

Private Equity's Effect on Financial Fragility in Sweden

An examination of Swedish private equity backed companies during the 2008 financial crisis

Andrea Mattsson* Molly Kjessler**

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ABSTRACT

Does private equity ownership impact financial stability during an economic crisis in Sweden? Through examining Swedish private equity owned companies' investment, funding and performance patterns, it is found that private equity backed companies have a positive effect on the economy relative to their non private equity owned counterparts. The empirical results show that private equity backed companies decreased their capital investments and debt issuance less than the non private equity backed companies, enabling them to uphold investment activity. The thesis provides suggestions for, and understandings of, the future in terms of how the financial performance and fragility will be affected during unstable periods.

Keywords: Private Equity, Capital Structure, Financial Crisis of 2008, Capital Investment, Debt Issuance, Equity Injections, Financial Fragility

Tutor: Cristian Huse, Assistant Professor, Department of Finance, Stockholm School of Economics

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* B.Sc in Business and Economics, 23494@student.hhs.se

** B.Sc in Business and Economics, 23495@student.hhs.se

Table of Contents

1. Introduction	2
1.1 Background.....	2
1.2 Purpose	3
1.3 Scope and Description of Investigation	4
1.4 Contribution.....	5
2. Previous Research and Theoretical Framework	6
2.1 Private Equity and Financing.....	6
2.2 Capital Structure Decisions and Leverage	7
2.3 Relationship Banking.....	9
2.4 Previous Conducted Study: Private Equity and Financial Fragility during the Crisis	10
2.5 Sweden and the Financial Crisis 2008	10
2.6 Capital Investments and Economic Growth.....	12
3. Hypothesis.....	12
4. Method	13
4.1 Construction of Sample	13
4.2 Creating a Matching Sample.....	14
4.3 Specifications of Dependent and Independent Variables.....	16
4.4 Firm Characteristics and Trends	17
4.4.1 Pre-crisis Firm Characteristics	17
4.3.2 Pre-crisis Trends.....	19
5. Empirical strategy/ Identification Strategy.....	20
5.1 Difference-in-Difference and Regression Equation.....	20
5.2 Fixed Effects Regressions and Comparisons	22
6. Main Results.....	24
6.1 Difference-in-Difference Results.....	24
6.1.1 Debt Issuance	24
6.1.2 Capital Investments	25
6.1.3 Equity Injections	26
6.1.5 Cost of Debt	27
6.1.4 Leverage.....	27
6.1.6 Conclusion of Difference-in-Difference Estimates	28
6.2 Fixed Effects Regression Results.....	28
6.3 Regression Result Controls.....	30
6.3.1 Robustness Test.....	30
6.3.2 Limitation in Result Interpretation	31
7. Discussion	31
7.1 General Discussion.....	31
7.2 Discussion of Capital Investments	32
7.3 Discussion of Debt Issuance.....	33
7.4 Discussion of Equity Injections.....	34
7.5 Discussion of Cost of Debt.....	34
7.6 Discussion of Leverage Ratio.....	35
7.7 Discussion of Robustness	35
8. Conclusion	36
References	38
Appendix	40

1. Introduction

1.1 Background

Given the record of turmoil, volatility and uncertainty characterizing the world's financial markets during the recession of 2008, concerns were raised among policymakers, the financial sector and the public at large, leaving them with the fundamental goal of promoting financial stability (Bernanke, Gertler, & Gilchrist, 1998; Reinhart & Rogoff, 2009). It was primarily insufficient banking systems and regulators that triggered concerns (B. Bernanke, 1983). Parallel to this, Axelson, et al. (2013) state that the high level of corporate debt, enabled by the booming pre-crisis period, was lifted as an important underlying issue leading up to the crisis. The issue lays in the risk of firms entering financial distress, reducing investment activity and contributing further to the economic downturn. In contrast, leverage can be perceived as an asset, used to contribute to economic growth through investment (Bernstein, Lerner, Sorensen, & Stromberg, 2016). Leverage financing being an integral part of private equity ownership (Kaplan & Strömberg, 2009), makes private equity-backed companies' way of handling the 2008 crisis interesting to observe. This paper aims to provide evidence of the effect of private equity ownership on the financial stability in times of crisis through studying the Swedish private equity market during the financial crisis of 2008.

Sweden as a market is suitable to study as the country has a leading position within private equity. In particular, given the size of the economy, the Swedish leverage buyout market is large in comparison with other countries. Some of the largest and most specialized private equity firms in Europe are located in Sweden (Næss-Schmidt, Heebøll, & Karlsson, 2017). Over the last decade (2006-2016), more than 1 000 Swedish companies have received private equity investments, which amounts to approximately 22.9 billion euro (Statista, 2018). To set this sum in perspective, it is almost equivalent to the total stock listing value on Nasdaq Stockholm during the same period (Nasdaq, 2018). The 1 000 companies represent 270 000 employees, equivalent to 7.5 % of all private employees and 5.5 % of Sweden's GDP. For all these companies, the private equity investment has had a direct impact on their growth and how well they perform (Næss-Schmidt et al., 2017). The classification of industry among Swedish private equity backed companies is well consistent with the overall distribution in Sweden. The distribution of industry for private equity investments is displayed in Figure 3. Industrial goods, consumer goods, IT & technology and health & education are all large industries, both in Sweden in general, and within the private equity portfolios (Swedish Private Equity and Venture Capital Association, SVCA, 2018).

During the two years prior to the 2008 crisis the credit terms were exceptional (Kaplan & Strömberg, 2009). To concretize the role of leverage in private equity ownership during the pre-crisis period, one can look at the debt to equity ratio. In 2007, Swedish private equity firms in total invested 3.1 billion euros (Statista, 2018). During the same period the equity ratio within private equity averaged in the low 30 %, meaning that for every euro raised in equity, 2.30 euro were raised in debt (Schwarzberg & Parker, 2016). These numbers are results of the period's booming financial markets, generating greater private equity funding and significantly higher leverage ratios (Axelson et al., 2013). This phenomenon does not merely correlate to this specific period, private equity markets are in general sensitive to credit cycles.

Research has explored the power of private equity as a beneficial form of ownership in stable economic states. Private equity's unique contribution of resources, principally capital funding in combination with expertise, has evidently led to growth in productivity, profitability and job creation (Bernstein et al., 2016; Davis et al., 2014). However, research that aims to isolate the effect of private equity ownership during periods of crisis and to examine whether this ownership form has an impact on the recovery of the economy, is less common. On the one hand, private equity ownership may play a stabilizing role during a financial crisis, using its capital structure as a tool to boost the economy through investment activity. On the other hand, private equity could be considered as a negative effect on financial stability due to the additional risk initiated by high leverage among the portfolio companies.

1.2 Purpose

This study is relevant for three main reasons. First, the characteristics of private equity ownership, such as high leverage, have proved to be of importance in times of economic turmoil. Previous research connected to the crisis highlights hindering counteracting the efficiency of financial institutions, such as adverse selection, asymmetric information and moral hazard problems, as main factors contributing to financial instability (Bernanke et al., 1998; Mishkin, 1997). In addition, firms with high leverage run higher risk of financial distress when encountered with a crisis, leading to investment holdbacks hampering economic stability (Bernanke, 1983). However, other findings reveal that institutions with relatively more capital, due to higher leverage ratios during the pre-crisis period, had less risk to experience distress during the 2008 crisis. The ability to receive leverage before the crisis breaks out allows for continuous investment activity during times of trouble (Buehler, Samandari, & Mazingo, 2009). Findings on financial distress are also supported by previous work on U.S. bank distress during

the banking crisis in 1989-93, where high leverage companies were less likely to enter distress (Estrella, Park, & Peristiani, 2000).

Secondly, the thesis is of interest due to the enabled possibility of comparisons it provides between Sweden and other markets. To be able to compare results in a correct manner, the thesis follows the method used by Shai Bernstein, Josh Lerner, & Filippo Mezzanotti (2018). In their paper, “Private Equity and Financial Fragility during the Crisis”, private equity backed and non private equity backed companies on UK market during the crisis are examined. Moreover, the report, “Swedish Private Equity Market – A footprint analysis”, supports that Sweden is suitable to examine as the country has a leading position in terms of private equity (Næss-Schmidt et al., 2017). In particular, given the size of the economy, the Swedish leverage buyout market is large in comparison with other countries. The report further states that some of the largest and most specialized private equity firms in Europe are located in Sweden. This is mainly due to the many historical success examples, including the major private equity firms EQT, Nordic Capital, Triton and Altor, which have created a competency cluster for the private equity sector in Stockholm. Over the years 2006 to 2016, more than 1 000 Swedish companies have received private equity investments, which amounts to approximately 22.9 billion euro (Statista, 2018). Furthermore, a similar study has not previously been conducted on the Swedish market. This thesis would thereby serve as basis for understanding in form of assurance for the next time the Swedish market will experience a period of crisis.

Lastly, an analysis revealing results that prove the impact of private equity ownership is of value due to its popularity. As mentioned, private equity ownership has a direct positive impact on growth in productivity, profitability and job creation. A deeper understanding of this topic would be of value for future decisions regarding investments in times of financial distress.

1.3 Scope and Description of Investigation

Data for 312 firms, 156 target firms and 156 control firms, are gathered on the basis of a difference-in-difference method. The 156 Swedish companies that were private equity owned during the time period of 2007 until 2011 are chosen as the target group of the study. A matching control sample, consisting of non private equity backed firms, is established.

The matching control group is chosen to represent the same distribution of industry as the target group. The target companies within in each industry group are then matched to its best non private equity backed counterpart in terms of size, leverage, and

profitability, resulting in a one-to-one matching. Once the 156 matching pairs are established, data needed to construct the key ratios are extracted from the Serrano database. The key ratios acting as dependant variables are capital investments, debt issuance, equity injections, cost of debt, and debt to assets. These variables are examined in order to contribute to explaining the hypothesis. These matched groups of firms are then studied through a difference-in-difference method, and a selection of regressions, where the effect of private equity during the crisis is examined.

Throughout the thesis, the terms private equity and PE are used in the same sense. The denotations PE-owned and PE-backed are used interchangeably and refer to companies that are owned to majority by a private equity firm. Non PE-owned companies represent companies that do not count as PE-owned. These are either publicly or privately owned, but not through a private equity transaction. The words company and firm are used interchangeably. The thesis defines the start of the crisis as mid-2008 and assumes 2008 until the end of 2011 to be the most affected years (Bäckström, 2014). Thus, 2007 represents the last pre-crisis year, and that 2012 represents the first after-crisis year. When the word crisis is used in its definite form, the 2008 financial crisis is referred to. When it is used in its infinitive form, a period of crisis in general is referred to. Given the fact that PE-owned companies account for approximately 5.5 % of total GDP in Sweden (Næss-Schmidt et al., 2017), it may seem to be hard to draw conclusions about their true impact on the financial fragility in Sweden. However, bearing in mind that it is only 1 000 companies that represent this number, the relative impact is still significant. Thereby, the thesis considers the outcome of the empirical study as an impact on the financial fragility in Sweden during times of crisis.

