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Master Thesis

Influence of Managerial Compensation on Capital Structure Decision

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Throughout existing literature, the static trade-off theory and the pecking order theory are the main explanatory theories for capital structure. At the same time, researchers have aimed to find determinants of the capital structure decision. Most of the found determinants are based on firm specific characteristics. This study contributes to this research for determinants by investigating whether there is a relation between (different types of) managerial compensation and capital structure. First finding is that that there is a negative and significant relation between total compensation and several debt-to-equity ratios, but that the explanatory power of this relation is very limited. Second finding is that this study does not find a significant relation between the proportion of equity-linked compensation and capital structure.

Key words: Managerial Compensation, Executive Compensation, Capital Structure, Leverage

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1. Introduction

Capital structure of a firm defines a way by which a firm is financed. In other words, the capital structure of a firm aims to explain the mix of financial sources used to finance real investment (Myers, 2001). The origin of capital structure theory dates back to Modigliani and Miller (MM) and their theory of capital structure irrelevancy. Capital structure irrelevancy shows that firms are, under certain conditions (such as perfect capital markets), indifferent for the type of investment and whether the investment is valuable. (Modigliani & Miller, 1958) However, as MM argue, there may be a preference for one of the two (main) types of financing, or there may be other motivations for firms in their capital structure decision.

Throughout existing literature, researchers find that there is not one main theory that best explains capital structure. Several theories contribute in the question of what determines the capital structure of a firm. Two of these theories are most often used, namely the static tradeoff theory and the pecking order theory. The static tradeoff theory assumes that there is an optimal debt level that balances the benefits and costs of issuing additional debt. The pecking order theory assumes that firm prefer internal over external finance, and when external finance is required that firms prefer debt over equity. A third, less frequently used theory, is the free cash flow theory that assumes that high debt levels will increase the value of the firm. Lastly, the capital structure irrelevancy theory of MM is described throughout literature, but declined in use after some of the assumptions turned out to be nearly impossible. (Myers, 2001) The original logic behind the MM assumptions is still used. However, with respect to the practical relevance of this research, one of the assumptions of the MM approach should be revised. Modigliani and Miller (1958) argue that in the absence of tax, capital structure irrelevancy holds, so capital structure has no influence on the value of a firm. However, in the real world, taxes do exists and in most prior research the pecking order theory turned out to be the main predictor of the capital structure.

Prior researchers have aimed to find determinants of capital structure of a firm. Bevan and Danbolt (2007) find that for a sample of UK firms, larger firms tend to have higher (lower) levels of long-term (short-term) debt compared to smaller firms, firms that are more profitable use less debt compared to less profitable firms, and that more tangible firms (with a larger proportion of fixed to total assets) use more debt compared to less tangible firms. Titman and Wessels (1988) support these results and find that the size of the firm negatively influences short-term debt ratios

and that high past profitability decreases current debt ratios. Until then, most determinants are firm characteristics and managerial behavior are not considered. Betrand and Schoar (2003) investigate to what extent managerial behavior influences decision-making within firms and find that financial leverage is influenced by manager fixed effects.

This research fills a gap in prior research in the search for determinants of capital structure by investigating whether the different types of managerial compensation are to some extent influencing the capital structure of firms. Ultimately, the directors of a firm are responsible for raising capital if the firm needs this and therefore, directors are responsible for the type of capital they raise too. Higher managerial compensation could lead to more entrenched managers because they prefer to remain seated in the company over switching to a different company. Eventually, this could lead to managers being more likely to issue debt capital because in that way they do not lose (part of their) control, as is the case in the situation of equity capital issuance. Besides that, managers may be willing to attract debt capital because of the, in general, lower price that has to be paid. (Types of) Managerial compensation are somewhere in between firm characteristics and managerial characteristics. Firms (mainly remuneration committees) are responsible for managerial compensation, but managerial characteristics (such as negotiation power or experience) could possibly also lead to differences in compensation. To the best of my knowledge, there has only been limited research on the relation between managerial (cash) compensation and capital structure (Bhagat et al., 2011) and several researchers have looked at the opposite relation (Berkovitch, Israel, & Arbor, 2000; Xu & Birge, 2008). This research aims to find this relation for a sample of European firms.

If a relation between (types of) managerial compensation and capital structure is found, it may be beneficial for firms to change managerial compensation policies which could lead to higher firm values, and eventually to higher shareholders values as well. Besides that, there is a negative relation between debt ratio of a firm and its growth for a sample of Greek firms (Eriotis et al., 2007) and a positive relation between bank debt and firm profitability for a sample of firms in the BRIC countries (Davydov, 2016). Practical relevancy for the firms may be obtained as well, but exact results should be proven in further research.

For this study, the research question is the following:

"To what extent do types of managerial compensation influence a firms' capital structure?"

This study contributes in investigating to what extent managerial compensation in general influences the capital structure decision of a firm. In a way, this research extends the research of Bhagat et al. (2011), but the current research will look at the European market, and will not only look at cash compensation but at the overall compensation. Second, this study examines whether there is a link between type of managerial compensation (equity-linked and cash-linked) and the capital structure decision of a firm.

The findings of this study are partly in line with existing theories (mainly with the pecking order theory) and prior research. It is found that there is a negative and significant (at the 1% level) relation between managerial compensation, operationalized as total annual compensation, and capital structure, which is operationalized by four different debt-to-equity ratios. Previous versions of managerial compensation are incorporated in an additional model and no significant relation is found. However, this is contrasting to the findings of a granger causality test that provides evidence for a significant causal relation between managerial compensation and three of the four debt-to-equity ratios used in this study. Several robustness checks support the main finding of a negative relation.

In addition, it is found that there is no significant relation between the proportion of equity-linked compensation (to cash-linked compensation) and capital structure. The results show negative coefficients for this relation, which is in line with entrenchment theory but not with the alignment theory. However, these are insignificant. Previous proportions of equity-linked compensations are added in an additional model and these findings do (in line with the main model) not show any significant results. In a third model, a dummy variable for LTIPs is included which increases the significance of the model for both short-term debt-to-equity ratios. Similar results (some increase in significance) are found in several robustness checks.

The structure of the thesis is as follows. Chapter one will be the introduction, with the introduction of the topic, the relevance and contributions of the study, leading to the research question. Chapter two provides a literature overview with existing theories and prior research, leading up to the hypotheses. Chapter three describes the research method, provides arguments for this specific research method and will describe the variables that are used. Chapter four describes the sample and shows the results of the analysis. Chapter five ends the thesis with a conclusion and a discussion with limitations and suggestions for further research.

2. Literature review

2.1 Capital Structure

In the influential paper by Myers (1984), two frameworks on the capital structure decision are discussed and compared with each other, the static tradeoff framework and the pecking order framework. According to the static tradeoff framework, each firm considers the costs and benefits of borrowing and determines an optimal debt ratio based on these. The main benefit of borrowing from the debt market is the tax deductibility of debt. One assumption is that if there are no costs of adjustment, meaning that it is costless to substitute between equity and debt financing, and another assumption is that if the static tradeoff framework is correct, the debt ratio of each firm should equal their optimal debt ratio. However, quite often, managers do not know or do not care about the optimal debt ratio of the firm, and for these reasons do not aim at reaching or holding on to this ratio. This is referred to as the *managerial theory of capital structure choice*. Myers (1984) assumes that this theory does not hold, and that managers are indeed able to find the optimal ratio. Brounen et al. (2005) find that the static tradeoff theory is moderately supported by their survey held under a sample of large multinationals of Dutch, German, French and UK firms.

While it may seem reasonable to argue that managers try to reduce risk (to decreases the power of outsiders when equity financing is relatively important or in the case of possible takeovers) by increasing their leveraged position, Berger et al. (1997) find, given that there is an optimal debt ratio of firms, that managers may increase leverage above this optimal point. Main drivers for this unconventional policy are motivated by entrenchment of managers, such as increasing the voting power of their own stakes and reducing the possibility of takeover attempts. Zwiebel (1996) supports this finding by developing an economic model in which managers voluntarily choose the leverage ratio of a firm to increase their own position. This model contributes to earlier research in that it limits a firm's decision to acquire debt by including the possibility of bankruptcy, which would lead to a loss of entrenchment for managers.

Although the static tradeoff framework is frequently discussed and investigated in scientific research, quite often it loses out (Atiyet, 2012; de Jong et al., 2011) to the second framework discussed by Myers (1984), which is the pecking order framework. According to this pecking order framework firms prefer internal finance over external finance, and debt over equity financing in the case that external finance is required. There are some problems, or possible misconceptions

regarding this definition. (Frank & Goyal, 2008) One of these is the problem with initial claims of the theory, which state that the theory rests on the interpretation that equity is not issued in the case that debt issuance is a possibility. Frank and Goyal (2008) argue that these initial claims are refutable and come up with the concept of debt capacity in the pecking order theory. The definition of debt capacity is that it is the point from where equity issuance becomes a reasonable option, or the point where debt issuance is no longer a possibility. The main underlying idea of the pecking order theory is adverse selection, explained by Myers and Majluf (1984) as the knowledge gap between the manager and the investors. Assumption is that the manager will know the value of an investment opportunity and investors do not, and that the manager acts in the interest of the existing shareholder. Managers of overpriced firms will use internal financing for an investment with a positive net present value (NPV) because these managers do have the opportunity to use their own internal financing. For outside (equity) investors, it seems profitable for the firm when there is no possibility to buy new shares. If firms go to the equity market and sell their shares, investors may be aware of the possible negative outcome, otherwise the firm would have financed the investment internally. Due to adverse selection, firms may prefer to finance internally over external finance.

If the assumption of interest alignment does not hold, a conflict may arise between managers and shareholders or between shareholders and debt-holders. In the first situation, shareholders may want to monitor or control the managers, which leads to increases in agency costs of equity. In the second situation, managers may try to transfer capital from debt-holders to the shareholders (as dividend for instance) and monitoring the flow of capital increases the agency costs of debt. (Chen & Chen, 2011; Jensen & Meckling, 1976) Finally, the pecking order framework assumes that debt is preferred over equity when external finance is required. Reasons for this are the (in general) lower rate paid for debt financing and the absence of voting power for debt financiers.

Both of these frameworks have been highly discussed and accepted in academic literature, but as mentioned in the introduction, researchers have aimed to find determinants that drive firms to choose for a particular type of capital structure. Lam et al. (2013) point out that recent literature shows that behavioral factors can affect firms' financing decisions. Betrand and Schoar (2003) show evidence for this and investigate to what extent managerial behavior influences decision-making within firms. The authors construct a panel data set that tracks the movements of managers among a (fixed) set of firms. By using this set, estimates of the influence of manager fixed effects can be made after controlling in the set for firm fixed effects and time-varying characteristics. Their

results show that manager fixed effects are important determinants of decision-making within firms for a number of variables such as acquisition policy, dividend payouts but also financial leverage.

Several prior researchers have aimed to find the preferences that are motivations for firms for their capital structure decision. Deesomsak et al. (2004) examined whether there is a difference between several (Asia Pacific) countries on the determinants of capital structure. They find that in one of the sample countries, profitability has a significant influence on capital structure, but at the same time find that firm size has no effect on another countries' capital structure. In general, they find that there are differences between the countries and their determinants of capital structure. Titman and Wessels (1988) investigate to what extent eight different variables influence the capital structure decision of firms. They look at firm characteristics such as growth, profitability and collateral value of assets and find that firms with specialized products experience relatively low debt ratios, and that small firms use more short-term debt compared to larger firms. De Jong, Kabir and Nguyen (2008) investigated other, more specified determinants of capital structure and investigate not only country specific, but also firm specific determinants. They find significant results regarding the firm specific characteristics, but also find that some countries do not show significant results for particular characteristics, meaning that there are also country specific influences that do matter.

Jensen and Meckling (1976) have laid the basis for explaining the capital structure of a firm by using the agency theory. One of the problems following the agency theory is mentioned before, the possible negative NPV of external financed projects. However, a second problem arises when Jensen and Meckling argue that the optimal capital structure of a firm is a tradeoff between agency costs and benefits of debt. By issuing debt capital, firms attract capital for which they have to pay back a prespecified amount (in terms of an interest percentage). Firms are free to use this capital for their own, chosen investments and therefore firms have the possibility to invest in risky projects. If the risky project turns out to be successful, the firm is able to pay back the initial debt, including the interest and the remaining part is fully attributable to the equity holders. However, if the risky project turns out to be unsuccessful, the firm will not be able to pay back the initial debt. This problem is called the *asset substitution problem*. For older firms, this may not be an issue, due to the importance of losing their reputation, but for starting firms the asset substitution problem is a serious possibility. (Harris & Raviv, 1991)

The *managerial theory of capital structure choice*, as pointed out before (Myers, 1984), assumes that managers do not know or do not care about the optimal ratio as determined by the static trade-off theory. As a reaction, the *norm theory of capital structure* is formed (Lam et al., 2013). This theory explains the cross-country difference on capital structure decisions by using the cultural dimensions of Hofstede (1980). The *norm theory of capital structure* describes:

(i) The manager-subordinate norm which defines the culture in different countries based on power distance and based on individualism versus collectivism. The manager-subordinate relationship defines how managers are expected to interact with their subordinates within the firm;

(ii) The manager-environment norm which defines the culture in different countries based on masculinity versus femininity and based on uncertainty avoidance. The manager-environment relationship defines how managers are expected to interact with the environment outside of the firm.

Cultures with high power distance and collectivism have a clear manager-subordinate relationship. Cultures with high masculinity and low uncertainty avoidance (high uncertainty acceptance) have a flexible manager-environment relationship. Firms in countries with clear manager-subordinate relationships and (or) with flexible manager-environments relationships in general (independent from the other) have a lower leverage ratio than firms in countries with respectively less clear and less strict relationships.

2.2 Managerial Compensation

Prior researchers have mainly investigated the determinants of managerial compensation, such as the study of Goergen and Renneboog (2011) that sets two contrasting views off against each other in order to explain managerial compensation. First, there is the theory that managerial compensation is defined by a market mechanism which makes sure that the compensation is effectively a means to maximize shareholder value, while second, there is the theory that the managers are more self-serving and that they are able to deprive profits of the firms and do not keep shareholder maximization in mind. Their main finding is that most reviewed literature is in line with the second theory, for instance due to the ability to extract rents in the situation of weak corporate governance. This is in line with the study of Li et al. (2007) that examines the relation

between corporate governance and CEO compensation. They find that excessive compensation can at least partly be attributed to poor corporate governance systems.

Goergen and Renneboog (2011) list the different parts that make up compensation packages as: the base salary, the annual bonus, stocks and stock options, insurance, pension benefits and severance pay. First, there is the short-term remuneration consisting of base salary and annual bonus. Base salary is determined by the compensation committee and accounts since the 1990s for a decreasing percentage of total pay. (Conyon & Murphy, 2007) Annual bonus is in general determined based on three components, performance measures (such as revenues), performance standards (a threshold that the management needs to reach) and pay-for-performance sensitivity. Second, the long-term remuneration consists of stock options, restricted stock and long-term incentive plans (LTIPs). Stock options have slightly increased as a percentage of annual payment since the 1950s due to new tax reform legislation and even furtherly increased since the 1990s. (Frydman & Saks, 2010) LTIPs are plans that only pay out in the event of good performance (generally measured by using a peer group as a benchmark).

Murphy (1999) make a distinction of CEO pay based on four main categories. First, the base salary which is generally based on an industry salary average. Other types of compensation are quite often measured based on the base salary, such as target bonuses which are typically expressed as a percentage of the base salary. Second, the annual bonus plans that are split up in the three components described before. Typically, no bonus is paid unless the performance standard is reached. If this threshold is attained, a minimum bonus will be paid out, which increases if the performance measure increases (the pay-for-performance sensitivity). More than half of the companies researched in the study of Murphy (1999) have multiple performance measures. Lastly, in general there is a bonus cap. Third, stock options are part of CEO pay in most cases. There are a number of possible designs for stock options, such as different terms of the contract. However, in general most options have an expiration of ten years and are granted at the fair value price on the date of grant. These options are typically not similar to stock ownership, due to for instance the absence of dividends for stock options. Since the 1990s, the proportion of stock option grants of CEO pay has heavily increased. Fourth, CEO pay is made up of a residual category which consists of restricted stock (shares with certain conditions), LTIPs (bonus plans based on multi-year-performances) and retirement plans.

The components of annual bonuses all have their own effects on the agency problem between managers and shareholders and lead to different possible problems. Performance measures could potentially lead to decisions with short-term incentives of managers that in the long-run are not beneficial for the firm. Second, there is the possibility of earnings management or adjustments in accruals. Performance standards are generally based on budgets or prior-year performance. If the standards are based on budgets, this might lead to avoidance of actions which has negative effects for next year. If the standards are based on prior-year performance, the ratchet effect and shirking are lurking. Managers will know that future performance standards are based on the current year performance, that the standards will increase if the current year performance is good and therefore, it is reasonable for managers to shirk. Third, related to the pay-for-performance sensitivity, managers may (most often near the end of the year) base their effort on whether they are located somewhere in the bandwidth between the minimum bonus threshold and the maximum bonus cap. If the firm is far from reaching the performance standards for the threshold, managers may withhold effort. If the firm has already reached the performance standards for the cap, managers may also withhold effort or managers may manage their earnings into the subsequent year. (Murphy, 1999)

2.3 Hypotheses development

Several studies examine the relationship between capital structure and managerial compensation, respectively as independent and dependent variable in the following two papers. Holmstrom and Tirole (2016) show that insiders have the ability to increase the liquidity of the firm's stock by issuing outside equity and therefore increase the monitoring of managerial performance (decrease the agency problem). Eventually, this leads to more efficient designs of managerial compensation contracts. A second paper investigated the relation between compensation contracts and capital structure and finds that manager incentives are better aligned with those of the shareholders in the case of performance-sensitive compensation and an optimal chosen capital structure. Therefore, debt capital benefits the shareholders in those situations. (Berkovitch, Israel, & Spiegel, 2000)

Other studies have examined the relationship as investigated in this study, with capital structure being the dependent variable. The first one is the study of Bhagat et al. (2011), they point out that prior theories do not incorporate managerial discretion, in other words, that managerial characteristics are not taken into account. Their paper investigates the effects of several managerial characteristics on the firms' capital structure decision such as CEO cash compensation, CEO tenure

and several others. They report negative and significant (for at least a 10% confidence interval) coefficients for the CEO characteristics, for both long-term debt to assets and short-term debt to assets. CEO ownership is included in a separate (2SLS) regression analysis, and reports a negative and mostly significant relation towards long-term debt to assets, but a negative and mostly insignificant relation towards short-term debt to assets. Altogether, Bhagat et al. (2011) show that managerial characteristics are important determinants of the capital structure decision. One remark regarding this paper is that the data sample is not specified, only that "sample includes firms with available data from Compustat, ExecuComp,Investor Responsibility Research Center (IRRC) and Center for Research in Security Pricies (CRSP) (p.1607)". The authors come up with several figures, equations and outputs of regression analyses, but regret to mention which countries or firms are included in the sample. According to the fact that all three authors are employed by universities from the US, the assumption that the sample is US-based seems reasonable.

