

The role of CEO stock options on corporate decisions

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Biographic note

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Abstract

The separation between firms' ownership and control represents one of the major challenges of corporate finance studies due to its ability to, on one hand reduce (through firms' agency costs) and on the other hand increase firms' value (through a more professional management). Variable remuneration has been pointed as one of the most effective ways of reducing agency costs (without reducing value created, at least at some extent of reducing agency costs, to shareholders) and therefore, it is unsurprisingly we observed an increasing weight of variable remuneration on the total management compensation. This dissertation, focusing on CEOs' stock option compensation and using S&P 500 data for the period from 2013 to 2015, aims to examine whether the specificities of this particular type of compensation can contribute to a set of managerial opportunism behaviours that may influence corporate dividend policies, leverage ratios and investment decisions.

For a final sample of 314 firms, split into 230 growth and 84 non-growth firms, our results confirm the idea of managerial opportunism in the definition of the amounts of dividends distributed, stock repurchases, leverage ratios and investment decisions although not always generalized and varying across industries and firms' size.

Key-words: Agency costs; Corporate Governance; Compensation; Executive stock options; Corporate policies

JEL Codes: G32, G35, J33, M12, M52

Resumo

A separação entre a propriedade das empresas e as funções de gestão das mesmas representa um dos maiores motivos de estudo das finanças empresariais uma vez que esta separação é, por um lado, capaz de reduzir e por outro, criar ainda mais custos de agência. Nesse sentido, a remuneração variável e por objectivos tem vido a apresentar uma importância crescente já que é considerada como uma forma eficaz de reduzir as divergências entre gestores e accionistas. Assim, este estudo foca-se especificamente na remuneração dos CEOs através da atribuição de opções de compra de acções da própria empresa, remuneração esta que revela desde já um peso bastante relevante nos EUA e que, dadas as suas especificidades, pode ter como consequências a alteração das políticas de dividendos, endividamento e investimento por forma a maximizar os interesses e a remuneração da gestão.

Para a realização deste estudo empírico, foram analisadas 314 empresas do índice S&P 500 no período de 2013 a 2015, tendo estas sido posteriormente divididas em 230 empresas com oportunidades de crescimento e 84 empresas em fase estável do seu ciclo de vida. Os resultados sugerem que, de facto, a remuneração através de opções de compra de acções da própria empresa tem impacto nas políticas de dividendos e de recompra de acções, assim como na definição dos rácios de endividamento e das políticas de investimento das empresas, embora os resultados variem de acordo com a dimensão e a indústria em que estas se inserem.

Palavras-chave: Custos de agência; Governo corporativo; Remuneração; Opções de compra de acções; Política corporativa

Códigos JEL: G32, G35, J33, M12, M52

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Acronyms

B&S – Black and Scholes

BM – Board meetings

CEO – Chief Executive Officer

CPX – Capital expenditures

DY – Dividend yield

LV – Leverage

MON – Monitoring

RK – Risk

ROA – Return on assets

RY – Repurchase yield

SOTO – Stock options to total compensation

TA – Total assets

TAX - Taxes

TQ - Tobin-Q

1. Introduction

Executive remuneration, in all its forms, has been a 'hot topic' over the last decades and the motivation for several studies. The constant challenges regarding globalization, open markets and economic and financial crisis demand firms to have highly qualified and experienced leaders whereby most relevant decisions pass through. Hereupon, to attract and lock-in key personnel (Lee et al., 2008), remunerate high responsibilities and align interests reducing agency costs (Hall and Liebman, 1998), executive pay has hugely increased last decades (Sapp, 2008) mainly caused by pay-for-performance measures which are pointed as an efficient solution for these agency costs. Namely, a substantial body of literature seem to suggest that stock option compensation can be "a financial incentive to make the stock go up once the CEO may become extremely wealthy in that case" (Angel and McCabe, 2008, p.227).

The problem however of tying managerial compensation to firms' performance may lie on managerial opportunism and all the schemes that can be created by executives to see their wealth increased independently of the harm that can be caused in the overall firm. In accordance with this line of thinking, Fenn and Liang (2001) proved the existence of a negative effect of stock option compensation on firms' dividend yield, Ryan and Wiggins (2001) and Ortiz-Molina (2007) documented a change of CEOs' debt preferences when they are awarded with stock options and Carpenter (2000) stated that stock options may be a way of influencing managers' risk appetite regarding investment decisions.

Once stock option compensation is a developed practice in the US only, this is the market where this study will be focused on. Thus, recurring to S&P 500 firms, for the period from 2013 to 2015 and looking to explore differences across growth and non-growth industries as well as across small, medium and large firms, this study intends to examine the veracity of the arguments about CEOs' stock option compensation influence on corporate decisions.

For a final sample of 314 firms (230 growth and 84 non-growth firms), our estimations unveiled that, although varying across industries and firms' size, stock option compensation in fact has a role in the definition of the amount of dividends distributed

and stocks repurchased as well as in the leverage ratios and in investment policies of firms, which confirms the hypothesized idea of managerial opportunism.

With this study, we intend to take a step forward in the definition of an optimal compensation package for managers, capable of aligning their interests with shareholders' ones.

The remainder of this article is structured as follows. Section 2 provides an exhaustive review of the literature about this subject. Section 3 describes the methodology and data used to perform the study while Section 4 presents the results and main findings of the estimations. Finally, in section 5 a resume, the main conclusions and suggestions for further studies are provided.

2. Literature Review

2.1 The effect of pay-for-performance measures on firms

There is a growing literature sustaining the idea that executives' remuneration and firms' performance are side by side. Murphy (1985) collected eighteen years of data of publicly held firms and concluded that there is in fact a positive correlation between executive compensation and firm's performance measured by the growth of sales and shareholders return.

In the overall research on the theme, the pointed problem seems not to be related with high wages but instead on how those payments are done and all the implications they bring to companies. To attract and encourage CEOs and remaining executives to engage and develop firms, we passed from an era where fixed salaries dominated, to an era where variable remuneration in the form of bonus, equity, stock options, pension plans and perquisites seem to represent a significant part of compensation plans. The motives are particularly well explained by Angel and McCabe (2008, p.227): "If the shareholders want the value of the stock to go up, then giving the CEO a financial incentive to make the stock go up is one of the best ways of achieving that goal. By giving the CEO a large number of stock options, the CEO may become extremely wealthy if the share price rises. If the stock price does not rise at all, then the CEO gets nothing from the options."

The main questions, the ones leading to this study, are then "how far are managers willing to go to see their wealth increased and how do they act to achieve so?".

In this context, there is a substantial body of literature showing that pay-for-performance measures can be attractive and engage executives with shareholders expectations. However, these metrics impact and can be influenced by a several number of variables as corporate governance, board composition, consultants, accountings and even investment decisions and firms' capital structure. Towards Board Composition and CEOs' compensation, several authors have put their efforts to unmask it. Core et al. (1999) found out that executives' remuneration tends to be higher when CEO is also Chairman, when Board is broader and when outside directors are nominated by CEOs, which seems logical and is also in accordance with Wade et al. (1990). Bebchuk and

Fried (2003) found similar outcomes but additionally documented that higher payments to CEOs are a result of antitakeover policies and inexistence (or in a few number) of large and institutional shareholders. Shleifer and Vishny (1986) defend that compensation and the existence of large shareholders have an inverse relation due to a higher control over executives' decisions. Consultants are a target of scrutiny too since, and citing Bebchuk and Fried (2003, p.78): "(…) consultants are often used to justify executive pay rather than to optimize it", once they are usually hired by the top executives that benefit from high compensation packages. Finally, Burns and Kedia (2006) disclosed that payments through options over firm's stocks incite CEOs to manage accruals and other accounts to boost their personal wealth.

2.2 The case of Executive Stock Options

Stock options represent a very particular case, one that may be very effective aligning both shareholders and managers interests whenever managers behave ethically. By granting stock options to executives, the Board of Directors is allowing them to buy, at a certain future date, part of the firm's equity at a predetermined price (the exercise or strike price).

To better understand further implications and concepts, it is important to comprehend how stock options are valued and which variables influence their value the most. According to Black and Scholes (1973)'s model applied to dividend paying stocks (presented in equations 2.1 to 2.3) the variables that influence the option value are presented in Table 1.

$$2.1 \qquad c = (S - D) * e^{-q*T} * N(d1) - Ke^{-r*T} * N(d2)$$

$$2.2 \qquad d1 = \frac{\ln\left(\frac{S-D}{K}\right) + \left(r + \frac{\sigma^2}{2}\right) * T}{\sigma * \sqrt{T}}$$

$$2.3 \qquad d2 = d1 - \sigma * \sqrt{T}$$

Table 1: Variables' effect on European call option price

Variable	Effect on an European Call
Stock current value	+
Exercise price	-
Time to maturity	+
Stock volatility	+
Risk-free rate	+
Discounted value of a future dividend	-

According to Table 1, current stock price, time to maturity, volatility and risk-free rate all have a positive impact on the value of the call as the higher these variables, the higher the probability of the option to be in-the-money and therefore, to be exercised on maturity date. The opposite happens with the strike price and dividends. Given this, it is now easier to realize that executives' wealth will be greater as higher is the stock price since they will buy for 'K' something that is worth 'S' (in case S > K, otherwise call will not be exercised).

Problems, however, arise when, as described by Dong et al. (2010), managers with significant amounts of stock option start having "myopic" conducts, harming that way shareholders' wealth. As reported by Hall and Murphy (2003), the value of stock options conceded to employees of S&P 500 achieved a value of approximately $120 billion in the year of 2000, which is, for example, more than the Portuguese GDP in that same year ($118.4 billion), according to World Bank (2016). Also, and according to Forbes (1998)[1], in 1998 stock options accounted for approximately forty percent of executives' total compensation. These numbers allow us to take (at least) three conclusions: 1) how stock options and managerial ownership were a trend at date; 2) the impact it may have on firms (if stocks are exercised) due to the magnitude of the

[1] Forbes (1998) "Who gets paid what"

numbers; 3) how relevant stock options are for managers and for their personal wealth. All the three considerations are important, but one should not underestimate human behaviour when it comes to their personal wealth. Needless to say, managers will tend to take riskier decisions in the name of firms since options eliminate their downside risk but allow unlimited gains (Sitkin and Pablo, 1992; Sanders, 2001).

As the volatility of the firm positively affects the value of the calls, managers seem to seek risky decisions in several different ways like choosing positive NPV projects with higher risks, increasing debt, reducing the use of derivatives, between many others, counteracting frequently shareholders' preferences and creating new agency problems. In an empirical study, however, Cohen (2000) determined no large harm done to shareholders regarding the increasing risk-taking behaviours of executives. Later, Knopf et al. (2002) added that higher amounts of options on managers' personal portfolios, will produce a decrease in the amounts spent by companies on hedging instruments.

Subject of study has also been the timing of information disclosure by executives. Once stock options have expiration date (frequently called vesting date), which is likely to be the most important date for option holders, administrators have incentives to manage the release of good and bad news so that it is ensured that their options will be in the money at that time. Such was documented by Aboody and Kasznik (2000) and Chauvin and Shenoy (2001) that state that due to the privileged information, executives tend to announce bad news before annual meetings where stock options are awarded, in order to push down the exercise price, and good news after the granting date, so that the probability of the options to be exercised increases. Consistent with this hypothesis, Yermack (1997) made an empirical analysis with a sample of 620 option grants to executives of Fortune 500 and observed an average cumulative abnormal return of approximately 2 percent in the fifty trading days after the options have been attributed.

