The Influence of Financial Constraints on Acquisition Premiums

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ABSTRACT

In this study I examine the effect of financial constraints on acquisition premiums. Three of the most widely used constraints measures in previous studies are assembled into one composite index. The financial constraints of target firms are related to acquisition premiums and abnormal returns in a sample period from 1985 to 2015, including the last financial crisis. This research is about U.K. publicly listed firms. The study builds on 196 acquisitions and finds evidence that target firms earn premiums in acquisitions. The cumulative average abnormal returns around announcement show a positive significant difference between financially unconstrained and constrained firms. This indicates that acquirers pay higher premiums for unconstrained firms compared to constrained firms, which is in contrast to prior literature. However, higher abnormal returns are generated for the target firms when it is considered to be financially constrained ánd is acquired during the financial crisis period.

Keywords: Acquisitions, Financial constraints, KZ index, WW index, SA index, acquisitions premiums, abnormal returns and financial crisis

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1. Introduction

Over the past decades, the activity of mergers and acquisitions grew sustainable (Martynova and Renneboog, 2008). It has largely been researched in many empirical papers, relating numerous aspects such as target or acquirer characteristics, to the likelihood or returns of acquisitions. Different motives, such as synergy creation and reducing the agency problem could be the cause of undertaking acquisitions (Mukerhjee, Kiymaz and Baker, 2004; Jensen and Meckling, 1986). Moving on, financial flexibility could also be seen as a potential driver for the activity of acquisitions (Erel, Jang and Weisbach, 2014).

Many researchers agree that the degree of financial constraints of a target company is important in its investment decision (Cleary, 1996; Kadapakkam, Kumar and Riddick, 1998). Besides this, the firm's financial constraints are an indicator for its returns, as Lamont, Polk and Saá-Requejo (2001) found that the returns of constrained firms move together. This could mean that financial constraints of the target firm could be a value driver for acquisitions. Although the empirical literature about financial constraints is ascending, there is little information known about the role of financial constraints in acquisitions. Furthermore, no consensus has been reached about the ''right'' measurement for financial constraints. Among the first researchers who established a measurement for financial constraints were Fazzari, Hubbard and Petersen (1988). Based on their definition of financial constraints, ''a larger wedge between the cost of external and internal capital'', they used the cash flow-investment sensitivity as an indicator. Other researchers, among whom Lamont, Polk and Saá-Requejo (2001), Whited and Wu (2006) and Hadlock and Pierce (2010), all developed a financial constraints index based on previous research papers: the KZ index, the WW index and the SA index, respectively.

Recent research of Khatami, Marchica and Mura (2015) finds that acquisitions improve the ability of constrained firms to get capital via the acquirer. They found significant effects between target's financial constraints and the acquisition premium paid (Khatami et al., 2015). This could be substantiated by Almeida et al. (2004), who state that financially constrained firms have to deal with unexploited investment possibilities and consequently have undeveloped growth potential.

The influences of financial constraints on acquisitions premiums and returns can have a more provoked effect in times of crises. As Lamont et al. (2001) state, financial constraints could lead to an exposure for firms to economic credit crunches. They reason that financial constraints are more present in times of economic downturn (Lamont et al., 2001). Bancel and Mittoo (2011) find in their study that firms which can be considered unconstrained, suffer less from the financial crisis than firms which have more constraints. With regard to financial constraints, it makes it more interesting for this study to take the financial crisis into account. This paper focuses on financial constraints as a motive to takeover another firm, with a secondary focal point on the latest financial crisis.

To examine the effects of target's financial constraints on U.K. public firms' premiums paid and abnormal firm performance in terms of share price, the following research question is addressed:

To what extent do financial constraints of target firms lead to differences in acquisition premiums?

Using the Thomson ONE and Datastream databases, all needed variables and information are retrieved with regard to the involved acquiring and target firms. An analysis of 196 acquisitions (e.g. deals) between 1985 and 2015, involving U.K. listed firms only. The sample results in 170 deals for unconstrained targets and 26 deals for the financially constrained targets. I apply my research question to the U.K. because the U.K. has a relative high amount of deals over the past decades (in contrast to other European countries) and is ranked close to the U.S. (CFI Research Report, 2011). Besides this, Woods (2000) states there are differences between U.S.- and U.K. acquisitions in terms of financing. Therefore, it is interesting to discover whether the results of previous literature about financial constraints and acquisition returns (in the U.S.) are the same for U.K. firms.

In this study a different joint index is created to measure financial constraints and it consists of the previously mentioned indices (the KZ-, WW- and SA index). The combination of this index combines both external and internal finance constraints and takes into account qualitative and quantitative aspects. These three measures are widely used and I expect the combination of these indices to add to the predictive power of the separate measures as more variables are considered. Moving on, these financial constraints measures are tested for the target firms in the sample, as the focus of this study is whether target shareholders benefit more from an acquisition if their firm is considered financially constrained. This is partially based on Khatami et al., (2015), who did not find any significant effect of financial constraints for acquiring firms regarding value creation in takeovers, whilst this was the case for target firms in their study. An event-study is used to calculate cumulative abnormal returns (CARs) around the acquisition announcement. Several multiple regression models, including a financial constraints dummy of the composite index, are used to find out which factors influence the difference in premiums paid for financially constrained and unconstrained target firms.

After robustness checks, I find, in contradiction with existing literature, that U.K. acquirers pay higher premiums for unconstrained targets compared to constrained targets. A negative (non-significant) relation was found between the crisis period and acquisition premiums, indicating that during the financial crisis the acquisition premiums were on average lower. Furthermore, during the crisis, financially constrained target firms earn higher premiums than unconstrained targets. This could indicate a relationship between the temporality of a firm's constraints and its future value after the crisis period. Lastly, the deal attitude, method of payment and tender offer are deal characteristics that seem to matter for the differences in premiums paid.

This study adds to prior literature as it fills the research gap for U.K. firms involved in public acquisitions, by investigating the relationship between a target's financial constraints and the

acquisition premium paid by the acquiring firm. Furthermore, a different combination (e.g. combining the KZ-, WW- and SA index) of financial constraints measures is composed and applied. Lastly, it is interesting to research whether the relation between financial constraints and acquisition premiums differs during a financial crisis period. In combination with previous research, this study can be valuable for future research. As many studies find that there is a higher premium paid for financially constrained firms than for unconstrained targets in the U.S., this study finds the opposite for U.K. firms. Further examination of differences between targets' financial constraints in acquisitions between these countries would therefore be of interest.

The remainder of this study is organized as follows. First, a literature review is provided in which the most influential literature on financial constraints and their relation to value enhancement of acquisitions is addressed. Based on the outcomes of prior literature, the hypotheses are formulated and a conceptual model is proposed. Then, the dataset is described and an explanation of the used variables and methodologies is given. Furthermore, the regression models and according analyses are elaborated on. After this the results are provided and discussed. Lastly, this paper concludes with the most important findings and some limitations and recommendations for future research are given.

2. Literature Review

Over the past decades, mergers and acquisitions increased enormously and researchers have generated a substantial amount of research which relates to this phenomenon (Bruner, 2002; Martynova and Renneboog, 2008). Research stretches from motives behind acquisitions, such as synergy creations, to value creation in acquisitions. For example, Bruner (2002) finds in his study that acquisitions are profitable for target shareholders and they earn abnormal returns in the 20-30% range. There is an ongoing debate on when firms face financial constraints. Kaplan and Zingales (1997) classify firms as being financially constrained when they face a wedge between internal and external costs of financing. This wedge is a consequence of capital market imperfections, which will be discussed later on. In some way, many firms face this wedge and therefore it is important to consider the extent of firms being financially constrained (Fazzari et al., 1988). Furthermore, firms that do not have the required amount of internal funds at their disposal could forego valuable and profitable investment projects (Almeida et al., 2004). Therefore, they state that those firms' growth potential is left unexploited. In acquisitions this could result in a higher premium, as the acquirer is willing to pay extra for the unexploited growth opportunities of the target. In times of economic downturn, this effect could be even greater as access to financial funds is more difficult (Lamont et al., 2001). Therefore, the global financial crisis is also elaborated on, since this time period is used as a sample in this study as well.

2.1 Motives for Acquisitions

One of the topics in the field of acquisitions is whether they add value for the acquiring- and target firms. Many papers examine the financial and operating performance of the combined firm after an acquisition (Bruner, 2002; Martynova and Renneboog, 2008; Khatami et al., 2015). Additionally, it is also investigated what the main intentions are to undertake an acquisition (or merger) (Matsusaka, 1993; Bruner, 2002; Martynova and Renneboog, 2008). Although the motives differ from one acquisition to another, a common measure of success is the increased value of the combined firm (Mukherjee, Kiymaz and Baker, 2004). Bruner (2002) suggests an acquisition to be successful as long as no value is destroyed.

In the case of an acquisition in which value is created, the investment returns exceed the required returns. The net present value (NPV) of the investment is positive and the abnormal returns are positive as well. These acquisitions are undertaken with the aim to gain synergies such as tax advantages, economies of scale, monopoly and increase in market power (Mukherjee et al., 2004). Another motive is to be able to respond to an economic credit shock by diversification. Matsusaka (1993) shows in his study that the acquirer benefits from these type of acquisitions.

Bruner (2002) also describes value destroying acquisitions. Examples of causes for these acquisitions are managerial hubris and agency problems. Roll (1986) explains managerial hubris as the overconfidence of managers, who believe they can manage the assets of a target firm more efficiently than the managers of the target firm itself. Consequently, they overpay for the target firm and could engage in an acquisition where no synergies can be created (Matsusaka, 1993). Agency problems could lead to value destroying acquisitions. As discussed by Jensen and Meckling (1976), agents (managers) do not always act in the best interest of their principals (shareholders). Managers can make decisions that are not in line with those of the shareholders and this could lead to inefficiencies and a decrease in welfare, for example due to too much risk-taking.

Throughout the history of mergers and acquisitions, which are said to come and go in waves, motives for acquisitions can vary over time (Martynova and Renneboog, 2008). As can be concluded from the previous literature, diverse reasons can affect the results of the deals, which should be accounted for.

2.2 Internal and External Funds of Finance

In a world of perfect capital markets, internal and external funds of finance are perfect substitutes of one another. Based on this assumption, Modigliani and Miller (1958) state that the financial structure, i.e. the internal and external use of capital, is irrelevant for the investment choice of a firm. This means firms can have access to the required amount of cash at a cost that equals their cost of capital. In order to obtain the needed funding for an acquisition, a firm's financial situation is therefore irrelevant.

Many other researchers, among whom Fazzari, Hubbard and Petersen (1988), criticised the assumption of Modigliani and Miller. Their research is based on capital market imperfections, where a firm's financial position matters for the cost of external financing. In this scenario the cost of external financing exceeds the cost of internal funds. The substitutability of external and internal funds is likely to be imperfect or incomplete based on different grounds. It is argued by Kadapakkem et al. (1998) and by Jensen and Meckling (1976) that the combined effects of transaction costs, managerial agency problems and asymmetric information can have a substantial effect on internal financing demand. Myers and Majluf (1984) also discuss the cost of financial distress as a rationale for market imperfections.

Transaction costs are related to the use of external debt or issuing equity and consist of shelf registration fees, administrative costs and underwriters' spreads. This makes internal funds – when available – lower in cost (Myers and Majluf, 1984). This financing hierarchy, also known as the pecking order theory elaborated on by Myers and Majluf (1984), reflects the preference for lower cost financing funds (internal) to more expensive funds (external). Moreover, the tax-disadvantage when issuing new equity contributes to this preference. The disadvantage is a consequence of the tax rate on dividends and capital gains. The tax rate for dividends is higher than the tax rate on capital gains and therefore internal finance has a cost advantage over external finance. As issuing new equity can also lead to a drop in the earnings

per share for the initial shareholders (because more shares are issued and their shareholder base decreases), it is used as a last resort for external finance.

Secondly, managerial agency problems arise when managers do not act in the interest of the shareholders. They act in their own interest by expanding firm size, also known as ‘’empire building’’ (Jensen, 1986). This involves risks because this is not necessarily the best strategic decision for the firm itself. External finance suppliers will suspect this and ask for a premium to lend the managers cash (Jensen and Meckling, 1976). When internal funds are unavailable, this extra cost can result in missing a valuable investment opportunity. Another agency problem can arise between managers and creditors. Managers are often willing to take on more debt, which increases the debt-equity ratio but could harm existing creditors (Myers and Majluf, 1984).

Lastly, asymmetric information among market participants is a driver for capital market imperfections, as in perfect capital markets there would not be any form of asymmetric information. Kadapakkam et al. (1998) explain this in the following way: as managers or inside investors have more detailed information about the firm and its investment decisions than outside investors have, credit rationing occurs. The outside investors cannot assess the quality of the managers and firm relatively well and therefore they have a disadvantage. This is also known as the agency problem of debt and seems to imply an excess demand for loanable funds (Stiglitz and Weiss, 1981). In other words, the availability of capital and debt and not its cost determines the level of investment. High levels of debt will induce firms to invest in overly risky opportunities due to the limited liability character of debt (Jensen and Meckling, 1976). Furthermore, Myers (1977) states that high levels of debt can also cause firms to forego positive net present value (NPV) investment projects and to go bankrupt. Myers and Majluf (1984) argue that informational imperfections lead outside investors to bear most of the cost due to the agency debt problem. Thus these outside investors raise the cost of external finance by demanding interest rates premiums, consequently driving a larger gap between internal and external funds. A firm with greater internal funds does not necessarily have to depend on external capital and therefore will be perceived less risky by lenders. The increased costs of external financing, previously discussed, can be mainly based on a firm’s choice on finance, agency problems and information asymmetry.

2.3 Financial Constraints Measures

Financial constraints are defined as frictions that prevent firms from funding all the desired investments (Lamont, Polk and Saá-Requejo, 2001). Causes of these constraints are illiquidity of assets, dependency of the firm on banks or other financial institutions, or the inability to issue equity.

As it is realistic to assume there are frictions in capital markets that makes them imperfect, it can be stated that the wedge between internal and external funding costs indicate whether a firm is financially

constrained or not. Put differently, the availability to internal and external finance does matter. In the empirical literature there are different approaches to measure financial constraints.

Much of the existing literature regarding financial constraints has predominantly been focused on the relation between investment demand and financial constraints. Among the first researchers who addressed this topic were Fazzari, Hubbard and Petersen (1988). They examined the relation between investments to financial factors such as access to the equity and debt market and internal funds. Investments by firms that face financial constraints would be determined by their cash flows. As smaller firms find access to external capital more difficult than their larger peers, because of higher agency and transaction costs (Kadapakkam et al., 1998), it can be argued that they would have a larger reactiveness towards their internal cash holdings. In other words, firms that use more internal funds and pay out less dividends are more sensitive to cash flow changes. The findings of Fazzari et al. (1988) are in line with this reasoning. Their sample was a large dataset of manufacturing firms, which were classified as financially constrained based on the dividend pay-out ratio. A larger cash flow-investment sensitivity is interpreted by Fazzari et al. (1988) as indicator for a larger wedge between the cost of external and internal funds and therefore used as evidence for firms being financially constrained.

