general partner can be held accountable for the full amount of liabilities the fund may have, whereas the limited partners can solely be held accountable for liabilities as long as it does not exceed the value of their investment in the fund (Bishop, 2004).

Regarding providing the capital needed, limited partners play an important role. The general partner typically provides solely 1 to 10 percent of the total capital invested in the fund. The remaining amount is invested by the limited partners (Moon, 2006). The total amount of capital invested in the fund will be used to invest in one or several companies, also called portfolio companies. This can be done by performing an LBO. In figure 2, the set-up of a private equity fund is represented visually.

As the lifetime of the fund is finite, a good exit strategy is very important in private equity. There are three common ways through which a company can be sold: selling to a strategic buyer, selling to another private equity firm (SBO) or selling the shares of the company on a stock exchange (IPO) (Berg and Gottschalg, 2005; Rigamonti et al., 2016). Strategic buyers will buy the company to generate synergies (Baker et al., 2015). Synergies can come from either economies of scale or economies of scope. An example of a strategic buyer is a competitor operating in the same market who buys the company to create economies of scale.

When investing in a company, private equity firms do not solely use equity. Sixty to eighty percent of the value of the investment is financed through taking on debt (Maeseneire and Brinkhuis, 2012). The equity invested into the private equity fund is used to cover the remaining 40 to 20 percent. The concept of a ‘leveraged buyout’ owes its name to these large amounts of debt private equity companies take on when investing in a firm. A debt ratio of sixty to eighty percent is very high compared to public firms who have a ratio of twenty to thirty percent (Maeseneire and Brinkhuis, 2012). The amount of leverage used in an LBO has not been constant over time. The leverage used was notably elevated during the late 1980s, where debt financing accounted for approximately 80% of the overall capital structure. However, this ratio experienced a decline during the 1990s and early 2000s, but has been steadily increasing in the years following (Axelson et al., 2007). Based on the foregoing, one can state that the amount of debt used increases when there is a private equity wave. This is not unexpected, since in these waves came with easier and cheaper access to debt capital (Cheffins and Armour, 2008).

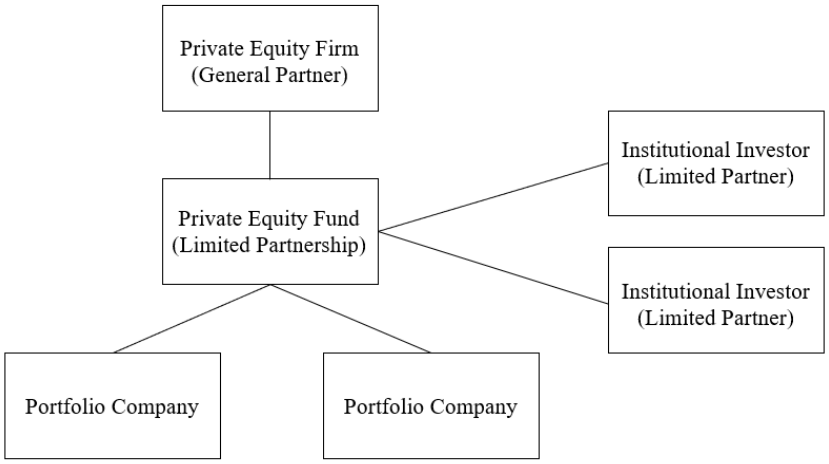

Figure 2. A visual representation of the private equity fund structure. The private equity fund is a limited partnership with the general partner being the private equity firm and the limited partners being institutional investors such as pension funds or wealthy individuals.

2.1.3. Value Creation

During the life of the private equity fund the aim is to add value to the company invested in. Adding value is done through several ways.

In the first place, private equity adds value through improving the governance of their portfolio companies. Agency problems between the management and shareholders of a portfolio company are reduced through providing equity incentives to the management of a company (Gompers et al., 2015). Jensen (1986) stated that the management of a company does not own enough equity to align its incentives with the shareholders of the company and maximize shareholder value. Private equity investors try to tackle this problem by providing a large share of equity to the management of the portfolio company. In addition, private equity firms take a seat in the board of the portfolio company. The board of a firm is an important governance tool since it is seen as a link between the management and the shareholders of a company; the board is able to monitor the management on behalf of the shareholders (Gompers et al., 2015). Gompers et al. (2015) surveyed 79 private equity investors regarding, among other things, the improvement of the governance of the portfolio company to see if improving the governance of a firm really is that important to a private equity investor when wanting to add value to a company. They find that about 58 percent of the private equity investors in their research hire their own management teams, indicating that private equity firms actively monitor and govern their portfolio companies.

Secondly, private equity firms improve the performance of their portfolio companies. Wright, Thompson and Robbie (1992) and Amess (2002) researched LBOs performed in the United Kingdom (UK) and found that there were noticeable improvements in the portfolio's firm profitability. The assets of the portfolio company were used more efficiently to optimize the cash flows. Boucly et al. (2011) found that the productivity of the portfolio companies were improved through increasing capital expenditures. A rise in productivity was also observed by Acharya et al. (2013) who found that the sales margins of portfolio companies increase after being subject to an LBO. Besides improving productivity, private equity investors also improve the financial ratios (Bruining, 1992).

Lastly, the amount of debt taken on when performing an LBO also has an effect on the value of the company through providing tax shields. This will be discussed in more depth in paragraph 2.4.

2.2. Theory of Capital Structures

As stated in the foregoing paragraph, debt is taken on by companies to provide them with a tax shield. To this date, there are two different standard theories regarding the company's capital structure choice. In 1958, Modigliani and Miller introduced their theory, assuming perfect capital markets without taxes, bankruptcy costs, agency costs, and asymmetric information (Modgliani and Miller, 1958). The essence of the Modglaini and Miller theorem is that the value of a company does not depend on its capital structure. This means that a firm's value is determined by its operations, rather than its financing choices. Therefore, a firm that is financed entirely with debt and one that is funded solely with equity will have the same value, as financial leverage is irrelevant and cannot enhance a firm's value (Modgliani and Miller, 1958).

Expanding the Modigliani and Miller theorem, the Trade-Off theory was found, adding tax shields and the cost of financial distress to the theorem. The so-called tax shield arises in the 'real world' due to firms being able to deduct their interest paid on debt for corporate income tax purposes (Kemsley and Nissim, 2002). When financing with equity, one does not create this tax shield since there are no deductible payments involved. The term 'cost of financial distress' is used to describe the negative effects that a company may experience due the leverage it has taken on because it cannot satisfy its debt obligations (John, 1993). Companies will maximize their total value by minimizing the effects of financial distress and maximizing the tax shield debt creates, taking into account the agency costs (Myers and Majluf, 1984; Myers, 1984).

Besides the Trade-Off theory, the Pecking Order theory is a standard theory used when explaining the capital structure of a company. Introduced by Donaldson (1961) and later on modified by Myers (1984), it states that the information asymmetry between managers and outside investors affects the capital structure of a company, i.e. if it will finance with debt or equity and internal or external financing. When there is asymmetric information, it is usually better for a company to issue debt instead of equity. The pecking order is followed if a company prefers using internal finance to external finance and if external finance is used, issuing debt to issuing equity (Frank and Goyal, 2008).

In line with the Trade-Off theory, private equity firms make use of large amounts of debt when performing an LBO to, among other things, generate a tax shield (Newbould et al., 1992; Colla et al., 2012). Nevertheless, the assumption that all interest payments done by a company can be deducted for corporate income tax purposes is not correct, as will be explained in the following paragraph.

2.3. Tax Regimes

2.3.1. Base Erosion and Profit Shifting Report

Globalization has been a hot topic in recent years. Due to development of free trade, free movement of capital and an increase in the mobility of capital, international flows of goods and services, capital and information are increased. Globalization made it painfully clear that the tax regimes around the world differ, offering opportunities for multinational enterprises to avoid paying taxes.

With the amount of tax that was being avoided through exploiting the differences between tax regimes of different countries on the rise, the OECD published its BEPS-Report in 2013, consisting of 15 action points. The aim of this report was to eliminate the possibilities for tax avoidance by encouraging countries to reform their tax regimes by giving guidelines through the different action points. Following these action points would lead to harmonization of the different tax regimes around the world. Every action point addresses a different subject. For example, action point 1 addresses the tax challenges arising from the digitalization of the economy and action points 8 to 10 address different transfer pricing issues.[1] The action point most relevant for this research is action point 4. This action point aims to limit the base erosion possibilities for companies arising through interest deduction possibilities (OECD, 2015). In the final report regarding action point 4, the OECD (2015) presented recommendations for legislation to restrict the amount of interest a company can deduct. In the report, it is suggested that two rules be implemented: a fixed ratio rule and a group ratio rule. The fixed ratio rule would enable an entity to deduct interest and other financial payments up to a fixed percentage of its earnings before interest, tax, depreciation, and amortization (EBITDA). Setting the benchmark at 20 percent, means that a firm can deduct its yearly interest expenses as long as it does not exceed 20 percent of its EBITDA in that same fiscal year. On the other hand, the group ratio rule would allow groups with higher levels of external debt to deduct net interest equal to the group's net interest-to-EBITDA ratio.

2.3.2. Anti Tax Avoidance Directive 1

The EU took on the advice of the OECD regarding limiting the amount of interest payments a company can deduct. In 2016, the European Commission published their first Anti Tax Avoidance Directive (ATAD 1) which was adopted by the European Council. When the EU publishes a directive, all member states have to implement it before a certain date, usually a few years after the publication. With regard to ATAD 1, the member states had to implement the directive from 1 Januari 2019 onwards.

Action point 4 of the BEPS-report is further developed by the European Commission in article 4 of ATAD 1, also called the earnings stripping rule. According to the earnings stripping rule, exceeding borrowing costs can only be deducted from the taxable income of a company as long as the total value in the fiscal year does not exceed 30 percent of a company's EBITDA. Member states are not bound to the 30 percent threshold; a lower

[1] For more information regarding the motives, aims and different action points of the BEPS-report, please take a look on the website of the OECD: https://www.oecd.org/ctp/beps-2015-final-reports.htm.

threshold can be implemented but increasing the threshold is not allowed (European Commission, 2016). Besides this threshold, member states are allowed to implement an additional fixed threshold of at most 3 million euros. The highest of these two thresholds, the fixed ratio and fixed amount, have to be applied. How these ratio's work out will be illustrated through a numerical example: imagine Company X that has an EBITDA of 40 million euros, paid 40 million euros interest and received 10 million euros interest. Company X thus has exceeding borrowing costs of 30 million euros (interest paid minus interest received). Based on the fixed ratio, Company X can deduct 12 million euros of interest, namely 30 percent of its EBITDA. The threshold of the fixed ratio is higher than the fixed amount, since 12 million euros exceeds 3 million euros. 18 million euros of the exceeding borrowing costs cannot be deducted by Company X.

Not all member states implemented the earnings stripping rule similarly. The Netherlands implemented the rule on 1 January 2019 with a fixed ratio of 30 percent and a fixed amount of 1 million euros. From 1 January 2022 onwards, the fixed ratio is lowered to 20 percent (Van Duijn and Sinnige, 2022). For comparison, Austria implemented the earningsstrippingrule with a fixed ratio of 30 percent and a fixed amount of 3 million euros in 2019 (Schuchter and Kras, 2023).

