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Impact of Interest Rates on Leveraged Buyout Capital Structure

Analysis of Interest Rates Relationship to Leveraged Buyouts

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ABSTRACT:
This thesis explores the relationship between interest rates and leveraged buyouts. The main objective is to understand the determinants behind capital structure decisions made in LBOs. Most common capital structure theories used to analyze corporate capital structures fail to explain the decisions made in private equity LBOs. Previous literature seems to mostly agree on the fact that LBO activity and capital structure is determined by the availability of debt. The thesis focuses on analyzing the possible effects of interest rates on debt availability for PE funds. LBOs heavily rely on high-yield bond market for financing, as debt is raised as extensively as possible. The thesis finds that interest rates are only part of the factors determining LBO capital structure. Credit market conditions seem to be the main determinant for successful deal financing, as PE funds are reported to benefit from mispricing of equity, debt and loose credit conditions. Literature reports a negative relationship between credit spreads and nominal interest rates against LBO activity and leverage ratio. Successful LBOs need precise credit market timing and market timing in general.

KEYWORDS: Leveraged buyouts, Private equity, Interest rates, Market timing, Capital structure

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1 Introduction

Leveraged buyouts (LBOs) have long held a prominent place in the category of high-stakes finance. Their potential to offer robust returns significantly higher than traditional investments has intrigued many throughout their existence. What sets LBOs apart is their capital structure. Unlike public or typical private companies, LBOs heavily rely on debt financing. In simple terms, LBO is a considerably leveraged acquisition of a company. Debt makes up most of the purchase price, while the amount of equity is minimized. This high-leverage model amplifies both risk and return, making LBOs aggressive, high-reward strategies. However, navigating a successful LBO is not an easy task. Many factors affecting the deal need to be considered. One of the most crucial ones is interest rates, as a large portion of capital in these acquisitions is debt. Rising interest rates can quickly affect profitability and limit potential gains. Low interest rates on the other hand make debt more affordable and might enhance gains. Well-executed LBOs deliver robust returns through cost-cutting and financial restructuring, making them extremely compelling for many investors.

It is no secret that LBOs carried out by private equity (PE) companies are a risky business. Ayash and Rastad (2021) report that LBO target companies experience an 18% higher bankruptcy rate than comparable firms, although the study does not fully explore the drivers of this increased risk. Generally, the higher leverage ratio of a company is seen as a risk factor, and LBOs rely heavily on debt financing. On the other hand, Cressy et al. (2007) find that PE-backed buyout targets outperform similar firms in operating profitability, suggesting that despite heightened risk, PE involvement may bring efficiency gains.

Debt market conditions are an important determinant of leverage in buyouts and returns obtained by the PE funds making the investments (Axelson et al., 2013). As interest rates drop, a window of opportunity opens for PE investors. Ruckin & Brown (2024) from Bloomberg News report that traditional lenders and private credit managers are now able to provide even 50% more credit in a single junk-rated deal than last year. They also

state that the number of mergers and acquisition deals has increased 22% compared to last year. A new wave of LBOs might be around the corner.

As mentioned, interest rates and overall debt market conditions affect LBO activity heavily. Understanding the aspects of LBOs' capital structure and debt is crucial when navigating the PE world. In this thesis, previous literature is analyzed regarding debt in PE LBOs and how interest rate fluctuations affect these investments.

1.1 Purpose of the study

This thesis aims to study the capital structure of PE LBOs and review the structure of the leverage. It especially focuses on analyzing capital structure theories and their relationship to LBOs capital structure decisions. The main objective is to provide insights into the structure of LBOs and identify the ways interest rates affect them. The first research question this thesis seeks an answer to is as follows:

Q1: How do interest rates affect the capital structure and overall investment opportunities in private equity leveraged buyouts?

There is no doubt that interest rates do have a clear impact on the LBOs. This thesis aims to identify how big the impact is and how strongly it determines the capital structure of a buyout. The possible impact interest rates have on LBO returns is also reviewed. Based on previous literature about the effects of debt market conditions on LBOs, the hypothesis will be the following:

H1: The private equity leveraged buyouts are cyclical at least partially because of the interest rates. This is because of financial stress caused by debt servicing during high interest rates makes most companies not suitable targets, but also because raising the debt gets more difficult. During low interest rates LBOs flourish, as they arbitrage the debt market by lending relatively cheaply compared to the risk involved. In conclusion, high interest rates lower the leverage rate of LBOs or stop them from happening

completely. Lower interest rates on the other hand are very suitable for LBOs, increasing the number of deals made and their leverage ratios.

To fully understand interest rates effects on leveraged buyouts, we need to understand the capital structure of these investments. Hence, the second research question is:

Q2: How is the capital structure of a leveraged buyout determined?

This thesis will approach this question by comparing theories regarding capital structure determinants of public companies and the possible differences when it comes to LBOs. The motivation of the study is to bring together previous literature regarding LBO leverage structure and understand the effect interest rate fluctuations have on it. LBO capital structure is closely linked to the investment returns and therefore LBO returns will be also covered alongside capital structure.

1.2 Structure of the study

The motivation for the thesis is presented in the first chapter along with research questions and hypotheses. The second chapter focuses on the basic characteristics of PE LBOs and introduces the key concepts associated with them. The third chapter focuses on capital structure theories, reviewing the theories used to explain capital structure decisions and their relation to LBOs. Then the thesis finally focuses on interest rates effects on the LBOs. In the last chapter, the findings will be summarized and directions for future research will be given.

2 An Overview of leveraged buyouts

According to Kaplan & Strömberg (2009), a leveraged buyout is a transaction where a company is acquired by a specialized investment company using a relatively small amount of equity and a large amount of debt. Debt is then serviced with cash flows for the acquired company. The company is subjected to operational engineering and financial restructuring to later sell it for profit. The specialized investment firms engaging in LBO transactions are generally referred to as private equity firms. A PE firm gathers a group of investors and typically buys a majority stake in a mature firm for a period of five to seven years on average (Kaplan & Strömberg, 2009). The firm has to be mature so the debt of the buyout can be serviced with a steady cash flow. The main objective is to improve the equity value used in the transaction by deleveraging and increasing business value. LBOs are a fascinating concept to many because they are based on testing the target company's debt capacity and implementing many financial theories while doing so.

This thesis focuses mostly on LBOs carried out by PE firms. It is noteworthy though that there is a variety of different kinds of leveraged acquisitions very similar or almost identical to LBOs carried out by PE firms (Baldi, 2015, pp. 4-5). These include management buyouts and employee buyouts, where managers or employees of the company take part in the acquisition. There is a wide range of literature researching different kinds of LBOs, but still, the determinants for their capital structure are somewhat unclear.

LBOs are also known for their robust returns. Guo et al. (2011) find that LBO returns are on average large and positive in most cases except, naturally for the LBOs that end in financial troubles. They report median market- and risk-adjusted return to be 72,5% on their sample. PE firms usually target gross equity returns above 20% (Brown et al., 2021). LBO is a complex transaction, but three core principles could be defined that contribute to LBO returns (Pignataro, 2013, pp. 3-4). The first is increasing equity in the investment by deleveraging with steady cash flows from the business. The second is to conduct

operational improvements in the target company. The third principle is increasing the multiple in which the value of the business is measured. These topics will be more broadly covered in the last part of this chapter.

2.1 History

The concept of leveraged buyouts began taking shape in the United States during the 1960s, but it was in the 1980s that it took its shape and popularity, fueled by the rising availability of junk bonds and an era of aggressive corporate acquisitions. The low equity needed for the investment and high returns gained with leverage made the transaction type spread worldwide. Kaplan & Strömberg (2009) report that LBO activity has been cyclical in nature. The study finds that the debt market conditions, and the availability of debt mostly cause this. LBOs have had multiple so-called boom-and-bust cycles. The first boom occurred during the 1980s, the second in the mid-1990s, and the third and the biggest one happened just before the global financial crisis between 2003 and 2007. The LBO activity remains cyclical to this day.

LBOs have received criticism for being predatory and ruthless strategies. Davis et al. (2014) find that while job reallocation is higher in PE-backed companies, average job destruction exceeds comparable companies' metrics by 10%. Accompanied by the higher bankruptcy risk, there have even been suggestions for increasing the regulations related to them (Ayash & Rastad, 2021). On the other hand, LBOs have been associated with better company performance and superior governance (Acharya et al., 2013). Acharya et al. (2013) report a significant 19,8% abnormal performance on PE-backed LBO targets. The upsides and downsides of LBOs remain the same to this day. The ongoing debate about their risks and possible benefits has not reached a clear conclusion. While the situation remains so, the PE industry can continue to prove its worth to investors with its incredible returns.