A second study investigates determinants of capital structure on Pakistani firms. Sheikh & Wang (2012) find that there is a negative and significant (at the 1% level) between the director remuneration and both the total debt ratio and the long-term debt ratio. A third paper analyzes the relation between corporate governance quality and capital structure. (Jiraporn et al., 2012) Their finding is that the so-called *substitution hypothesis* is accepted. The substitution hypothesis expects that leverage acts as a substitute for corporate governance. Both are means to reduce agency conflicts and therefore firms with strong corporate governance mechanisms rely less on debt capital than first with weak corporate governance systems. Armstrong et al. (2012) examine the relation between corporate governance mechanisms and CEO pay levels and find that there is a negative relation and thus that CEO pay is higher for firms with weak corporate governance mechanisms.

Although several papers investigate the relation between managerial compensation and capital structure, no such analysis has been performed for European countries. Therefore, the first part of this research studies the beforementioned relationship for a large sample of firms, divided over 25 countries in Europe. In order to analyze the relation between managerial compensation and capital structure, the following hypothesis is formed.

H1: There is a significant relation between managerial compensation and capital structure.

Jensen and Murphy (1990) argue that in terms of managerial compensation, it is less important how much a manager is paid, but what is important is the type of compensation that managers receive. Since 1990, a lot has changed, but the issue of the type of compensation is still relevant in more recent literature. (Bebchuck & Fried, 2010) Their argument is that equity-based compensation should be tied towards long-term results to make sure that managers do not take decisions that are in favor of their own short-term gains. A means to reach this outcome is to prohibit managers from cashing out equity-linked compensation on the short-term. However, besides that, they also argue that it is not beneficial for firms to enter into so-called *hold-till-retirement* requirements, because these could lead to distortions of managers' decisions to retire, or lead to short-term interests of managers that are close to retiring without taking the long-term effects in mind.

Xu and Birge (2008) relate their research to the agency problem where managers are the agents of the firm, and their interests are often not aligned with the interests of both equity and debt holders. Incentives between managers and equity holders are aligned if decision-making is in line with preferences of shareholders and dividends are paid to the shareholders. Incentives between managers and debtholders are aligned if the firm is able to pay back the loan and the interest. Nyberg et al. (2010) propose solutions for the agency problem in two ways. First, there is a solution of financial alignment of the agent that is related to the rewards of the principal. Second, alignment of preferences whereby the preferences of the agents may be further related to the preferences of the principal, which also may reduce the agency problem. A possible combination of both measures is to reward managers in terms of equity-linked compensation. If managers receive a substantial proportion of their compensation in terms of equity, the interest alignment between managers and equity holders may possibly increase, due to the fact that decisions with disadvantages for equity holders may in this case also lead to disadvantages for the managers themselves. Increasing the debt ratio could lead to a higher required cost of equity, as stated in proposition II by Modigliani and Miller (1958). Managers may assume that the gains from holding equity may increase linearly with the debt ratio of the firm (assumed that the firm earns enough to pay the equity holders the required return). Fahlenbrach and Stulz (2011) argue that managers (CEOs) that are large equity holders of the firm may choose for more conservative leverage to reduce the risk of their wealth. Increasing the debt ratio may thus be beneficial for the private wealth or personal liquidity needs for managers. Berger et al. (1997) investigate the relation between managerial entrenchment and

capital structure, and find that there is a positive relation between stock and compensation incentives of CEO and a firm's leverage.

Ghosh et al. (2007) investigate the relation between CEO ownership and firm value and find a significant and positive effect for low levels of CEO ownership (below five percent of stocks), due to the fact that these CEOs invest in research and development (R&D) projects with high risks, but with positive NPV payoffs. Griffith (1999) examines the same relation but find that firm value increases when the CEO owns a proportion of between zero and fifteen percent of the stock. An increase in equity-based managerial compensation leads, without the issuance of shares, to an increase of managerial ownership. If managers own a larger stake of their firm, their interests are better aligned with the interests of shareholders and this increases the use of debt, given that this is value-enhancing (Mehran et al., 1999). Besides this finding, managers using debt financing over equity to maintain power in their firm. Increasing managerial ownership too much could lead to reductions in firm value according to the *entrenchment theory*, which may also explain the decline in firm value after beforementioned percentages (5% and 15%). It may seem as there is a contradiction between the alignment theory and the entrenchment theory, but often, both theories can be applied to the same situation. The effects are firm-specific and thus there is a difference which of the two theories is the main explanator of a given situation. Following from this is the second hypothesis that will be tested:

H2: The proportion of equity-based (cash-based) to cash-based (equity-based) compensation will have a positive (negative) effect on the debt ratio.

3. Methodology and research method

Aim of this research is to show support for first, the relation between managerial compensation as main independent variable and a firm's capital structure as the dependent variable and second, the relation between equity linked compensation and a firm's capital structure. This chapter will elaborate on the methodological part of this research. First, the data used in this study is described. Second, the main dependent and independent variables will be widely described and third, the control variables will be described in a more concise way. Fourth, both of the models will be described.

3.1. Data

Data on the different types of managerial compensation is gathered by using BoardEx. Data on the capital structure of the corresponding firms is gathered by using Thomson Reuters Eikon. The two sources combined will form a panel dataset. The dataset consists of European listed (and some de-listed) firms for the period between January 2000 and December 2018. Some of the firms were not existent in the beginning of the time period, some others ceased to exist till the end. However, there is no reason to extrapolate data. This is generally called an unbalanced panel dataset, and does not lead to much more difficulties than a balanced panel dataset. (Wooldridge, 2012)

Managerial compensation is provided in the annual reports and dates are set on the publication of the annual report. Due to the fact that the publication date of the annual report has no effect on the relationship that is investigated (assumption), months will be omitted and only the years will be used in the dataset. In the dataset, only executive directors are included (directors with titles such as CEO, CFO, (division) president etc.). Prerequisite for being included is that the data on "Total Annual Compensation" is available which leads to a sample selection of 78,518 separate individuals. This research aims to find a relation between the managerial compensation and the capital structure of a firm. Due to the fact that capital structure is equal for every manager within a company in a given year, managerial compensation is averaged over the different directors in a company. The final sample consists of a total of 2,832 firms that have at least one year of reported Total Annual Compensation. Country of origin and industry of the sample are provided in Appendix A.

ISIN[1] codes are used to gather all the required data in Thomson Reuters Eikon. If these ISIN codes have not been provided by BoardEx, they have been hand collected[2] by using the Orbis Database from Bureau van Dijk. For some firms, it has not been possible to find an ISIN code, and thus data gathering for these firms has not been possible. For this reason, these firms have been removed from the sample. Several firms had multiple ISIN codes, which in the first place were separated to search for the variables in Thomson Reuters Eikon. In total, there were 3,762 ISIN codes plugged into Thomson Reuters Eikon to gather the data. After the collection of all variables, several steps are taken to make sure that each firm had one ISIN code. First, ISIN codes that did not show any data were deleted from the Eikon document, and those ISIN codes were deleted from the BoardEx document as well. Second, the full BoardEx file was checked and in the situation that one firm had multiple ISIN codes, those ISIN codes were checked in the Eikon document. If several ISIN codes had shown similar information, one of the ISIN codes was deleted (the ISIN code that showed the most information was kept). After these checks, 930 ISIN codes have been removed from the sample leading to the final sample of 2,832 firms.

3.2 Measurement of variables

This section provides details on the dependent, independent and control variables used in this research. All variables are described in Appendix B.

3.2.1 Dependent variable

Titman & Wessels (1988) use six measures of capital structure in their research. These six measures are based on two criteria, namely period of debt and underlying equity value. Period of debt in their analysis exists of long-term, short-term and convertible debt. Underlying equity value is the market value of equity or the book value of equity. Six measures are formed as ratios of the period of debt divided by underlying equity value. Combined, these six could be summarized as an overall debt ratio, but they argue that there are some good reasons for using only one ratio. Combining the six measures could lead to spurious correlation due to the underlying motivation for which firms may set their (required) debt levels. If firms set these debt levels based on market

[1] International Securities Identification Number (ISIN) identifies a unique security and is one of the main standard identification numbers worldwide. (Isin.org)

[2] Only the non UK firms have been hand collected.

values, using book values may lead different results (hard to interpret) and vice versa. For simplicity reasons, this study will not use all six measures and convertible debt will be excluded from the analysis.

Psillaki and Daskalakis (2009) use debt ratio as their dependent variable, which is defined as total liabilities (both long-term and short-term) divided by total assets. Their research leads to two conclusions, first that there seem to be determinants of capital structure that are country specific, and second that differences in capital structure are mostly explained by firm specific factors instead of country specific factors. The set-up of this study (using panel data analysis) already accounts for firms specific factors by looking at each firm as a separate entity.

3.2.2 Independent variables

In most prior studies, researchers aimed to find determinants for managerial compensation, meaning that it has been primarily the endogenous variable. However, there are some exceptions, such as Palia (2001) who investigates how managerial compensation influences the firm value of companies and Bhagat et al. (2011) that look at CEO cash compensation and the influence on capital structure. Palia (2001) uses the logarithm of managerial compensation in the model, while Bhagat et al. (2011) first use the cash compensation amount, and second use the ratio of cash compensation divided by assets. For this study, the natural logarithm of managerial compensation (LNTAC) will be used in the first model. Managerial compensation consists of several components, namely salary, bonus, long term incentive plans (LTIPs) and shares. The equity-linked compensation (EBC) is split up into LTIPs and shares, the cash-linked compensation is split up into salary and bonus.

BoardEx provides information on the equity-linked compensation of directors. Inclusion of the types of managerial compensation will be measured by using the ratio of equity-linked compensation divided by total compensation. This is for instance in line with prior research of Mehran (1995) that looks at looks at the percentage of total compensation that is equity based by managers and/or outside directors.

3.2.3 Control variables

Several control variables are included within the model of this research. The control variables are described below, and are based on prior literature that shows that these variables have a significant influence on the capital structure decision of firms.

General control variables

To control for differences in capital structure during the financial crisis, as proven by Iqbal and Kume (2014), a dummy variable for 'crisis' will be included (FINCRI). The recent financial crisis has a significant impact on the leverage ratio of firms in the UK and in Germany (in both bank-based and market-based countries there has been a significant difference). The leverage ratio increases from the pre-crisis period (2006-2007) to the crisis-period (2008-2009) and reverts to the pre-crisis level in the after-crisis period (2010-2011). (Iqbal & Kume, 2014) Expected is that the coefficient for this variable will be positive, due to the finding that the leverage ratio in the crisis period has increased.

Manager specific control variables

The first manager specific control variable is director's age (AGE). The average age of the executive directors for the sample is calculated and this is used as a control variable. Sundaram & Yermack (2007) find a positive relation between CEO age and the debt ratio of firms.

The second manager specific control variable is board gender diversity (GENDIV). Several studies show that there is a significant relation between board gender diversity and the capital structure of a firm. Adusei and Obeng (2019) find that gender diversity within the board of directors decreases the leverage ratio of (microfinance) firms. Another study finds when a firm is run by a female CEO, that this decreases the leverage ratio of the firm (Faccio et al., 2016) and therefore board gender diversity is included in this model.

In some circumstances, the gender diversity ratio turned out as a number that was below 0. This could be due to changes of managers within a given year. To cancel out these mistakes, the ratios for these firms are set at 0.

Firm specific control variables

In a longitudinal study by Frank and Goyal (2015), six factors are identified as being a solid basic for finding patterns in funding. From a large initial set of possible factors, these six factors have been identified as significantly influential. Four of these factors will be used in this research as well, supplemented with some other control variables. The first factor is the market-to-book ratio (MTB). Firms with a high market-to-book ratio tend to have lower levels of leverage.

The second factor is the profitability (PROF) of the firm. Firms with higher profits tend to have lower leverage ratios. Therefore, the ratio of operating income to revenue is included as a control variable. Research of Mehran (1995) supports this finding and adds that performance of a firm is positively related to the percentage of equity-linked compensation. Third factor is the size of the firm. The larger the firm in terms of asset value, the higher the leverage ratio of the firm. Therefore, total assets (TA) is included as a control variable. The fourth factor nature of the assets, and therefore tangibility (TANG) of the firm, is included as a control variable in the model. The more tangible the assets of a firm are, the more leverage in general. The measure of tangibility is copied from the research of Frank and Goyal (2015).

Furthermore, Titman and Wessels (1988) find that uniqueness of a firm is a characteristic that determines the capital structure of a firm. Uniqueness in their sample is researched by three indicators. The first one being the ratio of research and development (R&D) divided by total sales, the second one being the ratio of selling expenses over sales (SE/S) and the third one being the quit rate within an industry (the percentage of workers voluntarily leaving the job). Due to the high correlation (±90%) of the first two, only selling expenses over revenues (SEREV) will be used. The expectation regarding the SEREV ratio is that it is positively related to uniqueness due to the (in general) increased spending for promotion and selling purposes of unique products. Uniqueness is expected to be negatively related to capital structure.

Another firm specific control variable is size of board of directors (TBD). Alves et al. (2015) find a negative and significant relation between board size and debt ratio of a firm. Thereby, they show that the size of the board has several other implications. They find a positive relation between board size and external financing and a positive relation between board size and short term debt, both compared to the retained earnings. Besides that, board size has a negative influence on long term debt compared to short term debt. Lastly, board size has an increasing effect on external equity compared to long term debt. In general, the finding is that if board size increases, there is a decrease in risk-taking behavior moving away from short-term debt into long-term sources of funding.

Related to the size of the board of directors is another control variable, the duality of the role of the CEO (DRC). A dummy variable is included in the analysis with a value of 1 if the CEO of the firm is included in the board of directors and a value of 0 otherwise. Prior evidence shows that social influence of a CEO in the board of directors possibly leads to higher managerial payments

within the firm. (Main et al., 1995) To control for these higher payments, CEO duality is included in the model.

3.3 Model frameworks

3.3.1 Association between compensation and capital structure

Two models are used for this research. The first model describes whether there is a relation between the managerial compensation and the different debt-to-equity ratios used in this study. The second model handles the second part of this research and tests the relation between the proportion of equity-linked compensation to total compensation on the different debt to equity ratios. Table 6 with abbreviations of all variables used in this research is provided in Appendix B.

Before designing the exact models, some tests and transformations have been performed to make sure that the variables are fitted for the model. First, kurtosis and skewness have been tested. Kurtosis is an indicator of tails, center and shoulders of a distribution and measures the flatness (or peakedness) of a distribution. A positive kurtosis is an indicator of high peaks and low tails, a negative kurtosis is an indicator of (relatively) low peaks and high tails. A normal distribution has a kurtosis of 3. (DeCarlo, 1997) Skewness is an indicator of symmetry of a distribution. The higher the value of skewness, the less symmetrical the distribution is. A perfect normal distribution has a skewness of 0. (Arnold & Groeneveld, 1992) Table 7 in Appendix C shows the values of kurtosis and skewness used in this research. The top part represents the values before the transformation of variables which shows some values with large differences from the normal distribution. These have been transformed, mainly by taking the natural logarithm. One disadvantage of taking the natural logarithm is that it drops out all negative values. However, due to the nature of the variables, there are none that show a negative value. Several variables have been winsorized due to some extremely high or low values (MTB, PROF and SEREV) and several other variables have been corrected for impossibility (such as AGE > 100 and TANG > 1). The bottom part represents the values after the transformation of the variables.

Tests on correlation and multicollinearity have been performed to ensure that both do not exist within the sample. Due to high numbers of correlation coefficients shown in both the Pearson correlation and the pairwise correlation tables in respectively Table 8 and Table 9 in Appendix D, some variables have been removed from the model (TTR and RDREV). Appendix D shows the pairwise correlation and each asterisk indicates that the correlation is significant at the 5% level.

High correlations do exist among the different dependent variables, but none of the analyses use more than one of these variables and therefore these are not problematic. The correlation differ from -0.599 to 0.678. To test whether these correlations are useable, and thus to detect multicollinearity, the statistical phenomenon that two or more predictor variables are highly correlated, a Variance Inflation Factor (VIF) test has been performed. The VIF test is an indicators of inflation of the variance, which is due to increases in the standard errors of independent variables. (Daoud, 2018) The results of the VIF tests are shown in Appendix E. The results of the VIF test should be interpreted as follows. A VIF of one indicates that variables are not correlated, a VIF between one and five indicates that the variables are moderately correlated and a VIF higher than five indicates high correlation. None of the variables show a VIF above five so that means no indication of (high) multicollinearity.