The implementation of an interest deduction limitation in their corporate tax law was not new for every country in the European Union. Several member states, such as Germany and Portugal, already had an interest deduction limitation rule in their tax regimes before ATAD 1 was implemented. Such a rule could either be an earnings stripping rule or a thin capitalization rule (thin cap rule). A thin cap rule restricts the amount of interest payments a company can deduct based on the debt to equity ratio of that company. Thin cap rules almost always solely apply to interest payments to a related company, whereas the earnings stripping rule does not make this distinction. When a country has a thin cap rule in its tax regime of 3:1, it means that a company is allowed to have 300 million dollar debt when their equity is 100 million dollar. Only the interest payments paid over the amount of debt up to 300 million dollars can be deducted for tax purposes. Table 1 in Appendix A provides an overview of the different EU member states and their tax regimes regarding a general interest deduction limitation rule in the year 2016.[2]

2.4. Tax Regimes and LBOs

Private equity firms use large amounts of debt when investing in a company. From a tax point of view, using debt is beneficial. In principle, the interest paid to the debt holders is tax deductible, lowering the amount of corporate income tax the portfolio company has to pay. The words 'in principle' are used in the previous sentence, since the tax regimes in most countries have a wide variety of interest deduction limitation rules, as we have seen for EU member states in the previous paragraph. The interest paid on a loan can for instance not be deducted when it is in fact equity. Relevant interest deduction limitation rules for private equity firms and their LBOs are the thin cap rules and the earnings stripping rule.

[2] A report of the year 2016 is used since this is the latest report available before the implementation of ATAD 1 stating the interest deduction limitation rules a country has implemented.

Tax regimes differ widely across the world but as stated in the previous paragraph, the OECD tried to harmonize the different tax regimes by issuing its BEPS-report. The EU took on the advice of the OECD and published the ATAD 1 with its earningsstrippingrule, maximizing the interest payments a company can deduct at 30% of its EBITDA or 1 million dollars as from 1 January 2019. This was an important development for private equity firms with their LBO's, in which they use a lot of leverage. There has been a lot of research regarding the effect of tax regimes on the capital structure of companies and the results are ambiguous. The effect of a country's tax regime on the amount of debt used in an LBO has not been researched often. Maeseneire and Brinkhuis (2012) expected a positive relationship between the amount of debt used in an LBO and the corporate tax rate in the state the portfolio company is established, due to the tax shield debt created through interest payment deductions. Nevertheless, in their research the authors find a significant negative relationship or an insignificant positive relationship between the corporate tax rate and amount of debt used. In line with Maeseneire and Brinkhuis (2012), Ivanov et al. (2020) found that corporate tax rates and the amount of leverage taken on by a company, not the amount of debt used in an LBO, are negatively correlated. Graham (1996) finds a positive relation between the corporate tax rate and debt level of a company by using a model that simulates firm-specific marginal tax rates. On the contrary, De Jong et al. (2008) fail to find a positive relationship between the corporate tax rate and debt level; they only find a significant positive relation for 2 of the 42 countries taken into account in their research. Axelson et al. (2010) also looked into the determinants of the amount of leverage taken on in an LBO. They were unable to detect a significant effect regarding the tax shield.

The results from the literature are ambiguous regarding the effect of the tax shield on the amount of debt used in an LBO or the capital structure choice of a company. In addition, in almost every paper the authors make use of the corporate income tax rate as a proxy, which is not desirable since it does not capture the actual tax shield, due to the country specific interest deduction limitation rules lowering the tax shield that can be obtained (Maeseneire and Brinkhuis, 2012; Graham, 1996). When firm-specific marginal tax rates are used, a significant positive relationship is found (Graham, 1996). To test whether the value of the tax shield influences the amount of debt used in an LBO, the first two hypotheses will be as follows, taking the country specific interest deduction limitation rules into account:

H1: The Corporate Income Tax rate in an European country positively influences the amount of debt used in an LBO, taking into account the possible presence of the earnings stripping rule.

H2: The presence of an earnings stripping rule has a negative impact on the amount of debt used in LBOs in the European Union.

Besides the influence of a country's tax regime on the capital structure of a company, there has also been a lot of research regarding the effect of the size of a company on the amount of leverage it takes on. Research has found that the size of a company has a positive effect on the amount of leverage taken on, since larger companies are less sensitive to financial distress and bankruptcy (De Jong et al., 2008). Furthermore, larger firms can take on more debt due to

having more stable cash flows. Size also influences the amount of debt a company takes on through the tax shield debt creates. Many countries have a progressive corporate tax rate. In the Netherlands for instance, the first 200.000 euros of profit a company makes, will be taxed at a rate of 19%. The profit of a company that exceeds the threshold of 200.000 euros will be taxed at a rate of 25.8% (Rijksoverheid, 2023). When a company is taxed at a higher rate, the tax shields available will have a bigger worth, since it reduces the amount of tax that has to be paid more. Nevertheless, the interest deduction limitation rules will have a bigger influence on the larger companies compared to the small and mid size companies, leading to the conclusion that larger companies profit less from the tax shields created by taking on a lot of debt. The amount of interest payments that a company can always deduct under the earningsstrippingrule (e.g. 1 million euros in the Netherlands) is a relatively much bigger amount for small and mid size companies compared to large companies, meaning that smaller companies will be able to deduct more of their interest expenses. Since larger companies will not be able to fully exploit their tax shield, the following hypothesis will be tested:

H3: The positive effect of corporate income tax rate and the negative effect of the general interest deduction limitation rule on the amount of debt used in an LBO is strengthened when investing in large companies compared to small and medium-sized companies.

2.5. Firm-Specific and Macro Economic Factors and LBO Leverage

Based on the Trade-Off theory, the tax shield that can be generated through taking on debt should influence the capital structure of a company. Research has nevertheless shown that this is not necessarily the case. There are many other factors that influence the capital structure of a company and the amount of debt used by private equity firms when performing an LBO, starting with the size of the portfolio company. Larger companies are able to take on more debt since they are less likely to be in financial distress and go bankrupt. Another explanation for the positive correlation between firm size and debt level can be that larger firms are generally more diversified and their cash flows are more stable, leading to the greater ability to take on debt (De Jong et al., 2008).

Next to size, the growth opportunities a company has, is shown to negatively influence the amount of debt a company takes on (Barclay and Smith, 2005; Lehn and Poulsen, 1989; Billett et al., 2011; Goyal et al., 2002). Myers (1977) argues that companies with promising growth prospects would avoid taking on high-risk debt, while those relying on such debt may have to forgo potentially lucrative investment opportunities. This could have negative implications for the firm's overall market value. Furthermore, Myers (1977) states that lenders do not benefit from growth opportunities, as these opportunities are not a reliable security since in the changing business environment the growth opportunity can be easily no longer relevant in the future. Therefore, financing through equity issuance may be preferred over debt.

Thirdly, according to De Jong et al. (2008), Colla et al. (2012) and Campello and Giambona (2013) asset tangibility is positively correlated with the amount of debt taken on by a firm since a higher asset tangibility reduces the risk a lender has. Tangible assets can namely be used as collateral when borrowing.

Furthermore, research has shown that the profitability of a company can influence the amount of debt taken on. As seen in paragraph 2.2, the Static Tradeoff Theory predicts that profitable firms will take on more debt to reduce the amount of corporate income tax that has to be paid. Nevertheless, Frank and Goyal (2009) and De Jong et al. (2008) find a negative relationship between profitability and a firm's leverage, due to firms typically relying on retained earnings to fund new investments before taking on debt or issuing equity.

Lastly, the debt market conditions can also influence the amount of debt used. When the conditions on the debt market are better, lending is cheaper and more debt will be used in an LBO (Maeseneire and Brinkhuis, 2012). On the other hand, banks are more willing to lend money to firms when the interest rates are higher and thus the leverage of firms should lower when debt market conditions are better (Mokhova and Zinecker, 2013). Where Maeseneire and Brinkhuis (2012) find a negative relationship between the interest level and the amount of debt taken on in an LBO, Mokhova and Zinecker (2013) find positive as well as negative relations between the debt market conditions and the debt level of companies, differing per country.

2.6. Conceptual Model

Based on the literature discussed in the previous paragraphs, a conceptual model can be built that shows what influences the amount of debt used in an LBO and the relationships between these influencing factors. The conceptual model is shown in figure 3.

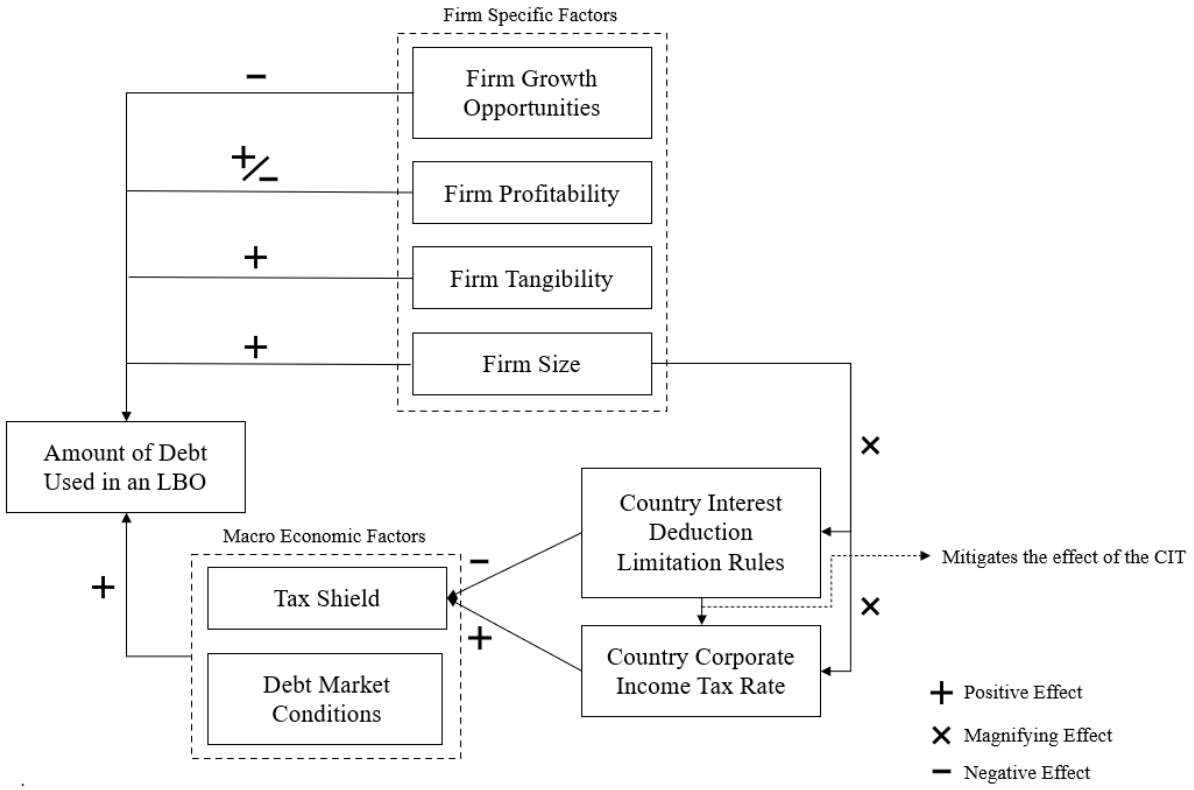

Figure 3. The conceptual model.

The factors influencing the amount of debt used can be divided into firm specific factors and macro economic factors. The tax shield debt creates, is expected to have a positive influence on the amount of debt used in an LBO. If a country has a general interest deduction limitation rule, the tax shield that can be created through taking on debt is lower. The corporate income tax rate of a country has a positive influence on the tax shield, since with a higher corporate income tax rate more tax can be avoided by creating a tax shield. A company's size is expected to have a positive influence on the amount of debt used in an LBO but will also magnify the effect of the general interest deduction limitation rule present in a country and a country's corporate income tax rate. Lastly, taking into account the presence of a general interest deduction limitation rule is expected to mitigate the effect of a country's corporate income tax rate on the amount of debt used in an LBO through the tax shield it creates.

