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Do acquirers release targets' financial constraints? Evidence from European private targets.



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Abstract

Some acquisitions might be justified by claiming that acquirers relieve targets' financial constraints through better expanding their operations and ability to invest. Allowing a target to take advantage of growth opportunities can create value for the mutual benefit of the acquirer and target. Accordingly, my dissertation examines whether acquirers release targets' financial constraints using a sample of 2,274 acquisition deals of European private targets from 2006 to 2015. Following the approach of Erel, Jang and Weisbach (2015), I formulate three hypotheses based on cash holdings, cash flow sensitivity of cash and cash flow sensitivity of investment. Theory suggests that if a financially constrained firm has its financial frictions relieved after an acquisition, these factors should decrease. However, the results obtained are not the expected because the three hypotheses purposed are all rejected, indicating that managers do not lower their cash holdings, neither their cash holdings and investment policy become less sensitive to the firm's cash flows. The general outcome reached is inconsistent with previous studies as there is no evidence of target firms having any pre-existing financial constraints relieved post-acquisition. This research contributes to the existing literature on the extent to which acquisitions lower financial constraints of target firms by solely studying privately held targets. While a potential factor leading to the acquisition of public firms could be the reduction in financial constraints, on the case of privately held firms this relationship is not proved.

Keywords: Mergers and Acquisitions; Corporate Investment; Financial Constraints; Cash Flow; Cash Holdings; Cash Flow Sensitivity of Cash; Cash Flow Sensitivity of Investment.

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Resumo

Algumas aquisições podem ser justificadas alegando que os adquirentes aliviam as restrições financeiras das empresas-alvo através de uma melhor expansão das suas operações e da sua capacidade de investir. Permitir que uma empresa-alvo aproveite as suas oportunidades de crescimento pode resultar na criação de valor para o mútuo benefício do adquirente e da empresa-alvo. De acordo, a minha dissertação examina se os adquirentes libertam as restrições financeiras de empresas-alvo, utilizando uma amostra de 2.274 aquisições de empresas-alvo privadas Europeias entre 2006 e 2015. Seguindo a abordagem de Erel, Jang e Weisbach (2015), formulo três hipóteses baseadas na acumulação de níveis de caixa e equivalentes, sensibilidade de caixa ao fluxo de caixa e sensibilidade do investimento ao fluxo de caixa. A teoria sugere que, se uma empresa financeiramente restringida tem as suas fricções financeiras aliviadas após uma aquisição, estes fatores devem diminuir. No entanto, os resultados obtidos não são os esperados porque as três hipóteses propostas são todas rejeitadas, indicando que os administradores não reduzem a acumulação de níveis de caixa e equivalentes, nem as suas disponibilidades e política de investimentos se tornam menos sensíveis aos fluxos de caixa da empresa. O resultado geral alcançado é inconsistente com estudos anteriores, uma vez que não há evidências de que quaisquer restrições financeiras pré-existentes nas empresas-alvo venham a ser aliviadas após a aquisição. Ao estudar exclusivamente empresas-alvo privadas, esta pesquisa contribui para a literatura existente sobre em que medida as aquisições diminuem as restrições financeiras de empresas-alvo. Enquanto a redução das restrições financeiras pode ser um fator potencial na aquisição de empresas públicas, no caso de empresas privadas essa relação não é comprovada.

Palavras-chave: Fusões e Aquisições; Investimento Empresarial; Restrições Financeiras; Fluxo de Caixa; Acumulação de Níveis de Caixa e Equivalentes /Disponibilidades; Sensibilidade de Caixa ao Fluxo de Caixa; Sensibilidade do Investimento ao Fluxo de Caixa.

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1. Introduction

Taking advantage of synergies is the key to successful acquisitions. In a well-executed acquisition, an acquirer might help a resource-constrained target mitigate its financial constraints, and consequently create value for their mutual benefit. Lately, there has been a growing interest in the literature regarding this matter because of the recent behaviour of corporations. In this dissertation, I examine whether acquisitions relieve financial constraints of target firms using a sample of European private targets.

Every day, companies come together to form larger ones through business combinations such as acquisitions, consolidations, mergers and takeovers or do the reverse and break up by divestitures, spinoffs and equity carve-outs. Mergers and acquisitions (hereinafter M&As), in particular, make the news with deals worth billions of dollars and dictate the fortunes of the companies involved for years to come. In recent years, the volume of acquisitions has been growing worldwide, so it is with no surprise that 2015 was the biggest year ever for M&A activity. According to the data from Thomson Reuters, 2015 peaked with \$4.7 trillion in announced M&As, beating the previous record of \$4.4 trillion in 2007¹, prior to the economic downturn (Figure 1). The number of mega-deals² also stands out, with Thomson Reuters totalling 137 mega-deals last year, which accounted for 52 percent of the year's overall M&A value.

M&As are typically clustered in waves and in the last 100 years there have been six waves of rapid merger activity. Merger waves are also present in cross-border M&As, with European waves following those in the United States with a short lag³. Some see last year's transactions as an indicator that the world economy is in the middle of a seventh wave because of the relative robustness of corporations' cash reserves which were encouraged by cheap financing due to historic low interest rates. As a result of the excess of cash, companies are often more motivated to grow through M&As, rather than by making capital investments. Although there are numerous reasons why acquisitions occur and the importance of the factors that motivate them vary over time, this research focuses on whether some acquisitions could be motivated by financial synergies resulting from reductions in target's financial constraints.

¹ According to a different data provider, Dealogic, M&A activity reached a volume of \$4.9 trillion, beating the record of \$4.6 trillion set in 2007.

² Any deal that exceeds \$5 billion.

³ Brakman, Garretsen and Schramm (2000); Gugler, Mueller and Weichselbaumer (2012).

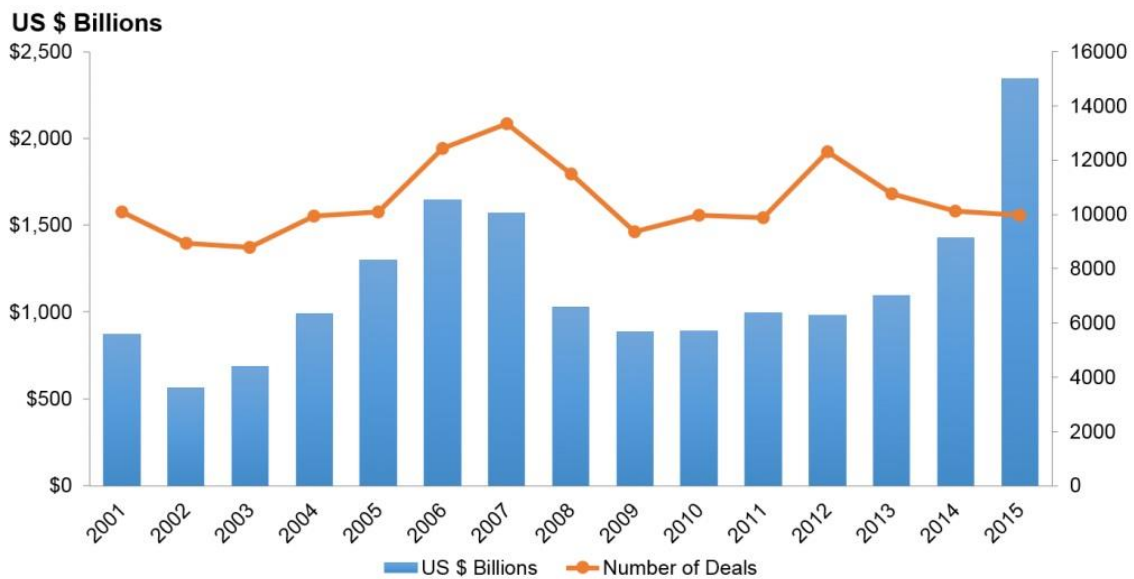


Figure 1 - Data for M&A deals in the US (2001 – 2015) for a perception of the magnitude of M&A activity in recent years. Adapted from “*successfulacquisitions.net*” with data from Tomson Reuters and Dealogic. Last accessed on 25th February 2017.

Modigliani and Miller (1958), claimed that in a world of perfect and complete capital markets, the costs of internal financing are equal to the costs of external financing, there are no transaction costs nor tax effects. In such a world, a firms’ financial situation is irrelevant for financing investment opportunities and thus, no firm has to give up from their first-best investments. However, once we consider market frictions, such as tax factors, transactions costs, or information costs, the cost of external funds surpasses the cost of internal generated funds; consequently, firms may struggle to invest in their growth opportunities. According to Denis and Sibilkov (2009), these financial frictions lead to lower future growth, reduced operating performance and firm value. Therefore, in the presence of certain frictions some firms (especially private ones) will occasionally face financial constraints and have to pass up on positive net present value projects. While the markets may work better for public firms, that can access several different financing mechanisms, private companies are more affected by these capital market imperfections, as they do not have equally easy access to capital and are more dependent on the availability of internal funds. This will most definitely affect a firm’s ability to pursue all value-increasing investment opportunities.

Accordingly, acquisitions may create a financial synergy if they ease financial constraints of private firms, allowing them to take advantage of their growth opportunities. Helping a target to fund profitable investments which otherwise would be looked over could create

value for the mutual benefit of the acquirer and target. Erel, Jang and Weisbach (2015, p. 289) state that “perhaps being part of a larger organization subsequent to an acquisition can improve financing through better direct access to capital markets, and also by the possibility of a reallocation of capital across divisions”. Therefore, some acquisitions might be justified by claiming that acquirers can better expand the target's operations because of the improved combined capacity to generate cash flows internally and the ability to raise capital externally.

The purpose of this dissertation is to evaluate and determine the impact of acquisitions on the financial constraints of private target firms. Studying private targets alone is important as they represent the vast majority of targets and acquisitions and they are quite different from public targets, especially in what relates to external financing. To measure the extent to which a target is financially constrained and evaluate whether the constraints change following an acquisition, I follow the approach of Erel, Jang and Weisbach (2015). According to their methodology, three hypotheses should be tested based on cash holdings, the cash flow sensitivity of cash and the cash flow sensitivity of investment. If a financially constrained firm has its financial frictions relieved after an acquisition, these factors should decrease.

To the best of my knowledge, this dissertation differentiates from the existing literature by using a sample of private targets only to study whether acquisitions relieve their financial constraints. Although I acknowledge that not all private firms are necessarily financially constrained, the literature typically sees these companies as facing more problems and higher costs in obtaining external funding. My research employs a sample between 2006 and 2015 of European private targets. One advantage of using a sample of European firms is that, unlike in the United States, in Europe subsidiaries are required to disclose their financial information. Thus, one can trace the financial situation of these companies before and after the acquisition, provided that post-acquisition they remain as independent subsidiaries of the parent company.

Overall, I do not find that post-acquisition the financial constraints of private firms are relieved. These results are consistent using several model specifications. In sum, I do not find evidence consistent with the extant literature that documents a relief in the targets' financial constraints post-acquisition. However, not only the previous studies use different time periods, they also include public targets in their samples, which are not included in this study.

The remainder of this dissertation proceeds as follows. In section 2 - *Literature Review* - the related literature is presented and discussed. Section 3 - *Hypotheses and Methodology* - describes the hypotheses development and empirical research model to measure targets' financial constraints. Section 4 - *Data Description* - reports the data availability and sample construction. Section 5 - *Empirical Results and Discussion* - discusses the results obtained and possible explanations for why targets remain financially unchanged following the acquisitions. Section 6 - *Conclusion* - covers the most relevant conclusions and the limitations of the dissertation. Section 7 includes the references and finally, in section 8 an appendix with variables specifications and additional tests is presented.

2. Literature Review

M&As are a part of corporate restructuring, which according to DePamphilis (2014) refers to actions taken to expand or contract firm's basic operations or fundamentally change its assets or financial structure. M&As are often used as they were synonymous; nonetheless, the terms merger and acquisition mean slightly different things. As stated by DePamphilis (2014), an acquisition occurs when a company takes a controlling interest in another firm, a legal subsidiary of another firm, or selected assets of another firm. There are numerous reasons for acquisitions to happen, yet firms conceptually engage in acquisitions when combining with targets increases the value from the perception of the acquiring firm's managers. Although, a question arises: which target should an acquirer go after? Frequently, acquirers seek a target such that the pooling of their joint capabilities will result in the elimination of redundant costs, leading to efficiency gains related to economies of scale and/ or scope – the so-called operational synergies. However, despite the extensive literature on the motives for M&As and operational synergies, the purpose of this research is to ascertain whether some acquisitions could be motivated by financial synergies resulting from reductions in target's financial constraints.

2.1 Financial Constraints in Mergers and Acquisitions

In the next subsections, some of the most relevant studies on financial constraints are briefly described to better understand their effects on firm behaviour. It is also important to state that although financial distress, bankruptcy risk or economic distress are highly related to each other, this dissertation will not address them when discussing financial constraints. As mentioned, the focus of this research is to examine whether acquisitions relieve financial constraints of European private targets.