1.4 Contribution

Through examining the dependant variables, the analysis' results imply that PE-backed companies were more resilient in the face of the financial crisis. The results indicate that PE-owned companies experience beneficial opportunities of issuing debt relative to their non PE-owned counterparts the years following the 2008 crisis. PE-owned companies decreased their debt issuance less than non PE-backed companies. The study proposes that this results from benign aspects of private equity and relationship banking. Moreover, the results show that private equity ownership has a positive effect on capital investment. However, equity injections decreased more for the PE-owned companies than for the matched firms.

A concluding prediction is thus that PE-owned companies are able to uphold their investment activity through the access to debt. This implies that PE-owned firms are able to contribute to the financial stability to a higher degree than their counterparts in periods of crises. The results are checked for and considered to be robust. Year fixed effects are controlled for throughout the study in order to eliminate time fixed effects that might disturb the validity of the research examining the differences of ownership form. When firm fixed effects further are included, the differences between the PE-backed firms and the non PE-backed firms disappear, given invariant time.

The paper is organized as follows. In Section II, we present previous research and theoretical framework. In section III, we then describe the hypothesis of the thesis. Section IV and Section V present the method used to test the hypothesis. Here an explanation of construction of sample and empirical strategy is presented. Section VI describes the main results on investment and performance, and is followed by Section VII which discusses the possible explanations to our results and robustness of the tests. Finally, Section VIII summarizes the results and conclusions are presented.

2. Previous Research and Theoretical Framework

2.1 Private Equity and Financing

As Kaplan & Strömberg (2009) explains, a private equity transaction is the process in which a financial sponsor, often a private equity firm, acquires a company with a relatively large portion of debt. The majority stake of the target company needs to be acquired. If the target company is public, the private equity firm commonly pays a premium over the current stock price to buy the target. The financing of these transactions usually consists of 60 to 90 percent debt. The term leveraged buyout is thus a natural term for the phenomenon. They further define the ownership horizon of the acquired companies to be between 5 and 10 years followed by a strategic exit. During this period, the debt is repaid by the use of cash flows from the acquired companies, with the aim of generating a high return on equity (ROE) until the strategic exit takes place. The key to a successful private equity ownership is to keep the cost of debt to be lower than the ROE cash flows.

In contrast to public companies, Michaely & Roberts (2012) mean that PE-owned companies are built on significantly more, almost exclusively, debt financing and therefore have higher ratios of leverage. In addition, PE-owned companies can be considered to be more

sensitive in their capital structure in relation to fluctuations in performance. This, due to their tendency to avoid external equity financing to a greater extent than the public companies.

Jensen (1989) points out positive aspects of private equity transactions. He implies that these kinds of transactions improve managerial incentives. Jensen means that high levels of leverage reduce the agency costs connected to having large amounts of free cash flows. He also suggests that the cost of financial distress associated with the high leverage ratios are relatively low in private equity transactions. Moreover, Bernstein, Lerner, & Mezzanotti (2018) present results from a study in their paper that private equity investors were relatively more active investors during the crisis. By this they mean that private equity investors were more likely to get involved in operational as well as financial activities. The investors claimed that this engagement was possible due to, among other things, majority stake, private equity ownership, close relations to financial institutions, and the opportunities of extra un-invested funds.

To continue, Bernstein et al. (2016) explored how the growth of private equity has raised concerns about its impact on the economy. The paper examines the impact of private equity on industry performance. It was found that industries where private equity firms actively invest have higher growth rate in terms of production and employment. Further the study shows that these industries are less sensitive to aggregate shocks.

2.2 Capital Structure Decisions and Leverage

As already mentioned, a leveraged buyout transaction is when a private equity firm acquires a stake of a target company with a large portion of leverage relative to equity. Broad research has been done in attempt to understand why debt financing is an integral part of these transactions. The two main theories are presented below. Firstly, that leverage is a result of firm characteristics and, secondly, that leverage is result of time-varying factors.

The first theory has its base in the trade-off between striving to outweigh potential financial distress issues and agency costs that debt may cause, and the agency benefits along with securing tax-savings that are a result of a tax-shield generated by cost of debt (Berk & DeMarzo, 2017). The trade-off theory is a financial theory based on the work of the economists Modigliani and Miller. The theory suggests that capital structure is optimal when the marginal costs of leverage is offset by the marginal benefits. Agency benefits can be seen as an enticement for firms to issue debt in place of equity for three main reasons. First of all, in the presence of debt, firm owners are more likely to make equitable choices as they are the ones

who will be affected by wrongdoings. Further, high levels of leverage sets pressure on merely realizing valuable investments. This, as the company has future interest payments to manage. Lastly, debt implies that management will have the incentives to work in line with sustainable strategies since they are constantly a subject to risks of financial distress (Kaplan & Strömberg, 2009).

Another relevant view, held by Myers (2001), means that decisions regarding capital structure depend on the characteristic traits of the firms. These traits include, among others, the strength of underlying assets and profitability of the firms. Myers means that firms with higher profitability and stable cash flows have higher levels of debt as they have lower risks of financial distress and default. As a result, these companies are prone to be able to take advantage of the agency benefits, in line with what Kaplan & Strömberg propose (2009).

In relation to the trade-off theory, the pecking order theory has been used to explain why companies choose to issue debt rather than equity. The trade-off theory was originally suggested by Donaldson in 1961 and later revisited by Myres & Majluf in 1984. The modified pecking order theory is presented by Myers (2001) and states that companies should prioritize to first finance themselves through internal retained earnings. When internal financing is depleted, companies should finance itself through debt. Finally, as a last resort, a company should finance themselves through issuing new equity. Here, it is theorized that the choice of having a high level of leverage is based on the fact that information asymmetries make it more costly to issue equity than debt. On the basis of the theory described above, companies with historically strong internal retained earnings do not require to raise new equity and as a result of profitability, they have excess cash to repay debt. Consequently, these companies will have lower levels of leverage than optimal as they do not fully exploit the debt tax shield and agency benefits of holding debt.

The second theory suggests that macroeconomic debt market conditions is a factor that may explain private equity acquiring activity patterns, and thereby affecting the PE-owned companies' capital structure. In other words, the theory states that leverage is mainly driven by time-series variation in credit market conditions (Opler & Titman, 1993). According to Kaplan & Strömberg (2009), Baker & Wurgler (2002), and Korajczyk & Levy (2003) tend to take advantage of the situation when the cost of debt is relatively lower than cost of equity, i.e. when there prevails mispricing in debt and equity markets.

A significant amount of research has been devoted to analyse and explain companies' capital structure. However, there lacks an explanation on how these theories and the factors behind them are affected by shocks to the economy, such as in the case of a financial

crisis that is studied in this paper. Studies of cycles in several geographical markets conducted by Axelson et al. (2013) proved that the use of leverage in buyouts is not correlated with the underlying characteristics of the companies themselves. Rather, the authors suggest that they are driven by changes in credit conditions in the broader economy. In the study, the periods of high levels of leverage are related to higher transaction valuations and great private equity funding, meaning that more leverage are results of booming financial markets. This suggests that private equity firms over-leverage and overpay when there is access to credit. As a result of the increased investment habits during booming times, there is a risk that the private equity firms find themselves in the situation where they are unable to support their portfolio companies with equity during times of crisis. Davis et. al. (2014) show the effect of the above described situation in his results that show that PE-backed firms in the US have lower relative rates of growth during economic downturns.

Furthermore, Gilchrist & Zakrajsek (2011) confirm that shocks to the credit spreads incited by the state of the economy have the effect of deteriorating the capital position of financial intermediaries. This causes an increase in cost of debt as the credit spreads become wider, and consequently resulting in a decrease of corporate borrowing which in turn reduces economic activity. Collin-Dufresne, Goldstein, & Martin (2002) imply that the factors behind the changes in the credit spread are driven by a common systematic shock affecting the whole market. This infers that all individual companies and their capital structure should be affected similarly by an economic crisis and changes in the credit spread. These findings suggest that we would expect a decrease in leverage as a result of a financial crisis for both PE-backed companies and control companies.

2.3 Relationship Banking

An additional theory aiming to explain companies' choice of debt to equity ratios is presented by Boot (2000) and Ivashina & Kovner (2011) highlighting the leverage related benefits companies are exposed to as a result of relationship banking. Boot provides an examination of the interrelationship between the competitive conditions within the financing business, and what he denotes *relationship banking*. Costs and benefits of building and sustaining relationships with creditors are discussed. The study shows that long-term relationships benefit the most. Therefore, it will be interesting to look into whether long-term highly leveraged PE-backed companies obtain benefits when borrowing (Kaplan & Strömberg, 2009).

This was deeper investigated by Ivishina & Kovner in the research “The private equity advantage: Leveraged buyout firms and relationship banking” (2011). This study examined a sample of more than 1 500 loans that financed private equity transactions between 1993 and 2005. The findings were that private equity firms’ relationships with banks acts as crucial factors for the loan interest rates and other loan conditions. Ivishina & Kovner state that this phenomenon has to do with repeated interactions between the private equity firms and the financial intermediaries. Repeated interactions with the intermediary reduces inefficiencies such as information asymmetry. This means that private equity LBOs’ financing in general can be done on better loan conditions than others.

2.4 Previous Conducted Study: Private Equity and Financial Fragility during the Crisis

An extensive amount of literature reports findings within the area of ownership forms. In the following chapter, previous research on the subject is presented. A study on private equity being contributors or bearers of financial stability through presence of investment has been historically conducted. The authors, Shai Bernstein, Josh Lerner, &Filippo Mezzanotti, from Stanford, Harvard Business School and Northwestern respectively, wanted to find out whether UK private equity firms contribute to financial fragility during economic crises or not. In the paper, “Private Equity and Financial Fragility during the Crisis” (2018) , it was found that PE-backed companies decreased investments less in relation to their non PE-backed counterparts. This, while also decreasing both equity injections and debt issuance less during the 2008 financial crisis. Among financially constrained companies the effect was stronger. This was the case for private equity investors who had more resources prior to the crisis. As a consequence, these companies developed higher asset growth and increased market share during the period.

2.5 Sweden and the Financial Crisis 2008

In mid 2007, the US economy faced and suffered from what is known as the worst financial crisis since the Great Depression. The crisis quickly spread to the rest of the world and the period was followed by extreme financial turbulence caused by acute liquidity and credit crunch in the economy (Blundell-Wignall, Atkinson, & Hoon Lee, 2009). The crisis was principally a result of the subprime mortgages meltdown which in turn was a result of banks excessive risk-taking (Reinhart & Rogoff, 2009). A wide range of asset classes and commodities fell dramatically in price. Parallel, the cost of corporate banking increased as credit spreads peaked

(Ivashina & Scharfstein, 2010). Sweden is however considered to have been less affected than the US by the crisis. The reason for this is that Swedish banks were more restrictive with loans due to the lessons learned from the financial crisis in Sweden 1990-1994 (Bäckström, 2014).

