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An Empirical Analysis of the Leverage and Pricing in Nordic Buyouts

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Abstract

There exist numerous theories about which factors that determine the capital structure of public companies. However, before Axelson et al. (2009) set out to analyse the financial structure of leveraged buyouts, little to none empirical evidence existed about what drove the capital structure used in Private Equity transactions. Axelson et al. (2009) focused on US and European Leveraged Buyout Deals, and among their discoveries were geographic differences which motivated this paper to focus on Nordic Leveraged Buyout Deals specifically. After constructing a comprehensive deal value data set of Nordic Leveraged Buyout Deals, I find that there is no correlation between the pricing of Nordic public companies and Nordic LBOs between 1997 - 2016. None of the macroeconomic factors used in this analysis succeeds to explain this relationship, but the level to which an LBO deal is levered is found to be positively correlated to its deal value – which is not the case for the comparable public companies. Based on bi – and multivariate regressions, I find evidence pointing towards the general market trend explaining the dissimilar relation to leverage proxied by are EURIBOR, OMX Helsinki, and Norwegian inflation, with PE managers increasing their leverage as the market is in long-term up-trend, while the comparable public companies simultaneously decrease their leverage. However, further research is necessary to look further into this statement, since the only statistical analyses that has been run are regressions – with insignificant results. Leverage is defined as total debt to EBITDA. Like the conclusion in other papers studying the same topic, the results in this paper confirms that the leverage in Nordic LBOs are not explained by the market-timing theory.

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I Introduction

For several decades, academics have studied the determinants behind public companies` capital structure. In turn, numerous theories have been developed, of which many differs greatly (e.g. The Trade-Off Theory (Modigliani and Miller 1985); Pecking Order (Myers 1984); Market Timing Theory (Baker and Wurgler 2009)). Graham and Harvey (2001) approached the issue by simply interviewing multiple CFOs in Fortune 500 companies, and identified and ranked the six most common factors the respective CFOs used when determining the debt policy. However, even after Graham and Harvey`s paper, new research has emerged that is pointing towards more factors, e.g. path dependence (e.g. Baker and Wurgler (2002)) and different behavioural determinants (e.g. Barros and Silveira (2007)). Despite the differences in methodology and disagreements in their conclusions, all these research papers have one thing in common: they all analyse public companies. One of the reasons for the traditional focus on public companies is the availability of data, and the notion that they work as a proxy for private companies.

The Private Equity (PE) industry has grown to become a significant proportion of all M&A activity and represented 23.9% of the global M&As in Q1 2017 (Bloomberg Finance, 2017). Private Equity recently became acknowledged as an asset class, and PE funds have harvested on the trend amongst investors to allocate increasingly large proportions of their portfolios toward alternative investments (Preqin 2016). Of the 460 institutional investors that participated in Preqin´s (2016) in-debt interviews for the 2016 Alternative Investments Outlook, 52% said they planned to increase their long-term allocation to Private Equity – and only 6% planned a decrease. These are not surprising numbers since the same report finds that the PE return is in line with or exceeds investors' expectations in 94% of the cases. However, despite their popularity, PE funds still operate with a large degree of secrecy, which combined with the fee structure has resulted in several incidents of the industry being scrutinised in the media. But with regulations differing largely from countries and regions, their practice and reputations are also unlike. As an example, recent research shows that PE-backed SMBs creates more value and workplaces than public SMBs in Norway (Finansavisen 2016). The former has

contributed to a revenue growth of 17.3% and a 14.0% increase in workplaces, while the latter is noticeably behind with an 11.3% and 4.3% growth in revenue and workplaces respectively (Finansavisen 2016). Private Equity is in other words of great importance and interest for Norway and the rest of the Nordic countries, and understanding the industry's practice and approach to active private investments is therefore important for the public, the governmental institutes whose job it is to regulate them, and the institutional investors increasing their allocation to the asset and that represents tens of thousands of savers and future pensioners.

PE is usually split into two separate groups: Venture Capital (VC) and Leveraged Buyouts (LBOs), but as we will see more sub classes has emerged the later years. Since LBOs constituted of approximately 92% of the Nordic PE industry regarding the amount invested in 2015, it is consequently the largest value creator and will, therefore, be in the focus of this paper (Argentum 2016). LBO investment companies, whose strategy is to take majority positions in mature companies, normally do so by financing the bulk of the deal with debt. In the sample used in this analysis, the debt on average financed 85% of the total deal value. Other research papers focusing on the US and European deals observed debt proportions around 75% (Axelson et al. 2012).

To better understand the financial structure of LBO transactions, Axelson, Jenkinson, Strömbert, and Weisbach (2009) constructed a database of US and European deals performed between 1997 and 2007. Next, they performed detailed time series and cross-sectional analysis on the capital structure and its determinants in LBOs and comparable public companies. They found no relationship between the use of debt in public companies and LBOs, and the factors found to explain leverage in public companies had no explanatory power over the level of which buyouts was levered. Their findings consequently contradict traditional capital structure theories such as the Modigliani and Miller analysis. They also unveil that leverage has a large impact on the LBO deal values, and the lower the cost of debt – the higher the deal values. In general, they confirm the statements of several PE practitioners: they want to finance their investment with as much debt as possible.

In Gomper`s, Kaplan`s and Mukharlyamov`s paper "What do private equity firms say they do" (2015), they perform a survey on private equity

professionals to unveil their actual practice regarding several corporate finance related decisions. In this survey, they, amongst other, examine corporate structure. They uncover that the same proportion, two thirds, of the 79 PE professionals participating in the survey use practices corresponding to the market-timing and trade-off theory.

However, in Axelson`s et al. (2009) research, they discover differences in how the US and European investment professionals structure the leverage, where US deals rely much more on the issuance of bonds than European deals, where 89% of the debt is from bank loans. They also find that European bank loans consist of more tranches than their US counterparts, with the average bank loan consisting of 4.7 tranches. Other research papers have also identified geographical differences regarding debt policy. An example is Brunzell et al. (2013) analysis of the debt policy in all Nordic listed companies, where they found Graham and Harveys (2001) second most important factor for debt issuance, debt rating considerations, to be of little to none importance in Nordic debt policies.

With these geographical differences being identified, the question is whether Axelson et al. (2009) and Gomper et al. (2015) results can be generalised to include Nordic buyout deals emerges. If not, what is then the relation between public and LBO leverage; how do they relate to pricing; and which factors determine the level of debt? These questions outline the scope of this paper.

II Literature Review

The following section will provide an overview and brief description of the most common capital structure theories. I will first present the main history and concept behind the PE-industry, with a particular focus on the strategy and rationale behind LBOs. Then, I will give an overview of the most common capital structure theories, starting with the trade-off theory, where the most common factors are defined and discussed regarding potential differences. Further, I will shortly present the pecking order theory, before outlining the concept of market timing. Lastly, previous research on the capital structure in PE backed firms will be presented.

Venture Capital (VC) is only included in the literature review of this paper, but in the following PE and LBOs are used interchangeably since VC will then be excluded from the scope. The same goes for deal value and price (defined as deal value/market value to EBITDA (earnings before interest, taxes, depreciation, and amortisation), and leverage and debt (defined as debt to EBITDA).

Private Equity

Private equity is, broadly, defined as any unquoted equity. It is, therefore, illiquid, considered to have high to very high risk (relative to the market), and consequently expected to yield higher returns than the market. It is normally split into two separate categories: VC and Leveraged Buyouts (LBOs). A VC investor invests 100% equity for a minority stake in an early stage and high-growth company and normally has a 5-10-year time horizon. VCs are considered to be the riskiest category in PE, with more than a third of the investments defaulting (Kaplan and Strömberg, 2008). The investor's role is of supportive nature and is mainly to support the development and growth with their expertise, and be the source of liquidity to companies that cannot access traditional financing (Miller, 2016).

LBOs, on the other hand, are highly leveraged equity investments in mature companies that operate in traditional industries. They are considered to be risky investments, but, unlike VCs, failures (when investors receive less than 1x investment) are considered to be exceptions. A normal buyout investment is between $1m to $10bn equity leveraged by 2X – 3X debt (Miller, 2016), where the target companies´ management is normally incentivised with a 5%-20% equity stake bought on favourable terms. The time horizon is shorter than for VCs, with an investment usually being exited after 3-7 years. The investor´s role also differs significantly from VC, as the investment professional's aims to create value in underperforming business by actively taking control over all the divisions of the business.

However, as the market has developed to become more complex, a demand for new sources of financing has emerged which has led to the establishment of sub-types of private equity. These sub-types are triggered by

special corporate events or are considered as more alternative than traditional assets – including venture capital and buyout. Invest Europe, the European association for private equity, venture capital, and infrastructure sectors, points toward 3 main sub-types, each containing two categories of investments (Invest Europe, 2016). The first sub-type is "special situations" that triggers a demand for capital, but certain circumstances eliminates the possibility of raising traditional capital. The two special situation investment categories are "distressed investments" where you acquire equity or debt of a company in a distressed situation, and "turnaround/restructuring" where the investor finances an existing business that is in the need of significant improvement or change.

The second sub-type is "debt-related investments" with the two under categories "mezzanine" and "private debt". Mezzanine is subordinated debt that is either unsecured or with junior access, which is provided alongside equity (often from a buyout firm) and the senior debt from other lenders. Private debt is more broadly defined, and ranges from senior to subordinated. It is normally provided to small and medium-sized businesses, and, as mezzanine, is often provided alongside equity for a buyout deal. The private debt funds were raised mainly in response to the recent financial crisis, since corporations` need for capital did not match the banks` willingness to provide it.

The last sub-type of private equity is what Invest Europe calls "alternative forms of private equity". The two alternative forms that Invest Europe refers to are "real estate private equity" and "infrastructure private equity". Both real estate (commercial and private real estate assets) and infrastructure (transportation, energy, utilities, social infrastructure, communication etc.) structures their investments as a PE fund, using both equity and debt (Invest Europe, 2016).

Venture Capital History

Private Equity has an interesting history - a history that for many is surprisingly young. The first modern VC/PE firm, as we know them today, was American Research and Development Corporation (ARD) (Hsu and Kenney, 2004). ARD was founded in 1946 by Georges Doriot who managed to raise $3.5 million to his first fund, of which $1.8 were from institutional investors. However, it was not before The Small Business Act was passed in 1958 that the

industry experienced significant growth. According to U.S Small Business Administration the motivation behind this act was (SBIC website, 2017):

"In 1958, Congress created the Small Business Investment Company (SBIC) program to facilitate the flow of long-term capital to America`s small businesses. SBA does not provide capital directly to businesses. Instead, SBA partners with private investors to capitalize professionally-managed investment funds (known as "SBICs") that finance small businesses."

Shortly after the creation of SBIC the investment activity in small US businesses increased, with 585 approved SBIC licenses between 1960 and 1962 that aggregated to $205 million in private placements. Today, many of the world`s largest and most famous corporations were initially backed by a Venture Capital investment firm, such as Compaq, Skype, Tesla, and Facebook. This is also reflected in the total assets U.S. Venture Capital firms has under management, which was $63.3 billion in 2015 (Meisler, Rojanasakul & Diamond, 2016). The aggregate value of the 9 241 VC deals in 2015 was $136 billion, with $73 billion in aggregate of 1 053 exits (Preqin, 2016).

LBO History

Although the VC industry still is larger than LBOs regarding deal volume, the value of LBOs are significantly larger – with the 3 556 deals executed in 2015 aggregating to $411 billion (Preqin, 2016). Even though LBOs represents such amounts today, it`s history is still quite young.

It is not perfectly clear exactly when the first LBO (as a Private Equity deal) was carried out, but it is accepted to claim that it was shortly after World War II (Olsen, Blaydon and Wainright, 2002). However, this is a question of definition, since J.P. Morgan`s acquisition of International Merchant Marine Co. in 1902 was financed largely with debt and preferred stock. The same goes for Henry Ford`s acquisition of the minority stake in Ford Motor Company in 1919, where 70% was financed with debt (Cheffins and Armour, 2007).