This methodology has been used in multiple empirical researches (Kaplan and Zingales, 1997; Almeida et al., 2004). Kadapakkam et al. (1998) however, found contradicting evidence, which is that the cash flow-investment sensitivity is the highest for larger firms and the smallest for the smaller firms. They ground this by stating that larger firms have greater flexibility with respect to timing their investments, by deferring their investment(s) until internal funds become available. Smaller firms deal with larger transaction costs by extracting external capital compared to larger firms, as they are more likely to be forced to make investments as a result of market competition. Due to lack of internal holdings, they may even face higher opportunity costs of foregoing investment opportunities. This results in a less strong positive relationship between investments and cash flows for smaller firms. Furthermore, Kadapakkam et al.'s (1998) second explanation is that larger firms are more subjected to possible managerial agency problems. Larger firms are often characterised by dispersed ownership, where managers act as the agents of the shareholders. Whenever internal funds are available, managers try to expand the firm size by empire building, which results in a stronger positive cash flow-investment sensitivity for larger firms. Their finding is in line with that of Kaplan and Zingales (1997), who uttered that U.S. firms with relatively low dividend pay-outs are not necessarily those facing external financial constraints. They introduced a classification scheme which is based on the same dataset of FHP (1988). KZ (1997) extended the research of FHP (1988) by combining qualitative and quantitative data sources to find out whether the firms labelled as financially constrained by FHP (1988) were indeed financially constrained – in the vision of KZ (1997). For example, they also accounted for the explanation of management regarding capital needs and the accessibility to it. Based on these qualitative and quantitative sources, they label firms as: not financially constrained, likely not financially constrained,

possibly financially constrained, likely financially constrained and undoubtedly financially constrained. According to Kaplan and Zingales (1997), higher sensitivities cannot be accounted for the evidence that firms are more financially constrained, which is the opposite of the result of Fazzari, Hubbard and Petersen (1988).

In 2000, FHP responded to the study of KZ (1997) and critiqued the paper based on the lack of the theoretical approach of their own study in 1988. In the opinion of FHP (2000), the results of KZ (1997) wouldn't therefore be solid enough. The debate continued when KZ responded in 2000 to FHP (2000). They agreed with the argument based on the theoretical approach, however they held ground on their own empirical results. Thus, the cash flow-investment sensitivity as a potential indicator of financial constraints is rather doubtful due to contradicting empirical results in literature (Fazzari et al., 1988; Kaplan and Zingales, 1997; Kadapakkam et al., 1998).

Cleary (1999) used the model of KZ (1997). He performs a multiple discriminant analysis and developed an index in order to determine a firm's financial status and financial constraints. The index is based on financial ratios that are mainly related to internal funds. His findings are in contrast with that of FHP (1988), who found that unconstrained firms are the most sensitive to cash flows. Cleary (1999) finds that the investment decisions of highly creditworthy firms are more sensitive to their liquidity or internal funds than low creditworthy firms are. This is in line with the findings of KZ (1997); the least constrained firms are the most sensitive to internal cash flow.

Moreover, the applicability of the KZ model is very complex and time-consuming and therefore Lamont, Polk and Saá-Requejo (2001) also created an index based on KZ (1997): the KZ index. They used this index to measure the impact of internal financial constraints on firm value and whether this is observable in stock price movements (in economic shocks). The reasoning behind this is that changes in financial constraints should be reflected in stock returns, based on the condition that financial constraints are an important indicator of the value of a firm. Lamont et al. (2001) find that indeed financial constraints are a determinant of firm value and state that stock returns of financially constrained firms move together. The KZ index is formulated as follows:

$$(1)\ \mathrm{KZ} = -1.001909\ Cash\ Flow\ kz + 0.2826389\ Tobin's\ Q + 3.139193\ Leverage\ kz - 39.3678\ Dividends - 1.314759\ Cash\ Holding$$

In 2004, Almeida, Campello and Weisbach also used this KZ index in their study in order to test the sensitivity of cash flow to cash holdings. They use this sensitivity instead of the cash flow-investment sensitivity used by FHP (1988), as they discuss the use of Tobin's Q, which controls for investment opportunities because the cash flow could include information on investments itself. Almeida et al. (2004) argue that a financially constrained firm which has an investment opportunity, needs to forego this opportunity in order to save their cash to invest in a more profitable opportunity and to survive

potential credit supply shocks. Unconstrained firms do not face this drawback as a result of their unlimited access to external capital. The use of cash policies and the liquidity demand is therefore used by them as an indicator for constraints. This internal indicator for financial constraints is also used by Guariglia (2008) and found significant for U.K. firms. Both Guariglia (2008) and Almeida et al. (2004) find that constrained firms hold on average more cash and save more of their cash flows than their unconstrained peers (Almeida et al., 2004). Denis and Sibilkov (2010) confirm this by stating that the marginal value of investments is larger for financially constrained firms. However, they use the credit rating level of a firm as indicator for being financially constrained.

Whited and Wu (2006) improved the index by also focusing on exogenous firm characteristics, relating to external financial frictions. Unlike the KZ index, they focused on quantitative data only. The WW index suggests that the shadow cost of external finance can be interpreted as a part of firm characteristics. In order to create the index, they account for cash flow, leverage, total assets, industry sales growth, firm sales growth and a dummy whether a firm pays dividend.

This resulted in the following:

$$\begin{aligned}(2)\ \mathrm{WW} = {} & -0.091\ \mathit{Cash\ Flow\ ww} - 0.062\ \mathit{Dividend\ dummy} \\ & + 0.021\ \mathit{Leverage\ ww} - 0.044\ \mathit{Log\ Total\ Assets} \\ & + 0.102\ \mathit{Industry\ Sales\ Growth} - \ 0.035\ \mathit{Sales\ Growth}\end{aligned}$$

Whited and Wu (2006) classified firms as constrained based on external finance demand. Hadlock and Pierce (2010) studied different measures of financial constraints and found mixed evidence for the indices. They discussed that KZ (1997) focused too much on endogenous firm characteristics, such as cash holdings (Hadlock and Pierce, 2010). Therefore, they developed another index that classified firms as constrained based on two external firm characteristics: firm age and firm size. They partly reproduced the method of KZ (1997) by collecting qualitative information from financial reports in order to classify firms as financially constrained. Based on this classification, Hadlock and Pierce (2010) assessed numerous logit models predicting financial constraints, as a function of several quantitative factors. Among these factors, the variables firm age and firm size were the most meaningful estimators of financial constraints and an index was developed based on these two variables. This is confirmed by Guariglia (2008) who used size and age also as a measure for external financing constraints. Hadlock and Pierce (2010) also argued that KZ's (1997) use of certain variables, such as Tobin's Q and dividend pay-out, are only a proxy for firm age and firm size. The SA index implies that for young and small firms, financial constraints start to decline rapidly as they mature and grow. The Hadlock and Pierce index (referred to as SA index) (2010) is formulated as follows:

$$(3)\ \mathrm{SA} = -0.737\ \mathit{Size} + 0.043\ \mathit{Size}^2 - 0.040\ \mathit{Age}$$

Furthermore, after classifying firms as constrained and unconstrained using the cash flow sensitivity of cash approach of Almeida et al. (2004), Hadlock and Pierce (2010) find that constrained firms show a significant cash flow sensitivity to cash, whereas the unconstrained firms do not. This is in line with previous findings (Guariglia, 2008). This evidence has increased the confidence in the SA-index as a reliable measure for financial constraints in empirical literature.

Guariglia (2008) was one of the first to combine both internal and external finance constraints for the U.K. He investigates the joint effects of internal and external financial constraints on investments and finds a differential impact on investments between internal and external financial constraints. Campello and Chen (2010) were the first to combine different measures into one composite index in the U.S. They compared multiple approaches to measure financial constraints and created an alternative composite index in their study as well. They found this index to be to most accurate (Campello and Chen, 2010). Khatami et al. (2010) had similar findings. The advantage of a composite measure is that it's based on schemes that are again based on multiple characteristics (Campello and Chen, 2010). Their reason to combine different measures into one scheme, is that researchers have long debated about the variables one should use to indicate a financial constraints factor. In the composite index of Campello and Chen (2010) they pool the following financial constraint measures: the KZ index, firm size, the coverage ratio and the dividend pay-out ratio. Furthermore, Khatami et al. (2015) used the composite measures of Campello and Chen (2010) and found significant results for financial constraints and returns. This study also practices a mixture of several measures. The three indices described previously are composited in this research: the KZ index, the WW index and the SA index.[1] The higher these indices are; the more financially constrained firms are. To my knowledge, no empirical paper has used these measures altogether before, in order to create an alternative joint index. As the KZ index is used in many papers and is often found to be considered as a relatively good measure of financial constraints, this index is included in the composite index. The WW index is added to the composite index because this index takes external financing constraints in consideration (Whited and Wu, 2006), whereas the KZ index lacks these exogenous characteristics. In order to also include other exogenous firm variables to determine financial constraints, the SA index is added, which contains size and age as variables (Hadlock and Pierce, 2010). Hadlock and Pierce (2010) argue that the KZ index is too reliant on the endogenous variables and that their index (which is a determinant of the KZ index) is a good alternative. These researchers (Hadlock and Pierce, 2010; Whited and Wu, 2006) designed indices that retrieved similar results and all rely on (some of the) same fundamentals of Kaplan and Zingales (1997). Lamont et al. (2001) and Whited and Wu (2006) both find a co-movement for the performance of financially constrained firms (using the KZ- and WW index, respectively). As different endogenous and exogenous

[1] The financial constraints measures and according variables used in this study are shown in Appendix A, Table 2

variables are used in the three different indices and they all measure differences between the performance of financially constrained and unconstrained firms, it is prospected that no aspect of relevance to financial constraints will be left out. Therefore, these three indices are composed and used in this study as a measure for financial constraints; this will be further explained in the methodology section. The Cleary index (1999) is not added as the usage of this index has been very scarce and very little empirical prove about this index is known.

2.4 Acquisition Premiums and Financial Constraints

‘’Financial constraints are frictions that prevent the firm from funding all desired investments’’, as Lamont et al. (2001) put it. Management that cannot maximize the firm’s assets can be taken over by competing management. Financially constrained firms which are not able to maximize the firm’s assets, are more attractive takeover targets and have higher potential to be acquired by another party. As financially constrained firms have lack of internal funds to invest in profitable projects, they have unexploited (growth) opportunities (Almeida et al., 2004). As their growth potential can be sufficient, a potential buyer might pay extra for this constrained target, resulting in a higher premium. The acquisition premium is directly linked to the decision on the sum a firm is willing to pay, as well as it is obliged to pay in order to takeover another firm. In other words, it is the difference between the estimated real value of the target and the actual acquisition price (Bargeron, Schlingemann, Stulz and Zutter, 2008).

One of the few researchers that linked financial constraints to acquisition premiums are Khatami, Marchica and Mura (2015). In their research they find that the degree of financial constraints of target firms significantly increases the acquisition premium. This is in line with the reasoning of Almeida et al. (2004), who state that financially constrained firms have substantial unexploited investment opportunities and therefore have great growth potential. Financially constrained target firms are more likely to be undervalued, as they are said to be smaller and therefore also easier to incorporate with other firms (Alexandridis et al., 2013). Besides this, Fu, Lin and Officer (2013) state that one of the main drivers for premiums are undervaluations. Based on this it can be stated that the acquisition premium paid is higher than when a target is not financially constrained and this is tested by the following hypothesis:

Hypothesis 1: Acquisitions of financially constrained targets lead to higher acquisition premiums compared to acquisitions of unconstrained firms.[2]

This study expects that there is a difference in premiums paid by the acquirer for financially constrained- and unconstrained target firms. The financial constraints of target firms are expected to be positively

[2] Acquisition premiums are calculated by the returns for targets’ shareholders, this accounts for all premiums mentioned throughout this study.

related to the premiums, as these targets have relatively more opportunities left unexploited compared to unconstrained targets. Due to this, when targets are acquired, the acquiring firms can benefit relatively more from the growth potential of the constrained target firm and are expected to pay a higher premium for this.

2.5 Firm Performance and Financial Constraints

Based on the reasoning that financial constraints are a valuable indicator of firm value (Lamont et al., 2001) and on the theory that changes in the intensity of constraints are reflected in the stock price, Lamont et al. (2001) show a common variation in stock returns of financially constrained firms. In other words, they prove the existence of a financial constraint factor in explaining stock returns. Baker, Stein and Wurgler (2003) also find in their research that financial constraints are an important determinant of stock returns. With a financial constraints factor, they suggest that financial constraints expose firms to economic shocks, such as an unexpected credit crunch. Furthermore, Lamont et al. (2001) find that financially constrained firms earn lower stock returns than their unconstrained peers.

This conclusion is in contrast to that of Whited and Wu (2006), who state that constrained firms earn higher returns instead of lower returns. Their rationale is based on the unrelated effect that investment policies have to stock returns. Here, it is important to notice that Lamont et al. (2001) use the KZ index, whereas Whited and Wu (2006) use their self-developed WW index, which could give a possible explanation for the contradicting outcomes of their studies. Therefore, it makes it more interesting when combining these indices together in one index.

Moving on, in the case of an acquisition, it is found by Khatami et al. (2015) that when a target is financially constrained, returns are higher for both parties than when a target is unconstrained. Hubbard and Palia (1999) elucidate on this extensively and argue in their paper that returns are the highest when financially unconstrained bidders buy financially constrained target firms. These results hold with the theoretical reasoning that an acquisition can ease financial constraints if the acquirer's capital funds are sufficient enough to enable the target to undertake (more) positive investment opportunities (Erel, Jang and Weisbach, 2015). Therefore, in this study financial constraints are only tested on target firms.

Hypothesis 2: Acquisitions of financially constrained targets lead to higher abnormal returns, compared to acquisitions of unconstrained firms.[3]

Thus, in this study it is expected that abnormal returns are positively related to the financial constraints of a target. This is based on unexploited investment or growth opportunities of financially constrained targets due to insufficient funds, which could lead to higher returns when these opportunities can be

[3] All the abnormal returns tested in this study are the returns for target firms and calculated around the acquisition announcement dates.

grasped after an acquisition (Khatami et al., 2015).

