

# Executive Directors Pay and Networks in Spanish Listed Companies

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## Abstract

This paper examines the role of social networks among board directors to determine the executive directors' compensation. Our sample of firms is peculiar since it is characterized by large significant shareholders with variability among firms. We find empirical evidence suggesting that higher network centrality of executive directors is associated with higher compensation. Furthermore, when the network centrality is evaluated by the relevance of directors as intermediaries among other directors, this centrality measure is negatively related to future firm performance. Firm's size, the existence of independent directors non-proposed by the nomination committee, and the existence of golden parachutes protecting top executives against firing, are the relevant control variables. All of them have a positive relation with executive director's pay.

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## 1. Introduction

There is cyclical interest over time on the economic press and the academic literature on the justification, or not, of executives compensation level. Executives' remuneration implies the approval or proposal of the board of directors, itself or through delegated committees. Especially relevant is the debate when compensation affects executive directors, and the knowledge of determinants and consequences of the observed remuneration becomes essential.

This paper investigates whether executive director's compensation is larger when they, or the remaining directors, have more network connections and whether subsequently impacts on the firm performance.

Our research question originates from two observed issues, already studied separately in the literature. First, the analysis of executive director's compensation depending on economic factors as the demand and supply of managerial skills, has been addressed in the corporate governance literature with some limitations. The social network literature can help to understand to what extent the social relationships among director's influence their remuneration.

Second, the expected influence of director's network connection on the remuneration should impact positively on performance; otherwise an agency problem is detected.

We find that, controlling for all relevant firm characteristics, an executive director of a firm in the top quartile of connected directors receives, on average, about 40-52 thousand € more compensation than another who is in the lowest quartile set of connected firms.

We differentiate several ways of being central in the network of directors. We also find that the extra-compensation generated by one of these ways (as intermediary of connections) is negatively related with future performance, suggesting an uncontrolled agency problem.

Our paper builds on two pieces of the literature concerning our research questions. On the one side Barnea and Guedj (2007) introduce the network connections to explain, additionally to the traditional board and corporate governance measures, the CEO compensation level for a set of firms included in the S&P 1500 index. On the other side, Core et al (1999) found that firms with weaker governance structures have poorer future performance with CEO higher compensation. Our paper uses the Barnea and Guedj (2007) network measures and the Core et al (1999) methodology to test whether more connected directors earn more compensation and this has an impact on future performance.

Our contribution is twofold. First, we show the whole picture of the determinants of compensations with the consequences on the firm future performance. We provide evidence on the relevance for the firms to have well connected director's explaining executive director's compensation, in addition to the usual economic determinants and firm corporate governance characteristics. Furthermore we prove the ineffectiveness of the compensation explained by a given way of being central in the director's network because of the negative impact on future firm performance.

Second, the institutional setting of our dataset enriches the analysis in several ways. Our data includes all listed companies in the Spanish electronic market for the period 2004-2006. This overcomes the most frequent focus on very wide held firms and includes at once firms with very large controlling shareholders and dispersed ownership firms. An effect of the different

ownership structure is a new type of director, “nominee” who represents a large stake of ownership without executive functions. Our social network measures distinguish among nominee’s, independent and executive directors, something that does not happen in the dispersed ownership environment. In order to detect uncontrolled agency problems we justify the board executives’ compensation on the remuneration of top non director executives of the firm, which allow us to control for the managerial skill market conditions. Finally, recent changes in the Spanish disclosure policy about compensation of board members and executives, mandatory in the annual corporate governance reports, provide new and detailed information, unavailable up to now in a comparable way across firms.

A third characteristic is the existence of directorship network among listed companies where many directors have seats in several firms. Taking into account all directors in our sample, the average number of firms where a director serves is 1.22. A ten percent of directors serve in more than one firm; five is the maximum number of firms where a director serves.

Eurozone finance ministers on 13 May 2008 heavily criticized the practice of presenting top managers with big bonuses and severance payments at a time when ordinary Europeans are being urged to push only for moderate wage increases. The chair of the ministerial meeting said that is ”no longer acceptable to have situations whereby certain top managers have excessive salaries and also benefit from golden parachutes, payments which have no relationship to their performance”. The 2008 US financial crisis have also shown several financial firms rescued by the US government, where CEO’s compensation was presented as too high by the economic press, such as AIG or Fannie Mae.

This kind of declarations leads us to ask about the correction or the excess of top managers remuneration. The answer, unless we use ethical approaches, necessarily is in the market for executives. But some executives can surpass the market benchmarks when they are directors of the board. The design of executive compensation can be an instrument to align executives and directors interests or alternatively could be part of the agency problem itself as Bebchuck and Fried (2003) claim. One of the roles of the board is to set and oversee the firm's policies for compensation executives, where incentives to extract excessive levels of compensation are higher when the executives are directors.

The institutional context of high average ownership concentration, turn out executive directors to be supported by significant shareholdings. The agency problem is then a conflict between large and minority shareholders. Weak governance structures lead to higher executives pay, as Core et Al (1999) assert, enhanced with the discretionary power of the CEO (executive directors in our case) with a lack of board control involvement. Alternatively, Hermalin and Weisbach (1998) predict that high compensation and low board scrutiny is possible when executives have bargaining power because they provide uncommon managerial skills. Our empirical approach tries to find and answer in which of the two mentioned scenarios executive directors are. We also determine if board characteristics and corporate governance practices are control mechanism of the executive directors' behavior or simply unobserved firm aspects, as directors social networks, explain the findings in the performance pay relationship.

The remainder of the paper is organized in five sections. Data, methodology and variables are defined in section 2. Section 3 gives detailed information on

our data sample. Empirical results are shown in section 4. The paper concludes in section 5.

## 2. Data, methodology, and variable measures

### *Data Sample*

As of 2007, there are three years Corporate Governance Annual Reports available for the listed companies in the Spanish electronic market. These reports include comparable data on executives and director's pay and detailed information on board of director's composition and a large set of corporate governance practices. This is a standard report publicly available at the Spanish securities commission CNMV<sup>1</sup>. The sample includes 126 companies in 2006, 119 companies in 2005, and 118 in 2004, corresponding to the firms quoted on the electronic trading system of the Spanish Stock Exchange that fully released the Annual Corporate Governance Report<sup>2</sup>. The sector of activity fits with the Madrid Stock Exchange sector classification. Table 1 shows a detailed sample composition, split in four similar size groups of market capitalization. There is a subset of 114 firms with available information for the three mentioned years.

[Insert Table 1]

### *Economic, governance and network measures*

Under the Core et al (1999) assumption, the economic determinants of board executive compensation should completely describe the cross-sectional

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<sup>1</sup> Order ECO/3722/2003 of 26 December specified the informational content to be provided in each of the areas defined in its text. Companies quoted in the electronic market, once delisted do not provide the Corporate Governance Annual Report.

<sup>2</sup> One firm was incorporated to this electronic trading system in 2005, eleven firms in 2006. Four firms were delisted from the Madrid Stock Exchange in 2006.

variation in the equilibrium level of this compensation. Shareholders are supposed to simultaneously determine the firm's governance structure and the compensation of executive directors in order to maximize firm's value. Economic determinants include aspects like the size of the firm, firm's performance, firm's risk, and firm's investment opportunities. Under this hypothesis, no board structure or ownership variables would be relevant explaining cross sectional differences in executives pay once the economic determinants have been taken into account. Firm environment and executive director's reservation wage according their quality would be taken into account. In case of model misspecification or uncontrolled agency problems would be captured by cross sectional significant differences and new determinants would come into play.

#### *A. Economic determinants of the level of executives pay.*

Regarding the economic determinants of executives pay, the standard explanations in the literature, used in Core et al (1999), expect that larger firms with greater growth opportunities and more complex operations will demand higher quality managers with higher equilibrium wages. It takes into account that the demand for talent may be different across industrial sectors. Performance, as agency models suggest, is assumed to be relevant explaining executives pay. Firms' risk is also a potentially important determinant of executives' compensation (e.g. Cyert et al, 1997).

These are firm economic conditions that would explain the level of executive directors' pay. Usually Sales tend to capture firm size and complexity, the Market-to-book ratio averaged over the previous years is a proxy for firm's investment opportunities, and sector dummies capture industry differences.

Performance measures include accounting (ROA) and stock market returns. These performance measures can be lagged or contemporaneous, as Hall and Liebman, (1998) do, to better capture the variable pay. Finally risk measures are taken from variance over last years of the performance values.

An additional economic factor that captures the reservation wage for executive directors refers to the compensation of firm top executives, non directors.

### *B. Governance variables; ownership and board of directors*

To discover unsolved agency problems the literature considers the potential impact of ownership structure and board of directors variables as corporate governance devices. Significant shareholders are supposed to have more control over the executives and their pay (e.g. Bertrand and Mullainathan, 2001, or Hartzell and Starks, 2003). Hartzell and Starks (2003) focus on institutional shareholders as monitors and find that top executive pay decreases with large stakes.

Corporate governance best practices codes suggest that the power concentration of the CEO - Chairman limits the shareholders control of the firm, and has a potential impact on their excess compensation, as Brick et Al (2006) study. Board size seems important, based on the evidence suggesting poor corporate governance for higher boards due to coordination problems, (Yermack, 1996). Other board characteristics as percentage of executive directors, relevance of independent directors or the lack of participation of the nomination committee appointing independent directors, as Core et al (1999) introduce, proxy for the corporate governance influence. Executive directors tenure, as in Barnea and Guedj (2007), the existence of golden parachutes for the executive directors, the existence of relevant transactions between directors and the firm, and the limits on the shareholders voting power

through voting caps are additional signal of the poor corporate governance practices able to tolerate executives directors excess pay.

These corporate governance variables are expected do not influence the economic determinants of the executive directors compensation unless an unsolved agency problem is present.

