

## DETERMINANTS OF EXECUTIVE STOCK OPTIONS: PORTUGUESE EVIDENCE

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### Abstract

The main purpose of this study is to investigate the determinants of stock options attribution. We hypothesize that the equity held by managers, the ownership concentration, the liquidity constraints, the firm risk and the firm size are related to the firm's attribution of stock options. Using a sample of 44 companies listed in Euronext Lisbon, we find that only equity held by managers and firm size are related to the firm's attribution of stock options, documenting a positive relationship for both.

**Keywords:** agency theory; incentives; stock options

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### Introduction

Agency theory suggests that compensation policy should be designed in such a way as to provide management with incentives to select and implement actions that increase shareholder wealth (Jensen and Murphy, 1990). A manager's total compensation package consists normally in three components: wages, benefits and incentives. Incentives are considered important mechanisms that motivate managers to enhance corporate performance.

Aimed at aligning the interests of executives with those of the shareholders, stock options have become a popular component of managerial compensation packages. Stock options provide incentives for executives to take actions that increase share prices and consequently shareholders wealth. This would improve the alignment of management and shareholders' interests and therefore reduces agency costs, since stock options provide a direct link between executive expected utility and shareholder wealth.

Stock options have been used extensively in the US and the UK but only recently have they become a component of managerial compensation in Portugal. A number of studies in the US and in other countries (e.g. UK, Singapore, Finland, Japan and France) have been focused on the ex ante incentives which motivates firms to implement stock options plans. The Portuguese market presents a unique case in the study of the determinants of executive stock options. In fact, while the ownership in US and in UK listed firms is widely diffused, the ownership in Portuguese listed firms is highly concentrated. Furthermore, to our knowledge this paper is the first to study the

determinants of stock options grants by listed firms in Euronext Lisbon.

The remainder of the paper is structured as follows. In section one, we analyse agency theory and stock options. In section two we provide an overview of the literature and develop testable hypotheses while we describe our research methodology in section three. The sample selection process and characteristics of the sample are presented in section four. The results of our study are reported and discussed in section five. We provide sensitivity tests in section six. Finally, section seven concludes the paper.

### 1. Agency theory and stock options

The separation between ownership and control originates potential interest conflicts between managers and shareholders. These potential interest conflicts have been recognized by the first time by Smith (1776), which refers that "*negligence and profusion must always prevail, more or less, in the management of the affairs of such a company ... where (executives) are the manager of other people's money than of their own*" (in Gomez-Mejia and Wiseman, 1997, p. 295). Also, Berle and Means (1932) have recognized the interest conflicts as a consequence of the separation between ownership and control, when they mention that "*the separation of ownership from control produce a condition where the interests of owner and of ultimate manager may, and often do, diverge, and where many of the checks which formerly operated to limit the use of power disappear*" (in Gomez-Mejia and Wiseman, 1997, p. 295).

Agency theory provides a theoretical framework that seeks to analyze the different contractual

relationships and the issues that they place to the firm. Thus, the agency theory framework is based on the concept of agency relationship. An agency relationship exists whenever one or more people (the principal) hires another person (the agent) to perform a service and, in doing so, delegates decision-making authority to the agent (Ross, 1973; Jensen and Meckling, 1976). In a corporation, shareholders are principals and managers are their agents.

Two essential elements of the agency theory are the fact that shareholders and managers interests do not coincide and there is some degree of opportunism between them. Thus, the environment where the agency relationship develops as well as the existence of information asymmetries between managers and shareholders originates costs both in the period that precedes the elaboration of the contract and subsequent periods. Moreover, if both parties act in their own self-interest (as the agency theory assumes), there is a good reason to believe that managers will not always act in the best interests of the shareholders. Thus, interest conflicts between shareholders and managers create agency costs. Jensen and Meckling (1976) define agency costs as the sum of the monitoring costs, the bonding costs and the residual loss. These costs attempt to reduce the costs of the agent acting in its own interest in detriment of the principal interests, as well as the incurred losses by the shareholder coming from the fact that the monitoring is not totally efficient. The allocation of these costs between the shareholder and the manager will depend on the great extent of the anticipation by the shareholder of the opportunist behaviour of the agent.