2.2 Target company characteristics

In PE LBOs, the target is usually an already functioning and well-established company. Unlike venture capital which focuses on startups, LBOs are directed toward mature companies with steady cash flows (Baldi, 2015, p. 16). The company acquired can be private or public. Public companies are delisted when acquired. This is done to achieve better control over the company, reduce agency costs, and gain tax savings (Aslan & Kumar, 2011). This way the more concentrated ownership obtained allows for more flexibility when restructuring the company. Aslan & Kumar (2011) report that PE-backed companies going public-to-private achieve considerable performance gains and improve profitability. LBO target companies vary in size, industry, and many other things, but some key features make a good target company. Here are some of them:

1. Mature firm with stable and predictable cash flows. If the PE firm is to acquire a company, it has to be able to predict its financial performance. The cash flow has to be high and stable so that the deleveraging of the company can be executed efficiently (Baldi, 2015, p. 16). Cash flow is usually calculated in standard company performance measure EBITDA, which means Earnings Before Interest, Tax, Deductions, and Amortization (Kaplan & Strömberg, 2009).
2. Prevalence of tangible assets. A Solid asset structure can be used to provide guarantees for bank loans (Baldi, 2015, pp. 16-17).
3. Surplus of assets. A surplus of assets and a prevalence of non-strategic assets are highly valued qualities for an LBO target company (Baldi, 2015, pp. 16-17). They can be sold to generate extra cash flow for deleveraging.
4. Low debt/equity ratio. The core idea of an LBO is to raise a considerable amount of debt. A modest amount of existing leverage in the target company leaves space for the debt raised for the investment (Baldi, 2015, pp. 16-17).
5. Market leader or niche market. The position of the target company should be hard and costly to challenge for competitors (Baldi, 2015, pp. 16-17). This way the core business of the target company can be ensured to be stable for the investment period.

6. Room for significant cost reductions. As LBOs assume a large amount of new debt for the company, all extra cash flow available has to be utilized (Gaughan, 2015, p. 329). Fixing existing inefficiencies might also affect the target company's value positively.

The key characteristics listed are not the only determinants when looking for a suitable target company. The ideal characteristics may vary depending on the PE company in charge of the buyout.

2.3 Stages of the transaction

LBOs are complex processes with many different implementations. This thesis will take a look into the process in general and doesn't cover all the possible variations for LBOs. The capital commitments will come from the PE firm and its business partners. PE firm itself is referred to as a general partner (GP) and the other partners are referred to as the limited partners (LP). The LPs are usually institutional and high-net-worth individual investors (Brown et al., 2021). Most of the capital, around 90%, is provided by the LP, and a small portion, at least 1% by the GP (Kaplan & Strömberg, 2009). GP is responsible for the investment decisions and charges a management fee from the LP (Brown et al., 2021). Together they create a PE fund, which will be the legal entity making the investments. The PE fund then raises debt to meet the cost of each buyout they plan to make. Usually, The PE fund composes a portfolio of multiple buyouts to diversify the risks. The lifespan of a PE fund partnership is usually around ten years or more (Brown et al., 2021).

2.3.1 Identifying the investors and the target companies

The first stage of the process is to identify the investors and get them involved (Baldi, 2015, p. 13). Once the investors have been found, they establish the PE fund and appoint an investment bank, a specialized corporate finance company, for transaction advisory and to perform due diligence on the target company or companies. Due diligence is a careful and comprehensive investigation or audit of a potential investment (Baldi, 2015,

pp. 13-14). The company's value is determined, and the preliminary financial structure of the buyout is planned. After this has been completed, a holding company is created for the transaction.

2.3.2 Acquisition

The second stage involves filling the requirements for rising debt for the transaction (Baldi, 2015, p. 14). This means that due diligence is performed on the parties associated with the investment. The third stage is the buyout itself by the holding company (Baldi, 2015 p. 14). Price negotiations are held between the buyers and sellers. A premium is paid over the actual price of the company. If the target company is public, a premium of 15 to 50 percent is paid over the current stock price (Bargeron et al., 2007; Kaplan, 1989b). Then the target is delisted. In the case of private companies, a premium is also paid, but a valuation of the target has to be done first, as the company is not priced on the stock market. This is usually done by comparing the target to similar companies and how much they are worth. Multiple of EBITDA or net income is commonly used as the basis for valuation and deal pricing (Pignataro, 2013, p. 12). Similar companies from the same industries are valued with similar EBITDA multiples so the value of the target can be derived from them (Pignataro, 2013, p. 15). When the target has been acquired, guarantees are granted to the banks that gave the loans (Baldi, 2015, p. 14). The target company’s shares or assets are used as the guarantees. The target company is sometimes merged with the holding company (Baldi, 2015, pp. 10-12). However, it is not mandatory. The debt obtained at the beginning of the acquisition may now be restructured if more affordable solutions are available (Baldi, 2015, p. 14).

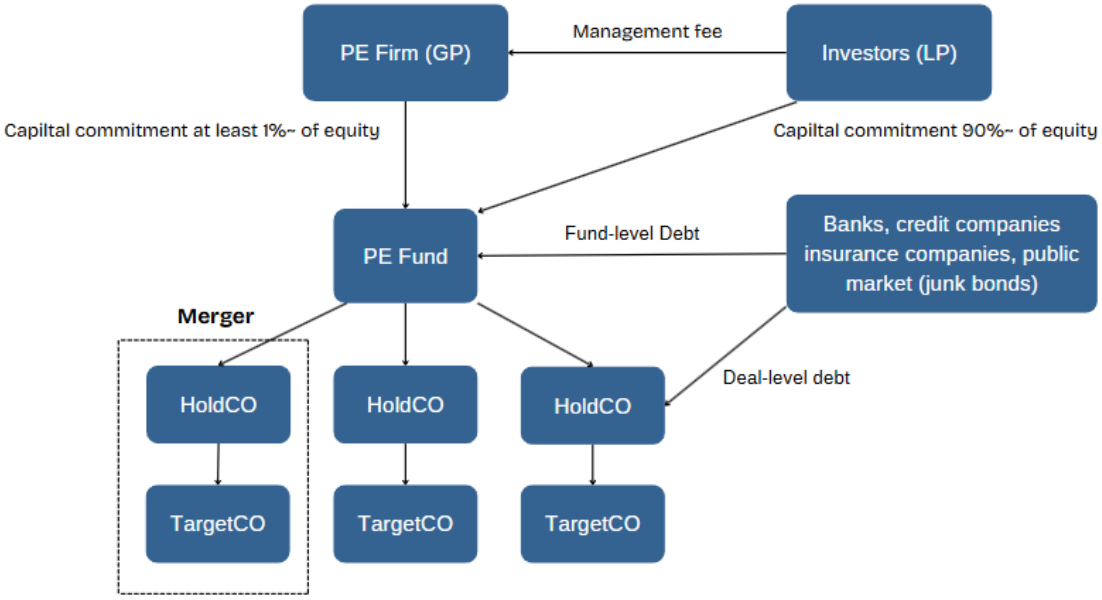

Figure 1. Structure of PE fund.

Based on Baldi (2015, pp. 6-12), Brown et al. (2021), Gaughan (2015, pp. 355-356), Kaplan & Strömberg (2009).

Now that the company is under the PE fund's control, the non-strategic assets of the target may be sold off to generate extra cash flow (Baldi, 2015, p. 11). Illiquid assets may rise as a problem at this point. Another way to generate cash flow with assets for the target company is by establishing a special purpose vehicle (SPV). SPV, described by Brown et al. (2021) is an independent company from the target that is used to raise more debt and generate cash flow with the target company's assets. This is executed by selling off the assets for the SPV. Then assets are used as collateral for additional debt for SPV, which is transferred back to the target company by purchase of assets or other means. Now the target company rents the assets back from the SPV. SPV pays the proceeds back to the target company. This way even the illiquid assets can be turned into extra cash flow. The holding company can also be used as an SPV. A famous example of an SPV is the great buyout bust of TXU corporation from 2007, where the holding company was used as an SPV to achieve legal independence from the PE fund. The holding company was kept independent from the target TXU and no merger was carried out. When the

deal failed, this arrangement kept the financial risk at that particular investment. It excluded the rest of the PE fund from financial responsibility, limiting the downside of the investment when the entity filed for bankruptcy in 2014.

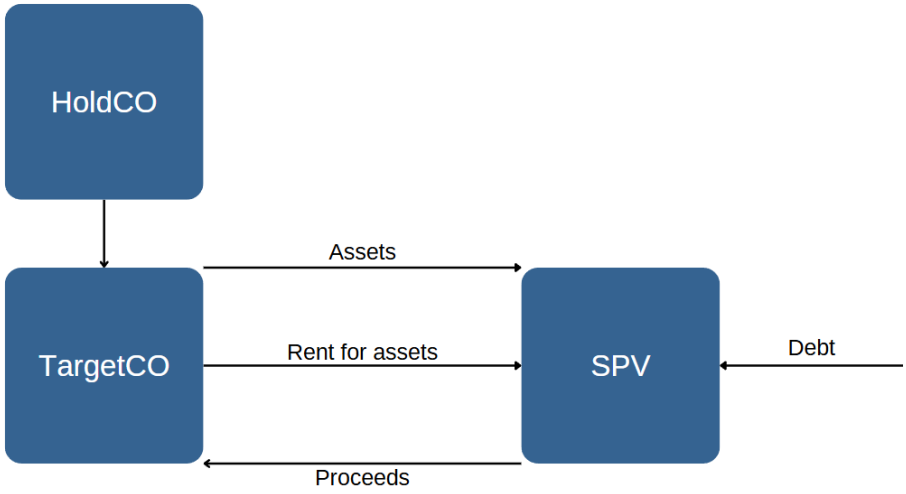

Figure 2. Special purpose vehicle (SPV) separate from the holding company.
Based on Brown et al. (2021).

