Deviation from Target Capital Structure: Evidence from large Acquisitions

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Abstract

The thesis studies target capital structures in the context of 1,290 acquisitions. In particular, the thesis analyses whether firms have target leverage ratios and whether they affect the choice of payment in the transaction. It illustrates that overleveraged bidders are less likely to pay for the acquisition with cash only. Moreover, the thesis examines the post-acquisition changes within the firm's capital structure and its adjustment speed. Addressing the change of target leverage after the transaction, the results suggest that managers consider the future target leverage of the combined firm in their acquisition's financing choices. Firms with high growth opportunities use the merger-induced change in target leverage for leverage adjustment, to a greater extent than firms with smaller growth opportunities. Firms tend to adjust their market leverage towards target by 39% every year, on average. Taking into account the leverage effect of the merger, it is shown that about 47% of an acquirer's leverage deviation caused by the merger is reversed after five years. Collectively, the results of the thesis support a capital structure model with a target ratio.

Key Words: Capital Structure, Mergers & Acquisitions, Target Leverage, Trade-off theory, Financing, Payment method

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Resumo

Esta tese debruça-se sobre as metas da estrutura de capital, no contexto de 1,290 aquisições. Em particular, a tese estuda se as empresas têm índices de alavancagem alvo e se estes afetam a escolha do pagamento na transação. De facto, a tese ilustra que os licitantes que estão sobre alavancados são menos propensos a pagar em dinheiro pela aquisição. Adicionalmente, a tese analisa as mudanças existentes no pós-aquisição dentro da estrutura de capital da empresa e na sua velocidade de ajustamento. Acerca da mudança na meta de alavancagem causada pela transação, os resultados sugerem que nas opções de financiamento da sua aquisição, os gerentes consideram como futura meta de alavancagem a da empresa combinada. As empresas com maiores perspetivas de crescimento tiram maior proveito de uma mudança na meta de alavancagem para o seu ajustamento do que as empresas com menores perspetivas de crescimento. As empresas tendem a ajustar a sua alavancagem de mercado para uma meta em média de 39% a cada ano. Tendo em conta o efeito de alavancagem da fusão, é sugerido que cerca de 47% do desvio de alavancagem causado pela fusão no adquirente é revertido após cinco anos. No geral, os resultados da tese apoiam um modelo de estrutura de capital com um rácio alvo.

Palavras-chave: Estrutura de Capital, Fusões e Aquisições, Alavancagem Alvo, Teoria do Trade-off, Financiamento, Forma de Pagamento

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List of Abbreviations

EBITDA – Earnings before interest, tax, depreciation and amortisation

M/B – Market to book value of assets

OLS – Ordinary least squares

R&D – Research and development expense

SIC – Standard Industrial Classification

1. Introduction

1.1 Research Problem Description

Despite the extensive research since the introduction of the modern capital theory by Modigliani and Miller (1958), firms' capital structure behaviours are still not fully explained by the available theories. One of the main theories amongst researchers that focus on explaining capital structure decisions is the trade-off theory of leverage. It suggests that firms intend to balance the costs of debt against its benefits, such as tax benefits of interest payments (Miller & Modigliani, 1958). The pecking order model, on the other hand, proposes a hierarchy of financing choices aimed at minimizing adverse selection costs, rather than the target ratio of the trade-off theory (Myers & Majluf, 1984).

It has been studied extensively, whether firms have meaningful target capital structures and how target deviations influence corporate decisions. However, the results of previous studies are mixed. Relevant corporate decisions to influence a firm's capital structure are, amongst others, stock issuances and the financing decisions of acquisitions. According to Uysal (2011), the effect of leverage deviation in the context of security issuance is widely studied; yet, the research on leverage deficits within corporate acquisition decisions is still limited.

Harford, Klasa and Walcott (2009) study the influence of leverage deficit on the choice of financing an acquisition and furthermore, the post-acquisition capital structure changes. The main conclusion of their research supports a capital structure model which integrates a target level and adjustment costs (Harford et al., 2009). Uysal (2011) extends the research of capital structures in the context of acquisitions by studying the likelihood of a firm making an acquisition based on the leverage deviation and he concludes that overleverage poses an obstacle in pursuing the opportunity of acquiring a firm.

1.2 Objective and Hypotheses Development

This thesis aims to contribute towards the existing literature focused on capital structure behaviours by studying the relevance of leverage targets using takeovers of a more recent period including the financial crisis of 2007-08. The focus of the thesis is to investigate the payment methods of acquisitions and the post-acquisition leverage changes to potentially find evidence, that supports existing capital structure theories. In particular, it is tested, if the conclusions of

previous studies such as Uysal (2011) and Harford et al. (2009) hold true for a different sample period of acquisitions by including the financial crisis and post-crisis years.

The thesis aims initially to study the role of financial deficit.

1. Do managers consider the firms' deviation from the target leverage ratio when choosing the payment method for acquisitions?
   Hypothesis 1: A firm's deviation from its target ratio influences the choice of payment method used for acquisitions.

Second, the thesis focuses on the post-acquisition changes within the firm's capital structure by analysing the changes of the firm's capital structure and its deviation from its target ratio.

2. Do the firms converge to their leverage ratio after the acquisition and what is the speed of adjustment?
   Hypothesis 2: The deviation from the firm's target leverage induced by a merger or acquisition is not permanent and the firm aims to reduce the divergence.

As proposed by Harford et al. (2009), five years of post-acquisition data is needed to study the capital structure adjustment and therefore, the sample of acquisitions used for the thesis includes acquisitions from 1993 to 2012 within the United States.

1.3 Thesis Contribution

The thesis contributes to the capital structure research by analysing a recent sample of acquisitions. Building upon Harford et al. (2009), the thesis extends the acquisition sample by including the financial analysis and comparing the pre- and post-crisis time. The findings of the thesis are mostly consistent with the previous research on this topic such as Uysal (2011), Harford et al. (2009) and Tao et. al. (2017), for example.

Addressing the first research question, the result of the thesis indicates that overleveraged bidders are less likely to pay for the transaction with cash and are therefore less likely to use debt financing. However, it was not proven that overleveraged firms are more likely to pay the acquisition with stock instead. Rather, overleveraged firms tend to use a mixed payment method, which includes both stock and cash.

The second research question aims to provide evidence that firms converge towards a target ratio. The acquisition sample of the thesis showed that firms adjust their leverage towards target

by approximately 39% every year, while the book leverage adjustment amounts to roughly 44%, which is similar to previous research. In addition, it is shown that about 47% of an acquirer's leverage deviation is reversed after five years. Overall, the thesis's results support the trade-off theory hypothesis.

The thesis proceeds as follows: Section 2 gives an overview of the literature addressing capital structure behaviours and financing choices within acquisitions. The third section addresses the methodology and construction of variables. Section 4 describes the data, while Section 5 focuses on the hypotheses, presenting and analysing the results. Finally, section 6 concludes the thesis with a discussion of the results and further research.

2. Literature Review

2.1 Research related to Capital Structure

The way firms choose their capital structures is still an open and relevant question within the field of corporate finance research. The appropriate capital structure is crucial for the firm's growth and survival; furthermore, capital structure decisions are important for understanding investment behaviours with regards to the implementation of policies. In 1984, Myers claims we know very little about "how firms choose their debt, equity and hybrid securities" and names the issue the "capital structure puzzle" (1984, p. 575). Almost thirty years later, the capital structure puzzle is still not completely solved. Graham and Leary (2011) review capital structure research papers, which have been published since 2005. They conclude that the existing research only partially explains the capital structure behaviours and further research is crucial.

Within the capital structure research there are three well-known theories – pecking order, market timing model and static trade-off, which aim to explain firms' capital structure behaviours. Conflicting conclusions exists among researchers about these theories and one might even claim that "No single theory of capital structure is capable of explaining all of the time- series and cross-sectional patterns that have been documented." (Ritter & Huang, 2009, p. 238).

The pecking order model suggests a hierarchy of financing choices aimed at minimizing adverse selection costs. The traditional pecking order model was proposed by Myers and Majluf (1984) in which firms first prefer internal funds and if external financing is required, debt is

favoured over equity. Firms follow a preference of debt first, then hybrid securities and lastly equity, hence, there is "[..] no well-defined target debt-equity mix, because there are two kinds of equity, internal and external, one at the top of the pecking order and one at the bottom." (Myers, 1984, p. 581). Moreover, it can be favourable to stockholders for the firm to forego positive investments rather than issuing high risk debt or new stock, which would be the case when the cost to existing shareholders of issuing new shares at a bargain exceed the project's positive cash flow (Myers & Majluf, 1984, p. 188). The authors' model predicts that stock prices will fall when managers have superior information and new stock is issued. Therefore, it is crucial for firms to build financial slack to undertake investment opportunities with positive NPV. With reference to Myers and Majluf (1984), firms can build financial slack through restricting dividends or issuing stock when the information advantage of management towards stockholders is minimal.

In contrast to the pecking order model, the static trade-off model suggests a capital structure consisting of an optimal ratio of debt and equity debt (Graham & Leary, 2011; Miller & Modigliani, 1958). Modigliani and Miller (1958) propose that in a perfect capital market setting without taxes and distress costs, the value of a firm should not depend on its capital structure, which is known as the irrelevance assumption. However, the irrelevance assumption does not hold true in a real-world market with imperfect conditions. Based on the imperfect market conditions, the traditional trade-off theory of leverage suggests a model in which the firm aims at balancing the costs and benefits of debt (Graham & Leary, 2011; Miller & Modigliani, 1958). Financial distress costs are defined as cost of debt, whereas the benefits of debt can be tax benefits of interest payment and mitigation of agency costs (Graham & Leary, 2011; Miller & Modigliani, 1958).

Another model aimed at explaining capital structure decisions is a model, which considers market timing. Wurgler and Baker (2002) test on a sample consisting of Compustat firms with an IPO date between 1968 and 1998 "[..] whether market timing has a short-run or even a long-run impact [..]" on capital structure (p. 2). The main finding is that fluctuations in the market value have "[..] large and persistent effects on capital structure." (Wurgler & Baker, 2002, p. 2). The authors claim that this effect is hard to explain through pecking order because due to the adverse selection managers avoid issuing stock and furthermore, trade-off theory assumes that temporary market to book ratio difference should have only temporary effects (Wurgler & Baker, 2002). In other words, "[..] capital structure is the cumulative outcome of attempts to time the equity market" (Wurgler & Baker, 2002, p. 1).