Lastly, the Breusch-Pagan test for heteroskedasticity of the independent variables and of the residuals has been performed. The Breusch-Pagan test for heteroskedasticity tests whether one of the general linear model assumptions, homoskedasticity should be questioned or not. The existence of heteroskedasticity within the model could lead to invalid conclusions of the model. (Breusch & Pagan, 1979) The results of these tests show that the null hypothesis, that homoskedasticity is present in the model, cannot be accepted, the p-value of each of the tests is below 0.05. To control for heteroskedasticity among the independent variables and the residuals of the model, robust standard errors are used in the regression. (Hoechle, 2007)

Expectation of this first model is that the coefficient of β_1 is significant (and negative), and thus in line with the first hypothesis. The formula for the first model is shown below.

$$\begin{aligned} CS_{(it)} &= \beta_0 + \beta_1 LNTAC_{(it)} + \beta_2 LNTA_{(it)} + \beta_3 AGE_{(it)} + \beta_4 LNMTBW_{(it)} \\ &+ \beta_5 PROFW_{(it)} + \beta_6 FINCRI_{(t)} + \beta_7 GENDIV_{(it)} + \beta_8 DRC_{(it)} + \beta_9 TBD_{(it)} \\ &+ \beta_{10} TANG_{(it)} + \beta_{11} LNSEREVW_{(it)} + \varepsilon_{(it)} \end{aligned} \tag{3.1}$$

Instead of showing four different formulas that are almost identical, one formula is shown with capital structure as the dependent variable. Each of the four measures of capital structure can take the place of $CS_{(it)}$ in the abovementioned formula and results will be shown for each measure separately.

Next to the standard regression formula (3.1), analyses are performed that incorporate lagged versions of the main independent variable to check whether managerial compensation from prior years has an effect on the capital structure of the firm.

3.3.2 Association between proportion of equity-linked compensation to total compensation and capital structure

The second model tests the second hypothesis and describes the relation between the proportion of equity-linked compensation to total compensation on the debt-to-equity ratio. Prediction is that the coefficient of β_1 for this model will be positive and significant, in line with MM proposition II and thus with hypothesis 2. The second model has the following formula. Abbreviations can again be found in Appendix B.

$$\begin{aligned} CS_{(it)} &= \beta_0 + \beta_1 EBTAC_{(it)} + \beta_2 LNTA_{(it)} + \beta_3 AGE_{(it)} + \beta_4 LNMTBW_{(it)} \\ &+ \beta_5 PROFW_{(it)} + \beta_6 FINCRI_{(t)} + \beta_7 GENDIV_{(it)} + \beta_8 DRC_{(it)} + \beta_9 TBD_{(it)} \\ &+ \beta_{10} TANG_{(it)} + \beta_{11} LNSEREVW_{(it)} + \varepsilon_{(it)} \end{aligned} \tag{3.2}$$

The same tests have been performed for this second analysis. Results of the skewness and kurtosis tests are shown in Appendix C. Pearson correlation and pairwise correlation are shown in respectively Appendix D. VIF tests have been performed for the second model as well. These results are unreported but are similar (mean VIF of 1.49 and 1.50 for resp. long and short term debt) to the VIF tests of the first model shown in Appendix E. A second Breusch-Pagan test for heteroskedasticity has been performed and shows that the null hypothesis is rejected (p-value < 0.05). Therefore, robust standard errors are included in the second model as well.

4. Results

In this chapter, the results of the different analyses will be described. The first part consists of a description of the main variables used in this study and a brief description of the control variables. The second part handles the results of the regression analyses and describes what is found, for the main analysis but also some additional findings for both models. The third part elaborates on several robustness checks used in this research.

4.1 Descriptive statistics

Summary statistics for all variables are shown in Table 1. Difference between the overall, between and within statistics are that these show respectively the summary statistics of the complete (overall) dataset, summary statistics between each individual observation and summary statistics for each time period (Porter, 2017).

The summary statistics are divided into three separate groups, the dependent variables, the independent variables and the control variables. In the analysis, the natural logarithm of the dependent variables and independent variables are used, as well as the natural logarithm of some of the control variables are used. However, in terms of easiness of interpretation, in Table 1 the untransformed statistics of the dependent and main independent variables are provided as well.

The untransformed dependent variables show means of 0.549, 0.270, 0.366 and -1.033 for respectively LDME, LDBE, SDME and SDBE[3]. Due to some outliers, the dependent variables have been winsorized which leads to the boxplots shown in Figure 6 in Appendix F. Averages of the winsorized dependent variables are 0.3401, 0.2048, 0.2097 and 0.0927 respectively in the same order as before and thus all show a positive value. The ratios are all within the range between zero and one, indicating that for the average company, equity is a more important source of capital than debt.

The average total annual compensation (TAC) of the dataset if € 1,059,200 and ranges from € 0 to a maximum of € 299,076,400[4] with a median value of € 328,000. After winsorization of the

[3] Abbreviations can be found in Appendix C.

[4] Several of these extremely high yearly remunerations are obtained from BoardEx and included in the dataset. Instead of trying to (individually) check whether these are correct, articles from "Financial Times" and "Het Financieele Dagblad" with topics related to executive pay / managerial compensation are consulted. The extremely high yearly remuneration are, according to these articles, virtually impossible but this cannot be

TAC variable, the average TAC_W reports a mean and median of respectively € 949,260 and € 328,000 (unreported). That the median value has not changed is not surprisingly, because the number of observations does not change after winsorization of the variables. Equity-linked compensation (EBC) has a mean of € 1.059,954, a median of € 289,500 and differs between € 0 and € 294,671,000[5]. The ratio of EBC to TAC (EBTAC) has a mean of 0.492, a median of 0.476 and varies between zero and one.

The age of the managers (AGE) in the dataset is on average 51 years old, as well as the median of age. Gender diversity (GENDIV) varies between 0 and 1 and has a median of 0.0 and a mean of 0.047, meaning that on average 5% of all directors are female throughout the dataset. As shown in Figure 7 in Appendix F, the proportion of female directors among the executive directors is increasing. However, the number is still surprisingly low. One possible explanation is that GENDIV is calculated based on solely the directors that reported a value for total annual compensation and that therefore GENDIV is not the actual ratio among all directors. However, this explanation is doubtful, because that would mean that for some reason compensation for female directors is less reported in BoardEx.

Total assets (TA) are on average € 17,200,000,000 (high due to some outliers) and have a median of € 103,391,500. Market-to-book ratio (MTB) is winsorized at the 1st and the 99th percentile. A mean ratio of 1.54 and a median ratio of 0.9 remain. Profitability (PROF) is winsorized at the 10th and the 99th percentile. PROF is winsorized at the 10th percentile due to a high number of extremely low PROF ratios[6]. After winsorization, a mean value of -0.012 and a median value of 0.063 remain. Tangibility (TANG) varies between 0 and 1 with a mean value of 0.215 and a median value of 0.11. The ratio of selling expenses divided by revenues (SEREV) is winsorized at the 1st and 99th percentile as well. A median value of 0.176 and a mean value of 59.72 are remaining. SEREV has, after winsorization, a minimum of 0.00002 and a maximum of 3,076.9. Size of board of directors (TBD) varies between 1 and 33 with a mean value of 7.688 and a median

established with full certainty based on these articles. A robustness check, with winsorized (at the 99th percentile) variables will be performed, in order to find out whether these extremely high compensation lead to disruptions in the model.

[5] The extremely high values for EBC are related to the high values for TAC. EBC will not be used as a standalone variable, but only as a proportion of TAC and therefore these high values do not lead to problems per se.

[6] The1st, 5th and 10th percentile correspond to a PROF value of respectively -63.54, -3.69 and -0.844. In order to eliminate PROF values for which the lose of operating income was (in value) higher than the profit of revenue, the 10th percentile was chosen to winsorize.

value of 7. Finally, dual role of CEO (DRC) varies between 0 and 1. DRC has a mean value of 0.307 and a median of 0.

TABLE 1: DESCRIPTIVE STATISTICS

Variable		Mean	Std.Dev.	Min	Max	Observations
						Natural logarithm of the dependent variables
LNLDME	overall	-2.054	2.151	-14.435	6.380	N=22,197
	between		1.929	-9.971	3.353	n=2,425
	within		1.331	-11.471	4.209	T-bar=9.153
LNLDBE	overall	-2.158	1.947	-13.464	7.425	N=24,331
	between		1.684	-8.869	3.118	n=2,512
	within		1.272	-12.069	5.659	T-bar=9.686
LNSDME	overall	-3.179	2.228	-15.189	6.824	N=23,310
	between		1.847	-10.428	2.761	n=2,509
	within		1.475	-12.506	3.957	T-bar=9.291
LNSDBE	overall	-3.253	1.930	-14.218	6.120	N=25,718
	between		1.515	-9.037	3.808	n=2,607
	within		1.407	-12.019	4.276	T-bar=9.865
						Untransformed dependent variables
LDME	overall	0.549	6.094	-0.209	590.081	N=31,506
	between		2.590	0	76.503	n=2,780
	within		5.611	-73.089	554.706	T-bar=11.333
LDBE	overall	0.270	13.778	-1,149	1,677.696	N=35,541
	between		5.089	-81.760	167.953	n=2,825
	within		13.103	-1,066.97	1,510.012	T-bar=12.581
SDME	overall	0.366	6.412	0	919.724	N=30,911
	between		2.191	0	68.382	n=2,772
	within		5.911	-67.910	857.087	T-bar=11.151
SDBE	overall	-1.033	206.749	-38,602	455	N=34,893
	between		52.092	-2,756.97	75.846	n=2,814
	within		199.224	-0.0004	2,763.56	T-bar=12.400
						Winsorized depended variables
LDME_W	overall	0.3401	0.7769	-0.2088	5.35955	N=31,506
	between		0.6250	0	5.35955	n=2,780
	within		0.4989	-4.1261	5.299	T-bar=11.3331
LDBE_W	overall	0.2048	0.335098	-0.2877	1.460396	N=35,541
	between		0.2640	-0.2301	1.460396	n=2,825
	within		0.21941	-1.28662	1.6530	T-bar=12.5809
SDME_W	overall	0.2097	0.6959	0	5.35955	N=30,911
	between		0.5324	0	5.35955	n=2,772
			0.4274	-3.7037	5.2414	T-bar=11.1512
SDBE_W	overall	0.0927	0.2110	-0.2877	1.460396	N=34,893
	between		0.1418	-0.1438	1.460396	n=2,814
	within		0.1696	-1.02412	1.48420	T-bar=12.400
						Independent variables
LNTAC	overall	5.926	1.403	-0.400	12.608	N=25,264
	between		1.259	0.693	9.718	n=2,779
	within		0.652	0.333	11.225	T-bar=9.091

LNEBC	overall	5.524	1.833	-1.109	12.594	N=14,500
	between		1.535	0	11.198	n=2,261
	within		1.073	-1.468	11.848	T-bar=6.413
TAC	overall	1,059.20	3,588.064	0	299,076.4	N=25,279
	between		1,785.163	2	35,996.24	n=2,779
	within		2,896.062	-33,614.6	264,139.4	T-bar=9.091
EBC	overall	1,059.954	4,337.015	0	294,761	N=14,555
	between		2,589.405	0	73,000	n=2,265
	within		3,503.95	-31,165.1	259,653.9	T-bar=6.426
						Control variables
AGE	overall	50.953	6.147	23	82	N=25,255
	between		5.477	28	73	n=2,776
	within		3.757	22.150	72.536	T-bar=9.098
LNTA	overall	11.952	3.079	0	21.836	N=36,512
	between		2.803	5.443	21.115	n=2,830
	within		0.861	2.481	17.219	T-bar=12.902
LNMTB_W	overall	0.010	1.058	-4.605	2.763	N=31,608
	between		0.880	-4.039	2.763	n=2,786
	within		0.646	-5.125	4.161	T-bar=11.345
TANG	overall	0.215	0.253	0	1	N=36,510
	between		0.226	0	0.971	n=2,830
	within		0.112	-0.686	1.103	T-bar=12.901
TBD	overall	7.688	3.881	1	33	N=25,645
	between		3.370	2	30.500	n=2,829
	within		1.202	-1.254	18.313	T-bar=9.065
GENDIV	overall	0.047	0.143	0	1	N=25,347
	between		0.124	0	1	n=2,819
	within		0.095	-0.824	0.981	T-bar=8.991
LNSEREV_W	overall	-1.642	3.655	-11.072	8.031	N=17,819
	between		3.582	-11.072	8.031	n=2,158
	within		1.135	-18.836	9.490	T-bar=8.257
PROF_W	overall	-0.012	0.348	-0.844	0.878	N=33,290
	between		0.335	-0.844	0.878	n=2,711
	within		0.203	-1.610	1.495	T-bar=12.280
FINCRI	overall	0.095	0.294	0	1	N=59,430
	between		0	0.095	0.095	n=2,830
	within		0.294	0	1	T-bar=21
DRC	overall	0.307	0.461	0	1	N=25,645
	between		0.389	0	1	n=2,829
	within		0.269	-0.643	1.257	T-bar=9.065

Table 1 provides descriptive statistics on the variables used in this research.

As stated in the literature review, base salary accounts since the early 1990s for a decreasing percentage of total compensation. (Conyon & Murphy, 2007) Figure 8 in Appendix F provides evidence that this has not been the case for the data set used in this research.

4.2 Regression results

4.2.1 Results association between compensation and capital structure

This part of the research describes the results of the first part of the analysis and elaborates on these results. In order to find the appropriate type of panel data regression, a Hausman test has been performed. The Hausman test is a statistical test that provides evidence for the decision between using the fixed effects model or the random effects model. (Wooldridge, 2012) The null hypothesis is that the random effects model should be used. Results of the Hausman test are unreported, but for each dependent variable, the p-value is below 0.05, meaning that the null hypothesis will be rejected and therefore that a fixed effects model will be used.

The first hypothesis predicts a significant relation between the total annual compensation of directors and the different debt-to-equity ratios used in this study. In Table 12 in appendix G, the results of the fixed panel data regression analysis are shown, without including the control variables. Each of the independent variable has a negative sign, and all but the LDBE show significant (at the 1% level) results. The explanatory power of this first model is very low, R-squared for the long-term debt to equity ratios are 0.00 and for both short-term debt-to-equity ratios the R-squared is 0.01. Although it may seem surprising to see that the constants are all negative, it is not. This is due to the logarithmic nature of the dependent variables. These values range between -2.015 and -1.551 which corresponds to respectively a (non-logarithmic) value of 0.133 and 0.212.

Table 2 below shows the results of the first analyses, with all different dependent variables and including the control variables. All analyses show a negative relation and show significance at the 1% level, which is in line with prior literature. Coefficients for the relation between TAC and both short-term debt-to-equity ratios are larger (more negative) than the coefficient on both long-term debt-to-equity ratios. Practically all of the (statistically significant) coefficients for the control variables show the expected sign. Several control variables are not significantly related to the capital structure measures used in this study. AGE, GENDIV, DRC, TBD and SEREV are found to be not significant. Notable regarding these variables is that almost all are relatively manager specific, except for SEREV. The other control variables (TA, MTB, PROF, FINCRI and TANG)

show significant coefficients related to at least two of the used debt-to-equity ratios. One striking result is that the coefficient of TA on both short-term debt to equity ratios is negative (predicted was a positive relation) and significant. A second remarkable result is that the four control variables suggested by Frank and Goyal (2015) are all significantly related to capital structure.

The models of the capital structure ratios including MVE show a R-squared of 0.20 and 0.14 for respectively long-term debt and short-term debt and therefore are moderately explanatory. Long-term debt and short-term debt based on the book value of equity both show a R-squared of 0.02 and are therefore limited explanatory.

Table 13 in Appendix G reports the regression analysis including several lagged values of the independent variable. The results show that there are no large differences of the coefficients of the independent variable, all of these remain negative and insignificantly. None of the lagged variables show a significant (at the 1% or 5% level) coefficient. Three previous periods have been chosen due to the limited significance level of the second lagged variable in this model (significance at the 10% level).

An additional test has been performed to examine whether there is a relation between lagged values of the TAC and current value of the debt-to-equity ratios. This test examines whether there is a causal relation between the variables, the so-called granger causality test. Granger causality tests whether one of the variables is causally predicting the other and that "y_t is causing X_t if we are better able to predict X_t using all available information than in the information apart from y_t has been used" (p.428). (Granger, 1969) The results of this test are shown in Table 14 in Appendix G. Several numbers are shown **bold**, those are the numbers that are important related to this part. All three lags of TAC are (significantly) important for LDME, the third lag of TAC is significantly related to LDBE and the first lag of TAC is significantly related to SDME. These findings show that those (five) particular lagged versions of TAC cause a decline in debt-to-equity ratio (with the exception of the second lag of TAC on LDME which is positive). Another interesting results from this Granger Causality test is that there is a negative and significant coefficient of the first lag of LDBE on TAC (shown in *italic*) and therefore that LDBE influences TAC.

In a final test, a dummy variable for LTIPS has been included. Including this dummy variable does not lead to major changes in the relation between TAC and the debt-to-equity ratios and the results are therefore unreported. The dummy variable is found to be significant for both short-term debt-to-equity ratios.