### *C. Directors' Network activity*

The managerial power approach by Bebchuck and Fried (2003) asserts that the exposure of directors to other boards has an impact on the compensation schemes of the firm. Sitting on multiple boards with high remuneration makes more likely higher amounts of compensation for executives. Barnea and Guedj (2007) find that firms that have more connected boards grant higher salaries to their CEOs. Core et al (1999) also find that total CEO compensation is higher when outside directors serve on three or more boards. Hallock (1997) finds that CEOs of interlocked firms earn higher compensation. Fich and Shivdasani (2006), measuring number of directorships held by outside directors, find that busy boards are associated with weak corporate governance and low sensitivity of CEO turnover to firm performance.

However, executive directors with outside directorships may be a signal of high managerial talent (Fama and Jensen, 1983). In addition, the firm whose directors get outside positions may benefit from the fact that the director learns about different management styles or strategies used in other firms (Carpenter and Westphal, 2001) or establishes a fruitful network for the firm or helps to monitor business relationships (Loderer and Peyer, 2002). Indeed, Fich (2005) found that CEOs are more likely to obtain outside directorships when the companies they head perform well. Furthermore, Perry and Peyer (2005) investigate firms with executives that accept an outside directorship

and found negative announcement returns only when the executive's firm had greater agency problems. Their results suggest that outside directorships for executives can enhance firm value.

### *Network centrality measures*

The measures of network centrality have been widely used in the sociology literature (see, Bonacich, 1972, 1987, and Freeman, 1978). In the finance literature Hochberg et al. (2007) operate with these measures to analyze venture capital networks. These centrality measures are network Closeness, network Degree, and network Betweenness. They perform several computations depending on the ways of being "central" in a social network. Analyzing whether a director is central or not, can be computed in three ways that we describe.

The network Degree for a director one year is the number of directors that have a direct link with her, sitting in the same board. Therefore, for a director, the network degree is larger when she is board member of several firms. In order to compare the network Degree across years it is possible to standardize the measure dividing the number of direct links by the maximum number of links that a director might have. This is a relative measure that accounts for the size of the pool of directors.

The network Betweenness measure estimates the relevance of non-direct links in a network. This accounts for the relevance of a director in linking other directors. The sociology literature refers to these non-direct links as geodesic paths. The network Betweenness of each director is its number of geodesic paths. If director A is linked with directors C and B, but directors B and C are not directly linked, A's score of network Betweenness takes value one. That is, the network Betweenness measure of a director is the number of pairs

of directors that have a non-direct link through her and also do not have a direct link between them. The measure is refined in order to capture the exclusiveness of the networking activity. In the case where if directors A and B have non-direct links through directors C and D, the geodesic path new computation just adds  $\alpha$  to the network Betweenness scores of directors C and D. The geodesic path is weighted to take into account the number of non-direct links between the two directors. Finally, the Betweenness measure is standardized dividing the weighted sum of geodesic paths of each director by the maximum number of geodesic paths that a director might have given the size of the pool of directors. A high score of network Betweenness reflects the ability to behave as a “broker” of connections in the network of directors, as an intermediary in the network.

The network Closeness measure is a sophistication of the Degree measure that weights of the sum of direct links with other directors by the centrality of these directors. If director A and B have the same degree measure but director A is connected to highly connected directors, director's A Closeness will be higher. In the sociology literature this measure is also known as eigenvector centrality (Bonacich, 1972, 1987), since it is obtained from the eigenvector associated to the highest eigenvalue of a matrix of links between directors. In this matrix there is a column and a row for each director. The diagonal of this matrix contains zeros. The  $ij$  elements of this matrix contain 1 if director  $j$  and director  $i$  have at least a direct link, it contains 0 otherwise. This measure is also standardized so that the length of the eigenvector that measures the Closeness of each director is equal to its associated eigenvalue.

These are our three network centrality measures that we explore their relevance explaining executive directors' pay. Furthermore, as the network measures are calculated for every director, we distinguish the impact of

different types of directors networking, such as executive directors, independent directors or nominees on their remuneration.

Some other measures related to directors' networks have been used in the finance literature, although they are substantially different from these sociological measures of centrality. Fich and Shivdasani (2006) introduce the concept of busy directors; for those seated on three or more boards. They are supposed to be too busy to perform their supervision function properly. Hallock (1997) analyzes the effect of interlocked boards, where two boards, A and B, are interlocked if the CEO of board A is an outside director of board B, and CEO of board B is also an outside director of board. The findings suggest that CEOs promote higher CEOs pay when they act as outside directors in interlocked boards.

None of the mentioned network measures take into account the entire set of links to assert the position of each director in the full network, as the sociology measures do. However, we take them into account as control variables computing the number of interlocked executives; executive directors that sit in another board as an outside director where also sits as executive director an outside director of the firm of the first.

An alternative analysis is to calculate the three centrality network measures for every firm. This is done by taking into account how many directors every firm share with the remaining. The computation of network Degree, Betweenness, and Closeness of each firm allow us to test whether firms' network centrality, more than directors' networking, is what matters to explain executive directors' pay.

### 3. Descriptive statistics

The 363 firm year observations sample built on the Corporate Governance Annual Reports is completed with financial data referring to performance measures, accounting and market, as size variables from Thomson Financial Database. The financial information available for years before 2004 allow to lag some variables, except for 12 firms that went public during the three year sample period. In addition, there are several firms without executive board members which reduces our sample by 22 firm year observations

The average board member remuneration is slightly smaller than the reported by Fernandes (2008) for Portugal. The executive board members compensation is also very close to the Portuguese figures. Comparing with the last year available data for the Netherlands, 2001; as report Duffhues and Kabir (2008) total board compensation is similar to the 2004 values in our dataset. In the different cultural and economical context of India, Fagernäs (2006) reports that the average executive compensation in 2004 is around 120.000 €, which is much lower than the compensation value in our study. Summary statistics of average compensation of directors, performance and size measures of the Spanish firms in the sample are shown in

Table 2. Our measure of directors' compensation includes fixed pay, bonuses, and the execution of stock options. It includes the quantity received from the firm and from other firms in the group. Hallock (1997) also measure the stock option remuneration by the exercise value when exercised, instead of the value when directors get them. He found no relevant differences if stock options are valued when granted.

[Insert Table 2]

Board structure is, on average, less based on executive directors than the one of the Portugal board companies, as Fernandes (2008) reports. The Portuguese average listed company has almost 40% of executive directors while our sample is around 20%. Dong and Ozkan (2008) in a sample of UK listed companies reports a 50% of executives on the board, for the average and median values. Table 3 describes the composition of boards in the Spanish companies.

[Insert Table 3]

Board's size is on average of 10.9 members. This size grows with company size. Independent directors are more relevant in the Ibx 35 firms (Index of the most relevant listed firms in the Spanish stock market).

[Insert Table 4]

Table 4 shows a univariate analysis on several characteristics reflecting a potential entrenchment of board executives. In the sample there are almost 50% of firms where the chairman of the board of directors is not the CEO of the company. These firms pay substantially less to board executive members. As expected, firms with contracts protecting top executives pay more than companies that do not have golden parachutes. Contrary to intuition, firms with interlocked directors are not associated to higher remuneration to board executives. Finally, firms with busy non executive directors pay more to their executives, potentially connected with the busy boards issue analyzed by Fich and Shivdasani (2006). They show that boards with a majority of busy

directors, with three or more seats on other boards do not perform a proper supervision, showing higher executives pay<sup>3</sup>.

As reported by the literature, firm size measured in several ways is strongly linked with executives pay. Table 5 shows the mean and the median values of executive and non executive directors pay and also information on non directors executives pay according to four size groups.

[Insert Table 5]

Table 5 shows clearly the well known result that director's remuneration is higher in larger firms. Regarding the six big industries we have split the sample the Oil and Energy sector shows significantly higher remuneration values, for all categories, than the rest of sectors<sup>4</sup>. Table 6 present summary statistics of several control variables considered. These control variables present volatility in our sample of firms. The mean executive's tenure goes from less than one year for the five percent of firms with a lower mean tenure of executive directors to more than 21 years for the firms with a higher value in this tenure measure. The average ownership of the largest shareholder is 35.53%, and there are firms where this shareholder holds less than 5.05%. Finally it is worth mentioning a majority of the Spanish firms do not have interlocked executive directors and busy non executive directors.

[Insert Table 6]

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<sup>3</sup> In the Spanish case the number of seats occupied by board members in other listed firms is lower than the US case. The maximum number of seats on other boards occupied by board members is 30. For 75% of the firms in the sample this value is below seven.

<sup>4</sup> Results not shown, but available from the authors on request.

Table 7 presents the evolution over time of the director's networking measures and of executives pay during out time period sample.<sup>5</sup> As Barnea and Guedj (2007) for the US market, we find that director's networking is decreasing over time while executives pay is increasing.

[Insert Table 7]

## 4. Results

### 4.1 Director's network centrality

First we estimate a OLS pooled regression model with industry and year fix effects, as in Barnea and Guedj (2007), to investigate the relevance of director's network centrality on executive's pay. The dependent variable is the log of average individual mean remuneration of executives in every company. This remuneration includes fixed pay, bonuses, cash from exerted stock options, and any additional remuneration from the group firms.

Table 8 shows in column 1 the estimation with the key explanatory variable which is the network directors' centrality (the average across all directors in the firm), and the control variables are the proxies for the economic determinants of executives' pay. The statistically significant network measures suggest that higher director's networking brings higher executives pay. The networks closeness and the network betweenness adjust best the explanatory power than the networks degree measure, as the Adjusted R-square reflects.

[Insert Table 8]

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<sup>5</sup> If these network measures are obtained just for executive directors, just for independent directors or just for nominee's directors, we also find a decreasing evolution. Not shown to save space.