While Wurgler and Baker find evidence of capital structures, that could not be explained by the trade-off theory or the pecking order model, Shyam-Sunder and Myers (1999) show that firms use debt to compensate anticipated finance deficits, which supports the pecking order model (1999, p. 242). Kayhan and Titman (2004) show that "[..] that over time, financing choices tend to move firms towards target debt ratios that are consistent with the tradeoff theories of capital structure." (p. 1). However, the speed of adjustment is relatively low and a firm's deviation from target leverage is based on its cash flows and investment needs. They claim that changes in capital structure are caused by financial deficits as previously confirmed by Shyam-Sunder and Myers (1999) (Kayhan & Titman, 2004). Furthermore, with reference to Welch, stock returns effect the deviations from the firms target ratios (Kayhan & Titman, 2004; Welch, 2004). While Baker and Wurgler (2002) studied the effect of market timing on capital structure in terms of past stock market returns, Welch (2004) investigates "[..] the failure of firms to undo the effects of stock returns and the consequent strong relation between lagged stock returns and capital structure" (p. 106). The author concludes that stock returns can explain a large part of debt ratio variations and moreover, "When stock returns are accounted for, many other proxies used in the literature play a much lesser role in explaining capital structure." (p. 106). Consistent with Welch (2004), Kayhan and Titman (2004) also highlight the greater effect of stock returns than financial deficits on target debt ratios (2004). This could be explained by the fact that high stocks returns are likely caused by higher growth opportunities and therefore, linked to lower target debt ratios (Kayhan & Titman, 2004). Furthermore, Kayhan and Titman (2004) find evidence that the effects caused by stock price changes and financial deficits reverse over time in the leverage regressions, thus, supporting the theory that firms have target ratios. To further test the theory of firms adjusting towards a target ratio, Hovakimian, Opler and Titman (2001) include the assumption that firms target ratio might change over time and incorporate a wide range of financing options such as repurchasing equity or retiring debt. Their study concludes that firms make financing choices based on a target leverage ratio, which plays a higher role in repurchases and debt retirements than in equity and debt issuances (Hovakimian et al., 2001). Furthermore, they show that stock prices play a relevant role by observing that firms rather issue equity than debt when stock prices are increasing, and through showing "[..] that more profitable firms have, on average, lower leverage ratios." (Hovakimian et al., 2001, p. 3).

In addition, Roberts and Leary (2005) further prove the theory of a target capital structure in the context of adjustment costs, which implies that it might be suboptimal for firms to rebalance continuously. The authors confirm that the financing behaviour persists even when adjustment

costs are introduced and that firms actively rebalance their debt ratio infrequently but in clusters (Roberts & Leary, 2005). They also test the main market timing variable as in Wurgler and Baker (2002) and find that its effect mitigates with adjustment cost, and as a consequence, adjustment costs influence the speed of adjustment. Moreover, they find evidence supporting the pecking order theory, i.e. firms prefer using internal financing for large investments (Roberts & Leary, 2005).

Another interesting study investigating both the trade-off model and pecking order is executed by Fama and French (2002) by testing the predictions in regard to leverage and dividends. Concerning the trade-off theory, the study tests whether leverage is mean-reverting, whereas, the pecking order is tested through analysing how financing decisions react to variations in earnings and investments (Fama & French, 2002). The authors infer that both theories share many predictions; yet, they find evidence that "[..] more profitable firms are less levered.", which confirms the pecking order but contradicts the trade-off theory (Fama & French, 2002, p.1). Moreover, they find strong evidence that "[..] firms with more investments have less market leverage, which is consistent with the trade-off model and a complex pecking order model." (Fama & French, 2002, p. 1).

Also, Byoun (2008) states: "[..] the two competing theories, which have largely been evaluated in isolation from one another, can and should be viewed as complements." (p. 3069), and thus, the researcher combines both models with investigating the capital stricture adjustment speed dependent on financial deficits or surpluses. The analysis provides the conclusion that "[..] firms make the most significant adjustments toward the target when they have above-target debt with a financial surplus." (Byoun, 2008, p. 3071). While it is concluded that firms incur higher adjustment costs in issuing debt when there is a debt level below the target (Byoun, 2008). In addition, firms' capital structures are adjusted slower at the time of financial deficits than with surpluses, which results from firms' financial constraints. Yet, "[..] the capital structure adjustments for both constrained and unconstrained firms show the same pattern: lowering above-target debt with a financial surplus and increasing below-target when facing a financial deficit." (Byoun, 2008, p. 3094). Byoun (2008) concludes that the traditional pecking order does not explain the influence of adverse selection costs and therefore, benefits of debt, adverse selection cost and other costs should be part of a combined theory of capital structures.

While Byoun (2008) tested the pecking order and the trade-off model, Flannery and Rangan (2006) test the three theories through analysing whether firms have target debt ratio and what

is their speed of adjustment and moreover, adding market timing or pecking order variables to the analysis. The results show a quick adjustment speed towards firms' target leverage ratios, in particular, the mean sample firm closes its market leverage gap by more than 30% per year, which is not consistent with some of the previously introduced studies such as Baker and Wurgler, (2002), and Fama and French (2002) (Flannery & Rangan, 2006). It is argued that the different results stem from the failure to account for a partial adjustment, as implemented in Flannery and Rangan's model. Overall, the study finds strong evidence in favour of a target capital structure for the sample of nonfinancial Compustat firms from 1966 to 2001. While the variables of the pecking order and market timing model are statistically significant, they are less relevant than the adjustment towards target ratio (Flannery & Rangan, 2006).

2.2 Research related to Financing and Leverage Ratios within Acquisitions

In addition to the capital structure theories introduced in the previous chapter, empirical work also illustrated financing choices and capital structure deviations specifically for acquiring firms, which is another important component of this thesis. One study which investigates the effect of acquirer and target characteristics on the method of payment was executed by Martin (1996) through studying 846 corporate acquisitions in the period of 1978 to 1988. The study argues that the most relevant variables are first, the mode of acquisition, for instance, tender offers are likely to be cash-financed, and second, the acquirer's investment opportunities due to the evidence that with higher investment opportunities acquirers are more likely to use stock financing (Martin, 1996). In addition to the method of payment, the financing decisions play a relevant role in the context of mergers. Martynova and Renneboog (2009) claim to be the first study to investigate simultaneously both the payment and financing decisions through a sample of 1,361 completed mergers and acquisitions between 1993 and 2001 in Europe. The authors' results show that acquirers have a preferred financing choice depending on their firm characteristics and the cost of capital plays a relevant role in the financing choice, whereas the agency cost seem to be less relevant. Moreover, their evidence is consistent with the pecking order theory that acquirers with high cash reserves use internal funds, while bidders facing internal funds deficits chose to issue debt and acquirers with high stock prices chose to issue equity (Martynova & Renneboog, 2009).

Another important aspect within the process of acquisitions is the competition among bidders and their likelihood to win. Morellec and Zhdanov (2008) claim that competition influences the choice of financing and highlight the strategic importance of leverage. Their study investigates

a sample of 1,926 takeovers of the period of 1980 to 2005 and "[..] predicts that a bidder with the lower leverage is likely to win in a takeover contest (unless the target firm is highly levered)." (p. 573). Moreover, the model shows that the winning firm should increase its leverage after the takeover completion (Morellec & Zhdanov, 2008), which is also consistent with Welch (2004) who claims "[..] that firms that have engaged in mergers and acquisitions activity tend to increase leverage." (p. 120).

Further empirical research addressing leverage ratios within acquisition was completed by Harford, Klasa and Walcott (2009), by investigating the concept of a target ratio with a sample of 1,188 large takeovers between 1981 and 2000. Their results support a capital structure model which includes a target level and adjustment costs. Moreover, they conclude that the acquirer is less likely to issue debt when its overleveraged in comparison to its predicted target capital ratio and firms that finance acquisitions with debt, tend to actively move back towards their target ratio in the following years (Harford et al., 2009). Furthermore, Uysal (2011) provides additional evidence by studying the influence of firms' leverage deficits on their acquisition behaviour through a sample of 7,814 acquisitions in the period of 1990 to 2007. It is concluded that firms, which have higher leverage than their predicted target capital structure are less likely to pursue an acquisition and moreover, pay lower premiums and are less likely to use cash as the payment method (Uysal, 2011). Yet, the probability of acquiring is not symmetric because underleverage has a negligibe effect on the likelihood of acquiring (Uysal, 2011). Besides, the study proves that firms rebalance their capital structure towards target ratio through finding that overleveraged firms adjust their leverage ratio by issuing equity and the likelihood of rebalancing is higher when the firm is anticipating to make an acquisition (Uysal, 2011).

3. Methodology and Variables Construction

3.1 The Leverage Variable

In order to address the research question, it is crucial to define leverage ratio. Many researchers use market leverage as variable to study capital structure behaviours (Hovakimian et al., 2001; Welch, 2004; Flannery & Rangan, 2006; Harford et al., 2009; Uysal, 2011). On the other hand, Chang and Dasgupta (2009) argue for using book leverage ratio because "[..] changes in the book debt ratio reflect what might be called "active rebalancing" [..]", while varying market leverage can be caused by "[..] unanticipated changes in the stock price that may not be in the control of management" (p. 1780). In addition, several studies use both market and book

leverage (Rajan & Zingales, 1995; Fama & French, 2002; Kayhan & Titman, 2004; Ritter & Huang, 2009). Comparing the results of both variables, no crucial divergence is shown. To ensure resemblance to similar studies, the thesis primarily uses market leverage. However, to study capital structures in the context of acquisition, the book leverage ratio can be more appropriate in order to exclude stock price fluctuations due to deal announcement and completion (Khoo, Durand, & Rath, 2017; Tao, Sun, Zhu, & Zhang, 2017). Therefore, book leverage is also used to ensure robustness and to compare the results to previous studies.

In addition to the differentiations between book and market value, there are varying definitions of leverage, which can result in measurement errors and thereby causing contradicting conclusions within the research (Graham & Leary, 2011). Welch (2011) claims that the common measure of leverage ratio as determined by financial debt scaled by assets considers non-financial equities as equity, which results in an incorrect estimation. Yet, the author states that there is no universal measure, which can be applied and the measure depends on the context of the research question (Welch, 2011). Thus, the thesis is guided by previous studies, which constructed a model to predict target leverage ratios. The thesis defines market leverage ratio as (book debt) / (total assets minus book equity plus market equity), (Kayhan & Titman, 2004). The book leverage ratio is defined as (book debt) / (total assets), whereby book debt is total assets subtracted by book equity following Uysal (2011). Book equity is then defined through book value of shareholder's equity plus balance sheet deferred taxes and investment tax credit minus preferred stock, whereby the shareholder's equity is determined by total assets subtracted by liabilities (French, 2018b; Uysal, 2011).

3.2 Determinants of Capital Structure

After defining leverage, it is important to examine the determinants of capital structure in order to construct the model for predicting leverage. The thesis incorporates the following set of firm characteristics used in the capital structure literature.

Firm size (size): One variable which is often included in models explaining capital structures is firm size (e.g. Hovakimian & Li, 2011; Kayhan & Titman, 2004; Marsh, 1982). Most studies conclude that firm size, which is measured by the natural logarithm of sales in this thesis, is positively correlated to leverage (Harford et al., 2009; Kayhan & Titman, 2004). Larger firms tend to be more diversified, which results in stable cash flows. As claimed by Rajan and

Zingales (1995), size could be "[..] an inverse proxy for the probability of bankruptcy." (p. 1451).

Profitability (profit): Variables related to the firm's profits are often included in similar studies (e.g. Bharath, Pasquariello, & Wu, 2006; Kayhan & Titman, 2004; Uysal, 2011). In this thesis, profitability is determined by the earnings before interest, tax, depreciation and amortisation (EBITDA) scaled by total assets. According to the trade-off theory, profitability is expected to have a negative correlation with leverage due to the tax benefits of debt. Hovakimian et al. (2001) confirm that firms which increase their leverage have a higher operating income than firms which reduce their leverage. In an earlier study by Titman and Wessels (1998) the opposite is found, which is that profitable firms have lower debt to market equity ratio. Therefore, it can be said that the relationship is not clear, as pointed out by Flannery and Rangan (2006), "A firm with higher earnings per asset dollar could prefer to operate with either lower or higher leverage." (p. 476).