Thanks to Sweden's previous experience of the 1990's crisis, the situation in 2008 was handled relatively successfully. Even though the growth in GDP fell distinctly in the late 2008 and 2009, the financial system worked comparably well. The crisis hit Sweden slightly later than other countries with larger global economies (Bäckström, 2014). In comparison with other markets, the Swedish banks were well-managed, stable and well-capitalized during the crisis of 2008. There is general a trade-off regarding over-regulated bank systems. Excessive capital requirements increase banks' funding costs, which leads to higher cost of debt for companies and thereby lending is reduced. This, in turn, has a negative effect on the economy through impact on investment and growth. The arguments above are in line with Collin-Dufresne, Goldstein, & Martin (2002). Sweden, however, managed to avoid the costs of this trade-off, which is one of the main reasons to why the Swedish market suffered milder consequences. The Swedish banks kept the interest rates at a low level enabling stable stimulation of the economy (Strandberg, 2010) .

To give an idea of how a shock can affect private equity activity, one can shed light on how the crisis affected Sweden in comparison to the UK in real terms. Although the Swedish private equity market faced tough times during the financial crisis, it can be said that the Swedish private equity market has soared in recent years. The market has emerged to become highly developed and attractive to investors even in comparison with other, more established, private equity markets (Swedish Private Equity and Venture Capital Association, SVCA, 2018). As a result of the booming period leading up to the crisis, defined with exceptional credit terms, the all-time largest total value of private equity investments in Sweden was in 2008 (Axelson et al., 2013). In 2008, Sweden's total private equity investment was recorded to amount to 3.35 billion euros. In 2009 the investments decreased to 1.33 billion euros but then the market successfully recovered and had private equity investments amounting to 2.86 billion in 2010 (Statista, 2018). This reflects a 61.3 % decrease of investment as a result of the financial crisis. However, looking at the before and after effect, there was a decrease of 24.6 % implying successful recovery and handling of the crisis. The main reason is connected to the country's ability to preserve low interest rates. This can be compared to the UK market which experienced a stagnation in private equity investments from 201.1 billion US dollars in 2008, to 83.67 billion in 2009, and to 65.76 billion in 2010 (Statista, 2018). This reflects an overall decrease of 67.3 % in investments during the crisis. The difference between these two

markets once again illustrates the relatively mild effect the crisis had on the Swedish private equity market. The historical patterns for private equity investments, for Sweden and the UK, are illustrated in Figure 1 and Figure 2 respectively.

Testing the hypothesis on the Swedish market specifically is relevant and of interest. This, as Sweden's relatively mild consequences of the crisis may be a contributing factor of the outcome of the test of the hypothesis. When comparing this study's results to previous the outcome of studies done on the UK, the effect of Sweden's management and position towards the crisis might become evident. A valid comparison will be able to be provided as there is previous research studying a similar thesis question. Thereby this thesis follows a resembling procedure as Bernstein, Lerner, & Mezzanotti (2018).

2.6 Capital Investments and Economic Growth

There is general agreement that the process of economic growth and capital investment are closely interconnected. Companies' performance and investment activity patterns directly and indirectly act as stimulation tools to aggregate economic growth (Bernstein et al., 2016). There are important aspects of companies enabling economic development. For instance, reduction of unemployment and contributions to the government in form of corporate tax are examples of factors boosting economic growth. However, the most consistent and controllable way to grow an economy is through improved capital goods structure and growing capital stock (Rajan & Zingales, 1998). Investing in superior capital equipment directly leads to productivity and efficiency for the investing company as well as profitability for the selling company, which in turn supports economic growth (Davis et al., 2014). To make it financially viable to increase or improve the capital goods structure, the company must have funds. These funds need to last until the new capital goods lead to additional revenue. The most effective and efficient way of raising these funds are through issuing debt at a low cost (Myers, 2001).

3. Hypothesis

One hypothesis is that Swedish PE-owned companies' financial activity is affected by the crisis, but to a less extent than non PE-owned companies. Thereby it can be implied that their operations and investments rather contribute to financial stability. A possible explanation is that private equity firms have a preferable position pertaining debt issuance and injecting internal equity contributions. Strong relationships with financial institutions facilitates the process of obtaining credit for their portfolio companies allowing investment and low cost reductions

during a period of crisis. This also means an indirect reduction of the negative effects on the economy's stability and the financial fragility. The hypothesis is in line with Ivashina & Kovner (2011) and has a clear connection to, and support from, the basis of Boot (2000) regarding relationship banking.

The reversed, acting as the null hypothesis, would be that Swedish PE-backed companies' activity during the crisis contribute to the economic instability. One possible explanation is that private equity firms elevated their investments during the booming economy leading up to the crisis. This aggravated their capability to fully support the portfolio companies once the crisis hit. Most naturally, the PE-backed companies would have to turn to divestment strategies to be able to survive the period, meaning less investments and larger cost reductions. The hypothesis is in line with Kaplan & Stein (1993).

On the basis of these contradictory hypotheses, this study aims to understand whether private equity contributed to the fragility of the economy in Sweden during the 2008 financial crisis. To consign the question, we examine the financial behaviour of PE-backed and non PE-backed firms before, during and after the crisis. Through looking at financial decisions and performances during these periods, we aim to get an understanding regarding private equity's role in affecting the sensitivity of the economy.

4. Method

4.1 Construction of Sample

The method used for the analysis of the hypothesis is based on the method used in Bernstein, Lerner, & Mezzanotti's paper. The first phase of gathering data is based on a list of all Swedish private equity transactions between the years 1970 and 2016 extracted from Capital IQ. The list is constructed through filtering on events related to "private equity" and "leveraged buyout". Through excluding transactions such as venture capital, a list of 1 962 companies is established. As the study examines the investment behaviour of PE-backed companies during the 2008 crisis, it is made sure that companies that qualified as PE-backed during the period is exclusively included. Assuming that a private equity ownership has an average investment horizon of five to ten years, transactions that were completed before 2002 are excluded as well as transactions completed after the end of 2007. In addition, the transactions are filtered to only contain companies with headquarters in Sweden. Further, companies that shifted ownership from private equity to public ownership through an IPO before the end of our chosen period are eliminated, resulting in 490 remaining companies. Due to the fact that the same company can

experience more than one private equity transaction during the given time period, corrections are made in order to establish a list of company names rather than transactions. Moreover, after verifying that the ownership form of the companies was private equity during the period of 2007 to 2011, an unbiased group of 428 companies to examine is defined.

Moreover, the list is randomly filtered to companies with information about organizational numbers available through *Alla Bolag*, which corresponded to 257 companies. This is necessary due to that the list of company names has to be translated into organization number when gathering data from the Serrano database via Stata. The full Serrano database is opened in Stata and the selected companies are merged with Serrano's data. After controlling for complete data in each of the years needed, a sample of 156 target companies is defined.

For these 156 companies a data set containing organization number, company name, and financial data from 2007 is extracted. The financial data consists of total assets, return on assets (ROA) and leverage ratio (debt to equity) for the 156 companies. This set of data is further aimed to work as the basis for the matching process, discussed in the following section. To support the methodology of the construction of sample, the industry distribution of the target group is compared to the industry distribution of Sweden's private equity investments. As shown in Figure 3 and Figure 4, the target sample's distribution of industry reflects Sweden's distribution of industry fairly well.

4.2 Creating a Matching Sample

PE-backed companies have specific fundamental characteristics that set them apart from overall companies. These characteristics include, among others, traits linked to size and leverage. Due to this, and for the overall quality of the empirical methodology, it is of importance to identify an appropriate control group. The aim is to find 156 coherent one-to-one matches based on characteristics, solely diverging in ownership form. The matching procedure is directly based on that of Bernstein, Lerner, & Mezzanotti's paper. This is done to be able to test the hypothesis in the same manner as they did, but on the Swedish market, as previously explained.

To analyse the effect of private equity ownership during the crisis, the target group needs to be compared to similar non PE-owned companies. We identify a group of control firms that operate in the same industries and had a similar size, leverage, and profitability in 2007. In line with the matching process used by Boucly, Sraer, & Thesmar (2011) which in turn is improved by Bernstein, Lerner, & Mezzanotti, the following criteria had to be met by the control companies;

1. They share the same first two digits in the organisation number as the target companies.
2. They share the same distribution of industry.
3. Return on Asset, i.e. net income over total assets, within a $\pm 30\%$ interval of the ROA of the target company.
4. Total Assets within a $\pm 10\%$ interval of the Total Assets of the target company.
5. Leverage within a $\pm 10\%$ interval of the leverage of the target company, measured as debt to equity.

Further follows a detailed description of how the matching was completed. After sorting the target companies on distribution of industry among the target companies, average size, profitability and leverage from 2007 is determined as matching variables for each of the industry groups. The 257 PE-owned companies extracted from Capital IQ are merged with, and dropped from, the Serrano dataset. Through dropping all companies that has organization numbers starting with a number other than 55, it is made sure that the group of companies that the match will be generated from limited companies only. This acts as the first step of the matching, guaranteeing the matching set of companies being of the same form of association.

Intervals of the above mentioned precentral deviations were formed of the averages of the three matching variables, total assets, ROA and leverage, for each industry group. These intervals are used to find and keep a set of potential control firms. Companies with variable values outside the established intervals were dropped. For some industry groups, the correct number of matching companies are generated immediately, whereas other groups are matched with too many potential control firms. In the last-mentioned case, matching companies within the correct interval are randomly selected. The described process generates a control group of 156 matching companies. The firms within the coherent industry groups, consisting of target firms and control firms respectively, are then matched on an individual level. Each PE-owned company within each industry group is matched with the most similar non PE-backed company. This, once again in terms of size, leverage, and profitability in 2007, i.e. before the crisis.

After generating a complete sample of control firms, the data that the analysis requests is collected. This is done by merging a list consisting of the organization numbers for the target group and the control group respectively, with the complete Serrano database. By doing this, companies non-relevant for the analysis are filtered away and data for the selected years of 2006 to 2012 is obtained for all companies. Necessary key ratios and information are

extracted. The two datasets are then combined. A dummy variable, *PE*, associated with whether the companies belongs to the target or control group were created. The dummy value 1 corresponds to PE-owned companies, while the value 0 corresponds to non PE-owned companies. Additionally, the dummy variable *non PE* is created, with the opposite values. This dummy is used to compare the extra effects on the dependent variables during the crisis period among the non PE-owned companies with the extra effect among the PE-owned companies.

4.3 Specifications of Dependent and Independent Variables

In line with Michaely & Roberts (2012), relevant dependent variables could be built with the essential financial data extracted. This process is likewise in line with Bernstein, Lerner, & Mezzanotti. The dependent variables, describing firm activity, capital structure and performance, are chosen specifically as they are explanatory to the reactions of a company's behaviour during a financial crisis. Further, the independent variables that are used as firm fixed controls in the regressions are presented.

The dependent variables are specifically debt issuance, capital investments, equity injections, cost of debt, and leverage ratio for each firm for the years included in 2006 to 2012. We identify debt issuance through calculating the change in total debt for each individual firm. Further, capital investments are calculated as the change in total assets between the current and last year, plus any depreciations. In a similar way, equity injections are calculated as the change in total equity minus profit. Cost of debt equals the respective firm's interest on interest-bearing liabilities. Leverage ratio is calculated as total debt over total assets. Following, the dependent variables, debt issuance, capital investments, and equity injections, are normalized by assets. This is done to better be able to compare firms within different industries and size classifications. To reduce the effect of possibly spurious outliers, all ratios are checked for errors and winsorized at 1 % and thus limit extreme values in the dataset. This, also in line with Bernstein, Lerner, & Mezzanotti. Below follows a detailed description of the dependent and independent variables.