In sum, so far it was showed how executive stock options influence general management decisions. Further review will focus on its impact on dividend policy, financing and investment decisions.

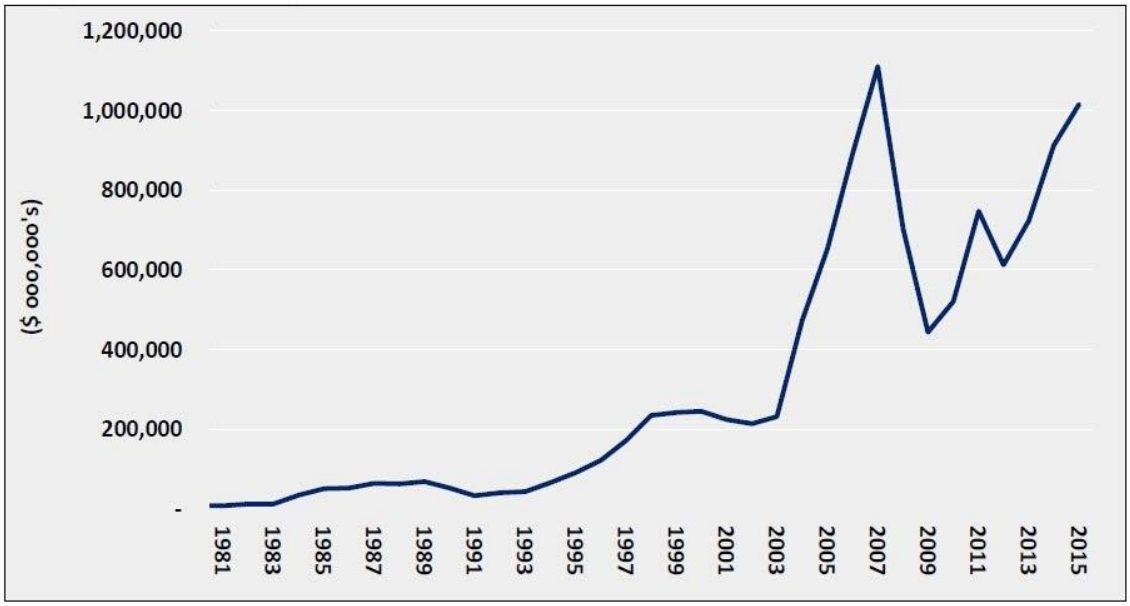
2.2.1 Executive stock options and dividend policies

Dividend policy is one of the major puzzles of modern finance and thus target of numerous researches. Regardless of this, no consensus seems to be reached about the subject due to the several pros and cons associated to its payment. Despite this fact, many reasons have been pointed all over the years to explain why firms keep paying dividends.

As first suggested by Miller and Modigliani (1961), one of the reasons to pay dividends is related with the clientele effect. The main argument of this theory resides on the premise that the payment of dividends will attract investors who privilege the receipt of "certain" income over time instead of waiting for capital gains (that may take a lot of time or never occur even). Miller and Rock (1985) defined a signalling theory, where managers pay dividends as a way of sending markets some information about firms' current and future condition. Later, Jensen (1986) and Chang (1993), stated that dividends are a way to (moderately) decapitalize firms and reduce agency costs so that managers are not allowed to act carelessly and invest in negative or risky NVP projects that can be undesirable for stockholders. Notwithstanding this, recent studies, as the ones provided by DeAngelo et al. (2006) and Denis and Osobov (2008) identified firms' profitability, growth opportunities, size and retained results as the most relevant variables explaining dividend distribution (or lack of it).

Nonetheless and at the same time dividend distribution was focus of study, another trend was arising in the markets: the repurchase of stocks as a way to remunerate shareholders. Generally speaking, these operations are simply a way for firms to acquire some of their outstanding shares on the market which can be done in a private placement or for the general public owning firms' shares.

Figure 1: Stock repurchases in the U.S. from 1981 to 2015



source: Compustat, Aswarth Damodaran

As documented by Cudd et al. (1996), repurchases take place mainly when stocks are undervalued by the market or for signalling or controlling reasons (by reducing the number of shares outstanding and the number of shareholders, managers' behaviour will be less scrutinized and their power will increase). On the other hand, some other authors define more opportunistic reasons for those buyback operations: Kahle (2002) defines EPS ratio as a significant motivation, while Lambert et al. (1989) and Lamba and Miranda (2010) stated managerial stock options as a major cause for it. From the perspective of EPS, the sense lies on the fact that some investors (mainly individual investors with lack of financial knowledge) recklessly make comparisons of EPS ratios between firms before investing. The problem lies on the fact that high EPS may be a product of good operational and financial results or solely an effect of the decrease of the number outstanding shares. On the other hand the hypothesis presented by Lambert et al. (1989) and Lamba and Miranda (2010) evidences the fact that dividends make stock price fall, which does not happens with repurchases. Hereupon, executives with stock options will show a preference for these operations because they will not observe a decrease in their wealth. Moreover, in the same study, authors concluded that the

higher the amount of stock options possessed by executives, the more likely it is that the firm will do a large repurchase of stocks in the future.

Aside managerial opportunistic behaviours, Jagannathan et al. (2000) determined that an increase in dividends occur after firms' good performances and buybacks, by its time, after poor performances, which is fair (at least theoretically) since increasing dividends after bad performances would make stock prices fall even more, which in some cases could be dramatic. In addition, repurchases grant managers some flexibility once they are made sporadically whereas a dividend cut can be misunderstood by the markets. Although buyback operations have observed a tremendous increase of popularity last decades, literature seems to be consensual when stating that they are not substituting but instead complementing dividend payments.

Fenn and Liang (2001) empirically showed that "a one standard deviation change in management stock option variable reduces dividend yields by an economically significant 38 basis points".

Later, Short et al. (2002) measured a significant positive relation between the existence of institutional shareholdings and dividend payout, which is mainly due to the higher monitoring practiced by these shareholders.

Cuny et al. (2009) found evidence proving that managers use stock repurchases to offset the reduction of the EPS ratio, which are caused by the exercise of executive stock options.

Perceiving opportunistic actions carried out by managers, shareholders were in need of finding ways to protect their interests. As such, in the later eighties, scholars introduced the concept of "dividend protected stock options". More specifically, these particular options ensure that the amount of dividends distributed is not determined (or at least affected) by the managers' wealth in the form of stock options. Dividend protected options will act adjusting the exercise price of executive stock options to the amount of dividends paid. Consistent with this, Lambert et al. (1989) stated that the amount of dividends is inversely related to the amount of executive stock options granted since these options are not dividend protected. White (1996) supports the idea that companies

start associating executives' variable compensation to dividend payments in order to reduce agency costs between managers and shareholders.

In the same line of thinking of the previous studies, recently, Burns et al. (2015) acknowledged that payout ratios increase when executive stock options are dividend protected and that this kind of shareholders defence is more commonly used in Europe than in the US.

In sum, the solution for this puzzle may lie on the use of dividend protected stock options. However and since this is not yet a common practice, the negotiation of managers' compensation packages must be carried out by the board of directors directly, instead of external consultants, contrarily to what is said by Geiler and Renneboog (2016).

2.2.2 Executive stock options and corporate financing decisions

"Executive pay is incorporated into Moody's credit analysis of rated issuers because compensation is a determinant of management behaviour that affects indirectly credit quality", *in Moody's Investor Service, Special Comment, 2007.*

Theory over the last decades has recognized the motives that can explain the capital structure differences between firms. When in need of capital, firms recur to own or external financing namely retaining results, doing IPO's/SEO's or simply issuing bonds or even hybrid instruments. No consensus, however, seems to be achieved about the motives that lead managers to choose one financing method instead of another.

The debate was first introduced by Modigliani and Miller (1958)'s capital structure irrelevance theory where authors defend that, in the absence of market frictions, the way firms get financing does not impact their valuation. However, not only markets are not perfect as also there are many other theories pointed to explain capital structure decisions across firms. Despite the lack of agreement about financing preferences, it seems clear that decisions are taken by managers according to the different benefits and

costs (not only for firms but for managers' personal interests too) of each financing method.

The most commonly shared theory is that managers define capital structure in a way that can maximize shareholders return, which usually is achieved pursuing a minimum weighted average cost of capital. Though it can be a fair point and some managers may in fact act in the benefit of shareholders, major part of literature point different motivations this puzzle: trade-off theory by Kraus and Litzenberger (1973), pecking order theory by Myers (1984), agency theories (Jensen (1986)) and management compensation theories as the one pointed by Smith and Watts (1982), between others.

Donaldson (1963) and Grossman and Hart (1982) sustain that managers avoid recurring to external financing since it increases the monitoring over their decisions, significantly reducing this way the consumptions of perquisites as also detailed by Myers: "managers avoid relying on external finance because it would subject them to the discipline of the capital market".

In accordance with the above described, Pinegar and Wilbricht (1989) conducted a survey to CEOs so that empirical results could confirm the theories of all the academic studies about pecking order. His findings evidence clear trends and determined managers' preferences as follows: 1) retained results, 2) straight debt, 3) convertible debt, 4) external common equity, 5) straight preferred stock and 6) convertible preferred stock.

Agha (2011) makes references on the concept of suboptimal leverage, where managers set leverage below the optimal levels to prevent from future financial distress situations and to be capable of accepting investment opportunities that may arise. The author recognizes that to mitigate these lower levels of debt (suboptimal) managers are offered stock options to increase their "appetite" for risk. However, at the same time, higher monitoring governance strategies must be implemented so that managers' risk behaviour does not become unsustainable and harmful for firms.

But if compensation through stock options reduces agency costs between managers and shareholders, on the other hand it increases the conflicts between shareholders and bondholders, transferring wealth from one to another. Under this view, an empirical

study conducted by DeFusco et al. (1990) found a cumulative abnormal return (from here on denoted by CAR) of common stocks of 0.68% in the two days after the announcement of the attribution of stock options to executives. In contrast, a negative CAR of -0.14% was found for bondholders for the same period.

The fact that this theme is target of several studies ends up benefiting bondholders which can better understand executives' behaviour and find ways to protect their interests. Consistent with this, Rajan and Winton (1995) found that when lenders have the right to renegotiate contracts or when debt is collateralized or asset-backed, borrowers do not have incentives to proceed with excessive risk-taking investments.

Another key feature in leverage analysis is the effect of the variables on credit ratings due to the role ratings have on determining the rate at which firms can get financing and consequently their credibility towards the markets. As such, Lee (2008) provided two major conclusions: 1) the exercise of executive stock options has a positive impact on firms' ratings due to the proceeds of the operations; 2) executive stock options that may one way or another signal future stock buybacks have a negative effect on the credit quality mainly because it evidences future decapitalization of the firm.

Datta et al. (2005) suggest that stock ownership plays an important role in financing decisions while Choe (2003), introducing the idea of executive options with adjustable strike price, suggest that when the size of the options awarded is fixed, the strike price must be put a bit high so that managers have incentives to accept risky projects. On the other hand strike price must be decreased with leverage for the motives already described.

Overall, it seems clear that managerial compensation can impact firms' leverage ratios, so closer monitoring mechanisms must be implemented to ensure that firm's best interest is tracked.

2.2.3 Executive stock options and corporate investment decisions

All other things equal and assuming a perfect world, management decisions about firm's investments is usually defined according to its net present value (NPV from here

on). Although other methods of valuating a project are known (as the payback period, real options, and the internal rate of return), literature recognizes NPV as the most efficient way of determining if a project must or not be implemented by firms. The picture changes, however, when we take into consideration the fact that, as previously explained, managers' interests often differ from shareholders' ones and so is the criteria that defines which project will be implemented by the firm.