Asset Tangibility (tang): Many models include a variable to capture a firm's tangible assets by estimating the ratio of net plant, property and equipment to total assets (e.g. Harford et al., 2009; Khoo et al., 2017; Rajan & Zingales, 1995). A common understanding amongst researchers is that firms with more tangible assets have higher leverage because tangible assets serve as collateral and therefore, bankruptcy costs are lower for these firms (Antão & Bonfim, 2014; Frank & Goyal, 2003).

Market-to-book assets (M/B): Another variable, which often occurs in previous literature aims on capturing future growth opportunities through measuring the ratio of market to book value of assets (e.g. Frank & Goyal, 2009; Harford et al., 2009; Hovakimian, Hovakimian, & Tehranian, 2004). The expected effect on leverage is negative as firms avoid issuing debt to protect their investment opportunities (Flannery & Rangan, 2006; Khoo et al., 2017).

Research and development expense: A variable focused on R&D spending is implemented in the model to capture a firm's product uniqueness (e.g. Hovakimian & Li, 2011; Kayhan & Titman, 2004; Uysal, 2011). As many firms do not have research expenses, it is considered a dummy variable (R&DDummy), which takes the value of one when a firm records R&D expenses. Previous research concluded that firms with high R&D spending prefer to issue more equity than debt, which results lower leverage (Flannery & Rangan, 2006; Hovakimian et al., 2001).

Selling expense (SellExp): Another variable aimed on addressing firms' unique and specialized products is selling expense (e. g. Harford et al., 2009; Hovakimian et al., 2004; Kayhan & Titman, 2004). The selling expenses scaled by net sales are expected to have a negative effect on leverage because the firm has more unique products, which can result in higher bankruptcy costs and therefore suggest decreased debt (Hovakimian et al., 2004).

Depreciation (Dep): To capture the tax shields attained outside of debt financing, a variable measured by depreciation and amortization expenses sized on assets is included in the model (e.g. Antão & Bonfim, 2014; Faulkender, Flannery, Hankins, & Smith, 2012; Khoo et al., 2017). It is assumed that higher depreciation expenses reduce the need of debt financing by providing tax shields.

Industry (IndDummy): Lastly, the model includes industry dummies to capture industry specific characteristics, which are not captured by the other variables (e.g. Kayhan & Titman, 2004; Khoo et al., 2017; Uysal, 2011). The industry dummies are based on the Fama and French (1997) twelve industry definitions obtained from French's website (2018a; van Alfen, 2017).

The following Table 1 summarizes the expected effects of the explanatory variables of the model according to literature. An overview of the calculations of all variables can be found in the Appendix 1.

Table 1: Overview Explanatory Variables

Variable	*Expected Effect on Leverage*
Firm Size	+
Profitability	+ -
Tangibility	+
Market to Book Ratio	-
Research & Development Dummy	-
Selling expense	-
Depreciation	-

3.3 Prediction Model & Leverage Deviation

After defining the dependent variable (leverage) and the explanatory variables, the model to predict a firm's target leverage and its deviation needs to be elucidated. A firm's target leverage ratio is not observable and therefore, a proxy is estimated by using an ordinary least squares (OLS) regression and a Tobit model. First, the thesis uses an OLS regression with fixed effects to predict the target leverage ratio as in Uysal (2011), Hovakimian and Li (2011) and Antão

and Bonfim (2014), to compare results. The panel data model controls for both firm (f_i) and time fixed effects (ψ_t). The estimation is described by the following equation:

$$Lev_{i,t} = \alpha + \beta_1 Size_{i,t-1} + \beta_2 Profit_{i,t-1} + \beta_3 Tang_{t-1} + \beta_4 M/B_{i,t-1} + \beta_5 R\&DDummy_{i,t-1} + \beta_6 SellExp_{i,t-1} + \beta_7 Dep_{i,t-1} + \psi_t + f_i + \varepsilon_{i,t} \quad (1)$$

Second, a Tobit model is often used for the prediction of target leverage (Harford et al., 2009; Hovakimian et al., 2001; Kayhan & Titman, 2004; Tao et al., 2017). The most common assumption of leverage is that its value lies between zero and one and hence, a Tobit regression can be the appropriate model to predict the target leverage. The Tobit regression is estimated using double censoring by censoring the leverage variable from above by the value of one and below by zero in line with Denis and McKeon (2012), Harford et al. (2009), Tao et. al. (2017) and Hovakimian et al. (2004).

The estimation of the Tobit regression is described by the following equation:

$$Lev_{i,t} = \alpha + \beta_1 Size_{i,t-1} + \beta_2 Profit_{i,t-1} + \beta_3 Tang_{i,t-1} + \beta_4 \frac{M}{B}_{i,t-1} + \beta_5 R\&DDummy_{i,t-1} + \beta_6 SellExp_{i,t-1} + \beta_7 Dep_{i,t-1} + \beta_8 IndDummy_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

To avoid potential endogeneity problems caused by unobserved factors which affect the variables and the leverage ratio, all explanatory variables are lagged by one year (Antão & Bonfim, 2014; Kayhan & Titman, 2004; Tao et al., 2017).

Next the target leverage of all firms is computed by using the fitted values of the regression equation (1) above, where X represents the capital structure determinants:

$$TLev_{i,t} = \hat{\alpha} + \hat{\beta} X_{i,t} \quad (3)$$

Then, for each firm the deviation from its target is computed by subtracting the predicted target leverage from its actual leverage to determine the leverage deficit at the point of acquisition:

$$LevDeviation = TLev_{i,t} - Lev_{i,t} \quad (4)$$

As the acquisition year, the completion date is used in the thesis, because the change in leverage would be caused at the time of effective date rather than at the announcement date, which can occur in another year than the completion date.

To measure the adjustment of firms towards target leverage ratio to address hypothesis 2, previous papers use partial adjustment models (e.g. Antão & Bonfim, 2014; Faulkender et al., 2012; Flannery & Rangan, 2006; Khoo et al., 2017). The second step of the thesis' model is a partial adjustment model based on the model proposed by Antão and Bonfim (2014) including firm (f_i) and time fixed effects (ψ_t):

$$\Delta\, Lev_{it} = \alpha + \beta_1 adjust_{i,t} + \beta_2 \Delta\, Profit_{i,t} + \beta_3 \Delta\, Profit_{i,t-1} + \beta_4 \frac{Investment}{Assets}_{i,t} + \beta_5 \frac{Investment}{Assets}_{i,t-1} + \psi_t + f_i + \varepsilon_{i,t} \quad (5)$$

The variable *"adjust"* represents the adjustment of leverage towards target ratio:

$$adjust_{i,t} = TLev_{i,t} - Lev_{i,t-1} \quad (6)$$

Profitability, as defined earlier, is included to account for short-term cash flow variations, as well as a variable focused on investments to capture movements, which would cause firms to move further away from their target in short-term (Antão and Bonfim, 2014; Fama & French, 2002). The investment variable is measured as capital expenditure scaled by total assets.

4. Data

4.1 Sample of Acquisitions

The thesis requires five years of post-acquisition data to study the leverage adjustment following Harford et al. (2009), and therefore focuses on acquisitions, which have been announced and completed between January 1993 and December 2012. The deal scanner of Thomson Reuters Eikon is used to obtain mergers and acquisitions of public firms located in the United States. Based on previous capital structure research, the sample excludes utilities and financial firms (Fama & French, 2002; Flannery & Rangan, 2006; Uysal, 2011), as well as government services according to the TRBC industry classification because their capital

structure may be influenced by special factors differing from other industrial and service firms. To test the hypotheses referring to the payment method, the sample is reduced based on the three main consideration structures: cash only, stock only and cash and stock combination. Furthermore, the sample considers only large acquisitions as in Harford et al. (2009) by requiring that the target firm's total assets account for at least 10% of the acquirer's total assets. The exclusion of smaller acquisition supports the assumption for the second hypothesis that the acquisition changes the acquirer's capital structure to analyse if firms converge back to their target ratio. In addition, only firms which can be clearly assigned to Compustat's Gvkey identification to obtain the firm specific data are considered. After obtaining the Compustat data through the Gvkey, further exclusions are completed by removing acquirers belonging to the financial or utilities industry according to the SIC code classification (SIC codes 6000 – 6999 and 4900 – 4999). Moreover, firms which make several acquisitions in one year are excluded. The exclusion is performed to ensure that the annual variables reflect the time of acquiring a firm to measure the leverage deficit. The final sample amounts to 1,290 acquisitions and mergers completed by 1,043 firms, accounting for both single and multiple time acquirers.

Table 2: Characteristics of Deals from 1993 to 2012

Year	Number of Acquisitions	Fraction of Sample		
		Cash and Stock Combination	*Cash Only*	*Stock Only*
1993	26	0.27	0.46	0.27
1994	62	0.39	0.40	0.21
1995	62	0.18	0.35	0.47
1996	66	0.20	0.32	0.48
1997	103	0.24	0.37	0.39
1998	109	0.28	0.45	0.28
1999	107	0.32	0.30	0.38
2000	101	0.23	0.29	0.49
2001	75	0.35	0.23	0.43
2002	51	0.37	0.27	0.35
2003	50	0.30	0.58	0.12
2004	56	0.38	0.38	0.25
2005	52	0.40	0.38	0.21
2006	81	0.33	0.58	0.09
2007	73	0.25	0.59	0.16
2008	49	0.37	0.55	0.08
2009	26	0.31	0.42	0.27
2010	50	0.32	0.54	0.14
2011	40	0.45	0.53	0.03
2012	51	0.31	0.63	0.06
Total	1,290	0.30	0.42	0.28

By studying the data on large acquisitions over the twenty years, several observations can be made. Firstly, the number of acquisitions has been almost continuously increasing since 1993, reaching a maximum number of acquisitions in 1998 (109 transactions). After 1998, the number of acquisitions declined to 50 acquisitions in 2003. In the years before the financial crisis the number of transactions increased again with 81 acquisitions in 2006, and 73 transactions in 2007. A general decline can be identified for the years after 2007 up to 2012.

Regarding the method of payment, it can be observed that in the latest years from 2006 to 2012, cash only was the preferred method. Considering the whole sample, the preference between stock only (363) and stock and cash combination (390) is almost equal with around 30%, whereas cash was chosen in 42% (537) of the transactions. Regarding the form of the deal, the majority of the transactions are completed as mergers (71%). The majority of the sample's acquirers are acquiring only one firm during the time frame. Further characteristics of the transactions and acquirers can be found in the Appendix 2 and 3.

To further describe the sample of acquirers, Table 3 summarizes the main variables of the 1,043 firms from 1992 to 2017 that make acquisitions in the defined period. The outliers of the following variables are winsorized at the 1st and 99th percentile level.