An inevitable consequence of the separation between shareholders and managers is that one of the involved parties in a transaction can possess more and/or better information than the other part. If the information flowed at zero cost, there not exist agency problems since an individual would not depend on the other. Thus, always that an individual depends on the action of the other the agency relationship appears and consequently the potential interest conflicts.

Uncertainty and information asymmetry between the principal and the agent can lead to the opportunist behaviour since the agent can use its knowledge to maximize its own utility at the cost of the principal. The existence of incomplete information and uncertainty originates two agency problems: adverse selection and moral hazard.

Adverse selection is a problem that negatively affects the ex ante contractual relationship between the principal and the agent. This results in the fact of the agent possessing private information about some variable that affects the transaction, but that the principal is unaware of. Thus, adverse selection is the condition under which the principal cannot be certain if the agent accurately represents his ability to do the work for which he is being paid for.

Moral hazard problem appears as consequence of information asymmetry existence in the ex post

contractual relationship. This derives from the fact that the principal cannot perfectly evaluate the efficiency of the agent's action or the result of these actions. Thus, moral hazard is the condition under which the principal cannot be sure if the agent has put forward his maximal effort. Agent actions are not observable neither verifiable, that is, the principal does not perfectly evaluate the agent's actions; this can lead the agent to adopt opportunist behaviours.

Shareholders can minimize interest conflict with managers through the establishment of appropriate incentives, designed to limit any dysfunctional behaviour of the agent (Holmström, 1979). However, the existence of asymmetry of information, the impossibility of the control agent without costs and the fact of the mechanisms of the government of the corporation are not always efficient can lead to possible discretionary actions by managers. Summing up, no matter the adequacy level of the incentives schemes designed to mitigate the conflict of interests between managers and shareholders, some room for potential misbehaviour by managers will always persist (Jensen and Meckling, 1976).

Interest divergence between shareholders and managers can be minimized through internal mechanisms, such as the design of remuneration systems linking managers' wealth to the shareholders' wealth (Jensen, 1986; Agrawal and Knoeber, 1996)<sup>25</sup>. In this sense, Jensen and Murphy (1990) suggest that equity compensation grants, such as stock options, can improve the alignment of management and shareholders' interests and therefore reduce agency costs.

## **2. Literature review and testable hypotheses**

A mechanism that can potentially be used to minimize agency problems consists of the integration of incentives in managers' remuneration packages. Among these incentives, the use of stock options is normally seen as one of the most efficient incentive for aligning the interests of managers and shareholders. This justifies the analysis of the determinants of stock options grants. From the several determinants identified in the literature, we analyse the equity held by managers, the ownership concentration, the liquidity constraints, the firm risk and the firm size. These determinants are commonly considered as of most important (Smith and Watts, 1992; Gaver and Gaver, 1993, 1995; Core and Guay, 2001; Ryan and Wiggins, 2001, 2002; Rosenberg, 2003; Nagaoka, 2005; Oyer and Schaefer, 2005). Next, we develop our testable hypotheses concerning

<sup>25</sup> Interest divergence between the principal and the agent can be limited through the external mechanisms, such as the labour market for managers and the capital market (Jensen, 1986; Agrawal and Knoeber, 1996). These external mechanisms act simultaneously with the internal mechanisms and can be complementary or substitutes.

the relationship between the equity held by managers, ownership concentration, liquidity constraints, firm risk, firm size and the stock option adoption.

### 2.1. Equity held by managers

The separation between ownership and control originates agency problems, because managers have a great degree of discretion in decision taking. This discretion results not only because it is difficult for the shareholders to control managers' actions but also due to the existence of information asymmetry. Those facts can lead the managers to act in their own self-interest. Thus, managerial incentives that make managers "residual claimants" can play an important mechanism in reducing the agency costs. As Jensen and Murphy (Jensen and Murphy, 1990, p. 37) argue "*the most powerful link between shareholder wealth and executive wealth is direct ownership of shares by the CEO*".