To understand what motivated the invention of these highly levered investments, it is helpful to take one step back and look into the previous merger wave. A vast amount of the mergers that took place in the mid-1970s was driven by conglomeration. In fact, according to the Federal Trade Commission, 50

large U.S. companies executed more than 50 acquisitions each in the 1970s, of which approximately 40 resulted in wide-range diversified conglomerates (Cheffins and Armour, 2007). This made several U.S. corporations too big and hence inefficient, which consequently caused them to be traded with a conglomerate discount. The first leveraged buyouts were public-to-private deals where either the funding family or management of the company were the people buying out the remaining shareholders. One of the main issues that historically would occur in such events were financing, a problem now solved by the Investment Banks` effort and potential to finance the lack of equity with debt. Jerome Kohlberg, Henry Kravis, and George Roberts were among these Investment Bankers, whom worked for Bear Sterns in the mid-1960s on orchestrating financing for investments that now started to go under the name Leveraged Buyouts. After almost a decade of arranging such deals, Kohlberg, Kravis, and Roberts wanted to open a separate division within Bear Stern whose sole purpose was Leveraged Buyouts. However, after being turned down they formed their own firm; KKR. The first years of KKR`s existence had a varying degree of success, and it was not until 1978 that they raised their first fund whose soul mandate was public-to-private LBO deals. After this, Kohlberg`s, Kravis`, and Roberts` experience with LBOs quickly became apparent in the deals they executed. Between 1974 and 1980 the median public-to-private deals in the market was $5.97 million, and at the same time KKR acquired Houdaille Industries for $355 million financed by 87% debt – the first ever sizeable modern public-to-private deal executed. It was this deal that laid ground for the complex deal structure that allowed investors to minimise the equity proportion and exploit the tax benefits; financial arrangements other actors almost immediately started to imitate.

As several LBOs were exited and their profits at exit became evident, investors quickly started deploying capital to the newly started non-venture capital equity funds. In 1982, such firms had approximately $0.5 billion in assets under management (AUM), which rose to $1.9 billion in 1983, and $14.7 billion by 1987. As LBO funds` AUM rose, an increasing number of brokerage firms and the like entered the market to issue debt securities. However, since lenders could no longer receive a guarantee on all the proceeds they lent out, a new marketplace emerged in the second half of the 1980s: high-yield, low grade

issues that became known as “junk bonds”. Also here KKR was in the forefront of innovation, and quickly became Drexel Burnham Lambert`s, the “innovator” of junk bonds, best client. However, LBO associations and brokerage houses also adopted the use of junk bonds quickly, and this new access to capital was rapidly reflected in the average deal values where the 75 U.S. going private deals executed in 1985 had an average value of $473.6 million.

The $25 billion KKR-led buyout of RJR Nabisco in 1989 represents the peak of the LBO merger-wave that was followed by a troubling credit market and a recession. This troubling market environment caused the annual aggregate LBO deal activity to decline from $75.8 billion in 1989 to $8 billion in 1992. Thus, the merger-wave in the 1990s was not defined by private equity deals, but by strategically motivated mergers by large corporations that wanted to exploit the benefits following vertical integration, economy of scale, and/or new technology. Although this led to LBOs constituting only 2.4% of completed mergers in 1996, new capital commitments to the asset class increased from $9.9 billion in 1993 to $25.5 billion in 1996 – indicating that private equity was regaining its popularity.

With renewed trust from investors, private equity funds had, once more, vast amounts of dry powder for new investments. However, with unfavourable debt markets they could no longer gear deals to historical levels, which meant they relied relatively more on their own cash-on-hand. Consequently, while the number of PE deals grew to a record height, the total deal value was still lower than those observed in the 1980s. Although this was during the tech-boom, most private equity investors chose deals where the target was undervalued due to lack of investor recognition – hence not in the tech-industry. Instead of the previous public-to-private deals it became more normal to acquire under-prioritised divisions of said businesses, and provide them with the capital and management necessary to excel separately through operational improvements. Following the crash of dot-com boom several public companies were traded at low valuations. Additionally, the weak returns in the stock and debt markets made PE an attractive asset class for investors. Combined with cheap debt the U.S. market saw 654 deals in 2006 aggregating to $411 billion which was 18 times the level observed in 2003 (Cheffins and Armour, 2007). Globally, the aggregate PE deal value peaked at ~$700 billion in 2007, where $407 billion

was U.S. deals and $235 billion European (Preqin, 2016). As Bain & Company points out in their Global Private Equity Report 2010 (Cummings and Richman, 2010), Private Equity is a cyclical industry. However, the recession that hit the global economy in 2007 and caused the global 2009 PE deal value to decrease to $81 billion is the most significant thus far. Banks and investors dramatically reduced their risk appetite, and the global issuance of loans to LBOs went from $500 billion in 2007 to less than $20 billion in 2009 (Cummings and Richman, 2010). In the same period, the recession was also evident in the deal metrics. The debt to EBITDA decreased from a multiple of 6.0 to 3.8 in the U.S. and from 6.1 to 4.1 in Europe. However, the deal multiple (deal value to EBITDA) only decreased from 9.7 in 2007 to 7.7 in 2009 in the U.S., indicating that the deals were financed with a substantial higher proportion of equity – from 34% in 2007 to 56% in 2009 (Cummings and Richman, 2010).

Since the recession hit the bottom in 2009, the PE industry has grown and become bigger than ever. Global AUM is $2.49 trillion (June 2016), with $820 billion in global dry powder (December 2016) (Preqin, 2017). The reason for the industry`s popularity is mainly the strong financial returns they have generated lately: the three-year annualised average up until June 2016 was 16.4% - the strongest performance within private capital. As a result, around 57% of all institutional investors now allocates a part of their portfolio to the asset, of which 95% feels their PE allocation has met or exceeded their performance expectations (Preqin, 2017). However, in terms of deal value the industry has become less active. Preqin, one of the leading alternative assets data and intelligence databases, declares the main reason to be the "seller`s market" environment, where GPs are meeting increasing competition, and hence prices, for assets (Preqin, 2017).

Nordic Private Equity

The Nordic`s PE history is significantly shorter than that of the U.S. and Europe in general. Although there were some Venture Capital models that were tested during the 1970s and 1980s, it was not until the beginning of 1990 that Nordic PE funds really started to emerge (Splid, 2013). The first Nordic PE firms, both Swedish, was Industri Kapital (IK) and Nordic Capital (NC) – both founded in 1989 (Splid, 2013). IK was sponsored by the Scandinavian bank SEB, and NC was backed by a bank and an insurance company; Svenska

Handelsbanken and Skandia Insurance. Noteworthy is the fact that the management teams that founded these PE firms did not have financial backgrounds as was the case with most U.S. firms, but an industrial background. Almost immediately after, the private equity firm Capman was founded by the two Finish banks KOP and Pohjola (also in 1989), and Nordic Private Equity Partner (NPEP) was established in Denmark in 1990. Despite the close geographic proximity and similarities in regard to language and culture between the Nordic countries, it was only IK that invested across all Nordic countries from inception.

Not only did the managements` background differ from The U.S. and Europe; so did the deal types. While other regions started out focusing on public-to-private deals, the Nordic PE firms targeted businesses within conglomerates that they considered non-core or non-synergistic and made the case for the conglomerate to carve them out – like the global PE trend at the time following the merger-wave defined by strategic investors.

During the 1990s, several of the now largest PE firms were formed: Wallenberg Group formed Scandinavian Equity Partners (now known as EQT), Unibank and two Danish pension funds formed Axcel, Danske Bank and A.P. Møller-Mærsk established Polaris Equity Partners, and the Norwegians shortly followed and established FSN Capital, HitecVision and Herkules Capital in 2000 (Splid, 2013). However, as more Nordic PE firms emerged, so did the international interest for Nordic companies and in 1996 a foreign PE firm executed the first deal.

The foreign investors did not only bring their capital, but also their optimistic valuations of high-tech companies. It did not go long before the tech-market crashed because of the tech-bubble, which had great consequences for the foreign players and the Nordic companies they had invested in - of whom many went bankrupt. The foreign PE firms` investment strategy and highly levered investments consequently came under great scrutiny, and many of the largest banks, such as Nordea, publicly stated that they would no longer provide capital to non-Nordic PE actors. It was not only the unrealistic assumptions behind the valuations that caused the critique of the foreign firms, but also their irresponsible behaviour when they were breached – compared to the Nordic PE firms.

Two cases that Splid focuses on in his article "Is Nordic Private Equity Different?" to highlight this, are the acquisitions of the cleaning company ISS and the telecom company TDC – both Danish. The treatment of the bondholders in the ISS deal came to such a surprise to the market that it led to a new market practice for corporate bonds. At that time, 7% of corporate bonds had a change-of-control clause, but after this deal 32% of the issues the following 14 months incorporated this clause in the bonds.

The € 11.7 billion TDC-deal received critique because of its use of the main principles behind LBOs: the high leverage and the tax deductibility on the high interest rates. In fact, it provoked the Danish politicians to such an extent that they reduced the deductibility of highly levered corporations.

In the late 1990s, the Nordic PE market was out of its youth and an increasing number of the aforementioned PE firms became Pan-Nordic. The annual aggregate deal value had been steadily increasing towards ~€600 million in end of the 1990s, but took off from 1998 to 2000 – reaching ~€3 billion. The annual deal value was between €2 bn and €3 billion the first half of the 00s, before increasing to €5 billion the last two years before the 2007 crisis that caused the aggregate value to decrease to €2 billion (Splid, 2013). However, the Nordic LBO market quickly dusted off the damages from the crisis, and climbed to a record level of €10 billion in 2011 – only two years after the crisis levels.

The Nordic PE industry has yet to stabilise regarding aggregate deal value, and the annual value shifted between € 6 billion and €8 billion in the time-period 2012 to 2015 before almost doubling to €11.5 billion in 2016 (Preqin, 2017).

As of January 2017, there are 225 Private Equity firms in the Nordic region. The 21 buyout funds that has fundraised since 2014 has raised €16.5 billion, which constitutes almost 50% of the private capital that has been raised in this period although they only represent ~20% of the number of Private Capital funds.

Capital Structure Theories

In the following the most popular capital structure theories are briefly described. This will provide insight in how Corporate Finance academicians and

professionals traditionally have chosen capital structure, and lay the groundwork for understanding the analyses that will follow in this paper.

The Trade-Off Theory

Modigliani and Miller (1958) show that capital structure, in an efficient and perfect market without taxes, bankruptcy costs, and asymmetric information, is irrelevant for pricing - as the fundamental asset value solely drives this. However, after including other factors such as tax shield in the equation, they uncovered that you could in fact increase profits by for example reducing taxes with deductible interest on the debt (Modigliani & Miller, 1963). The trade-off theory acknowledges market imperfection and adds several explanatory variables to the former theory.

According to the trade-off theory, optimal debt/equity ratio is found by trading off benefits and costs related to debt, where main advantages are the tax shield, interest deductibility related to the cost of debt, and added discipline. The main costs are bankruptcy cost, tax expense for the bondholders when receiving interest, loss of flexibility and agency problems. The trade-off theory considers underlying factors in both the financing and dividend decision – two of the three main principles in corporate finance **(**Damodaran, 2014). I will in the following define and outline the theory behind these factors, briefly discuss how the effects of the said imperfections may differ between LBOs and public companies.

Tax Shield

A tax shield is a benefit a company achieves by paying less tax because of deductible interest on debt. Financial theory dictates that companies will maximise this effect, which will cause profitable companies with steady taxable cash flows and high tax rate to be highly leveraged – since they are favourable debtors. Axelson et al. (2009) tested this theory with profitability (ROIC) and statutory corporate tax rate against the level of leverage, and found that the most profitable companies and the industries with variable cash flows had the lowest leverage. The latter is in line with traditional theory, but the former is not. This implies that companies, in general, do not maximise the use of leverage to fully exploit the potential tax shield. However, should one run the same regression

and only focus on target companies in LBOs, one could expect these results to be vastly different – with profitability being one of the main explanatory variables with leverage as the dependent variable.

Graham (1998) found the present value of the tax shield to be, on average, 10% of firm value – which underlines its importance for this paper. However, Because of the scope and time restrictions of this paper, I chose not to spend time finding ROIC or the statutory tax rate on all the deal companies.

Added Discipline

The increase in internal and external monitoring and financial pressure that comes from external capital can increase efficiency significantly. This is well described by Aswath Damodaran (Damodaran, 2016 slide 14):

"*Forcing such a [debtless firm] to borrow money can be an antidote to the complacency".*

The consequences for being inefficient and investing in poor projects then becomes bankruptcy and potentially unemployment, which both are motivational factors that should increase productivity and efficiency. Kaplan and Strömberg (2008 page 1) also identifies the use of leverage as an important ingredient in an organisational structure, and states that it helps make:

"[…] a lean, efficient organisation with minimal overhead cost".