Table 3: Summary Statistics – Acquisition Sample

Variable	*Obs.*	*Mean*	*p50*	*p25*	*p75*	*Std. Dev.*	*Min*	*Max.*
Market Lev.	15,336	0.33	0.29	0.14	0.47	0.23	-0.11	0.99
Book Lev.	16,099	0.48	0.46	0.29	0.62	0.66	-1.86	20.38
Firm Size	17,068	6.05	6.17	4.60	7.59	2.23	-3.27	10.71
Profitability	17,134	0.06	0.12	0.06	0.17	0.39	-11.74	0.43
Tangibility	17,186	0.25	0.18	0.08	0.35	0.22	-	0.92
Market/Book	15,336	2.22	1.53	1.13	2.29	3.89	0.25	156.29
R&D dummy	17,490	0.62	1.00	-	1.00	0.49	-	1.00
Selling Exp.	15,832	0.38	0.25	0.14	0.41	0.89	0.02	20.60
Depreciation	17,134	0.05	0.04	0.03	0.06	0.04	-	0.33

4.2 Prediction Data

To estimate the target leverage ratio, the thesis uses annual fundamentals data of firms recorded in Compustat from 1991 to 2017. The prediction data is used to estimate the target leverage by

applying the model of equation (1) and (2). The fitted values of the regressions are then used to predict the target leverage ratio of the firms of the acquisition sample.

As discussed, firms which belong to the financial or utilities industry according to the SIC code classification (SIC codes 6000 – 6999 and 4900 – 4999) are excluded. As in the acquisition sample, the main variables of the prediction data are winsorized. The final data sample amounts to 175,536 observations of 17,496 firms. Table 4 represent the summary statistics of the prediction data according to the main determinants of leverage as defined in Section 3.2.

Table 4: Summary Statistics – Prediction Data

Variable	*Obs.*	*Mean*	*p50*	*p25*	*p75*	*Std. Dev.*	*Min*	*Max*
Market Lev.	138,444	0.34	0.28	0.12	0.52	0.27	-0.11	0.99
Book Lev.	157,473	0.83	0.47	0.25	0.69	2.37	-1.86	20.38
Firm Size	155,334	4.72	4.87	2.97	6.68	2.83	-3.27	10.71
Profitability	163,493	-0.25	0.09	-0.08	0.15	1.47	-11.74	0.43
Tangibility	164,691	0.26	0.18	0.07	0.39	0.24	0.00	0.92
Market/Book	137,756	5.09	1.55	1.07	2.73	17.99	0.25	156.29
R&D dummy	175,536	0.53	1.00	0.00	1.00	0.50	0.00	1.00
Selling Exp.	138,850	0.79	0.27	0.15	0.49	2.48	0.02	20.60
Depreciation	163,488	0.05	0.04	0.02	0.06	0.05	0.00	0.33

To further describe the data before estimating the model, Table 5 shows the pairwise correlation between the main variables and their significance level. The results of the correlation matrix coincide with the expected relationship of the previously introduced research. The expected correlation between leverage and profitability, which was not clear earlier, is positive, yet, the correlation is rather low. The strongest correlation with leverage according to the sample is seen for size and tangibility. All correlations are significant at the 1% significance level, as indicated.

Table 5: Correlation Matrix – Prediction Data

	Mar. Lev.	Size	Profit	Tan	M/B	R&D dum.	SellEx	Dep
Mar. Lev.	1							
Size	0.187**	1						
Profit	0.024**	0.424**	1					
Tan	0.206**	0.161**	0.088**	1				
M/B	-0.115**	-0.300**	-0.747**	-0.079**	1			
R&D dum.	-0.149**	-0.057**	0.076**	-0.233**	-0.092**	1		
SellExp.	-0.108**	-0.473**	-0.527**	-0.084**	0.369**	0.065**	1	
Dep	0.145**	-0.101**	-0.177**	0.324**	0.092**	-0.032**	0.049**	1

*The * represents a 5% significance level, while ** indicates a 1% significance level.*

5. Empirical Analysis and Results

5.1 Analysis of Determinants of Capital Structure

As described in section 3.3 the thesis predicts the target leverage ratio with OLS regression and a Tobit model. Table 6 shows the OLS estimates of the equation (1) for both market and book leverage with using a fixed effect model and robust standard errors.

Table 6: OLS Regressions – Target Leverage

Dependent variable:	***Market Leverage***		***Book Leverage***	
	Coef.	*p-value*	*Coef.*	*p-value*
Size	0.028**	0.000	-0.112**	0.000
Profit	-0.033**	0.000	-0.510**	0.000
Tangibility	0.125**	0.000	-0.185	0.104
R&D dummy	-0.013*	0.025	-0.186**	0.000
M/B Ratio	-0.003**	0.000	0.012**	0.001
Sell. Expense	0.001	0.437	-0.034**	0.003
Depreciation	0.361**	0.000	2.844**	0.000
Constant	0.133**	0.000	0.964**	0.000
Firm Fixed Effect	Yes		Yes	
Year Fixed Effect	Yes		Yes	
Number of Observations	102,526		102,860	
Number of Groups	12,494		12,528	
R square:				
Within	0.115		0.114	
between	0.077		0.430	
Overall	0.080		0.287	

*The * represents a 5% significance level, while ** indicates a 1% significance level. Regressions are estimated with robust standard errors.*

By analysing the regression on market leverage, it can be concluded that all the explanatory variables are statistically significant at the 1% level, except the R&D dummy variable and the variable selling expense. While selling expense has no significant effect, the R&D variable shows a negative effect on market leverage at the 5% significance level. In comparison with Table 1, it can be seen that profitability has a negative coefficient, which is consistent with Titman and Wessels (1988), Flannery and Rangan (2006) and Frank and Goyal (2003), for instance. Fama and French (2002) explain the negative relationship as support for the pecking order, yet, leverage reduction can also be explained more mechanically – "When a firm earns profits, debt gets paid off and leverage falls automatically." (Frank & Goyal, 2003). The sign

of the coefficients on size are coherent with e.g. Harford et. al (2009), Kayhan & Titman (2004). The positive relationship of asset tangibility and leverage coincides with previous research such as Frank & Goyal (2003) and Harford et. al (2009). In addition, the estimated negative effect of the R&D dummy is consistent with the assumption that firm with R&D spending have lower leverage as in Flanner & Ragan (2006) and Hovakimian et al. (2001). Also, the effect of the market to book ratio reflects the results of e.g. Flannery & Ragan (2006) and Khoo et al. (2017). In contrast, depreciations show a significant positive relationship for both market and book leverage, although depreciation was assumed to be negative. Therefore, the results cannot confirm that higher depreciation expense as tax shields provide the need to reduce debt.

The coefficients obtained by using book leverage as a dependent variable show a significance at the 1% level with exception of tangibility. Comparing the signs of the coefficients to Table 1, firm size was found to be negative and therefore, the results are inconsistent with the assumption that larger firms operate with more leverage as they have easier access to debt markets because they are more diversified and transparent. Furthermore, tangibility has opposite signs as expected with reference to e.g. Frank & Goyal (2003). The assumption that firms with more tangible assets have higher leverage, e.g. Frank & Goyal (2003), could not be confirmed by the regressions on book leverage. Also, the M/B ratio has opposite signs in comparison with Flannery & Ragan (2006) and Khoo et al. (2017).

In addition to estimating the predictors of leverage trough an OLS regression with fixed effect, the thesis uses a censored Tobit regression following equation (2). The upper limit is defined as the value of one, while the lower limit is defined as zero.

Table 7: Tobit Regressions – Target Leverage

Dependent variable:	***Market Leverage***		***Book Leverage***	
	Coef.	*p-value*	*Coef.*	*p-value*
Size	0.029**	0.000	0.019**	0.000
Profit	-0.039**	0.000	-0.074**	0.000
Tangibility	0.114**	0.000	0.061**	0.000
R&D dummy	-0.039**	0.000	-0.028**	0.000
M/B Ratio	-0.003**	0.000	-0.0003*	0.039
Sell. Expense	0.001**	0.006	0.001**	0.005
Depreciation	0.408**	0.000	0.740**	0.000
Constant	0.222**	0.000	0.386**	0.000
Random Effect	Yes		Yes	
Number of Observations	102,586		102,920	
Uncensored	101,353		93,257	
Left censored	1,233		1,717	
Right censored	0		7,946	
Number of Groups	12,496		12,530	
Log likelihood	22454.94		4318.26	
Wald chi2(7)	6749.42		5743.41	
Prob >chi2	0		0	

*The * represents a 5% significance level, while ** indicates a 1% significance level.*

The first conclusion that can be drawn from the Tobit regression is that the signs of the coefficients are robust for both market and book leverage. In addition, all variables are statistically significant at the 5% or 1% significance level. Comparing it to the expected effects as discussed earlier (Table 1), it can be seen that the variables size, profit, tangibility, M/B ratio, and R&D are consistent with previous research. Selling expense seems to increase leverage although slightly in contrast to the assumption that firms with more unique products have less leverage (e.g. Hovakimian et al., 2004). The Tobit regression show the result of a positive effect of depreciation on leverage coherent with the OLS regression.

5.2 Predicted Leverage and Deviation of Acquirers

The analysis proceeds with the estimation of the predicted leverage and the deviation of acquiring firms by using the fitted values of the previous regressions, as described in equation (2). Table 8 shows the descriptive statistics of the predicted target leverage of the 1,043 firms over the period of 1992 to 2017.

Table 8: Summary Statistic of Predicted Leverage

Panel A: OLS Regression					
	Obs.	*Mean*	*Std. Dev.*	*Min.*	*Max.*
Book Leverage	13,260	0.465	0.316	-0.444	3.736
Market Leverage	13,260	0.404	0.083	-0.204	0.746
Panel B: Tobit regression					
	Obs.	*Mean*	*Std. Dev.*	*Min.*	*Max.*
Book Leverage	13,260	0.523	0.069	0.337	0.945
Market Leverage	13,260	0.406	0.095	-0.248	0.701

As concluded earlier, most of the capital structure determinants attained through the Tobit regression are in line with previous studies, whereas the OLS regression shows more divergences. Moreover, the Tobit regression resulted in fewer outliers and therefore, the main analysis is primarily continued with the target leverage of the Tobit regression.

Succeeding the prediction, the deviation is estimated (Equation 3). Table 9 displays the leverage deviation of the pre-acquisition year. While, the year of completion is considered as the year of acquisition. Regarding book leverage, the deviation from target amounts to an average of 0.08 for cash acquisitions, whereas the stock acquisitions amount to only 0.05, which could indicate a preference. Yet, considering market leverage, the deviation accounts to 0.083, on average, for cash transactions, while acquisitions completed by stock have a deviation of 0.076, on average.

Table 9: Leverage Deviation

Variable	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Max*
Panel A: Acquisition made by Cash Only					
Book Leverage	375	0.076	0.217	-0.947	0.642
Market Leverage	375	0.083	0.213	-0.680	0.499
Panel B: Acquisition made by Cash and Stock Combination					
Book Leverage	283	0.061	0.297	-2.315	1.573
Market Leverage	282	0.057	0.223	-0.711	0.419
Panel C: Acquisition made by Stock only					
Book Leverage	252	0.048	0.272	-1.948	1.364
Market Leverage	252	0.076	0.216	-0.603	0.510
Panel D: Non-Acquisition Observations					
Book Leverage	11,206	0.050	0.305	-12.039	2.492
Market Leverage	11,197	0.074	0.209	- 0.762	0.606
Panel E: Entire Sample					
Book Leverage	12,116	0.051	0.302	-12.039	2.492
Market Leverage	12,106	0.074	0.210	-0.762	0.606

Target leverage is predicted through the Tobit model.

Overall, the average leverage deviation is higher for cash payments than for stock payments, which could indicate that firms with more overleverage prefer cash payments. However, the table does not show statistical significances between the payment groups and therefore further analysis is needed. The next section uses a logit model to predict the payment form.