3 Data

3.1. Data on LBOs

To obtain the data needed for the LBOs, the database Zephyr is used. Zephyr is a database that contains worldwide data regarding mergers and acquisitions, IPOs and private equity. Orbis contains worldwide data regarding company financials. Both databases are from Bureau van Dijk (BvD), making it possible to match the information obtained from both databases by using the BvD firm identification code.

First, Zephyr is used to get a list of LBOs performed in the time frame covered in this study, which ranges from 1 January 2014 until 31 December 2022. The member states of the EU had to implement the earnings stripping rule on 1 January 2019. By choosing this time frame, the dataset includes years before as well as after the implementation. After setting a constraint to the years, the region in which the target is located is narrowed down to the EU. Furthermore, the deal must be (assumed) completed and the date of completion must be known. After setting these constraints, 33,872 deals are left.

Lastly, only the deals that are labeled as 'LBO' will be taken into account, leaving 923 LBOs with European targets.

3.2. Variables

After obtaining the data regarding the LBOs that have been performed in the timeframe set, Orbis is used to obtain information about the target companies. The variables that need to be obtained are stated and argued below.

3.2.1. Dependent Variables Debt Used

The variable of interest in this thesis, the dependent variable, is the amount of leverage used when performing an LBO. There are several ways through which the amount of debt used in an LBO can be determined. The most obvious one is looking at what amount of the price paid for the company is financed through debt. Unfortunately, this data is not readily available. Another option is looking at a debt ratio at the level of the portfolio company after the LBO is performed, for instance total debt divided by total assets. Loans that were outstanding before the LBO will be refinanced and immediately become due. In most contracts made with the lenders, a big change in ownership, which happens when performing an LBO, will lead to the loans being due immediately. For this reason, looking at the debt level of the portfolio company after the LBO is a good proxy for the amount of debt used in the LBO. There are several ratios one can use to determine the debt level of a company, such as the debt to equity ratio, interest to EBITDA ratio or debt to EBITDA ratio. In research regarding the leverage used in LBOs, the debt to EBITDA ratio is mostly used, since the debt taken on during an LBO is mostly based on the cash flow the portfolio company will generate to support the debt repayments (Maeseneire and Brinkhuis, 2012 & Axelson et al., 2010). When one would use the debt to equity ratio of a company, a company's operational performance, growth potential and ability to generate cash flows will not be taken into account. However, these three factors are important for a private equity firm when determining the amount of debt it will use in an

LBO. The interest to debt ratio is obtained through dividing the interest payments on debt by the EBITDA of a company (Axelson et al. 2010). Since the interest payments are dependent on the interest rate, this measure is not preferred. A lender will base the interest rates on several factors, such as the characteristics of the loan, the credit rating of the firm, whether there is a guarantor, the debt market conditions and many more factors. One should therefore look into the conditions of every loan to obtain the information needed to control for all these factors. Besides being time consuming, the information is also private. Furthermore, the use of a company's EBITDA as the denumerator is preferred over the use of a company's EBIT, since the EBITDA of a company is relatively easy to obtain and independent of a company's capital structure. The downside of the use of the debt to EBITDA ratio, is that EBITDA is not recognized by the international financial reporting standards (IFRS). Listed companies in the EU must follow these standards and these standards are also commonly used by non-listed companies. Nevertheless, the data shows that enough portfolio companies in the dataset reported an EBITDA. Following the research already done regarding the drivers of leverage used when performing an LBO, the debt level proxy used in this thesis will be the debt to EBITDA ratio.

3.2.2. Control Variables

Research has shown that there are several aspects that influence the amount of leverage taken on by companies, and thus maybe the amount of debt used in an LBO, as discussed in paragraph 2.5. The influence of the size of a company on the debt level in an LBO will be measured by the operating revenue of a company, in line with previous research done by Maseneire et al. (2012). To determine the growth opportunities of a company, ideally the market to book ratio of a firm is used, in accordance with previous research (Adam and Goyal, 2008). Nevertheless, this data is not available for the companies in the dataset. Therefore, the difference in operating revenue (turnover) between t and $t - 1$ is taken, with t being the year of the LBO. Despite the measure not being optimal, it is widely used in the literature regarding research concerning private equity (Cressy et al., 2007) and a company's leverage choice (Billett et al., 2007). To test whether the asset tangibility of a company is positively correlated with the amount of debt taken on in an LBO, the net fixed assets over book value of total assets is used, in line with De Jong et al. (2008). As done in prior research, a firm's profitability will be measured through dividing a company's EBITDA by its turnover (Becker-Blease et al., 2010; Nadant et al., 2018). The EBITDA of a company is preferred over its EBIT since a company can manipulate its EBIT through manipulating its interest capitalisation or depreciation and amortization costs (Nissim, 2019).

Lastly, the debt market conditions can also influence the amount of debt used. Since it is nearly impossible do termine the real interest rates on the leverage used in an LBO, the debt market conditions are measured through the 12 months average EURIBOR[3], in line with the research done by Maeseneire and Brinkhuis (2012), and the 10 year government bond yield of the country where the target is located. The 10 year government bond yield is often taken as a proxy for the risk free rate by academics and practitioners (Mukherji, 2011; Bruner et al. 1998). An overview of the 10 year government bond yield in the EU per year can be

[3] The EURIBOR is the average interest rate for which European banks provide loans to each other.

found in Panel B of Table 2 in Appendix A. The EURIBOR per year is displayed in Panel C of Table 2 in Appendix A.

3.2.3. Tax variables

The independent variables that can influence the amount of debt used in an LBO and the LBO activity, as discussed in the literature review, are the corporate income tax rate and the presence of a general interest deduction limitation rule. To account for the corporate tax rate, the combined corporate tax rate in the year of the LBO is used, based on the data from the OECD.[4] To calculate the overall corporate tax rate, we add the sub-central tax rate to the central corporate income tax rate, which is first reduced by any deductions for subnational taxes. An overview of the corporate tax rate per year per country can be found in Panel A of Table 2 in Appendix A. To test whether the effect of the corporate income tax rate on the amount of debt used becomes less when the general interest deduction limitation rule is taken into account, a dummy variable is created that equals '1' if the country where the target company of the LBO is located has a general interest deduction limitation rule in its legislation at the time the LBO was completed. To test whether the general interest deduction limitation rule is of influence on the amount of debt used in an LBO, three dummy variables will be created and a difference-in-differences model will be executed, as further discussed in paragraph 4.2.

3.3. Adjustments to the Data

A few adjustments are made to the dataset. The different dependent variables and firm specific independent variables are winsorized at the 5% level. By winsorizing at the 5% level, all observations above the 95th percentile are set equal to the value of the observation at the 95th percentile and all observations less than the 5th percentile are set equal to the value of the observation at the 5th percentile. Winsorizing is done to reduce the effect of outliers. After winsorizing the variable 'Size', the standard deviation remained very high (85.72). Hence, instead of winsorizing the variable, the natural logarithm of the variable 'Size' is taken to make it more normally distributed. By taking the natural logarithm, the standard deviation is heavily reduced from 1191.07 to 1.78.

3.4. Descriptive Statistics

By setting the constraint that the information needed for the dependent and independent variables is available for the target company of the LBO, a lot of LBOs are omitted. 402 LBOs are left, which is more than previous research regarding the amount of leverage used in an LBO. Maeseneire et al. (2012), for instance, used a dataset of 118 LBOs. There are more LBOs in the dataset that are performed in recent years, with a sharp decline in 2020; the year COVID-19 started. The years not being equally represented in the dataset can be explained by the increasing popularity of private equity (Stulz, 2019). There are relatively few LBOs in 2022, since the accounting data for 2022 is not yet available for many companies. The LBOs are distributed over 18 European countries, with Italy and France being overrepresented with

[4] https://stats.oecd.org/Index.aspx?DataSetCode=CTS_CIT#

relatively 29.6% and 45% of the LBOs. Not all European countries stated in Table 1 of Appendix A are present in the dataset due to the data needed not being available.

Table 1. Distribution of the LBOs per year and per Country for the European dataset.

Panel A: LBO Distribution per Year			Panel B: LBO Distribution per Country		
Year	Number of LBOs	Percentage	Country	Number of LBOs	Percentage
2014	22	5.5%	France	181	45%
2015	28	7.0%	Italy	119	29.6%
2016	50	12.4%	Spain	34	8.5%
2017	50	12.4%	Germany	18	4.5%
2018	60	14.9%	Sweden	11	2.7%
2019	71	17.7%	Belgium	10	2.5%
2020	38	9.5%	Finland	8	2.0%
2021	79	19.7%	Poland	6	1.5%
2022	4	1.0%	Romania	3	0.7%
			Estonia	2	0.5%
			Ireland	2	0.5%
			Netherlands	2	0.5%
			Czech Republic	1	0.2%
			Denmark	1	0.2%
			Hungary	1	0.2%
			Luxembourg	1	0.2%
			Portugal	1	0.2%
			Serbia	1	0.2%
Total	402	100%	Total	402	100%

When examining the different dependent variables, one will notice that the Debt/EBITDA ratio has a relatively high standard deviation compared to the other ratios. Together with the high maximum observation and the low minimum observation it indicates that there might still be outliers present in the data, even after winsorizing it. The dependent variables Debt/Income and Debt/Assets will be used in the robustness checks. In Table 3 of Appendix A, the definition of the different dependent and independent variables can be found.

Table 2. Descriptive statistics for the different dependent and independent variables of the European dataset. In Panel A the dependent variables are displayed. In Panel B the independent variables are displayed. In Panel C, the distribution of 1's and 0's in the dummy variable is shown.

Panel A: Dependent Variables						
	Mean	Median	Std. Dev.	Min.	Max.	Obs.
Debt/EBITDA	1.51	0.14	2.76	-1.11	10.01	402
Debt/Income	0.35	0.04	0.67	0	2.65	402
Debt/Assets	0.12	0.03	0.16	0	0.53	402
Panel B: Independent Variables						
Size	3.14	3.24	1.78	5.35	10.06	402
Profitability	0.13	0.12	0.19	-0.41	0.51	402
Growth	0.09	0.05	0.35	-0.53	1.14	402
Tangibility	0.44	0.43	0.28	0.04	0.91	402
CIT	0.30	0.30	0.05	0.13	0.38	402
Yield	0.02	0.02	0.008	0.005	0.04	402
EURIBOR	0.0003	-0.002	0.003	-0.0031	0.01	402
Panel C: Dummy Variable						
	Frequency of 0's	Percentage of 0's	Frequency of 1's	Percentage of 1's		
IDLR	141	35.1%	261	64.9%		402

4 Methodology

4.1. Difference-in-Differences

The difference-in-differences model is a quasi-experimental approach that compares the changes in outcomes over time between a treatment group and a control group (Bertrand et al., 2002). In this research, the control group consists of LBOs with target companies that are located in an European country that already had a general interest deduction limitation rule before the implementation of the earnings stripping rule: Germany, Italy, Poland, Portugal and Spain. The treatment group consists of LBOs with target companies that are located in an European country that did not have a general interest deduction limitation rule before the implementation of the earnings stripping rule, i.e. the other countries in Panel B of Table 1. The pre-treatment period runs from 1 January 2014 until 31 December 2018. The post-treatment period runs from 1 January 2019 until 31 December 2022. The breaking point is set at 1 January 2019, since the member states of the EU had to implement the earnings stripping rule in their legislation on that date. The data is almost evenly distributed between the control group and the treatment group: 44.3% of the LBOs are in the control group and 55.7% in the treatment group, as can be seen in Table 3.