TABLE 2: PANEL DATA ANALYSIS RESULTS RELATION MANAGERIAL COMPENSATION AND CAPITAL STRUCTURE

	Expected sign	LNLDME	LNLDBE	LNSDME	LNSDBE
LNTAC	-	-0.112	-0.111	-0.141	-0.142
		(3.74)**	(3.68)**	(4.26)**	(4.27)**
AGE	+	0.005	0.005	0.009	0.009
		(0.80)	(0.78)	(1.24)	(1.24)
LNTA	+	0.289	0.285	-0.192	-0.199
		(4.00)**	(3.91)**	(2.85)**	(2.96)**
LNMTB W	-	-0.965	0.051	-0.963	0.054
		(21.82)**	(1.13)	(20.86)**	(1.16)
PROF W	-	-0.273	-0.260	-0.390	-0.386
		(2.09)*	(2.01)*	(2.05)*	(2.03)*
FINCRI	+	0.168	0.171	0.071	0.072
		(3.23)**	(3.28)**	(1.26)	(1.27)
GENDIV	-	0.188	0.188	0.428	0.419
		(0.56)	(0.56)	(1.51)	(1.47)
DRC	+/-	-0.160	-0.155	0.077	0.079
		(1.69)	(1.64)	(0.88)	(0.91)
TBD	-	-0.004	-0.002	0.020	0.021
		(0.17)	(0.07)	(1.01)	(1.09)
TANG	+	0.933	0.935	0.905	0.911
		(3.31)**	(3.31)**	(2.74)**	(2.75)**
LNSEREV W	-	-0.022	-0.019	-0.038	-0.036
		(0.91)	(0.79)	(1.32)	(1.25)
CONSTANT		-5.793	-5.754	-1.018	-0.921
		(6.13)**	(6.02)**	(1.21)	(1.09)
R-squared		0.20	0.02	0.14	0.02
Observations		8,426	8,426	8,853	8,853

Table 2 present the results of the panel data analysis on the relation between managerial compensation and capital structure. The four debt-to-equity ratios are shown in each separate column. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$

Figure 1 below tries to shows these results graphically. However, the graphical results are not in line with the results from the regression analysis in Table 2. The deviation from the mean for both long term debt-to-equity ratios is higher for the highest two quartiles. The average of these long term debt-to-equity ratios is higher than the average of the lowest two quartiles. This could be an indication that there exists a positive relation between TAC and both LDME and LDBE. The boxplots of the two highest quartiles are also slightly above (at least the mean) of the boxplots for the lowest two quartiles. Figure 1 however is in line with the correlations as shown in Appendix D.

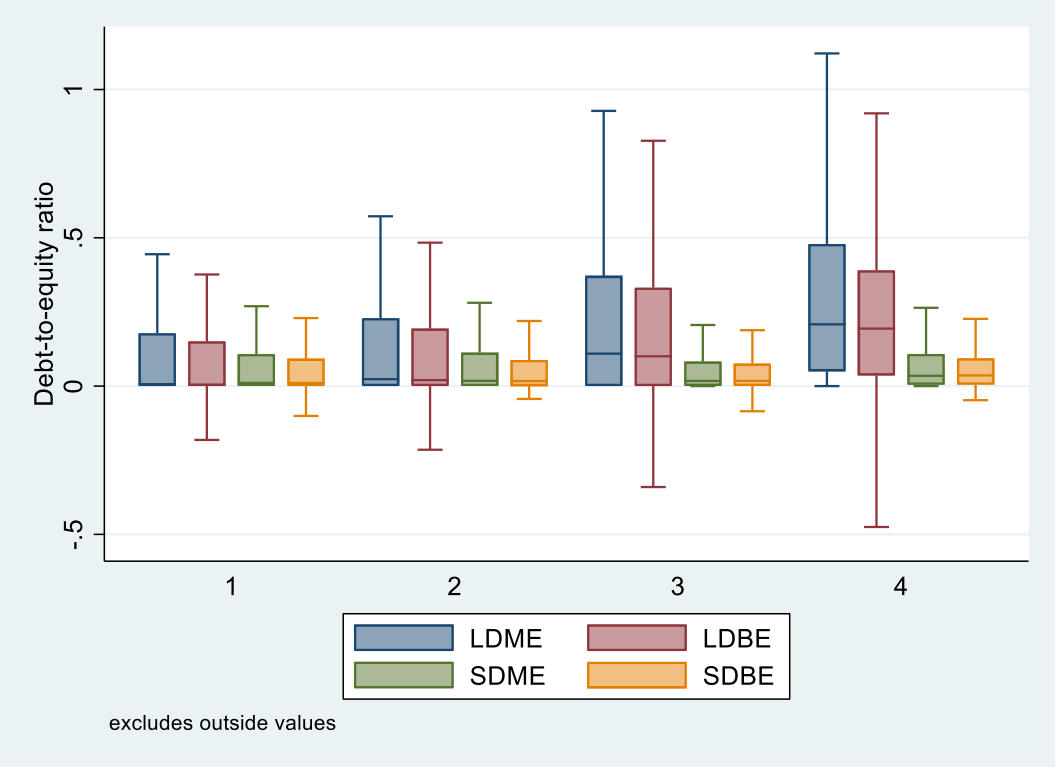

Figure 1: BOXPLOTS FOR EACH OF THE DIFFERENT DEPENDENT VARIABLES. THE NUMBER ON THE HORIZONTAL AXIS ARE INDICATORS FOR THE QUARTILES OF TOTAL ANNUAL COMPENSATION (WITH 1 BEING THE LOWEST QUARTILE AND 4 BEING THE HIGHEST). OUTLIERS ARE EXCLUDED FROM THE MODEL.

Figure 2 through 5 below show scatterplots of the distribution of each of the dependent variables. These graphical results are in line with the correlation coefficients shown in Appendix D. The plotted lines in both the figure for long term debt ratios are upward sloped (results from the regression analysis show a negative sign). The plotted line in Figure 4 is also slightly upward sloping and the plotted line in Figure 5 (SDBE) is slightly downward sloping. That the line in Figure 5 is downward sloping is not in line with the Pearson correlations from Table 8, all other figures do show the expected direction (according to the Pearson correlation). According to the

Pairwise correlation, Figure 4 is expected to be downward sloping and therefore this is not in line with this expectation. All others are in line with the Pairwise correlation.

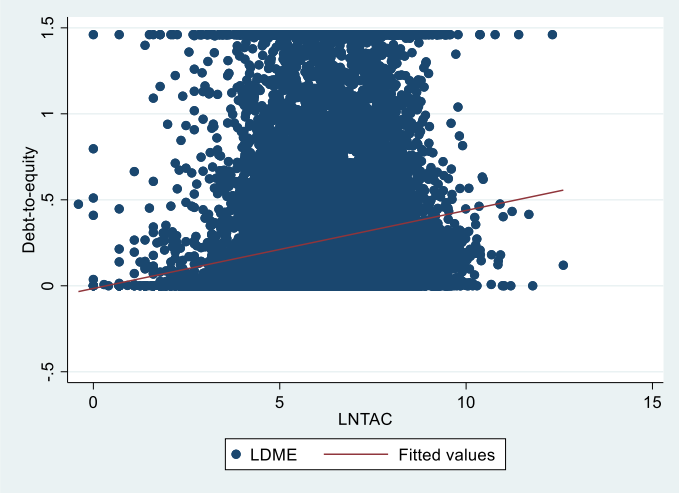

FIGURE 2: SCATTERPLOT LDME LNTAC

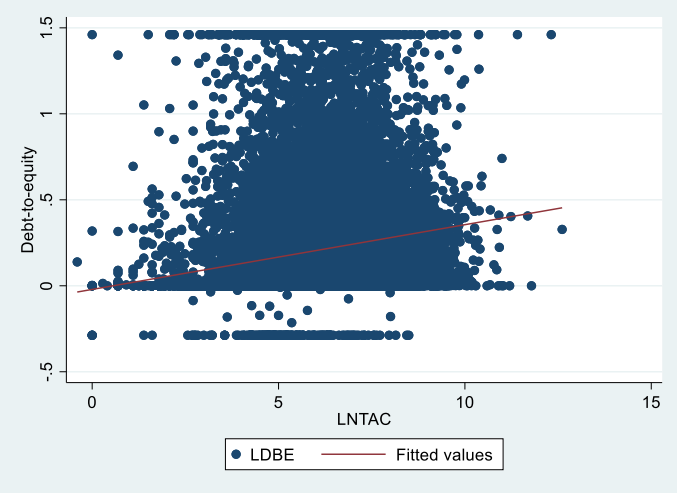

FIGURE 3: SCATTERPLOT LDBE LNTAC

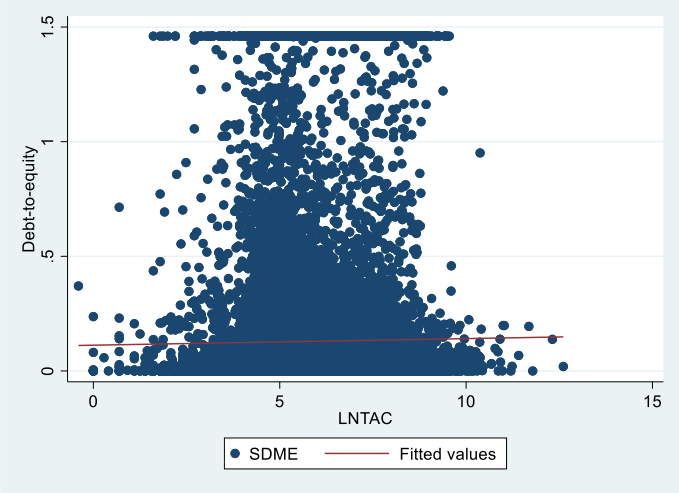

FIGURE 4: SCATTERPLOT SDME LNTAC

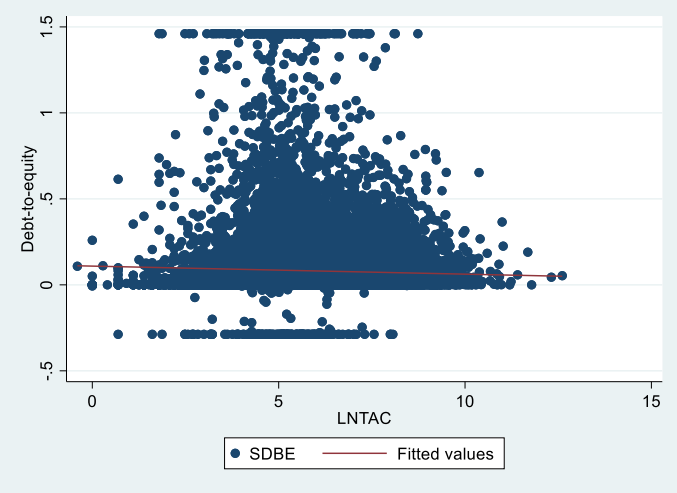

FIGURE 5: SCATTERPLOT SDBE LNTAC

4.2.2 Results association between proportion of equity-linked compensation to total compensation and capital structure

This second part of the results described and elaborates on the findings on the second part of the research. Once again, a Hausman test has been performed to check whether the fixed effects or the random effects model is the most appropriate model. The p-values for all dependent variables are below 0.05 and therefore the fixed effects model is again the model that will be used. Aim of the second part of the analysis is to determine the relation between the equity-linked part of the compensation and the different capital structure measures. Expected is that there is a positive relation, so that the higher the proportion of equity-linked compensation (compared to cash compensation), the higher the different debt-to-equity ratios.

Table 15 in Appendix H shows the results without including the control variables. The coefficients all show a negative and significant value towards all the dependent variables. All but the coefficients on LDBE show significance at the 1% level. The coefficient of TAC on LDBE shows significance at the 5% level. Without the control variables, the results all not in line with what is expected.

Table 3 below shows the results of the analysis including the control variables. Each of the coefficients of the independent variables on the dependent variable are negative and this is not in line with what is hypothesized. However, none of the variables show significant results at the 1% or the 5% level. The coefficients cannot be interpreted one on one with what is shown in the table, due to the nature of the dependent and independent variable. The independent variable is a ratio, and the dependent variable is the natural logarithm of the several capital structure measures. For instance, the coefficient of EBTAC on SDBE is -0.193. Due to natural logarithmic transformation, the actual interpretation of this coefficient is that an increase of 1% in the EBTAC ratio leads to a decrease of 0.1755% in SDBE. All control variables are again in line with existing literature. The second model has, in line with the first model, moderately explanatory power for both debt-to-equity ratios that included MVE (respectively R-squared of 0.18 and 0.11 for LTD and STD). For the debt-to-equity ratios calculated by using the BVE, the R-squared is 0.02 and 0.01 for respectively LTD and STD and therefore limited. The expected hypothesis of a positive relation between EBTAC and capital structure can therefore not be accepted. There are even some small hints that the opposite relation, a negative one, is found in the research, but this is solely the case

for SDME and SDBE and there is a limited (at the 10% level) significance. In combination with the limited explanatory power of the models, these results are nearly negligible.

Table 16 in Appendix H reports the findings if lagged versions of the independent variable are included in the model. The results for the current independent variable are similar to those reported without the lagged variables. However, when lagged versions are included, the coefficients of EBTAC on both the long-term debt ratios become significant (at the 10% level) and the significance of the coeffects on the short-term debt ratios becomes insignificant. The first lagged variable shows significant (at the 10% level) results on both the short-term debt ratios. The explanatory power of the model increases slightly in the case of LDME, LDBE and SDBE and decreases slightly in the model with SDME as dependent variable.

As well as for the first analysis in this research, a granger causality test has been performed for the second part too. The results of this test are shown in Table 17 in appendix H. The results from this granger causality test lack significance. There is no significant causal relation between EBTAC and one of the dependent variables.

A final test has been performed in which the dummy variable for LTIPS is included in the model. The results are reported in Table 18 in Appendix H. The coefficient on LTIPS is significant (at the 1% level) and positive for both short-term debt-to-equity ratios. The significance of EBTAC increases and the coefficient decreases (becomes more negative) if LTIPS is included in the model, compared to the results from the main analysis. The explanatory power of the model is still very limited.

TABLE 3: PANEL DATA ANALYSIS RESULTS RELATION EQUITY-LINKED PROPORTION OF COMPENSATION TO CAPITAL STRUCTURE

	Expected sign	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	+	-0.190	-0.185	-0.198	-0.193
		(1.54)	(1.51)	(1.74)	(1.68)
AGE	+	-0.002	-0.002	-0.002	-0.003
		(0.20)	(0.24)	(0.24)	(0.27)
LNTA	+	0.314	0.306	-0.159	-0.169
		(3.61)**	(3.47)**	(1.75)	(1.87)
LNMTB W	-	-0.935	0.084	-0.916	0.102
		(15.41)**	(1.34)	(14.01)**	(1.59)
PROF W	-	-0.343	-0.331	-0.304	-0.282
		(2.05)*	(1.97)*	(1.17)	(1.09)
FINCRI	+	0.153	0.158	0.045	0.049
		(2.45)*	(2.51)*	(0.62)	(0.68)
GENDIV	-	0.201	0.195	0.273	0.257
		(0.56)	(0.54)	(0.70)	(0.66)
DRC	+/-	-0.025	-0.022	0.222	0.223
		(0.21)	(0.18)	(1.96)	(1.97)*
TBD	-	-0.001	0.002	0.025	0.027
		(0.02)	(0.05)	(1.05)	(1.11)
TANG	+	0.710	0.720	0.753	0.763
		(2.02)*	(2.03)*	(1.78)	(1.80)
LNSEREV W	-	-0.000	0.001	-0.040	-0.039
		(0.01)	(0.02)	(1.05)	(1.04)
CONSTANT		-6.367	-6.265	-1.739	-1.600
		(5.21)**	(5.02)**	(1.53)	(1.41)
R-squared		0.18	0.02	0.11	0.01
Observations		5,301	5,301	5,494	5,494

Table 3 present the results of the panel data analysis on the relation between the equity-linked proportion of managerial compensation and capital structure. The four debt-to-equity ratios are shown in each separate column. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is the ratio of equity-linked compensation divided by Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) proxy of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

4.3. Robustness checks

4.3.1 Robustness checks association between compensation and capital structure

Several robustness checks have been performed in order to analyze the found relationships and to test the reliability of these results. As a first robustness check, five new dependent variables have been generated. The explanations of the abbreviations are again shown in Appendix B. The new variables are several ratios, namely total debt divided by book value of equity (TDBE), total debt divided by market value (TDME), long-term debt to equity value[7] (LDE), short-term debt to equity value (SDE) and total debt to equity value (TDE). These variables are considered to find out whether the division of long-term and short-term debt and the division of market value of equity and book value of equity are relevant for the purposes of this study, or that these divisions are negligible. The same regressions have been performed with these variables and the results are shown in Table 19 in Appendix I. The results are similar to those obtained by the main analysis. The results lose some of the significance when total debt is used and the difference between the underlying equity value remain intact (TDBE and TDME). However, there is once again significance at the 1% level if the average of equity value is used. The explanatory power of these models is very limited, four out of the five have a R-squared of below 0.04 and therefore the main analysis is preferred.

The second robustness check uses a different measure for the independent variable. In line with Bhagat et al. (2011), total annual compensation divided by total assets will be used. Due to non-normality, the natural logarithm of this ratio will be used. The results of this analysis can be found in Table 20 in Appendix I. The coefficient of TACTA is higher than the coefficient of TAC. However, these cannot be one on one compared. Main result of this second robustness check is that if a ratio (TACTA) is used, the effect on debt-to-equity ratios is still negative. The R-squared is similar to the R-squared from the main analysis.

The third robustness check handles the large number of firms from the UK in the dataset. As can be seen in Appendix A, over 75 percent of the first is coming from the UK. For this third check, firms from the UK are dropped out of the sample and the same regression analysis is performed. The results are shown in Table 21 in Appendix I. The relation between TAC and SDME and SDBE disappears (this is no longer significant). The relation between TAC and LDME and LDBE is

[7] Equity value is the average of book value of equity and market value of equity.

similar to the relation report before. The R-squared of this sample is slightly higher than the R-squared of the main analysis.

As a fourth robustness check, all original variables have been used in the analysis, meaning that all winsorized variables and all natural logarithmic variables are removed from the model. The results of this analysis are shown in Table 22 in Appendix I. None of the main results are significant anymore. Remarkable is that the R-squared on LDBE increases substantially compared to the original model to 0.72. Main finding here is that these results are insignificant, some control variables are significant but the independent variable is not, and therefore adjusting the original variables in the way this research has transformed them is reasonable and leads to significant results.