These director's network centrality explanatory power may be due to uncontrolled agency problems, and we control for some of the corporate governance related practices. They are introduced as control variables into the Table 9. Firm size remains as relevant although, some uncontrolled agency problems seem to arise. Golden parachutes protecting top executives in case of firing are associated with larger executives pay. Furthermore, the more independent directors not proposed by the nomination committee of the board of directors (gray independent directors in the Core et al. (1999) terminology) come with higher executives pay. Both findings are consistent with the Bebchuck and Fried (2003) managerial power approach. According the new model specification, only the director's closeness measure remains statistically significant. Barnea and Guedj (2007) find that the network Closeness measure is the most relevant centrality measures regarding CEOs pay.

[Insert Table 9]

#### 4.2 Executive director's networking.

The results from Table 9 suggest a secondary but positive role of director's centrality scores as determinant of executives pay. However, network scores of executive directors may have different implications than those of non executive director's, which have a supervisory role in the board. Therefore we distinguish among network measures of executive directors, of independent directors and of nominees. The results in Table 10 show a higher explanatory power of executive directors' network, even controlling for corporate governance characteristics. The model fitness is larger for network measures of executive directors compared to alternative categories of directors as shown in Table 8, Table 9, and Table 10.

[Insert Table 10]

Repeating the analysis for the network measures of independent directors we find no statistically significant relationship with executive's pay, neither for the model with economic determinants only. Similar analysis for nominee directors show weak significance of their networking impact on executive director's compensations controlling just for economic determinants. There is almost no significance in the model that controls for agency problems. Therefore, the remaining of the paper focuses on network centrality measures of executive directors.

#### 4.3 Individual remuneration of non director top executives.

The information available for the Spanish listed companies allows us to compute the average remuneration of non directors top executives. This information helps us to improve the estimation of the economic determinants, capturing the executive's labor market conditions. The first estimation in Table 11 shows a small improvement in the fitness and the average pay for non directors executives is statistically significant explaining executive directors pay, even controlling for the size of the firm. It remains statistically significant even if all the corporate governance proxies for uncontrolled agency problems are included into the model 2. Regarding network centrality scores, no more than the executive network scores are relevant once this new proxy for economic determinants of pay is considered. Closeness and Betweenness are confirmed as the relevant executive centrality measures regarding board executives pay as models 6 and 8 of Table 11 show up. Gray independent directors and golden parachutes also remain as the statistically significant proxies for uncontrolled agency problems. And we obtain some evidence of the tenure of board executives as a positive determinant of pay.

[Insert Table 11]

A correction of the model introducing the estimate of the non board executives remuneration due to some missing values brings similar results on an alter native specification.

#### 4.4 Misalignment of interests between executives and shareholders?

The findings of the previous estimations show as performance is not a statistically significant economic determinant of board executive's pay. Jensen and Murphy (1990) found sensitivity of pay to performance interpreted as alignment between executives and shareholders interest. Theoretical agency model approaches such as Hart (1983) or Holmstrom, (1979) suggest that this sensitivity mitigates the agency conflict between managers and shareholders. The perspective of the problem is different for the Spanish stock market with high levels of ownership concentration. An interesting fact is that the average director executive pay plus benefits from their firm's stock ownership is 32.8 times the average remuneration as executive directors from the firm. This figure is only 2.35 times if median values are considered. This reflects the presence of several highly concentrated firms where relevant shareholders manage the firm as executive directors.

The executive directors pay measure of previous estimations does not include any benefit that executives get as company owners. Hall and Liebman (1998) add this benefit to estimate the relation between CEO's welfare and firm performance. Although this is not the purpose of the paper Table 12 shows that as we include the ownership benefit to the remuneration, there is sensitivity to performance and consequently there is not a misalignment between executive directors and shareholders interest.

Table 12 first model shows that total reward of board executives is positively related to past accounting performance ( $ROA(t-1)$ ). If contemporaneous

performance measures are added to the model the stock return is the relevant performance measure. This characteristic does not change whether we add or not non board top executive compensation or directors network centrality measures. Models 5 and 6 of Table 12 show the non relevance of the Closeness scores of executive directors. Any other network measures regarding all directors or any other group of directors is also non significant<sup>6</sup>. The relevant difference related to the models without accounting for executives' ownership benefits is that the ownership variables (the ownership of directors and the ownership of the highest shareholder) become now significant and the relevance of a negative coefficient of the variance of ROA. These variables are proxies of the ownership structure of the firm. This structure must be relevant given the relevance of the benefits from share ownership of the executive directors in our sample.<sup>7</sup> The negative coefficient of the variance of ROA is consistent with board executives maintaining lower ownership of shares in riskier firms. However, a further analysis that is not the object of the paper is required to be conclusive.

#### 4.5. The effect of stock options exercise.

Since stock options are usually granted for several years, their payment could distort the effect that any annual variable, such as stock return, may have on executive directors' pay. Therefore, we measure executive directors' compensation without this cash from stock option execution. Assuming that the aggregate value of boardstock options are granted to executive directors,

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<sup>6</sup> Results are omitted in order to save space and are available on request.

<sup>7</sup> The positive relation of non executive directors' ownership and the total benefit that executive directors get from firm is not inconsistent with the supervising role of non executive directors. This supervising role just may affect the compensation paid by the firm, not the benefits from ownership of executive directors.

and equally to any of them. Table 13 presents the new model specification where the results do not change related to previous findings.<sup>8</sup>

[Insert Table 13]

The evidence suggests that including cash pay when exercise stock options do not change the results found in previous models.

#### 4.6. Which is the relevant network centrality measure?

Our network centrality measures are designed to evaluate different aspects of being central in the network of directors. However, including all of them into the same model simply Betweenness is statistically significant at 10% level, and just when non director's executive pay is included in the model. This is consistent with some multicollinearity between them, although these measures are quite different in absolute value. Regarding executive network measures, the lower correlation is between Closeness and Betweenness. Network degree, which presents a correlation coefficient of 0.69 with Closeness and of 0.79 with Betweenness is never significant. Barnea and Guedj (2007) find a predominant role of Closeness as the relevant centrality measure. We also use the encompassing principle (see Mizon and Richards, 1986) to detect statistically which is the most informative measure regarding executive directors pay. However, the J test of Davidson and Mackinnon (1981)<sup>10</sup>, does not provide conclusive results. Betweenness encompasses Degree at 10% level of significance if all control variables are considered. There is no network measure with superior information if top executives non directors pay is not

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<sup>8</sup> Our data just contains the total cash amount of exercised stock options. Results do not change if we assume that stock options are equally distributed among all directors. Not shown to save space.

<sup>10</sup> See Greene (2002) page 155.

considered in the complete model. However, Degree encompasses Closeness if no control variables are considered or just economic determinants proxies are included, also at 10% level of significance. Therefore, contrary to Barnea and Guedj (2007) in the US market that find Closeness to encompass all other measures, we just obtain weak support for the relevance of the Betweenness measure that is not encompassed by other measures in any case<sup>11</sup>.

4.7. Are network centrality measures proxies for economic determinants or for uncontrolled agency problems?

As Core et al (1999) we calculate the portion of executive directors' compensation predicted by a set of explanatory variables. If proxies for non economic determinants are due to uncontrolled agency problems, the portion of remuneration predicted by these variables may be interpreted as an excess of remuneration over their equilibrium (economic) wage rate. This excess is scaled by the total compensation since we use it as explanatory variable for future relative performance measures.<sup>12</sup> Core et al (1999) use future performance of one, three and five years. Our data on executive directors' compensations is so recent that just one year posterior performance is analyzed. Before 2004 there is no public data available on executive director compensation in the Spanish market. We analyze this relation as Core et al (1999). No relation or positive relation between predicted excess compensation and future performance is expected if this excess of compensation is associated to the economic determinants, to the firm's demand for high quality executive directors. We consider two performance measures: ROA and stock return. The

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<sup>11</sup> No table is presented with the results of these tests in order to save space. There is availability from the authors on request.

<sup>12</sup> As Core et al (1999), we also scaled by the predicted total compensation and got the same results.

regression models estimated to test the relation between predicted excess compensation and future performance are;

$$ROA_i = \delta_0 + \delta_1 \cdot \text{Predicted\_excess\_compensation}_i + \delta_2 \cdot \text{Var}(ROA)_i + \\ + \delta_3 \cdot \ln(\text{Sales})_i + \theta \cdot \text{YearControls}_i + \lambda \cdot \text{IndustryControls}_i + \varepsilon_i$$

where ROA is the performance measure for the subsequent year, variance of ROA is computed with the three years prior to when the compensation is awarded, Sales are for the year prior to the year in which compensation is awarded.

$$\text{Stock Return}_i = \alpha_0 + \alpha_1 \cdot \text{Predicted\_excess\_compensation}_i + \alpha_2 \cdot \text{Var}(\text{Stock Return})_i + \\ + \alpha_3 \cdot \ln(\text{MarketValueEquity})_i + \alpha_4 \cdot \text{Market-to-book}_i + \theta \cdot \text{YearControls}_i + \lambda \cdot \text{IndustryControls}_i + \varepsilon_i$$

where stock return is for the subsequent year after the compensation is awarded. Predicted excess compensation is for the year of the compensation award. Variance of return is computed for the three years prior to this award. The market value of equity and the market to book ratio correspond to the end of the year prior to when compensation is awarded.

Table 14 panel A presents the estimated models to analyze the effect of predicted excess compensation of executive directors due to their network centrality on one year ahead stock return. Table 14 panel B does it for one year ahead ROA. Since top executive non director's pay adds fitness to the executive directors' compensation models at the expense of fewer observations in our database, we present the estimations for the models of one year ahead stock return and ROA using this variable and without it in order to calculate the predicted excess compensation related to the network measures. Columns

1 to 3 of both panels take this variable into account, and columns 4 to 6 do not. Predicted excess compensation is calculated with the models of Table 11, columns 6 to 8, and with models of Table 10, columns 5 to 7. This corresponds to models with and without top executives non directors pay as explanatory variable of executive directors pay respectively.