2.3.3 Holding period

The holding period consists of operational engineering, deleveraging, and overall performance enhancement (Baldi, 2015, pp. 87-95; Pignataro, 2013, pp. 3-4). A new CEO and other management are often appointed (Pignataro, 2013, p. 28). PE firms take a strong role in the boards of their portfolio companies and are more involved in company governance than public company boards are (Kaplan & Strömberg, 2009). Portfolio companies' managements are given large equity upside with options and are required to make a meaningful investment into the company, around 20% combining options and stocks. (Kaplan & Strömberg, 2009). This way the management is aligned with shareholders' goals. Because the company goes private, the management's stocks and options become illiquid until the value is proven at the time of exit. This way the management doesn't have a motive to manipulate short-term performance.

2.3.4 Exit

The median LBO holding period is around 6 years (Kaplan & Strömberg, 2009). When the time of exit comes, the PE fund has roughly four options to realize its profits (Pignataro, 2013, p. 5). Strategic sales are the first option. In this exit opportunity, the business is sold to a company, which gains strategic benefits from the deal. The second option is selling the company to another PE firm. While uncommon, this may occur if the other PE firm has a plan to get the target to the next level. The third option is through an initial public offering (IPO). The last option is dividend recapitalization. In this approach, the capital is returned by dividends, and the target company issues more debt to finance the exit. The ownership structure of the company remains unchanged. When planning an exit, market timing should be carefully considered. PE funds will often try to benefit from changes in industry valuation and other market conditions that could positively affect the investment outcome. If an IPO is conducted, market timing is also very important. IPOs are known for being very dependent on the market timing (Alti, 2005).

2.4 Capital structure

LBO capital structure combines equity, senior debt, and subordinated debt. (Gaughan, 2015, p. 332). The exact amount of certain types of financing is deal-specific. LBOs are typically financed with 60% to 90% of debt and the rest with equity (Kaplan & Strömberg, 2009). Axelson et al. (2009) report that capital structure decisions are made in a way that should maximize the value of the fund. Brown et al. (2021) describe how debt can enter the transaction in many ways. PE company acting as the GP might raise some debt for the investments. The PE fund might raise debt for the investments independent of the portfolio companies' debts. Naturally, the target companies themselves have some debt when acquired.

Senior debt covers around 50%-70% of the capital (Baldi, 2015, p. 40). Senior debt is the highest priority debt in the company's capital structure, and it has the first claim for assets in case of default or liquidation. It consists of loans secured by company assets like

land, plants, or equipment (Gaughan, 2015, p. 333). This provides downside risk protection required by lenders. Around 25%-50% of the total capital is raised this way (Gaughan, 2015, p. 333). A typical term for this debt is 5 to 10 years and the interest rate is around prime plus 2%-3% (Gaughan, 2015, pp. 333-334). The rest of the senior debt is raised with the company's revolving credit (Gaughan, 2015, p. 334). This is debt secured with assets like accounts receivable or inventory. It has a shorter maturity than other senior debt and is slightly more expensive. It can be paid and reborrowed again once it hits maturity continuously.

Subordinated debt is around 15%-30% of the capital (Baldi, 2015, p. 40; Gaughan, 2015, p. 333). This kind of debt ranks below senior debt in case of default or liquidation and so gets repaid after the senior debt has been serviced. This is a wide class of different kinds of securities like high-yield bonds and mezzanine financing. Mezzanine financing is an asset class that combines features of debt and equity. Bonds that are convertible to equity are considered mezzanine financing for example. Subordination means that the senior debt creditors' obligations have to be satisfied first before the subordinated creditors will be considered (Gaughan, 2015, p. 335). The term on these loans is usually longer and the interest higher than in senior loans, around 6 to 10 years, and prime plus 4%-7% (Gaughan, 2015, p. 335). The contract may include equity-linked features like warrants (Gaughan, 2015, p. 335). A very considerable portion of subordinated debt is in the form of high-yield bonds (Gaughan, 2015, p. 335). These so-called junk bonds have poor credit ratings and relatively high interests to compensate for the higher risk.

When the PE fund is raising debt for the investment, covenants associated with subordinated debt and other debt are an important regulating factor. Covenants are control mechanisms that lenders use to protect themselves when the company is underperforming or has financial troubles (Baldi, 2015, p. 40). LBOs undertake a significant debt burden and therefore the debt covenants became an important part of the investment. Covenants used are usually based on keeping certain financial ratios in agreed parameters. Covenants could be about leverage ratio, interest coverage ratio, minimum EBITDA, and

more (Baldi, 2015, pp. 55-56). The covenants are tested periodically, and the company needs to test and report agreed-upon financial ratios and other information to the lenders. If the covenants are breached, they may negatively affect the debt elements, and the lenders might demand extra fees, and the PE fund to raise more equity to fix the problem. The loan might have to be paid off immediately in case of a covenant breach.

Equity covers around 10%-30% of the capital in the investment (Baldi, 2015, p. 40). As previously mentioned, equity enters the investment mostly from the LPs and a small portion from the GP and the company management (Kaplan & Strömberg, 2009). Other possible sources of equity could be subordinated debt lenders and investment banks involved (Gaughan, 2015, p. 333). Axelson et al. (2013) report that the amount of equity used in PE-backed buyouts is minimized to amplify its returns.

2.5 Value Creation

As mentioned, there are three main drivers of value in LBOs: Deleveraging, operational improvements, and multiple expansion (Pignataro, 2013, pp. 3-4). Operational improvements can be narrowed down to improving the net income or EBITDA of the target company. Deleveraging is done using the cash flow from the target company. As the debt gets paid, PE funds equity gets amplified. Operational improvements enhance the business profitability and cash flow. To achieve the planned operational improvements, the PE company usually changes the company management. PE-backed LBOs that had their CEO replaced at the time of the transaction have been reported to generate greater cash flows (Guo et al. 2011) The created extra cash flow can be used for deleveraging.

The multiple expansion is linked to company valuation. In the acquisition phase, the multiple of EBITDA is used to determine an appropriate price for the company. Other valuation measures are also commonly used, but the multiple of net income, EBITDA, or EBIT are usually the main ones (Pignataro, 2013, p. 12). Through operational improvements and governance engineering, the PE firm will try to increase the multiple used in valuation. In other words, the company is made more profitable, functional, and valuable.

Multiple is also compared pricing of similar companies from the same industry. An increase in industry valuation multiple combined with increases in operating performance accounts for 20% of the returns in LBOs (Guo et al. 2011).

Tax savings are also a source of value in LBOs. Interest expenses act as tax shields for the company and effectively eliminate the company's tax liabilities (Opler & Titman, 1993). Kaplan (1989a) finds that tax savings are a solid source of value in LBOs and that the value created by them is around 20%-140% of the premium paid in for the previous shareholders in the investment.

So, in short, company value is often measured with the multiple of EBITDA. The multiple used is taken from similar companies from the same industry. Value is created by improving the target's operational efficiency by increasing EBITDA. Multiple is increased by changes in industry pricing or with operational improvements, making the company considerably more potent than pre-acquisition. Lastly, the company cash flows are used to deleverage the company, amplifying investor's equity. Tax deductibility of interest rates makes the company minimize tax liabilities and this way also creates value by tax savings.

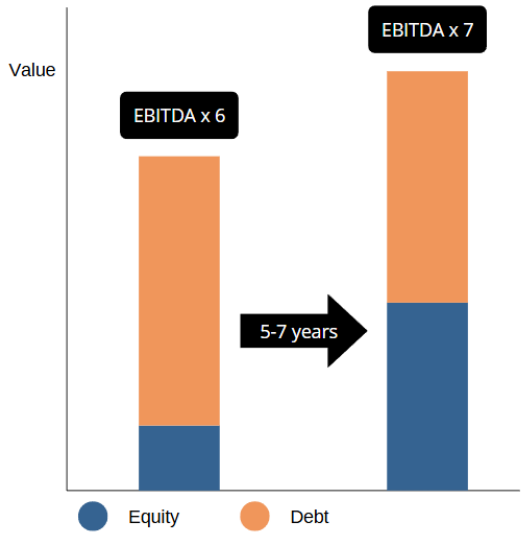

Figure 3. Value creation in LBOs

Based on Kaplan & Strömberg (2009), Pignataro (2013, p. 12).

3 Capital structure theories and LBOs

LBOs are an interesting topic when it comes to capital structure. This chapter focuses on analyzing capital structure theories and how they are applied to LBOs. It is noteworthy that while these theories might help explain the capital structure decisions behind LBOs, they cannot be taken for granted. Axelson et al. (2013) find that the capital structure decisions made by PE firms in the case of LBOs have different determinants than public firms have in general. The theories presented here are the most common ones applied in literature researching LBOs. The theories analyzed reveal the unique characteristics of LBO capital structure compared to public companies. LBOs, on the other hand, offer an opportunity to test the foundations of the theories and explore their flaws.