It is hard to give a distinct definition of financial constraints since it is an abstract concept and they are not directly observable. According to one possible definition from Fazzari, Hubbard and Petersen (1988, p. 142), a firm is financially constrained if "external capital is not a perfect substitute for internal funds". Note that this definition virtually covers every firm, since it is likely that all firms are constrained to some extent, for example if transaction costs matter (Kaplan and Zingales 1997). Nevertheless, I prefer to define financial constraints as "the inability of a firm or a group of firms to raise the necessary amounts (usually due to external finance shortage) to finance their optimal path of

growth” (Carreira and Silva 2010, p. 732), or simply as frictions that prevent a firm from financing the desired investment opportunities (Lamont, Polk and Saa-Requejo, 2001). Either way, financial constraints will cause firms to neglect valuable projects when they arise because the projects that a constrained firm chooses to pursue will not only depend on the existence of positive net present value projects but also on the availability and pricing of financing.

In practice, many frictions exist to impede a smooth relation between firm financing and investment⁴, thus when do firms face financial constraints? Kaplan and Zingales (1997, p. 172) consider firms as financially constrained when “they face a wedge between the internal and external costs of funds.” This wedge is triggered by imperfections in the capital market as explained in the next section.

2.1.1 Internal versus External Funds: Capital Market Imperfections

In perfect and complete capital markets a firm's investment decision is independent of its financial condition. According to Modigliani and Miller (1958) a firms' financial situation is irrelevant because the costs of internal financing are equal to the costs of external financing. An investment opportunity can either be financed with internal or external funds because they are perfect substitutes for each other.

However, capital markets can become imperfect or incomplete in the presence of certain frictions. When this is the case, a firm's financial position does matter, as the cost of external financing increases and the investment depends on the availability of internal generated funds and/or access to new debt or equity finance. Some examples of capital market frictions are transaction costs, tax regulations, agency problems (Jensen and Meckling, 1976; Jensen, 1986), cost of financial distress and problems with asymmetric information (Myers and Majluf, 1984).

Because frictions in capital markets lead to financing constraints on investment, some firms won't be able to take advantage of growth opportunities. The costs of obtaining external capital are less severe for public companies as their information environment is significantly better than that of private firms. Additionally, while public firms can access several different financing mechanisms, private companies do not have equally easy

⁴Tirole (2006) specifies model in which constraints occur because of contracting difficulties, moral hazard, or asymmetric information reasons.

access to capital and are more dependent on the availability of internal funds generated through cash flows and retained earnings; this will most definitely affect a firm's ability to pursue all value-increasing investment opportunities.

Accordingly, acquisitions may create value if they ease financial constraints of private firms, so that acquirers can better expand the target's operations because of the improved combined capacity to generate cash flow internally and a better ability to raise capital externally. For these reasons, the purpose of this dissertation is to evaluate and determine the impact of acquisitions in the financial constraints of private target firms. To measure the extent to which a target is financially constrained before an acquisition and evaluate whether the constraints change following the deal, I follow some measures of financial constraints from the literature which will be covered in the following subsection.

2.1.2 Measures of Financial Constraints

There are a wide number of specifications associated with a proper measure of financial constraints; numerous papers have used different kinds of criteria to classify firms in terms of financial constraints, while others estimate loadings of financial variables to easily construct indexes of constraints that can be used more broadly; however, my aim is not to discuss which measure is the most accurate but to adopt the one that most suits my research problem.

A particularly important measure of financial constraints advanced by Fazzari, Hubbard and Petersen (1988) is the Dividend Payout Ratio. According to this measure, firms are a priori classified as either constrained or unconstrained. The explanation is that constrained firms will exhibit a low dividend payout ratio because dividends and investment spending are competing financial decisions. If a constrained firm has difficulties in getting the required capital to finance an investment, then they will prefer to retain all of their low cost internal funds which forces a firm to lower their dividend payout. However, this measure is more appropriate for relatively larger and/or public firms and given that the firms in my sample are privately held, this measure is less relevant to the purpose of this study.

Consequently, throughout this dissertation the measures described by Erel, Jang and Weisbach (2015) are employed and in the next subsections I analyse in detail the literature regarding the measures that will be tested: cash holdings, cash-to-cash flow sensitivity and investment-to-cash flow sensitivity. Important to state that all three

measures of financial constraints are motivated by theory that is equally valid in all countries and for both public and private firms.

Additionally, I consider indexes for analysing financial constraints. Important indexes such as the KZ Index developed by Kaplan and Zingales (1997) and Lamont, Polk and Saa-Requejo (2001) and the WW-Index constructed by Whited and Wu (2006) are suitable because they are firm-specific, time-varying and can be used as a dependent variable due to their continuous character. However, their construction involves availability of data and since I work with private targets several variables are missing. Nonetheless, I proxy the missing variables for the KZ Index, so that I can classify firms into categories according to their rate of financial constraints (more or less financially constrained) previously to the acquisitions. I use the KZ Index to segment the sample and conduct an additional analysis on the cash flow sensitivity of investment based on the subsample of constrained target firms.

A. Cash Holdings

Holdings of liquid assets are irrelevant in a world of perfect capital markets. A firm that needs funds to keep operating or to invest can do so at no cost, since there is no liquidity premium in such a world. However, in the presence of financial market frictions it can become costly for a firm to be short of liquid assets⁵, and consequently the firm needs to equate between the marginal cost of holding liquid assets and the marginal benefit of holding those assets.

The discussion of financial constraints started long ago and was originally proposed by Keynes (1936), who described two major benefits to cash holdings: the transaction cost motive and the precautionary motive. The first benefit for holding cash conveys the idea that a firm can save transaction costs by using cash to make payments without having to liquidate assets. Alternatively, Keynes argues that financial market frictions such as cash flow shortfalls or prohibitively high external finance, might prevent a firm from investing in profitable projects if the firm does not have liquid assets; therefore, firms can find it profitable to hold cash to ensure that they will be able to keep investing. As a result, the firms' optimal cash holdings are determined by weighing the incremental holding cost of cash with the improved investment opportunities arising from avoiding potential

⁵ Opler, Pinkowitz, Stulz and Williamson (1999) define "a firm to be short of liquid assets if it has to cut back investment, cut back dividends, or raise funds by selling securities or assets".

financial constraints. These results are consistent with the view that firms hold cash as a precaution against potential future financial constraints and can continuously anticipate on investment opportunities. My dissertation focuses on this last motive for holding cash.

Various researchers (Kim, Mauer, and Sherman, 1998; Ozkan and Ozkan, 2004; Pinkowitz and Williamson, 2001) focused on the determinants of corporate cash holdings based on the theory of Keynes (1936), and the precautionary motive has been confirmed by the results of John (1993) and Opler, Pinkowitz, Stulz and Williamson (1999). John argues that firms wish to hold greater amounts of cash when they are coerced to higher financial distress costs. Similarly, the research of Opler et al. (1999) documented that cash flow volatility could affect a firm's cash-holding behaviour. Their work demonstrates that firms who hold more cash and liquid assets (so that they can keep investing in the future when cash flow is low and external financing is costly) are usually smaller, with more growth opportunities and with riskier activities.

These studies suggest that firms' saving behaviour should be positively related to the degree to which firms expect to face financial constraints coming up short in the future and it's particularly relevant for smaller firms and firms that face difficulties accessing to the capital markets and/or raising the necessary capital.

B. Cash-to-Cash Flow Sensitivity

Keynes (1936) originally introduced the idea that a liquid balance sheet allows firms to undertake valuable projects when they arise, but it is dependent on the extent to which firms have access to external capital markets (whether they face capital market frictions). If a firm has access to external funds there is no need to protect against future investment needs and corporate liquidity is irrelevant. Conversely, when a firm faces financial frictions, the firm's holdings of liquid assets may become a key issue for corporate policy.

In 2004, Almeida, Campello, and Weisbach presented a model of a firm's liquidity demand that formalizes Keynes' intuition. They argue that there is a link between financial constraints and a firm's demand for liquidity, as firms whose investments are constrained by capital market imperfections will withhold more of their incremental cash flow as cash if they fear that they may not be able to raise funds easily in the future. This alternative approach to measure financial constraints, involving the estimation of a firm's propensity to save cash out of cash flows, is referred to as the cash flow sensitivity of cash (or cash-to-cash flow sensitivity).

Accordingly, when internal funds are insufficient a firm has to pass up some investment opportunities and will choose to allocate additional cash flows to increase its investments both today and in the future. On the contrary, incremental cash flows do not have any real effects on unconstrained firm's investment policies since they can obtain external funds to finance projects. Only firms facing financial constraints manage liquidity to maximize value. Empirically, financially constrained firms should display a positive cash flow sensitivity of cash, so that cash holdings should increase with the firm's cash flows, while financially unconstrained firms should not exhibit a systematic propensity to save cash.

Furthermore, the research of Almeida, Campello, and Weisbach (2004) and other authors⁶ find evidence that the cash flow sensitivity of cash is strongly related to other measures of financial constraints. However, despite the existence of research that provides evidence consistent with Almeida et al. (2004)⁷, this model has still faced criticism by several researchers (*inter alia* Acharya, Almeida and Campello, 2007; D'Espallier, Huybrechts and Schoubben, 2014; Lin, 2007⁸; Pál and Ferrando, 2010⁹; Riddick and Whited, 2009¹⁰) as they proved contradicting evidence.

In the study of Acharya, Almeida and Campello (2007), financially constrained firms save cash from cash flow when hedging needs are high and use excess cash flow to reduce debt when hedging needs are low. Hereafter, a positive and significant cash-to-cash flow sensitivity is not evidence of financial constraints. Similarly, D'Espallier, Huybrechts and Schoubben (2014) find that firms with a high cash-to-cash flow sensitivity are more attractive to external financiers due to the association with a higher liquidity, profitability and more dividends.

⁶ See Sufi (2009), Hadlock and Pierce (2010), Farre-Mensa (2011), and Ostergaard, Sasson, and Sorensen (2011).

⁷ See Han and Qiu (2007) and Denis and Sibilkov (2009). Both studies focused on public traded firms in the U.S.

⁸ Lin (2007) showed a positive and significant cash-to-cash flow sensitivity for both constrained and unconstrained Taiwanese firms.

⁹ Pál and Ferrando (2010) revealed that firms in the Euro-area had a positive cash-to-cash flow sensitivity.

¹⁰ Riddick and Whited (2009) argue that the cash-to-cash flow sensitivity is not driven by the cost of external finance, but more importantly, it is driven by uncertainty and fluctuations in income.

C. Investment-to-Cash Flow Sensitivity

The existing literature on financial constraints has proved that frictions in capital markets can reduce some firms' access to low-cost finance, worsen their balance sheet positions and eventually limit their investment decisions. Fazzari, Hubbard and Petersen (1988) introduced an empirical measure that analyses the effects that financial constraints have on corporate investment demand: the investment-to-cash flow sensitivity.

Their research is based on the view - previously discussed - that external capital is not a perfect substitute for internal funds due to capital market imperfections. Fazzari et al. (1988) suggest that the amount of investments made by financially constrained firms vary with the availability of internal funds rather than just the existence of positive net present value (NPV) projects. In their study, the observed retention practice from financially constrained firms serves as a proxy for financial constraints, and consequently constrained firms should display a higher investment-to-cash flow sensitivity. The idea is that, while a financially unconstrained firm can easily finance its investments through external funds, the amount of investments made by a financially constrained firm will be driven by the cash flow it generates; hence, a positive and significant cash flow coefficient should be found. Several other studies support this conclusion (Audretsch and Elston, 2002; Benito, 2005; Guariglia, 2008; Almeida and Campello, 2007; Silva and Carreira, 2012). Nevertheless, this approach has been extensively challenged and a handful of literature is ambiguous about whether the influence of financial constraints has a positive or a negative effect on the investment-to-cash flow relationship.

A study from Kaplan and Zingales (1997) has identified several problems with the strategy of Fazzari, Hubbard and Petersen (1988) and challenges most of the previous work based on this methodology. According to Kaplan and Zingales (1997), there is no positive monotonic relationship between the investment-to-cash flow sensitivity and the degree of financial constraints, as they do not consider firms that choose to pay low dividends (even though they could pay out more) as constrained, and argue that investment-to-cash flow sensitivities do not provide useful evidence about the presence of financial constraints, as it does not necessarily relate to the cost of external finance or the level of internal funds available. As a matter of fact, Kaplan and Zingales (1997) argue that unconstrained firms¹¹ should display a stronger sensitivity of investment-to-cash flow because they have incentives to use additional earnings for financing fruitless

¹¹ Firms with healthier levels of liquid assets (cash).

investments, and an increase in cash flow will result in an increase of both their investment and dividend payment. On the contrary, constrained firms choose whether to allocate their cash flows to more investment or more dividends, and therefore the link between investment and cash flow is weaker¹².