[Insert Table 14]

Our results suggest that the excess of return associated with Closeness have a positive and significant effect on future performance if ROA is considered, see Table 14 Panel B columns 1 and 4. However the Degree and Betweenness measures have a negative and significant effect of future performance if stock return is considered, see Table 14 Panel A, columns 2, 3, 5, and 6. However, results are weaker for Degree since is the only measures without statistical significance in the model to explain executive directors pay. The inclusion of top executive non directors pay in the regressions to analyze executive directors' pay does not have any effect on these results. There is just a reduction in the number of observations in panel A.

Since our analysis to determine if any network measure encompasses the others does not provide conclusive results, we also repeated the previous analysis including the three measures into the executive director's compensation model. Predicted excess compensation calculated using the three measures at the same time just produce a positive effect on posterior ROA. If predicted excess compensation is calculated with each of the network measures at a time, results does not change except for Degree that present a positive effect on posterior stock return. Therefore, even controlling for the information provided by the other network measures, Betweenness is related to poorer future performance if stock return is considered, and Closeness with positive future performance if ROA is considered. The estimation of these

models is not presented in order to save space; it is available from the authors on request.

Regarding the proxies of corporate governance uncontrolled agency problems, we also construct predicted excess compensation and relate it to future performance measures. We just find weak evidence of predicted excess compensation related to ownership variables rendering lower future performance. In sum regarding the networking activity of directors, we obtain some evidence suggesting that directors connected to central directors provide fruitful contacts to the firm. However, directors who are central because of the intermediary role (Betweenness) do not provide added value to shareholders. Our evidence is consistent with these last directors acting as members of a club of elites that just take care of themselves. Kirchmaier and Stathopoulos (2008) found a negative relation between the CEO Network activity (measured as the total number of other directors with who is or had served in a board, similar to Degree but accumulated) and firm performance in a sample of UK firms.

#### 4.8 The economic significance of the empirical results

The estimated models measure executive directors' pay in logs. Therefore, the effect of any variable on log of executive directors pay must be conditioned on the level of compensation. In this section we calculate the mean level of this compensation and condition all the economic valuation on this mean level. We do the analysis taking into account the full sample of firms and just the firms included in the Ibex-35. The mean value of executive directors pay taking into account all observations is € 824 thousands, and € 1605 thousands including only firms in the Ibex-35. Furthermore, estimations are done with a model that takes into account top executive non directors pay and a model that does not take it into account. Table 15 presents these economic valuations.

[Insert Table 15]

In Table 15 we show that if coefficients from table 10 are taken into account (top executive non directors pay not included in the model), *Ceteris paribus*, one firm that pays € 824 thousands to executive directors would pay € 1966 more if this firm Closeness score increases one position, € 1498 in Betweenness. An increase in score from the 25 percentile to the 75 percentile in Closeness would imply an increase in € 52185, € 40920 if it were in Betweenness. These increments are bigger in the Ibox-35 companies subsample. A firm included in the index who pays € 1605 thousands to each of their executive directors, would pay € 301 thousands more with an increase from the 25 to the 75 percentile in Closeness, € 148 thousands in case of Betweenness. Additionally, Table 15 shows that a firm who pays € 824 thousands to each executive director would pay € 509 thousands more if the firms had golden parachutes to protect their top executives<sup>14</sup>.

#### 4.9. Robustness checks

Since we are using pooled regression OLS models with industry and year fixed effects, a first robustness check is to analyze whether in a year by year analysis we got inconsistent results. Table 16 shows that in a year by year analysis network measures have a positive coefficient whenever are statistically significant. As when pooled OLS regression is estimated (Table 10, columns 5 to 7) Closeness and Betweenness have a positive statistically significant coefficient, although it is not significant in all years, especially for

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<sup>14</sup> No consideration is made about the nature of the valuations in this section. For example, golden parachutes may proxy the demand for high quality directors. Indeed, in the previous section we just found empirical evidence supporting a negative relation of Betweenness with future firm performance, suggesting a non solved agency problem.

Betweenness. Regarding the rest of the variables in the model there are no inconsistencies in statistically significant variables. The introduction of top executive non directors pay as an explanatory variable does not alter the results (omitted to save space). Therefore, we conclude that the pooled OLS regression model does not introduce a relevant bias into the analysis.

[Insert Table 16]

We check whether our results are sensible to the accounting performance measure, to the company size measure, to the inclusion of contemporaneous performance measure, and to the inclusion of the ownership of individuals. Taking into account just shareholders who own 5% or more of the capital, this is a proxy of family ownership. Family ownership takes into account the different intensity of supervision over management that these shareholders may exercise. In order to save space we just present the models for Betweenness in Table 17. The Degree measure remains statistically non significant in all models. Closeness loses its statistical significance when top executive non directors' remuneration is considered. Control variables do not present differences respect to the models presented in Table 17. Betweenness is the more robust measure of network centrality regarding executive directors pay. It is statistically significant in all robustness checks. Columns 1 and 2 of Table 17 present the analysis when contemporaneous performance variables are introduced into the model. Contemporaneous stock return is statistically significant showing a positive relation with executive director's pay, consistent with optimal contract theory (e.g. Hart, 1983, Holmstrom, 1979). Regarding the rest of the control variables, the percentage of gray independent directors and the presence of golden parachutes remain as the relevant control variables.

[Insert Table 17]

Columns 3 and 4 of Table 17 present the estimations when return on equity instead of return on assets is used as the accounting performance measure. With this measure there are no changes regarding the relevant control variables except that market to book appears to have a positive significant relation with executives pay. This is consistent with the higher demand for talent in firms with growth opportunities. The variance of ROE is negatively related to executive directors' pay just when top executive non directors pay is considered. As discussed in Core et al (1999) risk variables have an undetermined effect on executives pay. In the one hand higher risk should be remunerated with higher salary, however, executives may prefer lower and securer remuneration in risky firms. We do not investigate further this issue since it is not the object of the paper.

In columns 5 and 6 of Table 17 we present the results when market capitalization is used instead of sales as a measure of size of the firm. These estimations do not present relevant differences regarding the control variables.

Ownership of individuals is not statistically significant and does not have any effect on the results. Therefore, to economize space we omit the estimations with this additional variable in Table 17.

Finally, as Barnea and Guedj (2007) we also compute the network centrality measures of firms. That is, instead of analyzing the connections of each director we analyze the connections of each firm. In this case, the connection of two firms takes into account the number of directors shared by these firms. Our results differ from those of Barnea and Guedj (2007), none of these measures is statistically significant to explain executive directors' compensation. It is consistent with our results regarding the predominant role of executive directors' network centrality measures. Therefore, we conclude

that network measures of executive directors' instead of these measures of firms are the relevant ones. Results are omitted to save space.

This section analyses the robustness of the executive directors' network centrality measures regarding these directors pay. Betweenness is the most robust measure. In any case, network centrality measures present a positive relation with executive director's pay. Regarding the control variables, size, the presence of independent directors not nominated by the nomination committee, and the existence of golden parachutes protecting executives in case of firing are the control key variables to explain executive directors pay in our sample.

## 5. Conclusions

In this paper we analyze the role of director's network centrality regarding executive directors' compensation. In order to measure this networking relevance we use three well known measures of network centrality in the Sociology literature. Following Barnea and Guedj (2007) we account for the positions of any director in the network of directors measuring directorships in any firm. Our results suggest a positive effect of network centrality of executive directors on their compensation. However, in contrast to Barnea and Gued (2007) who find Closeness as the relevant network centrality variable, we also find Betweenness as a relevant network centrality measure to explain executive directors pay, which appears as the most robust variable. Finally in order to get some evidence over the role of these variables on executive directors pay, and following the empirical methodology of Core et al (1999) we also relate the excess of compensation generated by each of the analyzed network centrality measures with several future firm performance measures. We find evidence suggesting a negative relation of the excess of compensation

generated by the Betweenness centrality measure and firm's future performance. This suggests that this measure of executive directors' network centrality is a proxy of an uncontrolled agency problem. Kirchmaier and Stathopoulos (2008) also found a negative relation between executives' network activity and firm performance in a sample of UK firms. However they just analyze CEOs network activity and use a different measure of this activity. Regarding the control variables, size, the presence of independent directors not nominated by the nomination committee, and the existence of golden parachutes protecting executives in case of firing are the most relevant variables to explain executive directors pay. All statistically significant effects on executive directors pay are also economically significant.

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Table 1

Distribution of the sample of firms grouped by market capitalizations and sectors of activity. Companies in the Ibex35 stock market index are of December each year. "Large" firms are those non Ibex35 with market capitalization above 1000 Million Euro. Medium capitalization is for firms smaller than 1000 Million Euro but larger than 250 Million Euro. Small refers to firms with capitalizations below 250 Million Euro.

	Oil and energy	Base materials, industry and construction	Consumer goods	Consumer services	Financial services and real state	New technologies and communication	<b>Total</b>
<b>Year 2004</b>							
Ibex 35	6	6	3	6	9	3	<b>33</b>
Large	3	5	2	4	8	0	<b>22</b>
Medium	0	8	10	2	7	1	<b>28</b>
Small	0	11	16	2	3	3	<b>35</b>
<b>Total</b>	<b>9</b>	<b>30</b>	<b>31</b>	<b>14</b>	<b>27</b>	<b>7</b>	<b>118</b>
<b>Year 2005</b>							
Ibex 35	7	6	3	7	8	3	<b>34</b>
Large	2	5	3	4	10	0	<b>24</b>
Medium	0	10	11	2	6	1	<b>30</b>
Small	0	9	14	2	3	3	<b>31</b>
<b>Total</b>	<b>9</b>	<b>30</b>	<b>31</b>	<b>15</b>	<b>27</b>	<b>7</b>	<b>119</b>
<b>Year 2006</b>							
Ibex 35	7	7	3	7	9	2	<b>35</b>
Large	2	7	7	5	13	1	<b>35</b>
Medium	0	10	11	2	8	2	<b>33</b>
Small	0	7	10	2	3	1	<b>23</b>
<b>Total</b>	<b>9</b>	<b>31</b>	<b>31</b>	<b>16</b>	<b>33</b>	<b>6</b>	<b>126</b>

Table 2

Descriptive statistics of the pool of companies included in our sample during 2004, 2005 and 2006 on compensation, performance and size measures. Compensation measures are in thousand Euro. Size measures are in millions, except employees.