Jensen and Meckling (1976) suggest that managers' stock ownership minimize agency problems. Managerial shareholdings are expected to minimize agency problems because it incentives managers to reduce perquisites consumption, to expropriate shareholders' wealth and to engage in other non-maximising behaviours. That is, managerial shareholdings incentive the managers to take share-price-increasing decisions, since managers bear a proportion of the wealth effects as a shareholder.

As a manager owns more stock, his interests become more aligned with shareholders. Thus, managerial ownership can lead to a convergence of interests between managers and shareholders (convergence-of-interests hypothesis).

Contrasting with the convergence-of-interests hypothesis, the entrenchment hypothesis suggests that managerial stock ownership, instead of reducing managerial incentive problems, may entrench the incumbent management team, leading to increasing managerial opportunism (Fama and Jensen, 1983). "*Managerial entrenchment occurs when managers gain so much power that they are able to use the firm to further their own interests rather than the interests of shareholders*" (Weisbach, 1988, p. 435)<sup>26</sup>.

<sup>26</sup> Morck et al. (1988), McConnell and Servaes (1990) and Short and Keasey (1999) study the relation between managerial stock ownership and firm performance. Morck et al. (1988), using US data, find that firm performance improves with managerial ownership when management holds less than 5% (or more than 25% percent) of the company's stock. However, when management holds between 5 and 25 percent, performance decreases with ownership. McConnell and Servaes (1990), also using US data, and find a positive relation between managerial stock ownership range of 0% to 40-50%. Short and Keasey (1999), use UK data, and find a non-linear relationship between managerial ownership and firm performance. However, they find that entrenchment occurs when management holds between 12% and 40%. These studies suggest that at low levels of managerial stock ownership, managerial stock

When managers hold the company's stock, the convergence-of-interests effect suggests a less need for adding further monitoring mechanisms while the entrenchment effect suggests a greater need for such mechanisms.

The convergence-of-interests hypothesis suggests thus that the probability of the attribution of stock options will be lower when managers hold of the company's stock. Consistent with the substitution effect, some studies find a negative relationship between managerial stock ownership and attribution of stock options (Mehran, 1995; Yermack, 1995; Ryan and Wiggins, 2001, 2002).

In contrast, the entrenchment hypothesis suggests a positive relationship between managerial stock ownership and attribution of stock options, that is the probability of the attribution of stock options will be greater when managers' hold the company's stock. Pasternack (2002) finds this positive association. Facing conflicting arguments, the following hypothesis is presented:

**H1a.** The percentage of stock held by managers has impact on the attribution of the stock options

**H1b.** The percentage of stock held by managers does not have impact on the attribution of the stock options

### 2.2. Ownership concentration

When shareholders hold a small fraction of outstanding stock, they have little or no incentive to monitor the management, since they are not likely to influence the outcome and the benefits they potentially receive from their monitoring activities are unlikely to exceed the costs they bear. Therefore, small shareholders have incentives to free-ride in monitoring management.

Shleifer and Vishny (1986) suggest that ownership concentration is an important corporate governance mechanism. Large shareholders have incentives to monitor and influence management to protect their significant investments. Thus, ownership concentration may reduce agency costs by increasing monitoring and alleviating the free-ride problem (Demsetz and Lehn, 1985; Shleifer and Vishny, 1986, 1997). Additionally, "*concentrated ownership creates liquidity problems for shareholders; large shareholders cannot sell large holdings in a company without significantly lowering the price of its stock. This creates a mutual dependence. Investors depend on managers to create value and profits, while managers depend on investors' evaluations of a firm. This mutual dependence creates a long-term relationship between*

ownership increases firm performance due to the convergence-of-interests effect. However, when the level of managerial stock ownership is high, entrenchment dominates convergence-of-interests, leading to higher agency problems and a consequent decline in the firm performance.

investors and managers and increases investors' incentives to reduce information asymmetry" (Lee and O'Neill, 2003, p. 215).

Summing up, the efficient monitoring hypothesis suggests that large shareholders reduce the scope of managerial opportunism, reducing the conflict of interests between managers and shareholders. Hence, efficient monitoring hypothesis suggests a negative relationship between ownership concentration and attribution of stock option. Consistent with the substitution effect, Mehran (1995), Ryan and Wiggins (2001), Rosenberg (2003), Ittner *et al.* (2003) and Nagoaka (2005) document a negative association.