Originally, this was one of Jensen´s (1989) arguments why the LBO model should become the dominant corporate organisational form. However, shortly after his prediction the junk bond market crashed, and several highly profiled LBO deals defaulted (Kaplan and Strömberg, 2008). Needless to say, the model suffered and did not become the default capital structure that Jensen expected it to become.

I have not taken it upon me to analyse the differences in effectiveness as a consequence of the dissimilar use of leverage between LBOs and public companies. However, as several academics agrees, there is a logical reasoning behind the conclusion that a highly-leveraged company is more efficient – so one could expect there to be a significant relationship between the spread in

leverage and an efficiency ratio (e.g. sales turnover) when comparing LBOs with other companies.

Expected Bankruptcy Cost

Expected bankruptcy cost is the probability of going bankrupt multiplied with the cost of going bankrupt. The cost of going bankrupt is the sum of legal and other general liquidation costs, plus the indirect operational costs that will incur, as customers, suppliers, and other thirds parties perceive the company to be in financial trouble.

With the probability being an important factor, access to liquidity is of great importance. Since an LBO is backed by a PE fund, which is characterised by financial power and a long-term relationship with the creditors, it is likely to assume that the bankruptcy cost is smaller for an LBO. Should the LBO get liquidity issues, it can "easily" receive funding from its parent or renegotiate the terms of debt contracts – which may not be as easy for a distressed non-PE-backed company. This is also in line with Jensen (1998) and Kaplan & Stein (1998) thoughts, whom all three agree that the lending side becomes more willing in an LBO, which allows the financial restructuring to be voluntary, quick, and at a lower cost than in bankruptcy proceedings. The reasons behind the bank`s willingness might be several, but one key reason is reflected in the famous quote:

"Owe the bank USD 1 million and it is your problem. Owe the bank USD 1 billion and it`s the bank`s problem"

Based on the above reasoning, it is likely to conclude that with lower bankruptcy cost, the trade-off theory will "allow" LBOs to have higher leverage.

Axelson et al. (2009) uses enterprise value to book value as a proxy for investment opportunities, which again represents bankruptcy cost – since companies with larger investment opportunities are likely to have higher bankruptcy costs. The logic is that a company whose value is mainly dependent on future growth also has the most to lose if bankruptcy negotiations or change in debt covenants significantly reduces access to new liquidity (Baker & Wurgler, 2009).

Loss of flexibility

When asked about which factors they considered most important in the financing decision, CFOs in large Scandinavian companies ranked the desire to maintain financial flexibility highest (3.43/4.00) (Baker and Martin, 2009). The US and other European CFOs had the same ranking, with financial flexibility scoring 2.59 and 3.39 respectively. The significant differences between the different regions is noteworthy – with relatively large differences in the CFOs` scores.

When comparing public companies and LBOs, the differences are relatively large. If a public company has borrowed to capacity and this includes issuance of bonds, the company must issue new equity to current or new investors in to raise more capital. This process may be time-consuming and expensive, and research has shown that issuance of equity on average results in significant net negative stock price reactions (Masulis and Korwar, 1986). In LBOs, the lending side is willing and the parent usually has enough dry powder to finance portfolio companies´ investments. In other words, this factor also "allows" LBOs to take on more leverage than non-PE-backed companies.

As mentioned, PE-funds prefer companies with stable cash flows that operate in mature industries. This means that forecasting required funding is fairly easy, which again allows them to easier justify maximising the use of leverage.

Agency Problems

Agency theory is the analysis of the relationship between the company management and shareholders, with emphasis on the potentially conflicting interests and incentives the two parties may have (Jensen, 1986). In regard to financial structure, the agency problem is especially relevant if a company has excessive free cash flow as a result of lack of profitable investment opportunities. Shareholders will then, most likely, prefer to receive a special dividend payment, while the management may fear that reducing their resources is equivalent to losing their power. Research has also unveiled a significantly positive relationship between growth in sales and management compensation (Murphy, 1985). This may incentivise the management to grow the company beyond its optimal size, by investing in negative NPV projects rather than paying excessive cash to the shareholders (Jensen, 1986). The management may also want to avoid these special pay-outs since they know this may lead to the

need of external funding for financing future investments, which leads to constant internal and external monitoring.

The GP in a PE fund is normally given a 20% carry. This gives the GP a call option like payoff, with a linear relationship to the LP only on the upside[1]. With this in mind, the GP has a personal incentive to maximise the use of debt to lever up his/her call option exposure. Axelson et al. (2009) note that in theory, this would rationalise GPs being willing to pay as much as the cost of debt will allow them – without the target firms fundamentals necessarily justifying it. It is based on this reasoning that I include the price of debt in the leverage regression, but also a separate deal value regression to examine whether this does in fact impact the price. The spread between EURIBOR and Northern European BB+ (rated by S&P and/or Bloomberg) issues is used as a proxy for the cost of debt.

Trade-off theory summary

Overall, the arguments presented in the trade-off theory opens for LBOs to take on more leverage than public companies.

Market timing theory

There are two different understandings of the market timing theory. The first version has to do with changes in stock price as a result of information asymmetry, where companies issue equity following a release of new information. This means that rational managers exploit positive announcement effects if they believe the gains from this are bigger than the cost of deviating from the optimal financial structure in the meantime (Baker and Wurgler, 2009).

The second version focuses on companies´ management perception that their cost of equity is irrationally low, which means they can raise capital by issuing overpriced equity. This theory was, to some extent, confirmed in a survey where two-thirds of the partaking CFOs admitted that their market price was one of the most important factors when deciding when to issue common stock (Graham and Harvey, 2001).

[1] GPs are normally required to invest 1% of the capital personally, so they do, in practice, have a minor downside (Axelson, Strömberg, and Weisbach, 2012).

Also, as Axelson et al. (2009) points out, timing issuance of debt by exploiting mispricing in the debt market may be just as important. This means that by taking on more debt as debt cheapens and issuing more debt when it is overvalued, companies can receive relatively more capital. If such a theory is correct, I should find a negative correlation between the price of debt and leverage in both LBOs and public companies.

Pecking order Theory

The pecking order theory is based on the notion that management ranks different types of financing after favourability but states that there is no optimal capital structure – each company have their individual optimal debt ratio that fits their specific need for external capital. I will in the following present Myers (1984) ranking and arguments. Internal financing is ranked as the most preferred, with the reasoning that information sensitive securities, such as equity and debt, are costly to issue. This is due to information asymmetry between the management and investor(s) (Baker and Wurgler, 2011), which was discussed under the "Market Timing" theory. Financing of new investment opportunities are prioritised, but sticky dividend policies lead to a small acceptance in the variation of payouts, which means that fluctuations in required investments and profitability are the main driving factors in the equation.

Should retained earnings not be sufficient to cover the financing of new investment opportunities, the safest external security ranks second: debt. The different types of debt are again ranked after perceived risk, with convertible debt perceived as the riskiest. Recent research supports this, where Baker and Wurgler (2009) found a negative correlation between debt and profitability. This has been explained by the lack of retained earnings in bad performing companies.

Lastly, issuance of equity to external investors is ranked as the least favourable method of financing. In practice, you will find cases where a company issued equity when it could have issued investment grade bonds, but in general. the ranking seems to hold – with only 6% of external financing coming from new stock issues (Myers, 1984).

As Axelson et al. (2009) concludes, the pecking order concept is less likely to explain the use of leverage in buyouts. This is based on the logic that if the Pecking Order Theory dictated leverage, the more profitable companies, proxied by ROIC, would be less leveraged. Not only does this oppose the trade-off theory, but also the concept of LBOs, which, very simply put, is using every argument available to minimise the equity proportion, hence maximise leverage, to capitalise on the gearing.

Capital structure in Private Equity backed firms

In Gomper`s, Kaplan`s and Mukharlyamov`s paper "What do private equity firms say they do" *(2015),* they perform a survey on 79 private equity firms to examine the relationship between traditional corporate finance theories and the practice of private equity professionals. Incorporated in this survey is a "test" of capital structure theories, where the questions are formed in such a way that the results should uncover which, if any, of the theories the practice resembles. They include factors from two of the theories mentioned above; the trade-off theory and the market-timing theory. Similar research had previously been performed by Axelson et al. in 2009 and a follow-up study in 2013, whom, for a large sample of buyouts, found no relation between the capital structure between buyouts and comparable public companies – hence no evidence for the market-timing theory. The reasoning is that companies in the same industry face the same cyclicality and hence market conditions, which means their capital structure should, according to market-timing, be adjusted similarly as debt or equity become relatively cheaper / more expensive.

To measure the trade-off theory, Gompers et al. (2015) includes firm industry, tax benefits, default risk, and the ability to generate improvements / reduce agency cost as factors. Market-timing is represented through questions about interest rates. Their results unveil that investment professionals in private equity firms considers the two theories to be equally important. That is, two thirds of the participants make a conscious choice between the tax-benefits and cost of default, and the same proportion takes on as much debt as the market allows. In contrast to the results in Graham and Harvey`s survey of CFOs, less than 10% claims financial flexibility to be of importance to the capital structure of their companies. However, as Gompers et al (2015) points out in their

discussion, this should not come as a surprise given PE firms` ability to provide additional capital in the future at relatively low risk as a result of no information asymmetry and, more often than not, gun powder from which they can draw capital. As presented above, added discipline was one main reason why Jensen expected LBOs to become the new standard. However, among PE firms only 40% of the contributors used debt for operational improvement.

Summary of Literature Review

As the most common capital structure theories are presented and discussed, key aspects of the theories and subjective reasoning makes points toward the conclusion that different factors affect the capital structure in LBOs and public companies. This is based on the conceptual differences between the two structures, and consequently the significant difference in how the theories will impact them. This interpretation is found to be confirmed by the recent researched performed by Axelson et al. (2009) and Gompers et al. (2015), whom finds no relation between the capital structure in comparable public and buyout-backed companies. Further, through a survey of 79 private equity firms they find that two thirds of PE investment professionals use market-timing theory when deciding capital structure of their deals – and the same proportion uses factors representing the trade-off theory.

An important part of this paper will, therefore, be to test if the market-timing theory and trade-off theory that was found to be used as basis for PE firms globally, also are used in the Nordic PE industry, and if not any: can I, based on my results, to some extent determine which factors that does?

III Data

Data sources and sample selection

Building a dataset of PE deals sufficient enough for quantitative analysis was no easy task. To further delineate the analysis with the geographical restrictions made the data collection a time-consuming process – an approximately 250 hours' process to be precise.

Initially, I started out collecting deal data only on deals performed by the five largest PE funds headquartered in the Nordics: Altor Equity Partners, Capman, EQT Partners, Herkules Capital, and Nordic Capital. However, after crosschecking deal values, debt values and EBITDA on the deals and their comparable public companies, the dataset consisted of only 41 deals. I, therefore, saw it necessary to loosen the restrictions and changed the parameter to the target companies´ headquarter instead of the PE funds. This increased the number of available deals significantly. I only included M&As classified as "Leveraged Buyout", "Management Buyout" and "Going private".

I used Thomson Reuters Eikon Private Equity to make a deal overview of all the funds that had invested in the Nordics from January 1997 – May 2016. This time-period is chosen since the results from my analyses will be compared to the ones Axelson et al. (2009) found when analysing the US and European deals, and their data-set starts with observations from 1997. Deals were added/removed from this overview when crosschecked against the PE companies' own lists of investments in each fund. Separate spreadsheets were made with extractions from Dealogic and Dealscope, where deal values, debt values (for deal financing, so both bank loan tranches and bond issuance) and EBITDA was extracted. As this only provided the necessary data for a fraction of the deals, I also used Bloomberg, Zephyr, Proff.no, and Capital IQ to complete the dataset. However, data were still missing, so I also used an extensive amount of web searches and found the missing information in annual reports and newspapers. This left me with a dataset consisting of 175 deal values, 121 debt values, and EBITDA on 145 target companies. However, since I only found one of these values for several deals, I crosschecked them and ended up with deal value and EBITDA on 94 deals, and debt data on 69 of these – which constitutes the final dataset.

The financial databases I used are all well-known commercial databases that does not need an introduction, except for proff.no. Proff.no is a database-service that provides professionals with detailed financial information about Norwegian companies. All Norwegian "aksje selskap" (limited companies) are required by law to publish their annual reports – both private and public, which made it relatively easy to find historical EBITDA on Norwegian target companies.

For each deal, I identified two comparable public Nordic companies and collected the necessary financial data. Companies were classified as comparable based on the Bloomberg Industry Classification System (BICS) (Bloomberg, 2015). BICS classifies companies on two levels, where level one is sector and level two is industry. Where I failed to find comparable companies in the same industry, I, subjectively, chose companies within the most resembling industry within the same sector as the target company. The data on Enterprise Value, Market Value, EBITDA, Debt, and ROIC I extracted from Bloomberg for these comparables, were from the same year as the deal. In total, I gathered enterprise value, market value, and EBITDA on 269 public companies, and the debt value on 251.