At a first glance, and taking into attention the Black and Scholes model, executives that are remunerated with stock options exhibit a preference for risky projects since it increases the volatility of the firm as a whole and, consequently, increases the probability of their options to be in the money at maturity. This line of thinking was defended by Larcker (1983), Agrawal and Mandelker (1987) and Carpenter (2000). Further studies, however, showed that these decisions depend on several other variables. In contrast with the abovementioned, Gaver and Gaver (1993) explain that managers' procedures can be exactly the opposite and their main argument is based on the fact that managers may be looking for low risk projects once they perceive the (total, non-diversify) risk they are incurring and instead of trying to achieve higher payoffs they might look to protect their "certain" (current) payoffs. This findings are consistent with Carpenter (2000), who states that stock options may be a way of reducing risk appetite of managers, depending on their "risk aversion profile and the moneyness of the option". In the same study, the author argues that granting deep in the money long-term stock options to CEOs can be a way of reducing risk-taking decisions once executives will probably prefer to keep the level of risk not to put in cause their current gains.

Several theories have also pointed time horizons and CEOs' age as variables that can induce certain investment decisions. Though Bolton et al. (2006), Gopalan et al. (2010) and Edmans et al. (2012) find benefits in long-vesting stock option grants, many other reviews defend the efficiency of short-vesting stock options or even a mix of both. As first reported by Bizjak et al. (1993) and later confirmed by Volker Laux (2012), when managers are granted stock options with large maturities they can either be induced to underinvest or overinvest today. On one hand, managers may decide not to increase capital expenditures or R&D expenses because the results of such investments may not be felt in their tenure or due to the likelihood of a takeover to happen. However, when this is not the case, they can, by opposition, increase the volatility of the firm in the

short-term by accepting risky projects, ensuring this way that their options will be in the money at the vesting date. Executive's age has also been proved to be relevant in the firm perspective. Ryan and Wiggins (2002) suggest that young managers which are building their reputation on the financial world look for short-term results, putting apart long-term investments. In the same direction but for different reasons, old managers (that will sooner or later retire) are not much worried about long-term investments, as it is easy to understand. Therefore, they report a "quadratic" relation between CEO's age and R&D expenses. Zona (2016) achieves a similar conclusion although pointing different motivations. According to his review, young managers do not invest much due to their lack of experience and knowledge about the firm and due to the complexity of R&D investment decisions. Old managers, by their time, present poor values in terms of R&D investment mainly because it affects today's results and only later will have positive impact on the firm performance, probably in other's tenure.

In a more general approach, Sheikh (2012) showed that pay-for-performance measures positively impact the investment in R&D and the number of patents registered and Laux (2015) concluded that stock options promote innovation once they can increase the payoffs of these options in case of success, leading then to new business ideas, while Fich and Shivdasani (2005) documented a positive relation between stock options granted to directors and the amounts invested by firms.

There is also substantial literature (Smith and Watts, 1992; Gaver and Gaver, 1993; Ryan and Wiggins, 2002; Yu, 2007) suggesting that firms facing more growth opportunities tend to have lower levels of debt and high use of stock options to remunerate executives.

As expected, theory and its interpretation varies a lot on this subject too. Although no consensus exists, authors seem to agree that stock options are often an instrument that can help shareholders inducing executives to act in a certain way. Nonetheless and to summarize, stock options granted to executives should have a mix between short and long-term vesting dates, be accompanied by restricted stocks and by a constant monitoring of executives' actions so that opportunistic behaviours are avoided.

3. Methodology and data

This study aims to identify CEOs' opportunistic behaviours and the impact they have on firms' corporate decisions. Namely, the hypothesis to be tested in here is whether CEOs' stock options compensation affects dividend distribution and financing and investment corporate decisions. This chapter provides a detailed description of the process that leads to our final sample, the descriptive statistics of the variables and the methodology applied in the study.

3.1 Methodology

In order to test the impact of compensation in corporate decisions about dividends, financing and investment, we specify three models having as dependent variables these three dimensions. The 'compensation' variable will appear as one of the regressors in all three specifications. Our reasoning is based on the assumption that stock options are valued according to the Black and Scholes (1973) model.

Because only three years of data are available and, in a so short period of time, not much is expected to change, regressions will include average values of t-1 and t-2 of all quantitative independent variables. Potential endogeneity problems are dealt with in this way, given that the independent variables' lagged values are exogenous by nature.

To reduce the effect of extreme values (outliers) and avoid distorted results, data was winsorized at 2.5%, setting data below the 2.5^{th} percentile to the 2.5^{th} percentile and data above the 97.5^{th} percentile to the 97.5^{th} percentile. This process, when compared to a trimming process, not only provides more robust results as also allows us to keep all the observations.

To prevent from possible heteroscedasticy and autocorrelation problems in the error terms, all regressions will be performed with the Newey-West estimators. The models are then defined as follows:

3.1.1 The dividends models

Equation 3.1 measures the impact on dividend yield (DY) of the percentage of CEOs' compensation that is paid in the form of stock options (SOTO) while equation 3.2 measures the impact on repurchase yield (RY).

$$DY_{it} = \beta_1 + \beta_2 \frac{(ROA_{it-1} + ROA_{it-2})}{2} + \beta_3 \frac{(\log TA_{it-1} + \log TA_{it-2})}{2} + \\ + \beta_4 \frac{(MON_{it-1} + MON_{it-2})}{2} + \beta_5 \frac{(BM_{it-1} + BM_{it-2})}{2} + \beta_6 \frac{(SOTO_{it-1} + SOTO_{it-2})}{2} + \\ + \beta_7 \frac{((SOTO_{it-1})^2 + (SOTO_{it-2})^2)}{2} + \sum_{j=1}^{n} \theta_j D_j + u_{it} \quad (3.1)$$

$$RY_{it} = \beta_1 + \beta_2 \frac{(ROA_{it-1} + ROA_{it-2})}{2} + \beta_3 \frac{(\log TA_{it-1} + \log TA_{it-2})}{2} + \\ + \beta_4 \frac{(MON_{it-1} + MON_{it-2})}{2} + \beta_5 \frac{(BM_{it-1} + BM_{it-2})}{2} + \beta_6 \frac{(SOTO_{it-1} + SOTO_{it-2})}{2} + \\ + \beta_7 \frac{((SOTO_{it-1})^2 + (SOTO_{it-2})^2)}{2} + \sum_{j=1}^{n} \theta_j D_j + u_{it} \quad (3.2)$$

In both cases, the impact in DY and RY is controlled by the return on assets (ROA), the company size (proxy by the log of total assets), the monitoring (proxy by shareholders' dispersion) and the number of board meetings (BM). Differences across growth and non-growth industries as well as structural breaks are explored by the dummy industry.

3.1.2 The financing model:

Equation 3.3 measures the impact on leverage (LV) of the percentage of CEOs' compensation that is paid in the form of stock options.

$$LV_{it} = \gamma_1 + \delta_2 \frac{(\log TA_{it-1} + \log TA_{it-2})}{2} + \gamma_3 \frac{(TAX_{it-1} + TAX_{it-2})}{2} + \\ + \gamma_4 \frac{(MON_{it-1} + MON_{it-2})}{2} + \gamma_5 \frac{(BM_{it-1} + BM_{it-2})}{2} + \gamma_6 \frac{(SOTO_{it-1} + SOTO_{it-2})}{2} + \\ + \gamma_7 \frac{((SOTO_{it-1})^2 + (SOTO_{it-2})^2)}{2} + \sum_{j=1}^{n} \theta_j D_j + u_{it} \quad (3.3)$$

The impact is controlled by the company size (proxy by the log of total assets), the effective tax rate, the monitoring (proxy by shareholders' dispersion) and the number of board meetings (BM). Once again, differences across growth and non-growth industries as well as structural breaks are explored by the dummy industry.

3.1.3 The investment model:

Finally, equation 3.4 measures the impact on investment (CPX) of the percentage of CEOs' compensation that is paid in the form of stock options (SOTO).

$$\begin{aligned} CPX_{it} = {} & \lambda_1 + \lambda_2 \frac{(\log TA_{it-1} + \log TA_{it-2})}{2} + \lambda_3 \frac{(TQ_{it-1} + TQ_{it-2})}{2} + \lambda_4 \frac{(MON_{it-1} + MON_{it-2})}{2} + \\ & + \lambda_5 \frac{(BM_{it-1} + BM_{it-2})}{2} + \lambda_6 \frac{(AGE_{it-1} + AGE_{it-2})}{2} + \lambda_7 \frac{((AGE_{it-1})^2 + (AGE_{it-2})^2)}{2} + \\ & + \lambda_8 \frac{(RK_{it-1} + RK_{it-2})}{2} + \lambda_9 \frac{(SOTO_{it-1} + SOTO_{it-2})}{2} + \lambda_{10} \frac{((SOTO_{it-1})^2 + (SOTO_{it-2})^2)}{2} + \\ & + \sum_{j=1}^{n} \theta_j D_j + u_{it} \end{aligned} \tag{3.4}$$

The impact is controlled by the company size (proxy by the log of total assets), the Tobin-q, monitoring (proxy by shareholders' dispersion), the number of board meetings and the CEO's age. Differences across growth and non-growth industries as well as structural breaks are explored by the dummy industry.

3.1.4 Dependent variables

Dividends (DY and RY)

Once the value of an option decreases when the price of the underlying asset drops, managers that are granted options over firm's stocks may be tempted to avoid dividends distribution since it decreases the ex-post stock price and thus reduces the option value. By opposition, stock repurchases does not decrease the value of the options granted to CEOs as the number of shares outstanding of the firm also decrease. Thereby, two regressions will be conducted: one with dividend yield and one for stocks repurchased, which is also presented in the form of a yield (from here on repurchase yield). It is expected that stock options payment negatively (positively) affects dividend distribution (stock repurchases).

Leverage (LV)

In the perspective of stock option holders, a higher amount of debt can increase the likelihood of the option to be in-the-money due to the increase of firm's risk and so the option value increases. Logically, this reasoning is only valid until a certain limit, otherwise firms would get into financial distress and therefore, stock options will be worth zero. Leverage will be measured by the debt-to-equity ratio, being equity measured at market values. Thus, this ratio is determined dividing total debt by market capitalization.

CAPEX (CPX)

In theory, and for similar reasons as the ones pointed for leverage, CEOs with significant stock option compensation and low supervision not only invest more as also invest in a riskier way. Investment will be measured by the ratio CAPEX/Sales, being CAPEX the dollar amount spent by firms on the acquisition of fixed assets.

3.1.5 Independent variables

CEO compensation (SOTO)

CEOs' stock options compensation will be measured by the dollar amount of stock option compensation over total compensation ratio, which is, by simplification, the percentage of the CEOs compensation that is paid in stock options. Alternatively, this variable will be replaced by a dummy which assumes the value 1 if the firm grants stock options to CEO and 0 otherwise.

Profitability (ROA)

The profitability of firms will be measured by the return on assets. ROA was determined dividing EBIT by Total Assets to which cash was subtracted once it is not an operating asset. Presumably, firms with higher returns will remunerate shareholders better, *ceteris paribus*, and will invest more. The impact on leverage is more uncertainty as, for instance, it will be negative according to the Pecking Order Theory but positive according to the Trade-Off Theory.

Size (TA)

The logarithm of total assets (in this study expressed in million dollars) is used as a proxy for the firm size.