	Obs (year/co)	Mean	Median	Std. Dev
<b>Individual average pay</b>				
Directors	363	219,6	144,9	251,9
Executive Directors	341	824,3	501,0	1.011,0
Non Executive Directors	363	81,2	56,3	81,1
Top Executives non Directors	307	318,1	222,8	340,4
<b>Performance measures</b>				
Return on Assets	363	5,80	5,23	7,06
Return on Equity	360	15,11	14,92	23,38
Market to Book ratio	363	3,69	2,49	4,74
Stock return	348	41,69	28,83	62,05
<b>Size measures</b>				
Assets	363	16.000	1.080	75.500
Sales	363	3.090	571	7.830
Market value	363	4.730	1.010	11.400
Employees	356	11.306	2.034	27.578

There are 8 observations on Stock returns higher than 200%. All of them pertain to firms in the first percentile of market value. If we drop these observations the mean stock return drops to 34.18% and its standard deviation to 32.88. We perform the analysis with and without these extreme observations and results do not change. During our sample time period (2004-2006) the mean annual return on the General Index of the Madrid Stock Exchange was 29.8%, which is close to the median stock return in our sample. This index is capital weighted, takes dividends into account (as our returns), and contains stocks traded in the non electronic trading platform. Therefore, our statistics on stock returns are consistent with the evolution of the market during the sample time period.

Table 3

Board of director's composition. Average values for 2004, 2005 and 2006 for 363 year-companies listed in the Spanish Electronic Market (Mercado Continuo). Nominees are directors proposed by block holders, and represent their interest in the firm.

	Board Size	% of Directors			
		Executive	Nominees	Independent	Other
Ibex 35	14,69	19,17	37,44	40,00	3,38
Large	11,60	19,15	49,89	26,89	4,07
Medium	8,77	21,49	46,94	28,52	2,93
Small	8,15	23,19	38,60	35,01	3,20
Total	10,91	20,73	42,88	32,98	3,38

Table 4

Remuneration of executive board directors depending on several board characteristics. Numbers of firms in the sample with these characteristics is also reported. Data for the pooled sample of firms listed in the Spanish Electronic Market (Mercado Continuo) during 2004, 2005 and 2006. Values reported in thousand Euro for 7 different sample division criteria. Chairman CEO refers when both position refer to the same person. Voting cap refers to a limit in the maximum number of votes of a shareholder that is independent of its ownership. Interlocked boards are boards where an executive is in its remuneration committee or in the board of another firm where a non-executive director of the first firm is an executive board member (Hallock, 1997). Operations board-firm identifies firms where any director has commercial relations with the firm. Golden parachute contracts represent an economic protection for top executives in case of firing. Busy non-executives identify firms where a non executive director is also a director in three or more other firms (Fich and Shivdasani, 2006). Gray independents are those that are not proposed by the nomination committee.

	Yes	# Firms	No	# Firms
Chairman CEO	982,77	197	607,53	144
Voting cap	1082,07	50	780,0201	291
Interlocked boards	606,8202	86	897,6582	255
Operations directors-firm	1012,818	107	738,1105	234
Golden parachutes	1083,31	186	513,51	155
Busy non-executives	1060,633	157	622,6633	184
Gray independents	828,8417	199	817,9569	142

Table 5

Individual average executives pay (board and non board members). Pay includes fixed pay, bonuses, and the execution of stock options. It is the quantity received from the firm and from other firm in the group. Data for the pooled sample of firms listed in the Spanish Electronic Market (Mercado Continuo) during 2004, 2005 and 2006. Values reported in thousand Euro grouped by firm size. Mean and median (below) values reported.

	Directors	Executive Directors	Non Executive Directors	Top Executives non Directors
Ibex 35	423,07	1.605,90	143,57	556,08
	334,93	1.193,17	117,65	411,57
Large	234,28	902,01	90,45	289,09
	193,79	722,00	66,80	226,63
Medium	120,08	343,28	52,20	186,65
	99,42	297,67	39,71	143,00
Small	74,99	227,75	30,79	116,79
	58,38	166,50	30,00	103,71
Total	219,65	824,31	81,16	318,07
	144,89	501,00	56,27	222,75

Table 6

This table presents summary statistics over the 2004, 2005 and 2006 for the board and ownership continuous variables of control. Percentage of executive directors that are interlocked (are in the remuneration committee, or are in the board of other firm as non executive directors where one executive director is also a non executive director of the first firm). Percentage of capital owned by executive directors and by non executive directors. Highest shareholder's percentage of capital (C1). Percentage of executives in the board of directors. Percentage directors who are classified as independent and have not been nominated by the corresponding committee over board size. Finally the percentage of non executive directors that are classified as busy (those with three or more sits in other boards of directors, Fich and Shivdasani, 2006).

	# Firms	Mean	Median	Percentile 5	Percentile 95	Standard deviation
% Interlocked executive directors	363	12,71	0,00	0,00	100,00	26,62
Mean executive's tenure	341	8,42	6,94	0,67	21,50	6,80
Executive's ownership	363	12,10	0,08	0,00	64,94	24,23
Non-executives ownership	363	10,85	2,42	0,00	50,55	17,38
C1	363	35,53	25,87	5,02	92,09	27,03
Board size	363	10,91	10,00	5,00	19,00	3,98
% Executives in the board	363	20,73	20,00	0,00	44,44	12,68
% Gray Independents	363	18,41	12,50	0,00	57,14	20,19
% Busy non-executives	363	10,00	0,00	0,00	38,46	13,79

Table 7

This table contains the mean measures of Closeness, Degree, Betweenness, and of executive director's individual pay across our sample of firms for each year in our time period sample.

<u>Year</u>	<u>Closeness</u>	<u>Degree</u>	<u>Betweenness</u>	<u>Executive director's pay</u>
2004	0,08143	0,01465	0,00012	675,9
2005	0,07931	0,01406	0,00010	775,3
2006	0,06007	0,01263	0,00008	1010,4

Table 8 The proxies of economic determinants and network centrality measures

This table contains estimations of the pooled model (2004/2006) where the log of individual executive board member remuneration is the dependent variable. Closeness, Degree, and Betweenness that are the mean of the network centrality measures of all directors in a firm. Proxies for economic determinants are one period lagged log of Sales, one period lagged stock return, and of Return on Assets (ROA), the average of the market to book ratio in the previous three years, and the variance of ROA and of stock return using the annual data of the three previous years. Finally, industry and year dummy variables are introduced to take into account fixed industry and year effects. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)
Closeness		0.760** (2.069)		
Degree			19.39* (1.957)	
Betweenness				1054* (1.904)
LogSales (t-1)	0.354*** (10.98)	0.333*** (9.090)	0.316*** (7.312)	0.329*** (8.906)
Market to Book 3YAv (t-1)	0.00975 (1.216)	0.00862 (1.092)	0.0106 (1.381)	0.0113 (1.442)
ROA (t-1)	0.00609 (0.568)	0.00520 (0.507)	0.00443 (0.433)	0.00406 (0.398)
Stock return (t-1)	0.159 (0.824)	0.148 (0.775)	0.169 (0.893)	0.157 (0.816)
Var(ROA)	-0.000153 (-0.563)	-0.000118 (-0.446)	-6.98e-05 (-0.263)	-9.42e-05 (-0.366)
Var(Stock return)	-0.0751 (-0.370)	-0.0935 (-0.472)	-0.0969 (-0.493)	-0.0761 (-0.379)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	272	272	272	272
R2	0.480	0.486	0.485	0.486
Adjusted R2	0.454	0.458	0.457	0.458

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 9 The complete model and network centrality measures

This table contains estimations of the pooled model (2004/2006) where the log of individual executive board member remuneration is the dependent variable. Closeness, Degree, and Betweenness are the mean of the network centrality measures of all directors in a firm. Proxies for economic determinants are one period lagged log of Sales, one period lagged stock return, and of Return on Assets (ROA), the average of the market to book ratio in the previous three years, and the variance of ROA and of stock return using the annual data of the three previous years. Corporate governance variables are the percentage of shares owned by executives, by non executives, and by the highest shareholder of the firm, a dummy variable identifying where the CEO is also the chairman of the board of directors, the size of this board, the percentage of executives in this board, the mean tenure of executive directors in the firm, the percentage of independent directors that is not proposed by the nomination committee (gray independent directors), a dummy variable identifying whether directors have done commercial transactions with the firm, the percentage of busy non executive directors (a director is busy if has a position in three or more boards of directors), the percentage of interlocked executive directors (those who are also non executive director in a firm where a non executive director of the first firm is an executive director, and those who serve in the committee that makes her compensation decisions), a dummy variable identifying where there are golden parachutes protecting top executives against firing, and a dummy variable identifying firms where there are voting caps (a maximum number of votes that a shareholder may exercise independently of the number of shares he has). Finally, industry and year dummy variables are introduced to take into account fixed industry and year effects. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)
Closeness		0.851*		
		(1.675)		
Degree			3.119	
			(0.166)	
Betweenness				366.5
				(0.568)
LogSales (t-1)	0.333***	0.327***	0.331***	0.327***
	(7.904)	(7.833)	(7.775)	(7.629)
Market to Book 3YAv (t-1)	0.00965	0.00931	0.00987	0.0107
	(0.941)	(0.897)	(0.974)	(1.031)
ROA (t-1)	0.00729	0.00765	0.00718	0.00710
	(0.772)	(0.832)	(0.768)	(0.758)
Stock return (t-1)	0.132	0.114	0.132	0.129
	(0.713)	(0.617)	(0.714)	(0.693)
Var(ROA)	-0.000304	-0.000306	-0.000298	-0.000292
	(-1.224)	(-1.282)	(-1.228)	(-1.202)
Var(Stock return)	-0.0728	-0.0788	-0.0731	-0.0694
	(-0.384)	(-0.419)	(-0.387)	(-0.364)
Executive' ownership	-0.00123	-0.000660	-0.00113	-0.000953
	(-0.288)	(-0.154)	(-0.265)	(-0.222)
Non-executives ownership	0.00513	0.00575	0.00507	0.00495
	(1.500)	(1.644)	(1.470)	(1.420)
C1	-0.00281	-0.00329	-0.00286	-0.00281
	(-1.048)	(-1.182)	(-1.052)	(-1.044)
CEO is board chair	0.106	0.119	0.106	0.107
	(0.901)	(1.011)	(0.897)	(0.898)