Appendix 4 shows the leverage deviation based on the SIC industry groups. By measuring book leverage, the largest average deviation was found in the industry group business equipment through measuring book leverage, whereas the highest deviation of market leverage was found in the manufacturing industry. Taking into account the entire sample, it can be observed that the average leverage deviation of book leverage is smaller (0.051) than the market leverage variance (0.074), which could indicate that firms are balancing the book leverage more actively.

5.3 Acquirer's Choice of Payment

To analyse the trade-off theory in the context of merger and acquisitions, this section focuses on Hypothesis 1 and therefore, it is tested whether a bidder's deviation from its target ratio influences the choice of payment used for the transaction. Consequently, the dependent variable is a dummy variable based on the payment, which can be stock, cash only or a stock and cash combination. The dependent variable takes a binary form; hence, the regressions follow a logit model with robust standard errors. The included control variables aim on capturing other factors, which can influence the payment choice such as the relative deal value to the bidder's assets, pre-acquisition cash holdings and profitability. Furthermore, firm size is included because larger firms can have easier access to the debt market due to diversification (Kayhan & Titman, 2004), which allows them to acquire financing for cash acquisition. In addition, the market to book ratio is included to account growth opportunities, while taxes scaled by total assets capture the interest tax shields. Table 10 and 11 show the regression results for cash only and stock only payment using market leverage. For robustness, the results for book leverage are presented in the Appendix 6 and 7. The four variables focused on the leverage deviations pre-acquisition are based on (Harford, Klasa, & Walcott, 2006). The first model includes the variables leverage deviation in the year before the merger, while the second model includes the change in deviation as a variable. According to Harford et al. (2009), "bidders with greater investment opportunities are more likely to suffer from underinvestment problems as a result of having too high a debt load, they could be more likely to give importance to maintaining target debt levels." (p. 8). Hence, the third and fourth model include the two leverage deviation

variables multiplied with the market to book ratio to account for growth opportunities following Harford et al. (2009).

Table 10: Predicting Cash Acquisitions – Market Leverage

Dependent Variable: Cash only = 1				
Pre-acquisition year leverage deviation	0.758*		0.682	
	(0.050)		*(0.220)*	
Pre-acquisition year in leverage deviation*M/B			0.079	
			(0.846)	
Pre-acquisition year change in leverage deviation		1.025		0.889
		(0.123)		*(0.189)*
Pre-acquisition year change in leverage deviation*M/B				0.125
				(0.399)
Cash/Total Assets$_{t-1}$	0.542	0.784	0.556	0.883
	(0.359)	*(0.212)*	*(0.351)*	*(0.169)*
Tax/Total Assets$_{t-1}$	1.360	0.845	1.379	1.260
	(0.663)	*(0.794)*	*(0.659)*	*(0.701)*
Market/Book Ratio$_{t-1}$	0.014	0.015	-0.012	-0.034
	(0.115)	*(0.114)*	*(0.932)*	*(0.620)*
Deal Value/ pre-acquisition year Total Assets$_{t-1}$	0.0005	0.0005*	0.0005	0.001*
	(0.068)	*(0.043)*	*(0.070)*	*(0.047)*
Profitability$_{t-1}$	-1.840**	-1.678*	-1.834**	-1.573*
	(0.009)	*(0.017)*	*(0.009)*	*(0.025)*
Firm Size$_{t-1}$	0.025	0.050	0.024	0.050
	(0.520)	*(0.216)*	*(0.536)*	*(0.222)*
Constant	-0.510	-0.699*	-0.474	-0.638*
	(0.065)	*(0.017)*	*(0.148)*	*(0.035)*
Pseudo R2	0.014	0.012	0.014	0.013
Number of observations	847	761	847	761
Log pseudolikelihood	-564.551	-505.086	-564.534	-504.780

*The * represents a 5% significance level, while ** indicates a 1% significance level. Logit regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

The regression results showed that there is a positive correlation between leverage deviation and cash payment, however, the relationship is not consistently significant in the four models. The models accounting for growth opportunities do not support the claim that bidders with higher growth opportunities are more likely to use cash due to the underinvestment issue as in Harford et al. (2009). Only the variable that considers the leverage deviation of the pre-merger year has a significance level of 5%. For a firm deciding to use cash as payment method, the most relevant factor is the profitability according to the four models. On one hand, the

coefficients of leverage deviation indicate that a firm does not consider the opportunity of a merger to adjust towards its target leverage ratio, which would support the target leverage hypothesis. On the other hand, the probability of a firm paying the acquisition with cash only is negatively associated with profitability, which suggest that firms consider the interest tax shield of issuing debt to finance the acquisition with cash. Furthermore, the cash ratio of a firm does not have a significant effect on the cash payment method, whereas the deal value has a significant positive correlation in the two regressions, which include the pre-acquisition year change as an explanatory variable. In addition to analysing the factors of cash payment, the regressions in Table 11 predict stock mergers.

Table 11: Predicting Stock Acquisitions – Market Leverage

Dependent Variable: Stock only = 1				
Pre-acquisition year leverage deviation	-0.040		-0.774	
	(0.924)		*(0.241)*	
Pre-acquisition year in leverage deviation*M/B			-0.761	
			(0.081)	
Pre-acquisition year change in leverage deviation		-0.355		1.094
		(0.619)		*(0.398)*
Pre-acquisition year change in leverage deviation*M/B				-1.020
				(0.149)
Cash/Total Assets	-1.345	-0.921	-1.515*	-1.12
	(0.053)	*(0.211)*	*(0.035)*	*(0.139)*
Tax/Total Assets	-1.778	-0.781	-1.983	-1.400
	(0.621)	*(0.841)*	*(0.582)*	*(0.719)*
Market/Book Ratio	-0.010	-0.007	0.232	0.080
	(0.380)	*(0.498)*	*(0.103)*	*(0.257)*
Deal Value/ pre-acquisition year Total Assets	0.000	0.000	0.000	0.000
	(0.419)	*(0.313)*	*(0.461)*	*(0.579)*
Profitability	1.665	1.530	1.600	1.213
	(0.089)	*(0.149)*	*(0.087)*	*(0.225)*
Firm Size	0.007	0.029	0.015	0.026
	(0.869)	*(0.532)*	*(0.087)*	*(0.579)*
Constant	-1.023**	-1.237**	-1.346**	-1.280**
	(0.001)	*(0.000)*	*(0.000)*	*(0.000)*
Pseudo R2	0.012	0.010	0.011	0.013
Number of observations	847	761	847	761
Log pseudolikelihood	-489.362	-438.942	-488.103	-437.574

*The * represents a 5% significance level, while ** indicates a 1% significance level. Logit regressions are estimated with robust standard errors. Regressions estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

In contrast to the regressions predicting cash acquisition, none of the variables is significant for predicting stock acquisitions. Therefore, it is concluded that leverage deviation does not significantly influence firms to make an acquisition paid with stock only, according to the sample. Also, the same regressions are performed for the stock and cash combination in Appendix 5. Addressing the leverage deviation, only the pre-acquisition leverage deviation is significantly negatively correlated with the mixed payment method. To further analyse and subsequently compare with results of the literature, Table 12 shows the cash predictions using the target leverage estimated by the Tobit and by the OLS regression with fixed effect.

Table 12: Predicting Cash Acquisitions – Tobit & OLS Regression

	Tobit Regression		**OLS Regression**	
Dependent Variable: Cash only= 1	*Market Leverage*	*Book Leverage*	*Market Leverage*	*Book Leverage*
Pre-acquisition leverage deviation	0.783*	0.456	0.793	0.122
	(0.042)	*(0.158)*	*(0.063)*	*(0.552)*
Cash/Total Assets	0.430	0.530	0.275	0.524
	(0.446)	*(0.344)*	*(0.665)*	*(0.408)*
Tax/Total Assets	1.177	2.062	-5.430	-4.325
	(0.703)	*(0.490)*	*(0.073)*	*(0.145)*
Market/Book Ratio	0.014	0.018	-0.019	0.000
	(0.137)	*(0.071)*	*(0.658)*	*(0.988)*
Deal Value/ pre-acq. Total Assets	0.000	0.000	-0.007	-0.007
	(0.094)	*(0.105)*	*(0.232)*	*(0.237)*
Profitability	-1.719*	-1.407*	0.265	0.522
	(0.010)	*(0.022)*	*(0.662)*	*(0.447)*
Constant	-0.351**	-0.397**	-0.263*	-0.315*
	(0.004)	*(0.001)*	*(0.068)*	*(0.021)*
Pseudo R2	0.014	0.012	0.008	0.012
Number of observations	847	847	856	856
Log pseudolikelihood	-564.753	-565.830	-493.190	-573.738

*The * represents a 5% significance level, while ** indicates a 1% significance level. Logit regressions are estimated with robust standard errors. P-value in parenthesis.*

Considering the OLS regression, none of the variables are significant in neither book or market leverage. For the Tobit regression, it is shown that the negative coefficient associated with profitability to cash payment holds true for both market and book leverage. For stock acquisitions predicted with book leverage deviations, none of the variables are significant, which is the same result as with market leverage. Therefore, it is concluded that leverage deviation is not relevant for choosing stock as a form of payment. The suggestions of Harford

et al. (2009), that firms with higher leverage than their target ratio "[..] prefer to finance the merger with equity rather than debt" (p. 8), cannot be confirmed with the present sample of large acquisitions. The thesis found a positive correlation of pre-merger leverage deviation to cash payment consistent with Harford et. al (2009). Although Harford et al. (2009) state a negative association, the relationship found in the present study is coherent due to the fact that the authors compute the deviation by subtracting the predicted leverage from the actual value, while the thesis computes the deviation in the opposite way. Harford et al. (2009) also found the variable pre-acquisition year change in leverage deviation to be significant for predicting cash acquisition, which is not proven in the present study. One reason for the divergence can be the defined acquisition year, while the thesis uses the completion date, Harford et al. (2009) use the announcement date.

The results of the thesis indicate that bidders which are overleveraged in comparison to their target ratio are less likely to pay for the acquisition with cash. According to Uysal (2011), most cash acquisitions are financed with debt, in reference to Harford et al. (2009) and Bharadwaj and Shivdasani (2003). Consequently, it can be concluded that firms with overleverage are less likely to finance their acquisition with debt, consistent with Uysal (2011) and Harford et al. (2009). In view of predicting mixed payment acquisition, a negative effect on leverage deviation was obtained, which suggests that overleveraged firms are more likely to use a mixed payment method. One could conclude that, in turn, overleveraged firms in return are more likely to use stock as consideration structure. However, the regressions on stock only resulted in non-significant results. Addressing the first hypothesis, the conclusion of the thesis is that bidders, which are above their target leverage ratio, are less likely to finance their transaction with debt, but it is not proven that they are more likely to finance the transaction with equity instead. Rather, overleveraged firms are more likely to use a mixed payment method.