3.1 Modigliani-Miller theorem

One of the key theories behind LBOs is the irrelevance theory of capital structure. Created by Modigliani and Miller in 1958 it is a backbone of many other capital structure theories as well. Modigliani & Miller (1958) argue that the value of a company is independent of its capital structure. The key idea behind this is the proposition that the company's cost of capital remains unchanged when increasing or decreasing leverage. Equity cost rises when increasing leverage to compensate for the risk associated, but because debt is cheaper than equity, the average cost of capital remains unchanged. An investor can adjust their preferred leverage of investment independently in their portfolio, which leads to the conclusion that the capital structure of a company doesn't add or decrease value. Modigliani & Miller (1958) argue that a company's value is solely determined by its ability to generate cash flow and its riskiness. Later they extended their theory and added the effects of tax benefits associated with debt. Tax shields resulting from the deductibility of interest payments increase company value and so issuing debt can create value in this context (Modigliani & Miller, 1963).

LBOs utilize tax shields and, in this way create value as the theory suggests. Kaplan (1989a) reports that tax benefits are an important part of buyout gains and that they

might explain the premium paid for the ex-shareholders in the transaction. While the theory can explain one aspect regarding LBO debt, it fails to explain the capital structure decisions made in the deal conclusively. Opler & Titman (1993) find that while tax shield motives behind LBO capital structure decisions are clear, it is not the main determinant for leverage used. They report that the amount of debt used in the buyouts is more than needed to eliminate taxes, suggesting the main motives of high leverage are derived from other things like free cash flow. Hence, we need to explore other theories to be able to explain the motives behind the leverage.

3.2 Trade-off theory

The Modigliani-Miller theorem is in fact an influential one. Trade-off theory is based on their work. Kraus & Lizenberger (1973) extend the theorem, creating a theory of their own as an extension of the Modigliani-Miller theorem. This trade-off theory argues that companies balance out the tax benefits of leverage and the risks associated with it, like financial distress and possible bankruptcy. They argue that there is an optimal capital structure that takes into account both the negative and positive aspects of leverage.

This is a fascinating theory regarding this thesis and LBOs in general. Is this balancing really done in LBOs and how much do interest rate fluctuations affect it? The literature points out that the theory is not as easily implemented. Abel (2018) finds many scenarios where the trade-off theory does not apply. He reports that the theory doesn't hold when the company profitability is not high enough, or when the tax rates are very high or low. The most interesting finding in the study is the negative correlation between company profitability and leverage, which means that a high-profitability company's optimal leverage would decrease when profitability rises. This finding suggests that the LBO capital structure does not follow the traditional trade-off theory. While the company is deleveraged and undergoes improvements in profitability during the holding period, it doesn't seem likely that it tries to balance the debt out as described in the theory. This is consistent with the findings of Axelson et al. (2013), who report that theories like the trade-off theory used to explain public companies' capital structures do not apply to LBOs.

3.3 Pecking order theory

Pecking order theory also has practical implications regarding LBOs. The theory is based on the findings of Myers & Majluf (1984) who argue that when companies consider options to finance their new investments, they should first use internal funds and cash flow, then debt as a secondary option, and equity as a last resort. They report that this way the company is using the most affordable possible source of financing and thus is beneficial from the shareholder's perspective.

LBOs are an interesting topic with this theory. This type of buyout reverses the pecking order theory as debt is being used as the primary way of financing the transaction. On the other hand, LBOs do follow the theory by avoiding the usage of equity. Axelson et al. (2013) do report that PE firms use as much leverage as they can to finance the buyouts, suggesting that the pecking order theory does apply. It could be argued that PE investors do not have the cash flow or internal funds to finance projects as big as a portfolio of LBOs, meaning that using the second-best option would be justified by the theory.

3.4 Jensen’s free cash flow theory

Jensen’s free cash flow theory is an essential motivating idea behind LBOs. Jensen (1986) finds that debt may be used as a disciplinary force when it comes to agency problems in corporate governance. When a company has already exhausted all of its profitable investment opportunities, excess cash flow may be used to fund non-value-adding projects that do not benefit the shareholders but benefit the managers of the company (Jensen, 1986). According to the paper managers typically get their bonuses and promotions in a way that encourages achieving extra growth. This happens when the managers get bonuses for increased sales and middle management gets rewarded with promotions when the company grows, which misaligns the management's incentives from shareholders. Jensen (1986) sees the possible solution to be an increase in leverage, which forces the company to allocate a significant portion of its cash flow towards servicing debt rather

than funding non-value-adding projects and this way aligning the management's incentives with shareholders.

In LBOs, this theory has been taken into practice. High leverage forces the target company management to practice financial discipline and focus the free cash flow on the debt repayment schedule. The debt also makes the management focus on the company's key operations and value-creating investments, optimizing operational efficiency.

3.5 Concluding remarks

As we can observe, the theories explained in this thesis only have limited capability to explain the capital structure decisions behind PE LBOs. The theories will be used to give direction to the following literature review exploring interest rates' effects on LBOs. Let's briefly explore the possible problems associated with the theoretical background. Modigliani & Miller (1958) and Kraus & Lizenberger (1973) base their conclusions on assumptions that should be critically addressed. Concepts like perfect capital markets and the rational behavior of market participants are not to be considered a standard. The efficient market hypothesis (EMH) by Fama (1970) could be used to describe some of the assumptions made in the Modigliani-Miller theorem and its extension, the trade-off theory. Fama (1970) argues that markets could be efficient to the extent that prices fully reflect all available information. Fama (1970) identifies three levels of market efficiency. Weak-form efficiency is a state of the market where the prices only reflect past market data. Excess returns can be gained with fundamental analysis, as it identifies future return prospects. As all of the historical data is reflected in the market, technical analysis should not work. The second level is semi-strong efficiency. This level assumes that all available information is reflected in the market prices. Fundamental analysis should not work, as all the legal information is reflected. Only insider information is not included in prices. The last level is strong-form efficiency. At this level, all available information is reflected in the market. Even insider information is reflected, and excess returns cannot be obtained. It is commonly accepted that markets cannot be efficient in the sense of strong- or semi-strong-form efficiency, as even fundamental analysis would be useless

and excess returns impossible to achieve. The idea of efficient markets is at least to some degree flawed, as even technical analysis has been proven to be able to generate excess returns (Neely et al. 1997).

While EMH provides a useful framework to understand the assumptions underlying Modigliani & Miller and trade-off theory, several critiques arise when applying it to PE and LBO decision-making. Private deals certainly can create information asymmetries regarding loans and deal pricing. PE firms have been speculated to benefit from market mispricing of equity and debt (Kaplan & Strömberg, 2009). This is considered to be because of superior information obtained by the PE firms (Kaplan & Strömberg, 2009). Malkiel (2003) argues against EMH by noting that some investors are not as rational as others, and that information asymmetries exist in the market. This same assumption could be applied to PE as it is considered to benefit from market inefficiencies in asset pricing and industry valuation. Therefore, Fama's (1970) EMH doesn't seem to hold, as markets cannot be characterized efficient in the sense of objectively reflecting past or future information correctly.

LBOs are not the only instance in which traditional capital structure theories fail to explain empirical evidence. Strebulaev & Yang (2012) find that firms following the zero-leverage policy in the US have better profitability, pay higher taxes, issue less equity, and have higher cash balances than similar firms of the same industry and size. This is not only puzzling considering the traditional capital structure theories but also considering Jensen's free cash flow theory. PE-backed companies have been seen by literature as a superior organizational form. This finding about zero-leverage companies challenges Jensen's (1986) and other's views of superior efficiency and value creation with debt. Also, it seems like the traditional capital structure theories do not apply to extreme cases when it comes to the usage of leverage.

PE LBO's success seems to be largely determined by market timing. The deals are reported to benefit from mispricing of financing and exits are also carried out as IPOs or

new LBOs, which are both very sensitive to market timing (Alti, 2005; Kaplan & Strömberg, 2009). This leads to the assumption that PE returns might be tied to timing the market correctly. This would explain why the traditional capital structure theories fail to explain PE behavior, as the theories rely on assumptions very much like EMH. Even Jensen's free cash flow theory loses part of its explanatory power over LBOs if the main driver for returns is market timing. The capital structure of an LBO might also have more to do with market timing than the theories. The findings of Strebulaev & Yang (2012) regarding zero-leverage companies also contradict Jensen's theory and further solidify the PE and market inefficiency relationship.

4 Interest rates and LBOs

Interest rates are a tool of the central banks to control the economy. Interest rates issued by central banks serve as the base rate for all commercial banks and this way act as a backbone of their business (Mankiw, 2009, pp. 62-63). This so-called policy rate is a key factor shaping the debt market. LBOs have been broadly studied since their emergence in the 1980s. Previous academic research doesn't seem to have a comprehensive theory or model capable of explaining their capital structure. Axelson et al. (2013) report that the theories used to explain and analyze capital structures of public companies do not fully apply to LBOs. In this chapter, capital structure theories are applied to LBOs and the theoretical effect of interest rates is determined. The results will be compared against empirical evidence and other literature. The chapter concludes with a literature-based simulation where LBO performance during relatively high interest rates is compared to low interest rates.