In accordance with Kaplan and Zingales (1997), are Gomes (2001), Alti (2003) and Moyen (2004). Both Gomes and Alti conclude that investment-to-cash flow sensitivities do not necessarily indicate the presence of financial constraints, as they can be generated from an environment without any financing friction. Alti (2003) showed that firms have a positive and significant investment-to-cash flow sensitivity *only* if they are unconstrained. According to Moyen (2004), when using firms that pay low dividends (*unconstrained model*) to identify financial constraints, the results produced are consistent with those of Fazzari, Hubbard, and Petersen (1988), while using firms that pay high dividends (*constrained model*) produces results consistent with those of Kaplan and Zingales (1997).

At last, Cleary, Povel and Raith (2007) combine the results of these studies and argue that the investment-to-cash flow sensitivity is U-shaped due to the interaction between the cost and revenue effect of investment. Therefore, contrary to prior literature, the relationship between investment and cash flow is positive everywhere due to a trade-off between two effects: the risk of default and liquidation, and the need to generate revenue to repay debt. According to their research, higher levels of internal funds induces to more investment which in turn involves higher repayment costs, and consequently a higher risk of default; therefore, a positive relation between investment and cash flow should be expected. On the contrary, the second effect states that when internal funds are low the firm needs funds to repay its debt. Subsequently, while the firm's internal funds are further decreasing the investment starts to increase in order to generate revenue to repay the debt; thus, once more, there is a positive relation between investment and cash flow.

Today there is still no consensus on the subject of investment-to-cash flow sensitivity. While some researchers have used the Fazzari, Hubbard and Petersen (1988) method, others have adopted the Kaplan and Zingales (1997) methodology. The first method is chosen for this dissertation because recent papers seem to be more supportive of this methodology, especially in the context of M&As like Erel, Jang and Weisbach (2015), which model I followed in this study. Additionally, Rauh (2006) and Almeida and

¹² See Moyen (2004).

Campello (2007) argue that cash flows, nonetheless affect investment, so investment-to-cash flow sensitivities can be good measures of financial constraints despite the critiques, plus the method employed by Kaplan and Zingales (1997) was too complex to complete within the designated time period of this research.

2.2 Theoretical Consideration

Irrespective of the pitfalls and other possible disadvantages of these three indirect measures of financial constraints¹³, they appear to be the most adequate for the purpose of this study. These measures are in fact used by Erel, Jang and Weisbach (2015), who analyse the effects of acquisitions of target firms on their financial constraints and determine whether after an acquisition the financial management decisions of target firms change in accordance with the notion of a less financially constrained firm. Since the purpose of this dissertation is very similar to the analysis of Erel, Jang and Weisbach (2015), their methodology is the most appropriate to follow.

It is important to realize that the previous literature concludes that after an acquisition the targets' cash holdings decrease and the sensitivities of cash and investment-to-cash flow also reduce, demonstrating that an acquirer plays a positive role in mitigating financial constraints on target firms. Their research also show that an acquirer can pursue a viable acquisition strategy by following measures of financial constraints from the finance literature. According to them, this practice allows a bidder to identify better targets and generate superior financial synergies.

¹³ Kaplan and Zingales (1997) and Cleary, Povel and Raith (2007) discussed the two major drawbacks of these models: they are not firm-specific and not time-varying.

3. Hypotheses and Methodology

This section covers the hypotheses and empirical research model adopted to determine what happens to the financial constraints of a particular private target firm both before and after being acquired. The model of Erel, Jang and Weisbach (2015) was followed since their research is very similar to the purpose of this dissertation. Their methodology acknowledges three measures capable of measuring financial constraints: level of cash holdings, cash flow sensitivity of cash and cash flow sensitivity of investment.

The first measure considered is the level of cash holdings. According to the results of Opler, Pinkowitz, Stulz and Williamson (1999), when operating cash flow turns down and outside funds are expensive - due to imperfect capital markets - firms facing financial constraints will decide to hold liquid assets in order to preserve the firm's ability to make strategic investments.

Additionally, the cash-to-cash flow sensitivity is examined. Developed by Almeida, Campello and Weisbach (2004), their study suggests that financially constrained firms will save more cash out of cash flow as they fear that they may not be able to raise funds easily in the future, while unconstrained firms do not exhibit a relation between cash flow and the tendency to save cash.

The investment-to-cash flow sensitivity is the final measure of financial constraints tested and was advanced by Fazzari, Hubbard and Petersen (1988). According to their research, variations in cash flow affect the amount of investments made by a firm, such that less constrained firms are able to undertake all desirable projects while investments made by constrained firms are driven by the cash flow they are able to generate.

While the cash flow sensitivity of investment measures the effect of constraints on today's investment, the cash flow sensitivity of cash reflects management's view as to whether the firm is likely to face financial constraints in the future (Erel et al., 2015). As discussed in the previous section, cash holdings and these two other measures are corroborated by prior finance literature and are based on observing managers own actions to address their financial needs.

3.1 Hypotheses Development

Based upon the literature discussed above, in particular Erel, Jang and Weisbach (2015), the following hypotheses were formulated:

H1: The level of cash holdings of private target firms decreases after the acquisition.

The theory suggests that the precautionary demand for holding cash in target firms is positively related to the degree to which firms are financially constrained. Therefore, when financial constraints are relieved by an acquisition we should observe that, holding other factors constant, target firms' cash holdings decrease.

H2: Post-acquisition, private targets should exhibit a lower cash-to-cash flow sensitivity.

In accordance with prior literature, there is a link between financial constraints and the change in the cash flow sensitivity of cash, i.e., constrained firms should save cash from incremental cash flows so that future investments can be financed. Therefore, after an acquisition we should observe a reduction in the cash flow sensitivity of cash of private targets reflecting changes in financial constraints occurring at that time.

H3: Post-acquisition, private targets should exhibit weaker investment-to-cash flow sensitivity.

According to the theory, the amount of investments undertaken by a financially constrained firm will be driven by the cash flow it generates, i.e., when there are financial constraints, an increase in firms' cash flow sensitivity of investment will allow it to undertake more projects. Therefore, after an acquisition we should observe a reduction between target firm's investment and its cash flow if the firms' financial constraints are eased.

3.2 Methodology and Variables Specification

In order to determine whether firms' financial constraints change when private targets are acquired, the following subsection describes the variables used throughout this dissertation and the empirical method to test the hypotheses.

A. The Cash Holdings of Target Firms

The first measure considered is the level of cash holdings backed by Opler, Pinkowitz, Stulz and Williamson (1999). The idea is that firms facing financial difficulties will typically hold more cash as a precaution against being short of liquid assets in the future and having to cut investments. If the demand for holding cash decreases when financial constraints are reduced by an acquisition, then firms' cash holdings should decline after they are acquired. To test this hypothesis, the quantity of cash normalized by the firm's *Total Assets* is estimated as follows:

$$Cash_{i,t} = \alpha + \beta_1 AFTER_{i,t} + \beta_2 Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

In the equation, the dependent variable $Cash_{i,t}$ is defined precisely as the quantity of cash and cash equivalents such as marketable securities over *Total Assets* for firm i in year t . Additionally, $AFTER_{i,t}$ is a binary variable that has the value of zero before the acquisition and the value of one after the acquisition.

In order to control for biases and to increase the robustness of the results, it is important to include control variables. Therefore, this dissertation also controls for factors which may influence the independent or dependent variables and hence, the outcome. In alignment with Erel, Jang and Weisbach (2015), I include two country-level controls¹⁴ - *Stock Market Capitalization to GDP_{i,t}* (gross domestic product) and *Nominal GDP Growth_{i,t}* - and seven firm-level controls - *Total Assets_{i,t}*, *Total Assets_{i,t}²*, *Cash Flow/Total Assets_{i,t}*, *ROA_{i,t}*, *Number of Employees_{i,t}*, *Sales Growth_{i,t}* and *Leverage_{i,t}* - that vary across specifications. Where *Total Assets_{i,t}* is the sum of fixed assets plus current assets. *Total Assets_{i,t}²* is the previous sum, squared. *Cash Flow/Total Assets_{i,t}* is estimated as EBIT plus depreciations and amortizations minus taxes scaled by total assets. *ROA_{i,t}* is measured as earnings before interest and taxes over total assets. *Number of Employees_{i,t}* is the total number of employees included in the firm's payroll. *Sales Growth_{i,t}* is measured as the change in sales over year $t-1$ to t . *Leverage_{i,t}* is the total debt normalized by total assets. $\varepsilon_{i,t}$ is an independent and identically distributed disturbance with zero mean. The variables mnemonics and detailed definitions can be found at the Appendix A.

¹⁴ A limitation of my research is that I could not include the country-level control *private credit by deposit money banks to GDP* used by Erel, Jang and Weisbach (2015), since the World Bank coverage of this dataset is only available between the years 1961-2014.

B. The Cash Flow Sensitivity of Cash

The second measure analysed is the cash-to-cash flow sensitivity. To estimate this, Erel, Jang and Weisbach (2015) followed the methodology of Almeida, Campello and Weisbach (2004) which suggests that financial constraints are related to a firm's propensity to save cash out of cash flows to finance future investments. Therefore, the change in the cash flow sensitivity of cash around the time of the acquisition should reflect changes in financial constraints occurring at that time¹⁵. Following Erel, Jang and Weisbach (2015), the change in the cash flow sensitivity of cash at the time of the acquisition can be determined in a similar way to the equation in cash holdings, with some minor changes:

$$\begin{aligned} \Delta \text{Cash Holdings}_{i,t} = & \alpha + \beta_1 \text{AFTER}_{i,t} + \beta_2 * \text{Cash Flow}_{i,t} & (2) \\ & + \beta_3 * \text{Cash Flow}_{i,t} * \text{AFTER}_{i,t} + \beta_4 \text{Controls}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

In this new equation, the dependent variable $\Delta \text{Cash Holdings}_{i,t}$ is the *change in Cash Holdings* normalized by *Total Assets* for firm *i* in year *t*. Moreover, the coefficient on *Cash Flow*_{*i,t*} divided by assets represents the cash flow sensitivity of assets before the acquisition, while the sum of this coefficient and the coefficient on *Cash Flow*_{*i,t*} interacted with the *AFTER*_{*i,t*} dummy variable represents the sensitivity after the acquisition.

C. The Cash Flow Sensitivity of Investment

At last, the investment-to-cash flow sensitivity will be scrutinised. Originally proposed by Fazzari, Hubbard and Petersen (1988) the idea underlying this measure is that, if a firm is financially constrained, then the ability to undertake additional projects will depend not just on the existence of value-increasing investments, but also on the availability of internal funds. Therefore, if a firm is financially constrained we should observe a relation between the firm's investment and its cash flow¹⁶. In order to measure the cash flow sensitivity of investment, this dissertation will once more follow Erel, Jang and Weisbach (2015) using the same rule as for the cash flow sensitivity of cash, with investment as the dependent variable, which is the *Gross Investment* divided by *Total Assets*. Therefore, to test the cash flow sensitivity of investment the equation is estimated as follows:

¹⁵ Erel, Jang and Weisbach (2015).

¹⁶ Ibid.

$$\begin{aligned} \text{Gross Investment}_{i,t} = & \alpha + \beta_1 \text{AFTER}_{i,t} + \beta_2 * \text{Cash Flow}_{i,t} & (3) \\ & + \beta_3 * \text{Cash Flow}_{i,t} * \text{AFTER}_{i,t} + \beta_4 \text{Controls}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

In this study, *Gross Investment*_{*i,t*} is measured as the change in fixed assets in a year raised with the depreciation, all of which are normalized by *Total Assets* for firm *i* in year *t*. A negative value indicates that the firm did not invest, and hence, these values are excluded in the sample. This specification is followed by with Erel, Jang and Weisbach (2015) in alignment with prior studies of Becker and Sivadasan (2010) and Chung (2011).

In equations (2) and (3) the country and firm level controls are the same as in the cash holdings model, but with the difference that because of the high correlation between the variables *Cash Flow*_{*i,t*} and *ROA*_{*i,t*}, the firm level control *ROA*_{*i,t*} is replaced by the *AFTER*_{*i,t*} dummy interacted with *Cash Flow*_{*i,t*}, which represents the cash flow sensitivity of cash and the cash flow sensitivity of investment after an acquisition.

All equations are estimated using the entire panel of firm-years for which there is data both before and after the acquisition, but exclude the year of the acquisition. Furthermore, all specifications include fixed effects for the target firm to control for time invariant firm characteristics and year dummies to control for changing macroeconomic conditions. Standard errors are clustered at the firm level.

4. Data Description

4.1 Data Availability

To evaluate the impact of acquisitions on the financial constraints of target firms it is important to have access to a sample of acquisitions for which I can measure the existence of constraints prior to the deal and evaluate whether these constraints change following the acquisition; however, to construct such a sample is not straightforward.