Table 9 The complete model and network centrality measures

Continuation

	(1)	(2)	(3)	(4)
Board size	-0.00190 (-0.0758)	-0.0157 (-0.551)	-0.00457 (-0.129)	-0.00277 (-0.109)
% Executives in the board	-0.00418 (-0.667)	-0.00496 (-0.779)	-0.00408 (-0.661)	-0.00389 (-0.632)
Mean tenure of board executives	0.00771 (0.858)	0.00531 (0.584)	0.00744 (0.821)	0.00691 (0.762)
% Gray independent directors	0.00781*** (3.268)	0.00740*** (3.089)	0.00781*** (3.263)	0.00772*** (3.200)
Operations directors-firm	0.128 (1.025)	0.152 (1.190)	0.128 (1.023)	0.128 (1.020)
% Busy non-executive directors	0.309 (0.772)	0.0806 (0.192)	0.280 (0.712)	0.214 (0.516)
% Interlocked executive directors	-0.0261 (-0.145)	-0.0224 (-0.122)	-0.0240 (-0.134)	-0.0150 (-0.0832)
Golden parachutes	0.500*** (3.934)	0.494*** (3.859)	0.497*** (3.836)	0.492*** (3.811)
Voting Cap	-0.0527 (-0.491)	-0.00584 (-0.0510)	-0.0489 (-0.433)	-0.0410 (-0.363)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	272	272	272	272
R2	0.547	0.552	0.547	0.548
Adjusted R2	0.499	0.503	0.497	0.498

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 10

## The models with executive directors' network measures

This table contains estimations of the pooled model (2004/2006) where the log of individual executive board member remuneration is the dependent variable. Closeness, Degree, and Betweenness are the mean of the network centrality measures of executive directors. For the remaining variables see Table 9. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Executives' closeness	1.016*** (2.794)				0.988** (2.215)		
Executives' degree		24.07*** (2.843)				16.40 (1.572)	
Executives' betweenness			1061*** (2.739)				685.3* (1.934)
LogSales (t-1)	0.328*** (9.673)	0.310*** (8.861)	0.344*** (11.19)	0.333*** (7.904)	0.331*** (7.943)	0.327*** (7.950)	0.333*** (7.981)
Market to Book 3YAv (t-1)	0.00878 (1.160)	0.0116 (1.547)	0.0123 (1.505)	0.00965 (0.941)	0.00942 (0.933)	0.0106 (1.049)	0.0113 (1.095)
ROA (t-1)	0.00394 (0.403)	0.00329 (0.334)	0.00243 (0.240)	0.00729 (0.772)	0.00661 (0.750)	0.00600 (0.652)	0.00556 (0.599)
Stock return (t-1)	0.147 (0.795)	0.185 (1.009)	0.158 (0.845)	0.132 (0.713)	0.115 (0.644)	0.143 (0.793)	0.129 (0.709)
Var(ROA)	-8.42e-05 (-0.325)	-2.92e-05 (-0.107)	-7.25e-05 (-0.280)	-0.000304 (-1.224)	-0.000281 (-1.212)	-0.000244 (-0.989)	-0.000247 (-1.020)
Var(Stock return)	-0.115 (-0.587)	-0.128 (-0.660)	-0.0736 (-0.374)	-0.0728 (-0.384)	-0.0917 (-0.493)	-0.0921 (-0.497)	-0.0661 (-0.354)
Executive' ownership				-0.00123 (-0.288)	-0.000333 (-0.0784)	-0.000457 (-0.108)	-0.000577 (-0.136)
Non-executives ownership				0.00513 (1.500)	0.00578 (1.646)	0.00507 (1.503)	0.00516 (1.514)
C1				-0.00281 (-1.048)	-0.00341 (-1.248)	-0.00293 (-1.096)	-0.00265 (-0.989)
CEO is board chair				0.106 (0.901)	0.115 (0.969)	0.0790 (0.666)	0.0839 (0.706)
Board size				-0.00190 (-0.0758)	-0.0190 (-0.672)	-0.0172 (-0.596)	-0.00312 (-0.124)
% Executives in the board				-0.00418 (-0.667)	-0.00558 (-0.888)	-0.00392 (-0.627)	-0.00419 (-0.668)
Mean tenure of board executives				0.00771 (0.858)	0.00531 (0.585)	0.00696 (0.771)	0.00803 (0.899)
% Gray independent directors				0.00781*** (3.268)	0.00711*** (3.032)	0.00756*** (3.200)	0.00745*** (3.186)
Operations directors-firm				0.128 (1.025)	0.131 (1.067)	0.112 (0.900)	0.119 (0.964)
% Busy non-executive directors				0.309 (0.772)	0.0736 (0.186)	0.220 (0.558)	0.225 (0.564)
% Interlocked executive directors				-0.0261 (-0.145)	-0.0460 (-0.251)	-0.0224 (-0.123)	-0.00944 (-0.0520)
Golden parachutes				0.500*** (3.934)	0.481*** (3.831)	0.481*** (3.906)	0.477*** (3.840)
Voting Cap				-0.0527 (-0.491)	0.00199 (0.0176)	-0.0283 (-0.263)	-0.0327 (-0.306)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	272	272	272	272	272	272	272
R2	0.493	0.497	0.495	0.547	0.556	0.553	0.553
Adjusted R2	0.465	0.469	0.468	0.499	0.507	0.503	0.504

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 11

## The models with individual remuneration of non directors top executives

This table contains estimations of the pooled model (2004/2006) where the log of individual executive board member remuneration is the dependent variable. Closeness, Degree, and Betweenness are the mean of the network centrality measures of all directors in a firm. The following three network centrality measures are computed just with executive directors. The rest of explanatory variables are described in Table 9, except top executive non board members pay that is introduced in logs. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Closeness			0.366 (0.829)					
Degree				-26.15 (-1.417)				
Betweenness					-199.7 (-0.305)			
Executives' closeness						0.710* (1.749)		
Executives' degree							14.13 (1.340)	
Executives' betweenness								736.2** (2.118)
Log Individual mean pay of non directors top executives	0.282** (2.098)	0.203* (1.669)	0.202* (1.656)	0.215* (1.768)	0.204* (1.673)	0.195 (1.642)	0.189 (1.590)	0.190 (1.624)
LogSales (t-1)	0.266*** (5.020)	0.264*** (4.753)	0.261*** (4.692)	0.276*** (4.867)	0.266*** (4.669)	0.265*** (4.830)	0.264*** (4.822)	0.271*** (4.895)
Market to Book 3YAv (t-1)	0.0126 (1.494)	0.0145 (1.195)	0.0141 (1.148)	0.0128 (1.081)	0.0140 (1.163)	0.0136 (1.132)	0.0150 (1.256)	0.0161 (1.330)
ROA (t-1)	-0.00368 (-0.314)	-4.69e-05 (-0.00420)	0.000565 (0.0506)	6.00e-05 (0.00536)	-7.22e-05 (-0.00645)	0.000335 (0.0312)	-0.000658 (-0.0597)	-0.00177 (-0.158)
Stock return (t-1)	0.112 (0.548)	0.0863 (0.441)	0.0718 (0.363)	0.0953 (0.482)	0.0897 (0.453)	0.0613 (0.321)	0.0941 (0.491)	0.0835 (0.435)
Var(ROA)	-2.90e-05 (-0.114)	-0.000181 (-0.760)	-0.000188 (-0.804)	-0.000226 (-0.937)	-0.000187 (-0.781)	-0.000177 (-0.784)	-0.000133 (-0.557)	-0.000120 (-0.514)
Var(Stock return)	-0.0688 (-0.329)	-0.0560 (-0.286)	-0.0532 (-0.272)	-0.0643 (-0.325)	-0.0601 (-0.304)	-0.0584 (-0.302)	-0.0691 (-0.358)	-0.0461 (-0.241)
Executive' ownership		0.000722 (0.135)	0.00109 (0.201)	-0.000247 (-0.0478)	0.000503 (0.0937)	0.00179 (0.336)	0.00175 (0.330)	0.00186 (0.353)
Non-executives ownership		0.00364 (1.069)	0.00410 (1.178)	0.00382 (1.133)	0.00369 (1.076)	0.00456 (1.276)	0.00371 (1.090)	0.00373 (1.098)