Independent variables

$$\text{Return on Assets (ROA)} = \frac{\text{Adjusted Operating Profit/Loss After Financial Income}}{\text{Total Assets}}$$

Total Assets = Total amount of assets, i.e. balance sheet total

$$\text{Leverage} = \frac{\text{Adjusted Total Liabilities}}{\text{Adjusted Equity}}$$

Dependent variables

$$\text{Net Capital Investments normalized by Assets} = \frac{\text{Change in Total Assets} + \text{Depreciation}}{\text{Total Assets}}$$

$$\text{Net Debt Issuance normalized by Assets} = \frac{\text{Change in Debt}}{\text{Total Assets}}$$

$$\text{Net Equity Injections normalized by Assets} = \frac{\text{Change in Equity}}{\text{Total Assets}}$$

$$\text{Cost of Debt} = \frac{\text{Financial costs} - \text{Financial Expenses affecting comparability}}{\text{Adjusted Total Liabilities}}$$

4.4 Firm Characteristics and Trends

4.4.1 Pre-crisis Firm Characteristics

As shown in Table 1, illustrating the industry distribution, the largest portion of the firms are active within industrial goods, where 34 % of the sample firms are represented. The sample's industry distribution is then compared with the overall distribution of industries in Sweden. The distribution among the selected target sample, which is identical to the distribution of the matching control group, is assumed to match the overall industry distribution among Swedish firms.

Table 1: Industry distribution sample

The table reports the industry distribution among the two groups. This is reported both as percentage of sample and as an actual number of firms within each industry. The distributions of industry are based on year 2007 which is the same year the matching relies on.

Industry distribution	PE firm sample		Matching firm sample	
	%	N	%	N
Materials	3%	5	3%	5
Industry Goods	34%	53	34%	53
Construction	1%	1	1%	1
Shopping Goods	16%	25	16%	25
Convenience Goods	3%	5	3%	5
Health and Education	11%	17	11%	17
Finance and Real Estate	4%	7	4%	7
IT and Electronics	10%	16	10%	16
Telecom and Media	5%	8	5%	8
Corporate Services	11%	17	11%	17
Others	1%	2	1%	2

To illustrate the accuracy in the matching procedure, the characteristics of the target firms are compared with the characteristics of the control group in 2007. This comparison is done to assure that the matching procedure is conducted in an appropriate manner. The conclusion can be drawn that the matching variables, ROA, debt to equity, and total assets, for the PE-backed companies and the non PE backed-companies are consistent. A difference is prevailed in ROA, where the non PE-backed firms have a ROA almost 2 percentage points higher than PE-backed firms, i.e. a return on assets of 10.4 % against a return on assets of 8.6 %. Furthermore, there are clear differences between the two groups in debt issuance and equity injections year 2007. The data suggests that, in average, the PE-backed firms raised more equity and issued less debt during 2007 than the non PE-backed firms. Additionally, capital investments were somewhat higher for the control group than for the target group, 12.8 % and 10.7 % respectively. These differences are not in line with what the theoretical framework and hypothesis suggests will be shown during the crisis, namely that PE-backed firms are more prone to issue debt and less to raise equity. It is though important to point out that these differences do not need to be misleading aspects to the analysis. As in the case for this study, the main results illustrate

reversed differences between the PE-backed and non PE-backed companies during the crisis period than the characteristics shown in the pre-crisis period. Thereby the differences that were first perceived as potential un-explanatory are not in actuality considered as problems, instead the hypothesis will be even more relevant.

Pre-crisis differences between the target and control group could act as a threat in the case where the PE-backed companies are superior in the tested dependent variables both before and during the crisis. The difference-in-difference (DID) model would then not generate results of value. In other words, the estimates presented in the main results section of the thesis would then not be explanatory in terms of reflecting the effect of being PE-backed versus non PE-backed. As mentioned, most of the measures indicate small differences, but debt and equity issuance on the other hand, are opposites. Further issues about this will be discussed under the main results section, where the results are presented.

In line with the theoretical framework that is the basis to the hypothesis, and the hypothesis itself, it is assumed that the firms' prior crisis state would not be of explanatory importance in their way of handling the crisis. The measurements are more detailed shown in Table 2. This step, checking for similarities among the firms before the crisis, may be seen as an unnecessary step for the analysis. However, higher analysis accuracy can be achieved through ensuring that the firms' actions and performance under the crisis are not a result of differences prior the crisis, but rather the ownership form.

4.3.2 Pre-crisis Trends

To further verify the two matched samples groups, trends during the one-year period of 2006 to 2007 and the two-year period of 2007 to 2008, are examined. As shown in Table 3 and Table 4, pre-crisis growth patterns (trends) were fairly similar between the two groups. This excludes the potential risk of PE-owned companies having significantly better performance patterns before the crisis than the control group. A situation as such would jeopardize the accuracy of the matching procedure and thereby affecting the definiteness of the study as a whole. In this case, it would be difficult to isolate the variable of being PE-owned as the describing variable when conducting the analyses. Our measures are thus estimated consistent with the assumption of trends being parallel among the two groups during the pre-crisis period. This is the fundamental assumption behind the setup of the difference-in-difference model in our analysis. Even though the similar trends presented in Table 3 can strengthen the accuracy of the study as above suggested, and thereby provide a strong basis for a regression model, it is taken into consideration that the parallel trend assumption cannot fully be proven. Additionally, the

presented pre-crisis trends in Table 3 may have been one-time occurrences and thereby the risk of relying on assumptions that are unable to reflect reality cannot be completely eliminated.

5. Empirical strategy/ Identification Strategy

5.1 Difference-in-Difference and Regression Equation

The analysis is based on a difference-in-difference method in which the effect of private equity as a form of ownership is isolated and examined. This is done by using the data of the target group, and the matching control group, in an analysis that calculates the additional effect of private equity ownership on selected key ratios. These calculations and DID estimators, that generate the estimates of the dependent variables, are the basis for further conclusions. These include conclusions about whether or not private equity as an ownership form influenced corporate behaviour and impact on economic stability during the years after the 2008 financial crisis. The following equation is established to work as the basis for the study;

$$y_{it} = \alpha_t + \alpha_i + \beta_1(PE * Crisis) + \beta_2(ROA_{it}) + \beta_3(Total\ Assets_{it}) + \beta_4(Leverage_{it}) + \varepsilon_{it}$$

Where:

- | | |
|----------------------|---|
| y_{it} | Represents the dependent variables for company i at time t . As mentioned, the dependent variables that are analysed are capital investments, debt issuance, equity injection, leverage ratio and cost of debt. |
| α_t, α_i | A set of firm and year fixed effects. Accounting for fixed effects allows the analysis to consider the fact that the dataset consists of panels organized as firm and year. |
| β_1 | A beta value of the extra effect that the dependent (outcome) variable will gain if the observation falls within the scope of being both PE-owned and one associated with one of the crisis years. The crisis years include 2008, 2009, 2010 and 2011 as previously mentioned. This is allowed through creating a combined dummy variable where the PE dummy and the crisis dummy are interacted. This new dummy variable is denoted as $PE \times Crisis$ and thus takes on the value of 1 if the observation is PE-owned and connected to the crisis years. |

β_2	A beta value of the extra effect that the dependent variable will gain of the independent variable return on assets.
β_3	A beta value of the extra effect that the dependent variable will gain of the independent variable total assets.
β_4	A beta value of the extra effect that the dependent variable will gain of the independent variable leverage, computed as the debt to equity ratio.
ε_{it}	A clustered error term at firm level

Before running the fixed effects model regressions, an overall understanding of the PE-backed versus non PE-backed effects on performance and capital structure is received. As a first step a difference-in-difference method is used. The method is appropriate to the analysis as it studies the changes in outcomes over time between the PE-owned firms (treatment group) and the non PE-owned firms (control group). This enables us to measure for differences between the two groups that are constant over time. In other words, this is a way in which we remove time-varying effects that would play an excessive role if we only analysed the before- and after outcomes for the treatment group.

The DID-process proceeds as follows.

1. Differences in outcome for the PE-owned firms, i.e. the treatment group, are calculated between different periods of interest. The respective differences from the different comparisons of years are referred to as (B-A), where B denotes the after-measure, while A denotes the before-measure. The difference in outcome (B-A) are referred to as (Y).
2. Differences in outcome for the non PE-owned firms, i.e. the control group, are calculated between the same periods of interest. The respective differences from the different comparison of years are referred to as (D-C), where D denotes the after-measure, while C denotes the before-measure. The difference in outcome (B-A) are referred to as (Y).

3. Furthermore, the differences between the before- and after differences in outcome for the two groups respectively are calculated. Those final differences are denoted as $(B-A) - (D-C)$, and referred to as the DID impact estimates (DD).

As previously discussed, the parallel trend assumption is fundamental for the analysis. This assumption cannot be fully proven which is accounted for when estimating the effect of the results. However, the two samples share the same distribution of industries, similar return on assets, investments and debt to equity ratios. Additionally, the pre-crisis growth patterns during the one-year period 2006 to 2007 and the two-year period 2006-2008 suggest that trends were similar between the target firms and the control firms. These arguments strengthen the accuracy of the regression equation used in the study.

To implement the DID-method to the study, Stata is used. The hypothesis suggests that the group of PE-owned firms will have a positive effect mainly on capital investment and debt issuance during the crisis period, whereas equity injections and cost of debt most likely will decrease more and increase less respectively for the PE-owned firms. Again, the analysis of this will be dependent on the assumption of equal characteristics and trends before the crisis. When establishing the DID estimates, time-varying effects that could have had a significant impact are isolated as described above. The estimates will be calculated for the differences between the PE-owned and non PE-owned firms, as well as differences between the pre-crisis and crisis periods. The year 2007 is used as pre-crisis basis for all measures in this section. However, both the year 2009 alone and a clustered dummy of the years 2008, 2009, 2010 and 2011 are used as a crisis time variable when computing differences since the pre-crisis values. This to be able to isolate the specific year effect of 2009.

5.2 Fixed Effects Regressions and Comparisons

It was realized that the DID estimates, aiming to reflect the effect of being PE-owned during the crisis, could be strengthened and further explained. It is taken in consideration that there are variables beyond ownership that have explanatory value therefore the DID estimates need to be supplemented. To intrinsically illustrate the private equity ownership, two sets of fixed effect model regressions were set up. In the first set of regressions, the dependent variables were regressed using *PExCrisis*, ROA, total assets and debt to equity as independent variables. The second regression replaces the first independent variable, *PExCrisis*, with the dummy variable *Crisis*. This, meaning that a comparison between the crisis' effect on all firms and the crisis'

effect on PE-backed firms during the crisis can be made. The coefficients and explanatory effects of *PExCrisis* and *Crisis* respectively in the regression are compared with each other to establish an understanding of the isolated effect of private equity ownership regardless of the time varying aspects.