The focus of my research are private targets since these firms face greater financial constraints and the majority of acquisitions involve private companies; additionally, the targets covered are also exclusively European because this study can only be done with companies that have data available before an acquisition and that after the deal remained as independent subsidiaries. While financial data prior to an acquisition for most European countries is available, as they require firms to report financial data publicly on an *unconsolidated basis*¹⁷, even if they are privately held or a subsidiary of another firm; conversely, it is impossible to obtain financial data for privately held firms or subsidiaries of public firms in the United States, since data on the targets before an acquisition is unavailable and following the deal it is impossible to identify financial data from only the target firms.

Up until recently, with Erel, Jang and Weisbach (2015), testing the performance of a group of target firms had not been done. These researchers were the first to examine the operating performance of target firms subsequent to an acquisition by studying European companies, which – as mentioned above - must disclose financial data for subsidiaries. Nevertheless, a key point is that the targets need to remain as an independent subsidiary¹⁸ following the acquisition.

¹⁷ Consolidated financial statements are the combined financial statements of a parent company and its subsidiaries whereas unconsolidated financial statements are the subsidiaries individual financial statements which are not included in the combined financial statements of the parent company to which it belongs.

¹⁸ Targets operate as an independent entity under the direction of the parent company and do not disappear after the acquisition.

4.2 Sample Construction

To conduct my research, I started with a sample of acquisitions selected from the Bureau van Dijk's *Zephyr* database. The acquisition data from *Zephyr* was then merged with financial information of European private target firms taken from Bureau van Dijk's *Amadeus* database.

This research relies on *Zephyr* rather than the more widely used database in the acquisition literature *SDC Platinum* because both *Zephyr* and *Amadeus* are provided by a common data vendor, Bureau Van Dyck, and therefore share the common firm identifiers (BvD ID number), making it possible to match acquisitions to financial data more accurately. In addition, accordingly to Erel, Jang and Weisbach (2015) *Zephyr's* coverage of private-firm acquisitions is better than *SDC's*. The required financial data is retrieved from *Amadeus* because it focuses mainly on private firms and is updated every year with financial information for over 21 million European companies.

The sample in this dissertation consists of announced and completed acquisitions between the period 2006-2015, where each firm has a maximum of 10 observations, one per year, since *Amadeus* is structured that way. To allow an acquisition to have financial information for at least one year before and after the deal, the sample is restricted to those acquisitions occurring between 2007 and 2014.

To control for the potential influence of outliers that could lead to biased outcomes, Cleary (1999) and George, Kabir and Qian (2011) winsorize data above (under) a maximum (minimum). Winsorizing data means to replace the extreme values of a dataset with a certain percentile value from each end. According to these authors it is a standard procedure on financial constraints; therefore, to reduce the effect of outliers in the dataset, I follow the same procedure and winsorize all firm-level variables at the top and bottom 1% of the distribution. In order to measure the true change of the variables it is necessary to adjust for the effects of price inflation; therefore, all non-ratio accounting variables in dollars were adjusted for constant prices using the US Consumer Price Index based on 2015 prices obtained from the World Bank database.

Furthermore, deals were selected based on the following requirements: **(i)** only include deals with a known value (including estimates); **(ii)** the acquirers can either be public or private; **(iii)** there are no restrictions regarding the acquirers' nationality; **(iv)** target firms

remain as an independent subsidiary following the acquisition; **(v)** financial and accounting data are available for the targets; **(vi)** firms without data on *Fixed Assets* for at least one year before and after the acquisition were dropped; **(vii)** target firms need to be from countries with at least 10 acquisition targets during the sample period **(viii)** firms with asset size less than \$1 million are excluded; **(ix)** deals where the firms have less than 10 employees are not included in the sample **(x)** only transactions by means of either share exchange, cash or a mix of both are studied **(xi)** deals where the target is a financial firm, as well as restructurings, privatizations, leveraged buyouts, and exists from private equity deals are not allowed in the sample because of differences in accounting and filling requirements; **(xii)** only acquisitions where acquirers gained more than 50% of the target's capital, and that before the acquisition owned less than 50% of the targets' capital are taken into account **(xiii)** exclude deals where the target was re-sold during the sample period and finally **(xiv)** eliminate observations with negative *Total Assets* to exclude companies with negative equity and technical bankruptcy. After cleaning the dataset, I end up with a sample consisting of 2,274 deals with targets from 22 European countries.

All summary statistics and regression estimations presented in the following section are calculated using data from *unconsolidated* statements for the targets. To ensure the financial data reports only the target firms I used the Consolidation Code provided by *Amadeus* to include financial statements with the codes U1 and U2, excluding codes C1 and C2 (Consolidated Statements), LF (Limited Financial), NRF (No Recent Financial) and NRLF (No Recent Limited Financial).

Finally, all models only include target firms with data on *Cash Flow* for at least five years before and after an acquisition, without excluding targets that are acquired less than five years from the beginning or the end of the sample period. This ensures that if there is an observation within the period of five years before or after an acquisition, it will contain data on *Cash Flow*, e.g., a target acquired in 2007 will have cash flows on at least one year prior and five years after the deal, while a target acquired in 2014 will have data for at least five years before and one after the deal is completed. This restriction (named five-year restriction for future reference) is included because a considerable amount of *Cash Flow* data was missing, affecting my results and therefore it now ensures that all targets have at least six observations on cash flows, equally justifying the usage of target-firm fixed effects.

5. Empirical Results and Discussion

In this section are displayed the results obtained on whether acquirers release private targets' financial constraints. First, the characteristics of acquisitions and summary statistics for the accounting variables of the target firms are presented, and finally the estimates of equations predicting the impact of the acquisitions on the financial constraints of private firms are reported.

5.1 Summary Statistics

This subsection presents the descriptive statistics on the acquisition sample over time and on the accounting variables of the target firms before and after the deal completion.

Table 1 - Statistics on the Acquisition Sample

This table presents statistics on the acquisition sample of European private targets from 2007 to 2014 reported by the *Zephyr* database, with at least one year of firm-level data available (in *Amadeus*) before and after the acquisition. The characteristics of acquisitions are tabulated by deal completion year. The *Total Assets* of target firms are computed as the averages of the last two available years before the acquisition. Variables are winsorized at 1% and 99% of the distribution. All variables are defined in Appendix A.

Deal Completion Year	No. Of Deals	Target's Total Assets before the Acquisition (USD Million)	
		Mean	Median
2007	278	131.668	17.797
2008	293	129.470	15.297
2009	247	172.179	23.001
2010	297	106.888	14.603
2011	231	142.779	24.192
2012	256	148.378	17.855
2013	325	151.879	13.473
2014	347	213.344	15.641
Total	2274	150.910	16.692

Table 1 exhibits the characteristics of acquisitions tabulated by deal completion year with target firms' total assets computed as the averages of the last two available years before the acquisition. Deals are relatively large with a median target asset size of roughly \$16.7 million. Further, the size distribution is skewed, with a mean asset size of about \$150.9 million, more than nine times the median. The number of deals increases over the last two years and the average deal size is larger in the later years of the sample, with a mean of \$213.3 million in 2014 compared to \$131.7 million in 2007; which is in line with data from Thomson Reuters who claim that 2015 was the biggest year ever for M&A activity. The data pattern suggest that several big firms started having problems over time in the post-crisis period, so that larger deals are included (although I do not analyse this aspect).

Table 2 - Summary Statistics on the Accounting Variables of the Targets

This table displays summary statistics for the accounting variables of the targets as averages of the last two available years before (Panel A) and first two after the acquisition (Panel B). All financial data are from Amadeus. *Total Assets* are in USD million. The univariate differences between panels A and B are based on the tests of differences in means (t-statistics) and medians (Wilcoxon rank-sum z-statistics) and are presented in Panel C. Variables are winsorized at 1% and 99% of the distribution. All variables are defined in Appendix A. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A - Before the Acquisition

	Before			
	Obs.	Mean	SD	Median
<i>Total Assets (USD million)</i>	2274	150.910	517.564	16.692
<i>Number of Employees</i>	2274	368.650	966.584	83.000
<i>Cash/Total Assets</i>	2245	0.126	0.164	0.061
<i>Gross Investment/Total Assets</i>	1425	0.087	0.135	0.053
<i>Cash Flow/Total Assets</i>	1485	0.038	0.292	0.066
<i>ROA</i>	1734	0.013	0.315	0.069
<i>Sales Growth</i>	1024	0.529	1.422	0.124
<i>Leverage</i>	2068	0.626	0.345	0.618

Panel B - After the Acquisition

	After			
	Obs.	Mean	SD	Median
<i>Total Assets (USD million)</i>	2274	160.677	540.111	19.442
<i>Number of Employees</i>	2274	369.621	929.928	92.750
<i>Cash/Total Assets</i>	2229	0.111	0.152	0.049
<i>Gross Investment/Total Assets</i>	1735	0.042	0.128	0.027
<i>Cash Flow/Total Assets</i>	1497	0.052	0.234	0.064
<i>ROA</i>	1741	0.000	0.300	0.055
<i>Sales Growth</i>	1272	0.164	0.850	0.007
<i>Leverage</i>	2035	0.603	0.379	0.567

Panel C - Test of Differences

	Differences in Means (p-value)	Differences in Medians (p-value)
<i>Total Assets</i>	9.766 (-0.623)	2.750 *** (-2.801)
<i>Number of Employees</i>	0.971 (-0.035)	9.75 *** (-2.953)
<i>Cash/Total Assets</i>	-0.015 *** (3.186)	-0.012 *** (3.044)
<i>Gross Investment/Total Assets</i>	-0.045 *** (9.588)	-0.026 *** (9.630)
<i>Cash Flow/Total Assets</i>	0.014 (-1.470)	-0.002 (-0.143)
<i>ROA</i>	-0.013 (1.233)	-0.014 *** (3.071)
<i>Sales Growth</i>	-0.365 *** (7.623)	-0.117 *** (11.640)
<i>Leverage</i>	-0.023 ** (2.031)	-0.052 *** (3.983)

Table 2 shows the univariate results for the differences in accounting variables of the targets as averages of the last two available years before (Panel A) and first two after the acquisition (Panel B). I use parametric t-statistics (to test the means) and non-parametric Wilcoxon rank-sum z-statistics (to test the medians) to see if the difference between the two periods is significant. In Panel C, most accounting variables (apart from *Total Assets* and *Number of Employees*) decline following the deals, as both the mean and the median are significantly higher over the two years prior to the acquisition when compared with the same period after. The mean of target firms' cash holdings drops from 13% to 11% while firms' investment decreased 4.5pp after the event. Interestingly, the firm-level variable cash flow-to-asset ratio does not vary.

Nevertheless, it is difficult to draw inferences from these tables. To evaluate whether targets' financial constraints change when they are acquired it is important to hold firm composition constant over time and control for other factors statistically.

5.2 Analysis of the Results

To evaluate whether private targets' financial constraints change when they are acquired, this subsection displays the outcomes obtained with the estimation of the multivariate models described in the third section. To allow a comparison with the study of Erel, Jang and Weisbach (2015) all estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level¹⁹.

Table 3 exhibits the estimates of the first policy considered: the level of cash holdings. In column (1), only *Total Assets* and *Total Assets squared* are included as firm-level variables, since some financial variables are missing due to differences in reporting requirements between countries. In column (2), firm's *Cash Flow to Total Assets* is added. Column (3) includes *ROA* but not *Cash Flow* since these variables are highly correlated. Finally, in column (4) the *Number of Employees*, *Leverage*, and *Sales Growth*, which potentially could be related to the firm's growth opportunities are added as controls. The number of observations declines substantially in the final specification because data on some items are missing for some firms. The coefficient on the *AFTER* dummy variable represents the cash holdings after an acquisition and it is not statistically different from zero across the different specifications. The estimates are consistent with the view that target firms do not reduce their cash-to-asset ratio, meaning that financial constraints are not relieved following the acquisitions.

According to the literature, the demand for holding cash decreases when financially constrained firms are acquired. Therefore, if financial constraints are relieved by an acquisition we should observe that target firms' cash holdings decrease. However, I find no evidence that this is the case for my sample of European private targets.

¹⁹ The estimates are also similar if we exclude target-firm fixed effects and/or include target-industry, country and year fixed effects, clustering for target-country and year. These results are presented in Appendix B.