2.6 Financial Crisis

Acquisitions are said to come and go in waves (Martynova and Renneboog, 2008). According to Kindleberger and Aliber (2011) financial crises also can be categorized in waves. In their book four different crisis-waves are described (Kindleberger and Aliber, 2011). The first wave started in the early 1980s when Mexico, Brazil and Argentina defaulted on U.S. dollar denominated loans. The second wave found its beginning in the 1990s where an implosion of real estate and stock bubbles led to massive failure of banks in Japan. The third wave, also known as the Asian financial crisis, began mid-1997 and was the result of an asset pricing bubble. The last financial crisis, which is the focus of this study, started in July 2007 as a result of consumer defaults on subprime mortgages, as stated by Duchin, Ozbas and Sensoy (2010). These defaults in the US had major consequences which resulted in several bank failures all over the world: the freezing of several funds of BNP Paribas in August 2007, the liquidity crisis of British Bank Northern Rock in September 2007, the downfall of Bear Stearns in March 2008, the bankruptcy of Lehman Brothers in September 2008 and the collapse of the largest savings bank of the US, called Washington Mutual, also in September 2008. As from July 2007 the first effects of the financial crisis became noticeable, this year is used as starting point for the ‘’crisis’’ sample in this study. Beltratti and Stulz (2010) comply with this, as they define the crisis period starting from the first half of 2007, when several financial institutions collapsed or were bailed out by government.

Campello, Graham and Harvey (2010) performed a research from 2007 until 2008, based on surveys for CFOs globally about the impact of the financial crisis. They find significant differences between financially constrained and unconstrained firms. The firms with less financial flexibility where found to incur deeper cuts in spending, burned through more cash, sold more assets to finance their operations and drew more heavily on debt during the crisis period (Campello et al., 2010). They showed that these firms had to forego or delay potential positive investment opportunities (Campello et al., 2010). Moreover, Bancel and Mittoo (2011) find that firms which have greater internal cash holdings, experience a lower impact of the crisis. Their main finding is that firms with high financial flexibility, which can be interpreted as financially unconstrained firms, suffered less from the global financial crisis of 2007 to 2009 than firms with lower financial flexibility (Bancel and Mittoo, 2011). Besides this they find that firms with sufficient internal capital are likely to have less external debt and have higher cash ratios (Bancel and Mittoo, 2011). Almeida et al. (2010) find evidence that during the financial crisis of 2007 to 2009, firms with less financial flexibility and which took on more long-term debt, cut back their investments more than the firms with more financial flexibility. This is line with Duchin et al. (2010), who state that firms which are financially constrained have the largest decline in corporate investment – in comparison to unconstrained firms.

In line with other researchers, Lamont et al. (2001) suggest that a financial constraints factor expose firms to economic credit crunches. The unexpected credit crunch during 2007-2009 made it more problematic for these firms to invest and to keep their future cash flows at a constant and steady level. Furthermore, Lamont et al. (2001) state that constraints are more present when monetary policy is strict or during economic downturns. This makes the sample in this study of great interest, as the total sample period includes the last financial recession. The following hypothesis will be used to test for differences between the non-crisis period and the last financial recession period:

Hypothesis 3: Acquisitions premiums in the financial crisis period are expected to be lower than in the non-crisis period [negative relation].

Hypothesis 4: Abnormal returns in the financial crisis period are expected to be lower than in the non-crisis period [negative relation].

Hypothesis 5: Acquisitions of financially constrained targets lead to higher acquisition premiums compared to acquisitions of unconstrained firms in the financial crisis period [cross-variable positive relation].

Hypothesis 6: Acquisitions of financially constrained targets lead to higher abnormal returns compared to acquisitions of unconstrained firms in the financial crisis period [cross-variable positive relation].

During the financial crisis, there was less financial flexibility due to poorer availability to external capital. As a financial constraints factor can expose firms to economic downturns (Lamont et al., 2001) and financial constraints can lead to higher premiums paid in acquisitions (Khatami et al., 2015) it is expected that there is a significant positive relation between financial constraints in the crisis period and acquisition premiums and the returns. However, the expectation is that the effect of financial constraints on acquisition premiums is less provocative during the financial crisis of 2007 to 2009, than in the non-crisis period.

2.7 Research Gap

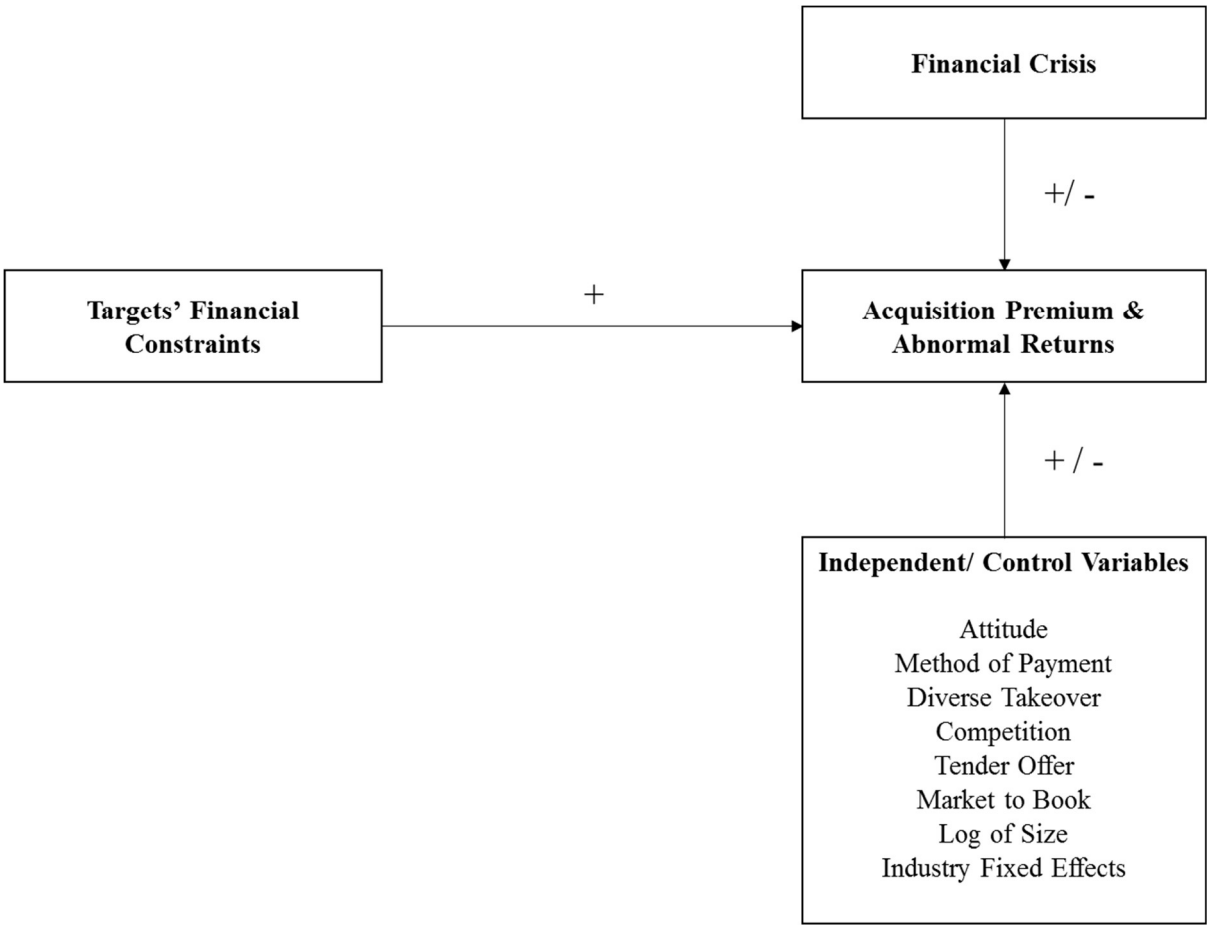
Little research has been done relating financial constraints to acquisition premiums and returns. To this day the discussion continues about measures for financial constraints. No consensus has been reached which measure or index is the ‘’best’’ and whether it affects abnormal returns positively or negatively. One of the few studies that combines multiple financial constraints measures is that of Campello and

Chen (2010) and Khatami et al. (2015). My study differs from those papers as in this research three financial constraints *indices* are used and composed into one model. To my knowledge, these financial constraints indices (e.g. the KZ index, the WW index, the SA index) have not been used and composed in previous literature altogether in one model or research before. As these indices all are fundamentally build on the Kaplan and Zingales (1997) study, it should add to the predictive power of the composed financial constraints measures. Besides this, both internal and external finance demand is taken into account, which is in line with Guariglia (2008). Furthermore, this study is based on U.K. firms, whereas other studies mainly focus on U.S. firms. One of the few researchers that investigates financial constraints in the U.K. is Guariglia (2008). However, he does not examine the effect of targets' financial constraints relating to acquisition premiums in the case of an acquisition. Therefore, this study adds to previous literature as well. In previous literature, the combination of financial constraints, acquisitions premiums and comparing two subsamples (including the financial crisis) has not been used and therefore it makes this study distinctive as well.

The expected relations described previously (by the hypotheses) are shown in the following conceptual model (Figure 1, see next page). These are formulated to answer the research question of this study:

To what extent do financial constraints of target firms lead to differences in acquisition premiums?

Figure 1



Based on this model, the data collection and the used methodologies are discussed in the next section.

3. Data and Methodology

3.1 Data

To obtain the appropriate data for this study, the SDC database via Thomson ONE Financial and Datastream are used. First the SDC database is used to obtain all the takeovers. Besides this, additional deal information is retrieved, among which the payment method and the deal attitude. Public listed firms from the U.K. are selected in the time range from 1985 to 2015. It is required for the acquisitions that they are completed and that the acquirer owns more than half of the total shares of the target firm after completion. Furthermore, only deals are considered with a value larger than 1 million ($). This minimum value is chosen to exclude the smallest firms, as these firms have often different ownership structures and other deal characteristics (Moeller, Schlingemann and Stulz, 2004). All the selection criteria and the according support can be found in Table 1, Appendix A. The total sample yielded a number of 3.158 observations for U.K. public firms. After applying all criteria, this resulted in 304 deals for which sufficient information was available.

Since the SDC database is mainly focused on deals, more variables are retrieved from Datastream (which includes Worldscope) in order to obtain financial data, mainly for the target firms. These variables are especially used for the calculation of the level of financial constraints. Variables such as the market capitalization, common equity, deferred taxes and sales are retrieved[4].

Finally, the data of the two different databases are matched. The Datastream and SEDOL codes are aligned to use in the event study. Then, SDC data is matched to that of Datastream. After aligning and matching these data from the two different databases some discards are made. Deals are deleted that have unavailable codes or are duplicates, or firms that have no event study output. To correctly calculate the financial constraints measures for the target firms, the proposed variables should be available for the target firms. Due to this, target firms with insufficient data (and their according acquiring firms) are deleted from the sample. Eventually, the main sample consists of 196 deals.

3.2 Methodology

3.2.1 Event Study

To measure the reaction of the stock market to the acquisition announcements, an event study methodology will be adopted. The Event Study Tool of Datastream is used to get target abnormal returns. The SDC database matches well with the Datastream's Event Study Tool.

[4] The total overview of the variables can be found in Appendix A, Table 3.

First, the event date needs to be identified. Here the event day is the day on which an acquisition is announced (denoted as t=0). When deciding the length of the event window, it should be taken into consideration that it is short enough to enhance the power of the test and that it is long enough to seize the total effect of the event (Uddin and Boateng, 2009). Adhering to this reasoning, multiple time windows are considered in this study. Consistent with prior literature, the following event windows are applied:

1. **The CAR3 period [-1, +1]**
   This period indicates the short-run returns around the event day (t=0). The advantage of such a short time frame reduces the possibility of interfering with other events (Officer et al., 2010)
2. **The CAR11 period [-5, +5]**
   Denotes the period from five days before to five days after the event day. This event window takes the pre- and post-announcement effects into account. This is in line with Officer et al. (2010) and Khatami et al. (2015)
3. **The target stock run-up period [-42, -1]**
   In accordance with Officer et al. (2010). The so-called run-up period begins (on average) 42 days before the acquisition announcement and ends the day before, as information about the possible acquisition then has reached the market
4. **The mark-up period [+5, +42]**
   This period is used to look for a smoothening effect of the acquisition announcement. About 1,5 months after the announcement, no effects should be observed (Schwert, 1996)
5. **The CARpremium period [-42, +5]**
   This period denotes the overall effect of the acquisition on target shareholder's wealth, because it shows the returns of pre-acquisition shareholders (Officer et al., 2010)

Secondly, the estimation period needs to be defined. This period is used in the event study as a control period, to determine the behaviour of stock returns in the absence of the event (e.g. acquisition announcement). The length of the estimation window is often equal to one year (252 trading days), according to MacKinlay (1997), as it should be ranged widely enough to capture the relationship between the stock- and the market returns. The most common choice is using the time period before the event window as a control period (MacKinlay, 1997; Officer et al. 2010). Therefore, this study uses an estimation window of 379 days to 127 days prior to the announcement day [-379, -127] (following Schwert, 1996; Officer et al., 2010). This is also in line with MacKinlay (1997), who reasons that the estimation window should be used prior to the event window for at least 120 days.

3.2.2 (Cumulative) Abnormal Returns

Within the chosen event windows, the cumulative abnormal returns need to be computed for each deal. In order to do so, abnormal returns of the target must be calculated. When analysing the returns, at least 25 daily stock returns are required. The abnormal returns give an indication of the size of the acquisition premium paid by the acquiring firm. One of the widely used approaches to calculate premiums is the use of cumulated abnormal returns. In this study, the methodology with regard to abnormal returns is mainly followed by that of MacKinlay (1997). The abnormal returns of the acquiring and target firm for each deal within the chosen event windows are computed by the following formula:

$$(4)\ AR_{it} = R_{it} - R^*_{it}$$

where *AR* are the abnormal returns for a given firm *i* on event day *t*, which equals the (target's) stock return in excess of the market model adjusted returns. The market model has the assumption that any stock's expected return is linearly related with that of the market. The standard market model formula is used in order to compute the benchmark returns (e.g. the returns in absence of the event) of the sample firms' common stock:

$$(5)\ E(R_t) = \alpha_i + \beta_i(Rm_t) + \varepsilon_{it}$$

The main advantage of this market model is that it takes into account differences for β in defining abnormal returns. The estimated market returns are based on the estimation period [-379, -127], as explained in the section of the event study. Following Uddin and Boateng (2009), the Financial Times Stock Exchange (FTSE) index is used as the equal weighted market portfolio (Rm_t). This index is comprised of firms that are traded on the London Stock Exchange. Then, the market-adjusted returns (R^*_{it}) are calculated using equation (5), by applying the estimated parameters $\hat{\alpha}_i$ and $\hat{\beta}_i$ to the event window:

$$(6)\ R^*_{it} = \hat{\alpha}_i + \hat{\beta}_i Rm_{it} + \epsilon_{it}$$

The parameters $\hat{\alpha}_i$ and $\hat{\beta}_i$ are ordinary least squares (OLS) estimates of the regression coefficients. The abnormal returns are calculated for the total sample, for the sample of financial constrained and unconstrained acquired targets and their differences. Then, to compare the abnormal returns of each event day across all acquisitions, the average of these returns is calculated for each event day *t*:

$$(7)\ AAR_t = \frac{1}{n}\sum_{t-y}^{t+x} AR_{it}$$

where *n* is the number of acquisitions, *x* denotes the number of days after the event day and *y* indicates the number of days before the event day. MacKinlay (1997) states that computing the *AAR* enables to judge whether the stock reaction in period t is valid by grouping the results in a specific way. To test for significance of the *AARs* for each event day *t*, the Student's t-test is used. It is also of interest to test

for the significance of the differences of these average returns between financially constrained and unconstrained firms. The assumption that comes with this is that the abnormal returns are normally distributed and have a finite variance. The concrete variance is not observable and therefore an estimator is calculated.