To gain further understanding, a similar process was reproduced by running two regressions, on all dependent variables, where the dummy *PExCrisis* was replaced with a new dummy called *nonPExCrisis*. The latter dummy represents non PE-owned companies during the crisis period. The remaining independent variables, ROA, total assets and debt to equity, were kept in both of the regressions. These two regressions further help explaining the actual effect of private equity ownership during the crisis. This, by comparing the differences in additional effects on the dependent variables outcome when the PE-owned firms are included to when the non PE-owned firms are included. As both *PExCrisis* and *nonPExCrisis* include the effect of the crisis period, time varying effects are isolated.

The two above discussed methods of running regressions establish extra explanations of the actual effect (beta) of private equity ownership during the crisis period, by comparing it to; (1) the extra effect of the respective dependent variable outcomes during the crisis, regardless of ownership form, and (2) the extra effect of the outcome coefficients during the crisis if only non PE-backed firms are included. The comparisons themselves helps isolating the actual time varying effects, and instead highlights the differences between the target group and the control group.

5.3 Robustness Test

To enhance the validity of the study, a robustness test is performed. As Lu & White (2014) explains in their study "Robustness checks and robustness tests in applied economics" that a robustness test is performed to find out how plausible and robust the main coefficients of the regressions are. To do this, one should add or remove variables to the regressions and thereafter compare the results to find out how the main coefficient behaves when the original test is adjusted. If it turns out that the studied coefficients are plausible and robust, the robustness test can be used as evidence of validity in the research. Hence, the validity of the regressions of this study is investigated by testing the time effect of the crisis period. This is done by replacing the underlying years for the crisis variable by years outside this period when calculating the difference-in-difference estimates of the respective examined variables. If the regressions display similar output as when the original crisis variable is used, the validity can not be strengthened by the conducted robustness test. In more detail, the robustness test will be

conducted through a DID examination comparing the pre-crisis period, 2007, and the after-crisis period, 2012. The year 2012 is thus used as an alternative, manipulated, crisis dummy variable named *AltCrisis*. For the robustness test exclusively, the variable *Crisis* is replaced with the variable *AltCrisis*. If the estimates turn out to be closer to zero than the original estimates, meaning little difference between the dependent variable values before and after the crisis, between the target and control group, validity of the original can be assumed to be robust. The robustness test is further conducted on the fixed effect regressions. Just as for the robustness test on the DID estimates, the crisis dummy is replaced with the alternative, manipulated, crisis dummy consisting of data from 2012.

6. Main Results

6.1 Difference-in-Difference Results

To examine whether PE-backed companies were more or less resilient in the face of the financial crisis, the dependent variables are addressed. This is done through looking at how the values of the variables differed between the two groups during the crisis.

The DID estimates showing the effect of private equity ownership of the two different periods; 2007 to *Crisis*, and 2007 to 2009, are presented in Table 6 to Table 10. Each table is included in connection to each variable. First, the coefficients for the dependent variables for the PE-backed group and the non PE-backed group two respectively are presented for each year. Thereafter, the differences between the years are presented. Finally, the actual DID estimates, the differences between the two groups' differences, are shown. The same structure is used for all dependent variables. The choice of comparison years was supported by that 2009 was most impacted by the crisis in Sweden. Being able to compare the estimates depending on whether 2007 is compared to an average of the crisis years or to 2009 solely gives an understanding on how the firms reacted the years after 2009. The results are tested for significance through t-tests that reveal p-values. The p-value show the probability for the DID estimates, given that the null hypothesis is true, is similar to or greater than the presented results. Hence, a smaller the p-value indicates higher significance. All p-values are presented together with the results in their tables.

6.1.1 Debt Issuance

We start by studying the net debt issuance, normalized by assets, to create an understanding of if, and how much, private equity ownership could explain debt issuance during the crisis period.

The statistically significant estimates show that both groups decreased their debt issuance. However, the coefficients of the variable show that the non PE-owned companies decreased their debt issuance more than the PE-owned companies DID. The overall DID estimates for this dependent variable suggest that private equity ownership had a positive effect on debt issuance, both when Crisis and when 2009 is used. The effect was shown to be larger when *Crisis* was used. The DID estimates between the groups, when 2007 is compared to *Crisis*, is over 0,10, while it is under 0,06 when 2007 is compared to 2009.

Table 6: Difference-in-difference estimates for net debt issuance normalized by assets

The table shows differences in mean values for the two groups during the two following periods; (1) 2007-2009, (2) 2007-*Crisis*. The DID estimate is calculated as the difference of the differences. The significance for the DID estimates is calculated through t-tests and is presented as p-values.

Net Debt Issuance / Assets		
	Diff. 09-07	Diff. <i>Crisis</i> -07
<i>PE</i>	-0,0512	-0,0154
<i>nonPE</i>	-0,1457	-0,1170
DID estimate	0,0945	0,1016
Significance (<i>P</i>-value)	0,0065	0,0008

6.1.2 Capital Investments

Following, we study the change in net capital investment patterns. The question is whether PE-backed companies experienced a more or less intense drop in capital investments in relation to non PE-owned firms. In the matching section, the pre-crisis firm characteristics between the two groups' variables were discussed. Non PE-backed firms had higher capital investments, which was somewhat surprising as it is assumed that PE-backed firms in general have higher capital investment due to ease of issuing debt. The results of the changes in capital investments normalized by assets are presented in Table 7. The results suggest that PE-backed companies decreased their capital investments less in comparison to non PE-backed companies. With the pre-crisis differences in mind, i.e. non PE-backed having stronger measures in capital investments, the effect of being PE-backed is more apparent.

Table 7: Difference-in-difference estimates for net capital investments normalized by assets

The table shows differences in mean values for the two groups during the two following periods; (1) 2007-2009, (2) 2007-*Crisis*. The DID estimate is calculated as the difference of the differences. The significance for the DID estimates is calculated through t-tests and is presented as p-values.

Net Capital Investments / Assets		
	Diff. 09-07	Diff. <i>Crisis</i> -07
<i>PE</i>	-0,1499	-0,0563
<i>nonPE</i>	-0,2800	-0,1669
DID estimate	0,1302	0,1106
Significance (<i>P</i>-value)	0,0739	0,0700

6.1.3 Equity Injections

Further, it was found that net equity injections decreased more for the PE-backed firms than for the non PE-owned companies during the crisis. Equity injections normalized by assets decreased for both groups of companies, both when comparing pre-crisis measures to 2009, and when measuring pre-crisis measures to the combined crisis dummy, *Crisis*. The average of the target group's equity injections became negative year 2008, while the control group's injections stayed positive. Since PE-backed firms' equity injections were double non PE-backed firms' before the crisis the results are notable. The PE-backed firms' equity injections decreased by 99.92 %, while non PE-backed firms decreased their equity injections by 55.99 %.

Table 8: Difference-in-difference estimates for net equity injections normalized by assets

The table shows differences in mean values for the two groups during the two following periods; (1) 2007-2009, (2) 2007-*Crisis*. The DID estimate is calculated as the difference of the differences. The significance for the DID estimates is calculated through t-tests and is presented as p-values.

Net Equity Injections / Assets		
	Diff. 09-07	Diff. <i>Crisis</i> -07
<i>PE</i>	-0,0609	-0,0544
<i>nonPE</i>	-0,0205	-0,0133
DID estimate	-0,0404	-0,0412
Significance (<i>P</i>-value)	0,0723	0,0316

6.1.5 Cost of Debt

The next DID measure to run is cost of debt. This variable reflects interest expenses for interest-bearing liabilities and was shown to be very similar between the two groups in the manner of changes from 2007 to the crisis and to the after-crisis period respectively. Both groups experienced increases in the cost of debt, especially between 2007 to 2009. However, as the changes were relatively similar, the DID estimates are almost equal to zero (see Table 9). This means that the extra effect of private equity ownership either is very small, or that the model used can not explain the effect fully. It may be the case that the cost of debt estimates can be explained by randomness rather than the actual observations. To examine the role of private equity ownership regarding cost of debt, the variable will be further examined in the following section, results part two.

Table 9: Difference-in-difference estimates for cost of debt

The table shows differences in mean values for the two groups during the two following periods; (1) 2007-2009, (2) 2007-*Crisis*. The DID estimate is calculated as the difference of the differences. The significance for the DID estimates is calculated through t-tests and is presented as p-values.

Cost of debt		
	Diff. 09-07	Diff. <i>Crisis</i> -07
<i>PE</i>	0,0123	0,0075
<i>nonPE</i>	0,0127	0,0077
DID estimate	-0,0004	-0,0002
Significance (<i>P</i>-value)	0,4852	0,4921

6.1.4 Leverage

The last DID estimate to examine is the leverage ratio, debt to assets. Both the target group and the control group's leverage ratios remained stable during the crisis, i.e. the differences between 2007 and the crisis years are small. Further the significance for the comparison of the year 2007 and 2009 is not considered significant enough making it hard to analyse the results. Due to this, the variables' results do not explain how private equity ownership actually affected the companies during the crisis.

Table 10: Difference-in-difference estimates for debt over assets

The table shows differences in mean values for the two groups during the two following periods; (1) 2007-2009, (2) 2007-*Crisis*. The DID estimate is calculated as the difference of the differences. The significance for the DID estimates is calculated through t-tests and is presented as p-values.

Tot. Debt / Tot. Assets	Diff. 09-07	Diff. <i>Crisis</i>-07
<i>PE</i>	0,0041	0,0047
<i>nonPE</i>	-0,0409	-0,0499
DID estimate	0,0450	0,0547
Significance (<i>P-value</i>)	0,1440	0,0561

6.1.6 Conclusion of Difference-in-Difference Estimates

So far, after calculating and examining difference-in-difference estimates, the results suggest that the target group has positive effects on capital investments and debt issuance, but negative effect on equity injections, where all these three variables are normalized by assets. It was further shown that private equity ownership had little effect of cost of debt and leverage. All in all, this implies that private equity is a superior form of ownership. The PE-backed group of companies were prone to uphold capital investments and decrease net debt issuance less during the crisis. Regarding net equity injections, the results suggest that the target group decreased the net equity injections more. Following, the results of further examinations, fixed effect regressions, of the extra effect of private equity ownership for the variables be presented.

6.2 Fixed Effects Regression Results

To further strengthen and explain the effect of private equity ownership during the crisis, two sets of regressions are run on the dependent variables presented. These regressions use size, leverage and profitability as constant independent variables. Size represents total assets, leverage is calculated as total debt to equity, and profitability represents return on assets. First a fixed effects regression is run on the dependent variables with the mentioned constant independent variables, and also the fixed dummy *PEfirm*Crisis*. Then, *PEfirm*Crisis* is replaced with the dummy *Crisis* alone enabling a comparison that establishes an understanding of the isolated effect of private equity regardless of the time varying aspects. Thereafter, the same setup of regressions are run, but now to compare different outcomes between the regression when *PEfirm*Crisis* and *nonPEfirm*Crisis* respectively. As already explained in the empirical strategy, the methods of comparing regressions by changing the fixed dummy, helps

isolate the actual time varying effects, and instead highlights the differences between the target group and the control group. For these regressions, it is chosen not to look at individual years but rather on the effect of the crisis in general and this to stay in line with the hypothesis that is being tested.