Table 3 - The Impact of Acquisitions on the Cash Holdings of Private Target Firms

This table presents the results of equations predicting private targets' *Cash Holdings* normalized by *Total Assets*. *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0045 (0.60)	0.0043 (0.57)	0.0040 (0.54)	0.0024 (0.30)
<i>Ln (Total Assets)_t</i>	-0.0277 (-1.44)	-0.0135 (-0.76)	-0.0146 (-0.83)	-0.0145 (-0.71)
<i>Ln (Total Assets)_t²</i>	-0.0005 (-0.20)	-0.0021 (-0.98)	-0.0022 (-1.01)	-0.0002 (-0.07)
<i>Cash Flow/Total Assets_t</i>		-0.0200 (-1.34)		-0.0265* (-1.69)
<i>ROA_t</i>			0.0364* (1.76)	
<i>Ln (Number of Employees)_t</i>				-0.0023 (-0.30)
<i>Sales Growth_t</i>				0.0039 (1.48)
<i>Leverage_t</i>				-0.0611*** (-3.92)
<i>Market Cap/GDP_t</i>	0.0005** (2.35)	0.0005** (2.50)	0.0005** (2.31)	0.0004* (1.85)
<i>GDP Growth_t</i>	0.0023* (1.77)	0.0024* (1.82)	0.0021* (1.67)	0.0020 (1.43)
Constant	0.1067** (2.03)	0.0765 (1.54)	0.0771 (1.56)	0.1102* (1.86)
Observations	3,921	3,896	3,906	2,824
R ²	0.667	0.668	0.667	0.696
Adjusted R ²	0.607	0.608	0.606	0.637

Table 4 shows estimates of equations in which the dependent variables are the *change in Cash Holdings over Total Assets* in columns (1) through (2), and *Gross Investment normalized by Total Assets* in column (3) and (4). In columns (1) and (3) the firm-level controls included are *Total Assets*, *Total Assets squared* and *Cash Flow to Total Assets* while in columns (2) and (4) the controls *Number of Employees*, *Leverage*, and *Sales Growth* are added. Across all specifications the coefficient on *Cash Flow* normalized by *Total Assets* represents the sensitivities before an acquisition, while its interaction with the *AFTER* dummy variable represents the changes in the sensitivities subsequent to acquisitions. If we look at columns (1) and (2) the coefficient on *Cash Flow* is positive and statistically significant between 0.6404 and 0.8110, suggesting that prior to the acquisitions targets were financially constrained. Yet, in both last specifications, column (3) and column (4), the coefficient is not statistically significant. Conversely, the coefficient on *AFTER* interacted with *Cash Flow* in column (1) increases about 24.54pp indicating that the cash flow sensitivity of cash increased following the acquisition but when all firm-level variables are considered in the regression, column (2), the results are not statistically different from zero. The same happens in columns (3) and (4) for the cash flow sensitivity of investment.

Altogether, the overall result on the cash flow sensitivity of cash and investment suggest that target firms appear to remain financially constrained after the deal. However, prior to being acquired their status is not as straightforward. While the cash flow sensitivity of cash clearly indicates that targets were financially constrained before the acquisitions, the cash flow sensitivity of investment suggests otherwise. To confirm whether the targets under the cash flow sensitivity of investment were financially restricted prior to the deals or not, I conducted an additional test which is displayed in the following subsection.

The existing literature describes that constrained firms save less cash from incremental cash flows after an acquisition as a result of becoming less financially constrained. Therefore, if financial constraints are relieved by an acquisition we should observe a reduction in the cash flow sensitivity of cash holdings of private targets. Further theory suggests that the amount of investments undertaken by a financially constrained firm is driven by the cash flow it generates. Accordingly, if an acquisition mitigates firms' financial constraints, we should observe a reduction between target firm's investment and its cash flow. However, in both situations the literature is not verified.

Table 4 - The Impact of Acquisitions on the Cash-to-Cash Flow and Investment-to-Cash Flow Sensitivities of Private Target Firms

This table displays the results of equations predicting private targets' cash-to-cash flow sensitivity ($\Delta \text{Cash}/\text{Total Assets}$) in columns (1) through (2) and investment-to-cash flow sensitivity ($\text{Gross Investment}/\text{Total Assets}$) in columns (3) and (4). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. The coefficient on *Cash Flow* interacted with the *AFTER* dummy variable represents changes in the sensitivities after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta \text{Cash}/\text{Total Assets}$		$\text{Gross Investment}/\text{Total Assets}$	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0256 (-1.28)	-0.0091 (-0.48)	0.0036 (0.36)	0.0053 (0.49)
<i>Cash Flow/Total Assets</i> _{<i>t</i>}	0.6404*** (5.27)	0.8110*** (7.04)	-0.0134 (-0.40)	0.0062 (0.16)
<i>AFTER</i> x <i>Cash Flow</i> _{<i>t</i>}	0.2454* (1.84)	0.1327 (1.02)	0.0183 (0.43)	-0.0172 (-0.40)
$\ln(\text{Total Assets})_t$	-0.0363 (-0.46)	-0.0821 (-1.27)	0.0478** (2.36)	0.0343 (1.43)
$\ln(\text{Total Assets})^2_t$	0.0030 (0.23)	0.0120 (1.61)	0.0007 (0.24)	0.0034 (1.24)
$\ln(\text{Number of Employees})_t$		0.0084 (0.60)		-0.0215** (-2.06)
<i>Sales Growth</i> _{<i>t</i>}		-0.0001 (-0.01)		0.0137*** (3.00)
<i>Leverage</i> _{<i>t</i>}		-0.0348 (-0.87)		-0.0136 (-0.53)
<i>Market Cap/GDP</i> _{<i>t</i>}	-0.0002 (-0.36)	-0.0000 (-0.01)	0.0004 (1.02)	0.0006 (1.50)
<i>GDP Growth</i> _{<i>t</i>}	0.0034 (1.35)	0.0047* (1.67)	0.0052*** (2.60)	0.0034 (1.48)
Constant	0.0362 (0.23)	-0.0338 (-0.18)	-0.2133*** (-4.01)	-0.2233*** (-3.16)
Observations	3,329	2,822	3,350	2,835
R ²	0.428	0.479	0.380	0.381
Adjusted R ²	0.303	0.377	0.245	0.260

In summary, the results of Tables 3 and 4 are in accordance, implying that acquisitions do not relieve private targets' financial constraints since both results suggest that the target firms remained the same following the completion of the deals²⁰. However, these multivariate results contradict the pattern suggested by the univariate comparisons in Table 2, that is cash holdings and gross investment-to-asset ratio decline after a target is purchased. The multivariate results also do not confirm the results of the study of Erel, Jang and Weisbach (2015). As mentioned previously, the main difference from my approach and the previous literature, is that I exclusively study privately held targets, as a result, one possible explanation for these findings is that there is difference between the acquisition of public and private targets. The analysis of these results should also take into account that when studying private firms, their *unconsolidated* financial statements might not be constructed very rigorously because they can hide and distort some of the constituents such as profits, in order to pay less taxes. Nevertheless, before advancing any conclusions it would be interesting to explore additional predictions.

5.3 Additional Analysis

This subsection displays additional tests conducted on target firms' cash holdings, sensitivity of cash-to-cash flow, and the sensitivity of investment-to-cash flow between subsamples with hypothetical different levels of financial constraints. Tests on prior financial constraints are first presented followed by within-sample comparisons.

5.3.1 Prior Financial Constraints

As discussed previously, the results on the cash flow sensitivity of investment suggest that target firms were not financially constrained before the acquisitions; therefore, one could argue that following the acquisitions nothing changes because the targets were not financially constrained in the first place; hence, to refute this argument, I conduct an additional test where the full sample is narrowed into a pre-acquisition sample and then divided into two mutually exclusive groups using the KZ Index. Firms are classified by the outcome of this index as constrained (KZ above the median) and not constrained (KZ below the median). Thereafter, I re-estimate the cash flow sensitivity of investment main regression for the two subsamples separately. The idea is to test whether for the

²⁰ I also estimated these equations using an alternative definition of cash flow computed using net income plus depreciations and amortizations. The results are similar to these reported here and are presented in Appendix C.

subsample of targets with higher KZ before the acquisitions (constrained firms), the situation on the financial constraints is the same as in the main regressions.

The KZ Index, employing the methodology of Lamont, Polk and Saá-Requejo (2001) is calculated as follows:

$$KZ_{i,t} = -1.001909 \frac{CF_{i,t}}{K_{i,t-1}} + 0.2826389 Q_{i,t} + 3.139193 \frac{B_{i,t}}{TK_{i,t}} - 39.3678 \frac{D_{i,t}}{K_{i,t-1}} - 1.314759 \frac{C_{i,t}}{K_{i,t-1}} \quad (4)$$

where $CF_{i,t}$ is cash flow defined as EBIT plus depreciations and amortizations minus taxes, $K_{i,t-1}$ refers to lagged property, plant and equipment, $B_{i,t}$ is the sum of long-term debt and short-term loans, $TK_{i,t}$ is total capital which comprises long-term debt, short-term loans and total shareholder's funds, $D_{i,t}$ refers to total dividends, $C_{i,t}$ to cash holdings, $Q_{i,t}$ is the Tobin Q, i refers to time dimension, t refers to cross-sectional dimension.

The construction of the KZ Index is usually done for public and listed companies because it comprises data only available to these types of firms. Nevertheless, despite working with private targets for which several variables were missing, I proxied the missing variables for the KZ Index using the approach of Koráb and Pomenková (2014). According to this working paper, the data to which I do not have access, namely *PP&E*, *Dividends* and *Tobin Q*, can be approximated. *PP&E* is measured through tangible fixed assets and *Dividends* always takes the value 0 since I work with unlisted firms which do not pay dividends. Finally, *Tobin Q* is typically defined as the market value of the firm over the book value of its assets; however, as the firms in my sample are privately held, I am unable to assess their market value. Accordingly, following other authors such as Konings, Rizov and Vandebusschedet (2003), Bakucs, Ferto and Fogarasi (2009), Guariglia and Mateut (2010) and Behr, Norden, and Noth (2013), the Tobin Q is proxied using sales growth.

Table 5 exhibits the results of the estimations of the cash flow sensitivity of investment on the two mutually exclusive groups based on the KZ Index. The results for the groups of financially constrained ("C") firms are presented in columns (1) through (2) and in columns (3) and (4) are the results for the unconstrained ("U") firms. We can see that in columns (1) and (2) the estimates are similar to those presented previously. The interaction of the coefficient on *Cash Flow with the AFTER* dummy variable is not statistically different from zero. Thence, I confirm the outcome from the main regressions on the cash flow sensitivity of investment and that my conclusions are robust.

Table 5 - Pre-Acquisition Investment-to-Cash Flow Sensitivity across Financially Constrained (Unconstrained) Private Target Firms

This table displays the results of equations predicting private targets' investment-to-cash flow sensitivity ($Gross\ Investment/Total\ Assets$) for the groups of financially constrained ("C") and unconstrained ("U") firms. The sample is narrowed into a pre-acquisition sample and then divided into two mutually exclusive groups using the KZ Index. Columns (1) through (2) exhibit the results for the constrained firms (KZ above the median) and columns (3) and (4) show the results for the not constrained firms (KZ below the median). All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Constrained (C)		Unconstrained (U)	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0014 (-0.12)	0.0010 (0.09)	0.0181 (1.35)	0.0138 (0.93)
<i>Cash Flow/Total Assets_t</i>	-0.0563** (-2.02)	-0.0201 (-0.68)	0.0190 (0.74)	0.0035 (0.10)
<i>AFTER x Cash Flow_t</i>	0.0063 (0.22)	-0.0260 (-0.77)	0.0272 (0.69)	0.0317 (0.63)
<i>Ln (Total Assets)_t</i>	0.0342 (1.50)	0.0106 (0.42)	0.0352** (2.00)	0.0505* (1.86)
<i>Ln (Total Assets)_t²</i>	0.0025 (0.79)	0.0070** (2.19)	-0.0009 (-0.30)	-0.0012 (-0.34)
<i>Ln (Number of Employees)_t</i>		-0.0139 (-1.15)		-0.0279* (-1.95)
<i>Sales Growth_t</i>		0.0087* (1.82)		0.0068 (1.10)
<i>Leverage_t</i>		-0.0252 (-1.14)		-0.0679** (-2.22)
<i>Market Cap/GDP_t</i>	0.0009* (1.83)	0.0005 (1.01)	0.0010** (2.00)	0.0013** (2.48)
<i>GDP Growth_t</i>	0.0026 (0.90)	0.0011 (0.39)	0.0050* (1.84)	0.0044 (1.42)
Constant	-0.3240*** (-5.42)	-0.1876** (-2.24)	-0.3591*** (-3.91)	0.1077* (1.72)
Observations	2,255	2,070	1,885	1,691
R ²	0.457	0.482	0.363	0.376
Adjusted R ²	0.338	0.355	0.221	0.216

5.3.2 Within-Sample Comparisons

Up until now, the estimates suggest that acquisitions do not affect target firms' cash holdings, sensitivity of cash holdings-to-cash flow, and the sensitivity of investment-to-cash flow. These findings imply that targets remain financially constrained following the acquisitions. However, to get a clearer picture of the impact of the acquisitions on the financial constraints of target firms it would be interesting to explore the structure of target firms' cash flows, since firms with worse financial health can influence the outcome, as we could expect that in these circumstances, acquisitions display a weaker reduction in targets' financial constraints. Additionally, a potential concern arises if the acquiring company combines some of its assets with those of the target firm, making it difficult to correctly trace target firm's assets after the firm is acquired. I evaluate these possibilities in the following propositions.