After the abnormal returns have been calculated for the total sample and for the financially constrained and unconstrained firms, next the cumulative abnormal returns (*CARs*) are computed over the different event windows. The *CARs* represent the dependent variables in the regressions. They give a good insight on the size of the premiums paid for the financially constrained and unconstrained firms.

The *CARs* for each firm *i* on event day *t* are calculated by using the following formula:

$$(8)\ CAR_{it} = \sum_{t-y}^{t+x} AR_{it}$$

Again, in order to do suggestions about the size of the premiums paid, the average of the returns is calculated. The *AAR* approach is applied, only now for *CARs*:

$$(9)\ CAAR_t = \frac{1}{n}\sum CAR_{it}$$

Then again the statistical significance of the *CAARs* are tested with a t-test. The previous assumptions (for equation (8)) are considered here as well: *CARs* are ought to have a normal distribution, a finite variance (which is replaced by an estimator) and a mean of zero.

Lastly, for the *CAARs*, there is also tested for differences between financially constrained and unconstrained target firms. If there is a difference in *CAARs* between financially constrained and unconstrained target firms (i.e. the null hypothesis of no difference in *CAARs* can be rejected), conclusive evidence is provided for the difference of the size of the premiums paid by the acquirers. This is tested by using the Welch's test. A Welch's t-test is preferred to a Student's t-test whenever sample sizes and variances are not equal between populations and must be estimated separately (Welch, 1947). The statistic and standard errors for the difference of means test are calculated in the following equations (respectively):

$$(10)\ t = \frac{\overline{X_1} - \overline{X_2}}{s_{\bar{X}_1 - \bar{X}_2}}$$

$$(11)\ s_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{s_1^2}{n_1}} + \sqrt{\frac{s_2^2}{n_2}}$$

3.2.3 Model Specification

In this section the used variables in the regressions will be explained with respect to prior literature. In Appendix A, Table 3 and 4, an overview is shown of the measures, the chosen variables and their definitions.

3.2.3.1 Dependent Variables

Four different event windows were described previously, as potential candidates for dependent variables. It cannot be stated with full confidence which is the best estimator of firm performance and acquisition premiums. This study focuses on announcement returns to observe a difference in premiums paid between for financially constrained versus unconstrained target firms and in order to exclude biases from other events which could influence the dependent variable, a small event window for the CAR is chosen: the CAR3 event window. This is in line with Bargeron et al. (2008) and Officer et al. (2010), who state that such a range provides point of estimates of the difference paid for the different target firms. Besides this, the CAR11 is chosen as well. This is also in line with Officer et al. (2010) and Khatami et al. (2015), in order to check for robustness. Additionally, the Premium CAR event window is also chosen to test for any differences in the target CARs between the acquisitions in the run-up and announcement period.

3.2.3.2 Independent Variables

For the independent variables, three financial constraints indices are used and composed. As discussed previously, no consensus has been reached in literature about the ‘’right’’ financial constraints measure(s). In this study a different combination of measures is composed to determine whether target firms can be considered as financially constrained. The KZ index, the WW index and the SA index are used. Each of them focus on specific features regarding financial constraints and none of the indices might be a perfect measure when used separately (Khatami et al., 2015). The KZ index has the (internal) focus more on firms that are in need for funds and can be indicated as high growth potential firms (Kaplan and Zingales, 1997) and is based on qualitative research. On the other hand, the WW- and the SA index have the focus more towards the firm’s cost of external funds (Whited and Wu, 2006; Hadlock and Pierce, 2010) and are based on quantitative data.

The KZ-, WW- and SA-index measures are computed according to the equations (1), (2) and (3) (see literature review for a broader explanation):

$$(1)\ \mathrm{KZ} = -1.001909\ Cash\ Flow\ kz + 0.2826389\ Tobin's\ Q + 3.139193\ Leverage\ kz - 39.3678\ Dividends - 1.314759\ Cash\ Holding$$

$$(2)\ \mathrm{WW} = -0.091\ Cash\ Flow\ ww - 0.062\ Dividend\ dummy + 0.021\ Leverage\ ww - 0.044\ Log\ Total\ Assets + 0.102\ Industry\ Sales\ Growth - 0.035\ Sales\ Growth$$

$$(3)\ \mathrm{SA} = -0.737\ Size + 0.043\ Size^2 - 0.040\ Age$$

The formulas and according variables are defined in Appendix A, Table 2. For the KZ- and WW index, variables are calculated a year before the acquisition. The indices are based on the annual financials, the year before the acquisition. As for the SA-index, size is the logarithm of the target's two-year average total assets before the acquisition. Age is equal to the number of years between the target's listing on FTSE (in Datastream) and the year the SA-index is created for that firm (i.e. a year before the announcement date).

The methodology to compose these measures is largely based on that of Campello and Chen (2010), Whited and Wu (2006) and Khatami et al. (2015). The firms are divided into terciles for each index and are assigned a number of 1 to 3. The top tercile index level is the 66.67% highest index of the distribution and is also called the cut-off value. This is based on several papers that use this top tercile as cut-off (among which Campello and Chen, 2010; Denis and Sibilkov, 2010). A minimum cut-off point is considered to be 50% cut-off point, up to the maximum cut-off point, namely the top decile. In this study the top decile results in almost no financially constrained firms and therefore this cut-off value is not chosen. The 50% cut-off value is also dropped as the results for the regressions did not change (much). As many empirical papers use values above the 50% percentile value, this is followed in this study as well. A firm is considered to be financially constrained (the highest index scores) when the index value lies above the cut-off value. Then an overall score (the up-summing of the three index-scores) is allocated to each firm. Lastly, firms in the top tercile– of the overall score – are regarded as financially constrained. Binary variables are used in the regression model with respect to a firm's constraints. This variable will take the value of 1 if the target firm has an overall index in the top tercile in the year before it is acquired and 0 otherwise. This is in line with Denis and Sibilkov (2010) and Khatami et al. (2015).

To see whether the financial constraints measures assess the same phenomenon, a correlation test is run. Furthermore, p-values are calculated to check for significance between the correlations. All the indices are positively related to the composite index, from which the KZ- and the WW index are significant on a 5% level. The observed correlations between the three individual are not all necessarily positive because of the different assumptions of the equations (see literature review). The values of correlations can be found in Table 4 in Appendix A. It could be that, although the three measures have different fundamentals and focus on several different aspects, part of the KZ- and WW-index measure the same features. However, the correlation between these indices is rather low, indicating that they are independent of each other. Although even a fraction of the indices overlaps; this is negligible as the goal is to label the financial constraints of a firm and this is what they both do; there is no ''double-labelling'' for financial constraints. It can be seen as attaching more value to the overlapping part of the measures; from literature it appears these variables (e.g. cash flows and dividends) are of high importance to label a firm as constrained (Fazzari et al., 1988; Lamont et al., 2001; Almeida et al., 2004).

3.2.3.3 Control Variables

Control variables are used to exclude factors which may have an influence on the used independent or dependent variables. With the use of control variables, the relationship between the acquisition premiums and financial constraints should be clarified. Besides this, other relations could be specified as well. As the focus in this study is on target firms' abnormal returns, it is studied whether the target characteristics influence their returns after an acquisition. Besides this, acquirer characteristics are not taken into account, as the sample size would decrease drastically because insufficient financial data is available for all firms. In accordance with prior literature relating to the topic in this study, the following control variables are used:

Crisis

In this study, a distinction is made between two periods: ''normal'' time periods from 1985 to 2006 and from 2010 to 2015 and the period of the latest global financial crisis (e.g. recession). The financial crisis period found its beginning in the first half year of 2007, (Beltratti and Stulz, 2010; Bancel and Mittoo, 2011) but as data for financial constraints measures is calculated on yearly basis, here January 2007 is used as the beginning of the financial crisis. The after crisis period is defined from 2010 to 2015, this is in accordance with Bancel and Mittoo (2011), who define 2010 as the beginning of an after crisis-period (i.e. the economic downturn has passed). Therefore, the recession period is accounted for from January 2007 to December 2009. In the regression analysis, the financial crisis is used as a control variable and set to 1 is the acquisition occurred during this time period (Khatami et al. 2015). During the crisis, the availability of external capital is relatively less than in non-crisis periods. As less money is available and firms find themselves in economic downturn, premiums are expected to be lower in the crisis period compared to the non-crisis period.

Furthermore, the financial crisis period holds a relation with financial constraints. As it is expected that financial constraints have a positive influence on abnormal returns, and the financial crisis enlarges the financial constraints factor expectedly, the abnormal returns for financially constrained targets during the crisis should be higher than for financially unconstrained targets in this same time span. Accordingly, a cross-variable is constructed in order to test whether financial constraints in the crisis period have a significant effect on the gains of an acquisition.

Attitude

In many studies the deal attitude towards the acquisition is taken into account. According to Hubbard and Palia (1999), and Khatami et al. (2015) it matters for the abnormal returns around announcement whether a firm is acquired in a hostile way. It appeared in the study of Hubbard et al. (1999) that a hostile takeover has a significant negative effect on firm performance. Thus, this variable is controlled for in the regression model. Based on this, a negative relationship between the (hostile) attitude and the dependent variables is expected.

Cash

Another control variable used in the regression is the method of payment. This variable can have an influence on the returns around the announcement date of an acquisition. Uddin and Boateng (2009) found that for firms where acquirers financed the acquisition with cash-only showed better abnormal returns than the firms who financed the acquisition with stock-only or mixed payments, for U.K. firms specifically. This is also shown by Alexandridis et al. (2013), for U.S. firms. The rationale behind this is that the method of payment can be seen as a signalling effect of management (Hubbard and Palia, 1999). It represents the acquirer's perspective of the relative value of a company's stock price. The level of confidence of bidding management is associated with the payment method. Acquiring shareholders will prefer to finance the acquisition with cash rather than equity when existing shares are overvalued and vice versa. (Officer et al. 2010). Moreover, the financing choice may affect the capital structure and this is an important aspect with regard to financially constrained firms. These capital structure changes can affect the abnormal returns (Bruner, 2002). Therefore, a control variable is used to decrease the (chance on) biases. Based on prior literature, it is expected that cash-only payments hold a positive relation with the abnormal returns around announcement.

Competition

When more than one bidder is involved in the run for an acquisition, it is often found that it increases returns for the target firms and /or decreases return for the acquirer (Moeller et al., 2004; Khatami et al., 2015). This is explained by firms that want to overbid their competitor (other bidder) and this drives the premium to higher levels, or higher abnormal returns for the target firm (Hubbard and Palia, 1999). Based on this, it is expected that multiple bidders in an acquisition increases the acquisition premium for the target firm.

Diversifying acquisition (diverse)

Almeida et al. (2004) showed in their paper that acquisitions within the same industry occur more often for financially constrained target firms. In more detail, Khatami et al. (2015) find in their study a positive significant correlation between financial constraints and the industry in which the firms operate. When a firm is considered financially constrained, the chance that they are taken over by a firm from the same industry (not diversifying) is higher than when the target firm is considered unconstrained. Furthermore, acquisitions that occur within the same industry appear to be more profitable (Lamont et al., 2001). Bas on this, it is expected that non-diversifying acquisitions have a positive relationship with the dependent variable(s).

Tender

Deals including a tender offer are an indication of positive abnormal returns for the target firm (Johnson and Abbott, 1991). This is confirmed by Hubbard and Palia (1999) and Moeller et al. (2004). A tender offer occurs when an investor proposes to buy shares (publicly) from all shareholders for a certain price

at some point in time. Then the underlying thought for a higher premium is that this offered price will be above market value in order to induce the shareholders to sell their stake. Therefore, a positive relation is expected between tender offer and acquisition premiums.

Market to Book (MtB)

One of the most variables used as a control factor in regression models regarding abnormal returns for acquisitions, is the market-to-book ratio, which measures a firm's growth potential. It is controlled for as target firms with a lot of growth potential need relatively more capital to meet their necessities. Due to market imperfections, external capital is relatively more expensive than internal funds (Myers and Majluf, 1984). As a consequence, firms with high growth potential invest less than their optimum, which results in lower operating performance (Denis et al., 2010). This could imply a relation with financial constraints, as it is more likely that financially constrained firms cannot finance their complete growth potential. Firms facing financial constraints should therefore have lower market-to-book ratios. Based on this, lower market-to-book ratios are thus expected to lead to a higher premium.

Log of Size (LNSize)

Firm size is a very important factor in acquisitions. Many papers relate size to the likelihood of an acquisition (Khatami et al., 2015) or the value creation in acquisitions. Alexandridis et al. (2013) show in their study that acquirers pay more (premium) for smaller firms, because of the possible growth opportunities of those firms, which are not exploited yet. Based on this, this variable is expected to be negatively related to the dependent variable(s).

Industry fixed effects (FE)

The control variable industry fixed effects is added to the regression model, in order to check for robustness and control for the targets' specific industries on the abnormal returns. Valuation differences between acquisitions could be enlarged by industry shocks, for example led by technologic innovation. Johnson and Abbott (1991) found in their study that wealth effects of acquisitions between unconstrained and distressed firms are (partially) driven by industry effects. This is confirmed by Alexandridis et al. (2013), who found in their study that lower premiums are paid for manufacturing firms and higher premiums are paid for technology firms. Therefore, in this study, for every industry group another dummy variable is created and inserted in the regression model, to prevent a bias in the regression results.