Policy rates issued by the central banks are usually a countermeasure to rising inflation (Mankiw, 2009, p. 96). Inflation reduces the value of money and therefore affects the debt in LBOs in many ways. Gomes et al. (2016) report that unanticipated inflation lowers the real burden of debt but also may lead to debt overhang that may affect a company's future investments negatively. As the real value of debt decreases, the debt and interest burden in LBOs becomes less valuable. It is important to take this into account when considering rising interest expenses. This can be done by comparing real interest rates against nominal interest rates. To determine real interest rates, one has to calculate it by using the nominal rate and inflation rate, like the consumer price index (CPI) (Mankiw, 2009, p. 32). This can be executed with Fisher's equation (1):

$$i = r + \pi \qquad (1)$$

Where: i = Nominal interest rate, r = Real interest rate and π = Inflation rate.

As LBOs are based on debt, the yield curve is an important factor that needs to be considered. The yield curve visualizes the bond market, where bond yields can be compared by maturity. Bonds with different maturities have different rates. In longer financial models, the 10-year US Treasury bond is often used as the risk-free rate. Shorter models usually go with a 3-month Treasury bill (T-bill). The spread between a 10-year Treasury bond and a T-bill is usually referred to as the slope of the yield curve (Mankiw, 2009, p. 264). The yield curve represents the market's predictions of future interest rates and is therefore an important indicator of the debt market and the whole economy (Mankiw, 2009, p. 264). Normally the short-term rates are lower than long-term rates, as the longer maturity raises the risk of some unexpected happening. If the yield curve is inverted, the long-term yields are lower than they are in the short-term. This is usually a sign of economic troubles and recession. The inverted yield curve signals that markets expect the rates to fall in the future to cope with troubled economic views. LBOs issue high-yield bonds to achieve the desired leverage and debt market conditions impact their ability to secure financing. The yield curve helps to understand current market conditions and may help to identify suitable investment opportunities.

4.1 Applying the theories

According to the irrelevance theory of capital structure by Modigliani & Miller (1958), the company's value is independent of its capital structure. This would imply that the considerable leverage of LBOs should not affect the company value negatively or positively, as a company's cash flows remain unchanged. When the effect of interest rates is considered, the theorem does not include their possible effects. Extensions of the theorem by Modigliani & Miller (1963) and Kraus & Lizenberger (1973) offer a chance to predict the effects of rising or dropping interest rates. Modigliani & Miller (1963) include the tax shields obtained from debt and Kraus & Lizenberger (1973) add the possibility of bankruptcy costs to the theory. Now looking at the LBOs, we can put these two into practice. An increase in interest rate expenses would also mean an increase in tax shields, which according to Modigliani & Miller (1963) is beneficial for the company at least to some extent. Of course, the benefit of tax savings becomes somewhat irrelevant after

the company's taxes are completely eliminated. Suggesting that relatively high interest rates limit the theoretical optimal debt. Dropping interest rates, on the other hand, could offer a possibility to increase the amount of leverage to achieve similar tax shields as during higher interest rates. Kraus & Lizenberger (1973) argue that a company's optimal leverage ratio also takes into account the costs of a possible bankruptcy. If this theory is applied to LBOs, we can quite safely say that the optimal leverage of the investment should be considerably less than we see in reality. Now if the impact of interest rates is considered, the result would be roughly the same as the application of Modigliani & Miller (1963). This is because the leverage needed to eliminate taxes requires less debt during high interest rates and more debt during low interest rates.

The pecking order theory by Myers & Majluf (1984) has a lot of explanatory power in LBOs. PE funds prefer to minimize equity and maximize the use of debt to amplify equity returns. The theory could be extended to different types of debt used in the investments. To maximize the use of debt and minimize the use of equity, the debt with the least similarity to equity should be preferred. This means that senior loans and revolving credit should be first maximized, and only after that should the company consider subordinated debt and mezzanine financing with equity features. Now when the effects of interest rates are considered through the pecking order theory, the trend seems to be the same as in previous theories covered. As the interest rates hike, raising debt could become more difficult and therefore the usage of equity has to be increased, even though it is not preferred by the theory nor the PE investors. In a low-interest rate environment, debt financing can be used more. Basically, in any environment, debt financing in any of its forms should be maximized by the theory.

Free cash flow theory by Jensen (1986) describes high leverage as an optimal way to align company management’s interests with the shareholders. Debt servicing will impose financial discipline and curb agency costs. Different interest rate environments will most likely have a minimal effect on the theoretical benefits described by Jensen (1986). This is because debt servicing will be a significant burden to the company in all

environments, as PE funds often maximize the amount of leverage used. The interest rate environment will probably determine the magnitude of value creation with deleveraging, as free cash flow used to pay interest cannot be used to pay down the debt burden. Jensen (1986) argues that the disciplinary effect of debt makes management focus on value-maximizing projects. This increased focus on value and efficiency could also contribute to operational improvements in the company. Thus, a conclusion can be drawn, that a low-interest-rate environment will not necessarily affect the capital structure of an LBO according to Jensen (1986), as long as the debt imposes enough discipline to allocate excess cash flow to value creation with debt. In a high-interest rate environment, the value creation with debt becomes harder due to increased interest expenses, but the disciplinary effect of debt described by Jensen (1986) will remain and create value with operational improvements.

4.2 Theory versus Practice

The theoretical framework helps to understand the relationship between LBOs and interest rates, but as already mentioned, it does not offer a comprehensive explanation of capital structure decisions made by PE funds in LBOs. The theories analyzed predict that a hike in interest rates will ultimately lower the leverage ratio of an LBO investment and shift its focus of value creation towards operational improvements and that a lowering interest trend will increase the leverage ratio and amplify the value creation with deleveraging. Debt is preferred as a source of financing in all situations and equity and equity like financing is minimized, if possible. Now the theory-based prediction will be put to the test.

Debt enters LBOs in many ways. As we already know, PE funds can get very creative to raise as much debt as possible. Axelson et al. (2013) state that PE companies report to take as much debt as they can. Their empirical findings support this claim. They argue that buyout leverage is heavily influenced by market conditions and their ability to raise debt. This debt market dependence of LBOs makes them sensitive to interest rate fluctuations.

As mentioned in the theory section, LBOs are not easily explained with traditional capital structure theories. This is most likely because theories like the irrelevance of capital structure and the trade-off theory rely on assumptions of perfect capital markets and rational market behavior. PE seems to exploit mispricing in the debt markets and companies (Kaplan & Strömberg, 2009). Axelson et al. (2008) find that LBO deal pricing has a negative correlation to interest rates. This implies that LBO deal valuation is sensitive to interest rates, which could suggest that sudden changes in them might cause PE funds to overpay or underpay for investments.

Kaplan & Strömberg (2009) suggest that PE firms arbitrage the debt market when the cost of borrowing is relatively cheap compared to the price of equity and the risk involved. They argue that PE firms are capable of creating value only by borrowing in conditions where the debt is too cheap. They also find the relationship between the high-yield bond market and LBO activity, as they measure the difference between S&P 500 companies' earnings yields against the high-yield bond market rates. When earnings yields are greater than high-yield bond rates, LBO activity tends to historically increase and decrease after the earnings yields drop. This finding supports the relationship between high-yield bond markets and LBO activity described in other literature.

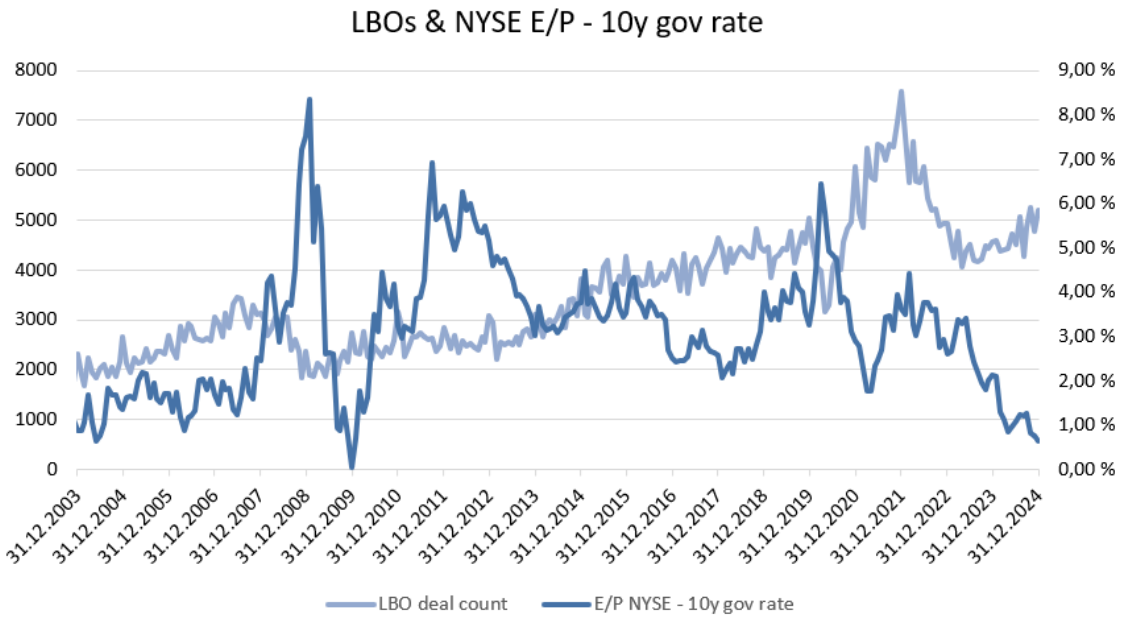

Figure 4. LBOs & NYSE E/P – 10y gov Rate.