A fifth robustness check has been performed in order to check whether outliers in TAC could be an influence on the investigated relation. Those observations with TAC values over the 75th percentile (over € 969,750) have been dropped and the same regression analyses have been performed. The results can be found in Table 23 in Appendix I. The results are similar to those of the main analysis. The coefficients on LDME and LDBE have decreased slightly (became less negative) but this does not lead to any outstanding differences. Explanatory power of this analysis is similar to the one of the main analysis. Therefore it is reasonable to argue that the observations with the largest TAC do not lead to disruptions in the analysis. A similar test has been performed where TAC has been winsorized at the 95th percentile. Results are unreported but are similar to the results of the main analyses. There is a slight difference in the coefficients of TAC_W on SDBE and SDME but these differences are fairly negligible.

In the sixth, and final, robustness check, an Ordinary Least Squares (OLS) regression analysis is performed. Average debt-to-equity ratio of each industry and of each country are included in this analysis. This has, due to the nature of a panel data analysis, not been possible in the main analysis. The results are shown in Table 24. The coefficients between TAC and all debt-to-equity ratios are highly significant. Table 24 also shows that there is a highly significant relation between the averages of the debt-to-equity ratios for industry and country. The explanatory power of the model increases to a moderate value.

4.3.2 Robustness checks association between proportion of equity-linked compensation to total compensation and capital structure

Several robustness checks have been performed for the second part of the analysis as well. The first check is similar to the first one described before. The newly created dependent variables have been used and the results are shown in Table 25 in Appendix J. The results differ slightly from those obtained before. In the main analysis, none of the relations between the main independent and dependent variables are found to be significant. However, this changes if the new variables are used. The direction of the relationship is similar to the one found before (negative) in the main analysis, which is still not as hypothesized. Three out of the five new variables show significance at the 5% level, in contrast to the main analysis were only one model shows significance at the 10% level while the others are insignificant. Especially SDE and TDE are highly significant and mainly the significance of EBTAC on TDE is useful. This means that, the higher the proportion of the equity-linked part of total compensation, the lower the total debt to equity ratio. Unfortunately, the explanatory power of the model is limited (R-squared of 0.04).

The second robustness check is with exclusion of all firms from the UK. The results are reported in table 26 in Appendix J. The results are similar to the ones obtained by the main analysis. However, there is a slight increase in significance levels for the ratios that include long term debt (both are significant at the 5% level). The coefficients become more negative if firms from the UK are excluded, meaning that firms that are not from the UK have a larger negative relation between EBTAC and LTDE ratio than those firms from the UK. As a check for this statement, a new regression analysis has been performed that only investigates the firms from the UK. The results show that the coefficient of EBTAC on both long term debt ratios is lower for UK firms compared to the main analysis (unreported), but there is lack of significance among these findings.

The third robustness check performs the main analysis but without winsorization and without taking the natural logarithm of the variables. Results are similar to the once obtained in the main analysis. There is a negative and significant relation (at the 5% level) between EBTAC and SDME, while the other relations do not show significant results. The results are shown in Table 27.

In the fourth robustness check, outliers of both TAC and EBTAC have (in separate tests) been removed from the model. In the first test, all observations over the 75th percentile of TAC have been removed from the model. Results are shown in Table 28 in Appendix J and are all lacking significant results between EBTAC and the different dependent variables. In the second test, all

observations over the 75th percentile (which happens to be exactly two-third) of EBTAC are removed from the data. The results of this test are shown in Table 29 in Appendix J. All main findings are significant at the 5% level. This indicates that, for those firms with the 25 percent highest EBTAC, the relation between EBTAC and capital structure is insignificant.

As a fifth and last robustness check, an OLS regression has been performed. The results show that, in line with Table 24, the averages of the debt-to-equity ratios are important determinants of the debt-to-equity ratio of a firm. The coefficient of EBTAC however remains insignificant and is similar to the coefficient from the main analysis. Results are therefore unreported.

5. Conclusion & Discussion

Prior research has tried to find determinants of the capital structure decision of a firm, and several firm specific characteristics have been proven to relate to capital structure such as size (TA), market-to-book ratio (MTB), profitability (PROF) and tangibility (TANG). (Frank & Goyal, 2015) A largely less researched field in capital structure determinants is the field of managerial characteristics. Therefore, the first part of this research investigates and describes the relation between managerial compensation and capital structure. The second part of this research investigates whether there is a relation between the proportion of compensation that is linked to equity (such as shares, LTIPs and options) and the capital structure of a firm. A hypothesis has been developed for both of these part that is tested by means of a large, quantitative data analysis. This part of the research consists of the discussion with interpretation of the main findings, links of the findings to prior literature and the conclusion, with a summarization of the results, contributions, limitations and recommendations for further research.

5.1 Discussion, interpretation of the results

The main finding regarding this study is that there is a negative relation between total annual compensation and debt-to-equity ratio, and thus that there is a negative association between managerial compensation and capital structure. This is in line with prior research of Bhagat et al. (2011) and Skeikh and Wang (2012) who investigate this relationship for different datasets.

The pecking order theory and the static tradeoff theory are the two main explanatory theories on the subject of capital structure. (Myers, 1984) The statis tradeoff theory, that explains capital structure by using an optimal debt ratio, is unrelated to this research. Whether or not an optimal debt ratio for firms exists is not discussed. The pecking order theory could be related to this research, it assumes that internal capital is preferred over external capital and that in the case external capital is required that debt is preferred over equity. The first part of this research find a negative relation between managerial compensation and capital structure. According to the pecking order theory, this could be due to managers (monetary) incentives to issue capital by using debt. This is partly supported by the results from the granger causality tests that show that there is indeed a causal relationship between total annual compensation and (at least three of the) debt-to-equity

ratios. Managers may assume that if their compensation is relatively high, that the debt-to-equity ratios in next years are relatively low and that this saves costs for the firm.

A second incentive for debt capital over equity capital for managers could be that the managers do not lose percentage of their shares and thus their ownership of the firm if debt capital is attracted. The voting power of managers that are losing ownership of the firm decreases, and the possibility of a take-over attempt increases at this same time. (Zwiebel (1996); Berger et al. (1997)) Managers with higher compensation may be more entrenched to the firm (preference of a high compensation over low compensation at another firm) and therefore try to attract new capital in the form of debt capital over equity.

Research on the second part of the analysis has not been conducted previously and therefore the second hypothesis is mainly based on studies that investigate the relation between managerial ownership and capital structure. Mehran et al. (1999) state that incentives of managers owning a larger stake of their firm are better aligned with those of shareholders, and therefore that this would increase the use of debt capital. However, the results found in this study suggest that the opposite is true. Firms with managers with a larger share of equity-linked compensation tend to have lower debt-to-equity ratios. These results are not significant, and not in line with the alignment theory, which predicts a positive relation. Alignment theory predicts that more aligned managers would, due to the two incentives described, increase the use of debt capital. The results are partly in line with the entrenchment theory, that states that the firm actually suffers after a certain point of managerial ownership. This is partly reflected in the results, and could be a possible explanation.

Most of the control variables show the predicted sign. One exception is that TA (size) shows a negative sign for both short-term debt-to-equity ratios where, according to Frank and Goyal (2015), a positive relation was excepted. This negative coefficient is however in line with research of Titman and Wessels (1988) who find a negative relation between size and short-term debt, mainly that smaller firms use more short-term debt than similar larger firms.

5.2 Conclusion, contributions, limitations and recommendations for further research

According to the first hypothesis, it is expected that there is a negative relation between total managerial compensation and the capital structure of a firm. Capital structure is operationalized as several debt-to-equity ratios. The results in Table 2 show that there is a highly significant, negative relation between managerial compensation and the different debt-to-equity ratios used in this

research. Several robustness checks with for instance different dependent variables, a different independent variable and after or before transformation of variables lead to (mostly) similar results. Overall, the first hypothesis of this research is supported. A negative relation between managerial compensation and debt-to-equity ratios is found. One important remark however, is that the explanatory power of the model is very limited. This is in line with prior research, such as the study of Rajan and Zingales (1995) that investigates determinants of capital structure for several countries. The explanatory power in their model is slightly higher than for this study, and varies between 0.05 and 0.29 and therefore also moderately explanatory.

In additional tests, previous years' compensation is included in the model, and the findings remain unchanged so there is still a significant and negative relation. There is no significant relation (at the 5% level) between previous years' compensation and capital structure and therefore it seems that these are not relevant in determining the capital structure. However, a granger causality test shows that there might be a causal relation between previous compensation and capital structure.

According to the second hypothesis, it is expected that there is a positive relation between the proportion of compensation linked to equity, compared to compensation linked to cash, and the different debt-to-equity ratios. Main finding is that there is no such relationship, the results which are shown in Table 3, are insignificant. Remarkable is that the coefficients that are found are in the opposite direction of what is expected, a negative relation is found. Robustness checks that have been performed show similar results. All main coefficients of the independent variables are found to be negative. Some of the robustness checks (with for instance subsamples) show that there are hints of a significant relation when not all observations are taken into account. In line with the results from the first part of this research is the explanatory power of the model, which is limited. Previous versions of the equity-linked compensation are included in a separate analysis. These results show that there is no significant relation between those previous ratios and the current capital structure of a firm. An additional granger causality test supports this.

This research tries to provide an answer to the question:

"To what extent do types of managerial compensation influence a firms' capital structure?"

The results on the first part of the analysis show that there is a negative relation between total managerial compensation and capital structure. However, the second part shows that there is no

clear (significant) relation between types of managerial compensation and capital structure. The (main) general answer to the research question is therefore that there is a negative relation between managerial compensation and capital structure but that no relation is found between types of compensation and capital structure.

This research is similar to the studies of Bhagat et al. (2011) and Sheikh & Wang (2012) in trying to find the relation between managerial compensation and capital structure. Nevertheless, there are some differences. The first difference is that this research is the first to look into this relation for a sample of firms from (25) European countries. The second difference is that this paper extends the prior research with the second part of the analysis. Existing research has examined the relation between CEO ownership and capital structure (Ghosh et al. (2007); Griffith (1999)) but does not look at the relation between CEO compensation that is related to equity and capital structure. Therefore, this study contributes to existing literature in that it, at first, adds evidence for the relation between managerial compensation and capital structure and, second that it provides (at least some) knowledge for the relation between the proportion of equity-linked compensation and capital structure. Results for the main analysis for this second part are not significant, but results on some of the robustness checks are significant.

Throughout this research, several limitations have emerged that can be useful for further research. The first limitation is related to the dataset used in this study. Data is retrieved by using BoardEx and Thomson Reuters Eikon and therefore not collected at first hand. Some of the values in the dataset seem quite impossible (such as the percentage of women on the board being 6 percent and yearly annual compensations of approximately € 300,000,000). Even though this might be difficult, further research could potentially look further into these high numbers. A second limitation related to the dataset is that there is a relatively low number of firms from countries other than the UK. Firms from the UK make up over 75 percent of the sample. One of the robustness checks handles this large percentage of UK firms, but further research might want to look into the relation for firms in countries not from the UK.

A second limitation is that this study makes only one distinction, equity-linked versus cash-linked compensation and does not go into the exact types of compensation. Further research may want to investigate the relation between these exact types of compensation such as different types of options, the fixed-variable proportion of compensation or look into the effect of defined contribution pension plans.

A second recommendation for further research could be to examine the differences of the investigated relation between European and American firms (several other regions could be included as well). This research find a negative relation between managerial compensation and capital structure, the paper of Bhagat et al. (2011) finds the same relation for US-based firms, but there may be some important differences. Third, the distinction on capital structure made by Titman and Wessels (1988) was not completely used in this study, convertible debt has been excluded from the model. Further research may want to look into this type of capital and its relation with managerial compensation.

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Appendices

Appendix A

TABLE 4: COUNTRY OF FIRM

Country	Freq.	Percent	Cum.
Austria	21	0.04	0.04
Belgium	189	0.32	0.35
Cyprus	273	0.46	0.81
Denmark	21	0.04	0.85
Finland	168	0.28	1.13
France	1617	2.72	3.85
Germany	1155	1.94	5.80
Gibraltar	147	0.25	6.04
Greece	42	0.07	6.11
Guernsey	1260	2.12	8.23
Iceland	105	0.18	8.41
Isle of Man	1260	2.12	10.53
Italy	315	0.53	11.06
Jersey	1743	2.93	13.99
Luxembourg	210	0.35	14.35
Netherlands	1008	1.70	16.04
Norway	252	0.42	16.47
Republic of Ireland	2625	4.42	20.88
Romania	21	0.04	20.92
Russian Federation	42	0.07	20.99
Spain	336	0.57	21.55
Sweden	462	0.78	22.33
Switzerland	609	1.02	23.36
Ukraine	21	0.04	23.39
United Kingdom	45528	76.61	100.0

Table 4 summarizes the division of firms per country and reports the frequency and (cumulative) percentages of the data.

TABLE 5: INDUSTRY OF FIRM

Industry	Freq.	Percent	Cum.
Aerospace & Defence	315	0.53	0.53
Automobiles & Parts	588	0.99	1.52
Banks	882	1.48	3.00
Beverages	315	0.53	3.53
Blank Check / Shell Companies	63	0.11	3.64
Business Services	4767	8.02	11.66
Chemicals	840	1.41	13.07
Clothing & Perso-l Products	777	1.31	14.38
Construction & Building Materials	1764	2.97	17.35
Consumer Services	168	0.28	17.63
Containers & Packaging	315	0.53	18.16
Diversified Industrials	357	0.60	18.76
Electricity	483	0.81	19.58
Electronic & Electrical Equipment	1827	3.07	22.65
Engineering & Machinery	1701	2.86	25.51
Food & Drug Retailers	378	0.64	26.15
Food Producers & Processors	1449	2.44	28.59
Forestry & Paper	147	0.25	28.83
General Retailers	1974	3.32	32.16
Health	1806	3.04	35.19
Household Products	714	1.20	36.40
Information Technology Hardware	1071	1.80	38.20
Insurance	966	1.63	39.82
Investment Companies	924	1.55	41.38
Legal	84	0.14	41.52
Leisure & Hotels	2982	5.02	46.54
Leisure Goods	189	0.32	46.86
Life Assurance	315	0.53	47.39
Media & Entertainment	3108	5.23	52.61
Mining	4095	6.89	59.51
Oil & Gas	3822	6.43	65.94
Pharmaceuticals and Biotechnology	2793	4.70	70.64
Private Equity	273	0.46	71.10
Publishing	84	0.14	71.24
Real Estate	2730	4.59	75.83
Renewable Energy	735	1.24	77.07
Software & Computer Services	5334	8.98	86.04
Speciality & Other Fi-nce	5082	8.55	94.59
Steel & Other Metals	357	0.60	95.19
Telecommunication Services	1281	2.16	97.35
Tobacco	21	0.04	97.39
Transport	1197	2.01	99.40
Utilities - Other	357	0.60	100.00

Table 5 summarizes the division of firms per industry and reports the frequency and (cumulative) percentages of the data.

Appendix B

TABLE 6 ABBREVIATIONS AND DESCRIPTIONS OF VARIABLES

Abbreviation	Variable	Description
ISIN_ID	ISIN	International Securities Identification Number (ISIN) identifies a unique security and is one of the main standard identification numbers worldwide
		Independent Variables
TAC	Total Annual Compensation	Average of the total annual compensation of executive directors of a company in a given year (in 000s).
EBC	Equity Based Compensation	Average of the equity based compensation of executive directors of a company in a given year (in 000s).
EBTAC	Equity Based / Total Annual Compensation	Ratio of equity based compensation to total annual compensation.
		Dependent Variables
CS	Capital Structure	Dependent variable in the models
LTD	Long Term Debt	Total debt of a company in a given year with a maturity > 1 year (in 000s).
STD	Short Term Debt	Total debt of a company in a given year with a maturity < 1 year. Including long term debt with a maturity < 1 year (in 000s).
MVE	Market Value of Equity	Number of shares outstanding times share price (in 000,000s).
BVE	Book Value of Equity	Total assets minus total debt (in 000s).
LDME	Long Term Debt / Market Value of Equity	Ratio of long term debt dividend by market value of equity.
LDBE	Long Term Debt / Book Value of Equity	Ratio of long term debt dividend by book value of equity.
SDME	Short Term Debt / Market Value of Equity	Ratio of short term debt dividend by market value of equity.
SDBE	Short Term Debt / Book Value of Equity	Ratio of short term debt dividend by book value of equity.
		Control Variables
TA	Total Assets	Total assets of a company in a given year (in 000s).
OI	Operating Income	Operating income of a company in a given year (in 000s).
REV	Revenue	Total revenue of a company in a given year (in 000s).
MTB	Market-to-Book Ratio	Ratio of market value of equity to book value of equity.
PPE	Net Plant, Property and Equipment	Value of net PPE of a company in a given year (in 000s)
TANG	Tangibility	Ratio of net PPE to total assets.
TBD	Total Board of Directors	Total number of directors in a board.

DRC	Dual Role CEO	Dummy variable that indicates 1 if the CEO has a position in the Board of Directors, and 0 otherwise.
M	Male	Number of male directors.
RATM	Ratio Male	Number of male directors divided by the total number of directors in a board.
GENDIV	Ratio of Gender Diversity	1 – Ratio Male. Ratio that shows the number of female directors to the total number of directors in a board.
SE	Selling Expenses	Total selling expenses of a company in a given year (in 000s).
RD	Research & Development Expenses	Total R&D expenses of a company in a given year (in 000s).
FINCRI	Financial Crisis	Dummy variable that indicates 1 for the years 2008 and 2009 and indicates 0 otherwise.
PROF	Profitability	Ratio of operating income to revenue.
AGE	Age of Director	The average age of the directors in a company in a given year.
TTR	Time To Retirement of Director	Time to Retirement of the director. Assuming a retirement age of 70.
		Robustness checks variables
TDBE	Total Debt to Book Value of Equity	Ratio of Total Debt (sum of STD and LTD) divided by BE.
TDME	Total Debt to Market Value of Equity	Ratio of Total Debt (sum of STD and LTD) divided by MVE.
LDE	Long-term Debt to Equity	Ratio of LTD divided by Equity (average of BVE and MVE).
SDE	Short-term Debt to Equity	Ratio of STD divided by Equity (average of BVE and MVE)
TDE	Total Debt to Equity	Ratio of Total Debt divided by Equity.
TACTA	Total Annual Compensation to Total Assets	Ratio of TAC divided by TA.