The results of the two regressions, partly show results coherent with the DID estimates in the previous section. For instance, that PE-owned companies decrease their capital investment less than the control group. This procedure, however, gives even further explanation of the ownership effect. As Table 11 shows, the extra effect of an observation associated with private equity ownership and the crisis period (dummy $PE_{firm} * Crisis$), is somewhat less negative than the extra effect of an observation associated with the crisis (dummy $Crisis$) alone. Moreover, the effect of $PE_{firm} * Crisis$ is somewhat less negative than the effect of $nonPE_{firm} * Crisis$ as well. These results together imply that the isolated effect of private equity ownership is positive.

Debt issuance, normalized by assets, also present results coherent with the DID estimates previously presented. Table 11 shows how the extra effect of $PE_{firm} * Crisis$ was positive, while the effect of $Crisis$ alone is negative. Furthermore, the differences of the effects are similar when $PE_{firm} * Crisis$ is compared to $nonPE_{firm} * Crisis$, where the effect of private equity ownership during the crisis is positive, and the effect of non private equity ownership is negative. Overall, these regressions provide a deeper understanding and suggestion of the isolated effect of private equity ownership on debt issuance to be positive during the crisis period.

In addition, the difference-in-difference procedure shows that net equity injections decreased more for the target group than for the control group during the crisis. Equity injections, normalized by assets, is used as a variable in the comparisons consisting of three sets of regressions. In Table 11 it is displayed that the extra effect of being PE-owned during the crisis on equity injections is more negative than that of the crisis' effect regardless of ownership form. In more detail, both the $nonPE_{firm} * Crisis$ and $Crisis$ effects are close to zero, while the $PE_{firm} * Crisis$ have a relatively clear negative effect. This signals that the PE-backed firms stand out with their decrease of equity injections.

The coefficient of $PE_{firm} * Crisis$ explaining cost of debt is smaller than both the effect of $Crisis$ alone and the effect of $nonPE_{firm} * Crisis$. However, the differences are in such small magnitude making it hard to examine the results.

To conclude the second part of the empirical study's results, regressions revealing the effect of being PE-owned during the crisis strengthened the test of the hypotheses. The

regressions ensure that private equity ownership has an actual positive effect on firms' capital investment and debt issuance habits. PE-backed firms are more resilient to the crisis and had a stabilizing role in these aspects. Moving on to equity injections, the effect of being PE-backed proves to be negative and ownership shows to have almost no effect on cost of debt. These results will be further discussed and analysed in the discussion section.

6.3 Regression Result Controls

6.3.1 Robustness Test

As explained in the method section, a robustness test based on the time effects of the crisis period is conducted to check for the validity of the DID model as well as the fixed effect regressions. The *Crisis* variable is, in this case, changed to year 2012. This alternative crisis dummy is used in the difference-in-difference and fixed effect analyses for each dependent variable. As shown in Table 12, the difference-in-difference estimates, portraying the effect of private equity ownership during the crisis, are presented for the three chosen periods. As shown in Table X the results of the robustness test for the regressions are presented.

The DID estimate of private equity ownership on debt issuance normalized by assets is clearly closer to zero when the alternative, manipulated, crisis dummy variable is used. The same result is for the case regarding capital investments normalized by assets. Regarding equity injections normalized by assets, the estimate does not show a difference as distinct as in the case of the two former discussed variables. However, the estimate acts in line with what the test aims to verify as the manipulated crisis dummy, 2012, reveals a slightly smaller private equity ownership effect than when the original model is used. Cost of debt shows a positive estimate when the new test is conducted, compared to the negative estimates the original model implied. Yet, these estimates are very small in magnitude in all periods, and thereby it is hard to determine the results of the robustness test on this variable. The robustness test of the fixed effects regressions, presented in Table 13, partly supports the analyses. For capital investments, the effect is similar to when the original crisis variable is applied. This outcome applies for equity injections as well. The test shows opposite effects for private equity ownership on debt issuance when *AltCrisis* compared to when *Crisis* is used. This is shown for cost of debt, however in smaller magnitude.

6.3.2 Limitation in Result Interpretation

Even though our analysis provides new findings within the field of private equity ownership during the crisis in Sweden, the study has several limitations that should be accounted for in future research. Naturally, there is a limited availability of data in all databases, likely for Serrano as well. Out of the 428 Swedish LBO transactions that were coherent with the correct ownership form and years, only 257 companies were merged with the database due to availability of organisation number in the online company information database *Alla Bolag*. Serrano only had complete information for 156 of these. In comparison to the starting point, the sample can be perceived as small. However, it is important to acknowledge the fact that each and every company has observations for the years 2006 to 2012 which in total adds up to 2 184 observations in our dataset. A larger sample of companies would without a doubt enable stronger, more valid, results whereby more precise conclusions could be drawn. This is probably a reason for why some of the significance levels of the regressions are relatively low. Yet, the distribution of industry among the PE-backed companies reflects the distribution of industry for Swedish private equity investments, see Figure 3 and Figure 4. This strengthens the relevance and validity. Further there is a risk for presence of bias in the matching method. There are probably other variables that could have strengthened the matching sample process. However, as it is decided to follow Bernstein, Lerner, & Mezzanotti's strategy, the matching procedure is justified. Concerning the validity of the difference-in-difference and regression models, one could argue that more independent variables could have been included. For instance, there are other firm fixed variables that could have been explanatory and have impacted the coefficients in the model, if they were included as independent variables. Once again, this is justified as the thesis follows the Bernstein, Lerner, & Mezzanotti paper.

7. Discussion

7.1 General Discussion

The study has contributed with interesting results regarding private equity as an ownership form and its impact on firms' behaviour and performance during the 2008 crisis. The hypothesis suggested that PE-owned companies would have the stabilizing role of contributing to the economy through continuous investment activity as a result of their relatively facilitated debt issuance process. The null hypothesis suggested that due to intense activity during the booming

period leading up to the crisis, the private equity firms would be unable to support their portfolio firms. This period led to cutbacks in equity injections which turn led to large capital investment reductions contributing to the downturn of the economy.

The first hypothesis suggested that PE-owned companies' financial activity was affected by the crisis, but to a less extent than non PE-owned companies. Thereby, their operations and investments rather contributed to financial stabilization. A possible explanation, with support of previous research in the area, is that private equity companies have a preferable position to pertaining debt issuance and internal equity contributions. Strong relationships with financial institutions facilitates the process of obtaining credit for their portfolio firms allowing investment and low cost reductions during a period of crisis. This also means an indirect reduction of the negative effects on the economy's stability and the financial fragility. One possible explanation to the null hypothesis, was thought to be that private equity firms elevated investment during the booming economy leading up to the crisis. This aggravated their capability to fully support their portfolio companies through equity injections once the crisis hit. Most naturally, the PE-backed companies would have to turn to divestment strategies to be able to survive the period, meaning less investments and larger cost reductions.

The results of the difference-in-difference estimates, comparing differences between the two groups, suggested that private equity ownership has positive effects on capital investments and debt issuance, but negative effect on equity injections. The results further showed that ownership form had little, close to zero, effect on both cost of debt and debt to assets. Below follows a more in-depth discussion on how the results, and hence the effect of private equity ownership, actually impacted the economy's recovery from the crisis.

7.2 Capital Investments

The positive effects on capital investments imply that private equity can be perceived as a superior ownership form leading to better possibilities of stable, continuous, capital investments to a higher degree than non PE-owned companies during the crisis. This further signifies that these companies indirect would have less impact on the downturn of the economy, since their contribution to market activity was less changed during the time of crisis than other companies' contributions. This can be explained by the higher levels of debt, obtained before the crisis hit, and the relative ease of issuing debt letting the firms have stronger funds in worse times. This, explained by the low interest rates Sweden managed to uphold. While this conclusion is drawn upon results from empirics associated with the 2008 crisis, it can further be assumed to be the

case in other periods of similar financial turmoil and can be used to indicate the outcome of the future. The study suggests that capital investments decrease less in a state of economic downturn for companies that are PE-owned. With the support of previous research, capital investments are proven to have a direct effect on productivity and efficiency which in turn leads to economic growth. Bearing the above in mind, PE-backed companies' behaviour during the crisis contributed to economic growth.

7.3 Debt Issuance

To continue, the results report that private equity ownership had positive effects on firms' ability to obtain debt issuance during the crisis. The results also suggest that the null hypothesis should be rejected. Instead, the original hypothesis should be viewed as an explanatory factor attempting to establish an understanding of the outcome of the 2008 crisis and possible outcomes of any upcoming crises. The benign possibility of obtaining debt for PE-backed companies partly lays in their particular relationship with financial intermediaries in combination with the generally low interest rates. In terms of explaining future scenarios, the results could be used to give an indication on how debt issuance during times of crisis is correlated with the private equity transaction patterns in Sweden. To explain, continued increase in popularity of private equity ownership implies that in future times of financial turbulence, Sweden will increase its number of PE-backed firms. These will, in line with our results, be able to issue debt to a larger extent than other firms and thereby keep up investment habits through times of crisis. As debt being a prioritized source of funding and proven to be a direct impact on investment activity, Swedish PE-owned companies will have an advantage in recovering from a crisis on an individual level as well as contributing relatively more to the economy in terms of financial stability. On the one hand, however, it is important to highlight the risks of increased debt issuance during a crisis. The process of issuing debt is not necessarily equivalent to increased capital investment. Instead, increase debt levels can result in financial distress affecting market fragility both for the company itself, and for the market as a whole. On the other hand, the target companies are backed by private equity firms with experience and expertise of high leveraged portfolio companies and have dealt with active ownership decisions, making the risk for financial distress in these cases smaller.

7.4 Equity Injections

The predictions made by the difference-in-difference model and fixed regressions suggest that equity injections decreased more among companies with private equity ownership. The outcome of this dependant variable thereby does not fully support the rejection of the null hypothesis. The main hypothesis had its base in the presumption that raised capital through equity injections allows firms to increase investment stimulating the economy. At first, it was a surprising finding that private equity ownership had negative effects on equity injections as it was hypothesised to be the opposite. However, on the basis of previous research, well developed theories and the empirical regression results on overall dependant variables in this study, there are explanations to why equity injections decreased more for PE-backed firms than for non PE-backed firms. First of all, the booming period leading up to the crisis, which was characterized by exceptional credit terms as well as high investment and transaction activity, left private equity firms unable to fully support their portfolio companies when the crisis hit. Secondly, regardless of economic state, debt is a prioritized form of funding, and additionally the empirics showed that debt was relatively cheaper and had advantageous conditions for PE-backed companies during the crisis, explaining choice of capital. Lastly, when a crisis hits an economy, many investors' asset portfolio values drops to low levels and the general reaction is to avoid investment. This becomes evident especially in investment decisions regarding PE-backed companies. Due to their high leverage, fast-paced and fast-changing active ownership decisions and somewhat lack of disclosure responsibilities, they can be perceived as relatively riskier. With these reasonable explanations stated, the negative effect of private equity ownership on equity injections does not necessarily imply that PE-backed companies contribute less, in relative terms, to financial stability during times of crisis.