5.4 Merger-induced Leverage Changes and Evolution

The next two sections focus on Hypothesis 2 by testing if firms increase their leverage deviation with an acquisition and if they adjust towards leverage ratio after the acquisition is completed. The first analysis of Table 13 aims to explain the leverage changes associated by the mergers. Unless indicated otherwise, the target leverage is determined by the predictions of the Tobit model for the succeeding analyses. It is assumed that firms, which are engaging in mergers are likely to change their leverage ratio due to the financing of a large target. The thesis focuses only on large transaction to increase the likelihood of an acquisition to impact the bidder's

leverage. At the same time the leverage ratio is expected to change, it is very likely the target is changed as well. Hence, the following model includes a variable called merger-induced change based on Harford et al. (2009). The merger-induced change captures the change in target from the pre-acquisition year to the effective acquisition year (Harford et al, 2009). Thereby, it can be tested if firms consider their future target ratio of the combined firm and if the leverage increases due to the transaction.

Following Harford et al. (2006), Table 13 uses the four variables of leverage deviation and the control variables as in Tables 10 and 11. The dependent variable in scope is the actual leverage in the first post-acquisition year subtracted by the year prior the merger. The regressions aim to determine whether bidders consider the target ratio of the combined firm in the financing decision and whether the financing decision leads to a leverage increase (Harford et al., 2009).

Table 13: Explaning Leverage Change of Acquistion – Market Leverage

Dependent Variable: ***Leverage in the year following the merger minus leverage in the year prior to the merger***				
Pre-acquisition year leverage deviation	0.284**		0.402**	
	(0.000)		(0.000)	
Pre-acquisition year in leverage deviation*M/B			-0.108*	
			(0.045)	
Pre-acquisition year change in leverage deviation		0.192*		0.173
		(0.015)		(0.146)
Pre-acquisition year change in leverage deviation*M/B				0.013
				(0.728)
Merger-induced change in target leverage	1.257**	1.387**	1.332**	1.400**
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Cash/Total Assets$_{t-1}$	-0.019	0.095	-0.031	0.097
	(0.679)	*(0.063)*	*(0.507)*	*(0.061)*
Tax/Total Assets$_{t-1}$	-0.414	-0.060	-0.436	-0.054
	(0.069)	*(0.816)*	*(0.051)*	*(0.834)*
Market/Book Ratio$_{t-1}$	-0.001	0.006	0.028	0.006
	(0.744)	*(0.093)*	*(0.073)*	*(0.245)*
Deal Value/ pre-acquisition year Total Assets	0.000**	0.000**	0.000**	0.000**
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Profitability$_{t-1}$	0.121	0.284**	0.126	0.287**
	(0.054)	*(0.000)*	*(0.030)*	*(0.000)*
Firm Size	-0.004	0.000	-0.003	0.000
	(0.124)	*(0.959)*	*(0.200)*	*(0.982)*
Constant	0.009	-0.050	-0.028	-0.054
	(0.723)	*(0.072)*	*(0.383)*	*(0.058)*
R squared	0.189	0.118	0.200	0.118
Number of observations	756	675	756	675

*The * represents a 5% significance level, while ** indicates a 1% significance level. Regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

In line with the results of Harford et al. (2009), the thesis finds a significant positive relation between the merger-induced change and the bidder's leverage levels. The merger-induced change is significant at the 1% significance level for all four ordinary least squares models. The results suggest that managers are more likely to complete and finance a merger, which increase their firm's leverage, if the transaction increases also the predicted target leverage ratio at the same time. The dimension of the coefficient of the merger- induced change variable accentuates the importance of the leverage adjustment and hence, that managers actively adjust their firm's leverage towards target.

Furthermore, the results show that the change in actual leverage associated with the merger is significantly and positively correlated with pre-acquisition year leverage deviation and the pre-acquisition change in leverage deviation. It can be concluded that bidders' managers are "less likely to structure an acquisition transaction which significantly increases book leverage the more a firm is already over its target leverage" (Harford et al, 2006, p. 25). Harford et al. (2009) reported that "[..] if the pre-acquisition year leverage deviation per dollar of assets is ten cents higher, the merger-induced change in market leverage is reduced by approximately 3.4 cents per dollar of assets." (p. 9). The present study shows that the raise of ten cents per dollar in pre-acquisition year leverage deviation leads to an increase by 2.8 cents in the merger-induced change in market leverage. Consequently, the results are very similar to the earlier study by Harford et al. and extending the sample of large acquisitions through including the financial crisis and the five years succeeding does not change the main conclusions that managers make financing decisions towards target leverage ratio.

The third and fourth column in Table 13 includes variables multiplied by the market to book ratio. A significant and negative coefficient is found on pre-acquisition year in leverage deviation*M/B variable. The increase of pre-acquisition year leverage deviation by ten cents per dollar increases the merger-induced change in market leverage by 4.0 cents in the third model. This could suggest that firms with greater growth opportunities take more advantage of a merger-induced leverage change to adjust towards target. Overall, the results of the model support the hypothesis 2 that firms adjust their leverage towards target ratio in the context to acquisitions.

To further analyse the leverage deviation induced by the merger, Table 14 shows the mean statistics of market leverage deviation over time, grouped by the consideration structure. The period is defined as two years prior to five years after the effective acquisition year.

Table 14: Mean of Market Leverage Deviation over Time

Years	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**
Panel A: All Observations								
Mean	0.066	0.073	0.064	0.073	0.072	0.063	0.056	0.058
Number Obs.	830	909	966	953	916	866	829	774
Panel B: Cash Only								
Mean	0.067	0.083	0.076	0.076	0.072	0.05	0.037*	0.05
Number Obs.	331	375	398	395	384	366	354	328
p-value	*(0.907)*	*(0.244)*	*(0.178)*	*(0.781)*	*(0.959)*	*(0.16)*	*(0.037)*	*(0.366)*
Panel C: Stock Only								
Mean	0.077	0.076	0.062	0.07	0.077	0.09	0.085*	0.083
Number Obs.	231	252	274	266	249	235	225	208
p-value	*(0.349)*	*(0.813)*	*(0.879)*	*(0.729)*	*(0.647)*	*(0.09)*	*(0.025)*	*(0.054)*
Panel D: Cash and Stock Combination								
Mean	0.055	0.057	0.05	0.074	0.068	0.056	0.057	0.048
Number Obs.	268	282	294	292	283	265	250	238
p-value	*(0.308)*	*(0.142)*	*(0.196)*	*(0.968)*	*(0.699)*	*(0.569)*	*(0.933)*	*(0.377)*

Target leverage is predicted through the Tobit model. P-value in parenthesis.

Panel A in Table 14 shows that the mean of the deviation of all acquisition is 0.073 in the year prior to the merger. Overall, the means show that the majority of the sample is underleveraged at any point of the observation period. It is observed that the highest average leverage deviation is found at the cash sample in Panel B. The leverage deviation of cash acquirer amounts to 8.3 cents per dollar of assets, while the cash and stock combination deviated by 5.7 cents per dollar of assets. For cash acquisition, the average deviation is reduced to 3.7 cents per dollar of assets in the fourth year after the acquisition completion, whereas the stock acquisition sample increases the deviation to 8.5 cents in the same time frame. Looking at the mixed payment acquisition sample, the deviation tends to be lower than the deviation of the other two payment groups over the observed period. The analysis of Table 14 supports the earlier conclusion that managers of cash acquisition consider the leverage deviation in their financing choice and they aim to reduce the unused debt capacity through financing the cash acquisition with debt.

5.5 Leverage Adjustment

Hypothesis 2 also focuses on firms' adjustment towards target ratio and therefore, the partial adjustment model as described in equation (4) with fixed effects, is applied. Table 16 shows the adjustment model, based on the whole sample of firms without specifically addressing the acquisition year. The dependent variable is the change in leverage by computing leverage subtracted by the lagged leverage. The explanatory variables aim to capture short-term movements away from the target capital structure.

Table 15: Adjustment Model

Dependent Variable:* Δ *Leverage	*Market Leverage*	*Book leverage*
Adjust	0.385** *(0.00)*	0.437***(0.000)*
Δ Profitability $_{t}$	-0.136** *(0.000)*	-0.204**(0.046)*
Δ Profitability $_{t-1}$	-0.033 ***(0.008)*	-0.083 *(0.068)*
Investment	-0.122** *(0.002)*	0.016 *(0.804)*
Investment $_{t-1}$	0.0367 *(0.235)*	-0.040 *(0.541)*
Constant	0.024** *(0.000)*	0.018** *(0.008)*
Firm Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes
Number of Observations	12,293	12,299
Number of Groups	998	998
R square:		
Within	0.339	0.224
between	0.013	0.067
Overall	0.188	0.131

*The * represents a 5% significance level, while ** indicates a 1% significance level. Regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis.*

The adjustment variable has a significant coefficient at the 1% significance level for both market and book leverage. Considering market leverage, firms adjust their leverage towards target by approximately 39% every year, while the book leverage adjustment amounts to roughly 44%. Therefore, the results provide evidence for the assumption that firms adjust towards target ratio, and thereby support the trade-off theory hypothesis. The results of the adjustment model are in line with previous research, such as the studies of Flannery and Rangan (2006), Roberts and Leary (2005), Fama and French (2002), Ritter and Huang (2009). The

adjustment rate of the present model is close to the adjustment speed of Flannery and Rangan (2006), who estimated a speed of approximately 36% using market leverage and 34% with book leverage. It is also similar to the result of Antoniou et al. (2008) of 32.2% for market leverage. In contrast, Ritter and Huang report a slower speed of 16% per year for book leverage using firm fixed effects, while the adjustment speed of market leverage is approximately 14%. Authors which do not use fixed effects, estimate lower speed of adjustment such as Kayhan and Titman (2004), who obtain 10% for book leverage and 8% for market leverage.

In addition, the thesis specifically focuses on the adjustment after the merger; thus, Table 16 focuses on the adjustment post-merger. Also, in the context of leverage adjustment, it is crucial to address adjustment costs. As pointed out by Flannery and Ragan (2006),

> "The speed with which firms reverse deviations from their target debt ratios depends on the cost of adjusting leverage. With zero adjustment costs, the trade-off theory implies that firms should never deviate from their optimal leverage." (p. 470).

Thus, the following model includes bankruptcy risk as an explanatory variable following Leary and Roberts (2005), Harford et al. (2009) and Tao et. al. (2017). Bankruptcy risk is thus a measure of adjustment cost. Following Harford et al. (2009) based on Graham (1996), this thesis uses a modified unlevered version of the Altman-Z score. The bankruptcy risk variable is computed through: computed through (total assets)/ (3.3 times earnings before interest and taxes + sales + 1.4 times retained earnings + 1.2 times working capital). Table 16 below displays a model based on Harford et al. (2009), which includes bankruptcy risk. The dependent variable is the change in leverage deviation from year zero to year three, four and five. The leverage deviation is estimated through predicted leverage of the Tobit model subtracted by the actual leverage. The other explanatory variables are equal to the model in Table 13.