Industry stage (GI)

To explore differences across growth and stable industries, we created a dummy variable, that will assume 1, is the firms belong to a growth industry[2] and 0 otherwise.

Monitoring (MON)

Managers with power and no constant supervision tend to be less careful with risky investments. Also, managers in this situation tend to avoid distributing dividends even when there is excess cash. Therefore, a monitoring variable (measured as shareholders' dispersion) will be included in our models[3].

Board Meetings (BM)

This variable can represent CEOs' supervision. The number of board meetings that occur during a fiscal year was included to complement the monitoring variable. It is expected that firms with a higher number of annual meetings will reduce the likelihood that CEOs will invest negligently and do not distribute dividends.

Risk (RK)

The risk of the firm will be determined by the annualized volatility of daily returns. Due to the characteristics of stock options valuation, this variable is included once the risk factor tends to increase the probability of stock options to be in the money.

Taxes (TAX)

Effective corporate income tax was obtained dividing income taxes by the pre-tax income or EBT. A higher corporate income tax usually has an important role in the determination of the debt amount of firms due to tax shelter.

[2] Industries with potential to grow due to market necessities and demand

[3] Although this can be a noisy measure, it is the one possible to include due to lack of data about institutional investors, who generally have large amounts of stocks and thus have the incentives to make a tight control

Tobin-Q (TQ)

Tobin-Q ratio performs a comparison between firms' market and book values. Although exceptions exist, the higher the ratio, the bigger the capacity of firms to add value to their balance sheet. Thus, it is expected that, firms with higher Tobin-Q values invest more since they (at least in theory) are able to add more value than the remaining firms, attracting thus investors more easily.

CEO age (AGE)

As described in the literature, CEO's age can influence investment decisions. Although with different motivations, younger and older CEOs tend to invest less: the first ones due to inexperience and the second ones since their retirement tends to be closer and so they may not be much concerned about company's future.

3.2 Data and sample

To perform our study data, for the period between 2013 and 2015, from a sample of 498 listed firms belong to S&P 500 was collected using DataStream database. Stock options compensation data for the same period was collected in AFL-CIO (American Federation of labour and congress of industrial organizations)[4], firms' financial statements and in *salary.com*[5]. Due to a large amount of missing data, 158 firms were removed from the initial sample. Then, firms have been grouped into sectors according to GICS (Global Industry Classification Standards) criteria. From here on, 20 firms were removed for belonging to the financial sector (Banks, Insurers, Real Estate Investment Trust and other financial services) and 6 other were excluded due to lack of representativeness of the sector it belongs: 5 of them represented the "telecommunication" sector and 1 represented the "utilities" sector. Finally each sector was classified as growth or non-growth industry according to their R&D intensity as documented by OECD (2011): consumer discretionary, health care, industries and IT, classified by OECD as high or

[4] An American association for employees' rights
[5] A web source for compensation data

medium-high tech industries were considered as growth industries and consumer staples, energy and materials, were by their time classified as low or medium-low tech industries and for that reason were settled as the non-growth ones in this study. This classification follows the previously explained literature reasoning that traditional industries do not grant as many stock options as growth industries since they do not have many investment opportunities and so CEOs do not need many incentives to invest and take risks. At the same time, it allows these firms to have high levels of debt in their balance sheet since they are less likely of needing new loans in the future to face investment opportunities. Also, because when there are no investment opportunities excess cash should be distributed, low amounts of stock options are less likely to represent a barrier to dividend distribution.

3.3 Descriptive statistics

From the 314 firms' sample, 230 belong to the growth industries and the remaining 80 to the non-growth industries. They were later split as small, medium or large according to their size. Because US criteria of size classification is a very complex one (depending of the number of employees and revenues and varying from sector to sector), we have qualified firms as small, medium or large according to the lower, middle or upper third of the sector's total assets annual average of the period under analysis (2013-2015). Our sample and sub-samples are presented in Table 2.

Table 2: Sample distribution according to growth, non-growth industries and size

Industry classification is taken from OECD. Size is determined according to sector's total assets annual average.

Classification	Total	Small	Medium	Large
Growth industries	230	78	76	76
	73.25%	34%	33%	33%
Non-growth industries	84	30	27	27
	26.75%	36%	32%	32%
Total	314	108	103	103

Table 3 provides mean and median values of all dependent and independent variables for the full sample, growth and non-growth industries, as well as the statistical significance of the differences of the two subgroups.

No big differences were observed between growth and non-growth industries regarding CEOs' stock option compensation.

In what has to do with shareholders' remuneration, it is interesting to observe that growth industries have lower dividend yields but higher repurchase yields when compared to the remaining subgroup. Shareholders dispersion (measured by the monitoring variable) evidences a greater concentration of shares in growth industries, which can probably be explained by the fact that these firms are usually hold by institutional investors and investment funds. It is also interesting to note that growth-industries' capital expenditures to sales are almost half of the values evidenced in the non-growth subsample.

Table 3: Mean and median values of the variables according to the full sample, growth industries and non-growth industries

This table presents mean values of all the variables included in this study. Values evidenced for the dependent variables (DY, RY, CPX and LV) are the average of year 2015 (t) while for the independent variables (Soto, Age, ROA, TA, Mon, BM, Rk, Tax and TQ) they are the average of years 2014 (t-1) and 2013 (t-2). Extreme values were treated recurring to winsorize porcess at a 2.5% level, exception is made for the BM and Age variables. Total assets are expressed in millions; age is expressed in years; board meetings, Tobin-Q and age are expressed in absolute terms and stock option compensation to total compensation, dividend yield, repurchase yield, leverage, capex, return on assets, risk and taxes are expressed in relative terms. Monitoring is expressed both in absolute and relative terms. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%.

Variable	Units	Full sample		Growth industries		Non-Growth industries		Mean diferences	Median differences
		Mean	Median	Mean	Median	Mean	Median		
Stock option to total compensation	%	19.10	16.80	19.55	17.26	18.11	17.71	1.44	-0.45
CEOs' age	#	56.80	57	56.57	58	57.53	58	-0.96	0.00
Board meetings	#	7.10	7	7.49	7	8.18	8	-0.69**	-0.34*
CAPEX / Sales	%	9.20	3.80	5.42	3.54	14.95	6.29	-9.53***	-2.75***
Dividend Yield	%	1.90	1.70	1.57	1.47	2.30	2.23	-0.73***	-0.76***
Repurchase Yield	%	3.50	2.30	4.05	3.75	2.92	3.02	1.13***	0.73***
Leverage	%	30.20	16.80	19.55	17.26	18.11	17.71	1.44	-0.45
Monitoring	#	1,853,521	47,312	214,081	49,778	82,525	39,029	131,556***	10,749**
Monitoring	%	0.276	0.014	0.364	0.020	0.036	0.009	0.33	0.011**
Risk	%	27.50	25.70	23.55	21.97	22.99	23.21	0.56	-1.24
Return on Assets	%	11.5	12.00	14.95	13.62	12.50	10.33	2.45***	3.29***
Total Assets	$ million	28,127	13,099	20,641	10,185	27,859	17,941	-7.218**	-7.756***
Efective Corporate tax	%	19.80	29.10	25.23	27.68	28.53	30.85	-3.30**	-3.17**
Tobin-Q	#	3.40	3.60	3.00	12.43	2.12	3.50	0.88**	8.93***

Tables 4 and 5 show the mean and median values for the small, medium and large sample of each industry stage respectively, where one must highlight the fact that small growth firms' CEOs stock option compensation is 5 percentage points higher than in large firms of the same group. We also observe that large firms tend to repurchase more stocks than smaller ones; leverage tend to increase with firm's size and is lower for growth industries (which is likely to be explained by the fact that these firms need to keep open the possibility to contract more debt since investment opportunities are more frequent) and that shareholders dispersion tend to decrease with size, although exception is made for the case of medium size firms of growth industries, where the concentration is huge and on average each shareholder has 6,886,024 shares, which is almost 0.79% of firm's total shares outstanding, being much higher than the 0.02% presented by medium size firms of the non-growth group. Profitability tends to decrease with firm size, contrarily to what was expected at first since large firms tend to be more efficient and take advantage from economies of scale. Correlation matrix of the variables is provided in appendixes.

Table 4: Mean and median values of the variables of growth industries

This table presents mean and median values of all the variables included in this study, for the "growth industries" group. Values evidenced for the dependent variables (DY, RY, CPX and LV) are the average of year 2015 (t) while for the independent variables (Soto, Age, ROA, TA, Mon, BM, Rk, Tax and TQ) they are the average of years 2014 (t-1) and 2013 (t-2). Extreme values were treated recurring to winsorize porcess at a 2.5% level, exception is made for the BM and Age variables. Total assets are expressed in millions; age is expressed in years; board meetings, Tobin-Q and age are expressed in absolute terms and stock option compensation to total compensation, dividend yield, repurchase yield, leverage, capex, return on assets, risk and taxes are expressed in relative terms. Monitoring is expressed both in absolute and relative terms. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%.

		Growth industries					
	Units	Small		Medium		Large	
Variable		Mean	Median	Mean	Median	Mean	Median
Stock option to total compensation	%	21.25	19.77	20.24	16.31	16.02	13.32
CEOs' age	#	56.77	56	56.97	56	56.03	56
Board meetings	#	6.56	7	6.47	6	7.51	8
CAPEX / Sales	%	4.10	3.20	5.40	3.08	5.69	3.45
Dividend Yield	%	1.48	0.74	1.66	1.41	2.13	2.22
Repurchase Yield	%	3.86	2.06	3.60	2.53	4.38	3.89
Leverage	%	15.31	11.70	28.67	20.32	35.04	22.48
Monitoring	#	464,936	75,654	6,886,024	85,376	190,635	36,337
Monitoring	%	0.256	0.042	0.782	0.030	0.056	0.004
Risk	%	27.24	25.36	27.73	26.64	25.08	24.40
Return on Assets	%	18.81	18.18	13.48	11.33	12.36	11.18
Total Assets	$ million	5,156	4,955	12,815	11,613	64,470	39,750
Efective Corporate tax	%	-4.10	29.39	30.99	28.59	25.16	28.17
Tobin-Q	#	9.98	4.92	5.68	3.08	5.69	3.32

Table 5: Mean and median values of the variables of non-growth industries

This table presents mean and median values of all the variables included in this study, for the "non-growth industries" group. Values evidenced for the dependent variables (DY, RY, CPX and LV) are the average of year 2015 (t) while for the independent variables (Soto, Age, ROA, TA, Mon, BM, Rk, Tax and TQ) they are the average of years 2014 (t-1) and 2013 (t-2). Extreme values were treated recurring to winsorize porcess at a 2.5% level, exception is made for the BM and Age variables. Total assets are expressed in millions; age is expressed in years; board meetings, Tobin-Q and age are expressed in absolute terms and stock option compensation to total compensation, dividend yield, repurchase yield, leverage, capex, return on assets, risk and taxes are expressed in relative terms. Monitoring is expressed both in absolute and relative terms. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%.