3.2.3.4 Regressions

In order to examine the differences between acquisitions of financially constrained and unconstrained target firms, given the chosen dependent variables (CAR3, CAR11 and Premium CAR) and independent (control-) variables, several regressions are developed. In every regression model there is controlled for industry-fixed effects. The first regression model only takes the runup characteristics of the target's stock into account. This is tested to see whether a relation holds between the raw returns of

the stock within the event window [-42,-5] and the chosen dependent variables CAR3 and CAR11. The regressions run for Premium CAR as dependent variable do not include the runup variable, as these windows overlap. However, a non-significant relation is expected between CAR3 and CAR11 and the runup variable, as this should not be and indicator for the differences between financially constrained and unconstrained firms and functions as a robustness check. The second regression (R2) tests for the effect of financial constraints on the dependent variables. The third regression model (R3) adds to this by including the financial crisis period and the cross-variable. The fourth regression (R4) includes the deal characteristics in order to check for robustness of the results. The fifth regression model (R5) does this for the first model as well by including target characteristics: size and market-to-book ratio. The last model (R6) includes all independent and control variables and is a final robustness check. The multiple regression models are given in the order they are tested and can also be found in a table format in Table 5 (Appendix A). The regression equations used in this study are:

$$(R1)\ Gains_i = \delta_0 + \delta_1 Runup + \delta_2 IndustryFE$$ [5]

$$(R2)\ Gains_i = \delta_0 + \delta_1 Runup + \delta_2 FC + \delta_3 IndustryFE$$

$$(R3)\ Gains_i = \delta_0 + \delta_1 Runup + \delta_2 FC + \delta_3 Crisis + \delta_4 (FC_i \bullet Crisis) + \delta_5 IndustryFE$$

$$(R4)\ Gains_i = \delta_0 + \delta_1 Runup + \delta_2 FC + \delta_3 Attitude + \delta_4 Cash + \delta_5 Competition + \delta_6 Diverse + \delta_7 Tender + \delta_8 IndustryFE$$

$$(R5)\ Gains_i = \delta_0 + \delta_1 Runup + \delta_2 FC + \delta_3 MtB_i + \delta_4 LNSize_i + \delta_5 IndustryFE$$

$$(R6)\ Gains_i = \delta_0 + \delta_1 Runup + \delta_2 FC + \delta_3 Crisis + \delta_4 (FC_i \bullet Crisis) + \delta_5 Attitude + \delta_6 Cash + \delta_7 Competition + \delta_8 Diverse + \delta_9 Tender + \delta_{10} MtB_i + \delta_{11} LNSize_i + \delta_{12} IndustryFE$$

Where $Gains_i$ are either the acquisition premiums for the target shareholders or the cumulative abnormal returns (for event windows [-1,+1] and [-5,+5]) for target firm *i*.

[5] Note that this regression model is not used when Premium CAR is the dependent variable, as the event windows overlap of the premium period and the run-up period. All the other regression models exclude the runup variable as well, when Premium CAR is the response variable.

3.2.3.5 Robustness Checks

Standard Ordinary Least Squares (OLS) regressions are applied to the models. Before running the regressions, some assumptions are tested of the Gauss-Markov theorem. This theorem does not rely on normality; however, it must be stated that non-normality might lead to invalid outcomes as outliers lead the p-value to a much smaller significance level. However, when the sample size is large enough (Central Limit Theorem), the distribution automatically comes closer to a normal distribution. The normality in this study is tested by the Jarque-Bera test, which tests this by checking the skewness and kurtosis of the distribution. When the test is satisfied, i.e. the hypothesis for normality is rejected, the data has to be checked for linearity. The Ramsey RESET test is used to specify whether the models are correct. If the outcome of this test appears to be significant, this means non-linear combinations of the independent variables have more power to clarify the response variable and the assumption of model miss-specification must be drawn. Moreover, when non-normality exists, the only drawback is that the tested hypotheses outcomes may not be valid. I also controlled for heteroscedasticity by using the Breusch-Pagan test. In the case of heteroscedasticity, the standard errors of the test are biased as the variances of the errors are inconsistent, which could lead to invalid t-statistics. Standard errors are then changed to robust standard errors, which are also known as White estimators. These estimators make the standard errors of a more reliable value. To check for multicollinearity, the variance inflation factor (VIF) is calculated as well. When multicollinearity is present, the standard errors of the parameters increase. The VIF is valid when the outcome is below five. Lastly, fixed-year effects are added in the regression models to see whether this affects the results significantly. The findings of these robustness checks are discussed in the results section.

3.3 Descriptive Statistics

The sample distribution is shown on the next page (Table 6). The statistics indicate that a much smaller amount of deals including financially constrained target firms are observed; about one sixth of the target firms of the total sample are considered constrained. The deal values of the financially constrained targets are on average one third compared to those of unconstrained targets, which implies that acquiring firms prefer to pay less for financially constrained target firms compared to unconstrained targets. Furthermore, a larger amount of deals for the total sample is shown in different periods of time; namely from 1997 to 1999 and between 2003 and 2007. No acquisitions of financially constrained targets are shown between 2012 and 2015. Also, it can be seen from the table that almost no financially constrained targets are acquired until 1999. It could be that financial constraints of firms were not seen as a valuable factor before the 21st century and after the financial crisis and therefore these firms were not attractive takeover targets.

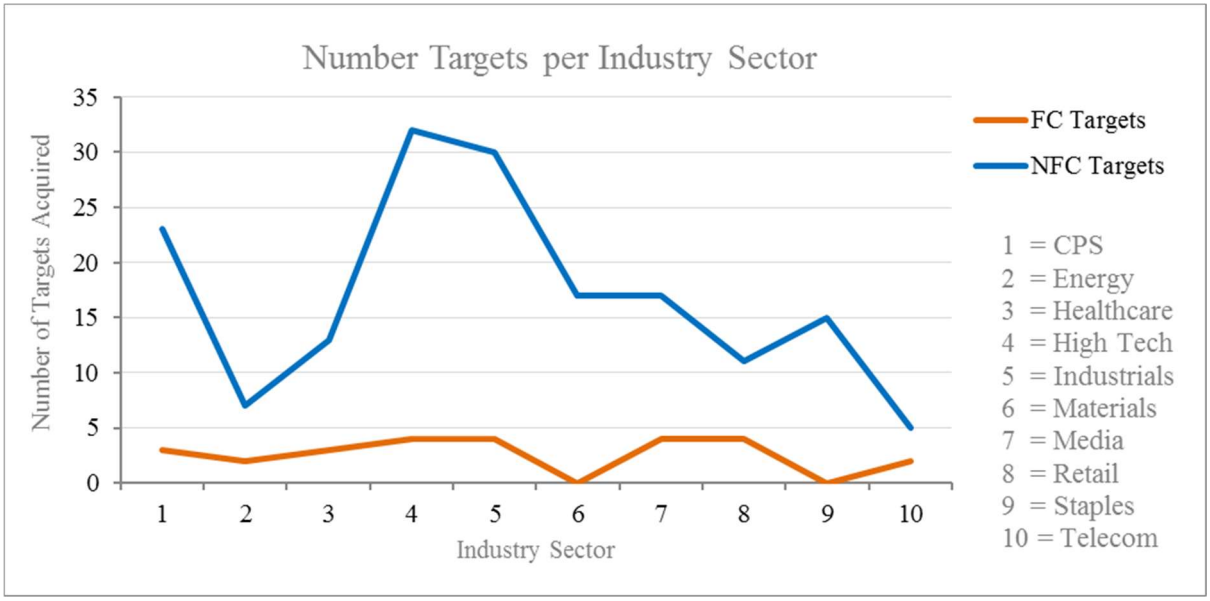
Table 6 – Distribution of Sample

This table includes the distribution of the analysed sample and is set based on announcement date. The acquisitions are subdivided based on target type: financially constrained (FC) versus not financially constrained (NFC) and the "all" column includes the full sample. Each of the subdivisions includes the number of deals and the total deal value (which is retrieved from SDC (in millions $). No deals in 1985 are available, as too little sufficient financial data was available and that resulted in zero deals for that year.

	All		FC Targets		NFC Targets	
	Number of deals	Total deal value	Number of deals	Total deal value	Number of deals	Total deal value
Total deal size per year for deals with FC and NFC targets						
1985	0	0	0	0	0	0
1986	1	230.143	0	0	1	230.143
1987	2	326.972	0	0	2	326.972
1988	0	0	0	0	0	0
1989	1	5235.746	0	0	1	5235.746
1990	0	0	0	0	0	0
1991	1	85.679	0	0	1	85.679
1992	0	0	0	0	0	0
1993	2	131.738	0	0	2	131.738
1994	1	24.391	0	0	1	24.391
1995	7	15518.740	0	0	7	15518.74
1996	5	1357.730	0	0	5	1357.73
1997	9	1258.430	1	19.493	8	1238.937
1998	10	9600.312	0	0	10	9600.312
1999	18	6985.251	2	557.496	16	6427.755
2000	9	5214.018	2	3710.134	7	1503.884
2001	9	2269.494	2	23.465	7	2246.029
2002	8	1908.622	2	25.163	6	1883.459
2003	14	5707.629	2	87.333	12	5620.296
2004	12	2208.633	2	105.02	10	2103.613
2005	14	8682.949	2	173.797	12	8509.152
2006	10	2358.142	1	57.076	9	2301.066
2007	13	7332.988	4	324.899	9	7008.089
2008	7	10749.541	0	0	7	10749.541
2009	10	1731.147	3	110.849	7	1620.298
2010	9	6381.946	1	53.821	8	6328.125
2011	5	482.118	2	105.013	3	377.105
2012	4	131.477	0	0	4	131.477
2013	5	464.645	0	0	5	464.645
2014	6	12473.532	0	0	6	12473.532
2015	4	105.157	0	0	4	105.157
Total	**196**	**108957.17**	**26**	**5353.559**	**170**	**103603.611**

Figure 2 illustrates the number of takeovers for each industry (based on 3-digit SIC-codes). The distinction is made between financially constrained and -unconstrained targets. It appears that unconstrained targets are found the least attractive when operating in sector 2 and 10; the energy and telecom sector respectively. The sectors where the most unconstrained targets are acquired are high tech and industrials. For constrained targets, the deviation is more dispersed. There is no obvious sector where the focus is on acquisitions of constrained firms. However, there are industry sectors which are not appealing for acquirers in which the constrained targets operate: in sector 6 and 9, materials and staples, zero financially constrained targets are acquired. Relatively seen, the most financially constrained targets (compared to unconstrained targets) are acquired in the telecom and retail sector, respectively.

Figure 2



In Table 7, the means of the used dependent variables in this study are presented. It is shown how many financially constrained (FC) and non-constrained (NFC) targets were acquired during the crisis period and the non-crisis period. All the dependent variables are higher for the unconstrained targets in the non-crisis period than for the constrained targets. This can be explained by the fact that firms that have no constraints, do not face any drawbacks – such as investment opportunities – and therefore exploit their possibilities and earn higher abnormal returns. In contrast to this are the means in the financial crisis period. All the dependent variables are higher for financially constrained targets compared to their unconstrained peers during the crisis period. Of the total financially constrained sample, 27% is acquired during the financial crisis period. For the unconstrained targets, this is only 13,5%. This implies that financially constrained targets are more attractive takeover targets during the crisis period

than unconstrained targets. This is tested for in the regressions as well and will be discussed in the results.

Table 7 – Descriptive Statistics Dependent Variables

	Non-crisis period				Financial crisis period			
	FC Targets		NFC Targets		FC Targets		NFC Targets	
	Number	Mean	Number	Mean	Number	Mean	Number	Mean
Dependent variables per period and target type								
CAR3	19	0.0984256	147	0.1289445	7	0.2234279	23	0.1317351
CAR11	19	0.1063258	147	0.1635083	7	0.3190563	23	0.1779572
PremiumCAR	19	0.0979601	147	0.2047463	7	0.5088031	23	0.3417061

The results of the means for the independent variables can be found in Table 8 on the next page. The means and standard deviations are also given for the constrained and unconstrained target groups, and the differences between the means and according t-statistics are shown. It can be seen that for the deal characteristics that the deal attitude towards unconstrained firms is more hostile than towards constrained firms. The positive difference between unconstrained and constrained target firms is significant at the 5% level for this variable. This implies that constrained targets are less often targets of hostile acquisitions. The payment method variable indicates that it is favoured to pay with cash for financially constrained firms than for their unconstrained peers. Only a slight difference is found between the competition for constrained and unconstrained targets. It shows that financially constrained targets more often face multiple bidders than unconstrained firms. However, this difference is only small and not significant. These outcomes of the payment method and the number of bidders is in line with the reasoning of Khatami et al. (2015), who state that in case of higher competition, the preferred payment method is cash. A significant difference is found for the cross-correlation between financial constraints and the crisis period. As mentioned previously, financially constrained targets during the financial crisis period are preferred to unconstrained targets. Furthermore, a significance difference is found as well for the variable tender offer. Financially constrained targets more often deal with tender offers than unconstrained targets. In the table, higher market-to-book ratios are shown for unconstrained targets. This is reasoned by the fact that constrained targets have more unexploited investment opportunities and therefore more growth potential and this shows in a (relatively) lower market-to-book ratio (Almeida et al., 2004; Denis et al., 2010). Lastly, a significant difference is found for the target size. The average target size is larger for unconstrained targets than for constrained targets. Relating this to the lower average deal value of constrained targets, this implies that smaller firms incur in deals with lower value.

Table 8 - Descriptive Statistics Independent Variables

This table shows the independent and control variables. The deal and target characteristics are compared between financially constrained (FC) and unconstrained (NFC) targets. The Welch t-score is calculated to indicate significance for the differences between constrained and unconstrained targets. ***, ** and * indicate significance at the 1%, 5% and 10% respectively.

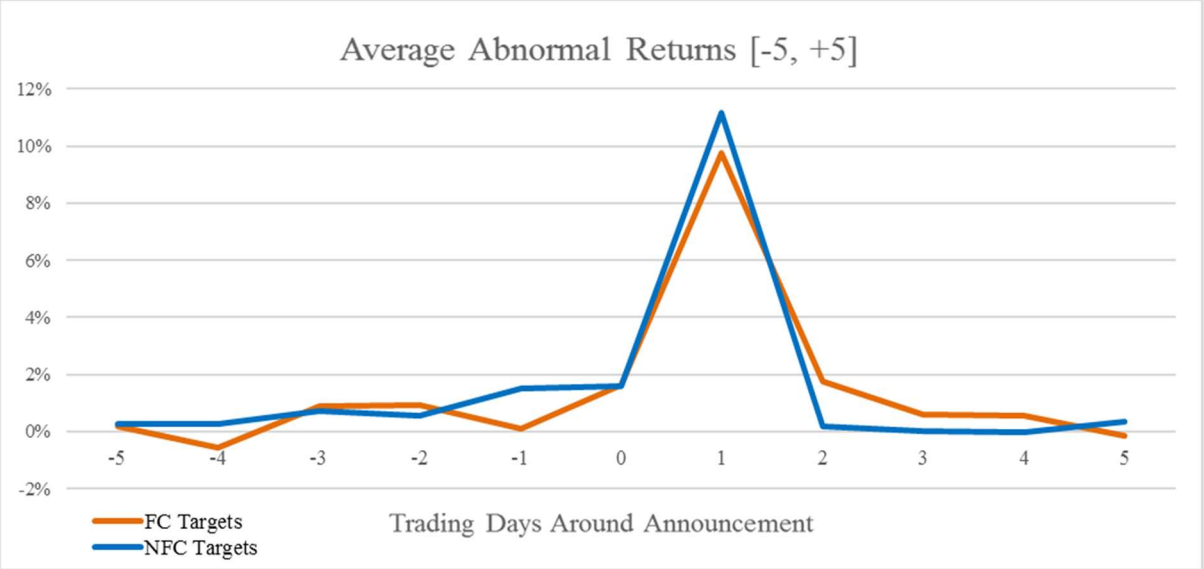
	All		FC Targets		NFC Targets		Difference NFC-FC
	Mean	SD	Mean	SD	Mean	SD	Mean
Independent variables per target type							
Stock Runup	0.05620	0.26250	0.02709	0.30024	0.07348	0.24032	0.04639 (1.0956)
FC Dummy	0.34184	0.47554	x	x	x	x	x
Attitude	0.02551	0.15807	0	0	0.03876	0.19377	0.03876 (2.2718**)
Cash	0.36224	0.48188	0.40299	0.49420	0.34109	0.47592	-0.06190 (-0.8423)
Crisis	0.15306	0.36097	0.19403	0.39844	0.13178	0.33957	-0.06225 (-1.0897)
Crisis x FC Dummy	0.06633	0.24949	0.08955	0.28769	0.00775	0.08805	-0.08180 (-3.9861***)
Competition	0.05612	0.23075	0.05970	0.23872	0.05426	0.22742	-0.00544 (-0.1537)
Diverse	0.34694	0.47722	0.35821	0.48309	0.34109	0.47592	-0.01712 (-0.2366)
Tender	0.81633	0.38821	0.89552	0.30819	0.77519	0.41908	-0.12033 (-2.2825**)
MtB	2.22357	2.02934	1.88164	1.85244	2.40116	2.10035	0.51952 (1.7776*)
LNSize	11.05791	1.61272	10.62346	1.48772	11.28356	1.63429	0.66010 (2.8475**)
Number of observations	196		26		170		

4. Results

4.1 Differences in Abnormal Returns

Based on the reasoning that financial constraints are a valuable indicator of firm value (Lamont et al., 2001) and on the theory that average abnormal returns are a good indicator of gains (premiums) for target shareholders, the difference between premiums for financially constrained and unconstrained target firms will be investigated. The output of average abnormal returns is generated according to the formulas described in the methodology section. In Figure 2 below, the average abnormal returns for the event window [-5,+5] are shown.