A. Target-Firm Cash Flow

Here I analyse the structure of target firms' cash flows by dividing the sample into terciles based on the size of the target firm cash flow and re-estimating the equations for the bottom and top terciles. The intuition is that following the post-crisis period of 2008, firms might be in sufficiently bad shape, as they were pushed into financial distress and could not even make the essential savings and investments; accordingly, we could expect that acquisitions display a weaker reduction in targets' financial constraints. Moreover, the processing of the data when working with more negative cash flow observations can be less effective than when evaluating companies with better financial health; therefore, the sensitivities might not work the way they were expected to. To evaluate this, I re-estimate the main equations from earlier tables (using the same specifications) on subsamples based on target firm cash flow size, as measured by the average *Cash Flow* over the last two years immediately prior to the acquisition.

Panel A and B of Table 6 exhibit the results of the equations predicting private targets' cash holdings on subsamples based on target firm cash flow size. On Panel A, we have the subsample on the smaller cash flows while on Panel B we have the top tercile of cash flows. For both panels, the coefficients on the *AFTER* dummy variable (which represents the cash holdings after the acquisitions) are not statistically different from zero across all the different specifications. The estimations are consistent with target firms not reducing their cash holdings, meaning that financial constraints are not relieved subsequent to the acquisitions.

Table 6 - Subsample of Target Firm Cash Flow: The Impact of Acquisitions on the Cash Holdings of Target Firms

This table presents the results of equations from Table 3 for subsamples based on target firm cash flow size. The sample of acquisitions is divided into terciles based on the size of the target firm cash flow (calculated as the average *Cash Flow* of the last two available years). Panel A examines the subsample of the smaller cash flows (Bottom 1/3) while Panel B analyses the larger cash flows (Top 1/3). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A

Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0060 (0.45)	0.0063 (0.46)	0.0047 (0.35)	0.0063 (0.43)
<i>Ln (Total Assets)_t</i>	-0.0114 (-0.51)	-0.0083 (-0.34)	-0.0070 (-0.29)	-0.0239 (-0.94)
<i>Ln (Total Assets)_t²</i>	-0.0038 (-1.03)	-0.0041 (-1.00)	-0.0048 (-1.22)	-0.0013 (-0.34)
<i>Cash Flow/Total Assets_t</i>		-0.0113 (-0.61)		-0.0136 (-0.81)
<i>ROA_t</i>			0.0241 (1.17)	
<i>Ln (Number of Employees)_t</i>				-0.0052 (-0.50)
<i>Sales Growth_t</i>				0.0054* (1.68)
<i>Leverage_t</i>				-0.0742*** (-3.74)
<i>Market Cap/GDP_t</i>	0.0009* (1.97)	0.0010** (2.31)	0.0009** (2.02)	0.0007 (1.37)
<i>GDP Growth_t</i>	0.0042* (1.88)	0.0043* (1.84)	0.0039* (1.73)	0.0024 (0.89)
Constant	0.0068 (0.10)	0.3553*** (5.76)	-0.0672 (-1.06)	0.1845*** (2.84)
Observations	1,372	1,358	1,364	964
R ²	0.617	0.618	0.618	0.669
Adjusted R ²	0.548	0.548	0.549	0.593

Panel B				
Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0071 (-0.75)	-0.0078 (-0.82)	-0.0069 (-0.74)	0.0001 (0.01)
<i>Ln (Total Assets)_t</i>	-0.1110* (-1.89)	-0.1097** (-2.08)	-0.1101* (-1.84)	0.0183 (0.35)
<i>Ln (Total Assets)_t²</i>	0.0079 (1.56)	0.0079* (1.65)	0.0078 (1.51)	-0.0024 (-0.53)
<i>Cash Flow/Total Assets_t</i>		-0.0438* (-1.71)		-0.0141 (-0.66)
<i>ROA_t</i>			0.0096 (0.18)	
<i>Ln (Number of Employees)_t</i>				0.0054 (0.68)
<i>Sales Growth_t</i>				0.0042 (0.99)
<i>Leverage_t</i>				0.0070 (0.27)
<i>Market Cap/GDP_t</i>	0.0002 (0.66)	0.0001 (0.41)	0.0002 (0.65)	0.0002 (0.80)
<i>GDP Growth_t</i>	0.0014 (0.98)	0.0013 (0.85)	0.0014 (0.97)	0.0030* (1.96)
Constant	0.3453** (2.09)	0.3539** (2.40)	0.3414** (2.02)	-0.0834 (-0.58)
Observations	1,304	1,301	1,302	989
R ²	0.754	0.755	0.753	0.751
Adjusted R ²	0.708	0.708	0.706	0.701

Panel A and B of Table 7 show the results of equations predicting private targets' cash-to-cash flow sensitivity in columns (1) through (2) and investment-to-cash flow sensitivity in columns (3) and (4). On Panel A, the coefficient on *Cash Flow* normalized by *Total Assets* is positive and statistically significant between 0.5524 and 0.6692 in columns (1) and (2), indicating that prior to the acquisitions targets were financially constrained. On the contrary, the coefficients are not statistically significant in columns (3) and (4). Observing the interaction of the coefficient *Cash Flow* with the *AFTER* dummy variable (which represents the sensitivities after the acquisitions) it can be seen that in column (1) it had a statistically significant increase of about 29.59pp, while across the rest of the specifications, the coefficients are not statistically different from zero. Conversely, on Panel B the coefficient indicating the sensitivities before an acquisition is positive and statistically significant between 0.7923 and 1.2265 in columns (1) and (2), while in

column (3) it decreased around 14.80pp, and in column (4) is not statistically significant. Meanwhile, the coefficient representing the changes in the sensitivities subsequent to acquisitions (*AFTER x Cash Flow*) is not statistically different from zero across all the specifications, indicating that the sensitivities did not change following the deals. The statistics on the cash flow sensitivity of cash and investment, suggest that target firms remain financially unchanged after the deal.

In synthesis, we can infer from the overall results that acquisitions do not relieve any pre-existing financial constraints of private target firms. I suggested that the issue of acquirers relieving targets' financial constraints would be less apparent for targets with more negative cash flows when compared to firms with better financial health, but I conclude that the results in both panels are similar and the conclusions are robust. The processing of the data is not less effective when evaluating companies with worse financial health.

Table 7 - Subsample of Target Firm Cash Flow: The Impact of Acquisitions on the Cash-to-Cash Flow and Investment-to-Cash Flow Sensitivities of Target Firms

This table displays the results of equations from Table 4 for subsamples based on target firm cash flow size. The sample of acquisitions is divided into terciles based on the size of the target firm cash flow (calculated as the average *Cash Flow* of the last two available years). Panel A examines the subsample of the smaller cash flows (Bottom 1/3) while Panel B analyses the larger cash flows (Top 1/3). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Δ Cash/Total Assets		Gross Investment/ Total Assets	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0197 (-0.56)	-0.0038 (-0.12)	-0.0126 (-0.64)	-0.0105 (-0.48)
<i>Cash Flow/Total Assets</i> _{<i>t</i>}	0.5524*** (4.12)	0.6692*** (4.05)	-0.0282 (-0.93)	-0.0220 (-0.66)
<i>AFTER</i> x <i>Cash Flow</i> _{<i>t</i>}	0.2959** (2.02)	0.2343 (1.34)	0.0238 (0.52)	0.0000 (0.00)
<i>Ln (Total Assets)</i> _{<i>t</i>}	-0.0919 (-1.38)	-0.1111 (-1.40)	0.0359 (1.28)	0.0317 (0.89)
<i>Ln (Total Assets)</i> ² _{<i>t</i>}	0.0090 (1.04)	0.0110 (1.04)	0.0064 (1.42)	0.0057 (1.15)
<i>Ln (Number of Employees)</i> _{<i>t</i>}		-0.0075 (-0.23)		-0.0130 (-0.75)
<i>Sales Growth</i> _{<i>t</i>}		0.0116 (0.86)		0.0137** (2.20)
<i>Leverage</i> _{<i>t</i>}		-0.0623 (-1.06)		0.0160 (0.46)
<i>Market Cap/GDP</i> _{<i>t</i>}	-0.0009 (-0.79)	-0.0007 (-0.67)	0.0005 (0.74)	0.0011 (1.37)
<i>GDP Growth</i> _{<i>t</i>}	0.0067 (1.34)	0.0070 (1.27)	0.0075** (2.10)	0.0064 (1.47)
Constant	0.0363 (0.12)	0.1744 (0.92)	0.1263 (1.13)	-0.1392 (-1.34)
Observations	1,174	965	1,185	974
R ²	0.423	0.486	0.349	0.378
Adjusted R ²	0.297	0.368	0.207	0.235

	Δ Cash/Total Assets		Gross Investment/ Total Assets	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0250 (-0.69)	0.0076 (0.45)	0.0031 (0.16)	-0.0028 (-0.14)
<i>Cash Flow/Total Assets_t</i>	0.7923** (2.55)	1.2265*** (20.88)	-0.1480* (-1.91)	-0.0486 (-0.94)
<i>AFTER x Cash Flow_t</i>	0.3460 (1.19)	-0.0114 (-0.15)	0.0849 (0.88)	0.0521 (0.64)
<i>Ln (Total Assets)_t</i>	0.5815** (2.39)	0.3171** (2.21)	-0.0175 (-0.28)	-0.0754 (-1.05)
<i>Ln (Total Assets)_t²</i>	-0.0562** (-1.99)	-0.0222 (-1.62)	0.0060 (1.05)	0.0141** (2.16)
<i>Ln (Number of Employees)_t</i>		0.0101 (0.47)		-0.0396** (-2.22)
<i>Sales Growth_t</i>		-0.0083 (-1.01)		0.0069 (0.86)
<i>Leverage_t</i>		-0.0561 (-1.19)		-0.0771* (-1.71)
<i>Market Cap/GDP_t</i>	0.0009* (1.71)	0.0005 (1.18)	0.0001 (0.22)	0.0002 (0.32)
<i>GDP Growth_t</i>	-0.0007 (-0.28)	-0.0009 (-0.26)	0.0050 (1.63)	0.0013 (0.47)
Constant	-1.6543*** (-2.95)	-1.1837*** (-2.69)	-0.1207 (-0.67)	0.3175 (1.62)
Observations	1,114	988	1,117	990
R ²	0.471	0.624	0.403	0.396
Adjusted R ²	0.351	0.547	0.266	0.273

B. Changes in Target Size

Although the construction of my sample requires targets to remain an independent subsidiary following the acquisition²¹ and all estimations are based on *unconsolidated* financial data on targets (so that they do not reflect the parent firm's financials), a potential concern arises if *Amadeus* classifies a subsidiary of a new parent by the same name and identifier as a pre-acquisition firm, yet the assets of the subsidiary are different. The reasoning is that an acquiring company could combine some of its assets with those of the target firm and keep them together organizationally in a subsidiary that appears to consist of only the target firm's assets. To avoid this and ensure that the assets in the

²¹ See section 4.

subsidiaries are similar to those of the original target firm, I re-estimate the main equations on a sample that only includes targets whose *Number of Employees* or size as measured by *Total Assets* (if data on *Number of Employees* are missing) does not change more than 50%²². This change is measured by comparing the average of the last two years available prior to the acquisition to the average of the first two years available following it. Additionally, I re-estimate the equations with a stricter criterion; eliminating observations where the *Number of Employees* changes by more than 10% in the two years following the acquisition. The following tables report the equations using the same specifications as in Tables 3 and 4.

Table 8 exhibits the level of cash holdings on subsamples based on target firms whose *Number of Employees* or *Total Assets* does not change by more than 50% in Panel A or more than 10% in Panel B. As can be seen for both panels and across all the different specifications, the coefficient representing cash holdings after an acquisition (*AFTER*) is not statistically different from zero. Therefore, following the acquisitions the target firms do not lower their cash-to-asset ratio, and consequently do not have their financial constraints mitigated.

Panel A and B of Table 9 show the results for the *change in Cash Holdings over Total Assets* in columns (1) and (2), and *Gross Investment* normalized by *Total Assets* in columns (3) and (4). The coefficients representing the sensitivities before an acquisition (*Cash Flow/Total Assets*) are positive and statistically significant between 0.8436 and 0.9333 in columns (1) and (2) in Panel A and between 0.9903 and 1.0226 in columns (1) and (2) in Panel B, suggesting that prior to the acquisitions targets were financially constrained. On the contrary, the investment-to-cash flow sensitivity in columns (3) and (4) for both panels is not statistically significant. Meanwhile, the coefficient on *AFTER* interacted with *Cash Flow* (which represents the sensitivities after the acquisitions) is not statistically significant across all the different specifications in Panel A. However, when controlling for target firms whose *Number of Employees* or *Total Assets* does not change by more than 10% (Panel B), it can be seen that in column (1) the coefficient (*AFTER* x *Cash Flow*) declines 30.07pp, indicating that acquisitions do in fact release targets' financial constraints; yet all the other specifications are not statistically different from zero.