		Non-Growth industries					
	Units	Small		Medium		Large	
Variable		Mean	Median	Mean	Median	Mean	Median
Stock option to total compensation	%	17.69	17.67	20.61	19.99	18.62	16.47
CEOs' age	#	57.73	58	56.63	56	57.67	58
Board meetings	#	6.27	6	7.70	8	9.59	7
CAPEX / Sales	%	24.52	4.35	18.81	6.13	17.44	6.77
Dividend Yield	%	1.60	1.53	2.52	2.23	3.28	2.96
Repurchase Yield	%	2.30	1.29	1.64	0.52	2.56	1.83
Leverage	%	29.94	17.78	52.62	33.80	42.19	22.34
Monitoring	#	154,635	46,808	86,980	38,295	34,334	24,058
Monitoring	%	0.077	0.042	0.020	0.008	0.005	0.002
Risk	%	29.70	28.16	30.55	29.92	29.12	27.20
Return on Assets	%	5.36	13.03	2.14	9.94	-1.38	8.10
Total Assets	$ million	7,560	6,930	24,135	23,004	62,132	46,414
Efective Corporate tax	%	30.16	32.22	24.40	28.17	26.70	27.33
Tobin-Q	#	-40.08	3.75	19.08	2.17	4.02	2.44

4. Empirical Results

This section provides the empirical results of our analysis regarding the impact of stock options granting to CEOs on corporate decisions.

4.1 Certification of hypothesis

This empirical study intends to test the following hypotheses:

H1: CEO' stock option grants decrease firms' dividend yield

H2: CEO' stock option grants increase firms' leverage

H3: CEO' stock option grants increase firms' investment expenses

4.2 Findings

For each dependent variable (dividend yield, repurchase yield, leverage and investment) two regressions are estimated, the first one that uses as proxy for stock option compensation, a dummy variable that assumes the value of 1 if the firm grants CEO's stock options and 0 otherwise. The second regression uses the actual percentage of CEO's compensation that is paid in stock options.

4.2.1 Stock options' effect on firm's dividend policy

Tables 6, 7, 8 and 9 report the results regarding the dividend policy, being Tables 6 and 7 referring to dividends and Tables 8 and 9 to stock buybacks.

Regarding CEOs' stock option compensation, (Table 6) we observe that as a dummy level it mainly influences medium and large firms. In both cases, this type of compensation has a positive impact in non-growth industries' dividend yield and a negative impact in growth industries' one. Alternatively, when the variable is expressed in relative terms (Table 7): for small and medium size firms, we observe a significant

linear relation between the percentage of stock options that the firm grants to its CEO and the dividend yield. The effect is positive in the case of medium size firms (where a 10 percentage points change in stock options granted implies a 0.24% change in the dividend yield) and negative in small firms (where a 10 percentage points change in stock options granted reduces the dividend yield in 0.1%). However, in the last case, when the industry stage is considered, this negative effect becomes insignificant for non-growth industries, having by its time a significant negative impact of 0.17% in the dividend yield of growth industries for each 10-percentage point change in CEOs' stock option compensation. Results also evidence a negative impact of this variable on the dividend yield of large firms from growth industries.

The difference across industries is generally felt across all firms as, when compared with non-growth industries, granting stock options to CEOs in growth industries imply a reduction on the dividend yield. No quadratic effects were observed in any case. However these results are side by side with the literature and confirm that, in some cases, the first hypothesis holds: CEOs whose stock option compensation is relevant tend to avoid distributing dividends since it reduces the ex-post stock price (exception is made for the case where dividends are unexpectedly good that increases the interest of investors) – the underlying asset – reducing then the probability of the option to be in-the-money at the maturity and therefore, reducing CEOs' wealth. This is particularly true in growth industries.

As expected, ROA and total assets have a positive impact on the dividend distribution (although not significant for all the subgroups). On the opposite side, we were expecting that the monitoring variables (monitoring and board meetings - that try to measure the control over CEOs' decisions) would increase the dividend yield, however results show a negative impact on it.

Table 6: The impact of CEO stock options on firms' dividend policy

Multivariate test

This table reports the estimation of equation 3.1. Stock option compensation is a dummy that equals 1 if the firm grants CEO stock options and 0 otherwise; dividend yield and ROA are defined in relative terms; total assets are expressed in $ million; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets.

Dependent variable: Dividend Yield									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	1.120***	1.119***	-3.686	1.440***	1.440***	-1.479	2.235***	2.234***	0.756
	[0.205]	0.205	[2.595]	[0.277]	[0.279]	[3.731]	[0.224]	[0.225]	[3.279]
Stock option Compensation dummy	0.112	0.611	0.219	0.480	0.942***	0.519	0.199	0.821**	0.710**
	[0.256]	[0.469]	[0.451]	[0.305]	[0.348]	[0.419]	[0.283]	[0.334]	[0.321]
GI*Soto_dummy		-0.683	-0.569		-0.683**	-0.636**		-0.838***	-0.709**
		[0.427]	[0.400]		[0.318]	[0.330]		[0.326]	[0.303]
Log (Total Assets)			0.735***			0.503			0.399
			[0.273]			[0.332]			[0.254]
Return on Assets			0.030**			0.061***			0.023
			[0.013]			[0.020]			[0.021]
Log (Monitoring)			-0.112*			-0.141			-0.266**
			[0.066]			[0.049]			[0.110]
Board Meetings			-0.083			-0.108			-0.033
			[0.053]			[0.049]			[0.050]
R-squared	0.002	0.039	0.151	0.028	0.113	0.236	0.005	0.050	0.206
Adj. R-squared	-0.008	0.020	0.101	0.018	0.086	0.189	-0.005	0.032	0.156
F-statistic	0.201	2.110	2.998	2.871	4.212	4.950	0.539	2.656	4.139
Prob. (F-statistic)	0.655	0.126	0.010	0.093	0.008	0.000	0.465	0.075	0.001
Included observations	108	108	108	103	103	103	103	103	103

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[6] First-order serial correlation has been tested through Durbin-Watson statistic and no significant positive or negative correlation has been found

Table 7: The impact of CEO stock options on firms' dividend policy

Multivariate test

This table reports the estimation of equation 3.1. Dividend yield, stock option to total compensation and ROA are defined in relative terms; total assets are expressed in $ million; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets. Equation (1) looks to explore a linear relation between soto and the dependent variable while (2) explores a quadratic effect and (3) explores differences across G.I. and non-G.I.

Dependent variable: Dividend Yield									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-5.225*	-5.208*	-4.075	-3.673	-3.422	-0.008	0.321	-0.374	1.101
	[2.877]	[2.987]	[3.051]	[3.292]	[3.319]	[3.417]	[3.09]	[3.042]	[3.099]
Stock option to total compensation (Soto)	-0.01*	0.020	0.004	-0.007	0.020	0.024**	-0.005	0.017	0.014
	[0.005]	[0.024]	[0.011]	[0.006]	[0.028]	[0.011]	[0.009]	[0.021]	[0.011]
Stock option to total compensation_squared		-0.01			-0.001			-0.001	
		[0.000]			[0.000]			[0.000]	
GI*Soto			-0.017*			-0.033***			-0.026**
			[0.01]			[0.01]			[0.011]
Log (Total Assets)	0.882***	0.823***	0.763**	0.781***	0.688**	0.365	0.463*	0.492**	0.375
	[0.311]	[0.306]	[0.321]	[0.295]	[0.301]	[0.317]	[0.249]	[0.238]	[0.249]
Return on Assets	0.037***	0.035***	0.033*	0.056***	0.059***	0.059***	0.021	0.022	0.023
	[0.013]	[0.014]	[0.017]	[0.021]	[0.022]	[0.02]	[0.02]	[0.021]	[0.019]
Log (Monitoring)	-0.088	-0.053	-0.096	-0.162*	-0.130	-0.150**	-0.272**	-0.249**	-0.263**
	[0.065]	[0.08]	[0.06]	[0.082]	[0.089]	[0.082]	[0.108]	[0.117]	[0.105]
Board Meetings	-0.080	-0.084	-0.08	-0.098**	-0.091*	-0.101**	-0.028	-0.025	-0.025
	[0.057]	[0.055]	[0.052]	[0.050]	[0.051]	[0.045]	[0.056]	[0.055]	[0.053]
R-squared	0.145	0.165	0.167	0.221	0.231	0.270	0.173	0.183	0.206
Adj. R-squared	0.103	0.116	0.117	0.181	0.183	0.224	0.130	0.132	0.157
F-statistic	3.455	3.329	3.364	5.498	4.798	5.908	4.056	3.578	4.160
Prob. (F-statistic)	0.006	0.005	0.004597	0.000	0.000	0.000	0.002	0.003	0.001
Included observations	108	108	108	103	103	103	103	103	103

4.2.2 Stock options' effect on firm's buyback decisions

Tables 8 and 9 report the estimated results for the same regressions but using the repurchase yield as dependent variable (regression 3.2).

When expressed as a dummy level (Table 8), stock option compensation does not shows a significant impact on firms' stock repurchases.

Notwithstanding, when measured in relative terms to the total compensation, our results change according to the size of the company. In the case of small companies, as higher is the percentage of stock compensation granted to the CEO, the lower will be the repurchase yield. For medium sizes, this impact is only true for companies that belong to a non-growth industry, as the stock compensation granted to CEO of medium growth companies has no impact on the repurchase yield. Finally and consistent with previous literature (Lambert et al., 1989; Lamba and Miranda, 2010) granting stock options to CEOs of large companies from a growth industry increases the repurchase yield (Table 9): a 10-percentage point change in stock options granted to CEOs increases the repurchase yield by 0.38% .The same is not true, however, for large companies from a non-growth industry.

Thus, granting stock options to CEOs of small and medium companies from a non-growth industry has a negative impact on shares repurchases while remunerate CEOs of large companies from a growth industry has the opposite impact. In the case of large companies from growth industries, such impact can be related with the hypothesized idea of managerial opportunism. The fact that in growth industries' case, repurchases tend to increase with firms' size is likely to be explained with an easier access to debt, which has a lower cost than equity and allows reducing firms' weighted average cost of capital.

Table 8: The impact of CEO stock options on firm's stock repurchases

Multivariate Tests

This table reports the estimation of equation 3.2. Stock option compensation is a dummy that equals 1 if the firm grants CEO stock options and 0 otherwise; repurchase yield and ROA are defined in relative terms; total assets are expressed in $ million; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%.

Dependent variable: Repurchase Yield									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	3.572***	3.572***	-3.616	3.679***	3.679***	13.076**	3.549***	3.549***	8.325
	[0.468]	[0.470]	[6.497]	[0.439]	[0.441]	[5.654]	[0.537]	[0.540]	[5.542]
Stock option Compensation dummy	-0.324	-0.115	-0.480	-0.133	-1.143**	-0.693	1.262**	0.204	0.477
	[0.528]	[0.583]	[0.590]	[0.510]	[0.571]	[0.728]	[0.626]	[0.755]	[0.796]
GI*Soto_dummy		-0.286	-1.177		1.495**	0.802		1.426**	1.044
		[0.543]	[0.583]		[0.640]	[0.683]		[0.670]	[0.674]
Log (Total Assets)			0.613			-0.979*			-0.654
			[0.713]			[0.557]			[0.436]
Return on Assets			0.0832**			0.049			0.065
			[0.037]			[0.054]			[0.048]
Log (Monitoring)			0.043			-0.096			0.135
			[0.125]			[0.164]			[0.191]
Board Meetings			0.030			0.038			0.004
			[0.123]			[0.107]			[0.084]
R-squared	0.003	0.005	0.050	0.000	0.044	0.079	0.041	0.067	0.111
Adj. R-squared	0.000	0.000	0.000	-0.009	0.025	0.022	0.032	0.048	0.055
F-statistic	0.364	0.253	0.832	0.049	2.310	1.384	4.344	3.565	1.996
Prob. (F-statistic)	0.548	0.777	0.548	0.825	0.105	0.229	0.040	0.032	0.074
Included observations	108	108	108	103	103	103	103	103	103

Table 9: The impact of CEO stock options on firms' stock repurchases

Multivariate Tests

This table reports the estimation of equation 3.2. Repurchase yield, stock option to total compensation and ROA are defined in relative terms; total assets are expressed in $ million; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets.Equation (1) looks to explore a linear relation between soto and the dependent variable while (2) explores a quadratic effect and (3) explores differences across G.I. and non-G.I.