Table 11 The models with individual remuneration of non directors top executives

Continuation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C1		-0.00168 (-0.642)	-0.00201 (-0.731)	-0.000958 (-0.372)	-0.00164 (-0.628)	-0.00240 (-0.891)	-0.00198 (-0.757)	-0.00164 (-0.630)
CEO is board chair		0.115 (0.887)	0.118 (0.907)	0.128 (1.006)	0.117 (0.902)	0.116 (0.890)	0.0856 (0.646)	0.0866 (0.655)
Board size		0.0169 (0.799)	0.00976 (0.413)	0.0410 (1.337)	0.0177 (0.811)	0.00203 (0.0819)	0.00293 (0.114)	0.0152 (0.705)
% Executives in the board		0.00237 (0.333)	0.00207 (0.289)	0.00137 (0.195)	0.00220 (0.311)	0.00127 (0.179)	0.00274 (0.383)	0.00227 (0.320)
Mean tenure of board executives		0.0143* (1.671)	0.0132 (1.541)	0.0164* (1.913)	0.0147* (1.718)	0.0127 (1.470)	0.0141 (1.631)	0.0150* (1.750)
% Gray independent directors		0.00802*** (3.101)	0.00790*** (3.040)	0.00800*** (3.082)	0.00805*** (3.069)	0.00768*** (3.001)	0.00802*** (3.087)	0.00783*** (3.057)
Operations directors-firm		0.0331 (0.262)	0.0469 (0.365)	0.0268 (0.209)	0.0338 (0.266)	0.0409 (0.326)	0.0207 (0.163)	0.0254 (0.203)
% Busy non-executive directors		-0.147 (-0.379)	-0.229 (-0.557)	0.0669 (0.172)	-0.101 (-0.245)	-0.275 (-0.708)	-0.195 (-0.498)	-0.220 (-0.559)
% Interlocked executive directors		0.156 (0.801)	0.156 (0.794)	0.145 (0.765)	0.150 (0.774)	0.144 (0.735)	0.171 (0.875)	0.196 (1.005)
Golden parachutes		0.514*** (3.713)	0.508*** (3.646)	0.546*** (3.859)	0.521*** (3.648)	0.493*** (3.618)	0.492*** (3.680)	0.484*** (3.591)
Voting Cap		-0.0918 (-0.722)	-0.0622 (-0.459)	-0.129 (-0.964)	-0.0991 (-0.740)	-0.0356 (-0.264)	-0.0637 (-0.499)	-0.0688 (-0.544)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	227	227	227	227	227	227	227	227
R2	0.497	0.560	0.561	0.563	0.560	0.565	0.565	0.568
Adjusted R2	0.464	0.500	0.499	0.502	0.498	0.503	0.503	0.506

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 12 Performance sensitivity of executive directors' total benefit

This table contains estimations of the pooled model (2004/2006) where the dependent variable is in logs and measures the total benefit that an executive extracts from the firm in which board of directors serve. This total benefit is the sum of the total remuneration as executive director, plus the benefit as shareholders. Executives' closeness is the mean of the closeness score of all executive directors in a firm. Individual mean compensation of top executives who are not directors is introduced in logs. The rest of explanatory variables are described in Table 9. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)
Executives' closeness					0.776 (1.09)	0.773 (1.15)
Log Individual mean pay of non directors top executives			0.0168 (0.17)	0.0188 (0.17)		
LogSales (t-1)	0.485*** (7.29)	0.533*** (8.23)	0.394*** (4.98)	0.440*** (5.79)	0.528*** (8.24)	0.482*** (7.23)
Market to Book 3YAv (t-1)	0.0173 (1.43)	0.0219* (1.75)	0.0208 (1.27)	0.0274 (1.59)	0.0226* (1.79)	0.0171 (1.43)
Stock return		0.449*** (3.11)		0.351** (2.33)	0.452*** (3.06)	
ROA		0.00939 (0.32)		-0.00202 (-0.072)	0.00587 (0.20)	
ROA (t-1)	0.0560*** (3.06)	0.0470 (1.48)	0.0477** (2.19)	0.0450 (1.36)	0.0487 (1.53)	0.0558*** (3.06)
Stock return (t-1)	0.314 (1.31)	0.214 (0.90)	0.274 (1.10)	0.199 (0.81)	0.209 (0.90)	0.311 (1.32)
Var(ROA)	-0.00101*** (-2.67)	-0.000956** (-2.24)	-0.000852** (-2.08)	-0.000809* (-1.87)	-0.000943** (-2.27)	-0.000999*** (-2.68)
Var(Stock return)	0.110 (0.43)	0.143 (0.59)	0.0489 (0.18)	0.0834 (0.33)	0.122 (0.51)	0.0888 (0.35)
Executive' ownership	0.0772*** (17.3)	0.0782*** (18.1)	0.0842*** (18.6)	0.0848*** (19.4)	0.0782*** (18.1)	0.0772*** (17.3)
Non-executives ownership	0.0158*** (3.14)	0.0166*** (3.59)	0.0147*** (2.83)	0.0143*** (3.03)	0.0171*** (3.66)	0.0165*** (3.24)
C1	-0.0133*** (-3.43)	-0.0119*** (-3.25)	-0.0111*** (-2.94)	-0.00990*** (-2.82)	-0.0123*** (-3.31)	-0.0137*** (-3.46)
CEO is board chair	0.294* (1.77)	0.265 (1.64)	0.268 (1.53)	0.256 (1.53)	0.275* (1.67)	0.305* (1.81)
Board size	0.00864 (0.27)	0.0123 (0.39)	0.0562** (2.02)	0.0598** (2.20)	0.00101 (0.029)	-0.00307 (-0.086)
% Executives in the board	-0.0102 (-1.54)	-0.00977 (-1.56)	0.00765 (1.08)	0.00628 (0.93)	-0.0101 (-1.60)	-0.0106 (-1.58)
Mean tenure of board executives	0.0153 (1.20)	0.0219* (1.77)	0.0352*** (2.82)	0.0404*** (3.32)	0.0205 (1.64)	0.0140 (1.07)
% Gray independent directors	0.00643 (1.64)	0.00471 (1.23)	0.0106*** (2.75)	0.00887** (2.42)	0.00439 (1.15)	0.00615 (1.57)
Operations directors-firm	0.0183 (0.11)	-0.0523 (-0.32)	-0.0342 (-0.20)	-0.0811 (-0.49)	-0.0451 (-0.28)	0.0192 (0.11)
% Busy non-executive directors	0.169 (0.28)	-0.169 (-0.29)	-0.261 (-0.43)	-0.559 (-0.95)	-0.354 (-0.59)	-0.0133 (-0.022)
% Interlocked executive directors	-0.0102 (-0.040)	-0.0737 (-0.30)	0.200 (0.81)	0.141 (0.60)	-0.0888 (-0.36)	-0.0170 (-0.067)
Golden parachutes	0.350* (1.82)	0.321* (1.70)	0.645*** (3.35)	0.611*** (3.28)	0.313* (1.66)	0.343* (1.77)
Voting Cap	-0.289 (-1.35)	-0.282 (-1.36)	-0.228 (-1.07)	-0.277 (-1.29)	-0.247 (-1.16)	-0.250 (-1.14)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	283	283	238	238	283	283
R2	0.72	0.73	0.78	0.79	0.73	0.72
Adjusted R2	0.689	0.703	0.750	0.758	0.704	0.689

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 13 The exercise of stock options

This table contains estimations of the pooled model (2004/2006) where the dependent variable is in logs and measures the mean individual remuneration of executive director less the estimated amount due to the execution of stock options. This estimation is the total amount paid by the execution of stock options to the board of directors divided by the total number of directors in the firm. Closeness, Degree, and Betweenness are the mean of the network centrality measures of all directors in a firm. The following three network centrality measures are computed just with executive directors. Individual mean compensation of top executives who are not directors is introduced in logs. The rest of explanatory variables are described in Table 9. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)
Closeness	0.345 (0.781)					
Degree		-27.36 (-1.486)				
Betweenness			-227.8 (-0.349)			
Executives' closeness				0.682* (1.682)		
Executives' degree					13.55 (1.294)	
Executives' betweenness						715.6** (2.070)
Log Individual mean pay of non directors top executives	0.196 (1.644)	0.210* (1.761)	0.198* (1.661)	0.190 (1.628)	0.184 (1.577)	0.184 (1.609)
LogSales (t-1)	0.260*** (4.736)	0.275*** (4.919)	0.264*** (4.712)	0.263*** (4.865)	0.263*** (4.856)	0.269*** (4.927)
Market to Book 3YAv (t-1)	0.0142 (1.159)	0.0128 (1.084)	0.0140 (1.168)	0.0137 (1.143)	0.0150 (1.262)	0.0162 (1.335)
ROA (t-1)	0.000412 (0.0369)	-5.24e-05 (-0.00469)	-0.000193 (-0.0173)	0.000202 (0.0188)	-0.000751 (-0.0681)	-0.00184 (-0.165)
Stock return (t-1)	0.0682 (0.348)	0.0913 (0.464)	0.0857 (0.436)	0.0579 (0.305)	0.0893 (0.468)	0.0792 (0.415)
Var(ROA)	-0.000179 (-0.773)	-0.000219 (-0.920)	-0.000179 (-0.757)	-0.000168 (-0.754)	-0.000127 (-0.535)	-0.000113 (-0.490)
Var(Stock return)	-0.0473 (-0.242)	-0.0585 (-0.297)	-0.0545 (-0.277)	-0.0522 (-0.270)	-0.0625 (-0.324)	-0.0402 (-0.211)
Executive' ownership	0.00117 (0.219)	-0.000188 (-0.0369)	0.000575 (0.108)	0.00185 (0.351)	0.00181 (0.344)	0.00193 (0.370)
Non-executives ownership	0.00370 (1.084)	0.00345 (1.049)	0.00332 (0.990)	0.00415 (1.184)	0.00333 (0.999)	0.00336 (1.008)
C1	-0.00203 (-0.742)	-0.000967 (-0.376)	-0.00168 (-0.645)	-0.00241 (-0.897)	-0.00201 (-0.770)	-0.00169 (-0.649)
CEO is board chair	0.120 (0.939)	0.131 (1.047)	0.120 (0.938)	0.119 (0.923)	0.0894 (0.684)	0.0900 (0.690)
Board size	0.0116 (0.492)	0.0435 (1.431)	0.0192 (0.890)	0.00402 (0.164)	0.00489 (0.192)	0.0166 (0.781)
% Executives in the board	0.00153 (0.216)	0.000771 (0.110)	0.00162 (0.231)	0.000753 (0.108)	0.00217 (0.305)	0.00172 (0.244)
Mean tenure of board executives	0.0133 (1.561)	0.0165* (1.940)	0.0148* (1.738)	0.0128 (1.488)	0.0141 (1.643)	0.0151* (1.759)
% Gray independent directors	0.00781*** (3.024)	0.00791*** (3.067)	0.00797*** (3.054)	0.00760*** (2.986)	0.00792*** (3.067)	0.00775*** (3.038)
Operations directors-firm	0.0415 (0.325)	0.0219 (0.172)	0.0292 (0.232)	0.0359 (0.289)	0.0166 (0.131)	0.0210 (0.169)
% Busy non-executive directors	-0.253 (-0.619)	0.0484 (0.125)	-0.123 (-0.300)	-0.298 (-0.772)	-0.222 (-0.570)	-0.246 (-0.630)
% Interlocked executive directors	0.151 (0.769)	0.139 (0.738)	0.143 (0.745)	0.139 (0.713)	0.165 (0.847)	0.189 (0.974)
Golden parachutes	0.505*** (3.641)	0.545*** (3.864)	0.519*** (3.649)	0.490*** (3.615)	0.490*** (3.678)	0.481*** (3.587)
Voting Cap	-0.0655 (-0.484)	-0.132 (-0.988)	-0.102 (-0.760)	-0.0394 (-0.293)	-0.0664 (-0.521)	-0.0711 (-0.561)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	227	227	227	227	227	227
R2	0.563	0.566	0.563	0.567	0.567	0.570
Adjusted R2	0.502	0.505	0.501	0.506	0.505	0.509