Table 16: Explaining Market Leverage Adjustment Post-Merger

Dependent variable:	***ΔLeverage deviation Year 0 to +3***		***ΔLeverage deviation Year 0 to +4***		***ΔLeverage deviation Year 0 to +5***	
Acquisition year deviation		-0.382**		-0.479**		-0.465**
		(0.001)		*(0.000)*		*(0.001)*
Acquisition year leverage		-0.005		-0.016		0.039
		(0.966)		*(0.898)*		*(0.768)*
Pre-acquisition year deviation	-0.265*		-0.386*		-0.377**	
	(0.029)		*(0.005)*		*(0.009)*	
Pre-acquisition year leverage	-0.007		-0.083		-0.088	
	(0.948)		*(0.507)*		*(0.519)*	
$Size_{t-1}$	0.007	0.010	0.014*	0.017**	0.015*	0.015*
	(0.208)	*(0.054)*	*(0.015)*	*(0.002)*	*(0.023)*	*(0.010)*
$Profit_{t-1}$	-0.048	-0.045	-0.042	-0.035	-0.024	-0.009
	(0.273)	*(0.231)*	*(0.347)*	*(0.386)*	*(0.547)*	*(0.801)*
Bankruptcy $risk_{t-1}$	0.002	0.001**	0.002	0.000	0.003	0.000
	(0.062)	*(0.004)*	*(0.463)*	*(0.802)*	*(0.113)*	*(0.954)*
Cash/ Total $Assets_{t-1}$	0.085	0.124*	0.157*	0.214**	0.094	0.210**
	(0.183)	*(0.028)*	*(0.020)*	*(0.000)*	*(0.188)*	*(0.001)*
Taxes/ Total $Assets_{t-1}$	0.591*	0.630**	0.302	0.411	-0.060	0.078
	(0.015)	*(0.005)*	*(0.338)*	*(0.152)*	*(0.862)*	*(0.830)*
Market/Book $Ratio_{t-1}$	0.004**	0.002**	0.003**	0.001**	0.004**	0.002**
	(0.000)	*(0.000)*	*(0.000)*	*(0.007)*	*(0.000)*	*(0.002)*
Constant	-0.060	-0.071	-0.072	-0.110*	-0.071	-0.122**
	(0.121)	*(0.051)*	*(0.128)*	*(0.015)*	*(0.151)*	*(0.008)*
Number of obs.	609	664	563	616	519	568
R square	0.088	0.171	0.100	0.212	0.205	0.225

*The * represents a 5% significance level, while ** indicates a 1% significance level. Regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

The regressions showed a significant negative association of the pre-acquisition year leverage deviation to the dependent variable for all three periods. This result indicates that the bidder reduces its leverage more towards the target in the years following the merger, when the pre-acquisition leverage deviation is higher. The bankruptcy risk is not significant in five of the six regressions, contradicting the trade-off theory, which proposes that firms balance bankruptcy costs against tax benefits of debt, yet, the tax variable is significant for the first two models.

Considering the pre-acquisition market to book ratio, there is a negative correlation with change in the acquirer's deviation, which suggests that acquirers are more likely to move towards target ratio when they have higher growth opportunities, consistent with Harford et. al (2009). The

acquisition year leverage deviation variable suggests that about 47% of an acquirer's leverage deviation is reversed after five years. In comparison, Harford et al. estimated a reversal of 54% for cash deals.

5.6 Analysis Pre- and Post-financial Crisis

The last part of the analysis emphasises the results in the context of the financial crisis. The papers of Uysal (2007) and Harford (2009), which were taken into account for the construction of the thesis, focus on acquisitions before the financial crisis of 2008. The thesis extends the sample until 2012 and therefore includes acquisitions made during the financial crisis and in the post-financial crisis years. The thesis divides the sample into pre-financial crisis, with observations before 2008, and post-financial crisis, with observations from 2008 to 2012. Table 17 follows the same model as Table 15 but estimates the model separately for both samples.

Table 17: Adjustment Model – Pre- and Post-Financial Crisis

Dependent Variable:* Δ *Leverage				
	Pre-financial crisis		**Post-financial crisis**	
	Market Lev.	*Book Lev.*	*Market Lev.*	*Book Lev.*
Adjust	0.467**	0.538**	0.490**	0.372**
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Δ Profitability $_{t}$	-0.144**	-0.178**	-0.130**	-0.251**
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Δ Profitability $_{t-1}$	-0.038**	-0.087**	-0.032**	-0.123**
	(0.000)	*(0.000)*	*(0.002)*	*(0.000)*
Investment	-0.144**	0.022	-0.158**	0.001
	(0.000)	*(0.747)*	*(0.001)*	*(0.988)*
Investment $_{t-1}$	0.005	-0.069	0.005	0.031
	(0.855)	*(0.247)*	*(0.900)*	*(0.544)*
Constant	-0.029**	-0.035**	0.087**	0.010
	(0.000)	*(0.003)*	*(0.000)*	*(0.068)*
Firm Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Number of Observations	8,101	8,101	4,198	4,198
Number of Groups	955	955	595	595
R square:				
Within	0.327	0.248	0.486	0.296
between	0.022	0.068	0.039	0.119
Overall	0.144	0.137	0.227	0.119

*The * represents a 5% significance level, while ** indicates a 1% significance level. Target leverage is predicted through the Tobit model. P-value in parenthesis.*

Considering market leverage, the adjustment speed is about 10% higher than the adjusted speed of Table 15. The adjustment speed for market leverage amounts to 47% in the pre-financial crisis, while the post-financial crisis sample has a leverage adjustment speed towards target of 49%. When the model is estimated with book leverage, the adjustment speeds diverge to a greater extent. While the model of Table 15 estimated an adjustment speed of 44%, the current model obtained a speed of 53% before the crisis and 37% after the crisis. Overall, it can be concluded that extending the sample with the financial crisis and five years after the crisis does not change the main conclusion that firms converge towards a target ratio. Rather, the adjustment speed increases for both samples.

Furthermore, it is tested if the change of leverage towards target after the merger differs in the two groups. Table 18 follows the model of Table 16 by including a measure of bankruptcy to estimate the speed of adjustment.

Table 18: Explaining Market Leverage Adjustment – Pre- and Post-Financial Crisis

Dependent variable:	***ΔLeverage deviation Year 0 to +3***		***ΔLeverage deviation Year 0 to +4***	
	Pre-crisis	**Post-crisis**	**Pre-crisis**	**Post-crisis**
Acquisition year deviation	-0.325*	-0.622*	-0.430**	-0.709**
	(0.016)	*(0.024)*	*(0.004)*	*(0.009)*
Acquisition year leverage	0.038	-0.170	0.031	-0.163
	(0.776)	*(0.473)*	*(0.831)*	*(0.487)*
$Size_{t-1}$	0.007	0.013	0.015*	0.021
	(0.240)	*(0.319)*	*(0.023)*	*(0.133)*
$Profit_{t-1}$	-0.044	0.006	-0.036	0.160
	(0.280)	*(0.978)*	*(0.365)*	*(0.473)*
Bankruptcy $risk_{t-1}$	0.001**	0.002	0.000	0.008**
	(0.006)	*(0.482)*	*(0.250)*	*(0.000)*
Cash/ Total $Assets_{t-1}$	0.146*	-0.013	0.243**	*0.031*
	(0.019)	*(0.926)*	*(0.000)*	*(0.822)*
Taxes/ Total $Assets_{t-1}$	0.581*	0.879	0.385	0.194
	(0.020)	*(0.160)*	*(0.224)*	*(0.808)*
Market/Book $Ratio_{t-1}$	0.002**	0.011	0.001*	0.023
	(0.000)	*(0.400)*	*(0.016)*	*(0.157)*
Constant	-0.078	-0.015	-0.118*	-0.099
	(0.061)	*(0.867)*	*(0.025)*	*(0.251)*
Number of obs.	512	152	494	122
R square	0.173	0.250	0.199	0.342

*The * represents a 5% significance level, while ** indicates a 1% significance level. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

Earlier, the results in Table 16 suggested that about 38% of an acquirer's leverage deviation is reversed after four years. Considering the post-crisis acquisition sample, a high increase can be seen to up to 62%. The increase is demonstrated in both the three- and four-year period after the acquisition. Consequently, it is concluded that managers reverse the leverage deviation, on average, faster in the post-crisis years, according to the sample. Also, the models showed a significant positive correlation of the cash variable to changes in post-acquisition leverage deviation for the pre-crisis sample. This indicates that bidding firms with more cash reserves are more likely to reduce their leverage after the merger. Overall, the results of the pre- and post-crisis analysis showed that managers actively rebalance their capital structure after the merger, which supports the trade-off model.

6. Conclusion and Future Research

The aim of this thesis was to study capital structures in the context of merger and acquisition. The study uses a sample of 1,290 large acquisitions, which were completed between 1993 and 2012. The first research question addresses whether the financial deficit of a firm to its target leverage ratio influences the choice of payment method. The evidence shows that bidding firms, which are overleveraged in comparison to their target ratio are less likely to pay for the transaction with cash. It is assumed that the majority of cash transactions are financed with debt; hence, already overleveraged firms do not further increase their leverage with an acquisition. According to the sample, overleveraged firms are more likely to use a mixed payment method of both equity and cash. One limitation of the current thesis is the lack of consideration for the mixed payments acquisition. To further support the claim that overleveraged firms are less likely to use cash, it could be interesting to study whether the proportion of stock in the mixed payment increase with higher overleverage. The results suggest that firms have target leverage ratios and try to not move further away from their target with the transaction.

The second research question aims to study the changes in leverage caused by the transaction. Large acquisitions have a great potential to move firms further away from their target leverage but, at the same time, the transaction can also change the target leverage of the then combined firm. The results provide evidence that if the transaction increases the target ratios, managers are more likely to complete an acquisition, which will increase their firm's leverage. Consequently, this points out that managers consider the future target leverage of the combined

firm in their acquisition decisions. Furthermore, the thesis showed that overleveraged firms are less likely to finance an acquisition, which would further increase their leverage. The thesis found that an increase of pre-acquisition leverage deviation by ten cents per dollar leads to a higher change in market leverage, when a measure for growth opportunities is included. This finding suggests that firms with greater growth opportunities take more advantage of a merger-induced target leverage change to adjust towards target.

Furthermore, the second research question focuses on whether firms convert towards a target ratio by studying the post-acquisition years. The acquisition sample of the thesis showed that firms adjust their market leverage towards target by 39% every year, on average, considering the whole sample. Moreover, the results illustrate that bidders reduce their leverage more towards the target in the years following the merger, when the pre-acquisition leverage deviation is higher. In addition, bidders are more likely to move towards target when they have higher growth opportunities. Addressing the financing effect of the merger, it is shown that about 47% of an acquirer's leverage deviation caused by the merger is reversed after five years.

Although the thesis shows that target leverage ratios are relevant in the context of acquisition, it is limited to annual fundamental data and annual market information. To further prove the importance of leverage targets, the market reactions of merger announcements could be examined. For instance, it could be tested whether leverage deficit plays a role in abnormal announcement returns. Furthermore, one could use quarterly data to measure the leverage deficit and include firms, which make several acquisitions per year.

Lastly, the thesis studied the adjustment speeds by splitting the sample into pre- and post-financial crisis. The adjustment speed for market leverage amounted to 47% for the pre-financial crisis sample, while the post-crisis sample achieved a slightly higher speed of 49%. Furthermore, the post-crisis sample showed that 62% of the leverage effect of the merger is reversed after three years, which is a much higher proportion than the 32% reversal before the crisis. However, the thesis is limited in comparing both time periods because the sample only accounts for acquisitions completed up to 2012 and therefore, the post-crisis sample is rather small. Additionally, due to the small size of cash transactions, the conclusions of the first research question were not tested in the context of comparing the pre- and post-crisis sample.

Overall, it can be concluded that firms converge towards a target ratio and that firms consider the leverage deviation in their acquisition decisions. Consequently, the thesis provides evidence for a capital structure model with a target ratio.