In used several different macroeconomic variables in the regression analyses. More specifically. I used monthly interest rates, inflation, and GDP for each Nordic country specifically. The interest rates and inflation were downloaded from Bloomberg, and the Quarterly GDP was found on the respective countries` governmental statistical webpage[2].

Characteristics and Representativeness

As can be seen from Table 1, the sample deals are fairly evenly spread out over the chosen time-period.

Date	#	LBO Ratio	Debt Ratio	Deal Value	Debt Value	EBITDA
1997-1999	12	7,625	8,488	291 968,00	324 977,50	38 288,83
2000-2002	20	8,546	9,913	567 031,11	657 751,11	66 351,00
2003-2005	18	5,470	23,335	397 988,69	1 697 733,00	72 755,84
2006-2008	27	11,893	7,443	975 456,65	610 476,67	82 018,71
2009-2011	17	6,656	4,219	601 147,00	381 092,44	90 321,12
2012-2014	20	11,431	8,181	560 525,75	401 169,49	49 037,00
2015-2016	17	13,090	6,188	771 606,33	364 747,78	58 945,41
Total	131	64,711	67,767	595 103,36	633 992,57	65 388,27

Table 1 Historical averages of deal-sample characteristics.

[2] Norway: www.ssb.no, Sweden: www.scb.se, Finland: www.stat.fi, Denmark: www.dst.dk

By comparing this to Argentum`s 2009 and 2016 Nordic Private Equity reports, it is evident that the number of deals in my data-set almost replicates the general Nordic PE trend. There has been an increase in the frequency of LBOs from 1997 until the 2008 financial crisis, a steep decrease thereafter followed by a relatively calm period (Argentum market analysis, 2009 and 2016). This is positive for the representativeness of the analyses. However, there is no guarantee that the specific deals in my dataset can represent all the deals performed in the respective time-period. So, despite these overlapping trends, this is not enough for me to classify my dataset as a perfect proxy for the Nordic PE Industry.

Date	**Denmark**		**Finland**		**Norway**		**Sweden**		**Iceland**	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
1997-1999	5	42 %	1	8 %	2	17 %	4	33 %		0 %
2000-2002	3	15 %	3	15 %	2	10 %	12	60 %		0 %
2003-2005	6	33 %	2	11 %	3	17 %	6	35 %		0 %
2006-2008	1	4 %	4	15 %	8	30 %	13	48 %	1	4 %
2009-2011	2	12 %	3	18 %	0	0 %	12	71 %		0 %
2012-2014	3	15 %	3	15 %	9	45 %	5	25 %		0 %
2015-2016	4	24 %	1	6 %	6	35 %	6	35 %		0 %
Total	**24 (18%)**		**17 (13%)**		**30 (23%)**		**59 (45%)**		**1 (0,8%)**	

Table 2 Geographical overview of Deals

Geographically, Sweden is overrepresented with 45% of total deal volume (table 2). The number of deals executed in Denmark, Finland, Norway and Iceland is not evenly distributed either, with the countries representing 18%, 13%, 23% and 0.8% respectfully. This is a result of the challenge I met when collecting the data. The trade-off was between an evenly distributed data sample and a sufficient size of the sample, where I chose to maximise the size. These proportions are quite close to what has historically been observed in the Nordic market (Argentum, 2015). The difference is that Finland has had more activity than Norway, whereas in my sample the Norwegian deal proportion is 100 basis points larger than Finland's. Although this challenge the representativeness of the data, I am quite confident that the differences between the countries are

small – if not none. Consequently, I do not consider this to jeopardize the significance of any potential conclusions.

It is apparent that the sample is biased towards large deals compared to the observed Nordic deal values – with almost 70% of the deal values exceeding € 100,000,000. The average deal value in the Nordic countries in 2015 was approximately € 15,000,000 (Argentum, 2015), but approximately 97% of my sample exceeds this. There are quite few mega deals, defined as deal values above €1 bn, which means that the majority of the deals are small and mid-cap. On a side note, this is also the deal sizes the market perceives to have the highest potential (Preqin, 2016). The large differences in deal values represent the largest deviation from Argentum`s observed values.

As one can see from Appendix 1, the sample does not suffer from an industry bias. 83 different industries are represented, with only 15 industries being represented with more than one deal, but none of which has more than four deals. Argentum does not keep a sector nor industry overview over Nordic PE deals, and I have therefore not succeeded with comparing my industry proportions with the actual values.

The number of observations is in some cases quite low, with several of the regressions only consisting of 68 and 69 observations. Due to the long time-period I am analysing, this often means that there are several months between each observation. Again, this is solely a result of the difficulties I met when collecting data. My experience is that five years of monthly data, 60 observations, is regarded as a sufficient dataset. Even though my quantity exceeds this, I acknowledge that these uneven monthly frequencies should be improved. Still, since my main objective is to look at the relationship between leverage and deal value for public companies and LBOs, this shouldn't cause significant problems with the quality of the data as long as all the data is properly matched.

All the variables used in the cross-sectional and time series analysis has been matched with the date of the deals. However, some of these variables are only released on a monthly basis, which means that the data is released for the last day each month. To ensure that the data were optimally matched, I therefore went through the dataset and manually matched the date of each deal to the closest monthly end. However, there are several deals that were executed in the

middle of each month, which causes an up to 2-week time difference between the deal and the monthly variables. Unfortunately, I do not have enough observations to exclude the deals performed mid-month, and thus I must accept the potential problems this may cause my regressions.

The spread between EURIBOR and the yield to maturity on BB+ bonds issued in northern Europe was used as a proxy for the cost of leveraged loans. Issues rated BB+ by either S&P or Bloomberg were included. In total, there were 143 issues that fulfilled these strains. However, only 55 of these was issued at dates I could match with satisfactory accuracy – and this was after I adjusted 9 of them with average growth values to match them with the closest observation in my dataset. To increase the number of observations I could decrease the geographical restrictions and include all European issues, but this would make the yields less relevant for this analysis. Optimally it should only be Nordic issues, but for obvious reasons, this could not be done.

As a conclusion, I may acknowledge that the dataset has its imperfections. However, after a thorough impact assessment, I do not consider the problems to be critical, and I am positive that the quality and quantity of the majority of the dataset is of satisfactory quality for the purpose of this paper.

IV Results

Deal Value

Pricing is in this paper defined as deal value to EBITDA for LBOs, and total enterprise value (TEV) to EBITDA for the comparable public companies. Firstly, I compared the pricing multiples for the two over time to examine potential differences in market trends, thereafter I ran a regression analysis to test whether there is a significant relationship between the two, and lastly, I ran a multivariate regression to study which macro - and microeconomic factors that determined the pricing for the two groups separately.

As can be seen on the graph from figure 1 below, the pricing and market trends between the deals and their respective comparable companies differs greatly from 2003 to 2008. The highest annual average of observed EBITDA multiples for LBOs was 26.73 in 2004, while the highest for the comparable public companies was 10.08 in 2005.

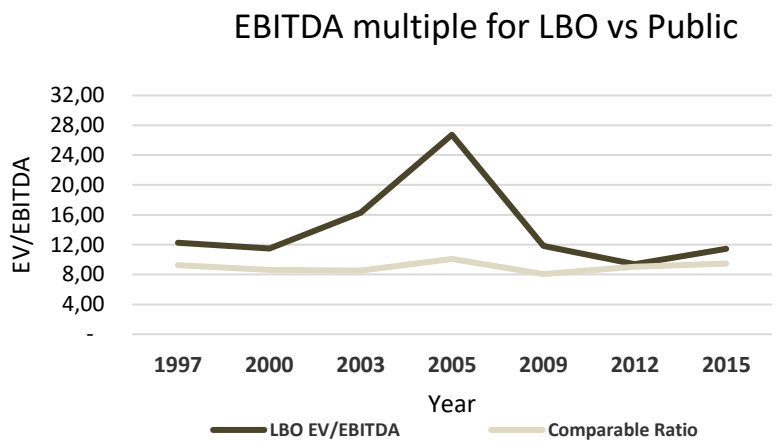


Figure 1 Historical development of the pricing of LBOs and Public companies. Price defined as deal value to EBITDA for LBOs and market value to EBITDA for the comparable public companies.

With that being said, four of the largest sample LBO deals were executed in this period, whom all three were priced with EBITDA multiples above 40. When multiples over 40 are defined as outliers, either because of the large deviation from the trend or even because of suspicion of errors, the trend appears more aligned (as depicted in figure 2 below). The entire dataset is, of course, checked for outliers, and separate regressions excluding these will be run and both results will be presented and compared when needed.

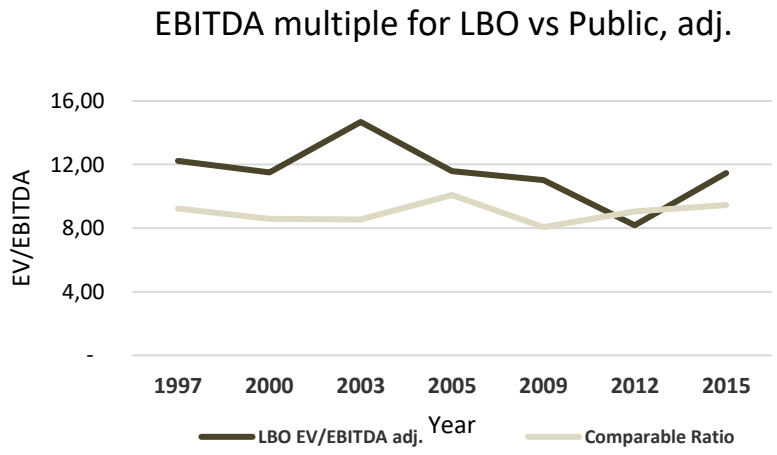
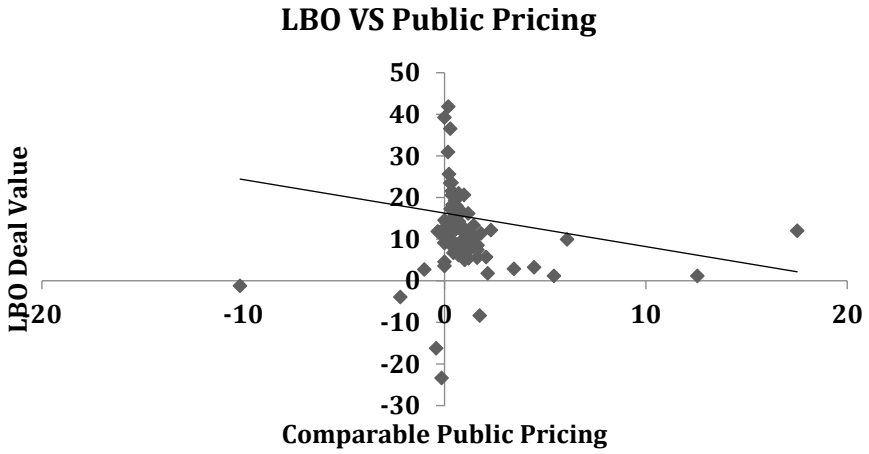


Figure 2 Historical development the of pricing of LBOs and Public companies after adjusting for extreme values. Price defined as deal value to EBITDA for LBOs, and market value to EBITDA for the comparable public companies.

Unlike recent research, I do not observe a significant increase in EBITDA multiples the later years. The average EBITDA multiple for the public companies in the dataset has remained in the interval between 8.54 and 10.08, and the same interval has been 8.18 and 14.68 for the LBO deals (adjusted).

Although the latter interval is subject to greater variation, the annual average multiple has gone from 12.24 in 1997 to 14.68 in 2016. Notably, this is higher than the multiple S&P Capital IQ observed for 2015, which was 10.30 in the second half of 2015 – the highest multiple ever observed during the 20 years they have been tracking these numbers (Shasha D., 2015).

I ran two regressions to study the statistical relationship between the pricing of LBO and public companies. In the first regression, I used the log of the average market value to EBITDA multiple of the two comparable public companies I had found for each deal as the independent variable. I chose to use the average due to the relatively high probability of low or high values affecting the results since the sensitivity towards each value was quite high with just under 100 observations. This also allowed the value to better represent the respective industry, although I acknowledge that it is far from a perfect industry average. This regression shows a significant negative relationship between the two, with a coefficient on -0.40 (Figure 3 below). However, being aware of the large effect the outliers have on the sample, regression number two was performed without these values.