²² I find qualitatively similar results when only using firms whose number of employees or size changes by less than 100%. See Appendix D.

Table 8 - Robustness on the Sample: The Impact of Acquisitions on the Cash Holdings of Target Firms

This table presents the results of equations from Table 3 for subsamples based on target firms whose *Number of Employees* or *Total Assets* does not change by more than 50% in the two years following the acquisition in Panel A (or more than 10% in Panel B). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A				
Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0049 (0.60)	0.0050 (0.62)	0.0043 (0.52)	0.0047 (0.54)
<i>Ln (Total Assets)_t</i>	-0.0303 (-1.31)	-0.0177 (-0.89)	-0.0145 (-0.78)	-0.0276 (-1.07)
<i>Ln (Total Assets)_t²</i>	0.0009 (0.34)	-0.0006 (-0.27)	-0.0011 (-0.53)	0.0020 (0.69)
<i>Cash Flow/Total Assets_t</i>		-0.0301 (-1.50)		-0.0367* (-1.78)
<i>ROA_t</i>			0.0183 (0.68)	
<i>Ln (Number of Employees)_t</i>				-0.0033 (-0.30)
<i>Sales Growth_t</i>				0.0042 (1.27)
<i>Leverage_t</i>				-0.0794*** (-3.23)
<i>Market Cap/GDP_t</i>	0.0003* (1.82)	0.0004* (1.88)	0.0003* (1.73)	0.0004* (1.80)
<i>GDP Growth_t</i>	0.0011 (0.75)	0.0012 (0.82)	0.0011 (0.73)	0.0015 (0.92)
Constant	0.1045* (1.69)	0.0811 (1.48)	0.0727 (1.36)	0.1152 (1.51)
Observations	3,146	3,124	3,135	2,273
R ²	0.697	0.699	0.698	0.731
Adjusted R ²	0.642	0.643	0.642	0.678

Panel B				
Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0135 (1.20)	0.0126 (1.10)	0.0133 (1.17)	0.0059 (0.49)
<i>Ln (Total Assets)_t</i>	-0.0539 (-1.52)	-0.0185 (-0.47)	-0.0159 (-0.42)	-0.0080 (-0.16)
<i>Ln (Total Assets)²_t</i>	0.0028 (0.77)	-0.0013 (-0.31)	-0.0015 (-0.35)	-0.0013 (-0.22)
<i>Cash Flow/Total Assets_t</i>		-0.0213 (-0.63)		-0.0582 (-1.38)
<i>ROA_t</i>			-0.0302 (-0.72)	
<i>Ln (Number of Employees)_t</i>				0.0214 (0.72)
<i>Sales Growth_t</i>				0.0126 (1.44)
<i>Leverage_t</i>				-0.1457*** (-3.52)
<i>Market Cap/GDP_t</i>	0.0002 (0.78)	0.0002 (0.68)	0.0002 (0.73)	0.0006* (1.83)
<i>GDP Growth_t</i>	0.0017 (0.70)	0.0021 (0.86)	0.0021 (0.88)	0.0026 (1.07)
Constant	0.1771* (1.71)	0.1092 (1.01)	0.1009 (0.98)	0.0072 (0.04)
Observations	1,406	1,396	1,400	1,026
R ²	0.715	0.712	0.712	0.776
Adjusted R ²	0.662	0.658	0.658	0.728

In summary, the general outcome advocates that target firms remain financially unaltered following the acquisitions. Despite the puzzling peculiarity found in Table 9, where a reduction in the cash-to-cash flow sensitivity in the first specification is statistically different from zero, the overall results are; nonetheless, similar to those reported in Tables 3 and 4. These tests suggest that dramatic changes in the assets of target firms following the acquisitions are not an important determinant of my results.

Table 9 - Robustness on the Sample: The Impact of Acquisitions on the Cash-to-Cash Flow and Investment-to-Cash Flow Sensitivities of Target Firms

This table presents the results of equations from Table 4 for subsamples based on target firms whose *Number of Employees* or *Total Assets* does not change by more than 50% in the two years following the acquisition in Panel A (or more than 10% in Panel B). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. The coefficient on *Cash Flow* interacted with the *AFTER* dummy variable represents changes in the sensitivities after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Δ Cash/Total Assets		Gross Investment/ Total Assets	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0007 (0.03)	0.0100 (0.55)	0.0168 (1.62)	0.0174 (1.55)
<i>Cash Flow/Total Assets_t</i>	0.8436*** (7.55)	0.9333*** (10.02)	-0.0042 (-0.10)	0.0085 (0.17)
<i>AFTER x Cash Flow_t</i>	0.0229 (0.17)	0.0218 (0.19)	-0.0196 (-0.44)	-0.0447 (-0.83)
<i>Ln (Total Assets)_t</i>	-0.0682 (-1.00)	-0.0954 (-1.29)	0.0484** (2.00)	0.0414 (1.41)
<i>Ln (Total Assets)_t²</i>	0.0088 (1.20)	0.0097 (1.21)	0.0021 (0.67)	0.0021 (0.63)
<i>Ln (Number of Employees)_t</i>		0.0314 (1.63)		-0.0164 (-1.24)
<i>Sales Growth_t</i>		0.0100 (0.85)		0.0108*** (2.79)
<i>Leverage_t</i>		-0.0233 (-0.69)		-0.0317 (-1.05)
<i>Market Cap/GDP_t</i>	-0.0001 (-0.15)	-0.0002 (-0.38)	0.0003 (0.61)	0.0005 (1.12)
<i>GDP Growth_t</i>	0.0025 (1.10)	0.0027 (1.05)	0.0040* (1.73)	0.0026 (1.03)
Constant	0.0027 (0.02)	-0.0327 (-0.14)	-0.3693*** (-6.14)	-0.2447*** (-2.84)
Observations	2,667	2,272	2,684	2,283
R ²	0.461	0.515	0.395	0.400
Adjusted R ²	0.343	0.420	0.262	0.281

	Δ Cash/Total Assets		Gross Investment/ Total Assets	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0459** (2.27)	0.0392** (1.98)	0.0206* (1.75)	0.0188 (1.28)
<i>Cash Flow/Total Assets_t</i>	1.0226*** (10.93)	0.9903*** (11.94)	0.0746 (0.93)	0.0774 (0.81)
<i>AFTER x Cash Flow_t</i>	-0.3007** (-2.48)	-0.1406 (-1.19)	-0.0621 (-0.78)	-0.0982 (-0.91)
<i>Ln (Total Assets)_t</i>	-0.2133*** (-2.74)	-0.2703*** (-3.45)	0.0243 (0.64)	0.0182 (0.48)
<i>Ln (Total Assets)_t²</i>	0.0247*** (2.65)	0.0259*** (2.94)	0.0064 (1.34)	0.0063 (1.45)
<i>Ln (Number of Employees)_t</i>		0.0058 (0.22)		-0.0149 (-0.58)
<i>Sales Growth_t</i>		0.0229 (1.60)		0.0028 (0.61)
<i>Leverage_t</i>		0.0742 (1.08)		-0.0598 (-1.41)
<i>Market Cap/GDP_t</i>	0.0006 (0.81)	0.0001 (0.19)	-0.0000 (-0.01)	0.0001 (0.15)
<i>GDP Growth_t</i>	0.0043 (1.24)	0.0032 (0.83)	0.0026 (0.79)	0.0006 (0.18)
Constant	0.3019 (1.44)	0.4934** (2.03)	-0.3309*** (-3.63)	-0.0939 (-0.66)
Observations	1,185	1,021	1,194	1,026
R ²	0.476	0.551	0.422	0.448
Adjusted R ²	0.357	0.456	0.290	0.331

6. Conclusion

My research examines the extent to which targets' financial constraints are mitigated by acquisitions. In order to measure the existence of financial constraints prior to the deal and evaluate whether these constraints change following the acquisition, I use a sample with 2,274 acquisition deals of European private targets from 2006 to 2015. Following the approach of Erel, Jang and Weisbach (2015), I formulate three hypotheses based on cash holdings, cash flow sensitivity of cash and cash flow sensitivity of investment. Theory suggests that if a financially constrained firm has its financial frictions relieved after an acquisition, these factors should decrease.

Prior literature provides evidence on the relieve of financial constraints following an acquisition because of the improved combined capacity to generate cash flow internally and ability to raise capital externally, but this was not verified in this study. In my sample, I do not find evidence of target firms having any pre-existing financial constraints relieved subsequently to an acquisition, as managers do not lower their cash holdings, neither their cash holdings and investment policy becomes less sensitive to the firm's cash flows.

My findings reject all hypotheses as the firms' cash holdings, cash flow sensitivity of cash and cash flow sensitivity of investment are lower after the acquisition event, which demonstrates that any pre-existing financial constraints are not mitigated post-acquisition. The reasons why this occurred can be various.

A contrasting starting point might justify the different outcome. My sample is clearly distinct from the study of Erel, Jang and Weisbach (2015), both the sampling period and the number of deals is significantly different. Alternatively, because my sample comprises some of the years of the financial crisis, it might be possible that the acquirers may be financially constrained themselves and therefore had less ability to ease the constraints of the targets (although I did not analyse this aspect). Additionally, a closing justification for the different conclusions derives from the possible difference between the acquisition of public and private targets, as my approach exclusively studies privately held firms. The issue of financial constraints has been more widely studied for public than for private companies and for that reason, the evidence serves much more for public than for private targets because the release of financial constraints does not only involve transferring resources and money within parent and subsidiaries, but rather when companies are acquired, they are protected by the parent company and under their

surveillance they can more easily access the financial markets and financing mechanisms such as the bond market and issue their own bonds more easily. This positive externality over the acquired company is stronger for when the target is public. Therefore, it is possible that the results of Erel, Jang and Weisbach (2015) are most important in deals for which the targets are public firms because when I consider private companies, I did not find evidence of targets' financial constraints being mitigated by acquisitions.

Nonetheless, the conclusion of this research has some limitations. Apart from potential sample selection issues of using only private targets, the unbalanced structure of the number of observation before- and after- acquisition can influence somehow the results, although this was a deliberate choice as constructing a perfectly balanced panel would considerably reduce the number of observations as *Amadeus* only provides data for the last ten years. Finally, other limitation of my research is that I do not have data on firms' abilities to move cash from a local subsidiary to a foreign parent, as well as many aspects of their tax system; therefore, I cannot completely control for institutional differences in cross-border deals. Besides these limitations, my study provides interesting evidence that can be compared with the extant literature and suggests the importance of analysing private target firms separately from public targets.

This study suggests three possible avenues for further research. First, researchers could focus on developing a new measure of financial constraints more suitable to private firms. Moreover, future research should focus on what are the motivations for acquisitions of public firms versus the acquisitions of private firms. Lastly and probably most important is: in order to cope with the limitations of this study, future research could compare results from publicly listed and unlisted target companies.

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8. Appendix

Appendix A – Variable Definitions with respective *Amadeus* and *Zephyr* Mnemonics

Variable	Definition and Amadeus/Zephyr Mnemonic
Panel A: Firm-Level Variables	
<i>Total Assets</i>	Book value of assets = Fixed assets (FIAS) + Current assets (CUAS).
<i>Ln (Total Assets)</i>	Natural logarithm of total assets converted into U.S. dollars.
<i>Ln (Total Assets)²</i>	Natural logarithm of total assets squared.
<i>Number of Employees</i>	Total number of employees included in the company's payroll (EMPL).
<i>Ln (Number of Employees)</i>	Natural logarithm of number of employees.
<i>Cash Flow</i>	EBIT(OPPL) + Depreciation & Amortization (DEPR) – Taxes (TAXA).
<i>Cash/Total Assets</i>	Cash and cash equivalents (CASH)/Total assets.
<i>Gross Investment/Total Assets</i>	[Fixed assets – lagged fixed assets + Depreciation (DEPRE)]/Total assets.
<i>Cash Flow/Total Assets</i>	Cash flow /Total assets.
Δ (<i>Cash/Total Assets</i>)	Cash flow/Total assets – lagged (Cash flow/Total assets).
<i>ROA</i>	EBITDA(EBTA)/Total assets.
<i>Sales Growth</i>	(Sales (TURN) – Lagged Sales)/Lagged Sales.
<i>Leverage</i>	[Long-term debt (LTDB) + Current liabilities (CULI)]/Total assets.
Panel B: Country-Level Variables	
<i>GDP Growth</i>	Annual percentage nominal growth rate of GDP in local currencies. (Source: World Bank)
<i>Market Cap/GDP</i>	Value of listed shares to GDP. (Source: World Bank)

Appendix B – Additional Tests: Target-industry, country and year fixed effects with standard errors clustered for target-country and year.