Based on Bloomberg (2025b; 2025c; 2025d)

Figure 4 illustrates the relationship between earnings yields, interest rates, and LBOs. The so-called “LBO carry” is calculated by deducting the 10-year government bond rate from the NYSE E/P ratio. Rising earnings yield relative to risk-free rate should make LBOs a more interesting investment opportunity, and a decline in it makes them less available. The LBO activity has a clear relationship with the E/P ratio relative to the risk-free rate, but it is clear that this is not the only determinant of it. LBO activity seems to continue rather steadily even if the market is not favorable. This could be due to agency reasons associated with management fees. The LBO activity follows the “LBO carry” rate with a small delay, as the establishment of a PE deal takes some time and there has to be a sufficient amount of interested investors. Kaplan & Schoar (2005) find that the cyclical nature of PE activity might be caused by the positive market-adjusted returns that lure more investors in even when the suitable market conditions deteriorate. This makes PE funds generate worse returns and investors are driven away until the market seems favorable again. This most likely causes the delay seen in Figure 4. The relationship is easily observed between the years 2020 and 2023.

Kaplan & Strömberg (2009) also find that after the buyout wave of the 1980s, banks demanded a greater EBITDA to interest expense ratio from PE funds. They point out that the first LBO wave might have had too loose credit conditions, leading to higher leverage ratios than during later waves. This demand by banks has historically lowered leverage, and a rise or drop in interest rate expenses might determine the deal's success. Rising interest rates will therefore limit the availability of debt as the interest expenses rise relative to EBITDA. Lowering rates will increase the amount of debt available.

Brinkhuis & De Maeseneire (2012) study the relationship between the debt market and LBO activity and find that they are heavily related. They report that, unlike public firms, LBOs' capital structure is not determined by traditional theories, but by debt market conditions and liquidity. This supports the findings of Kaplan & Strömberg (2009) and Axelson et al. (2013) and further solidifies the clear impact of debt market conditions on LBOs. Brinkhuis & De Maeseneire (2012) also find an interesting connection between PE companies' reputation and leverage ratio, as they find that PE companies with better reputations usually conduct LBOs with higher leverage ratios than PE companies with less reputation. They state that high-reputation PE sponsors are more capable of raising debt than less established players in the market. A similar effect is discovered by Fang et al. (2013). They find that banks involved in PE themselves have better financing terms in their in-house deals than stand-alone deals or bank-affiliated deals have. A good target-bank relationship is seen to achieve better financing terms. This is because of better information, less information asymmetries, and the trust bank has over the target. This would suggest that interest rates affect these types of deals less in all environments, while this lacks empirical evidence.

In conclusion, the literature seems to agree that capital structure decisions behind LBOs are not determined by costs of financial distress, tax shields, or even the cost of financing. LBO activity seems to be determined by the availability of debt and possible mispricing of debt in the market. High stock market earnings relative to interest rates also appear

to fuel LBO activity, suggesting that market timing is an essential factor behind successful investment.

4.3 High-yield bonds

Axelson et al. (2013) report that LBOs rely on high-yield bond markets for successful financing. This is easily understood, as only a limited amount of asset-secured debt can be raised. As debt is a considerable driver of LBO returns, lower leverage might affect the deal returns negatively, which could make PE investors choose other investment opportunities. To understand the interest rate sensitivity of LBOs, we need to understand their effect on the high-yield bond market.

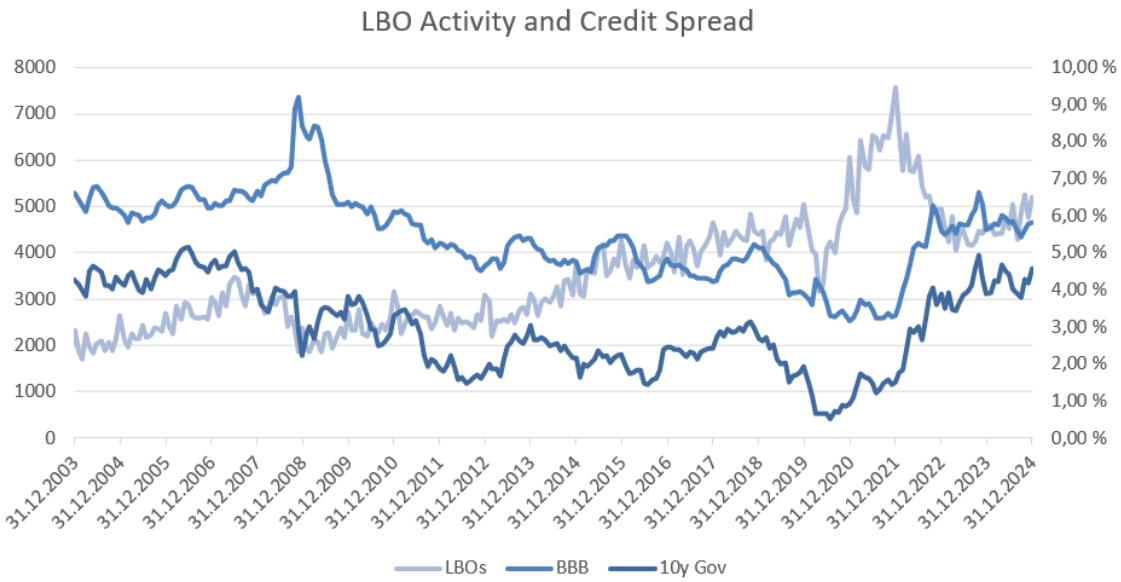

Figure 5. LBO Activity and Credit Spread.

Bloomberg (2025a; 2025c; 2025d).

As high-yield bond pricing is heavily affected by their liquidity- and credit risk premiums, the nominal interest rates have a less dramatic effect on them. Huang et al. (2023) observe this effect in practice when comparing high-yield bond funds to investment-grade bond funds. In their study, they find that investment-grade bonds are more sensitive to nominal interest rate changes compared to high-yield bonds. This is because the interest

rate risk is a bigger factor in investment-grade bonds. High-yield bonds, on the other hand, are more heavily influenced by credit risk conditions. Longstaff et al. (2005) find that even the most reliable investment-grade corporate bonds are heavily influenced by credit risk factors, which explains around 50% of the corporate yield spread. High-yield bonds obtain a considerably higher credit risk, so their pricing is based mostly on the credit risk.

Figure 5 illustrates credit spreads' influence on LBO activity. It has Moody's BBB-rated corporate bonds, 10-year government bond rate, and LBO activity combined. The closer the 10-year bond and BBB bonds are to each other, the better the conditions for an LBO as credit spreads are generally low. If the bonds drift away from each other, the conditions worsen for LBOs. The LBO boom after 2020 seems to be fueled at least partially by historically low interest rates.

Another component explaining the spread is liquidity. High-yield bonds are generally seen as high credit risk and low liquidity options in the bond market. When uncertainty arises in the market, investors usually try to move towards more secure assets. This so-called flight-to-safety reaction can be narrowed down to flight-to-quality meaning a shift towards credit-worthier assets and flight-to-liquidity meaning a shift towards more liquid assets. Longstaff et al. (2005) name credit and liquidity risk factors as the main determinants for corporate bond spreads. Beber et al. (2009) study the Euro-area bond market in order to determine the effects of liquidity and credit risk on it. They find that investors demand both liquidity and credit quality during market uncertainty. They also find that liquidity best determines the large cash flows in and out of the bond market. During times of market stress, investors chase liquidity, not credit quality.

High-yield bonds associated with LBOs usually have poor liquidity which could affect PE fund's ability to raise debt during times of market uncertainty. Interest rates may have their role to play in creating market uncertainty. Credit spreads can be used as an indicator of market uncertainty, as they describe the risk premium required by the investors

compared to risk-free assets. Interest rates have been reported to have a negative correlation with credit spreads (Duffee, 1998). Chen et al. (2011) also find that interest rates have predictive power over future credit market conditions. As the short-term interest rates hike, short-term credit spreads get smaller, because markets see moderate hikes in interest rates as a sign of stability. They also find that a hike in short-term rates will also narrow the credit spread in long maturities. On the other hand, Chen et al. (2011) find that a hike in long-term interest rates does increase the long-term credit spread, as it also raises concerns of increased default risk. Otherwise, their findings go according to Duffee's (1998). The findings show that interest rates play a role in determining market expectations and this way regulating the debt financing available for LBOs.