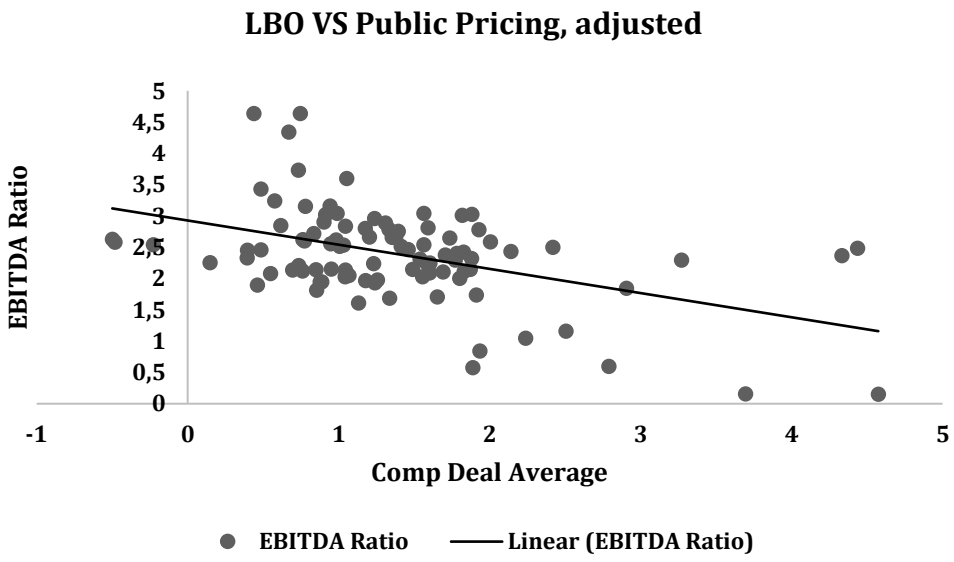


	Coefficients	*Standard Error*	*t Stat*	*P-value*
Public Pricing	-4,00E-01	7,08E-02	-5,66E+00	1,53E-07

Figure 3 The pricing of LBOs regressed on the pricing of comparable public companies. In this graph, the raw-ratios are used.

When the sample was adjusted for extreme values, the significance was reduced, but the relationship remains significant with a P-value of 3.84E-07

(figure 4). This relationship differs largely from both expectations and previous research. Axelson et al. (2009) found a strong positive relationship when performing the same analysis on the US and European market. The results found in my analysis suggest that Nordic LBOs are priced the highest when the price of their respective comparable public companies is low. With an intercept of 2.86, this means that LBOs are priced higher if the log ratio of their respective comparable is below 2.086, which in turn is a pricing multiple of 8.05. This raises several interesting questions.



	Coefficients	*Standard Error*	*t Stat*	*P-value*
Public Pricing (adj.)	-3,733E-01	6,836E-02	-5,461E+00	3,842E-07

Figure 4 Adjusted for extreme values and use of log ratios.

The first question that comes to mind is of course if there are errors in my data. I have too much respect for the research not to recognise that this might be the case. However, after going through the data three times, from a-z in the process, I can rule out that this is the case. Since I have already had a critical review of the data and its representativeness, I chose to accept the result from this regression – despite its controversy. However, I consider it necessary to further analyse this relationship.

Since there is a negative relationship between the two, one should expect macro - and microeconomic factors to have an inverse, or at least very different,

impact on the pricing. I, therefore, performed a multivariate regression using 16 macro variables, whose statistical relationship can be seen from table 3 below.

			Multivariate		Bivariate		
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Coefficient*	*T Stat*	*P-Value*
Intercept	1,630	1,779	0,916	0,363			
OSEBX	0,000	0,004	-0,127	0,900	0,000	-0,511	0,611
OMX Stock	-0,001	0,007	-0,154	0,878	-0,001	-0,921	0,360
OMX Helsinki	0,000	0,000	-0,333	0,740	0,000	-0,919	0,361
OMX Copenhagen	0,000	0,004	0,068	0,946	0,000	-0,930	0,355
Norway_Infl	-0,014	0,123	-0,116	0,908	-0,032	-0,369	0,713
Sweden_Infl	-0,247	0,151	-1,637	0,106	-0,040	-0,513	0,609
Finland_Infl	7,493	50,100	0,150	0,882	13,374	0,423	0,673
Denmark_Infl	0,203	0,420	0,483	0,631	0,303	1,049	0,298
Brent Spot	0,008	0,010	0,823	0,413	0,002	0,614	0,541
NOR 10	0,332	0,487	0,681	0,498	0,017	0,261	0,794
Swe 10	-0,439	0,481	-0,911	0,365	0,012	0,180	0,857
DK 10	0,002	0,283	0,007	0,994	0,053	0,826	0,411
EURIBOR	21,493	21,663	0,992	0,325	1,719	0,296	0,768

Table 3 Results from multi – and bivariate regressions on the independent variables explaining the pricing of the comparable Nordic listed companies.

None of the macro variables were significant in the multivariate regression nor in the separate regressions one each variable individually. However, in order to draw any conclusions, I chose to compare the three most significant explanatory variables for LBO and public pricing. Danish inflation, OMX Copenhagen, and the yield on Danish 10-year government bonds has the most significant impact on the pricing of the comparable companies, with a negative relationship to the OMX. However, the OMX coefficient is -0.0005, so the relationship is very weak. The Swedish inflation is significant at a 90% confidence level in the multivariate regression, but not when regressed individually.

For pricing of LBOs, Danish inflation, OMX Copenhagen, and OMX Stockholm are the three most significant independent variables (table 4 below). What is quite interesting is that OMX Copenhagen also has a negative

relationship in this regression – similar to the public pricing regression. The Brent Crude Oil spot price is significant on a 90% confidence level in the multivariate regression, followed by the return of OSEBX at a 94% level.

			Multivariate		Bivariate		
	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Coefficient***	***T Stat***	***P-Value***
Intercept	1,630	1,779	0,916	0,363			
OSEBX	0,000	0,004	-0,127	0,900	0,000	-0,511	0,611
OMX Stock	-0,001	0,007	-0,154	0,878	-0,001	-0,921	0,360
OMX Helsinki	0,000	0,000	-0,333	0,740	0,000	-0,919	0,361
OMX Copenhagen	0,000	0,004	0,068	0,946	0,000	-0,930	0,355
Norway_Infl	-0,014	0,123	-0,116	0,908	-0,032	-0,369	0,713
Sweden_Infl	-0,247	0,151	-1,637	0,106	-0,040	-0,513	0,609
Finland_Infl	7,493	50,100	0,150	0,882	13,374	0,423	0,673
Denmark_Infl	0,203	0,420	0,483	0,631	0,303	1,049	0,298
Brent Spot	0,008	0,010	0,823	0,413	0,002	0,614	0,541
NOR 10	0,332	0,487	0,681	0,498	0,017	0,261	0,794
Swe 10	-0,439	0,481	-0,911	0,365	0,012	0,180	0,857
DK 10	0,002	0,283	0,007	0,994	0,053	0,826	0,411
EURIBOR	21,493	21,663	0,992	0,324	1,719	0,296	0,768

Table 4 Results from multi – and bivariate regressions on the independent variables explaining the pricing of Nordic private equity deals.

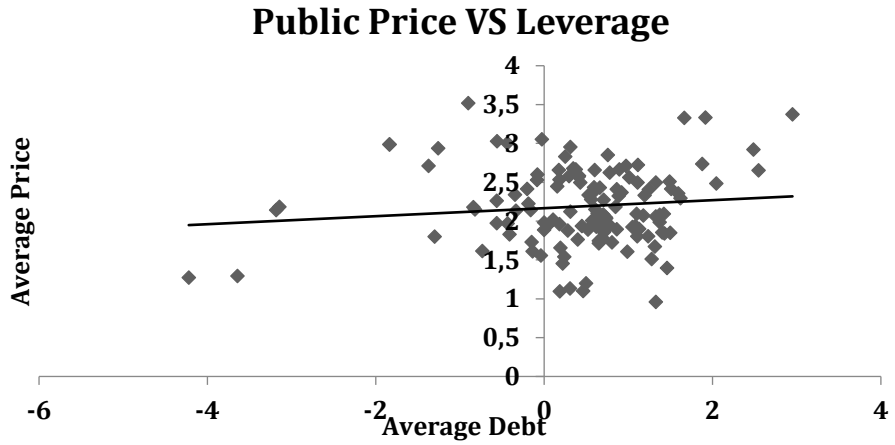
Unfortunately, none of these regressions confirms the results found in the LBO vs. Public pricing regression, since the most significant variables are either the same or at least of the same nature. However, since the main purpose of this paper is to analyse the leverage and not the pricing of Nordic buyout deals, I chose to leave the analyses of the macroeconomic determinants for the two for either another time or for someone else to examine.

So, with macroeconomic variables not being able to explain the negative relationship, this raises the last question I will examine: is leverage the most significant explanatory variable for the pricing of LBOs? And if so, can leverage also explain the differences in pricing of LBOs and public companies?

Leverage

Leverage VS Price

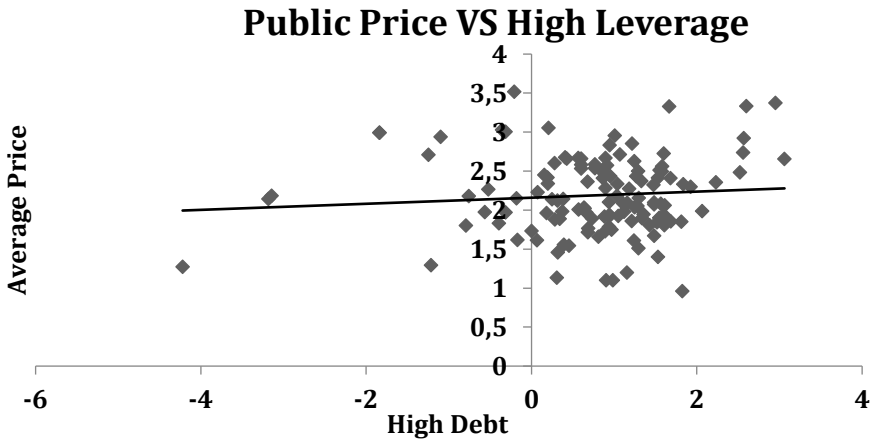
To examine the relationship between leverage and pricing, I ran regressions using the log of the Debt to EBITDA ratio as the explanatory variable and log of the Price to EBITDA as the dependent variable. As presented in figure 5, there was no significant relationship between the use of leverage and pricing of public companies.



	Coefficients	*Standard Error*	*t Stat*	*P-value*
Average Debt	5,154E-02	4,119E-02	1,251E+00	2,132E-01

Figure 5 Pricing of public companies (log of market value to EBITDA) against the leverage (log of debt to EBITDA).

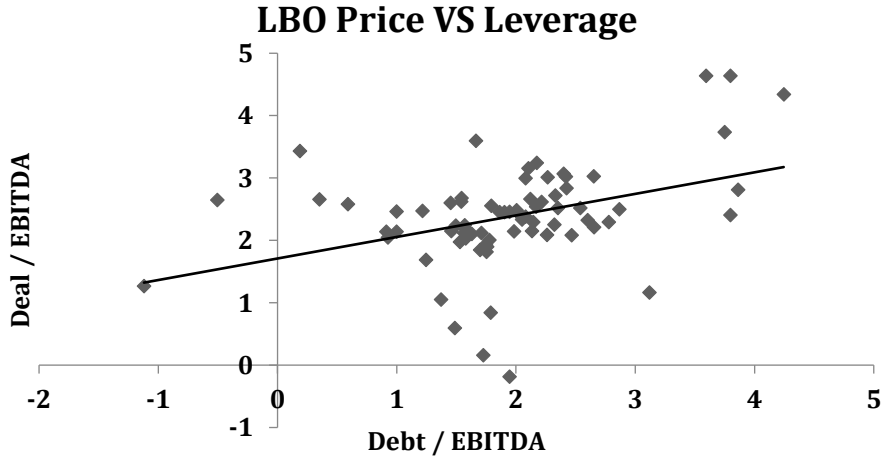
Only when using the raw EBITDA ratios and removing 4 of the outliers is this relationship significant at a 95% confidence level, but since I am using time-series data, I am more confident in the former results from this regression. Even when I ran the regression using only the most levered comparable company for each deal, the relationship did not hold (Figure 6). Hence, based on my dataset I can conclude that the use of debt does not determine the pricing of the public companies in my dataset.