Table 10 - The Impact of Acquisitions on the Cash Holdings of Private Target Firms

This table presents the results of equations predicting private targets' *Cash Holdings* normalized by *Total Assets*. *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-industry, country and year fixed effects and standard errors are corrected for clustering of observations at the target-country and year level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0024 (-0.53)	-0.0027 (-0.59)	-0.0009 (-0.19)	-0.0058 (-1.31)
<i>Ln (Total Assets)_t</i>	-0.0292*** (-6.96)	-0.0253*** (-6.22)	-0.0253*** (-6.46)	-0.0287*** (-7.17)
<i>Ln (Total Assets)_t²</i>	0.0019*** (4.15)	0.0014*** (3.43)	0.0014*** (3.48)	0.0018*** (4.68)
<i>Cash Flow/Total Assets_t</i>		0.0061 (0.50)		-0.0198 (-1.46)
<i>ROA_t</i>			0.0514*** (2.96)	
<i>Ln (Number of Employees)_t</i>				0.0035* (1.67)
<i>Sales Growth_t</i>				0.0044 (1.52)
<i>Leverage_t</i>				-0.0815*** (-10.61)
<i>Market Cap/GDP_t</i>	0.0004** (2.41)	0.0004** (2.43)	0.0003** (2.08)	0.0003 (1.05)
<i>GDP Growth_t</i>	0.0019** (2.41)	0.0020** (2.58)	0.0017** (2.12)	0.0016** (2.21)
Constant	0.1247*** (4.16)	0.1157*** (3.89)	0.1125*** (3.87)	0.2129*** (6.48)
Observations	3,921	3,896	3,906	2,824
R ²	0.220	0.218	0.221	0.275
Adjusted R ²	0.203	0.200	0.203	0.253

Table 11 - The Impact of Acquisitions on the Cash-to-Cash Flow and Investment-to-Cash Flow Sensitivities of Private Target Firms

This table displays the results of equations predicting private targets' cash-to-cash flow sensitivity ($\Delta \text{Cash}/\text{Total Assets}$) in columns (1) through (2) and investment-to-cash flow sensitivity ($\text{Gross Investment}/\text{Total Assets}$) in columns (3) and (4). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. The coefficient on *Cash Flow* interacted with the *AFTER* dummy variable represents changes in the sensitivities after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-industry, country and year fixed effects and standard errors are corrected for clustering of observations at the target-country and year level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta \text{Cash}/\text{Total Assets}$		$\text{Gross Investment}/\text{Total Assets}$	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0043 (0.37)	0.0140 (1.41)	-0.0109* (-1.89)	-0.0107* (-1.82)
<i>Cash Flow/Total Assets</i> _{<i>t</i>}	0.3732*** (4.60)	0.5201*** (6.14)	-0.0077 (-0.39)	0.0296 (1.35)
<i>AFTER</i> x <i>Cash Flow</i> _{<i>t</i>}	0.1994** (2.08)	0.0955 (0.94)	0.0405 (1.52)	0.0103 (0.39)
$\ln(\text{Total Assets})_t$	-0.0136 (-0.94)	-0.0129 (-0.98)	-0.0045 (-0.82)	-0.0016 (-0.24)
$\ln(\text{Total Assets})^2_t$	0.0017 (1.15)	0.0025* (1.89)	0.0000 (0.04)	-0.0001 (-0.21)
$\ln(\text{Number of Employees})_t$		-0.0117*** (-2.74)		-0.0039 (-1.24)
<i>Sales Growth</i> _{<i>t</i>}		-0.0003 (-0.03)		0.0190*** (5.18)
<i>Leverage</i> _{<i>t</i>}		0.0519** (2.50)		-0.0021 (-0.14)
<i>Market Cap/GDP</i> _{<i>t</i>}	-0.0002 (-0.45)	0.0001 (0.40)	0.0006** (2.11)	0.0008*** (2.67)
<i>GDP Growth</i> _{<i>t</i>}	0.0036 (1.39)	0.0043 (1.51)	0.0052*** (2.86)	0.0029 (1.35)
Constant	0.0687 (1.00)	-0.0820 (-1.09)	0.0704 (1.27)	0.0217 (0.32)
Observations	3,329	2,822	3,350	2,835
R ²	0.214	0.270	0.165	0.177
Adjusted R ²	0.193	0.247	0.143	0.151

Appendix C – Additional Tests: Alternative definition of cash flow computed using net income plus depreciations and amortizations.

Table 12 - The Impact of Acquisitions on the Cash Holdings of Private Target Firms

This table presents the results of equations predicting private targets' *Cash Holdings* normalized by *Total Assets*. *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0010 (0.14)	0.0004 (0.06)	0.0007 (0.10)	-0.0020 (-0.26)
<i>Ln (Total Assets)_t</i>	-0.0362** (-2.12)	-0.0261 (-1.55)	-0.0329* (-1.79)	-0.0202 (-1.14)
<i>Ln (Total Assets)_t²</i>	0.0014 (0.59)	0.0003 (0.13)	0.0009 (0.34)	0.0010 (0.44)
<i>Cash Flow/Total Assets_t</i>		-0.0226* (-1.95)		-0.0094 (-0.81)
<i>ROA_t</i>			0.0303* (1.66)	
<i>Ln (Number of Employees)_t</i>				-0.0037 (-0.54)
<i>Sales Growth_t</i>				0.0015 (0.75)
<i>Leverage_t</i>				-0.0456*** (-2.89)
<i>Market Cap/GDP_t</i>	0.0002 (0.80)	0.0002 (1.02)	0.0002 (0.83)	-0.0000 (-0.05)
<i>GDP Growth_t</i>	0.0028** (2.26)	0.0029** (2.32)	0.0027** (2.18)	0.0026* (1.92)
Constant	0.2664*** (4.20)	0.2621*** (4.42)	0.2731*** (4.37)	0.2923*** (5.05)
Observations	4,935	4,909	4,917	3,519
R ²	0.680	0.680	0.680	0.696
Adjusted R ²	0.622	0.622	0.622	0.638

Table 13 - The Impact of Acquisitions on the Cash-to-Cash Flow and Investment-to-Cash Flow Sensitivities of Private Target Firms

This table displays the results of equations predicting private targets' cash-to-cash flow sensitivity ($\Delta \text{Cash}/\text{Total Assets}$) in columns (1) through (2) and investment-to-cash flow sensitivity ($\text{Gross Investment}/\text{Total Assets}$) in columns (3) and (4). *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. The coefficient on *Cash Flow* interacted with the *AFTER* dummy variable represents changes in the sensitivities after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta \text{Cash}/\text{Total Assets}$		$\text{Gross Investment}/\text{Total Assets}$	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0010 (-0.05)	0.0193 (1.06)	0.0007 (0.07)	0.0022 (0.23)
<i>Cash Flow/Total Assets</i> _{<i>t</i>}	0.6914*** (5.06)	0.9889*** (10.81)	-0.0187 (-0.67)	0.0109 (0.34)
<i>AFTER x Cash Flow</i> _{<i>t</i>}	0.3116** (2.17)	0.0435 (0.41)	0.0325 (0.99)	-0.0076 (-0.22)
$\ln(\text{Total Assets})_t$	-0.1424 (-1.53)	-0.1371*** (-2.73)	0.0386** (2.06)	0.0454** (2.25)
$\ln(\text{Total Assets})^2_t$	0.0112 (0.71)	0.0149** (2.34)	0.0023 (0.83)	0.0028 (1.06)
$\ln(\text{Number of Employees})_t$		-0.0037 (-0.26)		-0.0201** (-2.06)
<i>Sales Growth</i> _{<i>t</i>}		0.0245* (1.93)		0.0139*** (3.41)
<i>Leverage</i> _{<i>t</i>}		0.0033 (0.07)		-0.0256 (-1.17)
<i>Market Cap/GDP</i> _{<i>t</i>}	0.0009 (1.30)	0.0005 (0.95)	0.0005 (1.50)	0.0006 (1.62)
<i>GDP Growth</i> _{<i>t</i>}	0.0012 (0.41)	0.0014 (0.44)	0.0035* (1.83)	0.0021 (0.99)
Constant	0.2702 (1.01)	0.0657 (0.41)	-0.4232*** (-6.37)	-0.2253*** (-2.88)
Observations	4,208	3,526	4,230	3,537
R ²	0.443	0.523	0.389	0.388
Adjusted R ²	0.322	0.432	0.256	0.271

Appendix D – Additional Tests: Changes in Target Size**Table 14 - The Impact of Acquisitions on the Cash Holdings of Target Firms**

This table presents the results of equations from Table 3 for subsamples based on target firms whose *Number of Employees* or *Total Assets* does not change by more than 100% in the two years following the acquisition. *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Cash/Total Assets	(1)	(2)	(3)	(4)
<i>AFTER</i>	0.0036 (0.47)	0.0037 (0.49)	0.0034 (0.44)	0.0019 (0.24)
<i>Ln (Total Assets)_t</i>	-0.0240 (-1.17)	-0.0105 (-0.60)	-0.0106 (-0.63)	-0.0241 (-1.11)
<i>Ln (Total Assets)_t²</i>	-0.0007 (-0.32)	-0.0022 (-1.20)	-0.0024 (-1.35)	0.0018 (0.77)
<i>Cash Flow/Total Assets_t</i>		-0.0199 (-1.24)		-0.0342* (-1.87)
<i>ROA_t</i>			0.0307 (1.32)	
<i>Ln (Number of Employees)_t</i>				-0.0044 (-0.49)
<i>Sales Growth_t</i>				0.0038 (1.35)
<i>Leverage_t</i>				-0.0655*** (-3.68)
<i>Market Cap/GDP_t</i>	0.0005** (2.21)	0.0005** (2.26)	0.0005** (2.12)	0.0004* (1.93)
<i>GDP Growth_t</i>	0.0019 (1.33)	0.0020 (1.39)	0.0018 (1.26)	0.0016 (1.07)
Constant	0.0966 (1.65)	0.0681 (1.27)	0.0673 (1.26)	0.1240* (1.85)
Observations	3,657	3,634	3,645	2,640
R ²	0.676	0.677	0.677	0.710
Adjusted R ²	0.617	0.618	0.618	0.653

Table 15 - The Impact of Acquisitions on the Cash-to-Cash Flow and Investment-to-Cash Flow Sensitivities of Target Firms

This table presents the results of equations from Table 4 for subsamples based on target firms whose *Number of Employees* or *Total Assets* does not change by more than 100% in the two years following the acquisition. *AFTER* is a dummy variable that equals the value of zero for the years before an acquisition and the value of one after an acquisition. The coefficient on *Cash Flow* interacted with the *AFTER* dummy variable represents changes in the sensitivities after an acquisition. All firm-level data is from Amadeus and is in USD million. All variables are defined in Appendix A. All estimations include target-firm and year fixed effects and standard errors are corrected for clustering of observations at the target-firm level. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Δ Cash/Total Assets		Gross Investment/ Total Assets	
	(1)	(2)	(3)	(4)
<i>AFTER</i>	-0.0074 (-0.38)	0.0117 (0.70)	0.0051 (0.50)	0.0087 (0.79)
<i>Cash Flow/Total Assets</i> _{<i>t</i>}	0.7140*** (5.52)	0.9447*** (10.62)	-0.0197 (-0.51)	0.0148 (0.33)
<i>AFTER</i> x <i>Cash Flow</i> _{<i>t</i>}	0.1441 (1.02)	-0.0170 (-0.16)	0.0268 (0.59)	-0.0143 (-0.28)
<i>Ln (Total Assets)</i> _{<i>t</i>}	-0.0459 (-0.53)	-0.0772 (-1.17)	0.0448** (2.12)	0.0280 (1.06)
<i>Ln (Total Assets)</i> ² _{<i>t</i>}	0.0011 (0.08)	0.0089 (1.21)	0.0014 (0.45)	0.0038 (1.29)
<i>Ln (Number of Employees)</i> _{<i>t</i>}		0.0171 (1.12)		-0.0133 (-1.14)
<i>Sales Growth</i> _{<i>t</i>}		0.0072 (0.71)		0.0108*** (3.08)
<i>Leverage</i> _{<i>t</i>}		-0.0353 (-0.97)		-0.0169 (-0.58)
<i>Market Cap/GDP</i> _{<i>t</i>}	-0.0001 (-0.12)	-0.0000 (-0.07)	0.0003 (0.82)	0.0005 (1.30)
<i>GDP Growth</i> _{<i>t</i>}	0.0035 (1.48)	0.0046* (1.65)	0.0047** (2.20)	0.0042* (1.75)
Constant	0.1017 (0.59)	-0.0198 (-0.10)	-0.3344*** (-6.15)	-0.1246 (-1.64)
Observations	3,103	2,639	3,122	2,651
R ²	0.428	0.516	0.376	0.374
Adjusted R ²	0.303	0.421	0.240	0.251