Table 6 describes the abbreviations used throughout this study and describes the variables used.

Appendix C

TABLE 7: SKEWNESS AND KURTOSIS RESULTS

	Skewness	Kurtosis
Before data transformation		
LDME	64.86747	5339.443
LDBE	40.7148	8951.472
SDME	105.1977	14,057.05
SDBE	-186.5314	34,826.47
TAC	39.19339	2,635.573
EBC	35.28098	1,988.003
AGE	0.2136899	3.753191
TA	11.91652	175.6022
MTB	127.4747	19,029.48
TANG	1.351056	4.025486
TBD	2.147086	9.828982
GENDIV	-6.991565	132.7734
SEREV	51.19021	3,081.773
PROF	-45.80967	2,572.634
After data transformation		
LNLDME	-1.030475	4.813861
LNLDBE	-1.078557	4.828812
LNSDME	-0.41326	3.820726
LNSDBE	-0.74369	4.228823
LNTAC	0.0554832	3.444222
LNEBC	-0.3983938	3.293351
AGE	0.2136899	3.753191
LNTA	0.4036725	3.021411
LNMTB_W	-0.3518574	4.326955
LNTANG	1.329633	3.808116
TBD	2.147086	9.828982
GENDIV	-0.7708064	3.576244
LNSEREV_W	0.2567235	3.486011
PROF_W	-1.112298	4.498491

Table 7 summarizes the Skewness and Kurtosis scores of the variables (before transformation in the upper part, after transformation in the lower part).

Appendix D

TABLE 8: PEARSON CORRELATIONS

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) LNLDME	1.000																
(2) LNLDBE	0.841	1.000															
(3) LNSDME	0.449	0.178	1.000														
(4) LNSDBE	0.257	0.270	0.861	1.000													
(5) LNTAC	0.173	0.158	0.075	0.053	1.000												
(6) LNEBC	0.112	0.140	0.039	0.060	0.867	1.000											
(7) LNTA	0.389	0.210	0.313	0.148	0.725	0.577	1.000										
(8) LNMTB_W	-0.460	0.090	-0.534	-0.033	-0.056	0.027	-0.373	1.000									
(9) PROF_W	0.183	0.190	0.074	0.072	0.280	0.230	0.375	-0.027	1.000								
(10) GENDIV	-0.060	-0.034	-0.069	-0.048	-0.044	-0.045	-0.040	0.051	-0.056	1.000							
(11) DRC	0.056	0.035	0.116	0.110	0.168	0.105	0.272	-0.052	0.019	-0.051	1.000						
(12) FINCRI	0.071	0.014	0.027	-0.034	-0.067	-0.097	-0.036	-0.108	0.018	0.002	-0.002	1.000					
(13) TBD	0.214	0.084	0.273	0.169	0.514	0.330	0.699	-0.264	0.152	0.008	0.392	-0.013	1.000				
(14) LNSEREV_W	-0.152	-0.081	-0.091	-0.021	-0.295	-0.251	-0.476	0.147	-0.259	0.063	0.072	-0.003	-0.114	1.000			
(15) LNRDREV	-0.172	-0.110	-0.114	-0.053	-0.296	-0.247	-0.481	0.140	-0.252	0.065	0.071	-0.004	-0.134	0.885	1.000		
(16) AGE	0.125	0.084	0.137	0.107	0.329	0.251	0.366	-0.090	0.177	-0.091	0.209	-0.006	0.282	-0.049	-0.072	1.000	
(17) TANG	0.193	0.246	0.014	0.047	-0.033	-0.027	-0.015	0.053	0.138	0.017	-0.055	-0.016	-0.045	0.021	0.025	-0.032	1.000

Table 8 reports the Pearson correlations for all variables.

1

TABLE 9: PAIRWISE CORRELATIONS

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) LNLDME	1.000															
(2) LNLDBE	0.869*	1.000														
	0.000															
(3) LNSDME	0.478*	0.247*	1.000													
	0.000	0.000														
(4) LNSDBE	0.297*	0.328*	0.876*	1.000												
	0.000	0.000	0.000													
(5) LNTAC	0.113*	0.121*	-0.042*	-0.050*	1.000											
	0.000	0.000	0.000	0.000												
(6) EBTAC	-0.050*	-0.003	-0.064*	-0.017	0.217*	1.000										
	0.000	0.783	0.000	0.082	0.000											
(7) LNTA	0.329*	0.203*	0.135*	-0.012	0.663*	0.053*	1.000									
	0.000	0.000	0.000	0.050	0.000	0.000										
(8) LNMTB_W	-0.453*	0.040*	-0.508*	-0.039*	-0.039*	0.107*	-0.331*	1.000								
	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
(9) PROF_W	0.143*	0.125*	0.003	-0.029*	0.235*	-0.010	0.402*	-0.115*	1.000							
	0.000	0.000	0.618	0.000	0.000	0.255	0.000	0.000								
(10) GENDIV	-0.029*	-0.021*	-0.027*	-0.012	-0.044*	-0.022*	-0.040*	0.018*	0.014*	1.000						
	0.000	0.006	0.000	0.112	0.000	0.009	0.000	0.008	0.042							
(11) DRC	0.016*	-0.016*	0.087*	0.069*	-0.061*	0.028*	0.061*	-0.058*	0.023*	-0.047*	1.000					
	0.045	0.043	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000						
(12) FINCRI	0.053*	0.011	0.057*	0.013*	-0.035*	-0.032*	-0.025*	-0.074*	-0.027*	-0.014*	-0.011	1.000				
	0.000	0.087	0.000	0.031	0.000	0.000	0.000	0.000	0.000	0.022	0.089					
(13) TBD	0.178*	0.110*	0.130*	0.068*	0.575*	0.022*	0.678*	-0.171*	0.175*	-0.028*	0.101*	-0.001	1.000			
	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.920				
(14) LNSEREV_W	-0.172*	-0.101*	-0.053*	0.020*	-0.379*	0.001	-0.599*	0.173*	-0.430*	0.020*	0.060*	0.002	-0.271*	1.000		
	0.000	0.000	0.000	0.023	0.000	0.953	0.000	0.000	0.000	0.024	0.000	0.770	0.000			
(15) AGE	0.056*	0.019*	0.077*	0.038*	0.119*	-0.038*	0.168*	-0.102*	0.070*	-0.077*	0.258*	-0.048*	0.125*	-0.073*	1.000	
	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
(16) TANG	0.233*	0.269*	0.047*	0.070*	0.059*	-0.038*	0.192*	-0.054*	0.120*	-0.023*	0.011	-0.022*	0.050*	-0.108*	0.021*	1.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.103	0.000	0.000	0.000	0.002	

Table 9 reports the Pairwise correlations for all variables. * shows significance at the 5% level.

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Appendix E

TABLE 10: VARIANCE INFLATION FACTOR LONG TERM DEBT

	VIF	1/VIF
LNTAC	2.214	.452
AGE	1.135	.881
LNTA	4.194	.238
LNMTB W	1.205	.83
PROF W	1.227	.815
1.FINCRI	1.015	.985
GENDIV	1.015	.986
1.DRC	1.134	.882
TBD	2.148	.466
TANG	1.051	.951
LNSEREV W	1.554	.644
Mean VIF	1.627	.

Table 10 reports the Variance Inflation Factor values for both long term debt measures.

TABLE 11: VARIANCE INFLATION FACTOR SHORT TERM DEBT

	VIF	1/VIF
LNTAC	2.241	.446
AGE	1.14	.877
LNTA	4.232	.236
LNMTB W	1.193	.838
PROF W	1.227	.815
1.FINCRI	1.014	.986
GENDIV	1.014	.986
1.DRC	1.135	.881
TBD	2.143	.467
TANG	1.05	.952
LNSEREV W	1.568	.638
Mean VIF	1.632	.

Table 11 reports the Variance Inflation Factor values for both short term debt measures.

Appendix F

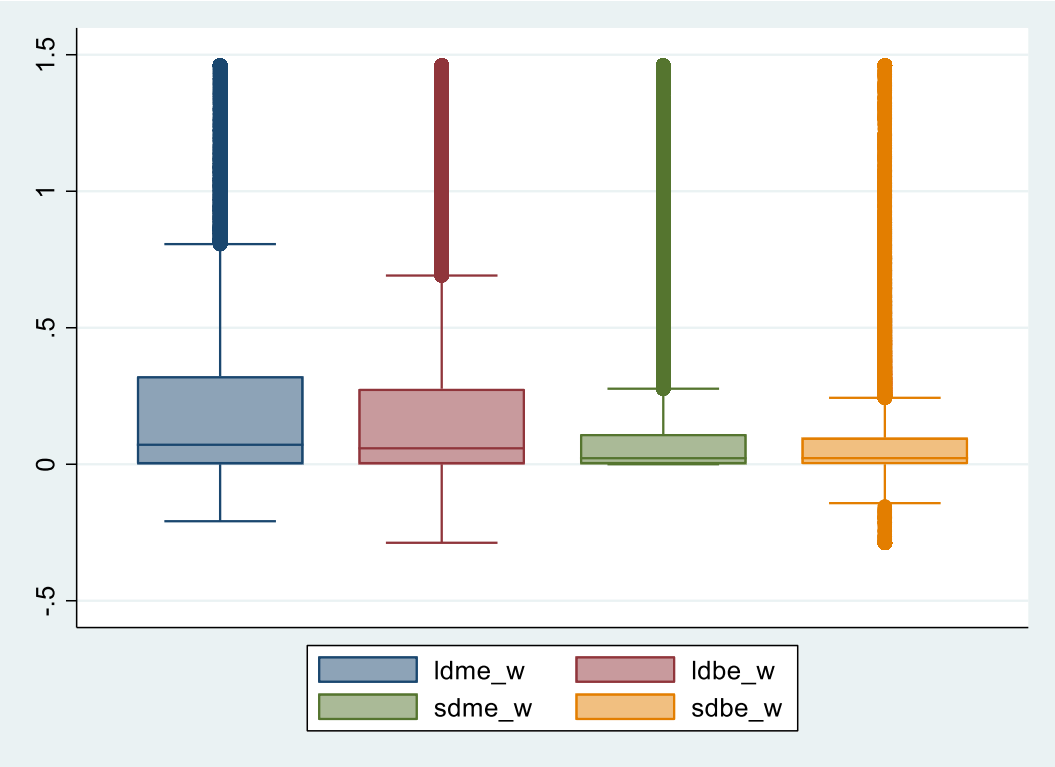

FIGURE 6: BOXPLOTS OF THE (WINSORIZED) DEPENDENT VARIABLES

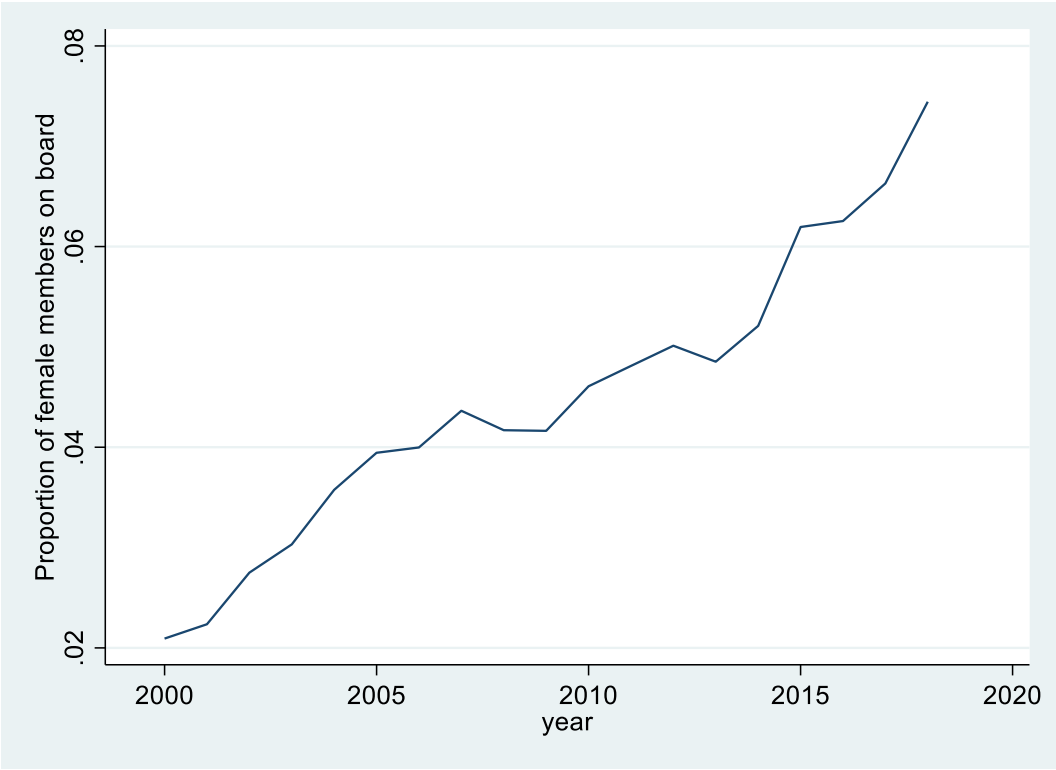

FIGURE 7: PROPORTION OF FEMALE MEMBERS ON BOARD

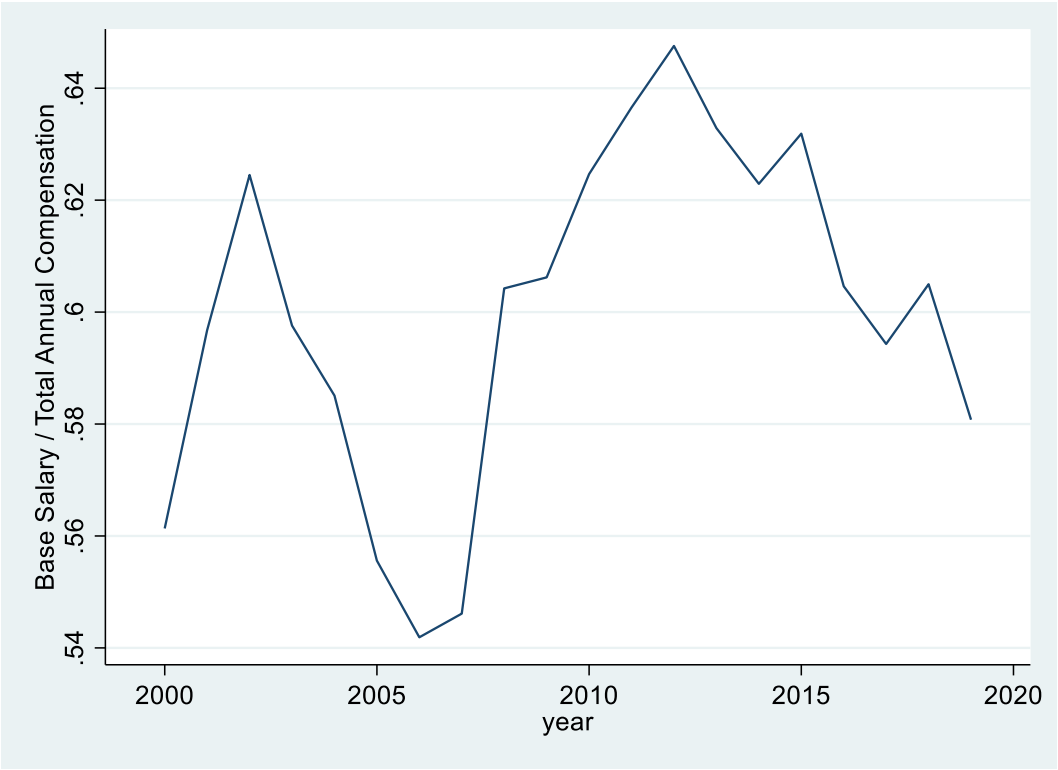

FIGURE 8: AVERAGE RATIO OF BASE SALARY DIVIDED BY TOTAL ANNUAL COMPENSATION

Appendix G

TABLE 12: PANEL DATA ANALYSIS WITHOUT CONTROL VARIABLES

	LNLDME	LNLDBE	LNSDME	LNSDBE
LNTAC	-0.082	-0.036	-0.270	-0.225
	(2.88)**	(1.44)	(8.67)**	(8.57)**
CONSTANT	-1.551	-1.961	-1.627	-2.015
	(8.75)**	(12.77)**	(8.49)**	(12.49)**
R-squared	0.00	0.00	0.01	0.01
Observations	15,741	16,216	16,417	16,975

Table 12 reports the results without including the control variables. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. T-values are shown in parentheses. * $p<0.05$; ** $p<0.01$