Figure 3



Accordingly, the average abnormal returns for the total sample and the difference in the returns for financially constrained and unconstrained targets can be found in Table 9. The AARs for unconstrained target firms are found to be significantly (at the 1% level) different from zero from three days prior to announcement to one day after. As for financially constrained targets, a slightly different pattern is observed. Two days before and the two days after announcement significant average abnormal returns are observed. For both constrained and unconstrained firms, the average abnormal returns are significantly different from zero on the announcement day (event window =0), with values of 1.66% and 1.59% respectively. Besides this, the AARs are even larger on the day after the announcement day as (event window =1) with returns of 9.77% and 11.16% for constrained and unconstrained firms respectively. To find the differences between premiums received for both parties, the differences between AARs are calculated and their significance is tested with the Welch's test.

Table 9 – Average Abnormal Returns

Average abnormal returns (AARs) in the event window [-5,+5]. The table shows the AARs for both financially constrained (FC) and not-financially constrained (NFC) target firms. The last row in each column shows a point estimate on the difference of NFC-FC returns, for which a t-statistic for a Welch's t-test is included. ***, ** and * denote significance at the 1%, 5% and 10%, respectively.

	Trading days around announcement										
	-5	-4	-3	-2	-1	0	1	2	3	4	5
Average abnormal returns (AAR)											
FC targets	0.2099	-0.5451	0.8960	0.9245	0.1159	1.6587	9.7686	1.7807	0.6241	0.5464	-1.0407
	(0.4635)	(-1.5298)	(1.6163)	(2.0047**)	(0.1677)	(1.1005)	(2.5692**)	(1.9951**)	(0.8696)	(1.0432)	(-0.405)
NFC targets	0.2921	0.2575	0.7262	0.5731	1.5342	1.5892	11.1570	0.1859	0.0407	0.0001	0.3625
	(1.0756)	(1.4362)	(2.8507***)	(1.9928**)	(3.4584***)	(3.6279***)	(7.8266***)	(0.4630)	(0.1808)	(0.001)	(1.9266*)
NFC-FC	0.0822	0.8026	-0.1698	-0.3514	1.4183	-0.0695	1.3884	-1.5948	-0.5834	-0.5463	1.4032
	(0.1558)	(2.0121*)	(-0.2783)	(-0.6465)	(1.7269)	(-0.0443)	(0.3419)	(-1.6295)	(-0.7758)	(-1.0081)	(1.2736)

The required variables used in the financial constraints measures to determine the financial constraints index of target firms, are all winsorized at the 5% level.

No particular trend is discovered between the returns of financially constrained and unconstrained targets, as can be seen from Table 9. From the 11 days, only one day (event window day = – 4) is found to show a significant difference (on the 10% level), that unconstrained targets have 0.8% higher average abnormal returns than constrained targets. This relationship fluctuates between 0 and 2% in negative and positive values. This indicates that there is no obvious difference between premiums paid for financially constrained targets and unconstrained target firms. However, the differences in results are ambiguous as they are not significant. Moving on, as AARs provide an indication of prices paid by acquirers to financially constrained and unconstrained target firms, however, according to Officer et al. (2010), cumulative abnormal average returns are a more appropriate measure of the returns for target shareholders.

In Table 10 the CAARs are reported for the five considered event windows. It can be observed in the table that 4 out of the 5 windows no significance is found. However, for the event window [-1,+1], thus CAAR3, significant values are found for the differences in premiums paid. Based on the this, the first hypothesis of this study, which indicates no difference between premiums paid between the two target types is rejected at the 1% significant level. Targets that are not financially constrained seem to receive slightly higher premiums than financially constrained firms. This relation is also found for the other dependent variables; however, these are non-significant. This outcome is in contrast to that of Khatami et al. (2015), who found that constrained targets would receive higher premiums than unconstrained targets. This could be the result of the small sample size and the fact that only one sixth of the sample is considered to be constrained. On the other hand, it might also be that acquirers prefer to buy financially unconstrained firms, as less uncertainty is involved and the acquisition results in a steady outcome. This can be supported by the difference in acquisition leverage between the U.K. and the U.S. Transactions in the U.S. are said to be more leveraged than in the U.K. and U.S. firms act more aggressive in an acquisition (Wood, 2000). One can say that the leverage structure of acquisition deals between the countries can therefore differ. Because leverage and financial constraints are closely related, it could be that the U.S. acquirers find financially constrained targets more appealing than U.K. acquirers do and therefore U.K. firms pay higher premiums for unconstrained firms.

Overall, it can be subtracted from the total sample that acquirers (on average) pay a premium to target shareholders. In more detail, it can be concluded that acquirers pay higher premiums for financially unconstrained targets than for constrained targets. This does not necessarily equal a value loss for the acquirer. The value of the target firm, which is indicated by the market, is in essence not the value worth to the acquiring firm. As discussed in the literature review, an acquisition is often initiated in order to gain synergies in terms of economies of scale or scope, especially for the acquirer (Matsusaka, 1993; Mukherjee et al., 2004). In other words, the market value of the target firm does not indicate the true value for the acquiring firm per se. Based on this reasoning, an acquisition premium could indicate a valuable acquisition where synergies can be obtained.

Table 10 – Cumulative Average Abnormal Returns

The cumulative average abnormal returns (*CAARs*) for different event windows. The following event windows are included: *CAAR3*, *CAAR11*, *Markup CAAR*, *Runup CAAR* and *Premium CAAR*. The event windows are applied to the total sample, as well as for both the constrained and unconstrained targets and their difference. A student t-test is used to test for significance of the CAARs for financially constrained (FC) and unconstrained target firms (NFC). For the difference between those target firms, a Welch's t-test is used. The t-score is given in parantheses. ***, **, * indicaticate significance at the 1%, 5% and 10% respectively.

				Difference
	All	FC targets	NFC targets	NFC-FC
Cumulative average abnormal returns (CAAR)				
CAAR3	13.9173	11.5433	14.2804	2.7371
	(109.2397***)	(21.9375***)	(115.5275***)	(5.0639***)
CAAR11	16.6019	15.8389	16.7186	0.8797
	(11.3747***)	(3.4710***)	(10.8765***)	(0.1827)
Markup CAAR	5.0498	9.9960	3.9019	-6.0941
	(2.9380***)	(1.8535*)	(2.3481**)	(-1.0799)
Runup CAAR	5.6383	4.8244	5.7628	0.9384
	(4.1604***)	(0.9002)	(4.3479***)	(0.1700)
Premium CAAR	21.9590	20.4534	22.1893	1.7359
	(11.7114***)	(3.3088***)	(11.3693***)	(0.2678)
Number of observations	196	26	170	

The required variables used in the financial constraints measures to determine the financial constraints index of target firms, are all winsorized at the 5% level.

4.2 Multiple Regressions

This section focuses on the results of the different regression models discussed in the methodology section with the three different chosen event windows, including days prior to days after the acquisition announcement. These outputs could give implications on the differences in cumulative abnormal returns for financially constrained and unconstrained firms. A difference in premiums paid was found (in the previous section), for which in this section possible indicators will be discussed. The tested regression models are split up in 18 multiple regression equations for which normality- and heteroscedasticity checks can be performed. Robust standard errors are applied where needed. The results of these multiple

regressions can be found in Table 11, 12 and 13 (for CAR3, CAR11 and PremiumCAR respectively) and are discussed hereafter.

4.2.1 Regression Results

The CAR3 is investigated to consider the day prior and the after the announcement as dependent variable. The CAR11 has a slightly longer timespan, to check whether differences occur between these windows. The PremiumCAR is investigated to analyse the overall premium.

The runup variable in the regression models for CAR3 and CAR11 has (as expected) no significant effect on the dependent variable, although it implies that the stock runup of the target holds a negative relation with abnormal returns around the announcement. As for the financially constrained dummy variable in the regression models, it is found to have no significant effect on the abnormal returns. Nevertheless, its noteworthy to say that, in line with the results from the CAARs, financial constraints appear to have a negative relation with abnormal returns. Based on this the second null hypothesis is rejected, which predicted no difference between the abnormal returns of financially constrained and unconstrained target firms.

Moving on to the tested variable financial crisis, it appears to have no significant relation to the abnormal returns and premiums. The financial crisis dummy correlates negatively with the cumulative abnormal returns, which indicates that the premium decreases in economic downturn, as predicted by hypothesis 3 and 4. However, as these results are non-significant, the relations are only an indication. The joint analysis of financial constraints of a target firm acquired during the financial crisis is also tested. The hypotheses 5 and 6 expected a positive relation of these combined effects on acquisition premiums and abnormal returns. In the regression models, the coefficients appeared to be positive for all dependent variables. For the CAR11 and PremiumCAR the relation is proved to be significant at the 5% and 10% levels, for different models. This confirms the hypothesis and therefore there is enough proof to believe that financially constrained targets obtain higher abnormal returns and premiums during economic downturn than their unconstrained peers during this time span. However, the reasoning on the expectations of hypotheses 5 and 6 had a different underlying. These hypotheses were based on the reasoning that financial constraints would enlarge the premium paid. Now the interpretation changes. The indication of acquirers preferring to buy constrained targets in economic downturn, could rely on the reasoning that unconstrained firms became constrained in the financial crisis period and would eventually turn stable again after such a period of downturn. Assuming that acquirers know these financial conditions of their supposed targets, they are willing to pay more for these ‘’temporarily’’ constrained firms in the recession, as these will flourish after this time period. This is partially based on Campello and Chen (2010), who state that firms, which are not necessarily constrained, cancel or postpone planned investments.

Table 11 – Multiple Regressions CAR3

Multiple regressions explaining the target firms cumulative abnormal returns for the event window [-1,+1]. The table contains regressions on the dependent variable CAR3. The variables as specified in Table 5 are listed in the first column. All explanatory variables are explained in the Methodology section. The coefficients of each independent variable are given, underneath the t-statistics are provided between brackets. ***, ** and * denote a 1%, 5% and 10% respectively. Standard errors are heteroskedasticity-consistent, where needed. In all models there is regressed for industry fixed effects.

	CAR3					
	(1)	(2)	(3)	(4)	(5)	(6)
Stock Runup	-0.07343 (-0.855)	-0.07747 (-0.906)	-0.08890 (-1.031)	-0.10426 (-1.234)	-0.07758 (-0.918)	-0.10343 (-1.233)
FC Dummy		-0.03840 (-1.094)	-0.05937 (-1.680*)	-0.06033 (-1.708*)	-0.04598 (-1.280)	-0.06531 (-1.763*)
Attitude				0.20359 (3.814***)		0.20818 (3.574***)
Cash				0.09885 (3.262***)		0.09240 (3.199***)
Crisis			-0.01313 (-0.305)	-0.00954 (-0.215)		-0.01017 (-0.226)
Crisis x FC Dummy			0.10666 (1.056)	0.07044 (0.700)		0.07199 (0.714)
Competition				0.01422 (0.303)		0.01962 (0.400)
Diverse				-0.00585 (-0.169)		-0.00468 (-0.132)
Tender				0.06659 (1.668*)		0.06431 (1.613*)
MtB					-0.00050 (-0.007)	-0.00127 (-0.180)
LNSize					-0.00902 (-0.973)	-0.00539 (-0.611)
Constant	0.20271 (3.828***)	0.21477 (3.961***)	0.21624 (3.939***)	0.11444 (1.922**)	0.31338 (2.428**)	0.17772 (1.412)
R-squared	0.0980	0.1055	0.1136	0.2106	0.1095	0.2121

Number of observations 196

Table 12 – Multiple Regressions CAR11

Multiple regressions explaining the target firms cumulative abnormal returns for the event window [-5,+5]. The table contains regressions on the dependent variable CAR11. The variables as specified in Table 5 are listed in the first column. All explanatory variables are explained in the Methodology section. The coefficients of each independent variable are given, underneath the t-statistics are provided between brackets. ***, ** and * denote a 1%, 5% and 10% respectively. Standard errors are heteroskedasticity-consistent, where needed. In all models there is regressed for industry fixed effects.