	Coefficients	*Standard Error*	*t Stat*	*P-value*
High Debt	0,0389	0,0409	0,9518	0,3431

Figure 6 Public pricing against leverage using only the highest levered comparable companies.

The statistical relationship between LBO deal-values and use of debt is another story. These regressions yield positive and significant results with a 99% confidence level when using the log-ratios, raw ratios and after correction for outliers. The results when using the log-ratios are presented in figure 7 below.



	Coefficients	*Standard Error*	*t Stat*	*P-value*
Leverage	0,3453	0,0975	3,5429	0,0007

Figure 7 Pricing of LBOs (log of Deal Value to EBITDA) against the leverage (log of debt to EBITDA).

After failing to explain the negative relationship between Nordic public and LBO leverage using macroeconomic variables, my results point toward a

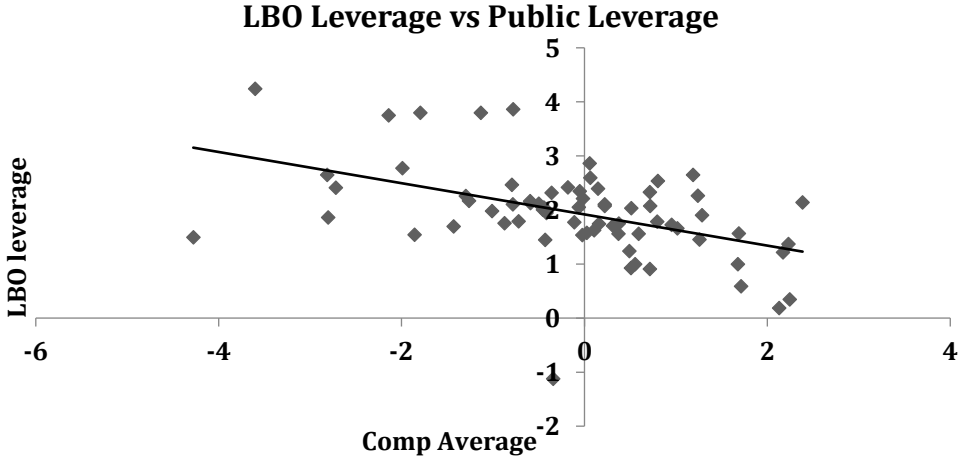
potential explanation. Based on these results, it can be argued that the public market does not price levered companies higher or even penalises highly levered companies, while the Nordic PE industry accepts higher deal values if they can finance them relatively more with debt. The former conclusion is in line with the empirical analyses of the US and European deals, where Axelson et al. (2009, page 26) also find

"[…] leverage and pricing in buyouts do go hand in hand".

Since there is a negative relationship between the pricing of the two and the different variables that determine the pricing are identified, the next logical step is to analyse the relationship between the use of leverage in the LBOs and their respective comparable public companies – is this also negative?

The use of Leverage

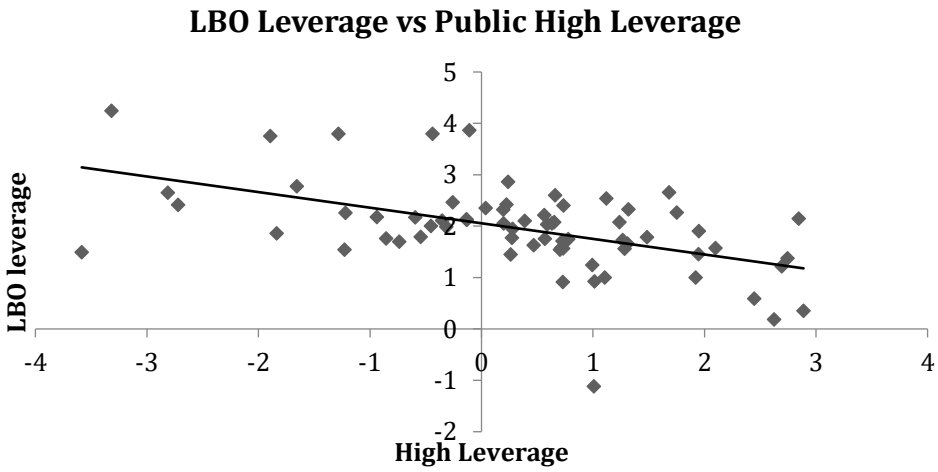
The relationship between how the two financial groups in question use leverage was examined by regressing the log of the debt to EBITDA multiple for LBOs to the comparable companies.



	Coefficients	*Standard Error*	*t Stat*	*P-value*
Average leverage	-2,887E-01	6,649E-02	-4,342E+00	4,886E-05

Figure 8 The log of the Debt to EBITDA ratio for LBOs against the average equivalent ratio for the comparable public companies.

With a P-value of -4.34 the relationship is significant and negative with a coefficient of -0.29 (figure 8). However, with an intercept of 1.92, the LBOs are more levered unless their peers have a log ratio above approximately 1.48. This equals a debt to EBITDA multiple of approximately 4.39. The average public company in the sample was structured with 26% debt and was levered 1.89 times EBITDA. Of my sample, only 10.4% of the comparable companies had leverage multiple above 4.39. Hence, 90% of the LBOs were higher levered than the comparable companies. Both the intercept and coefficient increases in absolute terms when each LBO deal is regressed only on the more leveraged of the two respective comparable companies (Figure 9).



	Coefficients	*Standard Error*	*t Stat*	*P-value*
High Leverage	-3,037E-01	6,274E-02	-4,840E+00	7,985E-06

Figure 9 The log of the Debt to EBITDA ratio for LBOs against the highest of the two comparable public companies for each deal.

Based on these results, I draw the conclusion that there is, in fact, a statistically significant relationship between the capital structure of Nordic LBOs and public companies. However, since this relationship is negative, the two cannot only use complete different decision variables for their capital structure, since it should also be fair to assume that they have the inverse relations to some variables – which causes the significant negative relationship.

Again, my results demand further analysis to fully grasp the logic, or at least thought process, behind the capital structure and deal value of Nordic buyout deals. To further break down the relationship, I will in the following

perform and present both multi – and bivariate regressions to study the explanatory macro and micro variables behind the use of leverage in LBOs and Public companies.

Explanatory variables for leverage

The variables I used had to be relevant for all four countries (I chose to ignore that one Icelandic deal), public companies, and LBOs. I, therefore, chose country specific macros and stock indices, and, maybe mostly for my own curiosity, Brent Crude Oil Spot price. Since close to none of the LBO deals were public to private, I did not have access to ROIC or any other company specific profitability ratio for a representative amount of deals. However, I did include ROIC in the public leverage regression. See table 5 for an overview of variables and the regressions. Since Axelson et al. (2009) is my benchmark research paper, I have used as many as the same variables as them as possible, although I failed to locate all of them.

	Multivariate				**Bivariate**		
	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Coefficient***	***T Stat***	***P-Value***
Intercept	1,821	7,405	0,246	0,807			
OSEBX	0,000	0,018	-0,026	0,980	-0,003	-1,273	0,207
OMX Stockholm	0,015	0,024	0,637	0,527	-0,003	-0,693	0,491
OMX Helsinki	0,000	0,001	-0,295	0,769	0,000	-0,113	0,910
OMX Copenhagen	-0,006	0,018	-0,346	0,731	-0,002	-0,887	0,378
NOR_Infl	-0,698	0,459	-1,523	0,134	-0,354	-0,941	0,350
SWEDEN_Infl	0,121	0,523	0,232	0,818	-0,151	-0,439	0,662
DENMARK_Infl	1,083	1,576	0,687	0,495	-0,474	-0,445	0,658
FILNAND_Infl	-301,140	213,323	-1,412	0,164	-196,473	-1,384	0,171
BRENT CRUDE	-0,004	0,049	-0,073	0,942	-0,020	-1,548	0,126
GNOR10YR	2,028	1,924	1,054	0,297	0,306	1,066	0,291
GSWE10YR	-2,155	2,069	-1,042	0,302	0,235	0,795	0,430
GDK10YR	0,216	1,056	0,204	0,839	0,288	0,974	0,334
EURIBOR	46,956	63,264	0,742	0,461	18,786	0,781	0,437
ROIC	-0,014	0,036	-0,375	0,709	-0,020	-0,613	0,542

Table 5 Overview of variables and results from multi and bivariate regressions for the explanatory variables behind the leverage of public companies

As seen from table 5, none of the variables in the multivariate regression used to examine the leverage in public companies are significant – underlined

by an adjusted R Square value of 0.252. To rule out the chance of this being as a result of statistical problems, I also run separate bivariate regressions on all variables individually. Still, none of the variables are significant, although some of them are close to being so. The three closest are the spot price of Brent Crude Oil, Finish inflation, and OSEBX – all with negative coefficients. Note that the two former are amongst the most significant in the multivariate analysis as well. I also performed a separate analysis using only the one comparable company for each deal that was the highest levered. In this regression, Brent Crude was significant at a 94% confidence level, followed by OSEBX and OMX Copenhagen in descending order – but the latter two were not significant, although very close (Table 6).

	Multivariate			
	Coefficients	***Standard Error***	***t Stat***	***P-value***
Intercept	-4,282	9,518	-0,450	0,655
OSEBX	-0,038	0,024	-1,602	0,115
OMX Stockholm	0,004	0,031	0,122	0,903
OMX Helsinki	0,000	0,001	0,067	0,946
OMX Copenhagen	0,033	0,023	1,398	0,168
NOR_Infl	-0,371	0,589	-0,629	0,532
SWEDEN_Infl	-0,462	0,672	-0,688	0,494
DENMARK_Infl	-2,243	2,026	-1,107	0,273
FILNAND_Infl	0,799	274,188	0,003	0,998
BRENT CRUDE	0,121	0,063	1,926	0,060
GNOR10YR	-0,517	2,473	-0,209	0,835
GSWE10YR	1,078	2,659	0,405	0,687
GDK10YR	1,018	1,357	0,750	0,457
EURIBOR	26,740	81,314	0,329	0,744
ROIC	0,029	0,046	0,632	0,530

Table 6 Multivariate regression with macro and micro economic variables on only the most levered comparable public companies.

Since the EBITDA is directly influenced by the Oil price, it is possible that the oil-related companies appear higher levered when the oil price, and hence EBITDA, goes down even though their leverage defined as debt over total assets remains constant. Also note that ROIC is not significant, which means that my

empirical evidence does not support the theory that the most profitable companies maximise their tax shield – as discussed in the literature review.

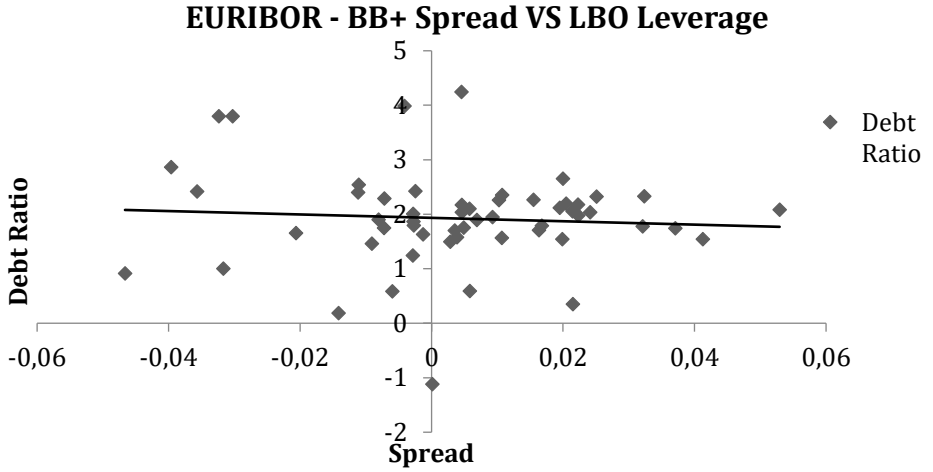
For me to be able to draw any conclusion from this leverage break down, I consider it necessary to use the most significant variables as a basis for comparison - despite their insignificance. Any potential conclusions can therefore not be considered sufficiently empirically tested, but be more of a suggestive nature. However, they will, in my experience, be able to raise interesting questions as well as give guidance to future research.

When regressing the same independent variables on the debt of my buyout sample, two key differences appears: EURIBOR has a coefficient of 13.02 and is significant with 97% confidence level, and the second and third most significant variables are OMX Helsinki and Norwegian inflation. Results are presented in table 7 below.