Dependent variable: Repurchase Yield									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-3.984	-3.974	-4.865	16.465***	16.398***	12.514**	11.102**	10.026*	9.898*
	[6.139]	[6.815]	[6.305]	[5.762]	[5.922]	[5.827]	[5.607]	[5.284]	[5.676]
Stock option to total compensation (Soto)	-0.021	-0.003	-0.032**	0.000	-0.007	-0.032*	0.03**	0.064	0.001
	[0.015]	[0.047]	[0.016]	[0.015]	[0.050]	[0.020]	[0.017]	[0.058]	[0.021]
Stock option to total compensation_squared		0.000			0.000			-0.001	
		[0.001]			[0.001]			[0.001]	
GI*Soto			0.013			0.036*			0.039*
			[0.017]			[0.021]			[0.023]
Log (Total Assets)	0.600	0.546	0.692	-1.364***	-1.339**	-0.915*	-0.849**	-0.804*	-0.714*
	[0.682]	[0.724]	80.699]	[0.523]	[0.586]	[0.564]	[0.430]	[0.448]	[0.429]
Return on Assets	0.086**	0.085**	0.09**	0.054	0.053	0.050	0.063	0.063	0.060
	[0.036]	[0.039]	[0.038]	[0.052]	[0.053]	[0.053]	[0.050]	[0.049]	[0.052]
Log (Monitoring)	0.082	0.104	0.087	-0.083	-0.092	-0.096	0.106	0.142	0.092
	[0.127]	[0.146]	[0.125]	[0.146]	[0.149]	[0.145]	[0.206]	[0.203]	[0.203]
Board Meetings	0.038	0.036	0.038	0.029	0.028	0.033	-0.014	-0.009	-0.02
	[0.120]	[0.119]	[0.123]	[0.108]	[0.110]	[0.108]	[0.084]	[0.081]	[0.087]
R-squared	0.056	0.058	0.059	0.071	0.071	0.084	0.082	0.086	0.097
Adj. R-squared	0.010	0.002	0.003	0.023	0.013	0.027	0.034	0.029	0.041
F-statistic	1.217	1.035	1.056	1.481	1.225	1.469	1.728	1.512	1.723
Prob. (F-statistic)	0.307	0.407	0.394	0.203	0.300	0.197	0.135	0.182	0.124
Included observations	108	108	108	103	103	103	103	103	103

4.2.3 Stock options' effect on firm's leverage

Tables 10 and 11 show the estimation results when leverage (measured by the debt-to-equity ratio) is the dependent variable (regression 3.3).

When considering the dummy variable – grant or not grant stock options to the CEO – (Table 10), the coefficients associated to the dummy variable are not statistically significant. When the stock options granted are measured in relative terms to the total compensation (Table 11), it is possible to observe that for small firms from non-growth industries a small change of 1 percentage point change in the stock option pay (in the total compensation) implies a 0.264% decrease in firm's leverage ratio. This is likely to be explained by the fact that, being these stable firms without many new opportunities, CEOs may prefer certain incomes instead of taking extra risks and trying to achieve higher payoffs, as it was reported by Gaver and Gaver (1993).

This way, and although there is an exception for small firms that belong to a non-growth industry or, in a smaller scale for medium firms that belong to a growth, the CEOs' stock option compensation does not influence much firms' debt ratios. This may be explained by the fact that, contrarily to the dividends' case, leverage has long-term effects that increase firm's risk and that may end up in firm's bankruptcy, making not only those stock options be worth zero as well as making managers lose their jobs.

Table 10: The impact of CEO stock options on firms' leverage

Multivariate Tests

This table reports the estimation of equation 3.3. Stock option compensation is a dummy that equals 1 if the firm grants CEO stock options and 0 otherwise; leverage and effective corporate taxes are defined in relative terms; total assets are expressed in $ million; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets.

Dependent variable: Leverage									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.202***	0.202***	-1.813***	0.272***	0.272***	-0.263	0.292***	0.292**	0.334
	[0.032]	[0.033]	[0.392]	[0.051]	[0.051]	[0.625]	[0.037]	[0.037]	[0.501]
Stock option Compensation dummy	-0.033	0.016	-0.033	0.035	0.119*	0.050	0.056	0.047	0.059
	[0.035]	[0.068]	[0.055]	[0.057]	[0.063]	[0.060]	[0.043]	[0.059]	[0.055]
GI*Soto_dummy		-0.066	0.016		-0.124**	-0.072		0.012	0.005
		[0.073]	[0.060]		[0.056]	[0.048]		[0.061]	[0.064]
Board Meetings			0.003			0.003			0.012
			[0.006]			[0.010]			[0.009]
Log (Monitoring)			0.001			-0.014			0.026*
			[0.009]			[0.014]			[0.015]
Effective Corporate Taxes			-0.101			-0.069			-0.038
			[0.114]			[0.275]			[0.203]
Log (Total Assets)			0.235***			0.075			-0.038
			[0.043]			[0.066]			[0.044]
R-squared	0.007	0.021	0.278	0.006	0.055	0.085	0.013	0.013	0.078
Adj. R-squared	-0.003	0.003	0.235	-0.004	0.036	0.028	0.003	0.000	0.020
F-statistic	0.729	1.143	6.476	0.564	2.925	1.485	1.336	0.677	1.355
Prob. (F-statistic)	0.395	0.323	0.000	0.455	0.058	0.191	0.251	0.511	0.241
Included Observations	108	108	108	103	103	103	103	103	103

Table 11: The impact of CEO stock options on firms' leverage

Multivariate Tests

This table reports the estimation of equation 3.3. Leverage, stock option to total compensation and effective corporate taxes are defined in relative terms; total assets are expressed in $ million; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets. Equation (1) looks to explore a linear relation between soto and the dependent variable while (2) explores a quadratic effect and (3) explores differences across G.I. and non-G.I.

Dependent variable: Leverage

	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-1.707***	-1.704***	-1.761***	-0.548	-0.438	-0.218	0.403	0.513	0.346
	[0.401]	[0.404]	[0.393]	[0.605]	[0.608]	[0.596]	[0.478]	[0.532]	[0.503]
Stock option to total compensation (Soto)	-0.154**	-0.207	-0.264**	-0.095	0.558	0.163	0.159	-0.185	0.039
	[0.061]	[0.227]	[0.106]	[0.096]	[0.413]	[0.152]	[0.176]	[0.461]	[0.172]
Stock option to total compensation_squared		0.111			-1.249*			0.789	
		[0.463]			[0.706]			[1.211]	
GI*Soto			0.116			-0.285**			0.162
			[0.128]			[0.146]			[0.218]
Board Meetings	0.004	0.004	0.004	0.004	0.006	0.004	0.012	0.012	0.012
	[0.006]	[0.006]	[0.006]	[0.01]	[0.009]	[0.01]	[0.01]	[0.01]	[0.01]
Log (Monitoring)	0.001	0.001	0.002	-0.015	-0.008	-0.015	0.025	0.021	0.024
	[0.008]	[0.009]	[0.008]	[0.014]	[0.014]	[0.014]	[0.016]	[0.016]	[0.016]
Effective Corporate Taxes	-0.083	-0.085	-0.069	-0.059	-0.051	-0.073	-0.042	-0.049	-0.033
	[0.113]	[0.114]	[0.117]	[0.266]	[0.272]	[0.266]	[0.204]	[0.206]	[0.209]
Log (Total Assets)	0.224***	0.224***	0.229***	0.107*	0.081	0.071	-0.042	-0.047	-0.036
	[0.046]	[0.046]	[0.044]	[0.061]	[0.064]	[0.06]	[0.041]	[0.044]	[0.044]
R-squared	0.295	0.295	0.299	0.079	0.103	0.093	0.072	0.080	0.076
Adj. R-squared	0.260	0.253	0.257	0.032	0.047	0.036	0.024	0.022	0.019
F-statistic	8.519	7.038	7.174	1.664	1.831	1.632	1.510	1.384	1.322
Prob. (F-statistic)	0.000	0.000	0.000	0.150	0.101	0.147	0.194	0.229	0.255
Included observations	108	108	108	103	103	103	103	103	103

4.2.4 Stock options' effect on firm's investment decisions

The output of the regression 3.4, when the dependent variable is firms' investment, measured by the CAPEX/Sales ratio, is presented in Tables 12 and 13.

Table 12 shows the results when the stock option compensation is treated as a dummy variable and we can see that large firms, from a non-growth industry, that grant stock options as part of the CEO compensation invest around 0.069% more than the firms do not grant (similar results were obtained for medium firms); the impact however is negative for large firms of growth industries.

Alternatively, considering the percentage of stock option in the CEO's total remuneration (Table 13), we do not observe a clear impact in investment decisions. There is however an exception for the case of large firms from growth industries where a 10-percentage point change in percentage of stock options in CEO's total compensation decreases investment in almost 1 percent. Although significant, this result contradicts our expectations that firms that grant more stock options to CEOs invest more, but is consistent with Gaver and Gaver (1993)'s suggestion on some CEOs preference on certain incomes instead of taking risks to achieve higher stock options' payoffs.

Regarding stock options' quadratic effects, no evidence has been proven to exist for any of the size subgroups. There is also no relevant evidence about the quadratic effect of CEOs' age (younger and older CEOs invest less than middle age ones) as it was pointed by Ryan and Wiggins (2002) and Zona (2016).

Risk has also been proven to play an important role on firms' investment decisions once our outputs show significant results for the overall firms regardless of the size.

Table 12: The impact of CEO stock options on firms' investment decisions

Multivariate Tests

This table reports the estimation of equation 3.4. Stock option compensation is a dummy that equals 1 if the firm grants CEO stock options and 0 otherwise; investment and risk are defined in relative terms; total assets are expressed in $ million; CEO age is expressed in years; Tobin-Q is the ratio between equity market and book value; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets.