However, "when ownership is concentrated in a firm, there are potential conflicts of interest between the dominant shareholders and dispersed minority shareholders" (Erickson *et al.*, 2005, p. 388). Thus, firms with concentrated ownership may be subject to agency costs arising from conflicts of interest between majority and minority shareholders. Large shareholders gain the possibility to expropriate private benefits of control, namely expropriate wealth from minority shareholders (expropriation hypothesis). So, the expropriation hypothesis suggests a greater probability of stock option in the presence of concentrated ownership.

Given the conflicting arguments, the following hypothesis is presented:

**H2a.** The ownership concentration has impact on the attribution of the stock options

**H2b.** The ownership concentration does not have impact on the attribution of the stock options.

### 2.3. Liquidity constraints

Unlikely salary and bonuses, stock options do not require current outlay of cash by the firm, so that they allow corporations to preserve liquidity. In fact, stock options conserve cash on the grant date and represent a source of cash on the exercise date. Thus, liquidity-constrained firms may substitute stock options for cash remuneration, because the granting of options requires no cash payout (Yermack, 1995; Core and Guay, 2001). Therefore, liquidity constraints can increase the probability of stock option adoption. In this sense, Core and Guay (2001), Mehran and Tracy (2001), Nagaoka (2005) and Yermack (1995) document that the attribution of the stock options is positively associated with liquidity constraints.

However, "low liquidity might reduce agency costs as the management has less possibilities for excessive unproductive investments" (Pasternack, 2002, p. 77). This fact, suggests a lower probability of the attribution of the stock options in presence of liquidity constraints. In this sense, Ittner *et al.* (2003) and Uchida (2006) find a negative relationship between stock options and liquidity constraints.

Given the conflicting arguments, the following hypothesis is presented:

**H3a.** Liquidity constraints have impact on the attribution of the stock options

**H3b.** Liquidity constraints do not have impact on the attribution of the stock options

### 2.4 Firm risk

Agency theory predicts that risk reduces the probability of using equity incentives (Aggarwal and Samwick, 1999) and, thus of stock options, because "the manager, unlike the owners, has already invested most of his or her nondiversifiable and nontradable human capital in the firm" (Beatty and Zajac, 1994, pp. 315 and 316). However, the risk can encourage manager's willingness to receive stock options as a form of compensation, because the potential value of the stock options is an increasing function of price-stock volatility (risk). Rosenberg (2003) finds that the attribution of the stock options is negatively associated with systematic risk. In contrast, Nagaoka (2005) and Oyer and Schaefer (2005) find a positive relationship between stock options grant and price-stock volatility.

Facing conflicting arguments, the following hypothesis is presented:

**H4a.** Firm risk has impact on the attribution of the stock options

**H4b.** Firm risk does not have impact on the attribution of the stock options

### 2.5. Firm size

Firm size effects managerial compensation (Jensen and Murphy, 1990; Belkaoui and Pavlik, 1993; Sanders and Carpenter, 1998). Higher levels of compensation are expected to be paid to executives of larger firms because of the larger the scope of their business operations (Gaver and Gaver, 1995). Larger firms are expected to be more difficult to manage and to monitor, with greater potential for agency conflicts (Jensen and Meckling, 1976). This suggests that firm size can be positively related with stock option adoption. Gaver and Gaver (1993, 1995), Ittner *et al.* (2003), Kato *et al.* (2005), Ryan and Wiggins (2001, 2002) and Smith and Watts (1992) document a positive relationship between stock options and firm size.

However, "large firms receive more publicity and coverage by analysts, which reduces asymmetric information" (Ryan and Wiggins, 2001, p. 107). This suggests that monitoring costs may be lower in large firms because of reduction of asymmetric information resulting from analysts' coverage. This suggests that firm size can be negatively related with stock option adoption. Frye (2004), Kedia and Mozumdar (2004) and Oyer and Schaefer (2005) find this negative relationship.