TABLE 13: PANEL DATA ANALYSIS WITH LAGGED VERSIONS OF INDEPENDENT VARIABLE

	LNLDME	LNLDBE	LNSDME	LNSDBE
LNTAC	-0.120	-0.116	-0.134	-0.132
	(3.10)**	(2.96)**	(3.32)**	(3.27)**
L.LNTAC	-0.044	-0.051	-0.050	-0.055
	(1.29)	(1.47)	(1.31)	(1.43)
L2.LNTAC	-0.008	-0.014	-0.070	-0.073
	(0.25)	(0.42)	(1.88)	(1.94)
L3.LNTAC	-0.010	-0.003	0.015	0.022
	(0.33)	(0.11)	(0.40)	(0.58)
AGE	-0.000	-0.000	0.015	0.015
	(0.05)	(0.02)	(1.70)	(1.72)
LNTA	0.423	0.424	-0.094	-0.098
	(4.68)**	(4.74)**	(0.92)	(0.96)
LNMTB W	-0.953	0.065	-0.881	0.136
	(17.78)**	(1.24)	(13.98)**	(2.17)*
PROF W	-0.440	-0.417	-0.341	-0.319
	(2.60)**	(2.51)*	(1.32)	(1.24)
FINCRI	0.172	0.177	0.119	0.118
	(2.99)**	(3.04)**	(1.86)	(1.83)
GENDIV	-0.017	-0.016	0.477	0.476
	(0.05)	(0.04)	(1.34)	(1.35)
DRC	-0.128	-0.125	0.183	0.185
	(1.18)	(1.14)	(1.77)	(1.80)
TBD	0.007	0.008	0.022	0.023
	(0.24)	(0.27)	(0.87)	(0.92)
TANG	0.782	0.778	0.990	0.985
	(2.29)*	(2.27)*	(2.53)*	(2.51)*
LNSEREV W	-0.011	-0.006	-0.010	-0.006
	(0.36)	(0.20)	(0.28)	(0.16)
CONSTANT	-6.890	-6.904	-1.979	-1.928
	(6.17)**	(6.20)**	(1.66)	(1.62)
R-squared	0.19	0.03	0.12	0.02
Observations	5,583	5,583	5,777	5,777

Table 13 reports the results of the main analysis of TAC on capital structure and includes lagged versions of TAC. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. L.LNTAC, L2.LNTAC and L3.LNTAC are lagged versions of the independent variable. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 14: GRANGER CAUSALITY RESULTS

LNLDME_	L.LNLDME_	0.540 (14.18)**	LNLDBE_	L.LNLDBE_	0.528 (12.30)**
	L2.LNLDME_	0.085 (3.34)**		L2.LNLDBE_	0.086 (3.28)**
	L3.LNLDME	-0.008 (0.41)		L3.LNLDBE	0.006 (0.27)
	L.LNTAC	**-0.171** **(3.59)****		L.LNTAC	0.002 (0.06)
	L2.LNTAC_	**0.066** **(2.01)***		L2.LNTAC_	0.036 (1.20)
	L3.LNTAC_	**-0.049** **(2.07)***		L3.LNTAC_	**-0.057** **(2.55)***
LNTAC	L.LNLDME	-0.011 (0.85)	LNTAC	L.LNLDBE	*-0.033* *(2.29)**
	L2.LNLDME_	0.015 (1.92)		L2.LNLDBE_	0.009 (1.05)
	L3.LNLDME_	0.003 (0.44)		L3.LNLDBE_	0.006 (0.67)
	L.LNTAC	0.456 (14.99)**		L.LNTAC	0.446 (15.23)**
	L2.LNTAC	0.204 (9.85)**		L2.LNTAC	0.201 (10.06)**
	L3.LNTAC_	0.123 (7.47)**		L3.LNTAC_	0.124 (7.80)**
N		7,521	*N*		7,669
LNSDME_	L.LNSDME_	0.487 (16.65)**	LNSDBE_	L.LNSDBE_	0.454 (14.99)**
	L2.LNSDME_	0.134 (5.74)**		L2.LNSDBE_	0.148 (6.19)**
	L3.LNSDME	0.044 (2.25)*		L3.LNSDBE	0.057 (2.72)**
	L.LNTAC	**-0.254** **(3.92)****		L.LNTAC	-0.109 (1.71)
	L2.LNTAC_	-0.028 (0.66)		L2.LNTAC_	-0.075 (1.84)
	L3.LNTAC_	-0.004 (0.13)		L3.LNTAC_	-0.023 (0.81)
LNTAC	L.LNSDME	-0.001 (0.10)	LNTAC	L.LNSDBE	-0.013 (1.17)
	L2.LNSDME_	0.001 (0.14)		L2.LNSDBE_	-0.003 (0.40)
	L3.LNSDME_	0.002 (0.32)		L3.LNSDBE_	0.002 (0.27)
	L.LNTAC_	0.449 (15.16)**		L.LNTAC_	0.441 (15.58)**

	L2.LNTAC_	0.205 (10.08)**		L2.LNTAC_	0.201 (10.28)**
	L3.LNTAC	0.114 (7.24)**		L3.LNTAC	0.114 (7.24)**
N		7,931	*N*		7,931

Table 14 reports the results of the granger causality test on the relation between TAC and capital structure. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. L.LNTAC, L2.LNTAC and L3.LNTAC are lagged versions of the independent variable. T-values are provided in parentheses. * $p<0.05$; ** $p<0.01$

Appendix H

TABLE 15: PANEL DATA ANALYSIS WITHOUT CONTROL VARIABLES

	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	-0.403	-0.169	-0.579	-0.368
	(4.15)**	(1.96)*	(5.73)**	(4.14)**
CONSTANT	-1.838	-2.021	-3.183	-3.334
	(39.19)**	(48.28)**	(65.52)**	(77.31)**
R-squared	0.00	0.00	0.01	0.00
Observations	9,773	10,074	10,038	10,373

Table 15 reports the findings of the equity-linked proportion of compensation to capital structure without including the control variables. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is the ratio of equity linked compensation divided by Total Annual Compensation. T-values are shown in parentheses. * $p<0.05$; ** $p<0.01$.

Table 16: Panel data analysis with lagged versions of independent variable

	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	-0.326	-0.330	-0.295	-0.297
	(1.75)	(1.76)	(1.37)	(1.38)
L.EBTAC	-0.078	-0.079	-0.380	-0.376
	(0.43)	(0.43)	(1.83)	(1.81)
L2.EBTAC	0.152	0.153	-0.215	-0.212
	(0.97)	(0.98)	(1.00)	(0.98)
L3.EBTAC	0.110	0.110	-0.136	-0.139
	(0.71)	(0.71)	(0.70)	(0.72)
AGE	-0.020	-0.020	0.002	0.002
	(1.57)	(1.54)	(0.13)	(0.16)
LNTA	0.374	0.374	-0.143	-0.143
	(3.05)**	(3.05)**	(0.87)	(0.88)
LNMTB W	-1.000	0.008	-0.866	0.142
	(11.49)**	(0.09)	(6.78)**	(1.10)
PROF W	-0.598	-0.600	-0.041	-0.042
	(3.80)**	(3.81)**	(0.10)	(0.11)
FINCRI	0.148	0.147	0.031	0.032
	(1.94)	(1.94)	(0.32)	(0.33)
GENDIV	-0.307	-0.308	0.805	0.805
	(0.87)	(0.87)	(1.35)	(1.36)
DRC	0.090	0.092	0.376	0.379
	(0.65)	(0.67)	(2.05)*	(2.07)*
TBD	-0.003	-0.003	0.017	0.017
	(0.09)	(0.09)	(0.44)	(0.43)
TANG	0.309	0.306	-0.047	-0.050
	(0.81)	(0.80)	(0.09)	(0.10)
LNSEREV W	-0.035	-0.033	-0.053	-0.054
	(0.78)	(0.74)	(0.70)	(0.71)
CONSTANT	-6.304	-6.315	-1.642	-1.646
	(3.83)**	(3.84)**	(0.78)	(0.79)
R-squared	0.20	0.03	0.08	0.02
Observations	2,580	2,580	2,577	2,577

Table 16 reports the results of the second analysis between equity-linked proportion of compensation and capital structure with lagged versions of EBTAC. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is the ratio of equity linked compensation divided by Total Annual Compensation. L.EBTAC, L2.EBTAC and L3.EBTAC are lagged versions of the independent variable. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

Table 17: Granger Causality Results

LNLDME	L.LNLDME_	0.642 (6.59)**	LNLDBE	L.LNLDBE_	0.607 (5.46)**
	L2.LNLDME	0.143 (2.39)*		L2.LNLDBE_	0.143 (2.25)*
	L3.LNLDME	0.010 (0.23)		L3.LNLDBE	0.008 (0.17)
	L.EBTAC	-1.045 (0.82)		L.EBTAC	-0.086 (0.08)
	L2.EBTAC_	-0.125 (0.16)		L2.EBTAC_	0.156 (0.23)
	L3.EBTAC_	-0.300 (0.58)		L3.EBTAC_	-0.222 (0.49)
EBTAC	L.LNLDME	-0.001 (0.06)	EBTAC	L.LNLDBE	-0.028 (1.15)
	L2.LNLDME_	0.010 (1.67)		L2.LNLDBE_	0.003 (0.36)
	L3.LNLDME_	-0.008 (1.19)		L3.LNLDBE_	-0.011 (1.66)
	L.EBTAC	0.365 (1.60)		L.EBTAC	0.465 (2.06)*
	L2.EBTAC	0.204 (1.46)		L2.EBTAC	0.251 (1.79)
	L3.EBTAC_	0.124 (1.30)		L3.EBTAC_	0.173 (1.73)
N		3,638	*N*		3,703
LNSDME_	L.LNSDME_	0.496 (6.20)**	LNSDBE_	L.LNSDBE_	0.462 (6.37)**
	L2.LNSDME_	0.163 (3.28)**		L2.LNSDBE_	0.166 (3.59)**
	L3.LNSDME	0.106 (2.55)*		L3.LNSDBE	0.115 (2.83)**
	L.EBTAC	-0.935 (1.28)		L.EBTAC	-0.712 (1.23)
	L2.EBTAC_	-0.472 (1.08)		L2.EBTAC_	-0.500 (1.40)
	L3.EBTAC_	0.038 (0.13)		L3.EBTAC_	-0.199 (0.80)
EBTAC	L.LNSDME	-0.001 (0.12)	EBTAC	L.LNSDBE	-0.011 (1.26)
	L2.LNSDME_	-0.003 (0.55)		L2.LNSDBE_	-0.006 (1.12)
	L3.LNSDME_	0.002 (0.45)		L3.LNSDBE_	0.001 (0.17)
	L.EBTAC	0.377 (4.51)**		L.EBTAC	0.354 (5.34)**

	L2.EBTAC_	0.220		L2.EBTAC_	0.197
		(4.39)**			(4.72)**
	L3.EBTAC_	0.123		L3.EBTAC_	0.112
		(3.70)**			(3.68)**
N		3,567	*N*		3,643

Table 17 reports the results of the granger causality test on the relation between EBTAC and capital structure. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. L.EBTAC, L2.EBTAC and L3.EBTAC are lagged versions of the independent variable. T-values are provided in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 18: PANEL DATA ANALYSIS INCLUDING LTIPS DUMMY VARIABLE

	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	-0.203	-0.199	-0.268	-0.264
	(1.57)	(1.54)	(2.32)*	(2.28)*
AGE	-0.002	-0.002	-0.003	-0.004
	(0.21)	(0.25)	(0.34)	(0.37)
LNTA	0.310	0.302	-0.179	-0.190
	(3.53)**	(3.37)**	(1.96)*	(2.09)*
LNMTB W	-0.934	0.085	-0.914	0.105
	(15.38)**	(1.34)	(14.08)**	(1.63)
PROF W	-0.347	-0.335	-0.318	-0.297
	(2.06)*	(1.99)*	(1.23)	(1.15)
FINCRI	0.153	0.158	0.043	0.047
	(2.45)*	(2.50)*	(0.59)	(0.65)
GENDIV	0.202	0.196	0.277	0.261
	(0.57)	(0.54)	(0.72)	(0.68)
DRC	-0.023	-0.019	0.231	0.232
	(0.19)	(0.16)	(2.05)*	(2.06)*
TBD	-0.000	0.002	0.025	0.027
	(0.01)	(0.06)	(1.08)	(1.14)
TANG	0.709	0.719	0.749	0.758
	(2.02)*	(2.03)*	(1.77)	(1.79)
LNSEREV W	-0.001	0.001	-0.040	-0.040
	(0.02)	(0.02)	(1.07)	(1.06)
LTIPS	0.051	0.058	0.269	0.276
	(0.44)	(0.48)	(2.74)**	(2.76)**
CONSTANT	-6.351	-6.247	-1.611	-1.468
	(5.18)**	(4.99)**	(1.43)	(1.31)
R-squared	0.18	0.02	0.12	0.02
Observations	5,301	5,301	5,494	5,494

Table 19 reports the results of the second analysis between equity-linked proportion of compensation and capital structure where LTIPS is includeed in the model. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is equity linked compensation divided by Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. LTIPS is a dummy variable on whether managers received compensation in the form of LTIPS. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

Appendix I

TABLE 19: PANEL DATA REGRESSION NEWLY CREATED DEPENDENT VARIABLES

	TDBE	TDME	LDE	SDE	TDE
LNTAC	0.015	-0.101	-0.032	-0.010	-0.042
	(0.18)	(2.43)*	(3.61)**	(2.83)**	(3.99)**
AGE	0.014	-0.005	0.000	0.001	0.002
	(0.63)	(0.69)	(0.14)	(2.03)*	(0.89)
LNTA	0.032	-0.039	0.027	-0.009	0.018
	(0.27)	(0.60)	(2.38)*	(1.68)	(1.26)
LNMTB W	0.578	-0.767	-0.074	-0.030	-0.102
	(1.42)	(4.60)**	(7.00)**	(4.47)**	(7.63)**
PROF W	0.330	-0.460	-0.123	-0.046	-0.167
	(0.56)	(2.67)**	(2.23)*	(2.06)*	(2.54)*
FINCRI	0.222	0.253	0.074	0.013	0.087
	(1.84)	(3.11)**	(3.50)**	(1.61)	(3.81)**
GENDIV	-0.266	0.068	-0.032	-0.004	-0.032
	(1.25)	(0.41)	(1.03)	(0.17)	(0.74)
DRC	0.015	-0.051	-0.017	0.002	-0.014
	(0.30)	(1.04)	(0.97)	(0.19)	(0.64)
TBD	0.186	0.024	-0.009	0.001	-0.009
	(1.20)	(0.99)	(1.54)	(0.32)	(1.28)
TANG	-0.755	0.215	0.108	0.026	0.151
	(0.86)	(1.05)	(1.37)	(0.93)	(1.71)
LNSEREV W	0.382	-0.080	-0.018	-0.006	-0.023
	(0.93)	(2.48)*	(2.04)*	(2.78)**	(2.31)*
CONSTANT	-1.250	1.576	0.100	0.173	0.264
	(0.40)	(1.90)	(0.47)	(2.56)*	(1.06)
R-squared	0.00	0.07	0.03	0.01	0.03
Observations	11,201	11,201	11,336	11,240	11,201

Table 19 reports the results of the first robustness check. Five newly created variables are used and each column handles one of these variables. TDBE is the ratio of total debt divided by book value of equity, TDME is the ratio of total debt divided by market value of equity, LDE is the ratio of long term debt divided by average equity, SDE is the ratio of short term debt divided by average equity and TDE is the ratio of total debt divided by average equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are provided in parentheses. * $p<0.05$; ** $p<0.01$

TABLE 20: PANEL DATA ANALYSIS NEWLY CREATED INDEPENDENT VARIABLE

	LNLDME	LNLDBE	LNSDME	LNSDBE
TACTA	-1.292	-1.250	-1.594	-1.599
	(3.32)**	(3.18)**	(4.01)**	(3.99)**
AGE	0.005	0.005	0.009	0.009
	(0.81)	(0.79)	(1.25)	(1.25)
LNTA	0.232	0.229	-0.263	-0.271
	(3.21)**	(3.14)**	(3.94)**	(4.05)**
LNMTB W	-0.967	0.049	-0.964	0.052
	(21.83)**	(1.09)	(20.89)**	(1.12)
PROF W	-0.278	-0.266	-0.398	-0.394
	(2.13)*	(2.05)*	(2.09)*	(2.07)*
FINCRI	0.169	0.172	0.071	0.072
	(3.24)**	(3.29)**	(1.27)	(1.29)
GENDIV	0.190	0.190	0.429	0.421
	(0.57)	(0.56)	(1.52)	(1.49)
DRC	-0.157	-0.152	0.081	0.083
	(1.66)	(1.60)	(0.93)	(0.96)
TBD	-0.003	-0.001	0.020	0.022
	(0.14)	(0.04)	(1.06)	(1.15)
TANG	0.944	0.948	0.923	0.930
	(3.35)**	(3.35)**	(2.80)**	(2.81)**
LNSEREV W	-0.022	-0.019	-0.039	-0.037
	(0.92)	(0.80)	(1.33)	(1.26)
CONSTANT	-5.145	-5.129	-0.219	-0.119
	(5.29)**	(5.20)**	(0.25)	(0.13)
R-squared	0.20	0.02	0.14	0.02
Observations	8,426	8,426	8,853	8,853

Table 20 reports the findings of the second robustness check, where TACTA is used as the main independent variable. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. TACTA is the main independent variable and is the ratio of Total Annual Compensation divided by Total Assets. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 21: PANEL DATA ANALYSIS EXCLUDING UK FIRMS

	LNLDME	LNLDBE	LNSDME	LNSDBE
LNTAC	-0.141	-0.141	-0.038	-0.037
	(2.95)**	(2.95)**	(0.61)	(0.60)
AGE	0.002	0.003	-0.006	-0.005
	(0.18)	(0.28)	(0.45)	(0.37)
LNTA	0.134	0.138	-0.095	-0.094
	(0.80)	(0.83)	(0.69)	(0.68)
LNMTB W	-1.012	0.005	-0.999	0.016
	(13.39)**	(0.06)	(11.46)**	(0.18)
PROF W	-0.085	-0.080	-0.312	-0.299
	(0.24)	(0.23)	(0.70)	(0.67)
FINCRI	0.063	0.063	-0.157	-0.157
	(0.74)	(0.74)	(1.55)	(1.54)
GENDIV	-0.819	-0.813	-0.889	-0.880
	(1.86)	(1.84)	(1.43)	(1.42)
DRC	-0.237	-0.237	-0.016	-0.017
	(1.04)	(1.04)	(0.08)	(0.09)
TBD	-0.004	-0.002	0.059	0.060
	(0.23)	(0.13)	(2.13)*	(2.19)*
TANG	1.376	1.358	1.130	1.108
	(1.93)	(1.91)	(1.42)	(1.38)
LNSEREV W	-0.058	-0.045	-0.016	-0.005
	(1.55)	(1.13)	(0.26)	(0.08)
CONSTANT	-3.380	-3.469	-2.162	-2.225
	(1.32)	(1.36)	(1.15)	(1.18)
R-squared	0.27	0.03	0.17	0.02
Observations	1,961	1,961	1,960	1,960