7.5 Cost of Debt

As the results report, the difference between cost of debt associated with PE-backed firms and non PE-backed firms is marginal. Two main reason for why differences are of such small magnitude can be discussed. Either, the result can be a cause of an un-explanatory regression model, or the results are in line with previous research about the crisis defined as a systemic shock affecting all companies in the market and Sweden being able to keep its interest rates stable throughout the crisis. Theories suggest that the changes in the credit spreads during the crisis increased cost of debt are driven by a common shock affecting the whole market

simultaneously. In this sense, a firm's ownership form is an irrelevant variable of how cost of debt reacted to the crisis. The pre-crisis average cost of debt of the two groups could have been coincidentally similar, and the simultaneous shock would evoke the same reaction among the companies. This would explain the significantly small differences in effect of private equity versus non private equity ownership during the crisis on the increase of cost of debt. Further, the results are naturally explained by the fact the credit institutions' rates did not increase distinctly in the Swedish market.

7.6 Leverage Ratio

The regressions and tests run on leverage ratio gave insignificant results. On the one hand, the insignificant result could be explained by an insufficient empirical method, this, while it on the other hand could be explained by previous research. After the crisis in Sweden, strict restrictions and controls for leverage ratios and new debt issuance were set in place. These regulations were applied for all companies, regardless of ownership form. As the two groups entered the crisis with similar leverage ratios and were affected similarly it is not surprising that the differences between their outcomes are small. These arguments could hence work as an explanation for the variable's insignificant results.

7.7 Robustness

The conducted robustness test on the difference-in-difference model increases the validity of the results by showing that private equity ownership has an effect on the selected variables during the crisis years specifically. This, whilst the robustness test on the regressions implied the model to be less valid. The results imply that the effect of private equity ownership varies depending on period in time. For most dependent variables, the effect is strong during the crisis period, and weaker during the chosen non-crisis period. This test can thereby be accountable for other analyses on private equity's effect during times of crisis. Even though the results point to that the difference between pre-crisis, 2007, and after-crisis, 2012, periods are small, meaning that the PE-effect is distinct during the crisis. It can be assumed that the consequences and effects followed by the crisis still are present. It would have been more rewarding to conduct the comparison with a non-crisis period further away in time from the actual crisis period. The test further supports that the crisis dummy variable including the years 2008 to 2011, was correctly defined. The robustness test of the fixed effects regressions does not show as strong results as the for the DID model and thereby only partly supports the analyses' validity. Regarding capital investments and equity injections, the robustness does not increase

the validity of the regression. This, as the differences between the original regression coefficients and the robustness fixed coefficients are small. The test shows opposite effects for private equity ownership on debt issuance, signalling that the robustness test further strengthens the method in regard to this variable. The same is the case for cost of debt, where validity though is verified less than it is for debt issuance.

Bernstein, Lerner, & Mezzanotti presented that private equity investors were relatively more active investors during the crisis in their work. They argued that private equity investors were more likely to be involved in operational as well as financial decisions. The investors themselves claimed that this engagement was possible due to, among other things, majority stake, private ownership, and close relations to financial institutions. These findings are in large in line with our empirical results.

8. Conclusion

Our study was aimed to provide evidence of the effect of private equity ownership on the financial stability in the Swedish economy during the financial crisis of 2008. The aim was to determine whether the PE-backed companies' investments, funding and performance during the crisis, contributed to financial instability less than their non PE-backed counterparts. This thesis can provide an understanding of the relationship between private equity's particular capital structure, investment decisions and business strategies and its effect on the economy as a whole during times of crisis. Additionally, conducting the analysis on the Swedish market, which has not been done before, allows for comparisons between different markets. The empirical results showed that PE-backed companies decreased their capital investments and debt issuance less than the non PE-backed companies. The results can for instance be explained by the ability of PE-owned companies to use their benign relationships with banks to issue debt and thereby enable them to keep up capital investment activity during times of crisis and Sweden's particular way of keeping the interest rates at a stable level. These capital investments are closely interconnected to economic growth. Companies' performance and investment activity patterns directly and indirectly act as stimulation tools to aggregate economic growth. On the other hand, it was found that PE-backed companies' equity injections are more likely to decrease more during a crisis than non PE-backed companies. Primarily, the explanation lies in the booming period leading up to the crisis which left private equity firms unable to fully support their portfolio companies when the crisis hit. Also, regardless of economic state, debt is a prioritized form of funding. While the thesis contributes with new findings, there is still

room for further research within the field. It is suggested to deeper investigate through a qualitative study that aims to describe the underlying factors behind the results. Moreover, it would be of further relevance to test a similar hypothesis on other financial markets to enable comparisons.

Overall, the underlying theories, the empirical results, and the discussion together suggest that the consequences of the crisis were milder for PE-owned companies than for non PE-owned companies. These conclusions should all be seen as suggestions for, and understandings of, the future in terms of how the financial performance and fragility will be affected during unstable periods in Sweden. The conclusion can be drawn that the thesis is consistent with the formulated hypothesis that private equity ownership has a positive effect on the financial fragility during times of crisis.

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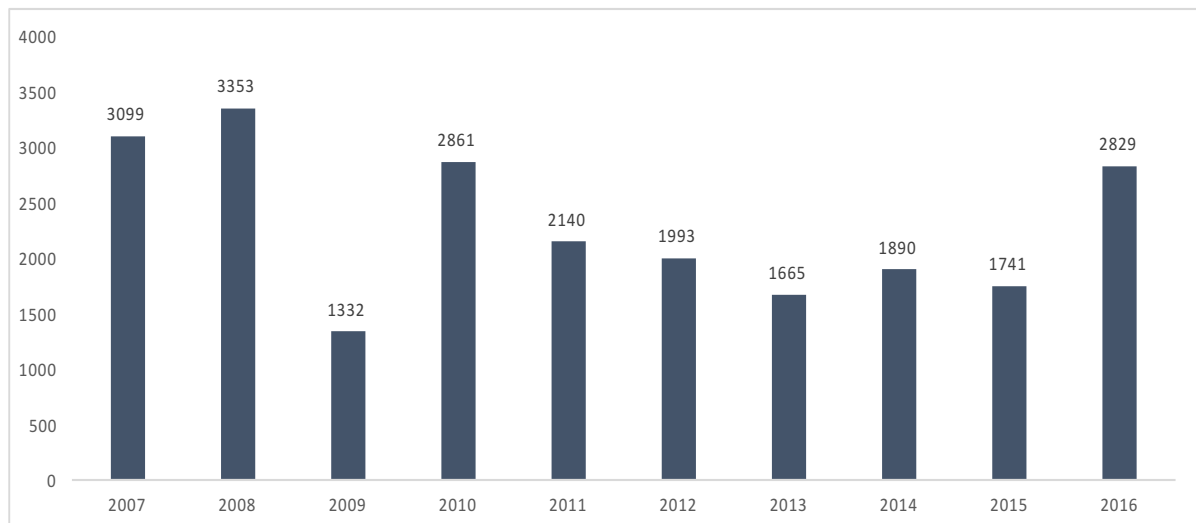
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Appendix

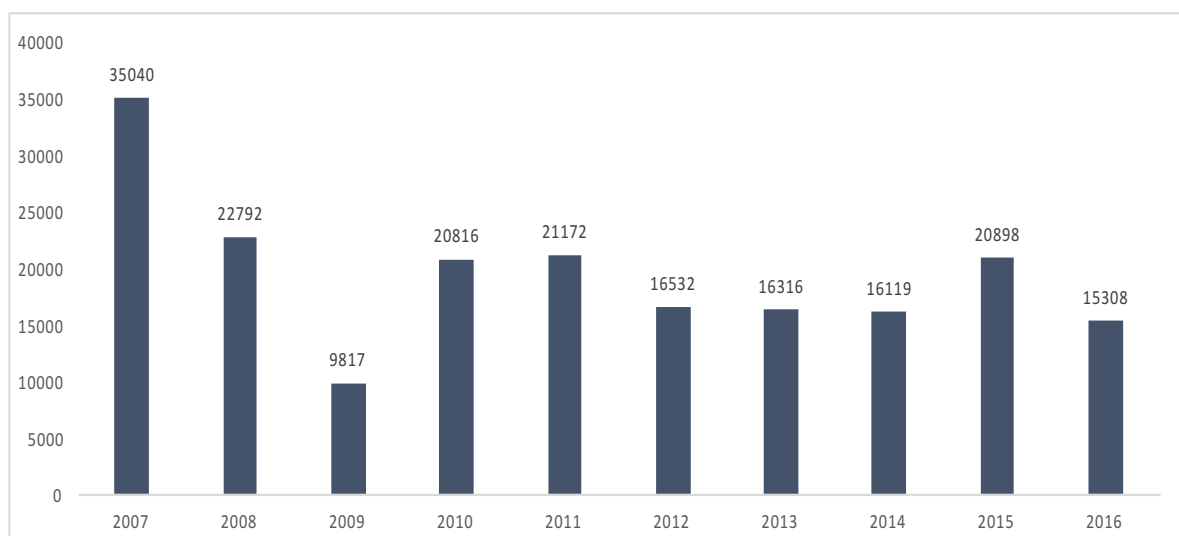
Figures

Figure 1: Total amount of investment of private equity companies in Sweden from 2007 to 2016 (in million euros)



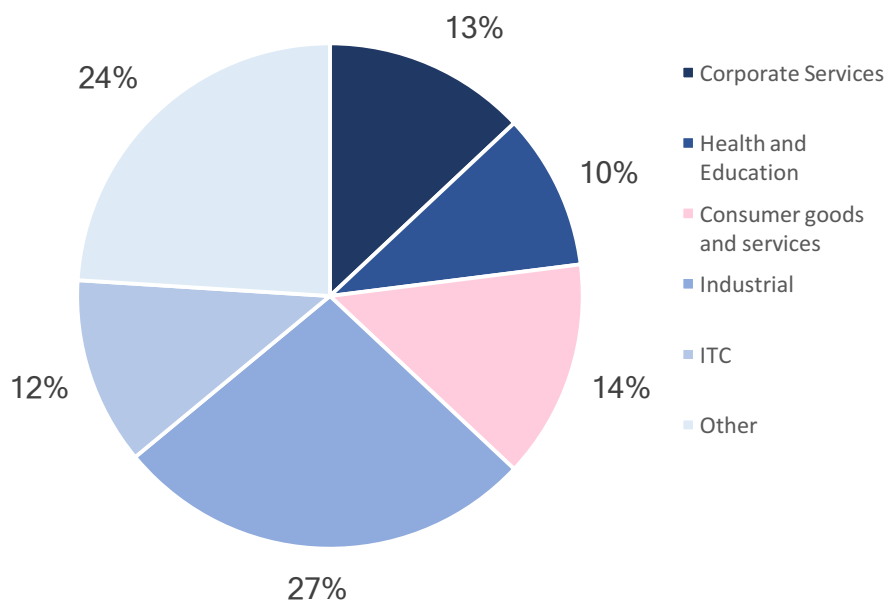
Reference: Statista, 2016

Figure 2: Total amount of investment of private equity companies in the UK from 2007 to 2016 (in million euros)