Facing conflicting arguments, the following hypothesis is presented:

**H5:** Firm risk has an impact on the attribution of the stock options

**H6:** Firm risk does not have impact on the attribution of the stock options

### 3. Research Method and Variable Measurement

#### 3.1. Research Method

The hypotheses established in section 2 are tested using cross-sectional data and logistic regression analysis.

The following equation describes the model used to test the relationships between stock options grant (SO) (the dependent variable) and the independent variables equity held by managers (EQMA), ownership concentration (OWCON), liquidity constraints (LIQCON), firm risk (RISK) and firm size (SIZE).

$$SO_i = \beta_0 + \beta_1 EQMA_i + \beta_2 OWCON_i + \beta_3 LIQCON_i + \beta_4 RISK_i + \beta_5 SIZE_i + \varepsilon_i$$

#### 3.2. Variable Measurement

##### 3.2.1. Dependent Variable

The dependent variable is dichotomous, taking the value of 1 when the firm grants a stock option plan during a certain year and 0 otherwise.

##### 3.2.2. Independent Variables

**Equity held by managers (EQMA):** This variable measures the proportion of the company's shares directly or indirectly owned by the manager.

**Ownership concentration (OWNCON):** This variable measures the proportion of stocks owned by shareholders who own at least 2% of the common stock of the company. Portuguese listed firms need to disclose the ownership levels of shareholdings in excess of 2%.

**Liquidity constraints (LIQCON):** Following Core and Guay (2001), we measure the liquidity constraints as [(common and preferred dividends + cash flow from investing – cash flow from operations)/market value of equity]<sup>27</sup>.

**Firm risk (RISK):** Firm risk is measured as the volatility (standard deviation) of daily stock market returns. Thus firm risk is calculated as follows:

$$\sigma_i = \sqrt{\frac{\sum_{t=1}^T (R_{j,t} - \bar{R}_j)^2}{T - 1}}$$

where:

$\bar{R}_j$  = average stock return j;

$R_{j,t}$  = stock return j in the moment t;

T = observations number.

**Firm size (SIZE):** This is calculated as the logarithm of market value of equity<sup>28</sup>.

### 4. Sample Selection and characteristics

#### 4.1. Sample Selection

The initial sample includes all companies whose stocks are listed, in main market, in Euronext Lisbon. A total of 50 companies were listed at the end of the year 2003. Companies (one company) with missing data for the majority of the variables are excluded. Companies do not having shares listed in the previous year are also excluded (one company). Additionally, companies whose shares were delisted in the following years are also excluded (four companies). As a result, the final sample size is 44 companies.

In the equity held by managers variable we have two cases of missing value. With the objective to maximize the number the observations, we replace the missing values by the average value. Thus, average is calculated from available data and used to replace missing values. Mean substitution has been a common way to estimate missing values (Hair *et al.*, 1998).

Information on stock options grant, equity held by managers, ownership concentration and liquidity constraints are collected from the Annual Report and Corporate Governance Report. Both Annual Report and Corporate Governance Report are available online ([www.cmvm.pt](http://www.cmvm.pt)). We obtain price-stock data from the Euronext Lisbon, which allows measuring the variables firm risk and firm size. All the independent variables are measured in the previous year of the stock options grant.

#### 4.2. Sample Characteristics

Tables 1 and 2 present the sample descriptive statistics and correlations, respectively, for the five independent variables used in this research.

<sup>28</sup> Sales volume (Rosenberg, 2003; Smith and Watts, 1992), total assets (Kato *et al.*, 2005; Mehran, 1995; Yermack, 1995) and the number of employees (Ittner *et al.*, 2003) are also generally used to measure the size of the firm.

<sup>27</sup> Core and Guay (2001) use total assets as deflator.

**Table 1.** Summary of Descriptive Statistics of the Variables  
**Sample:** 44 Portuguese Listed Firms

	Mean	Median	Std. Dev.	Min.	Max.	1 <sup>st</sup> Quart.	3 <sup>rd</sup> Quart.
EQMA	0.058	0.006	0.136	0.000	0.606	0.000	0.046
OWCON	0.666	0.710	0.198	0.161	0.954	0.529	0.824
LIQCON	-0.342	-0.334	0.756	-3.429	1.261	-0.622	-0.010
RISK	0.024	0.019	0.013	0.009	0.060	0.014	0.029
SIZE	19.061	18.769	2.125	15.778	24.163	17.658	20.580

**Notes:** EQMA represents equity held by managers; OWCON represents ownership concentration; LIQCON stands for liquidity constraints; RISK stands for the shares price volatility and SIZE represents the firm's size.