Table 3. The distribution of the LBOs with a European target over the control group and the treatment group per year.

Year	Control Group	Treatment Group
2014	6	16
2015	4	24
2016	22	28
2017	14	36
2018	23	37
2019	40	31
2020	17	21
2021	50	29
2022	2	2
Total	178	224

4.2. The Model

4.2.1. Hypothesis 1

To test whether the corporate income tax rate remains to have a positive influence on the amount of debt used in an LBO when the presence of a general interest deduction limitation rule is taken into account, i.e. hypotheses 1, the effect of the corporate income tax rate on the

Debt/EBITDA ratio of a company will first be measured, without adding a dummy for the presence of a general interest deduction limitation rule. The regression is as follows:

$$Y_{i,t} = \beta_0 + \beta_1 CIT_{j,t} + \gamma_1 X_{j,t} + \gamma_2 Z_{i,t} + \delta_t + \varepsilon_{i,t} \quad (1)$$

With $Y_{i,t}$ being the Debt/EBITDA ratio of the target company i at time t. t is the year in which the LBO is completed. $CIT_{j,t}$ is the corporate income tax rate of country j at time t. $X_{j,t}$ is a vector of the different macro economic control variables and $Z_{i,t}$ is a vector of the different firm specific control variables. δ_t is a categorical variable based on the industry a company is in. The industry a company is in is determined by its SIC-code. Adding fixed effects to the regression would not be correct, since the dataset used in this research is classified as repeated cross sectional data, not panel data. Panel data is required for fixed effects. Adding a categorical variable based on the completion date of an LBO is unfortunately not possible due to collinearity. Lastly, $\varepsilon_{i,t}$ is the error term.

Thereafter, the dummy variable $IDLR_{j,t}$ and the interaction term $CIT_{j,t} * IDLR_{j,t}$ will be added to regression (1) to see whether the presence of a general interest deduction limitation rule affects a potential effect of the corporate income tax rate on the Debt/EBITDA-ratio, resulting in the following regression:

$$Y_{i,t} = \beta_0 + \beta_1 CIT_{j,t} + \beta_2 IDLR_{j,t} + \beta_3 CIT_{j,t} * IDLR_{j,t} + \gamma_1 X_{j,t} + \gamma_2 Z_{i,t} + \delta_t + \varepsilon_{i,t} \quad (2)$$

4.2.2. Hypotheses 2

To test hypothesis 2, whether the presence of a general interest deduction limitation rule negatively influences the amount of debt used in an LBO, the difference-in-differences model will be used. Therefore, the variable $IDLR_{j,t}$ in regression (2) will be replaced by three dummy variables. First, the variable $Time_i$ is added, which equals 1 when the LBO is performed in the period starting 1 January 2019. Second, the dummy variable $Group_i$ is added, which equals '1' if the LBO is in the treatment group. Lastly, the interaction dummy $Time_i * Group_i$ is added. It has the value of '1' if the LBO is performed in the period starting 1 January 2019 in a country that did not have a general interest deduction limitation rule in its legislation. If the beta of this dummy variable is significant, the implementation of the earnings stripping rule by the member states of the EU has had an influence on the amount of debt used in an LBO. This leads to the following regression:

$$Y^g_{i,t} = \beta_0 + \beta_1 CIT_{j,t} + \beta_2 Time_i + \beta_3 Group_i + \beta_4 Time_i * Group_i + \gamma_1 X_{j,t} + \gamma_2 Z_{i,t} + \delta_t + \varepsilon_{i,t} \quad (3)$$

The dependent variable in this research ($Y_{i,t}^{g}$) is the Debt/EBITDA ratio of the target company i at time t, belonging to either the treatment or the control group (g). t is the year in which the LBO is completed.

4.2.3. Hypothesis 3

To test the third hypothesis, whether the effect of the corporate income tax rate and the general interest deduction limitation rule on the debt used in an LBO is enlarged when the company becomes bigger in size, two interaction terms are created: $SIZE_{i,t} * CIT_{j,t}$ and $SIZE_{i,t} * IDLR_{j,t}$. These two interaction terms are added to regression (2) subsequently, leading to regressions (4), (5) and (6). For these hypothesis a multivariate regression is used instead of a difference-in-differences model:

$$Y_{i,t} = \beta_0 + \beta_1 CIT_{j,t} + \beta_2 IDLR_{j,t} + \beta_3 SIZE_{i,t} * CIT_{j,t} + \gamma_1 X_{j,t} + \gamma_2 Z_{i,t} + \delta_t + \varepsilon_{i,t} \quad (4)$$

$$Y_{i,t} = \beta_0 + \beta_1 CIT_{j,t} + \beta_2 IDLR_{j,t} + \beta_3 SIZE_{i,t} * IDLR_{j,t} + \gamma_1 X_{j,t} + \gamma_2 Z_{i,t} + \delta_t + \varepsilon_{i,t} \quad (5)$$

$$Y_{i,t} = \beta_0 + \beta_1 CIT_{j,t} + \beta_2 IDLR_{j,t} + \beta_3 SIZE_{i,t} * CIT_{j,t} + \beta_4 SIZE_{i,t} * IDLR_{j,t} + \gamma_1 X_{j,t} + \gamma_2 Z_{i,t} + \delta_t + \varepsilon_{i,t} \quad (6)$$

4.3. Assumptions of the Model

In addition to the assumptions of the Ordinary Least Squared (OLS) model, the difference-in-differences model relies on one main assumption. The difference-in-differences model requires that there are parallel trends (Angrist and Pischke, 2008). If something other than the treatment changes in one of the two groups and not in the other at the time of the treatment, the parallel trend assumption will be violated and the results will be biased. To test whether this assumption holds, the interaction term $Time_i * Group_i$ before the introduction of the earnings stripping rule should be assessed for the treatment group (Dimick and Ryan, 2014). If this interaction term lacks significance before the implementation of the general interest deduction limitation rule, one may assume that, if the earnings stripping rule would not have been implemented, the trends would have continued in parallel. Results show that the term is not significant before the implementation. Hence, the difference-in-differences model can be used.

As stated above, the assumptions of the OLS-model must also hold. Two important assumptions to test are whether there is no multicollinearity and whether error terms are normally distributed. The assumption of no multicollinearity states that the different independent variables in the regression should not be correlated. To test whether the error terms are normally distributed, the Breusch-Pagan test for heteroskedasticity is performed on the data, with its hypothesis being:

H_0: *the variances of the error terms are equal, i.e. there is homoscedasticity.*

H_a: *the variances of the error terms are not equal*

After performing the Breusch-Pagan test, one can conclude that the error terms are not equally distributed; i.e. there is heteroskedasticity. The results can be found in Table 5 of Appendix A. To control for heteroskedasticity, robust standard errors are used.

To test whether the independent variables are correlated, a correlation matrix is made of the independent variables (Table 4). The Pearson Correlation Coefficient is used. It has a value between -1 and +1, with +1 indicating perfect correlation and -1 indicating perfect negative correlation. In addition, the Pearson Correlation Coefficient has to be statistically significant, which can be determined by looking at the P-value. If the P-value is below 0.05, there is statistical significance.

Table 4. The Correlation Matrix for the European Dataset.

	Group* Time	Group	Time	Size	Growth	Profita-bility	Tangi-bility	CIT	Yield	EURI-BOR	IDLR
Group* Time	1.0										
Group	0.45	1.0									
Time	0.53	-0.24	1.0								
Size	0.01	-0.19	0.14	1.0							
Growth	-0.01	0.01	0.02	0.13	1.0						
Profita-bility	-0.07	-0.16	0.03	0.32	0.12	1.0					
Tangi-bility	-0.07	-0.22	0.03	-0.10	0.02	-0.03	1.0				
CIT	-0.05	0.42	-0.34	-0.15	0.01	0.00	-0.14	1.0			
Yield	-0.49	0.22	-0.88	-0.09	-0.03	0.02	-0.05	0.31	1.0		
EURI-BOR	0.01	-0.07	0.16	0.15	0.05	0.08	-0.08	-0.06	0.14	1.0	
IDLR	0.37	-0.66	0.70	0.20	-0.01	0.11	0.17	-0.48	-0.64	0.08	1.0

The 10 year government bond yield is negatively correlated with the time-dummy. The correlation is also statistically significant. Since the yield shows no further correlation with other independent variables and it plays an important role in the regression by being a proxy for the risk free rate, the variable is not eliminated.

The last test performed to the model is the Likelihood Ratio. This test is used to determine whether the categorical variable based on the industry of the target company must

be added to the regression or if a model without suits the data better. The hypotheses of this test are as follows:

H_0: *a model without industry fixed effects is most appropriate for the data.*

H_a: *a model with industry fixed effects is most appropriate for the data.*

The Hausman test cannot be used since the data is heteroskedastic. The results of the Likelihood Ratio test are presented in Table 6 of Appendix A. The addition of industry fixed effects is desirable for all models.

4.4. Robustness Checks

In this thesis the results obtained will be checked for robustness by using a different variable as a proxy for the amount of debt used in an LBO and using a different dataset to perform the regressions.

4.4.1. Changing the Dependent Variable

In the main regression, the Debt to EBITDA ratio is used to proxy the amount of debt used in an LBO. To test for robustness, this ratio will be replaced by the Debt to Assets ratio and the Debt to Income ratio. The Debt/EBITDA ratio is mostly used by practitioners, while the Debt/Assets ratio is often used in literature (Maeseneire et al., 2012; Heckemeyer and Mooij, 2017). The Debt/Income ratio is used in the robustness check because it is less sensitive to manipulation since no costs are subtracted. An explanation of these ratios can be found in Table 3 of Appendix A.

4.4.2. Changing the Dataset

As the member states of the EU were obliged to implement the earnings stripping rule on 1 January 2019, the UK already had a general interest deduction limitation rule implemented for one year (HM Revenue and Customs, 2018). The Corporate Income Restriction (CIR) became effective for the fiscal years starting after 1 April 2017, i.e. for most companies the CIR became effective starting 1 January 2018. This rule shows similarities with the earnings stripping rule. According to the CIR, the deduction for interest expenses during the taxable year must not exceed the highest of the following:

1. 2 million pounds of net interest expenses; or
2. 30 percent of a company's tax-EBITDA; or
3. The group's ratio of interest to EBITDA.

Since the CIR is very similar to the earnings stripping rule, one would expect that the change in this section has led to the same effects in the UK as observed in the EU. The hypotheses in this research will therefore also be tested in another dataset, namely that of LBOs performed in the UK between 1 January 2014 and 31 December 2022. The difference-in-differences model will not be performed in the UK-dataset due to the control group not being present. The British dataset has the same features as the European dataset. One can see that, again, there are more LBOs performed in the most recent years, with a sharp decline in the year COVID-19 started. There is no data regarding LBOs performed in 2022 in the UK, due to

accounting data not being available. In Table 6, the descriptive statistics for the different dependent and independent variables are given.

Table 5. Distribution of the LBOs per year for the British dataset.

Panel A: LBO Distribution per Year		
Year	Number of LBOs	Percentage
2014	7	2.4%
2015	8	4.1%
2016	20	13.0%
2017	18	10.6%
2018	19	10.6%
2019	15	26.8%
2020	7	7.3%
2021	15	23.4%
Total	109	100%

Table 6. Descriptive statistics for the different dependent and independent variables of the British dataset. In Panel A the dependent variables are displayed. In Panel B the independent variables are displayed. In Panel C, the distribution of 1's and 0's in the dummy variable is shown.