	CAR 11					
	(1)	(2)	(3)	(4)	(5)	(6)
Stock Runup	-0.08074	-0.08075	-0.10211	-0.11763	-0.08039	-0.11857
	(-0.950)	(-0.943)	(-1.209)	(-1.450)	(-0.931)	(-1.449)
FC Dummy		-0.00007	-0.04154	-0.04189	0.00463	-0.03517
		(-0.002)	(-1.120)	(-1.172)	(0.119)	(-0.962)
Attitude				0.22408		0.22482
				(5.729***)		(5.464***)
Cash				0.11207		0.11609
				(3.464***)		(3.571***)
Crisis			-0.03180	-0.02761		-0.02121
			(-0.618)	(-0.526)		(-0.400)
Crisis x FC Dummy			0.21321	0.17215		0.16758
			(1.891*)	(1.496)		(1.468**)
Competition				0.05472		0.04522
				(0.886)		(0.742)
Diverse				-0.00362		-0.00139
				(-0.100)		(-0.037)
Tender				0.06584		0.06693
				(1.623*)		(1.611*)
MtB					-0.00149	-0.00331
					(-0.196)	(-0.433)
LNSize					0.00659	0.01032
					(0.565)	(0.923)
Constant	0.26784	0.26786	0.27165	0.15862	0.19986	0.05115
	(5.340***)	(5.095***)	(5.228***)	(2.512**)	(1.404)	(0.359)
R-squared	0.0907	0.0907	0.1252	0.2210	0.0925	0.2257

Number of observations 196

Table 13 – Multiple Regressions PremiumCAR

Multiple regressions explaining the target firms cumulative abnormal returns for the event window [-42,+5]. The table contains regressions on the dependent variable PremiumCAR. The variables as specified in Table 5 are listed in the first column. All explanatory variables are explained in the Methodology section. The coefficients of each independent variable are given, underneath the t-statistics are provided between brackets. ***, ** and * denote a 1%, 5% and 10% respectively. Standard errors are heteroskedasticity-consistent, where needed. Note that equation (R1) not is applied for this dependent variable, as discussed in the Methodology. Therefore the regression results start at (2). In all models there is regressed for industry fixed effects.

	PremiumCAR				
	(2)	(3)	(4)	(5)	(6)
FC Dummy	-0.0221 (-0.383)	-0.08013 (-1.393)	-0.09206 (-1.645*)	-0.01643 (-0.280)	-0.08191 (-1.422)
Attitude			0.16854 (2.929***)		0.16309 (2.613***)
Cash			0.12257 (2.725***)		0.12679 (2.728***)
Crisis		0.08024 (1.093)	0.07874 (1.048)		0.08280 (1.088)
Crisis x FC Dummy		0.25784 (1.700*)	0.20884 (1.320)		2.04300 (1.282)
Competition			0.06815 (0.790)		0.05605 (0.645)
Diverse			0.01644 (0.323)		0.01251 (0.305)
Tender			0.15534 (2.668***)		0.15873 (2.681***)
MtB				0.00309 (0.250)	-0.00012 (-0.010)
LNSize				0.00471 (0.293)	0.01251 (0.779)
Constant	0.32934 (5.467***)	0.31193 (5.283***)	0.10403 (1.274)	0.26970 (1.506)	-0.03539 (-0.178)
R-squared	0.0628	0.1213	0.1955	0.0636	0.1984

Number of observations 196

4.2.2 Hypotheses of Control Variables

Attitude

Hubbard and Palia (1999) stated in their study that abnormal returns increased when the acquisition was done in a hostile way. Therefore, the expectation was that hostile acquisitions have a positive influence on premiums. From the results, the coefficients of the attitude dummy appear to be statistically significant in all models (at the 1% significance level) and vary between 16% and 22%, confirming the expectation.

Cash

When investigating the payment method in the acquisitions, it also appeared of high significance for all dependent variables. The coefficients have values varying around 10% (at the 1% significance level), meaning that when an acquisition is paid for in total cash, the cumulative abnormal returns increase with (about) 10%, than when the payment was all in stock, or a combination of both. Hence, this implies that the differences between premiums for the two types of target firms is affected by the payment method. This is in line with the expectation of this study and can be supported by Uddin and Boateng (2009), who also found that cash-only payments in acquisitions resulted in higher cumulative abnormal returns.

Competition

The number of bidders in an acquisition appeared to be an indicator of the level of abnormal returns. Moeller et al. (2004) found in their study that multiple bidders resulted in positive returns for the target firm, as overbidding can lead to higher prices paid. However, this variable appears non-significant for all dependent variables. Nonetheless, a positive relation is found which complies with the economic effect that is has on abnormal returns. The coefficient is larger for the PremiumCAR event window, which can be explained by the increase in bidding competition before the acquisition.

Diversifying acquisition (diverse)

In neither of the models it is found that cross-industry takeovers have a significant effect on the cumulative abnormal returns. The expectation was that non-diversifying acquisitions would result in higher abnormal returns, as acquisitions that occur within the same industry appear to be more profitable according to Lamont et al. (2001). However, this result was only found (and non-significant) for the PremiumCAR response variable with a very low value of the coefficient, concluding that acquirers do not pay higher premiums in order to obtain synergies.

Tender

The coefficient of the dummy variable tender offer was found significant for all dependent variables. Especially for the PremiumCAR, the results are of the highest significance level and positive. This longer event window justifies the positive relation, based on the reasoning of the proposition of an investor for buying shares from all shareholders at a point in time. The offered price will result in a

higher premium as the shareholders will be induced to sell their stake. The expectation was confirmed by the regressions.

Market to Book (MtB)

Moving on to the targets' characteristics, the market-to-book ratio barely affects the dependent variables, on a non-significant level and with negative and positive values. This appears surprizing, as a significant effect was predicted. The market-to-book ratio is seen as an indicator for a firm's growth potential and therefore one would say an acquiring firm is willing to pay for this, resulting in a higher premium.

Log of Size (LNSize)

The second target characteristic was the size of the firm. Almost the same results from the MtB-variable account for the size-variable as well. No significant and very small values were noticed in all of the regression models. This was unexpected, as a significant negative effect was predicted. It seems in this study, that these target characteristics did not matter for the differences in premiums paid by the acquirers in acquisitions.

4.2.3 Robustness Checks Results

As previously discussed in the methodology, some assumptions for the regression models were tested. To check for robustness with regard to the financial constraints measure, regression model (4) for CAR3 (which had the most significant results) was performed for every financial constraints index separately as well. The results can be found in Table 14, where it can be observed that the results do not differ much from the original regression model with the composite index. The only difference is, that the composite index is significant at the 10% level, whereas the other indices are not significant. There is also tested whether individual years have a significant effect on the regression outputs. The regression model (6), containing all independent and control variables, is re-run for every dependent variable by adding fixed-year effects. Clustered standard errors are applied, to find out whether there are some dependencies between them. This is shown in Table 15. The coefficients and errors did not change significantly, which implies that there are no clustered events. There are less significant results than in the proposed regression model in this study. An important difference is that the size-variable shows significance when year dummies are applied, for the PremiumCAR as dependent variable only. All the variables were also tested for variance inflated factors (with the Collin-test) to discover any confounding effects. The VIF shows how much the variance of the coefficient estimate is being inflated by multicollinearity. The collinearity diagnostics can be found in Appendix B, Table 16, where it can be seen that the variables are not inflated by other predictors. For every multiple regression model (CAR3, CAR11 and PremiumCAR) several tests were performed. These results can be observed in Appendix B with the according tables; 17, 18 and 19 respectively. Heteroscedasticity was observed in the CAR3- and CAR11 regression. Therefore, standard robust errors are used where needed, in order to improve

the validity of the tests. This was also applied for PremiumCAR. In all of the multiple regressions, non-normality was observed by performing the Jarque-Bera test. The distribution of the residuals can be found in Appendix B, in Figures 4a, -b and -c. However, according to the Central Limit Theorem, the results can still be seen as valid (although with some caution) because of the sample size of this study.

Table 14 – Regressions CAR3 for Different Independent Variables

Multiple regressions explaining the target firms cumulative abnormal returns for the event window [-1,+1], for the different independent variables (FC Dummy): the Composite index, the KZ index, the WW index and the SA index. The table contains regressions on the dependent variables CAR3. All explanatory variables are explained in the Methodology section. The coefficients of each independent variable are given, underneath the t-statistics are provided between brackets. ***, ** and * denote a 1%, 5% and 10% respectively. Standard errors are heteroskedasticity-consistent, where needed. In all models there is regressed for industry fixed effects.

	CAR3			
	Composite index	KZ index	WW index	SA index
Stock Runup	-0.10426	-0.09138	-0.10038	-0.09212
	(-1.234)	(-1.077)	(-1.151)	(-1.077)
FC Dummy	-0.06033	-0.03091	-0.03182	-0.01790
	(-1.708*)	(-0.873)	(-0.925)	(-0.632)
Attitude	0.20359	0.22130	0.21394	0.21978
	(3.814***)	(4.338***)	(4.188***)	(4.185***)
Cash	0.09885	0.09694	0.09837	0.09765
	(3.262***)	(3.149***)	(3.234***)	(3.201***)
Crisis	-0.00954	0.00122	0.00514	0.00740
	(-0.215)	(0.028)	(0.116)	(0.169)
Crisis x FC Dummy	0.07044	0.03569	0.02752	0.01275
	(0.700)	(0.374)	(0.287)	(0.134)
Competition	0.01422	0.01279	0.00998	0.01505
	(0.303)	(0.273)	(0.222)	(0.316)
Diverse	-0.00585	-0.00590	-0.00788	-0.00886
	(-0.169)	(-0.169)	(-0.222)	(-0.254)
Tender	0.06659	0.05839	0.05838	0.05861
	(1.668*)	(1.506)	(1.504)	(1.500)
Constant	0.11444	0.11302	0.11386	0.11022
	(1.922**)	(1.884*)	(1.904**)	(1.835*)
R-squared	0.2106	0.1999	0.2003	0.1974
Number of observations 196				

Table 15 – Multiple Regressions with Year Fixed-Effects

Multiple regressions explaining the target firms cumulative abnormal returns for the event window [-5,+5] with year fixed-effects. The table contains regressions on the dependent variables CAR3, CAR11 and PremiumCAR. Regression model 6 is tested, where all variables are included. The coefficients of each independent variable are given, underneath the t-statistics are provided between brackets. ***, ** and * denote a 1%, 5% and 10% respectively. Standard errors are clustered, according the years. In the models there is regressed for industry fixed effects.

	CAR3	CAR11	PremiumCAR
Stock Runup	-0.06130	-0.11741	
	(-0.775)	(-1.424)	
FC Dummy	-0.04748	-0.02064	-0.08830
	(-1.372)	(-0.614)	(-1.466)
Attitude	0.23564	0.19608	0.12305
	(3.833***)	(3.119***)	(1.142)
Cash	0.09064	0.12389	0.15728
	(2.808***)	(3.541***)	(3.035***)
Crisis	0.15879	-0.10548	0.02614
	(1.398)	(-0.799)	(0.112)
Crisis x FC Dummy	0.09749	0.18601	0.23469
	(0.825)	(1.359)	(1.059)
Competition	0.00602	0.02289	0.08639
	(0.096)	(0.284)	(0.783)
Diverse	0.01985	0.02007	0.03658
	(0.575)	(0.533)	(0.621)
Tender	0.06149	0.05343	0.11831
	(0.575)	(1.134)	(1.724*)
MtB	-0.00156	-0.00024	0.00689
	(-0.234)	(-0.032)	(0.521)
LNSize	0.00340	0.02217	0.02502
	(0.370)	(1.831*)	(1.461)
Constant	-0.13848	-0.03181	-0.05582
	(-0.873)	(-0.164)	(-0.184)
R-squared	0.3819	0.3879	0.3247

Number of observations 196

5. Conclusions

The aim of this study was to investigate whether financial constraints have a significant impact on the takeover premium and returns in public acquisitions for firms based in the U.K. Based on previous literature by Khatami et al. (2015) and Almeida et al. (2004), it was expected that the level of financial constraints of target firms would increase the acquisition premium, as financially constrained target firms have insufficient access to capital and therefore cannot exploit (many) positive investment opportunities and ultimately their growth potential. In order to draw such conclusions, the cumulative (average) abnormal returns in acquisitions by public firms and several financial constraints measure(s) were analysed and compared between two samples (financially constrained versus financially unconstrained). To measure the level of financial constraints, three widely used indices are used and composed into one index. Acquisitions data of 196 deals is used from 1985 to 2015 and for the crisis period data is used from 2007 to 2009.

5.1 Summary Results

Cumulative average abnormal returns revealed that, in line with previous literature, target firms benefit around announcement and earn a premium. A significant difference was found between the returns between financially constrained and unconstrained firms, implying that acquirers pay on average higher premiums for financially unconstrained firms, in contrast to prior literature. Furthermore, no significant, but a negative relation was found between the crisis and the premiums, indicating that premiums on average are lower in the period of the crisis. Elaborating further on this, relatively more financially constrained targets than unconstrained firms were acquired during the financial crisis. Also, financially constrained targets during the financial crisis period earn higher premiums than their unconstrained peers, which could induce a relationship between the temporality of a firm's financial conditions and its future value after the financial crisis. Lastly, some deal characteristics were found of significance as well. The deal attitude, method of payment and tender offer seem to matter for the difference in premiums paid for financially constrained and unconstrained firms.

Concluding, from the small amount of financially constrained targets observed, it can be suggested that acquirers prefer unconstrained targets to constrained targets in the U.K. An explanation for this is that the level of uncertainty is relatively higher for financially constrained firms; acquiring a financially constrained target is a more risky and unstable project and therefore the acquisition of an unconstrained target can be considered as a safer opportunity. This aligns with the thought that U.K. firms prefer less risky acquisitions than U.S. firms (Wood, 2000). The findings regarding financial constraints and premiums add to existing literature as a new composite index is developed, consisting of the widely

used KZ-, WW-, and SA indices. Relating these to the acquisition premiums of public firms in the U.K. makes this study distinctive.

5.2 Limitations

Moving on to the limitations, the small sample size of U.K. firms which had sufficient data to be part of the sample, could have led to insignificant results as only one sixth of the total sample was considered to be constrained. Furthermore, some possible control variables (acquirer characteristics) were not chosen as otherwise the sample would decrease even further in size, due to the lack of financial data of U.K. firms available. Also, the financial constraints were measured the year preceding the acquisition. This could cause some differences between the moments the financial constraints are measured per firm, as a firm could be bought in the beginning or in the ending of the year. Therefore, they are not precisely measured one year pre-acquisition. This could cause a small bias in the measurement of financial constraints. For the measurement of the takeover premium, cumulative (average) abnormal returns are used, whereas Bargeron et al. (2008) suggest that first bid to completion (FBC premium) might also be a good measurement. In this study only public listed firms are used, which are less likely to display a very wide range of financial constraints (Guariglia, 2008). Moving on, due to the discussion about financial constraint measures, another combination of measures is used here. Because there is no ideal way to measure constraints, it remains an indication of the financial condition of a firm. However, it would be interesting to find out which indices and indicators would provide a better composite index, and so the discussion continues.

5.3 Future Research

For future development it can be of interest to include private targets, to find out whether there is a difference between private and public parties and to enlarge the sample with respect to financial constraints. Incorporating private firms would shed new light on the financial constraints phenomenon, as private firms can be considered as more likely to be financially constrained than public firms. Then, Ouimet (2013) shows in his study that minority acquisitions are more common when the target is considered to be constrained. It would be interesting to include both minority and majority acquisitions with respect to this topic and to find out whether there is any relation regarding financial constraints and minority or majority acquisitions. Furthermore, it could of interest to research whether the relations found in this study also account for other European countries, when controlling for country fixed effects. As the sample size of this study was relatively small, it could be interesting whether enlarging the sample size could provide more insights. Lastly, an interesting topic with regard to the financial constraints factor, would be the temporality of the financial conditions of a target firms and whether this has an effect on premiums as well.