Table 21 reports the results of the third robustness check. Only non-UK firms are included in these analyses. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 22: PANEL DATA ANALYSIS BEFORE VARIABLE TRANSFORMATION

	LDME	LDBE	SDME	SDBE
TAC	-0.000	-0.000	-0.000	0.000
	(1.24)	(1.04)	(1.14)	(0.24)
AGE	-0.000	0.035	-0.002	0.000
	(0.02)	(1.81)	(0.76)	(0.11)
TA	0.000	0.000	0.000	0.000
	(2.13)*	(0.92)	(1.47)	(0.35)
MTB	-0.000	0.345	-0.000	0.008
	(4.42)**	(3.05)**	(1.11)	(3.32)**
PROF	0.000	0.000	0.000	-0.000
	(1.16)	(1.21)	(1.54)	(0.83)
FINCRI	0.324	-0.118	0.140	-0.024
	(3.39)**	(0.40)	(2.39)*	(0.63)
GENDIV	0.060	2.364	0.274	0.026
	(0.52)	(1.30)	(0.94)	(0.34)
DRC	-0.081	-0.043	0.092	0.032
	(1.60)	(0.49)	(0.88)	(1.86)
TBD	0.005	0.044	0.015	0.016
	(0.26)	(0.78)	(0.72)	(1.74)
TANG	0.164	-1.674	-0.023	-0.074
	(0.69)	(1.86)	(0.41)	(1.04)
SEREV	0.000	0.000	-0.000	-0.000
	(0.52)	(0.25)	(1.00)	(0.94)
CONSTANT	0.332	-2.103	0.123	-0.063
	(1.02)	(1.97)*	(0.70)	(0.43)
R-squared	0.01	0.72	0.02	0.11
Observations	11,420	11,881	11,325	11,755

Table 22 reports the results of the fourth robustness check. Untransformed variables have been used. LDME, LDBE are long term debt-to-equity ratio based on respectively market value and book value of equity. SDME and SDBE are short term debt-to-equity ratios based on respectively market value and book value of equity. TAC is the main independent variable and is Total Annual Compensation. AGE is age of the director. TA is a proxy for firm size (Total Assets). MTB is the market-to-book ratio. PROF is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. SEREV is of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 23: PANEL DATA ANALYSIS EXCLUDE 25TH PERCENTILE WITH HIGHEST COMPENSATION

	LNLDME	LNLDBE	LNSDME	LNSDBE
LNTAC	-0.082	-0.082	-0.143	-0.146
	(2.23)*	(2.22)*	(3.05)**	(3.08)**
AGE	0.008	0.008	0.012	0.013
	(1.12)	(1.11)	(1.45)	(1.46)
LNTA	0.276	0.273	-0.276	-0.286
	(3.36)**	(3.33)**	(3.94)**	(4.07)**
LNMTB W	-0.978	0.038	-0.973	0.045
	(19.70)**	(0.76)	(19.16)**	(0.88)
PROF W	-0.086	-0.059	-0.295	-0.282
	(0.56)	(0.39)	(1.59)	(1.53)
FINCRI	0.194	0.195	0.063	0.064
	(2.92)**	(2.93)**	(0.91)	(0.91)
GENDIV	0.178	0.180	0.396	0.389
	(0.50)	(0.50)	(1.27)	(1.24)
DRC	-0.164	-0.161	-0.055	-0.054
	(1.52)	(1.49)	(0.54)	(0.54)
TBD	-0.029	-0.027	0.031	0.033
	(1.10)	(1.02)	(1.07)	(1.12)
TANG	0.912	0.909	1.089	1.092
	(2.81)**	(2.80)**	(3.00)**	(3.00)**
LNSEREV W	-0.016	-0.012	-0.020	-0.017
	(0.56)	(0.43)	(0.61)	(0.53)
CONSTANT	-5.696	-5.661	-0.503	-0.372
	(5.75)**	(5.69)**	(0.59)	(0.43)
R-squared	0.20	0.02	0.15	0.02
Observations	5,823	5,823	6,297	6,297

Table 23 reports the results of the fifth robustness check, TAC values in the upper quartile are excluded from this analysis. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

Table 24: Ordinary least squares regression

	LNLDME	LNLDBE	LNSDME	LNSDBE
LNTAC	-0.092	-0.103	-0.132	-0.140
	(4.43)**	(5.01)**	(6.14)**	(6.54)**
AGE	0.005	0.005	0.013	0.012
	(1.36)	(1.43)	(3.60)**	(3.41)**
LNTA	0.228	0.226	-0.051	-0.050
	(15.89)**	(15.91)**	(3.47)**	(3.42)**
LNMTB W	-0.739	0.202	-0.977	-0.029
	(34.17)**	(9.58)**	(43.50)**	(1.34)
PROF W	0.124	0.127	-0.081	-0.078
	(1.54)	(1.58)	(0.98)	(0.95)
FINCRI	0.227	0.203	0.096	0.083
	(4.00)**	(3.60)**	(1.66)	(1.44)
GENDIV	-0.074	-0.092	0.024	0.023
	(0.51)	(0.64)	(0.16)	(0.15)
DRC	-0.249	-0.246	-0.007	-0.002
	(5.64)**	(5.65)**	(0.16)	(0.05)
TBD	-0.038	-0.031	0.028	0.031
	(6.11)**	(5.22)**	(4.13)**	(4.69)**
TANG	1.665	1.424	0.606	0.496
	(21.67)**	(18.16)**	(7.75)**	(6.31)**
LNSEREV W	0.028	0.023	-0.013	-0.017
	(3.86)**	(3.30)**	(1.73)	(2.29)*
COUNT AV	0.305	0.605	0.484	0.800
	(4.51)**	(6.16)**	(7.45)**	(7.88)**
IND AV	0.376	0.678	0.450	0.848
	(12.52)**	(17.89)**	(12.51)**	(15.72)**
CONSTANT	-3.442	-2.002	-0.045	2.406
	(11.89)**	(5.88)**	(0.13)	(5.18)**
R-squared	0.34	0.19	0.28	0.06
Observations	8,426	8,426	8,853	8,853

Table 24 reports the finding of the sixth robustness. An ordinary least squares regression is performed and the average of each dependent variable per industry and per country is included. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. LNTAC is the main independent variable and is the natural logarithm of Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. COUNT AV is the average debt-to-equity ratio of each country. IND AV is the average debt-to-equity ratio of each industry. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

Appendix J

TABLE 25: PANEL DATA ANALYSIS NEWLY CREATED DEPENDENT VARIABLES

	TDBE	TDME	LDE	SDE	TDE
EBTAC	-0.103	-0.154	-0.045	-0.034	-0.083
	(2.52)*	(1.65)	(1.92)	(2.61)**	(3.10)**
AGE	-0.017	-0.009	-0.003	0.000	-0.003
	(1.00)	(1.11)	(1.13)	(0.27)	(1.06)
LNTA	-0.062	-0.057	0.038	-0.002	0.037
	(0.72)	(0.74)	(2.93)**	(0.50)	(2.42)*
LNMTB W	0.246	-0.762	-0.076	-0.023	-0.100
	(1.57)	(2.76)**	(5.18)**	(3.10)**	(5.53)**
PROF W	-0.262	-0.506	-0.204	-0.041	-0.238
	(2.89)**	(2.05)*	(2.35)*	(2.29)*	(2.61)**
FINCRI	0.125	0.229	0.102	0.002	0.103
	(3.92)**	(2.42)*	(2.98)**	(0.28)	(2.94)**
GENDIV	-0.285	0.144	0.000	0.000	0.002
	(1.00)	(0.78)	(0.01)	(0.01)	(0.05)
DRC	0.092	-0.023	0.017	0.012	0.029
	(1.38)	(0.37)	(0.86)	(1.93)	(1.34)
TBD	0.052	0.025	-0.009	0.001	-0.008
	(0.92)	(1.06)	(1.11)	(0.52)	(0.88)
TANG	0.101	0.129	0.097	-0.016	0.099
	(0.74)	(0.57)	(0.86)	(0.71)	(0.85)
LNSEREV W	-0.028	-0.056	-0.020	-0.004	-0.022
	(1.70)	(1.44)	(1.53)	(1.63)	(1.61)
CONSTANT	1.529	1.444	-0.048	0.100	0.031
	(1.04)	(1.25)	(0.21)	(1.48)	(0.12)
R-squared	0.01	0.06	0.03	0.01	0.04
Observations	6,757	6,757	6,822	6,772	6,757

Table 25 reports the findings of the first robustness check for the second part of the analysis. The five newly created variables are used and shown each in a separate column. Five newly created variables are used and each column handles one of these variables. TDBE is the ratio of total debt divided by book value of equity, TDME is the ratio of total debt divided by market value of equity, LDE is the ratio of long term debt divided by average equity, SDE is the ratio of short term debt divided by average equity and TDE is the ratio of total debt divided by average equity. EBTAC is the main independent variable and is equity linked compensation divided by Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are provided in parentheses. * $p<0.05$; ** $p<0.01$

Table 26: Panel data analysis excluding UK firms

	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	-0.424	-0.408	0.041	0.058
	(2.04)*	(1.99)*	(0.16)	(0.23)
AGE	-0.013	-0.013	-0.015	-0.015
	(1.01)	(0.95)	(0.90)	(0.85)
LNTA	0.183	0.185	0.119	0.118
	(0.77)	(0.78)	(0.73)	(0.72)
LNMTB W	-1.093	-0.083	-0.788	0.221
	(8.36)**	(0.66)	(7.42)**	(1.99)*
PROF W	-0.404	-0.394	0.126	0.143
	(0.88)	(0.86)	(0.15)	(0.17)
FINCRI	-0.049	-0.051	-0.245	-0.247
	(0.37)	(0.38)	(1.76)	(1.77)
GENDIV	-0.795	-0.788	-2.806	-2.796
	(0.76)	(0.75)	(2.21)*	(2.20)*
DRC	-0.390	-0.388	-0.070	-0.068
	(1.08)	(1.07)	(0.24)	(0.24)
TBD	0.011	0.012	0.051	0.051
	(0.49)	(0.49)	(1.44)	(1.45)
TANG	1.777	1.793	0.447	0.460
	(1.13)	(1.14)	(0.42)	(0.43)
LNSEREV W	0.026	0.034	-0.056	-0.054
	(0.25)	(0.33)	(0.59)	(0.56)
CONSTANT	-4.192	-4.260	-5.163	-5.196
	(1.02)	(1.04)	(2.34)*	(2.35)*
R-squared	0.23	0.03	0.12	0.05
Observations	1,041	1,041	1,019	1,019

Table 26 reports the findings of the second robustness check of the second part of the analysis. Firms from the UK are not included in these analyses. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is equity linked compensation divided by Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 27: PANEL DATA ANALYSIS BEFORE VARIABLE TRANSFORMATION

	LDME	LDBE	SDME	SDBE
EBTAC	-0.219	-0.164	-0.076	-0.016
	(1.94)	(1.12)	(2.54)*	(0.48)
AGE	-0.009	-0.004	0.001	-0.001
	(1.08)	(0.42)	(0.39)	(0.35)
TA	0.000	0.000	0.000	0.000
	(3.22)**	(1.28)	(1.03)	(0.31)
MTB	-0.000	0.110	-0.000	0.002
	(0.92)	(6.80)**	(1.13)	(1.05)
PROF	0.000	0.000	0.000	-0.000
	(1.72)	(1.00)	(1.88)	(0.19)
FINCRI	0.378	0.113	0.039	-0.023
	(2.84)**	(2.63)**	(2.17)*	(0.48)
GENDIV	0.135	0.120	-0.038	0.080
	(0.82)	(0.44)	(0.81)	(0.72)
DRC	-0.075	0.080	0.021	0.010
	(1.06)	(1.59)	(1.18)	(0.80)
TBD	0.011	0.035	0.023	0.009
	(0.48)	(1.29)	(1.74)	(1.02)
TANG	-0.229	-1.517	-0.090	-0.120
	(0.59)	(1.11)	(1.72)	(1.20)
SEREV	0.000	0.000	0.000	-0.000
	(2.23)*	(0.90)	(1.58)	(0.71)
CONSTANT	0.863	0.396	-0.077	0.049
	(2.03)*	(0.74)	(0.52)	(0.36)
R-squared	0.01	0.52	0.05	0.01
Observations	6,858	7,119	6,807	7,054

Table 27 reports the finding of the third robustness check in which the main analysis without transformation of the variables is performed. Untransformed variables have been used. LDME, LDBE are long term debt-to-equity ratio based on respectively market value and book value of equity. SDME and SDBE are short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is equity linked compensation divided by Total Annual Compensation. AGE is age of the director. TA is a proxy for firm size (Total Assets). MTB is the market-to-book ratio. PROF is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. SEREV is of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

TABLE 28: PANEL DATA ANALYSIS EXCLUDE 25TH PERCENTILE WITH HIGHEST COMPENSATION

	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	-0.018	-0.012	-0.088	-0.082
	(0.12)	(0.08)	(0.55)	(0.51)
AGE	-0.001	-0.002	0.000	-0.000
	(0.09)	(0.16)	(0.01)	(0.02)
LNTA	0.369	0.359	-0.240	-0.258
	(3.29)**	(3.19)**	(2.38)*	(2.54)*
LNMTB W	-0.919	0.098	-0.932	0.091
	(13.23)**	(1.42)	(12.35)**	(1.23)
PROF W	-0.025	0.026	-0.278	-0.222
	(0.10)	(0.11)	(1.08)	(0.86)
FINCRI	0.215	0.219	0.066	0.073
	(2.67)**	(2.69)**	(0.66)	(0.74)
GENDIV	0.318	0.308	0.171	0.151
	(0.61)	(0.59)	(0.39)	(0.34)
DRC	0.027	0.028	0.064	0.062
	(0.18)	(0.19)	(0.42)	(0.41)
TBD	-0.046	-0.044	0.054	0.055
	(1.12)	(1.05)	(1.33)	(1.36)
TANG	0.536	0.541	1.035	1.040
	(1.31)	(1.31)	(2.16)*	(2.16)*
LNSEREV W	-0.002	-0.001	-0.016	-0.016
	(0.04)	(0.04)	(0.39)	(0.39)
CONSTANT	-6.626	-6.480	-1.315	-1.092
	(4.80)**	(4.61)**	(1.12)	(0.93)
R-squared	0.19	0.02	0.13	0.01
Observations	3,056	3,056	3,286	3,286

Table 28 reports the findings of the fourth robustness check of the second part that excludes the quartile with the highest TAC values. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is equity linked compensation divided by Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.

Table 29: Panel data analysis exclude 25th percentile with highest proportion equity-linked compensation

	LNLDME	LNLDBE	LNSDME	LNSDBE
EBTAC	-0.320	-0.317	-0.370	-0.366
	(2.26)*	(2.21)*	(2.08)*	(2.04)*
AGE	-0.019	-0.021	-0.002	-0.003
	(1.68)	(1.72)	(0.16)	(0.25)
LNTA	0.433	0.426	-0.190	-0.196
	(4.28)**	(4.12)**	(1.67)	(1.75)
LNMTB W	-0.899	0.125	-0.918	0.107
	(13.30)**	(1.78)	(11.24)**	(1.33)
PROF W	-0.492	-0.490	-0.303	-0.298
	(2.54)*	(2.49)*	(0.89)	(0.89)
FINCRI	0.183	0.185	0.102	0.105
	(2.81)**	(2.82)**	(1.12)	(1.15)
GENDIV	-0.180	-0.199	0.487	0.463
	(0.38)	(0.41)	(0.92)	(0.88)
DRC	-0.053	-0.052	0.290	0.290
	(0.37)	(0.36)	(2.08)*	(2.08)*
TBD	-0.013	-0.010	0.024	0.026
	(0.47)	(0.34)	(0.88)	(0.95)
TANG	0.645	0.649	0.720	0.728
	(1.78)	(1.77)	(1.61)	(1.63)
LNSEREV W	-0.029	-0.028	-0.040	-0.039
	(0.82)	(0.81)	(0.90)	(0.89)
CONSTANT	-6.962	-6.829	-1.327	-1.199
	(5.02)**	(4.77)**	(0.96)	(0.88)
R-squared	0.18	0.03	0.11	0.02
Observations	4,119	4,119	4,255	4,255

Table 29 reports the findings of the (second) fourth robustness check of the second part of the analysis. Firm within the highest quartile of EBTAC are excluded from the model. LNLDME, LNLDBE are (natural logarithmic) long term debt-to-equity ratio based on respectively market value and book value of equity. LNSDME and LNSDBE are (natural logarithmic) short term debt-to-equity ratios based on respectively market value and book value of equity. EBTAC is the main independent variable and is equity linked compensation divided by Total Annual Compensation. AGE is age of the director. LNTA is a proxy for firm size (Total Assets). LNMTB W is the winsorized market-to-book ratio (natural logarithm). PROF W is proxy for profitability. FINCRI is a dummy variable indicating the financial crisis (2007 and 2008). GENDIV is proxy for gender diversity on the board. DRC is a dummy variable whether the CEO has a dual role as CEO and chairman of the Board of Directors. TBD is total member in the Board of Directors. TANG is a proxy for tangibility of the firms' assets. LNSEREV W is winsorized (and natural logarithm) of ratio selling expenses divided by revenues. T-values are given in parentheses. * $p<0.05$; ** $p<0.01$.