Reference: Statista, 2016

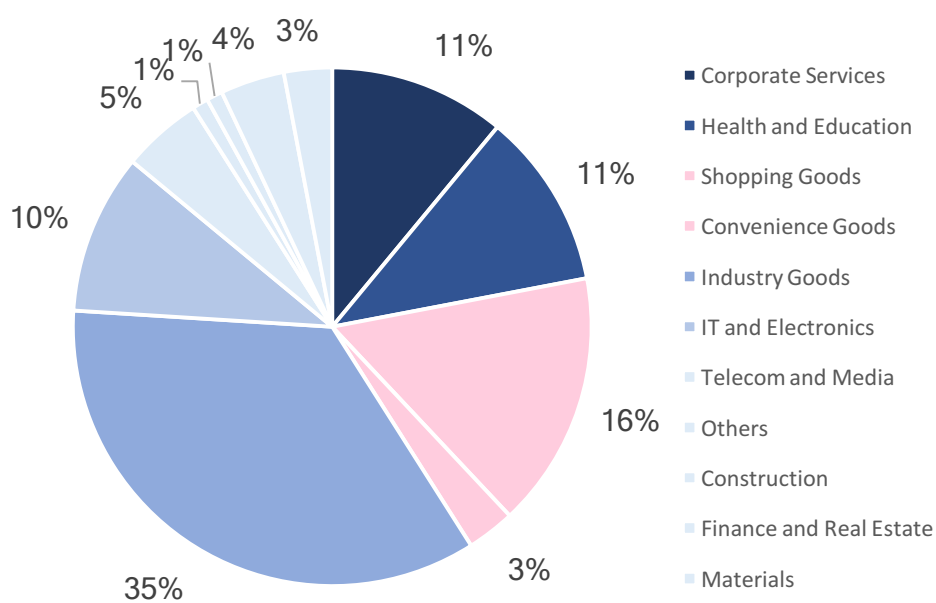
Figure 3: Share of private equity investments in different industries in Sweden, 2017.



Reference: SVCA, 2017

Figure 4: Industry distribution of target sample

The colours have been adjusted to facilitate comparisons and understanding of similarities between Sweden's and the target samples' industry distribution



Reference: SVCA, 2017

Summary Statistics

Table 2: Firm characteristics of target and control group 2007

Firm characteristics 2007

	PE-backed firm sample			Matching firm sample			Mean diff.*
	Mean	St. dev.	N	Mean	St. dev.	N	
Capital Investments / Assets	0,107	0,025	156	0,128	0,023	156	0,021
Net Debt Issuance / Assets	0,017	0,022	156	0,076	0,02	156	0,059
Net Equity Injections / Assets	0,055	0,017	156	0,024	0,008	156	-0,031
Return on Assets	0,086	0,024	156	0,104	0,011	156	0,018
Debt / Equity	2,87	0,391	156	2,723	0,167	156	-0,147
Total Assets	539 834	128 587	156	464 726	64 000	156	-75 108

The table shows mean values of the two groups characteristics in 2007.
 *Mean diff. reflects mean differences between the two groups and is calculated by subtracting the control group's mean value of the respective characteristics, with the same measures for the target group.

Table 3: Firm one-year trends 2006-2007 and firm two-year trends 2006-2008**Firm one-year and two-year trends**

	PE firm sample		Matching firm sample		Mean diff.**
	Mean*	N	Mean*	N	
<i>One-year trends</i>					
Return on Assets	0,530	156	0,215	156	-0,315
Debt / Equity	-0,016	156	-0,087	156	-0,072
Total Assets	-0,046	156	0,056	156	0,102
<i>Two-year trends</i>					
Return on Assets	-0,166	156	-0,064	156	0,102
Debt / Equity	-0,111	156	0,048	156	0,159
Total Assets	0,005	156	0,130	156	0,126

The table shows mean values of the two groups' one-year and two-year growths 2006-2007, and 2006-2008.

*Mean reflects growth in mean values of the two groups' measures of the respective variables.

**Mean diff. reflects mean differences between the two groups, and is calculated by subtracting the control group's mean value of the respective growths, with the same measures for the target group.

Table 4: Firm one-year trends 2007-2008**Firm trends 2007-2008**

	PE firm sample		Matching firm sample		Mean diff.**
	Mean*	N	Mean*	N	
Capital Investments / Assets	-0,827	156	-1,035	156	-0,208
Net Debt Issuance / Assets	1,383	156	-1,469	156	-2,852
Net Equity Injections / Assets	-1,076	156	-0,888	156	0,188
Return on Assets	-0,455	156	-0,230	156	0,225
Debt / Equity	-0,097	156	0,148	156	0,245
Total Assets	0,054	156	0,071	156	0,017

The table shows mean values of the two groups one-year growth between 2007 and 2008.

*Mean reflects growth in mean values of the two groups' measures of the respective variables.

**Mean diff. reflects mean differences between the two groups, and is calculated by subtracting the control group's mean value of the respective growths, with the same measures for the target group.

Table 5: Mean values of 2007-2012 & crisis period for the target and control groups

Mean values of dependent variables		2007	2008	2009	2010	2011	<i>Crisis</i>	2012
<i>PE firm</i>	CI / A	0,107	0,019	-0,043	-0,019	-0,001	0,051	-0,024
	DI / A	0,017	0,041	-0,034	0,009	-0,008	0,002	-0,056
	EI / A	0,055	-0,004	-0,006	0,014	-0,002	0,000	-0,010
	Cost of debt	0,029	0,038	0,042	0,036	0,033	0,037	0,035
	Debt / Assets	0,567	0,577	0,571	0,565	0,574	0,572	0,555
Observations		156	156	156	156	156	620	156
<i>non PE firm</i>	CI / A	0,128	-0,004	-0,152	0,026	-0,025	-0,039	-0,045
	DI / A	0,076	-0,036	-0,069	-0,036	-0,022	-0,041	-0,043
	EI / A	0,024	0,003	0,003	0,029	0,007	0,010	-0,006
	Cost of debt	0,025	0,036	0,038	0,033	0,025	0,033	0,030
	Debt / Assets	0,678	0,663	0,637	0,612	0,599	0,628	0,592
Observations		156	156	156	156	156	620	156
The table shows mean values of the variables; (1) Net Capital Investments / Assets, (2) Net Debt Issuance / Assets, (3) Net Equity Injections / Assets, (4) Cost of debt, and (5) Tot. Debt / Assets, for the years 2007 to 2012, and for the crisis-period.								
*The "crisis" time variable denotes the period reflected by the dummy <i>Crisis</i> , which includes 2008, 2009, 2010 and 2011								

Main Results

Table 11: Fixed effect regression model coefficients

Main Results Fixed Effect Regression

	Net Capital Investments / Assets		Net Debt Issuance / Assets		Net Equity Contrib. / Assets		Cost of Debt	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Crisis	-0,0642		-0,0174		-0,0099		0,0067	
PE firm x Crisis *		-0,0512		0,0217		-0,0210		0,0062
non PE firm X Crisis **		-0,0769		-0,0556		0,0009		0,0072
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1 837	1 837	1 834	1 834	1 826	1 826	2 097	2 097
R-squared	(0.0460)		(0.0401)		(0.1420)		(0.0411)	
		(0.0432)*		(0.0398)*		(0.1432)*		(0.0074)*
		(0.0449)**		(0.0456)**		(0.1411)**		(0.0334)**

The table reports the estimates of a difference-in-difference fixed effect model on the dependent variables; (1) Net Capital Investments / Assets, (2) Net Debt Issuance / Assets, (3) Net Equity Injections / Assets, and (4) Cost of debt. All specifications include year fixed effects. Additionally, all measures rely on a baseline regression with a set of firm fixed effects. These include firm profitability measured as return on assets (ROA), firm size measured as total assets, and firm leverage measured as the total debt to equity ratio (D/E). The parameters of interest are the crisis dummy variable, the interaction between the crisis dummy variable and the PE firm dummy variable, and the interaction between the crisis dummy variable and the non PE-backed firm dummy variable. The PE and non PE dummies are included as firm level controls and the results are presented in the (b) columns.

Robustness Tests

Table 12: Robustness test on difference-in-difference model applying alternative crisis variable, 2012

Robustness test with alt crisis variable

		Crisis-2007	Alt. Crisis-2007
Net Debt Issuance / Assets	<i>PE</i>	-0,0154	-0,0726
	<i>nonPE</i>	-0,1170	-0,1199
	DID estimate	0,1016	0,0473
	Significance (<i>P-value</i>)	(0,0008)	(0,1120)
Capital Investments / Assets	<i>PE</i>	-0,0563	-0,1314
	<i>nonPE</i>	-0,1669	-0,1727
	DID estimate	0,1106	0,0413
	Significance (<i>P-value</i>)	(0,0700)	(0,2177)
Net Equity Injections / Assets	<i>PE</i>	-0,0544	-0,0653
	<i>nonPE</i>	-0,0133	-0,0296
	DID estimate	-0,0412	-0,0357
	Significance (<i>P-value</i>)	(0,0316)	(0,1142)
Cost of Debt	<i>PE</i>	0,0075	0,0056
	<i>nonPE</i>	0,0077	0,0043
	DID estimate	-0,0002	0,0013
	Significance (<i>P-value</i>)	(0,4921)	(0,3927)

The table shows the robustness test where an alternative crisis dummy variable is included. The alternative dummy reflects data from year 2012, while the original dummy reflects data from the years 2008 to 2011. The DID estimates are calculated as the difference of the two groups' differences of means.

Table 13: Robustness test on fixed effect regression applying alternative crisis variable, 2012

Main results with alt. crisis variable

	Net Capital Investments / Assets		Net Debt Issuance / Assets		Net Equity Contrib. / Assets		Cost of Debt	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Alt Crisis	-0,0331402		-0,0441		-0,0111		0,0010	
PE firm x Alt Crisis *		-0,0226		-0,0507		-0,0177		0,0013
non PE firm X Alt Crisis **		-0,0436		-0,0377		-0,0044		0,0007
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,837		1,834		1,826		2,097	
R-squared	-0,0425		-0,0441		-0,1418		-0,0316	
		(0,0420)*		(0,0422)*		(0,1420)*		(0,0297)*
		(0,0425)**		(0,0407)**		(0,1412)**		(0,0316)**

The table reports the estimates of a difference-in-difference fixed effect model on the dependent variables; (1) Net Capital Investments / Assets, (2) Net Debt Issuance / Assets, (3) Net Equity Injections / Assets, and (4) Cost of debt. In this table the outcomes are products of a robustness test where the alternative crisis dummy is applied in place of the original crisis dummy. The alternative dummy reflects data from 2012. All specifications include year fixed effects. Additionally, all measures rely on a baseline regression with a set of firm fixed effects. These include firm profitability measured as return on assets (ROA), firm size measured as total assets, and firm leverage measured as the total debt to equity ratio (D/E). The parameters of interest are the crisis dummy variable, the interaction between the crisis dummy variable and the PE firm dummy variable, and the interaction between the crisis dummy variable and the non PE-backed firm dummy variable. The PE and non PE dummies are included as firm level controls and the results are presented in the (b) columns.