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Appendix A

Table 1 – Criteria Selection for Acquisitions

Selection Criterion	Explanation
U.K. listed target and acquirer	Both the target and acquiring firm must be public as index data on stock returns is needed The subject researched in this study has not performed for the U.K. and therefore this requirement is set
Sample period from January 1985 to December 2015	Data is available from 1985 for U.K. firms in Thomson ONE Timespan is sufficiently long to capture all effects In accordance with Denis et al. (2010), Khatami et al. (2015)
All acquisitions are completed	All unsuccessful bids are neglected In accordance with Officer et al. (2010), Khatami et al. (2015)
Only majoirty acquisitions are considered	Focus on acquirers who own more than 50% of the shares after the transaction and own less than 50% before the transaction In accordance with Uddin, Boateng (2009), Officer et al. (2010), Khatami et al. (2015)
Deal size larger than 1 million	Moeller, Schlingemann and Stulz (2004) require this as a minimum value to study acquisitions Also in accordance with Khatami et al. (2015)
Financial Institutions and Regulated Utility Firms are excluded	SIC codes ranging from 4900 - 4999 and 6000 - 6799 were not taken into account; this is in line with Whited and Wu (2006, Uddin and Boateng (2009) and Khatami et al. (2015) Most financial and utility firms have different firm- and capital structures due to other regualtion policies and some are (partially) government owned. Uddin and Boateng (2009) state that these firms do not have the same meaning as non-financial firms because of the different nature of assets and liabilites of financial and utility firms The focus is not only on manufacturing firms, as Lamont et al. (2001) did, but other firms are included as well. Campello and Chen (2010) did not restrict their sample to solely manufacturing firms and their results were in line with previous literature The KZ index is absed on non-financial firms only, this is taken into account as well
Only deals with certain payment methods are taken into consideration	Composition of the deal should be cash-only, stock-only or a combination of both (mixed), to exclude more differentiating deals In accordance with Sudarsanam and Mahate (2003)
Bankruptcy acquisitions are excluded	This criterion is chosen as the focus is on financially constrained firms and not on bankruptcy firms This is in line with Khatami et al. (2015)

Table 2 – Financial Constraints Measure

Financial Constraint Measures	Formula and definitions	Implicated by / based on
Kaplan and Zingales (KZ) index	(1) KZ $= -1.001909\ Cash\ Flow\ kz + 0.2826389\ Tobi\ 's\ Q + 3.139193\ Leverage\ kz$ $-\ 39.3678\ Dividends\ -\ 1.314759\ Cash\ Holding$	Lamont, Polk, Saá-Requejo (2001) Almeida, Campello, Weisbach (2004) Khatami, Marchica, Mura (2015)
Cash Flow kz	(Income before extra items + depreciation and amortization) / plant, property and equipment (PPE)	Lamont et al. (2001); Hadlock, Pierce (2010); Khatami et al. (2015)
Tobin's Q	(Market capitalization + total assets - common equity - deferred taxes) / total assets	Lamont et al. (2001); Hadlock, Pierce (2010); Khatami et al. (2015)
Leverage kz	(Total debt) / (total debt + shareholder's equity)	Lamont et al. (2001); Hadlock, Pierce (2010); Khatami et al. (2015)
Dividends	(Common dividends + preferred dividends) / PPE	Lamont et al. (2001); Hadlock, Pierce (2010); Khatami et al. (2015)
Cash Holding	(Cash + short-term investments) / PPE	Lamont et al. (2001); Hadlock, Pierce (2010); Khatami et al. (2015)
Whited and Wu (WW) index	(2) WW $= -0.091\ Cash\ Flow\ ww - 0.062\ Dividend\ dummy + 0.021\ Leverage\ ww$ $-\ 0.044\ Log\ Total\ Asset \quad 0.102\ Industry\ Sales\ Growth \quad 0.035\ Sales\ Growth$	Whited, Wu (2006) Hadlock, Pierce (2010)
Cash Flow ww	(Income before extra items + depreciation and amortization) / total assets	Whited, Wu (2006)
Dividend dummy	Indicator that takes the value of 1 if the firm pays cash dividends, 0 otherwise	Whited, Wu (2006)
Leverage ww	Long-term debt / total assets	Whited, Wu (2006)
Log Total Assets	Natural logarithm of total assets	Whited, Wu (2006)
Industry Sales Growth	Firm's three-digit industry sales growth	Whited, Wu (2006)
Sales growth	(Net sales t - net sales t-1) / net sales t-1	Whited, Wu (2006)
Hadlock and Pierce (SA) index	(3) SA $= -0.737\ Size \quad 0.043\ Size^2 - 0.040\ Age$	Hadlock, Pierce (2010); Campello, Chen (2010) Khatami et al. (2015)
Size	Natural logarithm of total assets	Hadlock, Pierce (2010); Khatami et al. (2015)
Age	Number of years the firm is listed with a non-missing stock price (in Datastream)	Hadlock, Pierce (2010); Khatami et al. (2015)

All the above mentioned variables are winsorized to cap outliers, at the 5% level. The winsorization is based on Hadlock and Pierce (2010).

Table 3 – Variable Definition

Dependent Variables	Definitions	Implicated by / based on
CAR3	The cumulative abnormal returns calculated from 1 day prior to 1 day after the announcement date	Moeller et al. (2004) Bargeron et al. (2008); Officer et al. (2010)
CAR11	The cumulative abnormal returns calculated from 5 days prior to 5 days after the announcement date	Hubbard, Palia (1999); Officer et al. (2010); Khatami et al. (2015)
Premium CAR	The cumulative abnormal returns calculated from 42 days prior to 5 days after the announcement date	Schwert (1996); Officer(2010)
Independent Variable		
FC	Dummy variable taking value 1 when the target is considered to be financially constrained, 0 otherwise	Campello, Chen (2010); Khatami et al. (2015)
Control Variables		
Crisis	Dummy variable taking value 1 when the takeover was in the financial crisis period, 0 otherwise	Khatami et al. (2015)
Attitude	Dummy variable taking value 1 when the takeover was hostile	Moeller et al. (2004); Khatami et al. (2015)
Cash	Dummy variable taking value 1 when the payment of the deal was 100% cash, 0 otherwise	Moeller et al. (2004); Sudarsanam et al. (2003); Khatami et al. (2015)
Competition	Dummy variable taking value 1 when there was more than 1 bidder, 0 otherwise	Hubbard et al. (1999); Moeller et al. (2004); Khatami et al. (2015)
Diverse	Dummy variable taking value 1 when the acquirer and target firm were from the same industry, 0 otherwise	Almeida et al. (2004); Khatami et al. (2015)
Tender	Dummy variable taking value 1 when the bid was a tender offer, 0 otherwise	Hubbard et al. (1999); Moeller et al. (2004); Khatami et al. (2015)
Market to Book (MtB)	Market value to book ratio of the target firm	Moeller et al. (2004); Denis et al. (2010)
LNSize	Log of size (total assets) of the target firm	Officer et al. (2010); Alexandridis et al. (2013)
Industry Fixed Effects (FE)	Dummy variables for each industry sector (3-digit industry level), to control for industry differences	Hubbard et al. (1999); Alexandridis et al. (2013); Khatami et al. (2015)

Table 4 – Correlations between Indices

This table shows the correlations between the financial constraints measures and the composite index, that combines all the three indices. The variables used to calculate the different indices are all winsorized at the 5% level. The significance of the correlations are indicated by **, which accounts for significance at the 5% level.

	Composite Index	KZ Index	WW Index	SA Index
Composite Index	1.0000			
KZ Index	0.1453**	1.0000		
WW Index	0.3510**	-0.0011	1.0000	
SA Index	0.0771	0.0770	-0.4596**	1.0000

Table 5 – Model Specifications

This model includes the three independent variables: CAR3, CAR11 and Premium CAR. (x) indicates whether the variables are chosen to be part of the regression model (1), (2), (3), (4), (5) or (6). Thus, six different regressions are run on each of the dependent variables. The first model considers runup characteristics only (for the dependent variables CAR3 and CAR11), while the second model includes the effects of financial constraints. The third model expands the second model by adding the financial crisis dummy and the cross-variable. The fourth regression checks for robustness by including deal characteristics. The fifth model does this as well, by including target characteristics. Finally, the sixth model includes all the variables and is a further robustness check.

		CAR3						CAR11						Premium CAR				
		(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(2)	(3)	(4)	(5)	(6)
	Constant	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)
Runup Characteristics	*Stock Runup*	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)					
Target Type	*FC Dummy*		(x)	(x)	(x)	(x)	(x)		(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)
Deal Characteristics	*Attitude*				(x)		(x)				(x)		(x)			(x)		(x)
	Cash				(x)		(x)				(x)		(x)			(x)		(x)
	Crisis			(x)	(x)		(x)			(x)	(x)		(x)		(x)	(x)		(x)
	Crisis x FC Dummy			(x)	(x)		(x)			(x)	(x)		(x)		(x)	(x)		(x)
	Competition				(x)		(x)				(x)		(x)			(x)		(x)
	Diverse				(x)		(x)				(x)		(x)			(x)		(x)
	Tender				(x)		(x)				(x)		(x)			(x)		(x)
Target Characteristics	*MtB*					(x)	(x)					(x)	(x)				(x)	(x)
	LNSize					(x)	(x)					(x)	(x)				(x)	(x)
Industry Control	*Industry FE*	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)

Appendix B

Table 16 - Confounding Effects

This table shows the confounding effects for the independent variables, calculated in STATA by the collin-command. The VIF minimum value is 1 and the lower the value, the less a variable is explained by another predictor. The VIF should not be higher than 5 and the tolerance level should not be lower than 0.1101; this would indicate confounding effects between the variables.

	VIF	VIF^2	Tolerance	R-squared
Runup	1.07	1.03	0.9361	0.0639
FC Dummy	1.10	1.05	0.9077	0.0923
Attitude	1.08	1.04	0.9301	0.0699
Cash	1.05	1.03	0.9513	0.0487
Crisis	1.11	1.05	0.9004	0.0996
Competition	1.04	1.02	0.9577	0.0423
Diverse	1.09	1.04	0.9178	0.0822
Tender	1.09	1.04	0.9165	0.0835
MtB	1.07	1.04	0.9332	0.0668
LN Size	1.13	1.06	0.8845	0.1155

Table 17 – Robustness checks CAR3

The various tests to check for normality, multicollinearity, omitted variables and heteroskedasticity, which are performed in STATA, are shown in this table, for the dependent variable CAR3. Conclusions based on the outcomes are also given. See also the Methodology section, regressions for explanation on these tests.

Residuals CAR3	Total Sample
Observations	196
Mean	0.00021
Standard Deviation	0.19108
Variance	0.03651
Skewness	0.0480
Kurtosis	0.0002
Jarque-Bera	15.05 (0.0005)
Conclusion	Non-normality
VIF CAR3	
Mean	1.51
Conclusion	No multicollinearity
Ramsey RESET CAR3	
F-test	3.68 (0.0133)
Conclusion	No omitted variables
Breusch-Pagan CAR3	
Chi² value	3.17 (0.0751)
Conclusion	Heteroscedasticity

Table 18 – Robustness checks CAR11

The various tests to check for normality, multicollinearity, omitted variables and heteroskedasticity, which are performed in STATA, are shown in this table, for the dependent variable CAR11. Conclusions based on the outcomes are also given. See also the Methodology section, regressions for explanation on these tests.

Residuals CAR11	Total Sample
Observations	196
Mean	0.00025
Standard Deviation	0.20849
Variance	0.04347
Skewness	0.0007
Kurtosis	0.0256
Jarque-Bera	13.86 (0.0010)
Conclusion	Non-normality
VIF CAR11	
Mean	1.51
Conclusion	No multicollinearity
Ramsey RESET CAR11	
F-test	1.75 (0.1589)
Conclusion	No omitted variables
Breusch-Pagan CAR11	
Chi² value	3.24 (0.0719)
Conclusion	Heteroscedasticity

Table 19 – Robustness checks PremiumCAR

The various tests to check for normality, multicollinearity, omitted variables and heteroskedasticity, which are performed in STATA, are shown in this table, for the dependent variable PremiumCAR. Conclusions based on the outcomes are also given. See also the Methodology section, regressions for explanation on these tests.

Residuals PremiumCAR	Total Sample
Observations	196
Mean	0.00054
Standard Deviation	0.30828
Variance	0.09504
Skewness	0.2807
Kurtosis	0.0180
Jarque-Bera	6.47 (0.0394)
Conclusion	Non-normality
VIF PremiumCAR	
Mean	1.52
Conclusion	No multicollinearity
Ramsey PremiumCAR	
F-test	0.75 (0.5232)
Conclusion	No omitted variable bias
Breusch-Pagan PremiumCAR	
Chi² value	0.98 (0.3224)
Conclusion	Homoscedasticity

Figure 4a – CAR3 Residuals Distribution

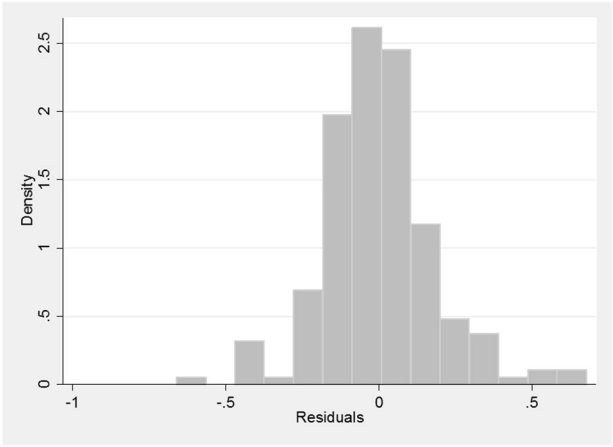

Figure 4b – CAR11 Residuals Distribution

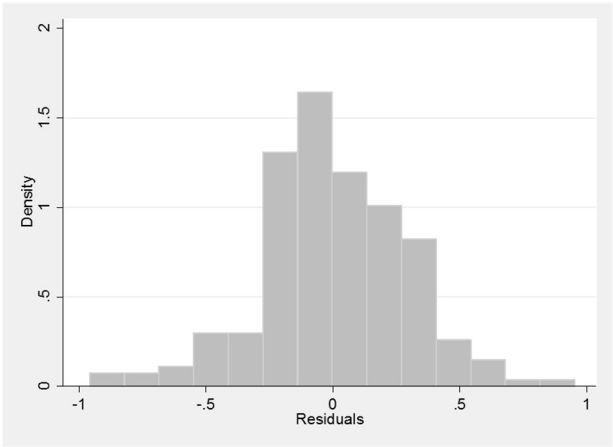

Figure 4c – PremiumCAR Residuals Distribution