Bond optionality should also be considered when exploring the interest rate sensitivity of high-yield bonds. High-yield bonds often have embedded options associated with them. These options can be categorized into call and put options. Call options allow the bond issuer to buy the bond back at a predetermined price, and put options allow the bondholder to sell the bond back to the issuer at a predetermined price. Bonds may include certain terms regarding exercising the options. These may include protective periods that restrict the option usage. Kihn (1994) finds that compared to investment-grade bonds, high-yield bonds are significantly less sensitive to stock market risks and bond market risks, including interest rates. This is due to the shorter duration of high-yield bonds and the effect of the embedded options. High-yield bonds often have both call and put options written into them. These options lower the volatility of the bonds and make them less sensitive to interest rate fluctuations. Lowering rates will increase the price of the bond, and the issuer will most likely exercise their call option as soon as it is financially beneficial. A hike in interest rates will decrease the price of the bond. This will trigger the bondholder to exercise their put option in the pursuit of higher returns. The evidence by Kihn (1994) shows that interest rates do not affect high-yield bond prices considerably, as the embedded options will be exercised at the earliest opportunity. Call options embedded into bonds will help the PE fund lower the interest rate burden of LBOs during declining interest rates. On the other hand, the put options might put the

target company in minor distress, as it has to buy the bond back during rising interest rates. Overall, the embedded options in high-yield bonds make them more secure assets during market movements and make them, therefore, more available for LBOs.

Convertible bonds should also be reviewed, as they often exist as part of the financing package of LBOs. Convertible bonds include an equity call option for the bondholder that allows them to convert the bond to a predetermined amount of shares of the issuer. Convertible bonds often include embedded call and put options alongside the equity feature. Kihn (1996) compares high-yield bonds with embedded options to convertible high-yield bonds. Convertible bonds are reported to act very much like bonds with just embedded options. The difference between these two bond types is still reported to exist, as convertible bonds are more sensitive to the stock market risk and less sensitive to the bond market risk. In other words, convertible bonds act more like equity than regular high-yield bonds. Convertibility might bring additional advantages as successful LBOs upscale the target company value considerably. If the target company equity will most likely generate better returns than the bond itself, the bondholder may be more likely to exercise the equity call. Kihn (1996) reports that during declining interest rates, convertible bonds generate positive abnormal returns compared to normal high-yield bonds. This effect is observed during the interest rate call period, which means that the bond issuer cannot yet buy back the bond. Otherwise, the convertible bonds seem to act like regular high-yield bonds. This supports the findings that lowering interest rates creates more optimal conditions for an LBO. If investors expect the interest rates to fall, investing in convertible bonds of an LBO is more appealing.

4.4 Boom-and-bust cycles

Literature has observed that LBO activity tends to have boom-and-bust cycles. This odd phenomenon is clearly visible, yet it doesn’t seem to have a clear explanation. The literature agrees that it most likely has something to do with the availability of debt financing.

Kaplan & Strömberg (2009) argue that PE boom and bust cycles are driven by interest rates relative to earnings and stock market values. They report that just before the financial crisis in 2007 to mid-2008 interest rates on buyout-related debt rose considerably if the debt was available at all. In this setting, PE activity has decreased substantially, especially with big buyouts. They argue that while debt markets are unfavorable, PE firms still keep getting commitments from investors, which creates pressure to make investments, as PE funds are unlikely to return the invested capital due to agency reasons associated with management fees.

The deals made during a more favorable interest environment were heavily based on arbitrating the debt market and a rise in interest rates closes this opportunity. As the PE returns decline due to failed investments, the capital commitments from investors also decline (Kaplan & Schoar, 2005; Kaplan & Strömberg, 2009). This speculation supports the conclusion of Axelson et al. (2013) about LBO activity's relationship to the debt market and high-yield bonds. Without affordable or available debt, PE returns seem to lag behind. This causes investors to choose other investment opportunities until the returns rise again, finalizing the boom-and-bust cycle of LBOs.

Axelson et al. (2008) raise the question, of why the availability of financing varies so much over time. They speculate that hedge fund activity might be one of the factors affecting PE fund's ability to raise debt. That is because hedge funds have incentives to invest their capital in yields higher than riskless rates for agency reasons. Another speculation by them is that the availability of financing could also represent an efficient allocation. Market uncertainty is definitely one of the factors behind the availability of financing, as covered in the earlier chapter.

Axelson et al. (2009) come into the conclusion that LBO activity has a negative relationship to real interest rates and credit spreads. This supports the findings of Axelson et al. (2008) and Kaplan & Strömberg (2009). In order to determine LBO activity, the

availability of debt and macroeconomic conditions like inflation and nominal interest rates need to be analyzed first.

Fang et al. (2013) discover that banks' in-house deals have better financing terms compared to other kinds of deals. While these deals do not necessarily carry better outcomes, they seem to be very well-timed with the prevailing credit conditions in the market. The better financing terms seem to be the result of banks' ability to time the credit market, rather than better incentive alignment in bank in-house deals. In these kinds of deals the banks retain the lowest amount of the loans and so the risks themselves. The banks' ability to time the credit market really well seems to be the main driver for better financing terms. Timing the market seems to be once again the main reason for the cyclical nature of LBOs. Interest rates' role in this scenario would be to act as an indicator of market stability accompanied by the yield curve.

The cyclical nature of PE LBOs is closely linked to PE companies trying to time the market as the returns of the deals heavily rely on favorable market timing. Cao (2011) finds that PE funds tend to shorten the period they restructure the target company privately, if industry valuation and IPO market conditions are favorable. During favorable market conditions, PE funds may even perform very short-term "flip" LBOs to benefit from changes in IPO and general valuation of the company. According to the study, market conditions determine the timing of the IPO, but don't always conclude the relationship between the PE fund and the target company, as the PE sponsor will often continue their strong presence in the company post-early IPO. Exit is usually delayed with companies with high cash flows and strong fundamentals and market conditions. This compliments the other findings regarding LBOs' relationship to market timing.

4.5 High interest rates

Now that the key literature has been reviewed, the effects of interest rate fluctuations will be briefly covered to conclude the analysis. The effects of high and low-interest rate environments according to the literature are compared.

The most common capital structure theories fail to accurately predict LBO activity's relationship to interest rate environments. Axelson et al. (2013) report that PE companies use as much leverage as possible and rely on high-yield bond markets to finalize the capital structure. Kaplan & Strömberg (2009) investigate the same relationship between high-yield bonds and LBOs and find a relationship between companies' earnings yields and high-yield rates. A rise in policy rates will not determine LBO activity by itself, as high-yield bond markets are more reliant on market credit conditions (Hunag et al. 2023; Longstaff et al. 2005). High-yield bonds are also known to be less liquid in the bond market because of their high-risk profile. Rising market uncertainty will drive investors away from high-yield bonds. So-called flight-to-liquidity is reported to happen in the bond market by Beber et al. (2009). A moderate and expected rise in policy rates will most likely not affect LBO activity, as the credit market often sees it as a sign of stability (Chen et al. 2011). An unexpected and radical hike in policy rates will most likely lower the credit spread in shorter maturities but increase them in longer maturities and this way make the bond market less open to high-yield bonds from LBOs, making the investments less successful. LBO investment horizon is usually 5 to 7 and the bonds issued for them could be considered to be long term. If bonds with shorter maturities are used for some reason, they should be more accessible during an interest rate hike. Still, LBOs should keep their position as an interesting investment opportunity as long as the high-yield bond yields do not exceed the operating yields of the stock market companies, as this has been found to decrease LBO activity. Policy rates do not affect this much, because high-yield bond rates mostly consist of liquidity and credit premiums, but as we reviewed, policy rates have the power to shape the premiums.

While the high-yield bond market is crucial to LBO's success, other perspectives on rising interest rates have to be taken into account. Rising interest rates will limit the amount of debt available from banks, as they demand an EBITDA to interest expenses ratio to be high enough to withstand possible financial troubles (Kaplan & Strömberg, 2009). This will affect PE companies differently based on their relationship with banks and their

presence in the PE market, as well-established PE companies and bank's own PE sectors can obtain superior financing terms (Brinkhuis & De Maeseneire, 2012; Fang et al. 2013).

Axelson et al. (2009) predict with their model that real interest rates and credit spreads would have a negative relationship to LBO activity. Rising nominal interest rates will most likely lower the credit spread as mentioned before. Real interest rates take into account nominal rates and inflation rates. To predict the effect of an interest rate hike on LBOs, we also need to analyze the inflation.

Rising interest rates will also make the target company bondholders more likely to exercise their put options, as rising rates will make the existing bonds less attractive. This might cause some problems in the target company, as the capital for bondholder compensation has to be put together. Issuing a new bond will also be costly due to higher rates. On the other hand, if the company can afford to buy back the bond, it will delever age the company and amplify equity. Bondholders with convertible bonds might also exercise their put options if they cannot see the LBO to be hugely successful.

In conclusion, a hike in interest rates will most likely decrease LBO activity and lower the amount of leverage in the deals, as debt becomes less available.