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Appendix

Appendix 1: Variable Description

Variable	Description
Market Leverage	book debt/ (total assets - book equity + market equity)
Book Leverage	book debt/ total assets
Book Equity	total assets - total liabilities + deferred taxes and investment tax credit + preferred stock
Book Debt	total assets - book equity
Market Equity	common shares outstanding * price closing
Firm Size	Ln (net sales)
Profitability	EBITDA/total assets
Market to book ratio	(total assets - book equity + market equity)/total assets
Tangibility	property plant & equipment net/total assets
Selling Expense	selling expense/net sale
Depreciation	depreciation and amortization/total assets
Cash/Total Assets	cash and short-term investments/ total assets
Tax/Total Assets	income tax paid/ total assets
Investment	capital expenditure/ total asset
Bankruptcy Risk	(total assets)/ (3.3 times earnings before interest and taxes + sales + 1.4 times retained earnings + 1.2 times working capital)

Appendix 2: Characteristics of Deals

Characteristic	Fraction of Sample
Panel A: Consideration Structure	
Cash Only	41.6%
Cash and Stock Combination	30.2%
Stock Only	28.1%
Panel B: Form of the Deal	
Merger	72.6%
Acquisition of Assets	19.6%
Acquisition of Partial Interest	3.8%
Acquisition of Majority Interest	2.1%
Acquisition of Remaining Interest	1.6%
Buyback	0.2%
Acquisition of Certain Assets	0.1%
Panel C: Deal Attitude	
Friendly	96.6%
Neutral	2.3%
Hostile	0.8%
Unsolicited	0.2%
Not Appl.	0.2%
Panel D: Cross Border	
Non-Cross Border	87.8%
Cross Border	12.2%

Appendix 3: Characteristic of Acquirer

Characteristic	Fraction of Sample
Panel A: Multiple Acquirers	
Acquirers making one large acquisition	81%
Acquirers making more than two large acquisition	15%
Acquirers making two large acquisition	4%
Panel B: TRBC Economic Sector of Acquirers	
Technology	24.93%
Industrials	22.72%
Cyclical Consumer Goods & Services	16.49%
Healthcare	13.71%
Basic Materials	7.09%
Energy	6.52%
Non-Cyclical Consumer Goods & Services	5.37%
Telecommunications Services	3.74%

Appendix 4: Leverage Variation – Industry

Variable	*Obs.*	*Mean*	*Std. Dev*	*Min*	*Max*
Consumer Non-Durables					
Book Leverage	980	0.024	0.237	-2.385	0.549
Market Leverage	980	0.095	0.214	-0.582	0.450
Consumer Durables					
Book Leverage	424	-0.017	0.246	-1.534	0.485
Market Leverage	424	- 0.056	0.245	-0.626	0.297
Manufacturing					
Book Leverage	1,850	0.053	0.256	-2.192	1.100
Market Leverage	1,850	0.091	0.219	-0.626	0.606
Oil, Gas, and Coal Extraction and Products					
Book Leverage	704	0.018	0.605	-12.039	0.910
Market Leverage	704	0.073	0.204	-0.545	0.461
Chemicals and Allied Products					
Book Leverage	446	0.005	0.186	-1.111	0.529
Market Leverage	446	0.042	0.187	-0.567	0.402
Business Equipment					
Book Leverage	3,819	0.061	0.341	-8.192	2.492
Market Leverage	3,815	0.074	0.188	- 0.733	0.487
Telephone and Television Transmission					
Book Leverage	432	-0.009	0.363	-3.560	0.732
Market Leverage	431	0.026	0.231	-0.548	0.561
Wholesale, Retail, and Some Services					
Book Leverage	1,499	0.028	0.255	-2.793	1.597
Market Leverage	1497	0.055	0.242	-0.582	0.578
Healthcare, Medical Equipment, and Drugs					
Book Leverage	1,246	0.064	0.334	-6.776	1.978
Market Leverage	1,246	0.068	0.198	-0.799	0.406
Not defined Industry Group					
Book Leverage	1,617	0.051	0.290	-2.895	2.427
Market Leverage	1,613	0.084	0.231	-0.626	0.586

Appendix 5: Predicting Stock and Cash Acquisitions – Market Leverage

Dependent Variable: Stock and Cash Payment = 1				
Pre-acquisition year leverage deviation	-0.791*		-1.292*	
	(0.041)		*(0.026)*	
Pre-acquisition year in leverage deviation*M/B			0.528	
			(0.365)	
Pre-acquisition year change in leverage deviation		-0.754		-0.815
		(0.286)		*(0.263)*
Pre-acquisition year change in leverage deviation*M/B				0.054
				(0.729)
Cash/Total Assets	0.480	-0.093	0.572	-0.053
	(0.441)	*(0.890)*	*(0.365)*	*(0.938)*
Tax/Total Assets	-0.479	-0.745	-0.331	-0.581
	(0.881)	*(0.824)*	*(0.981)*	*(0.864)*
Market/Book Ratio	-0.012	-0.021	-0.188	-0.0413
	(0.219)	*(0.357)*	*(0.230)*	*(0.577)*
Deal Value/ pre-acquisition year Total Assets	-0.001	-0.001	0.000	-0.001
	(0.209)	*(0.115)*	*(0.219)*	*(0.114)*
Profitability	0.910	0.779	0.948	0.819
	(0.143)	*(0.262)*	*(0.159)*	*(0.248)*
Firm Size	-0.035	-0.081	-0.041	-0.081
	(0.380)	*(0.056)*	*(0.316)*	*(0.055)*
Constant	-0.588*	-0.197	-0.356	-0.173
	(0.044)	*(0.516)*	*(0.319)*	*(0.584)*
Pseudo R2	0.007	0.006	0.008	0.006
Number of observations	847	761	847	761
Log pseudolikelihood	-528.034	-481.630	-427.29	-482.231

*The * represents a 5% significance level, while ** indicates a 1% significance level. Logit regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

Appendix 6: Prediction Cash Acquisition – Book Leverage

Dependent Variable: Cash Payment = 1				
Pre-acquisition year leverage deviation	0.496		0.648	
	(0.131)		*(0.237)*	
Pre-acquisition year in leverage deviation*M/B			-0.082	
			(0.668)	
Pre-acquisition year change in leverage deviation		0.014		-0.173
		(0.974)		*(0.940)*
Pre-acquisition year change in leverage deviation*M/B				0.017
				(0.940)
Cash/Total Assets	0.678	0.903	0.685	1.030
	(0.242)	*(0.150)*	*(0.235)*	*(0.114)*
Tax/Total Assets	2.218	0.221	2.2120	0.509
	(0.464)	*(0.946)*	*(0.463)*	*(0.877)*
Market/Book Ratio	0.020	0.019	0.024	-0.030
	(0.057)	*(0.417)*	*(0.053)*	*(0.644)*
Deal Value/ pre-acquisition year Total Assets	0.000	0.000	0.000	0.000
	(0.062)	*(0.034)*	*(0.064)*	*(0.063)*
Profitability	-1.620*	-1.440*	-1.600*	-1.311
	(0.015)	*(0.036)*	*(0.015)*	*(0.063)*
Firm Size	0.040	0.050	0.040	0.049
	(0.300)	*(0.218)*	*(0.301)*	*(0.237)*
Constant	-0.651*	-0.731*	-0.658*	-0.665*
	(0.017)	*(0.013)*	*(0.016)*	*(0.029)*
Pseudo R2	0.013	0.010	0.013	0.011
Number of observations	847	761	847	761
Log pseudolikelihood	-565.303	-506.247	-565.225	-505.820

*The * represents a 5% significance level, while ** indicates a 1% significance level. Logit regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

Appendix 7: Prediction Stock Acquisition – Book Leverage

Dependent Variable: Stock Payment = 1				
Pre-acquisition year leverage deviation	-0.532		-0.783	
	(0.127)		*(0.165)*	
Pre-acquisition year in leverage deviation*M/B			0.120	
			(0.538)	
Pre-acquisition year change in leverage deviation		0.008		0.501
		(0.986)		*(0.477)*
Pre-acquisition year change in leverage deviation*M/B				-0.152
				(0.528)
Cash/Total Assets	-1.157	-0.965	-1.147	-1.145
	(0.112)	*(0.189)*	*(0.089)*	*(0.132)*
Tax/Total Assets	-1.072	-0.571	1.034	-0.939
	(0.760)	*(0.881)*	*(0.765)*	*(0.807)*
Market/Book Ratio	-0.012	-0.008	-0.018	0.0571
	(0.668)	*(0.748)*	*(0.323)*	*(0.396)*
Deal Value/ pre-acquisition year Total Assets	0.000	0.000	0.000	0.000
	(0.723)	*(0.300)*	*(0.473)*	*(0.315)*
Profitability	1.738	1.453	1.722	1.242
	(0.058)	*(0.162)*	*(0.065)*	*(0.223)*
Firm Size	0.000	0.029	0.000	0.031
	(0.997)	*(0.533)*	*(0.997)*	*(0.503)*
Constant	-0.991**	-1.223**	0.982**	-1.302**
	(0.001)	*(0.000)*	*(0.002)*	*(0.000)*
Pseudo R2	0.014	0.010	0.015	0.011
Number of observations	847	761	847	761
Log pseudolikelihood	-488.198	-439.057	-488.063	-438.490

*The * represents a 5% significance level, while ** indicates a 1% significance level. Logit regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*

Appendix 8: Explaning Leverage Change of Acquistion – Book Leverage

Dependent Variable: Leverage in the year following the merger minus leverage in the year prior to the merger – Book Leverage				
Pre-acquisition year leverage deviation	0.165**		0.231*	
	(0.008)		*(0.028)*	
Pre-acquisition year in leverage deviation*M/B			-0.034	
			(0.395)	
Pre-acquisition year change in leverage deviation		0.139		0.141
		(0.145)		*(0.197)*
Pre-acquisition year change in leverage deviation*M/B				0.000
				(0.925)
Merger induced change in lev. deviation	-1.189*	-0.728**	-1.184*	-0.729**
	(0.014)	*(0.000)*	*(0.014)*	*(0.000)*
Cash/Total Assets	-0.177	-0.003	-0.176	-0.004
	(0.138)	*(0.953)*	*(0.139)*	*(0.936)*
Tax/Total Assets	0.219	0.153	0.259	0.149
	(0.725)	*(0.568)*	*(0.676)*	*(0.568)*
Market/Book Ratio	0.000	-0.007	0.001	-0.007
	(0.737)	*(0.100)*	*(0.676)*	*(0.186)*
Deal Value/ pre-acquisition year Total Assets	0.000	0.000*	0.000	0.000*
	(0.259)	*(0.047)*	*(0.247)*	*(0.045)*
Profitability	-0.306	-0.072	-0.310	-0.736
	(0.319)	*(0.486)*	*(0.308)*	*(0.490)*
Firm Size	-0.004	0.000	-0.004	0.000
	(0.413)	*(0.703)*	*(0.423)*	*(0.708)*
Constant	0.088	0.042	0.086	0.042
	(0.184)	*(0.066)*	*(0.191)*	*(0.058)*
R-squared	0.351	0.480	0.352	0.480
Number of observations	759	678	759	678

*The * represents a 5% significance level, while ** indicates a 1% significance level. Regressions are estimated with robust standard errors. Target leverage is predicted through the Tobit model. P-value in parenthesis. Models built upon Harford et al. (2006).*