**Table 2.** Pearson Correlation Coefficients Matrix

	EQMA	OWCON	LIQCON	RISK	SIZE
EQMA	1.000				
OWCON	-0.608***	1.000			
LIQCON	0.269	-0.353**	1.000		
RISK	0.202	0.064	-0.160	1.000	
SIZE	-0.266	-0.029	0.252	-0.462***	1.000

**Notes:** EQMA represents equity held by managers; OWCON represents ownership concentration; LIQCON stands for liquidity constraints; RISK stands for the shares price volatility and SIZE represents the firm's size.  
\*\*\* Correlation is significant at the 0.01 level (2-tailed); \*\* Correlation is significant at the 0.05 level (2-tailed).

Table 1 shows that the mean (median) equity held by managers is 5.8% (0.6%), with a minimum of 0.0% and a maximum of 60.6%. The ownership concentration variable displays a mean (median) of 66.6% (71%), ranging from 16.1% to 95.4%. These results show that listed companies in Euronext Lisbon display a large degree of ownership concentration. Liquidity constraints variable represents - 34.2% (with a median of - 33.4%) of the market value of the company. The risk variable presents a mean (median) of 0.024 (0.019), with a minimum of 0.009 and a maximum of 0.060. The mean of firm size is about EUR 1,580 million with a minimum of EUR 7,120 thousand and a maximum of EUR 31,185 million.

Table 2 provides the Pearson correlation coefficients of all the variables presented in the logistic regression model. Some significant correlations between the variables are identified. For instance, there is a significant negative correlation between the equity held by managers and the ownership concentration variables, as well as between the size firm and risk. There is also a significant negative correlation between the liquidity constraints and ownership concentration. Correlation coefficients are, in general, low (below the 0.9 threshold) (Tabachnick and Fidell, 2001), suggesting an absence

of serious statistical problems related with multicollinearity.

## 5. Results and discussion

Table 3 presents logistic regression estimates for the equation developed in section 3.

The chi-square and Hosmer and Lemeshow goodness-of-fit tests indicate that the model's estimates fit the data at an acceptable rate. Additionally, the overall percent correctly predicted seems good (86.4%). Moreover, the Wald statistic test shows that the independent variables equity held by managers and firm size are significant at the 5-percent level.

The coefficient of percentage shares outstanding held by managers is positive and statistically significant, which suggests that firms with higher managerial ownership have more probability of granting stock options. Thus, this result is consistent with the entrenchment hypothesis. The firm size is also significantly positively related to the attribution of stock options. Therefore, large firms appear to be more likely to use stock options, consistently with the argument that monitoring difficulty is increases with firms' size.

**Table 3.** Logistic Regression Results

Independent variables	Coefficient	Standard Deviation	Wald Test
Constant	- 6.135	3.758	2.665
EQMA	1.411	0.709	3.960**
OWCON	0.670	0.413	2.622
LIQCON	0.093	0.112	0.677
RISK	0.106	0.617	0.029
SIZE	1.427	0.628	5.157**
Chi-square	19.108***		
- 2 Log Likelihood	- 22.616		
Percentage Correct	86.4%		
Hosmer and Lemeshow Test	3.907		

**Notes:** EQMA represents equity held by managers; OWCON represents ownership concentration; LIQCON stands for liquidity constraints; RISK stands for the shares price volatility and SIZE represents the firm's size. \*\*\* Significant at the 1-percent level, \*\* Significant at the 5-percent level.

In contrast, results suggest no evidence that ownership concentration, liquidity constraints and risk affect the probability of stock option attribution.

Summing up, the results reveal that percentage shares outstanding held by managers and firm size significantly increase the probability that firms grant stock option, whereas ownership concentration, liquidity constraints and risk do not seem to matter.