	Multivariate				**Bivariate**		
	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Coefficient***	***T Stat***	***P-Value***
Intercept	1,639	1,849	0,887	0,379			
OSEBX	0,007	0,005	1,298	0,200	0,000	0,691	0,492
OMX Stockholm	-0,006	0,007	-0,792	0,432	0,000	0,161	0,872
OMX Helsinki	0,000	0,000	-0,784	0,437	0,000	**1,084**	0,282
OMX Copenhagen	0,000	0,005	-0,053	0,958	0,000	0,642	0,523
NOR_Infl	0,203	0,111	1,832	0,073	0,085	**0,917**	0,362
SWEDEN_Infl	-0,146	0,171	-0,853	0,398	0,015	0,180	0,858
DENMARK_Infl	0,359	0,386	0,931	0,356	0,084	0,321	0,750
FILNAND_Infl	-44,582	51,192	-0,871	0,388	-9,258	-0,261	0,795
BRENT CRUDE	-0,010	0,013	-0,759	0,451	-0,002	-0,648	0,519
GNOR10YR	-0,186	0,554	-0,336	0,739	0,021	0,291	0,772
GSWE2YR	0,395	0,527	0,749	0,457	0,057	0,900	0,371
GSWE5YR	-0,276	1,115	-0,247	0,806	0,046	0,683	0,497
GSWE10YR	0,087	1,061	0,082	0,935	0,041	0,554	0,581
GDK1YR	-0,140	0,260	-0,537	0,593	0,049	0,845	0,401
GDK10YR	0,229	0,321	0,713	0,479	0,010	0,142	0,887
EURIBOR	29,011	17,643	1,644	0,106	13,019	**2,268**	0,027

Table 7 Overview of variables and results from multi and bivariate regressions for the explanatory variables behind the leverage of Nordic LBOs.

This is somewhat surprising since this could mean that LBOs are more levered when the European risk-free rate increases – which EURIBOR often is used as a proxy for. However, when EURIBOR is used as the basis for calculation of the spread on European leveraged loans (proxied by the yield to maturity on BB+ bond-issues), the relationship becomes negative – though far from significant (figure 10). This means that my data does not prove that Nordic PE managers lever their investment higher when the debt becomes cheaper as Axelson et al. (2009) discovered was the case for the US and European deals in general. I want to stress that the data from the latter regression was the data I had the most problems with regarding both quality and quantity – and I consider this to be the part of this paper that should be the most interesting for further research.



	Coefficients	*Standard Error*	*t Stat*	*P-value*
Spread	-3,113	5,955	-0,523	0,603

Figure 10 Spread between EURIBOR and the yield on Northern Europe BB+ issues against the Nordic LBO leverage.

Regarding the second and third most significant explanatory variables, their positive coefficient supports the negative correlation found between the leverage in public companies and LBOs – since the variables are of the same economic nature as those for public companies, only positive. Based on these results, one conclusion can be that the Nordic economic environment causes the negative relationship. This is further based on the logic that both stock indices and inflation increase when the market exhibits long-term economic growth.

This would mean that LBOs increases their leverage in times of economic growth, whereas the comparable public companies make sure to decrease their leverage as the opportunity for this prevails.

But why is this? Is this the case for LBOs because of the access to debt increases? Do public companies, in general, use the excessive cash gained from the economic growth to pay down their debt?

V Conclusions

This paper has performed in-depth empirical analyses of the leverage in Nordic Private Equity transactions, based on deal data on acquisitions that took place between 1997 and 2016. This is the first time, to my knowledge, that a data-set like this have been built, and these analyses have been executed specifically on Nordic Buyout Deals. The deal value of 94 buyout deals was regressed toward the pricing of comparable public companies, a relationship that was found to be negative and significant. In my sample, LBOs were priced the highest, as defined by deal value to EBITDA, until an EBITDA multiple of 8.05.

The negative relationship between the pricing of the two is not successfully explained by macroeconomic factors, of which none are found to have explanatory power on neither the leverage nor pricing for neither public companies nor Nordic LBOs. However, leverage is found to explain the deal value in Nordic LBOs, but not the pricing of public companies. Thus, I conclude that leverage is the factor, or at least one of the factors, that causes the negative relationship between the pricing of Nordic buyout deals and their respective comparable public companies. This means that this paper does not support the market-timing theory in regard to Nordic buyouts, since this would mean that the correlation should be positive. Hence, my results are in line with previous research (Axelson et al. (2009) and Gompers et al. (2015)).

To explain the latter results and gain deeper insight into the determinants behind the leverage in Nordic buyouts, bi - and multivariate regressions was run on the leverage in both LBOs and public companies using macro - and microeconomic factors. The spot price on Brent Crude Oil, Finnish inflation, and the return on OSEBX are the three most significant variables explaining the use of debt in public companies in descending order – whom all have a negative

coefficient. For LBOs, the equivalent variables are EURIBOR, OMX Helsinki, and Norwegian inflation, which are all positively related to LBO leverage. Based on this, one conclusion may be that PE managers levers their investments relatively more in periods of economic growth, while public companies decrease their use of debt relative to profitability (proxied by EBITDA) in general market up-trends. However, this is a speculative conclusion. The results based on the variables I used does not allow me to sufficiently draw any conclusion in regard to the trade-off theory, as Axelson et al. (2009) did.

The reason behind this is not included in the scope of this paper but is considered to be of great interest for future research. Is it the cost of debt that causes the increase in debt for LBOs (which observations in this paper points towards), or is it an optimistic bias in the debt capital market that significantly increases the access to debt? If so, why don't the Nordic public companies exploit this access to "cheap" capital?

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Appendix 1

Industry count and overview of deal sample.

Industry	Count	Industry	Count
Aircraft Finance & Leasing	1	Industrial Fans & Blowers	1
Animal Feed	1	Industrial Machinery	1
Apparel Design	1	Infrastructure Software	2
Application Software	4	Internet Based Services	1
Auto Parts	2	Investment Management	1
Banks	1	IT Services	2
Basic & Diversified Chemicals	4	Logistic Services	1
Biotech	1	Material Handling Machinery	1
Business Process Outsourcing	1	Medical Equipment	1
Cable and Satellite	1	Metalworking Machinery	1
Communications Equipment	2	Mortgage Finance	1
Construction Materials	1	Motorhomes, Trailers & Campers	1
Consumer Cyclicals	1	Non wood Building	2
Consumer Electronics	1	Office Supplies	1
Container and Packaging	2	Oil & Gas Services	2
Corrugated Packaging Metal	1	Oilfield Service Equipment	1
Customer Relation Mgmt	2	Other Commercial Services	4
Design and manufacturing	1	Other Machinery	1
Educational Service	1	Other Spec Retail - Discr	1
Electricity Transmission	1	Other Sporting Equipment	1
Enterprise Software	3	Other Wholesale products	1
Fabricated Metal & Hardware	1	Other wholesaler	1
Factory Automation Equipment	2	Packaged Food	2
Financial Transaction Proc Services	1	Paper	1
Food and Drug Stores	1	Periodical Publishers	1
Generic Pharma	1	Proffesional Services	1
Health Care Facilities	1	Real Estate Services	3
Health Care Services	4	Rubber and Plastic	1
Health Care Supplies	2	Specialty Apparales Stores	1
Healthcare	2	Specialty Chemicals	2
Home Improvement	1	Sporting Goods	1
Home Products Store	1	Surgical Appliances & Supplies	1
Hotel & Motel (excl. Casino Hotel)	1	Telecom Carriers	1
Household Appliances	1	Textile	1
Household Furniture	1	Venture Capital	1
Housewares	1	Wealth Management	1
HVAC Building Products	1	Windows & Doors - Building Products	1
Industrial Distribution & Rental	1	Wireline Telecom Services	1
Industrial Electronics Equipment	1	Wood building Materials	1
		(blank)	24
		Formula1	
		Grand Total	131

Executive Summary

This paper analyses the relationship between, and determinants for, leverage and pricing in Nordic public companies and Nordic Leveraged Buyouts. The analyses are based on a dataset consisting of 94 Nordic Private Equity buyout deals, defined by the headquarter of the target company. The work is performed as a part of the requirements for the award of the MSc in Management at Luiss Guido Carli.

Private Equity

Traditionally, private equity has been split into Venture Capital and Leveraged Buyouts. A VC investor invests 100% equity for a minority stake in an early stage and high-growth company and normally has a 5-10-year time horizon. VCs are considered to be the riskiest category in PE, with more than a third of the investments defaulting (Kaplan and Strömberg, 2008). The investor's role is of supportive nature and is mainly to support the development and growth with their expertise, and be the source of liquidity to companies that cannot access traditional financing (Miller, 2016). LBOs, on the other hand, are highly leveraged equity investments in mature companies that operate in traditional industries. They are considered to be risky investments, but, unlike VCs, failures (when investors receive less than 1x investment) are considered to be exceptions. A normal buyout investment is between $1m to $10bn equity leveraged by 2X – 3X debt (Miller, 2016), where the target companies´ management is normally incentivised with a 5%-20% equity stake bought on favourable terms. The time horizon is shorter than for VCs, with an investment usually being exited after 3-7 years. The investor´s role also differs significantly from VC, as the investment professional's aims to create value in underperforming business by actively taking control over all the divisions of the business.

VC investments are the oldest of the two, where the first known VC firm, American Research and Development Corporation (ARD), was established in 1946. However, in was not before The Small Business Act was passed in 1958 that the industry flourished. The act was passed to ensure long-term capital to American SMBs. The VC industry is still to this day bigger than LBOs in volume, but the latter far exceeds VC in aggregate value. LBO firms,

as we know them today, came to life shortly after World War II. However, highly levered investments had been carried out before this (e.g. Henry Ford`s minority stake in Ford Motor company financed by 70% debt). The first, modern, leveraged buyouts came in the form of public-to-private acquisitions, as a result of the previous merger wave characterised by conglomeration. These public-to-private deals were initially executed by the management or founding family, whom "finally" had the opportunity to gain status as majority shareholder thanks to the banks` willingness to structure and finance deals that demanded only a small proportion equity. Kravis, Kohlberg, and Roberts were among the investment bankers working on such deals in Bear Sterns in the mid-1960s. However, after their proposal to start up a separate division specialised in LBOs were turned down, they left Bear Sterns and established KKR. The three investment bankers` expertise quickly materialised in the deal values, and within few years they raised a specialised public-to-private fund. Their deal and firm structure was imitated within few years, and as the competition for deals increased so did the deal values. This led to a merger-wave characterised by LBOs. This wave peaked in 1989 when KKR led the $25 billion acquisition of RJR Nabisco, which was shortly followed by a credit crisis and a recession. Since then, the industry has had its up and downs. However, since the last recession hit in 2007 and caused the PE aggregated annual deal value to hit rock bottom in 2009, the industry has grown at a rapid pace to record highs. In June 2016, the global AUM was $2.49 trillion, with $820 million in global dry powder. Now, 57% of all institutional investors allocated a proportion of their portfolio towards private equity. With a three-year annualised average return of 16.4% (until June 2016), 95% of the institutional investors feels their PE allocation has exceeded or met their performance expectations.

However, as the market has developed to become more complex, a demand for new sources of financing has emerged which has led to the establishment of sub-types of private equity. These sub-types are triggered by special corporate events or are considered as more alternative than traditional assets – including venture capital and buyout. Invest Europe, the European association for private equity, venture capital, and infrastructure sectors, points toward 3 main sub-types, each containing two categories of investments (Invest Europe, 2016). The first sub-type is "special situations" that triggers a demand

for capital, but certain circumstances eliminates the possibility of raising traditional capital. The two special situation investment categories are "distressed investments" where you acquire equity or debt of a company in a distressed situation, and "turnaround/restructuring" where the investor finances an existing business that is in the need of significant improvement or change. The second sub-type is "debt-related investments" with the two under categories "mezzanine" and "private debt". Mezzanine is subordinated debt that is either unsecured or with junior access, which is provided alongside equity (often from a buyout firm) and the senior debt from other lenders. Private debt is more broadly defined, and ranges from senior to subordinated. It is normally provided to small and medium-sized businesses, and, as mezzanine, is often provided alongside equity for a buyout deal. The private debt funds were raised mainly in response to the recent financial crisis, since corporations` need for capital did not match the banks` willingness to provide it. The last sub-type of private equity is what Invest Europe calls "alternative forms of private equity". The two alternative forms that Invest Europe refers to are "real estate private equity" and "infrastructure private equity". Both real estate (commercial and private real estate assets) and infrastructure (transportation, energy, utilities, social infrastructure, communication etc.) structures their investments as a PE fund, using both equity and debt (Invest Europe, 2016).