Panel A: Dependent Variables						
	Mean	Median	Std. Dev.	Min.	Max.	Obs.
Debt/EBITDA	0.51	0.02	0.84	-0.05	2.91	109
Debt/Revenue	0.10	0.007	0.21	0.00002	0.78	109
Debt/Assets	0.04	0.00007	0.01	0.00	0.36	109
Panel B: Independent Variables						
Size	10.32	10.29	1.26	6.06	14.70	109
Profitability	0.14	0.12	0.12	-0.05	0.37	109
Growth	0.21	0.14	0.25	-0.12	0.88	109
Tangibility	0.28	0.20	0.25	0.01	0.85	109
CIT	0.19	0.19	0.01	0.19	0.21	109
Yield	0.01	0.01	0.004	0.002	0.02	109
LIBOR	0.008	0.009	0.003	0.003	0.01	109
Panel C: Dummy Variable						
	Frequency of 0's	Percentage of 0's	Frequency of 1's	Percentage of 1's		
IDLR	53	48.6%	56	51.4%		109

5 Results within the European Union

5.1. Effect CIT on Debt Level in an LBO

5.1.1. The Debt/EBITDA Ratio

To test whether the effect of the corporate income tax rate in a country changes when the presence of a general interest deduction limitation rule, i.e. the earnings stripping rule, is taken into account, regressions (1) and (2) are performed subsequently. The dependent variable is the Debt/EBITDA ratio of a company in the year that the LBO is performed. The results are presented in Table 7.

As shown in column one of the table, the coefficient of the corporate income tax rate in a country is positive, indicating that a higher corporate income tax rate leads to the use of more debt when performing an LBO. Since, for instance, a corporate income tax rate of 25% is noted as 0.25, an 1 percent point increase in the target country's corporate income tax rate increases the Debt/EBITDA ratio of the target company by 0.04, keeping other things constant. When the presence of the earnings stripping rule is taken into account, the effect of the corporate income tax rate on the amount of debt used is mitigated but remains positive; an 1 percentage point increase in the corporate income tax rate in this case increases the Debt/EBITDA ratio of the target company by 0.01 when there is a earnings stripping rule in place.[5] The earnings stripping rule in itself has a negative influence on the amount of debt used in an LBO; the presence of a general interest deduction limitation rule in the country where the target company is located leads to a decrease in the company's Debt/EBITDA ratio of 1.82 based on the variables 'IDLR' and 'CIT*IDLR'. A higher corporate income tax rate will lead to private equity firms using more debt, since the interest payments are deductible for corporate income tax purposes, creating a tax shield. These results are in line with the literature; when the tax rate is higher, more tax can be avoided through enhancing the tax shield (Graham, 1996). If a country has a general interest deduction limitation rule in its legislation, the creation of a tax shield will be restricted. If the interest payments of a company will be higher than a certain threshold, the payments are not deductible for corporate income tax purposes. However, one must be cautious with taking conclusions based on these results. The effect of the corporate income tax rate and the general interest deduction limitation rule on the amount of debt used in an LBO is not statistically significant, in line with previous research (De Jong et al., 2008; Axelson et al., 2010; Maeseneire and Brinkhuis, 2012). It can thus not be ruled out that the observed effect is coincidental and that there is no relationship between the tax regime of a country and the amount of debt used in an LBO. The significance of the coefficients, in all regressions performed, is tested using a two-sided t-test. This test is suitable for these regressions since the dependent and independent variables are continuous (McCrum-Gardner, 2008). Several assumptions should be met when performing this t-test, such as homoscedasticity and independence (Hsu and Lachenbruch, 2014). As stated before, the error terms are heteroscedastic. This 'problem' is solved through using robust standard errors.

[5] When a country has a general interest deduction limitation rule in its legislation, a one percentage point increase in the CIT now becomes (2.62-1.64)/100, due to the interaction term in column 2 of Table 7.

Table 7. Regression 1 and 2 testing hypothesis 1. The dependent variable is the Debt/EBITDA ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)	
	Debt/EBITDA		Debt/EBITDA	
	Coef.	Std. Err.	Coef.	Std. Err.
CIT	3.71	4.13	2.62	6.12
IDLR			-0.18	2.98
IDLR*CIT			-1.64	9.37
EURIBOR	-9.68	59.76	0.32	63.21
Yield	-20.80	28.02	-46.11	34.21
Tangibility	4.21***	0.86	4.35***	0.88
Profitability	4.38***	1.17	4.52***	1.16
Growth	1.19*	0.65	1.19*	1.81
Size	-0.13	0.13	-0.13	0.13
Constant	-1.05	1.44	0.11	2.2
Industry Control Variable	Yes		Yes	
Observations	402		402	
Adjusted R^2	0.06		0.06	
F-value	772.08***		2.55***	

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

Besides the variables of interest, several firm specific and macro-economic control variables were included in the regression, following previous research done regarding the debt used in an LBO (e.g. Maeseneire and Brinkhuis, 2012). The regressions reveal that, contrary to previous research done by Maeseneire and Brinkhuis (2012) and Axelson et al. (2010), the firm specific variables have a significant effect on the amount of debt used by private equity firms and the macro economic variables do not. The positive coefficient of the variable 'Tangibility' indicates that the more tangible assets a company has, the more debt will be used in an LBO. As stated in Table 3 of Appendix A, the tangibility of a company is measured through dividing the net fixed assets of a firm by the total book value of a firm's assets. It is unlikely that this ratio will rise with 1 unit. However, when this ratio for instance increases with 0.01, the Debt/EBITDA ratio of the target company will rise with 0.04. The rationale behind the positive effect is that tangible assets can be used as a collateral when lending, reducing the risk the lender has. The lender will therefore be willing to lend more

money at a lower interest rate. Lowering the interest rate will reduce the costs of capital, making it appealing for the borrowing company to take on more debt.[6] Furthermore, private equity firms will use more debt when they buy more profitable companies and companies with larger growth opportunities, as is shown in Table 7 through the significant positive coefficients of the variables 'Profitability' and 'Growth'. A 0.01 increase in the company's growth- or profitability ratio will lead to a 0.01 or 0.04 increase in the Debt/EBITDA ratio, respectively. The profitability of a company positively affecting the amount of debt used in an LBO is not in line with the results of Frank and Goyal (2009) and De Jong et al. (2008), stating that profitable firms will first rely on retained earnings before taking on debt. This reasoning does not apply when examining the field of LBOs, since the debt was used by private equity firms to finance the acquisition instead of companies financing their own investments. The positive effect of the profitability of a company on the amount of debt used in an LBO nevertheless is in line with the Static Tradeoff Theory, stating that profitable companies have to pay more corporate income tax thus will take on more debt to lower the amount of corporate income tax that has to be paid. The positive sign of the coefficient of the variable 'Growth' is not in line with previous research and rationale (Billett et al., 2011; Goyal et al., 2002). Interest payments will reduce future free cash flows, reducing the amount of investments that can be done in the future compared to when a company finances these investments with equity.

It is important to notice the adjusted R^2 of 6 percent. This indicates that solely 6 percent of the variance in the Debt/EBITDA ratio of a company is explained by the variables in the regression. Hence, there are several variables not taken into account in this multivariate regression that do influence the amount of debt used when performing an LBO. An additional interesting point regarding the adjusted R^2 is that the addition of the dummy variable and the interaction term for the presence of a general interest deduction limitation rule does not improve the explanatory power of the model.

5.1.2. Robustness Check

The robustness of the results of the main regressions in column one and two is checked by changing the dependent variable Debt/EBITDA to Debt/Income and Debt/Assets. The results are presented in Table 1 of Appendix B. Overall, the results stay the same. However, the presence of the earnings stripping rule no longer has a negative effect on the amount of debt used in an LBO but turns positive. In addition, the effect of the corporate income tax on the amount of debt used is negative when a country does not have a general interest deduction limitation rule in force but turns positive or shows no effect when a country does have a general interest deduction limitation rule in its legislation, as can be seen in column 2 and 4 of Table 1 in Appendix B.

Compared to the main regressions, the adjusted R^2 is noticeably higher; 10 to 28 percent. This indicates that the chosen variables explain more of the variance in the Debt/Income and Debt/Assets ratio of a company than the variance in the Debt/EBITDA ratio of a company.

[6] The cost of capital of a firm is determined through using the WACC: Rd x (1-Tc) x D/V+Re x E/V.

5.2. Effect General Interest Deduction Limitation Rule on Debt Level in an LBO

5.2.1. The Debt/EBITDA Ratio

To test whether the presence of a general interest deduction limitation rule in the country where the target company is located negatively influences the amount of debt used in an LBO, a difference-in-differences model is runned. The breaking point is set at the date the EU member states had to implement the earnings stripping rule. Hence, the difference-in-differences model tests whether the implementation of the earnings stripping rule had an effect on the amount of debt used when performing an LBO. Where this effect was captured by the variables 'IDLR' and 'CIT*IDLR' in regression 1 and 2, it is now captured through adding the variables 'Time', 'Group' and 'Time*Group' in regression 3. The variable 'Time*Group' is the variable of interest in this model.

As can be seen in column 1 of Table 8, the corporate income tax rate in the country where the target company is located positively influences the amount of debt used when performing an LBO. An 1 percentage point increase in the corporate income tax rate in the state where the target company is located leads to a 0.02 increase in the Debt/EBITDA ratio. This positive effect was also observed in the multivariate regression performed in paragraph 5.1. Furthermore, the dummy variable 'Time*Group' has a negative effect on the amount of debt used in an LBO. To repeat: the dummy variable only has a value of '1' if the LBO is performed after 1 January 2019 and features a target company that is located in a EU member state that did not have a general interest deduction limitation rule before implementing the earnings stripping rule. The coefficient of the dummy variable 'Time*Group' being negative therefore indicates that the implementation of the earnings stripping rule by EU member states has had a negative impact on the amount of debt used by private equity firms when performing an LBO; the presence of the earnings stripping rule reduces the Debt/EBITDA ratio of the target company by 1.06. One cannot rule out that there is no relationship between the presence of a general interest deduction limitation rule and the amount of debt used in an LBO because, again, the observed effect is not statistically significant. The variables representing the presence of a general interest deduction limitation rule not being significant in the multivariate regression and the difference-in-differences model can be due to the 'carry forward'. In many countries, the interest expenses that cannot be deducted in a certain year due to the earnings stripping rule, can be carried forward to the subsequent years. The interest expenses can thus still create a tax shield in a year where the threshold of the earnings stripping rule is not exceeded. The benefits of taking on a lot of debt have not vanished completely.

With regards to the control variables, the firm specific control variables 'Tangibility', 'Profitability' and 'Growth' positively influence the amount of debt used in an LBO and the macro economic control variables show no significant effect, in line with the multivariate regressions conducted in paragraph 5.1.