Dependent variable: Investment									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.101***	0.101***	-1.437	0.068***	0.068***	1.366*	0.089***	0.089***	-0.506
	[0.034]	[0.034]	[1.811]	[0.017]	[0.017]	[0.821]	[0.021]	[0.021]	[0.525]
Stock option compensation dummy	-0.047	-0.017	-0.011	0.019	0.086*	0.063*	-0.005	0.068*	0.069*
	[0.029]	[0.035]	[0.020]	[0.023]	[0.045]	[0.037]	[0.018]	[0.042]	[0.040]
GI*Soto_dummy		-0.040	-0.007		-0.099**	-0.052		-0.100**	-0.083*
		[0.039]	[0.018]		[0.046]	[0.035]		[0.046]	[0.044]
Age			0.043**			-0.017			-0.007
			[0.018]			[0.022]			[0.012]
Age_squared			0.000			0.000			0.000
			[0.000]			[0.000]			[0.000]
Tobin-Q			0.000			0.000			0.000
			[0.000]			[0.000]			[0.000]
Board Meetings			-0.008**			0.002			0.005
			[0.004]			[0.004]			[0.005]
Log (Monitoring)			0.003			0.001			-0.009
			[0.004]			[0.007]			[0.008]
Log (Total Assets)			0.008			-0.118*			0.068*
			[0.101]			[0.072]			[0.038]
Risk			0.634***			0.317*			0.447**
			[0.213]			[0.164]			[0.187]
R-squared	0.044	0.060	0.432	0.006	0.123	0.246	0.001	0.108	0.231
Adj. R-squared	0.035	0.044	0.379	-0.004	0.105	0.173	-0.009	0.089	0.157
F-statistic	4.921	3.437	8.266	0.616	7.000	3.367	0.065	6.037	3.106
Prob. (F-statistic)	0.029	0.036	0.000	0.434	0.001	0.001	0.799	0.003	0.003
Included Observations	108	108	108	103	103	103	103	103	103

Table 13: The impact of CEO stock options on firms' investment decisions

Multivariate Tests

This table reports the estimation of equation 3.4. Investment, stock option to total compensation and risk are defined in relative terms; total assets are expressed in $ million; CEO age is expressed in years; Tobin-Q is the ratio between equity market and book value; monitoring represents the shareholders dispersion ratio which is expressed as the average number of shares owned by shareholders and board meetings is the number of meetings that occurred annually. GI is a dummy that equals 1 for growing firms and 0 if the firm is in a stable phase. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in brackets. Equation (1) looks to explore a linear relation between soto and the dependent variable while (2) explores a quadratic effect and (3) explores differences across G.I. and non-G.I.

Dependent variable: Investment									
	Small			Medium			Large		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-1.372	-1.393	-0.302	1.063	1.230	1.300	-0.835	-0.809	-0.528
	[1.149]	[1.159]	[1.115]	[0.905]	[0.892]	[0.852]	[0.583]	[0.585]	[0.507]
Stock option to total compensation (Soto)	-0.045	-0.088	-0.021	0.006	0.254	0.164	-0.022	0.038	0.158
	[0.036]	[0.096]	[0.057]	[0.042]	[0.214]	[0.167]	[0.046]	[0.202]	[0.139]
Stock option to total compensation_squared		0.089			-0.471			-0.137	
		[0.153]			[0.373]			[0.395]	
GI*Soto			-0.032			-0.175			-0.248*
			[0.064]			[0.162]			[0.156]
Age	0.039**	0.039**	0.037**	-0.011	-0.012	-0.014	-0.005	-0.005	-0.006
	[0.017]	[0.017]	[0.016]	[0.022]	[0.022]	[0.021]	[0.012]	[0.012]	[0.012]
Age_squared	0.000***	0.00**	0.000**	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Tobin-Q	0.000	0.000	0.000	0.000**	0.000**	0.000*	0.000*	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Board Meetings	-0.008**	-0.008**	-0.008**	0.002	0.002	0.002	0.006	0.006	0.006
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]	[0.005]	[0.005]
Log (Monitoring)	0.004	0.003	0.003	-0.002	0.000	-0.002	-0.008	-0.008	-0.008
	[0.003]	[0.003]	[0.003]	[0.007]	[0.007]	[0.007]	[0.007]	[0.008]	[0.007]
Log (Total Assets)	0.010	0.013	0.009	-0.103	-0.122	-0.116	0.097**	0.094**	0.067*
	[0.101]	[0.103]	[0.101]	[0.077]	[0.076]	[0.076]	[0.046]	[0.046]	[0.039]
Risk	0.652***	0.647***	0.661***	0.345**	0.366**	0.327*	0.432**	0.436**	0.433**
	[0.215]	[0.214]	[0.227]	[0.170]	[0.166]	[0.170]	[0.195]	[0.196]	[0.192]
R-squared	0.432	0.433	0.433	0.217	0.229	0.236	0.160	0.161	0.212
Adj. R-squared	0.386	0.380	0.381	0.151	0.155	0.162	0.089	0.080	0.136
F-statistic	9.414	8.301	8.316	3.266	3.077	3.189	2.241	1.988	2.788
Prob. (F-statistic)	0.000	0.000	0.000	0.003	0.003	0.002	0.031	0.049	0.006
Included observations	108	108	108	103	103	103	103	103	103

5. Conclusion

The introduction of variable components in management compensation has both interesting and complex points of view. In this study, we examine the possibility that CEOs' stock option compensation can originate interests' misalignment and increase managerial opportunism due to the peculiarity of stock options valuation.

The results provided by our study show that in fact stock option compensation is likely to have a role on firms' dividend policies: for the particular case of growth industries, granting stock options to CEOs results in a reduction of the dividend yield, confirming the idea of managerial opportunism. The same however was not confirmed for non-growth firms.

When considering share buybacks as an alternative measure for shareholders' remuneration, our results suggest that management' stock options can in fact impact their decisions about firms' stock repurchases: in the growth industry subgroup, stock option compensation and repurchases have a positive and significant relation, being this effect larger for large firms.

Regarding leverage, the results suggest that stock option compensation has a negative impact on firms' leverage of both small firms from non-growth industries and medium firms from growth-industries. Although unexpected, this results are likely to be explained by Gaver and Gaver (1993) suggestion that some CEOs prefer "to play safe" and ensure that certain payoffs are ensured, instead of taking risks and trying to achieve higher payoffs. Consistent with this idea our results also suggest that, in the case of large firms from growth industries, granting stock option to CEOs decreases the investment expenses. However, no significant results have been found for the remaining firms.

Our results suffer from the short period of analysis, but accessible data about CEOs' stock option compensation for a longer period was not available. New studies on this topic, beside to analysis a larger period can also benefit from using alternative measures for investment since capital expenditures excludes the amounts spent on acquisitions. Other control variables, such as the percentage of shares owned by institutional shareholder should be used as proxy for monitoring since these are usually the ones that

perform a closer control over CEOs' decisions (which in our case was not possible to do for the same reasons as the ones pointed for the small period of data analyzed).

6. References

Aboody, D., and Kasznik, R. (2000), "CEO stock option awards and the timing of corporate voluntary disclosures", *Journal of Accounting and Economics,* Vol*. 29*, No., pp. 73.

Agha, M. (2011), "Leverage, executive incentives and corporate governance", *Accounting and Finance,* Vol*. 53*, No. 1, pp. 1-30.

Agrawal, A., and Mandelker, G. N. (1987), "Managerial Incentives and Corporate Investment and Financing Decisions", *The Journal of Finance,* Vol*. 42*, No. 4, pp. 823-837

Angel, J. J., and McCabe, D. M. (2008), "The Ethics of Managerial Compensation: The Case of Executive Stock Options", *Journal of Business Ethics,* Vol*. 78*, No. 1/2, pp. 225-235.

Bank, W., (2016), Portuguese Data - The world Data Bank, Retrieved 10th October, 2016, from http://data.worldbank.org/country/portugal

Barnea, A., Haugen, R. A., and Senbet, L. W. (1980), "A Rationale for Debt Maturity Structure and Call Provisions in the Agency Theoretic Framework", *The Journal of Finance,* Vol*. 35*, No. 5, pp. 1223-1234.

Bebchuk, L. A., and Fried, J. M. (2003), "Executive Compensation as an Agency Problem", *The Journal of Economic Perspectives,* Vol*. 17*, No. 3, pp. 71-92.

Bizjak, J. M., Brickley, J. A., and Coles, J. L. (1993), "Stock-based incentive compensation and investment behavior", Vol*. 16*, No. 1, pp. 349.

Black, F., and Scholes, M. (1973), "The Pricing of Options and Corporate Liabilities", Vol*. 81*, No. 3, pp. 637.

Bolton, P., Scheinkman, J., and Xiong, W. (2006), "Executive compensation and short-termist behavior in speculative markets", *Review of Economic Studies*, No., pp. 577-610.

Boumosleh, A. (2012), "Firm investment decisions, dividend policy, and director stock options", *Journal of Applied Business Research,* Vol*. 28*, No.

Brockman, P., Martin, X., and Unlu, E. (2010), "Executive Compensation and the Maturity Structure of Corporate Debt", *The Journal of Finance,* Vol*. 65*, No. 3, pp. 1123-1161.

Burns, N., and Kedia, S. (2006), "The impact of performance-based compensation on misreporting", *Journal of Financial Economics,* Vol*. 79*, No., pp. 35.

Burns, N., McTier, B. C., and Minnick, K. (2015), "Equity-incentive compensation and payout policy in Europe", Vol*. 30*, No., pp. 85-97.

Carpenter, J. N. (2000), "Does Option Compensation Increase Managerial Risk Appetite?", *The Journal of Finance,* Vol*. 55*, No. 5, pp. 2311-2331.

Chang, C. (1993), "Payout Policy, Capital Structure, and Compensation Contracts when Managers Value Control", *The Review of Financial Studies,* Vol. *6*, No. 4, pp. 911-933.

Chauvin, K. W., and Shenoy, C. (2001), "Stock price decreases prior to executive stock option grants", *Journal of Corporate Finance,* Vol. *7*, No. 1, pp. 53-76.

Choe, C. (2003), "Leverage, volatility and executive stock options", *Journal of Corporate Finance,* Vol. *9*, No. 5, pp. 591-609.

Cohen, R. B., Hall, B. J., Viceira, L. M. (2000). *Do executive stock options encourage risk-taking?* Working Paper. Graduate School of Business Administration, Harvard University.

Core, J. E., Holthausen, R. W., and Larcker, D. F. (1999), "Corporate governance, chief executive officer compensation, and firm performance", *Journal of Financial Economics,* Vol. *51*, No. 3, pp. 371-406.

Cudd, M., Duggal, R., and Sarkar, S. (1996), "Share Repurchase Motives and Stock Market Reaction", *Quarterly Journal of Business and Economics,* Vol. *35*, No. 2, pp. 66-76.

Cuny, C. J., Martin, G. S., and Puthenpurackal, J. J. (2009), "Stock Options and Total Payout", *The Journal of Financial and Quantitative Analysis,* Vol. *44*, No. 2, pp. 391-410.

Datta, S., Iskandar-Datta, M., and Raman, K. (2005), "Managerial Stock Ownership and the Maturity Structure of Corporate Debt", *The Journal of Finance,* Vol. *60*, No. 5, pp. 2333-2350.

DeAngelo, H., DeAngelo, L., and Stulz, R. M. (2006), "Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory", *Journal of Financial Economics,* Vol. *81*, No. 2, pp. 227-254.

DeFusco, R. A., Johnson, R. R., and Zorn, T. S. (1990), "The Effect of Executive Stock Option Plans on Stockholders and Bondholders", *Journal of Finance,* Vol. *45*, No. 2, pp. 617-621.

Denis, D. J., and Osobov, I. (2008), "Why do firms pay dividends? International evidence on the determinants of dividend policy", *Journal of Financial Economics,* Vol. *89*, No. 1, pp. 62-82.

Donaldson, G. (1963, May/Jun 1963). Financial Goals: Management vs. Stockholders. *Harvard Business Review, 41,* 116.

Dong, Z., Wang, C., and Xie, F. (2010), "Do executive stock options induce excessive risk taking?", *Journal of Banking & Finance,* Vol. *34*, No. 10, pp. 2518-2529.

Duru, A., Iyengar, R. J., and Zampelli, E. M. (2012), "Performance choice, executive bonuses and corporate leverage", *Journal of Corporate Finance,* Vol. *18*, No. 5, pp. 1286-1305.

Edmans, A., Gabaix, X., Sadzik, T., and Sannikov, Y. (2012), "Dynamic CEO Compensation", *The Journal of Finance,* Vol*. 67*, No. 5, pp. 1603-1647.