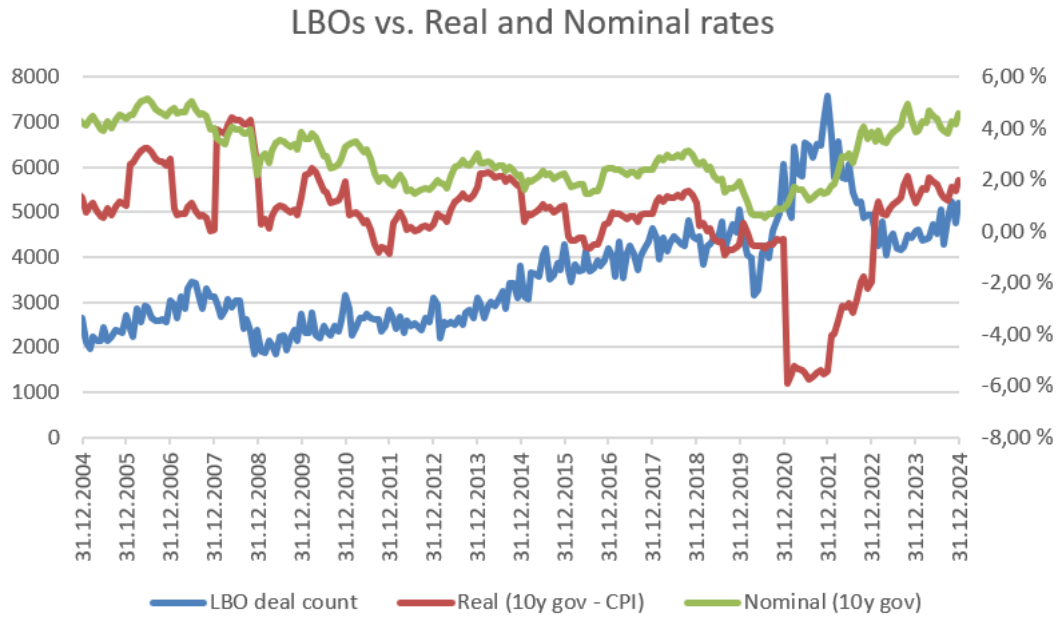

Figure 6. LBOs vs. Real and Nominal rates.

Bloomberg (2025c; 2025d), Federal Reserve Bank of St. Louis (2025).

Figure 6 illustrates the relationship between interest rates and LBOs. Real interest rates are calculated by deducting the inflation percentage from the 10-year treasury yield. Nominal interest rates and LBOs seem to have only little explanatory power when it comes to LBO activity. However, the same effect observed in Figure 5 can be identified in the 2020 boom. The real interest rates also highlight the same period, as inflation rates peaked starting from 2021. This evidence supports the conclusion of the literature review that a hike in interest rates will suppress LBO activity.

4.6 Low interest rates

Lowering interest rates will increase credit spreads if the market sees them as a sign of uncertainty (Chen et al. 2011; Duffee 1998). This might trigger a flight-to-safety and more specifically flight-to-liquidity reaction in the bond market that can make raising debt for LBOs more difficult (Beber et al. 2009). In general, unexpectedly dropping interest rates will widen the credit spreads and make the debt from high-yield bonds more expensive in the short term. An expected decline in interest rates will most likely make the market

expect lower rates in the future. This would not affect the short-term credit spreads considerably, but it might lower the credit spread in the long maturities. If long-term interest rates decline, LBO activity will be boosted. This doesn't seem to happen during an unexpected decline in interest rates, as credit spreads have a negative correlation to interest rates (Duffee, 1998). Still, the effect seems to be positive for LBO activity, as long as the high-yield bonds are available for them. Market uncertainty will be concluded by the time a possible rise in interest rates comes and lowers the long-term credit spreads in the bond market (Chen et al. 2011).

On the other hand, debt from banks may be easier to raise during lower interest rates, as the EBITDA to interest expenses allows for a greater debt burden (Kaplan & Strömberg, 2009). As LBO activity has a negative correlation to real interest rates and credit spreads, the inflation aspect should also be considered (Axelson et al. 2009).

A decline in interest rates will make exercising the call options of target companies' bonds more attractive, as new bonds may be issued at a lower cost. LBO deals done during declining interest rates or expectations of lowering interest rates will be easier to finance with bonds. This is because bond investors can expect convertible bonds to be a highly successful investment in this setting (Kihn, 1996).

Figure 6 already provided some evidence that a decline in nominal interest rates may affect LBO activity. A decline in real interest rate, on the other hand, seems to perfectly match the timing of the 2020 LBO boom. This supports the findings of the literature review, although more comprehensive research should be done with a broader data set.

In conclusion, LBO activity tends to be boosted during lower interest rates. High-yield bond availability in this scenario depends on the overall market situation. An unexpected lowering of rates is often seen as a sign of market uncertainty and this might drive investors away from risky high-yield bonds. This highlights the overall credit market conditions effect on LBOs. Interest rates are just part of the solution.

It is noteworthy that the nominal interest rate itself is a poor determinant of overall market conditions for LBO activity. Literature seems to mostly agree that the main determinant of LBO activity and success is the ability to time the market and more specifically the credit market. Interest rate effects therefore need to be added to the context of overall market conditions to understand their implications for LBO activity.

5 Conclusions

This thesis aims to shed light on the interest rates effects on LBO capital structure decisions and investment outcomes. This is conducted by reviewing current literature regarding the topic and comparing the most commonly used capital structure theories against empirical findings. The thesis highlights that this area of PE should be researched more, as the literature doesn't seem to have a clear understanding of LBO capital structure determinants and interest rate effects on the investment. Reviewing the literature reveals that LBOs do not seem to be hugely affected by interest rate policy itself, but market conditions seem to be the key factor in determining LBO success. The riskier the market is perceived; the less LBOs will be conducted.

In this thesis, general LBO characteristics were reviewed and their strong dependence on debt financing is covered. The most common capital structure theories were covered in order to understand their relationship with LBOs. The theories did not have a comprehensive ability to explain decisions behind LBO capital structures. This was most likely due to inconsistencies and unrealistic expectations included in the theories. After that, the basic elements of interest rates are reviewed. Theories discussed earlier are applied to the fluctuations of interest rates and compared to the empirical evidence and speculation of current literature. The effects of interest rates are demonstrated by summarizing the literature-backed effects during low and high interest rates.

The research questions Q1, Q2, and hypothesis H1 were reviewed extensively. They are as follows:

Q1: How do interest rates affect the capital structure and overall investment opportunities in private equity leveraged buyouts?

H1: The private equity leveraged buyouts are cyclical at least partially because of the interest rates.

Q2: How is the capital structure of a leveraged buyout determined?

This thesis finds that LBO capital structure is determined by the PE fund's ability to raise debt, as leverage is used as extensively as possible. The slight decline in LBO leverage ratios observed after the wave of the 1980s is explained by banks' tightened credit policy, not leverage optimization by the PE funds. Traditional capital structure theories have no comprehensive explanatory power over LBOs but do help to understand the decision-making involved in the investments. These theories mostly fail to explain LBOs because of their expectations of perfect capital markets, which don't take into account the cycles of optimal credit conditions among other things. The cyclical nature of LBO activity is closely linked to debt market credit conditions and liquidity. To reach the highest possible leverage ratio, PE funds rely on high-yield bond markets for financing. LBO activity flourishes as long as the earnings ratio of companies in the market is higher than high-yield bond yields. If the bond yields outperform the market companies, LBO activity tends to reduce. This thesis finds that interest rates are not an optimal determinant of LBO activity, as they are only a part of the explanatory determinants behind the whole market conditions. According to the literature, the most influential determinant of LBO activity is credit market conditions. The credit market conditions also largely determine the leverage ratio. Empirical evidence suggests that market timing in general is important in LBO success. Interest rates shape the debt market and credit conditions, but other factors, such as inflation and the overall market situation need to be included in the analysis as well.

The idea behind Hypothesis H1 is correct, as interest rates are clearly a part of the factors determining LBO's success. The importance of market timing is also highlighted by the literature and empirical evidence. On the other hand, it doesn't take credit market conditions into account. Literature proves that timing the credit market and the overall market is one of the key LBO activity determinants. LBOs seem to flourish during low interest rates and reliable market conditions. A hike in the interest rates is not a considerable problem, as long as the credit market is stable and confident. Literature and empirical

evidence point out that timing the market is one of the key foundations behind PE activity. This would suggest that PE returns are closely linked to exploiting market inefficiencies.

The findings of the thesis are relevant to the PE industry. The PE company managers need to be well aware of the market environment. This thesis finds that PE managers should not focus on interest rates alone but on market stability and monetary policy as a whole. Understanding the key relationship between the high-yield bond market and successful LBO activity is crucial to thrive in the PE industry. The PE sectors of banks have had an advantage in the form of better financing terms in the PE market, because of their ability to time the credit market. This means that PE companies should focus on analyzing the market more effectively and enhance their ability to recognize market cycles and optimal credit conditions. A careful monitoring of the high-yield bond market is also beneficial.

Future research should be conducted regarding the market timing of LBOs and other possible indicators of a favorable LBO investment opportunity should be identified. While it is clear that LBO capital structure can’t be determined by traditional theories, this aspect of the investments should be studied more. Furthermore, capital structures of LBOs should be more carefully studied to determine if there is an optimal structure of leverage that takes into account the macroeconomic conditions, market conditions, and target company characteristics.

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