Table 8. The results of the difference-in-differences model. The dependent variable is the Debt/EBITDA ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as

well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)	
	Debt/EBITDA		Debt/Income		Debt/Assets	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
CIT	2.35	4.21	-0.11	1.12	-0.16	0.25
Time	0.65	1.12	-0.02	0.25	0.004	0.06
Group	0.69	0.61	0.13	0.17	0.02	0.04
Time*Group	-1.06	0.79	0.005	0.21	-0.06	0.05
EURIBOR	-19.11	71.98	19.41	19.20	4.56	4.23
Yield	-19.42	64.12	-14.34	14.10	-3.09	3.19
Tangibility	4.29***	0.94	1.31***	0.21	0.29***	0.05
Profitability	4.47***	1.17	0.46	0.38	0.09	0.08
Growth	1.21*	0.66	0.11	0.17	0.02	0.03
Size	-0.13	0.12	-0.05	0.04	0.009	0.007
Constant	-0.96	2.14	0.02	0.50	0.02	0.11
Industry Control Variable	Yes		Yes		Yes	
Observations	402		402		402	
Adjusted R^2	0.06		0.10		0.28	
F-Value	15.3***		9.88***		45.79***	

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

5.2.2. Robustness Check

To test whether the results obtained are robust, the Debt/Income ratio and Debt/Assets ratio of the target company are used as dependent variables in the difference-in-differences model. Using these ratios as dependent variables changes several observed effects. To begin with, in both regressions the corporate income tax rate negatively influences the amount of debt used in an LBO. Where in the main difference-in-differences model a 1 percentage point increase in the corporate income tax rate in the state where the target company is located led to a 0.02 increase in the Debt/EBITDA ratio, an 1 percentage point increase now leads to a decrease in the Debt/Income ratio and Debt/Assets ratio of respectively 0.0011 and 0.0016. The magnitude of the coefficients is a lot smaller than in column one and not statistically significant. Secondly, the effect of the presence of the earnings stripping rule turns positive when the Debt/Income ratio is used as a proxy for the amount of debt used in an LBO. The

use of the Debt/Assets ratio as the dependent variable leads to the presence of a general interest deduction limitation rule having a negative effect on the amount of debt used in an LBO of 0.06, in line with the results obtained when using the Debt/EBITDA ratio as the dependent variable. Lastly, the control variables 'Tangibility', 'Profitability' and 'Growth' remain to positively influence the amount of debt taken on when performing an LBO. However, 'Profitability' and 'Growth' are no longer statistically significant.

5.3. Tax Variables and the Size of a Company

5.3.1. The Debt/EBITDA Ratio

The third and last hypothesis to test states that the size of a company strengthens the effect of the corporate income tax rate and the presence of the earnings stripping rule on the amount of debt used by private equity firms when performing an LBO. To test this, two interaction terms are subsequently and jointly added to the basic multivariate regression. The results are presented in Table 9. To determine whether any changes can be observed when the interaction term is added to the regression, the coefficients of the different variables are compared with Table 7.

First, the interaction term 'Size*CIT' is added to the regression. This term measures whether the corporate income tax of a country influences the amount of debt used in an LBO to a greater extent if the target company is bigger in size. Whereas the coefficient of the 'CIT' variable is positive in Table 7, it turns negative in the presence of the interaction term as can be seen in column 1 of Table 9. As illustrated in column 1 and 3 of Table 9, when the corporate income tax rate in a country equals zero, a one percent change in the size of a company leads to decrease in the Debt/EBITDA ratio of respectively 0.005 and 0.004. However, the coefficients are not statistically significant and the adjusted R^2 is only 6 percent.

Removing the interaction between the corporate income tax and size from the regression and adding the interaction between the earnings stripping rule and size, leads to the 'CIT' variable becoming positive again. The influence of the presence of a general interest deduction limitation rule on the Debt/EBITDA ratio, compared to column 2 of Table 7, remains negative. The Debt/EBITDA ratio of a target company is lowered by 1.76 if the size of a company is zero and the country where the target company is located introduces a general interest deduction limitation rule in its legislation, as can be seen in column 2 of Table 9. If a company becomes bigger in size, the impact of the presence of the general interest deduction limitation rule will be enlarged since the coefficient of the interaction term is -0.08.

Table 9. Regression 4, 5 and 6 testing hypothesis 3. The dependent variable is the Debt/EBITDA ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as

well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)	
	Debt/EBITDA		Debt/EBITDA		Debt/EBITDA	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
CIT	-0.45	8.14	2.57	6.20	-0.15	7.57
IDLR	0.25	3.35	0.12	2.99	-0.36	3.27
CIT*IDLR	-3.09	10.62	-1.88	9.26	-3.06	10.67
Size*CIT	1.21	2.34			1.08	2.29
Size*IDLR			-0.08	0.25	-0.04	0.23
EURIBOR	0.38	63.21	2.13	63.70	1.34	63.94
Yield	-47.83	34.59	-46.20	34.25	-47.69	34.54
Tangibility	4.39***	0.90	4.38	0.90	4.41***	0.91
Profitability	4.60***	1.18	4.49	1.17	4.57***	1.19
Growth	1.18*	0.65	-0.08	0.20	1.18*	0.66
Size	-0.49	0.70	-0.08	0.20	-0.42	0.71
Constant	1.03	2.67	0.01	2.17	0.88	2.45
Industry Control Variable	Yes		Yes		Yes	
Observations	402		402		402	
Adjusted R^2	0.06		0.06		0.05	
F-Value	335.92***		12.49***		677.53***	

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

Lastly, both terms are added to the regression jointly. The observed signs of the interaction terms are identical to the regressions performed and presented in column 1 and 2 of Table 9. For a given corporate income tax rate, there will be a certain target company size for which the amount of debt used in an LBO is positively influenced by the corporate income tax rate. Hence, there is a breaking point since the coefficient of the interaction term is positive and the coefficients of the variables 'Size' and 'CIT' are negative. When there is a general interest deduction limitation rule in force, this point will be difficult to reach, since the interaction term 'CIT*IDLR' is relatively large. Regarding the presence of a general interest deduction limitation rule, the amount of debt used in an LBO will be decreased more when the target company is larger in size. The coefficients for the variables 'CIT*IDLR', 'Size' and 'Size*IDLR' are all negative in column 2 and 3. The dummy variable 'IDLR' is

negative in column 3 but positive in column 2. However, its coefficient in column 2 is not large enough to offset the negative coefficients of the other variables. This effect is in line with what was expected since the general interest deduction limitation rule will have a bigger influence on the larger companies compared to the small and mid size companies. The amount of interest payments that a company can always deduct under the earningsstrippingrule (e.g. 1 million euros in the Netherlands) is a relatively much bigger amount for small and mid size companies compared to large companies, meaning that smaller companies will be able to deduct more of their interest expenses.

5.3.2. Robustness Check

In line with the previous regressions performed, the robustness of the results are checked by using different dependent variables, namely the Debt/Income ratio and Debt/Assets ratio of the target company. The results are presented in Table 2 of Appendix B and are largely in line with the results presented in Table 9. However, the interaction term 'Size*IDLR' shows ambiguous effects, whereas its sign turns positive when the Debt/Assets ratio of a company is taken as the dependent variable.

6 Results within the United Kingdom

To test the robustness of the results obtained in the EU-dataset, the different multivariate regressions (i.e. regression 1, 2, 4, 5 and 6) are performed using the UK-dataset. The difference-in-differences model, i.e. regression 3, cannot be performed in the UK-dataset due to no control group being present.

6.1. The Effect of the CIT an the IDLR on the Debt Level in an LBO

To test whether the corporate income tax rate influences the amount of debt used in an LBO and whether the presence of a general interest deduction limitation rule mitigates this effect, regression 1 and 2 are performed and presented in Table 10. The results of the regressions with the Debt/Income ratio and Debt/Assets ratio as dependent variables are presented in Table 3 of Appendix B. Comparing the results to Table 7, it is interesting to notice that, where the signs of the variables of interest (i.e. 'CIT' and 'IDLR') were respectively positive and negative in the EU-dataset, in the UK-dataset the coefficients changed signs in all the performed regressions. Including the interaction term 'CIT*IDLR' in these regression led to an omission of the interaction term and thus was not possible. This could explain the difference in the results obtained. Based on the regression presented in column 2 of Table 10, one can conclude that a percentage point change in the corporate income tax rate will lower the Debt/EBITDA ratio of the target company with 0.15. The implementation of the general interest deduction limitation rule in the UK (CIR) positively influences the Debt/EBITDA ratio by 0.08. When the dependent variable is changed into the Debt/Income ratio or Debt/Assets ratio of the target company, the implementation of the CIR remains to have a positive influence on the amount of debt used in an LBO. Apart from the regression presented in column 2 of Table 3 in Appendix B, the corporate income tax remains to have a negative influence on the amount of debt used in an LBO. The results are far from statistically significant. Even though every coefficient, aside from the tangibility of the target company, is insignificant, the adjusted R^2 of the model is very high; 29 to 58 percent. This can be due to multicollinearity. However, none of the independent variables are highly correlated, as can be seen in Table 4 of Appendix A. Nevertheless, due to the smaller sample size and insignificant coefficients, the high adjusted R^2 should be interpreted with caution. One must conclude that the results obtained in the UK-dataset differ from the EU-dataset.

Table 10. Regression 1 and 2 testing hypothesis 1 in the UK-dataset. The dependent variable is the Debt/EBITDA ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)	
	Debt/EBITDA		Debt/EBITDA	
	Coef.	Std. Err.	Coef.	Std. Err.
CIT	-19.42	19.71	-15.04	27.91
IDLR			0.08	0.36
LIBOR	42.66	63.94	40.51	64.85
Yield	24.05	35.79	27.65	41.04
Tangibility	1.45**	0.65	1.47**	0.68
Profitability	0.33	0.70	0.42	0.81
Growth	0.56	0.45	0.58	0.45
Size	0.13	0.09	0.13	0.09
Constant	0.17	3.96	-0.76	5.97
Industry Control Variable	Yes		Yes	
Observations	109		109	
R^2	0.58		0.54	
F-Value	3.85***		3.69***	

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

6.2. Tax Variables and the Size of a Company

To test whether the size of a company has an influence on the effect of the corporate income tax rate and the presence of a general interest deduction limitation rule on the amount of debt used in an LBO, additional multivariate regressions, i.e. regressions 4, 5 and 6, are performed on the UK-dataset. The results are presented in Table 11 and Table 4 of Appendix B.

The results obtained in this dataset are different from the results from the EU-dataset. When solely the interaction term 'Size*CIT' is added to the regression, the sign of both the variables 'CIT' and 'Size*CIT' are negative, indicating that an increase in the corporate income tax and/or size of a company will lead to an decrease in the amount of debt used in an LBO. When both the interaction terms are added to the regressions, the coefficient of the variable 'CIT' remains negative and becomes more than 30 times larger. The coefficient of the variable 'Size*CIT', compared to the regression in column 1 of Table 11, becomes positive; in column 1 the coefficient is -1.48 and in column 3 the coefficient is 7.40. With the

sign of the variables 'CIT' and 'Size' being negative and the coefficient of the interaction term 'Size*CIT' being positive, there will be a company size for which the corporate income tax rate positively influences the amount of debt used in an LBO. This result is in line with the result obtained in the EU-dataset. None of the coefficients in the performed multivariate regressions stated in Table 11 are significant.