Fama, E. F., and French, K. R. (2002), "Testing Trade-Off and Pecking Order Predictions about Dividends and Debt", *The Review of Financial Studies,* Vol*. 15*, No. 1, pp. 1-33.

Fenn, G. W., and Liang, N. (2001), "Corporate payout policy and managerial stock incentives", *Journal of Financial Economics,* Vol*. 60*, No. 1, pp. 45-72.

Fich, Eliezer M., and Shivdasani, A. (2005), "The Impact of Stock-Option Compensation for Outside Directors on Firm Value", *The Journal of Business,* Vol*. 78*, No. 6, pp. 2229-2254.

Friend, I., and Larry, H. P. L. (1988), "An Empirical Test of the Impact of Managerial Self-Interest on Corporate Capital Structure", *The Journal of Finance,* Vol*. 43*, No. 2, pp. 271-281.

Gaver, J. J., and Gaver, K. M. (1993), "The Association Between Performance Plan Adoption and Corporate Capital Investment: A Note", *Journal of Management Accounting Research,* Vol*. 5*, No., pp. 145-158.

Geiler, P., and Renneboog, L. (2016), "Executive Remuneration and the Payout Decision", *Corporate Governance: An International Review,* Vol*. 24*, No. 1, pp. 42-63.

Gopalan, R. M., Todd, Song, F., and Thakor, A., V. (2010). *The optimal duration of executive compensation: theory and evidence.* Paper presented at the AFA 2012 Chicago Meetings Paper.

Grossman, S. J., and Hart, O. D. (1982). Corporate financial structure and managerial incentives *The Economics of Information and Uncertainty* (pp. 107-140): University of Chicago Press.

Hall, B. J., and Liebman, J. B. (1998), "Are CEOS Really Paid Like Bureaucrats?", *The Quarterly Journal of Economics,* Vol*. 113*, No. 3, pp. 653-691.

Hall, B. J., and Murphy, K. J. (2003), "The Trouble with Stock Options", *Journal ofEconomic Perspectives,* Vol*. 17*, No. 3, pp. 49-70.

Jagannathan, M., Stephens, C. P., and Weisbach, M. S. (2000), "Financial flexibility and the choice between dividends and stock repurchases", *Journal of Financial Economics,* Vol*. 57*, No. 3, pp. 355-384.

Jensen, M. C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers", *The American Economic Review,* Vol*. 76*, No. 2, pp. 323-329.

Kahle, K. M. (2002), "When a buyback isn't a buyback: open market repurchases and employee options", *Journal of Financial Economics,* Vol*. 63*, No. 2, pp. 235-261.

Knopf, J. D., Nam, J., and Thornton, J. H. (2002), "The Volatility and Price Sensitivities of Managerial Stock Option Portfolios and Corporate Hedging", *The Journal of Finance,* Vol*. 57*, No. 2, pp. 801-813.

Kraus, A., and Litzenberger, R. H. (1973), "A State-Preference Model of Optimal Financial Leverage", *The Journal of Finance,* Vol*. 28*, No. 4, pp. 911-922.

Lamba, A. S., and Miranda, V. M. (2010), "The Role of Executive Stock Options in On-Market Share Buybacks", *International Review of Finance,* Vol*. 10*, No. 3, pp. 339.

Lambert, R. A., Lanen, W. N., and Larcker, D. F. (1989), "Executive Stock Option Plans and Corporate Dividend Policy", *The Journal of Financial and Quantitative Analysis,* Vol*. 24*, No. 4, pp. 409-425.

Larcker, D. F. (1983), "The association between performance plan adoption and corporate capital investment", *Journal of Accounting & Economics,* Vol*. 5*, No. 1, pp. 3-30.

Laux, V. (2012), "Stock option vesting conditions, CEO turnover, and myopic investment", *Journal of Financial Economics,* Vol*. 106*, No. 3, pp. 513-526.

Laux, V. (2015), "Executive Pay, Innovation, and Risk-Taking", *Journal of Economics and Management Strategy,* Vol*. 24*, No. 2, pp. 275-305.

Lee, K. W., Lev, B., and Yeo, G. H. H. (2008), "Executive pay dispersion, corporate governance, and firm performance", *Review of Quantitative Finance and Accounting,* Vol*. 30*, No. 3, pp. 315-338.

Lee, Y.-J. (2008), "The Effects of Employee Stock Options on Credit Ratings", *The Accounting Review,* Vol*. 83*, No. 5, pp. 1273-1314.

Leland, H. E., and Toft, K. B. (1996), "Optimal Capital Structure, Endogenous Bankruptcy, and the Term Structure of Credit Spreads", *The Journal of Finance,* Vol*. 51*, No. 3, pp. 987-1019.

Mehran, H. (1995), "Executive compensation structure, ownership, and firm performance", *Journal of Financial Economics,* Vol*. 38*, No. 2, pp. 163.

Miller, M. H., and Modigliani, F. (1961), "Dividend Policy, Growth, and the Valuation of Shares", *The Journal of Business,* Vol*. 34*, No. 4, pp. 411-433.

Miller, M. H., and Rock, K. (1985), "Dividend Policy under Asymmetric Information", *The Journal of Finance,* Vol*. 40*, No. 4, pp. 1031-1051.

Modigliani, F., and Miller, M. H. (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *The American Economic Review,* Vol*. 48*, No. 3, pp. 261-297.

Murphy, K. J. (1985), "Corporate performance and managerial remuneration. An empirical analysis", *Journal of Accounting and Economics,* Vol. *7*, No. 1/2/3, pp. 11-42.

Myers, S. C. (1977), "Determinants of corporate borrowing", *Journal of Financial Economics,* Vol. *5*, No. 2, pp. 147-175.

Myers, S. C. (1984), "The Capital Structure Puzzle", *The Journal of Finance,* Vol. *39*, No. 3, pp. 575-592.

OECD (2011), "Technology intensity definiton", ISIC Rev. 3

Ortiz-Molina, H. (2007), "Executive compensation and capital structure: The effects of convertible debt and straight debt on CEO pay", *Journal of Accounting and Economics,* Vol. *43*, No. 1, pp. 69-93.

Pinegar, J. M., and Wilbricht, L. (1989), "What Managers Think of Capital Structure Theory: A Survey", *Financial Management,* Vol. *18*, No. 4, pp. 82-91.

Rajan, R., and Winton, A. (1995), "Covenants and Collateral as Incentives to Monitor", *The Journal of Finance,* Vol. *50*, No. 4, pp. 1113-1146.

Rajgopal, S., and Shevlin, T. (2002), "Empirical evidence on the relation between stock option compensation and risk taking", *Journal of Financial Economics,* Vol. *33*, No. 2, pp. 145-171.

Ryan, Jr., and Wiggins, R. A. (2002), "The Interactions between R&D Investment Decisions and Compensation Policy", *Financial Management,* Vol. *31*, No. 1, pp. 5-29.

Ryan, J. H. E., and Wiggins, I. I. I. R. A. (2001), "The influence of firm- and manager-specific characteristics on the structure of executive compensation", *Journal of Corporate Finance,* Vol. *7*, No. 2, pp. 101-123.

Ryan Jr, H. E., and Wiggins Iii, R. A. (2002), "The interactions between R & D investment decisions and compensation policy", *Financial Management,* Vol. *31*, No. 1, pp. 5-29.

Sanders, W. G. (2001), "Behavioral responses of CEOs to stock ownership and stock option pay", *Academy of Management Journal,* Vol. *44*, No. 3, pp. 477-492.

Sapp, S. G. (2008), "The Impact of Corporate Governance on Executive Compensation", *European Financial Management,* Vol. *14*, No. 4, pp. 710-746.

Sheikh, S. (2012), "Do CEO compensation incentives affect firm innovation?", *Review of Accounting and Finance,* Vol. *11*, No. 1, pp. 4-39.

Shleifer, A., and Vishny, R. W. (1986), "Large Shareholders and Corporate Control", *Journal of Political Economy,* Vol. *94*, No. 3, pp. 461-488.

Short, H., Zhang, H., and Keasey, K. (2002), "The link between dividend policy and institutional ownership", *Journal of Corporate Finance,* Vol*. 8*, No. 2, pp. 105-122.

Sitkin, S. B., and Pablo, A. L. (1992), "Reconceptualizing the Determinants of Risk Behavior", *The Academy of Management Review,* Vol*. 17*, No. 1, pp. 9-38.

Smith, C. W., and Watts, R. L. (1992), "The investment opportunity set and corporate financing, dividend and compensation policies", *Journal of Financial Economics,* Vol*. 32*, No. 3, pp. 263.

Smith Jr, C. W., and Watts, R. L. (1982), "Incentive and Tax Effects of Executive Compensation Plans", *Australian Journal of Management (University of New South Wales),* Vol*. 7*, No. 2, pp. 139.

Stulz, R. M. (2000). *Does financial structure matter for economic growth? A corporate finance perspective*. Working Paper Ohio State University.

Titman, S., and Wessels, R. (1988), "The Determinants of Capital Structure Choice", *The Journal of Finance,* Vol*. 43*, No. 1, pp. 1-19.

Wade, J., O'Reilly, C. A., and Chandratat, I. (1990), "Golden Parachutes: CEOs and the Exercise of Social Influence", *Administrative Science Quarterly,* Vol*. 35*, No. 4, pp. 587-603.

White, L. F. (1996), "Executive compensation and dividend policy", *Journal of Corporate Finance,* Vol*. 2*, No. 4, pp. 335-358.

Yermack, D. (1997), "Good Timing: CEO Stock Option Awards and Company News Announcements", *The Journal of Finance,* Vol*. 52*, No. 2, pp. 449-476.

Yu, M. (2007), "An Examination Of The Effectiveness Of CEO Stock Option Granting Decisions Toward R&D Investments", *Journal of Business & Economics Research,* Vol*. 5*, No. 12, pp. 93-106.

Zona, F. (2016), "Agency models in different stages of CEO tenure: The effects of stock options and board independence on R&D investment", *Research policy,* Vol*. 45*, No. 2, pp. 560-575.

7. Appendixes

Correlation Matrix

	Soto	Age	BM	CPX	DY	RY	LV	Mon	RK	ROA	TA	Tax	TQ
Soto	-	-0.02	-0.01	-0.10	-0.11	0.00	-0.07	-0.02	-0.04	0.10	-0.09	0.16	-0.09
Age	-	-	-0.03	-0.01	0.10	-0.01	-0.01	-0.08	-0.14	0.10	-0.04	0.12	-0.06
BM	-	-	-	0.14	-0.04	0.00	0.17	-0.04	0.10	-0.20	0.18	-0.13	0.20
CPX	-	-	-	-	0.13	-0.20	0.38	-0.01	0.25	-0.27	0.14	0.04	0.15
DY	-	-	-	-	-	0.04	0.20	-0.29	-0.35	0.02	0.36	0.03	0.35
RY	-	-	-	-	-	-	0.08	0.03	-0.01	0.11	0.00	0.07	0.00
LV	-	-	-	-	-	-	-	-0.01	0.09	-0.39	0.17	-0.05	0.17
Mon	-	-	-	-	-	-	-	-	0.31	0.04	-0.17	-0.12	-0.17
Rk	-	-	-	-	-	-	-	-	-	-0.13	-0.20	-0.21	-0.19
ROA	-	-	-	-	-	-	-	-	-	-	-0.26	0.25	-0.27
TA	-	-	-	-	-	-	-	-	-	-	-	-0.09	1.00
Tax	-	-	-	-	-	-	-	-	-	-	-	-	-0.09
TQ	-	-	-	-	-	-	-	-	-	-	-	-	-