## 6. Sensitivity analyses

To ensure the robustness of our results, we perform several sensitivity checks. We repeat the analyses using only complete cases (without missing data). Absence of influential observations and the use of alternative variables are also tested.

### 6.1. Repeating analyses without missing data

The results (not reported here) of the logistic regression without the missing values remain mostly unchanged with the exception of the significant level of the independent variable equity held by managers EQMA that is now significant at a 10-percent level.

### 6.2. Influential observations

Where outliers are found (namely in the variables equity held by managers and liquidity constraints), a winsorization method is used to test the robustness of the results. Extreme values (defined as values that are more than three standard deviations away from the mean) are replaced by values that are exactly three standard deviations away from the mean.

The results (not reported here) controlling for the existence of influential observations do not substantially differ from results presented previously in table 3. Nevertheless, equity held by managers is

only significant at the 10-percent level and the coefficient of firm risk RISK becomes negative.

## 6.3. Alternative Variable Definition

In this section, we test the impact of using alternative definition for the firm size variable on logistic regression results. Thus, we use the logarithm of assets instead of the market value of equity as a proxy for firm size. Results (not reported here) show minor changes, namely that the independent variable equity held by managers becomes significant only at 10-percent level. The coefficient of liquidity constraints becomes negative and significant.

## 7. Summary and conclusions

The separation between ownership and control potentially originates interest conflicts between managers and shareholders.

To minimize that conflict of interests it is necessary to design a package of mechanisms that stimulate a convergence of interests. A mechanism that can be used to minimize agency problems consists of the integration of incentives in the managers' remuneration. Stock options are considered an important mechanism the alignment of interests, because they provide a direct link between executive expected utility and shareholder wealth.

This paper studies empirically the determinants of stock options attribution during the year 2003 for a sample of 44 listed companies in Euronext Lisbon. We hypothesize that the equity held by managers, the ownership concentration, the liquidity constraints, the firm risk and the firm size determine the firm's attribution of stock options.

The equity held by managers is considered a way to align the interests between shareholders and managers (Jensen and Meckling, 1976), as it contributes to motivate managers to maximize firm

value. However, besides interest convergence, equity held by managers can contribute to increase furthermore the interest divergences (entrenchment hypothesis), since it may raise managerial opportunism. Supporting the entrenchment hypothesis, we document a significantly positive relationship between equity held by managers and attribution of stock options. This suggests that companies listed in Euronext Lisbon with higher managerial ownership have more probability to attribute stock options.

The ownership concentration is considered an important mechanism of corporate governance (Shleifer and Vishny, 1986) because it can contribute to minimize the free rider problem, influencing the stock options grants. The liquidity constraints is also considered a determinant of attribution of stock options as the firm can remunerate its managers without using of cash or, at least, is able to differ this use. Agency theory predicts that risk reduces the probability of using stock options for compensation (Aggarwal and Samwick, 1999). However, the convex shape of stock options makes them more valuable to executives when volatility is high, suggesting a positive relationship between firm risk and stock options attributions. Nevertheless, the empirical results obtained from our data set suggest that ownership concentration, liquidity constraints and firm risk do not influence the probability of attributing stock options.

Jensen and Meckling (1976) argue that the larger the firm the higher are the difficulties to monitor managers. In contrast, larger firms can minimize monitoring difficulty, because they are more exposed to publicity and under more attention from financial analysts (Ryan and Wiggins, 2001). Consistent with the argument that monitoring difficulty is increasing with firm size, we find a significantly positive relationship between firm size and stock option attributions.

This study has some limitations. The size of our sample is small, an immediate result of the small size of the Portuguese stock market. This may influence some results. Additionally, the use of a binary dependent variable imposes limitations because it involves loss of information. Nevertheless, as our objective is to study the determinants of stock option attributions, we consider this use the most suitable procedure. Finally, information about market capitalization is highly dependent on the share price, while data based on accounting variables is influenced by the different accounting policies.

There are many opportunities for future research in this area, particularly for testing of other potential determinants in order to allow a better understanding of which incentives companies listed in Euronext Lisbon to attribute stock options.

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