Table 11. Regression 4, 5 and 6 testing hypothesis 3 in the UK-dataset. The dependent variable is the Debt/EBITDA ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)	
	Debt/EBITDA		Debt/EBITDA		Debt/EBITDA	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
CIT	-2.73	123.18	-19.79	39.08	-90.43	265.05
IDLR	0.06	0.46	-0.47	2.69	-1.43	4.57
Size*CIT	-1.48	15.12			7.40	27.70
Size*IDLR			0.05	0.24	0.15	0.45
LIBOR	40.09	65.09	36.37	60.80	30.44	62.85
Yield	27.82	41.20	30.00	39.33	33.67	44.00
Tangibility	1.42	0.95	1.35	0.90	1.39	0.96
Profitability	0.42	0.81	0.40	0.83	0.34	0.96
Growth	0.57	0.49	0.52	0.52	0.49	0.53
Size	0.42	2.93	0.09	0.20	-1.41	5.65
Constant	-3.06	23.03	0.73	10.09	15.12	54.33
Industry Control Variable	Yes		Yes		Yes	
Observations	109		109		109	
Adjusted R^2	0.52		0.52		0.50	
F-value	3.33***		15.53***		24.75***	

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

Regarding the effect of the general interest deduction limitation rule on the amount of debt used in an LBO the results also differ. When the interaction term is added to the regression, the variable 'IDLR' has a negative sign, as can be seen in column 2 and 3 of Table 11. This is in line with the results presented in Table 9. However, the coefficient of the interaction term

is positive, indicating that there will be more debt used in an LBO when the target company becomes bigger in size and a general interest deduction limitation rule is implemented.

When the dependent variable is changed into the Debt/Income ratio or Debt/Assets ratio of the target company, the coefficients of the tax variables show an ambiguous effect, as can be seen in Table 4 of Appendix B. For instance, the coefficient of the variable 'Size*CIT' has a negative sign in column 1, 3 and 4 but this sign turns positive in column 6. In addition, the variable 'IDLR' has a positive sign in column 1 and 4 but this sign turns negative in column 2, 3, 5 and 6. Again, based on the results discussed in this paragraph, one must conclude that the results obtained in the EU-dataset differ from the results obtained in the UK-dataset.

7 Conclusion

In this section the main research question is answered. Furthermore, the limitations of this thesis are discussed and recommendations for future research are made.

7.1. Conclusion

This research aimed to test whether the presence of a general interest deduction limitation rule influences the amount of debt used by private equity firms when performing an LBO. A general interest deduction limitation rule prevents base erosion through limiting the amount of interest payments a company can conduct from its corporate income tax base to a certain threshold. Private equity firms use a lot of debt when performing an LBO, leading to high interest payments. Not being able to deduct all these interest payments affects the revenue model of the private equity firms and hence the amount of debt used in an LBO might be lowered.

To test the effect of the presence of a general interest deduction limitation rule on the amount of debt used, two datasets are formed: a dataset consisting of LBOs performed with a target company located in the EU and a dataset consisting of LBOs performed with a target in the UK, all within the years 2014 until 2022. Several regressions are run, taking the Debt/EBITDA ratio, Debt/Income ratio and Debt/Assets ratio of the target company as proxies for the amount of debt used in an LBO. In the multivariate regression, a dummy is used to indicate whether a country has a general interest deduction limitation rule in its legislation. In addition, a difference-in-differences model is performed on the data. Besides the general interest deduction limitation rule, another variable of interest is the corporate income tax rate. Lastly, interaction terms were added to the multivariate regression to test whether the size of a company influences the effect of the corporate income tax rate and the general interest deduction limitation rule on the amount of debt used in an LBO.

The results of these regressions performed in the EU-dataset show that the corporate income tax rate indeed has a positive influence on the amount of debt used in an LBO. This effect remains positive but is mitigated when the possible presence of a general interest deduction limitation rule is taken into account. Following from the multivariate regression and the difference-in-differences model, a target company that is located in a country that has a general interest deduction limitation rule in its legislation will be bought with less debt compared to companies located in a country without a general interest deduction limitation rule in force. However, one cannot conclude that there is a relationship between the corporate income tax rate, the general interest deduction limitation rule and the amount of debt used in an LBO since the coefficients of the tax variables are not statistically significant. Failing to find significant results for the tax variables is in line with previous research regarding the influence of a country's tax regime on debt (Maeseneire et al., 2012; De Jong et al., 2008). Based on this research, the null hypothesis, i.e. there is no relationship between the corporate income tax rate of a country, the presence of the earnings stripping rule and the amount of debt used in an LBO, cannot be rejected. However, it is important to note that failing to reject the null hypothesis does not necessarily mean that the null hypothesis is true; it means that there is insufficient evidence to support the alternative hypothesis with the alternative hypothesis being that there is a relationship between the tax variables and the amount of debt

used in an LBO. Lastly, this research examined whether the effects of the corporate income tax rate and the general interest deduction limitation rule on the amount of debt used in an LBO was strengthened when private equity firms invest in relatively large companies. The results show that the effect of the general interest deduction limitation rule on the amount of debt used in an LBO is enlarged when the target company is bigger in size. Regarding the corporate income tax rate, the effect on the amount of debt used is negative for small firms. However, there will be a company size for which the effect of the corporate income tax rate on the amount of debt used in an LBO will turn positive. The tax shield that can be obtained by companies will become larger as the company becomes bigger in size. However, this relationship is not linear since many countries know two 'levels' of corporate income tax rate. In the Netherlands the first 200.000 euros are taxed at a rate of 19 percent. Profits above this threshold are taxed at a rate of 25.8 percent. Hence, the possible tax shield that can be created will have more value when the company is bigger and generates more revenues. Nevertheless, one cannot draw any conclusions since the observed effects are again not statistically significant.

The results obtained in the EU-dataset were tested for robustness through performing the regressions in the UK-dataset. The coefficients of the tax variables changed signs compared to the EU-dataset. The general interest deduction limitation rule had a positive influence on the amount of debt used in an LBO and the corporate income tax rate negatively influenced the amount of debt used. Regarding the possible strengthening effect of the size of a company, the results are the same in the EU-dataset and UK-dataset for the corporate income tax rate, namely that the corporate income tax rate negatively influences the amount of debt used for the buyout of small firms but that there is a company size for which this effect will turn positive. With respect to the general interest deduction limitation rule, the results differ since the coefficients indicate that there will be more debt used in an LBO when the target company becomes bigger in size and a general interest deduction limitation rule is implemented. Once again, one cannot conclude that the size of a company has a strengthening effect due to the coefficients not being statistically significant.

7.2. Limitations and Further Research

The main limitation of this research is that the coefficients of many variables are not statistically significant. Regarding the tax variables, a reason for this can simply be that there is no relationship between the tax regime of a country and the amount of debt used in an LBO, although that seems unlikely. An additional explanation could be that taking into account the corporate income tax rate and the presence of a general interest deduction limitation rule is not enough to be a representation of the marginal corporate income tax rate of a company and the tax shield that it will obtain. There are more specific laws that can influence a company's tax burden, such as the participation exemption or the loss relief. Leaving out these laws can lead to omitted variable bias and thus insignificant coefficients. When further examining the influence of the tax regime of a country on the amount of debt used in an LBO, one should in one way or another find out what the marginal tax rate of the target company is. This information will be difficult to obtain, especially for private companies, since the tax assessments of companies are private information.

Another limitation of this research is that the adjusted R^2 is relatively low. For comparison; the adjusted R^2 in the research by Maeseneire and Brinkhuis (2012) ranges from 6 to 20 percent while the adjusted R^2 in the main regressions in this research is 6 percent. This indicates that there are variables not taken into account that do influence the amount of debt used when performing an LBO. These variables can for instance be related to the characteristics of the private equity firm and fund instead of the target firm, variables that are not taken into account in this research. It can be interesting to see if taking these variables into account in further research improves the adjusted R^2 of the model and the significance of the coefficients of the other variables. Another way to improve the significance and the adjusted R^2 might be to take into account a variable that controls for time unit-specific effects. In this research, adding such a variable to the model unfortunately led to collinearity.

Lastly, in further research the robustness of the results can be checked in countries outside of Europe. Due to the use of the databases Orbis and Zephyr, only companies in Europe could be taken into account. Performing the research outside of Europe, i.e. in the United States or developing countries, can be useful since the investment climate differs from the European Countries through for instance the access to finance. The private equity markets also differ. Smolarski, Wilner and Yang (2011) for instance show that the average deal size is much bigger and the number of deals is way smaller in India compared to countries in the EU.

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Appendix A

Table 1. Interest deduction limitation rules. This table displays the EU member states in the year 2016. The second column states whether that member state had a general interest deduction limitation rule implemented in its tax regime regarding loans from third parties. The third column subsequently explains how the interest deduction limitation rule is shaped.

Country	General Interest Deduction Limitation Rule	Explanation of the Rule
Austria	No	-
Belgium	No	-
Bulgaria	No	-
Croatia	No	-
Cyprus	No	-
Czech Republic	No	-
Denmark	No	-
Estonia	No	-
Finland	Yes	Interest paid on intra-group loans are deductible as long as it does not exceed 25% of a company's EBITDA.
France	No	-
Germany	Yes	Interest can be deducted up to a value of 30% of a company's EBITDA.
Greece	Yes	Interest can be deducted up to a value of 40% of a company's EBITDA (30% from 2017).
Hungary	No	-
Ireland	No	-
Italy	Yes	Net interest paid can be deducted up to a value of 30% of a company's EBITDA.
Latvia	No	Thin cap rule of 4:1 debt to equity.
Lithuania	No	Thin cap rule of 4:1 debt to equity, solely for loans from controlling parties.
Luxembourg	No	-
Malta	No	-
Netherlands	No	-

Table 1. Interest deduction limitation rules (continued).

Poland	Yes	Interest payments are deductible up to 50% of a company's operational profit or a thin cap rule of 1:1 debt to equity is applied.
Portugal	Yes	Interest payments can be deducted up to 40% of a company's EBIT or 1 million euros.
Romania	No	-
Slovakia	Yes	Interest payments can be deducted up to 25% of a company's EBITDA.
Slovenia	No	-
Spain	Yes	Net financial expenses are deductible up to 30% of a company's operating profit with a maximum of 1 million.
Sweden	No	-
United Kingdom	No	-

Source: European Commission, Directorate-General for Taxation and Customs Union (2016).

Table 2. An overview of country specific factors. In Panel A, an overview of the combined corporate tax rates per country is given, as published by the OECD. In Panel B, the 10 year government bond yield is displayed for the country where the target company is located. Furthermore, the 12 month average EURIBOR and the 12 month average UK LIBOR is shown in Panel C.

Panel A: Corporate Income Tax Rates

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Belgium	34%	34%	34%	34%	29.6%	29.6%	25%	25%	25%
Czech Republic	19%	19%	19%	19%	19%	19%	19%	19%	19%
Denmark	24.5%	23.5%	22%	22%	22%	22%	22%	22%	22%
Estonia	21%	20%	20%	20%	20%	20%	20%	20%	20%
Finland	20%	20%	20%	20%	20%	20%	20%	20%	20%
France	38%	38%	34.4%	34.4%	34.4%	34.4%	32%	28.4%	25.8%
Germany	29.7%	29.8%	29.8%	29.9%	29.9%	29.9%	29.8%	29.8%	29.8%
Greece	26%	29%	29%	29%	29%	24%	24%	22%	22%

Table 2. An overview of country specific factors (continued).

Hungary	19%	19%	19%	9%	9%	9%	9%	9%	9%
Ireland	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Italy	31.3%	31.3%	31.3%	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%
Lithuania	15%	15%	15%	15%	15%	15%	15%	15%	15%
Luxemb-ourg	29.2%	29.2%	29.2%	27.1%	26%	24.9%	24.9%	24.9%	24.9%
Netherlan ds	25%	25%	25%	25%	25%	25%	25%	25%	25.8%
Poland	19%	19%	19%	19%	19%	19%	19%	19%	19%
Portugal	31.5%	29.5%	29.5%	29.5%	31.5%	31.5%	31.5%	31.5%	31.5%
Romania	16%	16%	16%	16%	16%	16%	16%	16%	16%
Serbia	15%	15%	15%	15%	15%	15%	15%	15%	15%
Spain	30%	28%	25%	25%	25%	25%	25%	25%	25%
Sweden	22%	22%	22%	22%	22%	21.4%	21.4%	20.6%	20.6%
United Kingdom	21%	20%	19%	19%	19%	19%	19%	19%	-

Source: OECD (2023). Accessible through: https://stats.oecd.org/Index.aspx?DataSetCode=CTS_CIT#.