Although the US PE industry started in the 1950s, the Nordic PE industry did not see any PE firms emerge before the 1990s. Between 1989 and 1991 several Nordic PE firms were established, where most of them were founded by banks and insurance companies. Among these were Scandinavian Equity Partners, which is now known as EQT and is among the biggest European PE firms. The first Nordic deals were in line with the then current global PE trend, where they acquired non-core or non-synergistic divisions of conglomerates. However, unlike their international counterparts, the management in Nordic PE firms possessed industrials expertise – not financial as was the case with US management. The aggregated Nordic deal value climbed to a record of €10 billion in 2011, only two years after the bottom in 2009. However, in the time-period between 2012-2015 the aggregated deal value varied between €6 billion and €8 billion, before it almost doubled to a new record in 2016 to €11.5 billion. As of January 2017, there are 225 private

equity firms based in the Nordic region. The 21 largest buyout funds that have raised capital since 2014, which aggregates to €16.5 billion – 50% of all private capital raised in this period.

Capital Structure Theory

Of all the corporate finance theories regarding capital structure that has been developed, there are some that have been more accepted than others. The trade-off theory that was developed in 1963 by Modigliani and Miller is among the most famous. This theory says that the optimal debt/equity ratio is found by trading off the benefits and costs related to debt. The main benefits are tax shield and added discipline, and the main costs are expected bankruptcy cost, loss of flexibility, and agency problems. The market-timing theory dictates that companies decides their capital structure based on the current valuation of their equity. Within this, there are two different understandings: one, companies chose to deviate from current capital structure by issuing equity because of current information asymmetry that increases their stock price. Two, the management consider their cost of equity to be perceived too low, meaning that they can exploit the mispricing by issuing overpriced equity. The market-timing theory also includes exploiting low cost of debt; increasing their debt proportion as interest rates decreases. The pecking order theory claims that a company`s optimal capital structure is dependent on their specific need for external capital. Myers (1984) ranks the alternatives for financing with internal financing being the most preferred, followed by debt (from traditional bank debt as the safest, to convertible debt as the riskiest), and lastly issuance of equity to external investors. Of these three capital structure theories, Axelson et al. (2009) concludes that the pecking order theory is the least likely to explain the use of leverage in buyouts. This is based on the logic that if the Pecking Order Theory dictated leverage, the more profitable companies, proxied by ROIC, would be less leveraged. Not only does this oppose the trade-off theory, but also the concept of LBOs, which, very simply put, is using every argument available to minimise the equity proportion, hence maximise leverage, to capitalise on the gearing. This means that the market-timing theory and the trade-off theory are the theories that are the most interesting to analyse in the context of leverage buyouts.

Several academics have studied the determinants for Capital Structure in public companies, and have consequently produced different theories regarding them. However, the capital structure behind private equity deals was not put under the loop before Axelson et al. (2009) performed a comprehensive empirical analysis on the topic. To better understand the capital structure specifically for LBO transactions, Axelson, Jenkinson, Strömbert, and Weisbach (2009) constructed a database of US and European deals performed between 1997 and 2007. Next, they performed detailed time series and cross-sectional analysis on the capital structure and its determinants in LBOs and comparable public companies. They found no relationship between the use of debt in public companies and LBOs, and the factors found to explain leverage in public companies had no explanatory power over the level of which buyouts was levered. Their findings consequently contradict traditional capital structure theories such as the Modigliani and Miller analysis. They also unveil that leverage has a large impact on the LBO deal values, and the lower the cost of debt – the higher the deal values. In general, they confirm the statements of several PE practitioners: they want to finance their investment with as much debt as possible. They found varying evidence of the trade-off theory. These results were reinforced by Gomper et al. (2015), who researched the same topic but with a different research design. Through a survey of multiple private equity professionals, they uncovered that the same proportion, two thirds, of their respondents used the trade-off theory and market-timing theory when determining the capital structure in their deals. They also found other differences between their respondents and the public company managers that participated in Graham and Harvey`s (2011) survey. The most notable difference is their feelings toward flexibility, where under 10% of the PE professionals looks at this as important, whereas is was the most important factor for the public company managers. However, Axelson et al. (2009) and other research on capital structure have unveiled geographical differences. This motivated me to focus on the capital structure in Nordic Leveraged Buyouts specifically.

Data and Analysis

Initially, data was collected with extractions from Dealogic and Dealscope, where deal values, debt values (for deal financing, so both bank loan tranches and bond issues) and EBITDA was extracted. As this only provided the necessary data for a fraction of the deals, I also used Bloomberg, Zephyr, Proff.no, and Capital IQ to complete the dataset. However, data were still missing, so I also used an extensive amount of web searches and found the missing information in annual reports and newspapers. This left me with a dataset consisting of 175 deal values, 121 debt values, and EBITDA on 145 target companies. However, since I only found one of these values for several deals, I crosschecked them and ended up with deal value and EBITDA on 94 deals, and debt data on 69 of these. I gathered deal data about the deal value, leverage, and EBITDA on each target, and matched each deal with two comparable public companies. Companies were classified as a comparable based on the Bloomberg Industry Classification System (BICS). Before cross checking the deal values, the deal data-set consisted of 131 deals from 79 different identified industries. I failed to identify the BICS of 24 of the deals. In total, I collected enterprise value, market value, and EBITDA on 269 comparable public companies, and debt values on 251 of these. In some cases, I failed to locate comparable companies that operated in the same industry as the respective deal. In these situations, I subjectively chose companies that operated in the most resembling industry.

By comparing this to Argentum`s 2009 and 2016 Nordic Private Equity reports, it is evident that the number of deals in my data-set almost replicates the general Nordic PE trend regarding distribution of deal volume. Geographically, Sweden has 45% of deal volume, Denmark 24%, Norway 23%, and Finland 13%. Although this is not evenly distributed geographically, it is in line with the Argentum`s observations However, in Argentum`s market overview Finland has a larger proportion of the deal volume than Norway. It is apparent that the sample is biased towards large deals compared to the observed Nordic deal values – with almost 70% of the deal values exceeding € 100,000,000. The average deal value in the Nordic countries in 2015 was approximately € 15,000,000 (Argentum, 2015), but approximately 97% of my sample exceeds this. The number of observations is in some cases quite low, with several of the regressions only consisting of 68 and 69 observations. Due

to the long time-period I analysed, this often meant that there were several months between each observation. This is a because of the difficulty of locating detailed deal information on private equity deals.

The pricing-trends of LBOs and public companies were plotted and examined, followed by a bivariate regression where a significant negative relation between the pricing of Nordic LBOs and public companies was unveiled – both before and after adjusting for extreme values. Since these results contradicted previous research, I further analysed the explanatory variables behind the pricing of both groups, but the macroeconomic variables used in the multi and bivariate regressions failed to uncover why the relationship between them was negative. Also unlike recent research, I do not observe a significant increase in EBITDA multiples the later years. The average EBITDA multiple for the public companies in the dataset has remained in the interval between 8.54 and 10.08, and the same interval has been 8.18 and 14.68 for the LBO deals (adjusted).

When using the log of the Debt to EBITDA ratio as a proxy for leverage, I found no significant relationship between the capital structure and pricing of public companies. Even when I ran the regression using only the most levered comparable company for each deal, the relationship did not hold. Hence, based on my dataset I can conclude that the use of debt does not determine the pricing of the public companies in my dataset. However, when running the same regressions for LBOs, the relationship was significant at a 99% confidence level. Based on these results, I draw the conclusion that the use of leverage is the factor, or at least one of the factors, that causes the negative relationship between the pricing of LBOs and their respective comparable public companies. These results also mean that it can be argued that the public market does not price levered companies higher or even penalises highly levered companies, while the Nordic PE industry accepts higher deal values if they can finance them relatively more with debt. These results are in line with previous research, and Axelson et al. (2009) concludes: *"[…] leverage and pricing in buyouts do go hand in hand".* I continue performing an in-depth analysis of the explanatory variables behind the use of leverage for the two groups.

For my deal sample, there is a significantly negative relationship between the leverage in public companies and private equity transactions. With

an intercept of 1.92, the buyouts appear to be more levered until the point where public companies exhibit a debt to EBITDA ratio of 4.39 and above. In my sample, only 10.4% of the comparable companies had leverage multiple above 4.39. Hence, 90% of the LBOs were higher levered than the comparable companies. This relationship holds, and the coefficient increases in absolute terms, when the same analysis is performed only on the most levered of the two comparable companies for each deal respectively. Based on these results, I draw the conclusion that there is, in fact, a statistically significant relationship between the capital structure of Nordic LBOs and public companies. However, since this relationship is negative, the two cannot only use complete different decision variables for their capital structure, since it should also be fair to assume that they have the inverse relations to some variables – which causes the significant negative relationship.

To examine this assertion, I ran multi – and bivariate regression analyses on 16 different variables (both macro and micro) (Table 3-7). The variables consisted of typical macro figures specific for each Nordic country, and in the leverage regression for public companies I also included ROIC. Although none of the independent variables had a significant explanatory power on the leverage in public companies, the three most significant variables were: Brent Crude spot price, Finnish inflation and the return on OSEBX – whom all had negative coefficients. These three variables were used in the following when comparing public and LBO leverage. Since I ran bivariate regressions and did not perform regressions using control variables, the following results are exploratory.

EURIBOR is the only significant explanatory variable for leverage in buyouts, which suggests that Nordic Private Equity General Partners (GPs) increases their leveraged as the European risk-free rate increases. In contrast to Axelson et al. (2009), the EURIBOR and BB+ spread is not significant, which means that I do not possess evidence of Nordic PE managers increasing their leverage as the cost of debt decreases. However, the significance of EURIBOR might be linked to the inverse effect on valuations through the discount rate, or be a proxy for the general economic environment where PE GPs increases their leverage in an environment where the market demands higher "risk free" payoff. Hence, this an explorative analysis, and further research is necessary.

Conclusions

This is the first time, to my knowledge, that a data-set like this have been built, and these analyses have been executed specifically on Nordic Buyout Deals. The deal value of 94 buyout deals was regressed toward the pricing of comparable public companies, a relationship that was found to be negative and significant. In my sample, LBOs were priced the highest, as defined by deal value to EBITDA, until an EBITDA multiple of 8.05.

The negative relationship between the pricing of the two is not successfully explained by macroeconomic factors, of which none are found to have explanatory power on neither the leverage nor pricing for neither public companies nor Nordic LBOs. However, leverage is found to explain the deal value in Nordic LBOs, but not the pricing of public companies. Thus, I conclude that leverage is the factor, or at least one of the factors, that causes the negative relationship between the pricing of Nordic buyout deals and their respective comparable public companies. This means that this paper does not support the market-timing theory in regard to Nordic buyouts, since this would mean that the correlation should be positive. Hence, my results are in line with previous research (Axelson et al. (2009) and Gompers et al. (2015)).

To explain the latter results and gain deeper insight into the determinants behind the leverage in Nordic buyouts, bi - and multivariate regressions was run on the leverage in both LBOs and public companies using macro - and microeconomic factors. The spot price on Brent Crude Oil, Finnish inflation, and the return on OSEBX are the three most significant variables explaining the use of debt in public companies in descending order – whom all have a negative coefficient. For LBOs, the equivalent variables are EURIBOR, OMX Helsinki, and Norwegian inflation, which are all positively related to LBO leverage. Based on this, one conclusion may be that PE managers levers their investments relatively more in periods of economic growth, while public companies decrease their use of debt relative to profitability (proxied by EBITDA) in general market up-trends. However, this is a speculative conclusion. The results based on the variables I used does not allow me to sufficiently draw any conclusion in regard to the trade-off theory, as Axelson et al. (2009) did.

Further research about the explanatory variables for leverage in Nordic buyouts should be a topic of interest for anyone wish to gain deeper

understanding of the topic in this paper. Is it the cost of debt that causes the increase in debt for LBOs (which observations in this paper points towards), or is it an optimistic bias in the debt capital market that significantly increases the access to debt? If so, why don't the Nordic public companies exploit this access to "cheap" capital?

The main finding of the paper is in line with previous research (Axelson et al. 2009 and Gromper et al. 2015) that concludes that the market-timing theory does not explain the leverage in LBO deals.

Because of the controversy around the usage of insignificant variables as evidence for empirical conclusions, I explicitly note that results and conclusions based on these results are of suggestive nature, and more empirical evidence must be collected for the empirical evidence to be sufficient.