Panel B: 10 Year Government Bond Yield

	2014	2015	2016	2017	2018	2019	2020	2021	2022
European Union	2.61%	2.76%	2.31%	2.46%	2.26%	1.11%	0.49%	1.17%	3.91%
United Kingdom	1.76%	1.96%	1.24%	1.12%	1.27%	0.82%	0.19%	0.97%	3.67%

Source: European Central Bank (2023). Accessible through: https://sdw.ecb.europa.eu/browse.do?node=9691417.

Panel C: 12 Month Average EURIBOR and LIBOR

	2014	2015	2016	2017	2018	2019	2020	2021	2022
EURIBOR	0.48%	0.17%	-0.04%	-0.15%	-0.17%	-0.22%	-0.31%	0.49%	1.1%
LIBOR	0.98%	1.02%	0.89%	0.70%	1.00%	1.00%	0.47%	0.29%	-

Source: Global Rates (2023). Accessible through: https://www.global-rates.com/en/.

Table 3. The different variables used in this research and their definitions.

Variable	Definition
Dependent variables	
Debt/EBITDA	The long term liabilities of a company divided by its earnings before interest, tax, depreciation and amortization. All measured at the end of the year the LBO took place.
Debt/Income	The long term liabilities of a company divided by its operating revenue. All measured at the end of the year the LBO took place.
Debt/Assets	The long term liabilities of a company divided by its total assets. All measured at the end of the year the LBO took place.
Independent Variables	
Size	The natural logarithm of the operating revenue (turnover) of a company, measured in the year the LBO took place.
Profitability	The company's earnings before interest, tax, depreciation and amortization divided by its operating revenue (turnover).
Growth	The difference in the operating revenue (turnover) of a company between the year the LBO took place and the previous year.
Tangibility	The net fixed assets of a firm, divided by the total book value of a firm's assets. Measured in the year the LBO took place.
CIT	The combined corporate income tax rate of the country where the target company is located, measured in the year the LBO took place.
Yield	The ten year government bond yield of the country where the target company is located, measured in the year the LBO took place.
EURIBOR	The average interest rate for which European banks provide 12 month loans to each other. Measured in the year the LBO took place.
LIBOR	The average interest rate for which British banks provide 12 month loans to each other. Measured in the year the LBO took place.
IDLR	A dummy variable which has the value '1' if a country has a general interest deduction limitation rule in the year the LBO took place and the value '0' if not.
Time	A dummy variable which has the value '1' when the LBO is performed after the implementation of a general interest deduction limitation rule.
Group	A dummy variable which has the value '1' when the LBO is in the treatment group
Time*Group	A dummy variable which has the value '1' when the LBO is performed after the implementation of a general interest deduction limitation rule and belongs to the treatment group.

Table 4. The Correlation Matrix for the British Dataset

	Size	Growth	Profita-bility	Tangi-bility	CIT	Yield	LIBOR	IDLR
Size	1.00							
Growth	0.15	1.00						
Profita-bility	-0.19	-0.08	1.00					
Tangi-bility	0.14	-0.11	0.10	1.00				
CIT	-0.22	0.02	0.10	0.02	1.00			
Yield	-0.20	-0.03	-0.03	-0.26	0.63	1.00		
LIBOR	-0.16	-0.15	0.10	-0.10	0.37	0.49	1.00	
IDLR	0.22	0.04	-0.11	0.06	-0.66	-0.59	-0.23	1.00

Table 5. The Breusch-Pagan Test for Heteroskedasticity. Regressions 2, 3 and 6 are tested for heteroskedasticity.

	EU-Dataset	UK-Dataset
Regression 2	71.64***	14.08***
Regression 3	72.06***	
Regression 6	73.54***	15.66***

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

Table 6. The Likelihood Ratio Test. The regressions performed are tested to determine whether the addition of industry fixed effects is desirable.

	EU-Dataset	UK-Dataset
Regression 1	156.71***	210.89***
Regression 2	159.23***	209.49***
Regression 3	149.19***	
Regression 4	159.85***	209.47***
Regression 5	159.27***	207.14***
Regression 6	159.63***	203.44***

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

Appendix B

Table 1. Regression 1 and 2 testing hypothesis 1 in the EU-dataset. The dependent variables are the Debt/Income and Debt/Assets ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)		(4)	
	Debt/Income		Debt/Income		Debt/Assets		Debt/Assets	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
CIT	0.35	1.01	-0.46	1.58	-0.14	0.23	-0.39	0.34
IDLR			-0.45	0.66			-0.15	0.15
IDLR*CIT			1.12	2.02			0.39	0.46
EURIBOR	17.27	16.41	21.35	16.80	4.05	3.39	5.24	3.54
Yield	-13.31*	6.93	-17.28**	8.76	-1.28	1.43	-2.21	1.93
Tangibility	1.25***	0.19	1.28***	0.20	0.30***	0.04	0.30***	0.04
Profitability	0.43	0.39	0.45	0.38	0.09	0.08	0.09	0.08
Growth	0.11	0.17	0.11	0.17	0.01	0.03	0.01	0.03
Size	-0.06	0.04	-0.05	0.04	0.008	0.007	0.009	0.007
Constant	0.02	0.33	0.40	0.58	-0.04	0.07	0.07	0.13
Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	402		402		402		402	
Adjusted R^2	0.11		0.10		0.28		0.28	
F-value	43.06***		34.70***		2277.01***		272.10***	

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

Table 2. Regression 4, 5 and 6 testing hypothesis 3 in the EU-dataset. Regression 1 and 2 testing hypothesis 1. The dependent variables are the Debt/Income and Debt/Assets ratio of a company, being a proxy for the amount of debt used in an LBO. Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)		(4)		(5)		(6)	
	Debt/Income		Debt/Income		Debt/Income		Debt/Assets		Debt/Assets		Debt/Assets	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef	Std. Err.	Coef	Std. Err.	Coef	Std. Err.
CIT	-1.72	2.60	-0.47	1.59	-1.70	2.72	-0.60	0.48	-0.39	0.34	-0.63	0.50
IDLR	-0.28	0.62	-0.38	0.75	-0.27	0.71	-0.12	0.15	-0.15	0.16	-0.13	0.15
CIT*IDLR	0.53	1.88	1.06	2.04	0.53	1.88	0.29	0.46	0.39	0.46	0.28	0.45
Size*CIT	0.50	0.60			0.49	0.63	0.08	0.12			0.10	0.13
Size*IDLR			-0.02	0.08	-0.004	0.08			0.0002	0.01	0.004	0.01
EURIBOR	21.37	16.78	21.81	17.21	21.46	17.16	5.24	3.55	5.23	3.59	5.16	3.59
Yield	-17.98**	8.78	-17.30*	8.82	-17.97**	8.80	-2.33	1.93	-2.21	1.93	-2.34	1.93
Tangibility	1.29***	0.20	1.28***	0.19	1.30***	0.19	0.31***	0.04	0.30***	0.04	0.31***	0.04
Profitability	0.48	0.38	0.44	0.39	0.48	0.39	0.10	0.08	0.09	0.08	0.10	0.08
Growth	0.11	0.17	0.11	0.17	0.11	0.17	0.01	0.03	0.01	0.03	0.01	0.03
Size	-0.20	0.18	-0.04	0.06	-0.19	0.21	-0.02	0.04	0.01	0.01	-0.02	0.04
Constant	0.78	0.82	0.37	0.61	0.77	0.92	0.13	0.16	0.07	0.13	0.15	0.17
Industry Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	402		402		402		402		402		402	
Adjusted R^2	0.10		0.10		0.10		0.28		0.28		0.28	
F-value	11.90***		17.22***		2283.07***		419.42***		39.10***		96.96***	

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

Table 3. Regression 1 and 2 testing hypothesis 1 in the UK-dataset. The dependent variables are the Debt/Income and Debt/Assets ratio of a company, being a proxy for the amount of debt used in an LBO.Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)		(4)	
	Debt/Income		Debt/Income		Debt/Assets		Debt/Assets	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
CIT	-2.22	5.67	3.93	7.47	-1.31	1.55	-0.006	1.73
IDLR			0.12	0.10			0.03	0.02
LIBOR	-1.17	20.02	-4.20	20.23	3.98	4.60	3.34	4.61
Yield	9.85	9.25	14.91	11.15	0.49	2.93	1.56	3.21
Tangibility	0.44***	0.15	0.47***	0.15	0.07	0.04	0.08*	0.04
Profitability	-0.13	0.22	-0.009	0.23	0.04	0.06	0.07	0.06
Growth	0.13	0.11	0.16	0.10	0.03	0.03	0.04	0.02
Size	0.01	0.03	0.009	0.03	0.004	0.008	0.003	0.007
Constant	-0.20	1.23	-1.50	1.62	0.10	0.30	-0.17	0.37
Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	109		109		109		109	
Adjusted R^2	0.29		0.32		0.46		0.47	
F-value	31.98***		10.47***		3.88***		20.50***	

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

Table 4. Regression 4, 5 and 6 testing hypothesis 3 in the UK-dataset. The dependent variables are the Debt/Income and Debt/Assets ratio of a company, being a proxy for the amount of debt used in an LBO.Vertically, the different dependent variables as well as the use of a industry control variable, the number of observations, the adjusted R^2 and the F-value of the model are presented. For every variable, the coefficient and the robust standard error are stated.

	(1)		(2)		(3)		(4)		(5)		(6)	
	Debt/Income		Debt/Income		Debt/Income		Debt/Assets		Debt/Assets		Debt/Assets	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef	Std. Err.	Coef	Std. Err.	Coef	Std. Err.
CIT	32.50	37.84	-1.09	9.64	9.69	52.22	3.06	8.81	-0.81	2.44	-7.52	15.97
IDLR	0.07	0.12	-0.47	0.78	-0.32	0.92	0.02	0.02	-0.07	0.18	-0.16	0.28
Size*CIT	-3.44	4.57			-1.13	5.68	-0.37	1.04			0.70	1.56
Size*IDLR			0.05	0.07	0.04	0.09			0.009	0.02	0.02	0.03
EURIBOR	-5.16	21.15	-8.58	19.08	-7.67	21.47	3.23	4.78	2.63	4.59	2.07	4.87
Yield	15.31	10.34	17.39	10.83	16.83	12.19	1.60	3.32	1.96	3.42	2.31	3.93
Tangibility	0.35**	0.17	0.35**	0.16	0.34*	0.18	0.06	0.05	0.06	0.04	0.06	0.05
Profitability	0.01	0.21	-0.02	0.19	-0.01	0.21	0.07	0.07	0.06	0.06	0.06	0.07
Growth	0.12	0.12	0.09	0.14	0.10	0.14	0.03	0.03	0.03	0.03	0.02	0.03
Size	0.68	0.91	-0.03	0.03	0.10	1.15	0.07	0.20	-0.003	0.01	-0.15	0.32
Constant	-6.85	7.49	0.08	2.27	-2.12	10.60	-0.75	1.70	0.08	0.60	1.45	3.28
Industry Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	109		109		109		109		109		109	
Adjusted R^2	0.33		0.33		0.31		0.45		0.46		0.44	
F-value	13.78***		4.96***		4556.98***		12.64***		42.38***		2.8^06***	

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