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 14 Excess compensation of network centrality and future performance

This table relates future performance one year ahead with the excess compensation due to network centrality scores of Closeness, Degree, and Betweenness. Panel A uses stock return as a firm future performance measure, and Panel B uses Return on Assets. Non board top executive pay is considered into de executive directors pay regression used to estimate predicted excess compensation in models of columns 1 to 3. This excess of compensation is computed with models of Table 11, columns 6 to 8. It is not included in models of columns 4 to 6. In this case exces of compensation is computed with models of Table 10, columns 5 to 7. Control variables are the variance of stock returns (ROA) calculated with the yearly returns (ROA) of the three previous years, the log of sales, and of the market capitalization in the previous year, and the market to book ratio of the previous year. Finally, industry and year dummy variables are introduced to take into account fixed industry and year effects. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

<b>Panel A - Stock Return as one year ahead firm's performance measure</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
Predicted excess compensation (Closeness)	-2.237 (-1.32)			-0.534 (-0.48)		
Predicted excess compensation (Degree)		-6.903*** (-3.14)			-3.555** (-2.15)	
Predicted excess compensation (Betweenness)			-4.717*** (-3.38)			-3.320** (-2.47)
Var(Stock return)	-0.101* (-1.75)	-0.108** (-1.99)	-0.119** (-2.18)	-0.0776 (-1.39)	-0.0754 (-1.38)	-0.0838 (-1.59)
Log Market Capitalization (t-1)	-0.0723* (-1.91)	-0.0659* (-1.89)	-0.0754** (-2.09)	-0.0509* (-1.74)	-0.0421 (-1.53)	-0.0493* (-1.77)
Market to book (t-1)	-0.00371 (-0.77)	-0.00484 (-0.98)	-0.00465 (-0.97)	-0.00719 (-1.34)	-0.00814 (-1.50)	-0.00781 (-1.45)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	222	222	222	264	264	264
R2	0.30	0.32	0.31	0.28	0.29	0.28
Adjusted R2	0.261	0.287	0.275	0.246	0.256	0.253
<b>Panel B - Return on Assets as one year ahead firm's performance measure</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
Predicted excess compensation (Closeness)	87.46* (1.94)			73.36** (2.26)		
Predicted excess compensation (Degree)		18.99 (0.41)			39.36 (1.02)	
Predicted excess compensation (Betweenness)			48.36 (1.07)			68.53 (1.45)
Var(ROA)	0.00183 (1.60)	0.00166 (1.56)	0.00178 (1.65)	0.00284** (2.29)	0.00285** (2.37)	0.00283** (2.36)
LogSales(t-1)	-0.204 (-0.53)	-0.0590 (-0.15)	-0.0409 (-0.12)	0.00698 (0.021)	0.130 (0.37)	0.185 (0.63)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	221	221	221	262	262	262
R2	0.06	0.03	0.04	0.09	0.06	0.07
Adjusted R2	0.0161	-0.0146	-0.00304	0.0502	0.0202	0.0316

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 15 The economic significance

The economic valuation is based on estimated regressions where the dependent variable is in logs, this valuation is conditioned on the absolute value of the underlying dependent variable (mean individual compensation of executive directors). Therefore, we obtain the mean value of this underlying variable across all observations (firm/year) and obtain the economic valuation of the statistically significant variables conditioned on this mean value. The economic valuation is based on the models of Table 10 (11) column 5 (6) except for Betwenness that are from column 7 (8). The analysis is done for the full sample and just for firms in the Ibex-35. Network measures are evaluated assuming the mean difference across observations (firm/year) sorted with the network measure, and assuming an increment in the network measure from the 25 percentile to the 75 percentile. 1% sales increment corresponds to a firm with sales equal to the mean value of sales. It is € 3,090 millions taking all the firms into account, € 9,080 millions considering just firms in the Ibex-35.

	Coefictiens of Tabla 10		Coefictiens of Tabla 11	
	Full Sample	Ibex-35	Full Sample	Ibex-35
<b>Network centrality measures</b>				
Mean increase in Closeness	1.966 €	12.781 €	1.413 €	9.175 €
Mean increase in Betwenness	1.498 €	9.437 €	1.610 €	10.140 €
Increase from 25 to 75 percentile in closeness	52.185 €	301.297 €	37.176 €	211.218 €
Increase from 25 to 75 percentile in betwenness	40.922 €	148.311 €	44.041 €	159.858 €
<b>Other statistically significant variables</b>				
1% sales increment	2.728 €	5.316 €	2.184 €	4.256 €
Golden parachutes	509.168 €	991.947 €	525.267 €	1.023.309 €
% Gray independent directors - increase in 1%	5.882 €	11.459 €	6.355 €	12.381 €

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 16 Year regression models

This table contains estimations of a model for each year in our time period sample, where the log of individual executive board member remuneration is the dependent variable. Closeness, Degree, and Betweenness are the mean of the network centrality measures of executive directors. For the remaining variables see Table 9. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

Year	2004	2005	2006	2004	2005	2006	2004	2005	2006
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Executives' closeness	0.0234 (0.016)	2.090** (2.58)	1.773** (2.13)						
Executives' degree				12.20 (0.60)	26.90 (1.56)	20.83 (0.87)			
Executives' betweenness							491.2 (0.76)	1225* (1.99)	620.3 (0.59)
LogSales (t-1)	0.312*** (3.68)	0.365*** (5.94)	0.289*** (3.46)	0.306*** (3.83)	0.358*** (5.61)	0.283*** (3.54)	0.311*** (3.88)	0.369*** (6.13)	0.292*** (3.57)
Market to Book 3YAv(t-1)	0.00513 (0.50)	0.0233 (0.70)	0.0429 (1.44)	0.00600 (0.60)	0.0198 (0.59)	0.0328 (1.03)	0.00640 (0.63)	0.0225 (0.66)	0.0308 (0.95)
ROA(t-1)	-0.0128 (-0.59)	0.000740 (0.024)	0.00719 (0.40)	-0.0140 (-0.66)	0.00312 (0.099)	0.0122 (0.63)	-0.0143 (-0.68)	0.000214 (0.0066)	0.0135 (0.71)
Stock return (t-1)	0.683 (0.77)	0.0381 (0.13)	-0.00957 (-0.031)	0.705 (0.81)	-0.0103 (-0.032)	0.0315 (0.10)	0.698 (0.79)	-0.121 (-0.35)	0.0123 (0.040)
Var(ROA)	-0.000112 (-0.19)	0.0000394 (0.10)	0.000860 (0.91)	-0.00000988 (-0.019)	0.00000772 (0.018)	0.000299 (0.36)	-0.0000310 (-0.062)	-0.0000222 (-0.054)	0.000260 (0.30)
Var(Stock return)	-0.976 (-0.71)	-0.302 (-0.65)	0.122 (0.47)	-1.054 (-0.86)	-0.151 (-0.32)	0.0780 (0.30)	-1.002 (-0.83)	-0.0661 (-0.14)	0.0940 (0.36)
Executive' ownership	-0.00150 (-0.24)	-0.00534 (-1.15)	0.00586 (0.66)	-0.000753 (-0.12)	-0.00592 (-1.21)	0.00448 (0.50)	-0.000836 (-0.13)	-0.00613 (-1.26)	0.00429 (0.48)
Non-executives ownership	-0.000899 (-0.12)	0.00960* (1.70)	0.00709 (0.82)	-0.00109 (-0.14)	0.00841 (1.46)	0.00577 (0.71)	-0.000770 (-0.10)	0.00864 (1.51)	0.00583 (0.71)
C1	-0.00403 (-0.96)	-0.00167 (-0.43)	-0.00244 (-0.39)	-0.00416 (-0.96)	-0.000646 (-0.17)	-0.00188 (-0.29)	-0.00370 (-0.81)	0.000123 (0.033)	-0.00203 (-0.32)
CEO is board chair	-0.0140 (-0.069)	0.150 (0.78)	0.476* (1.72)	-0.0637 (-0.30)	0.118 (0.59)	0.340 (1.32)	-0.0499 (-0.23)	0.136 (0.69)	0.335 (1.30)
Board size	0.0238 (0.43)	-0.0430 (-1.21)	-0.0167 (-0.32)	0.0130 (0.26)	-0.0343 (-1.04)	-0.0130 (-0.21)	0.0222 (0.52)	-0.0114 (-0.33)	0.00419 (0.077)
% Executives in the board	0.00203 (0.20)	-0.00328 (-0.34)	-0.0189 (-1.33)	0.00236 (0.23)	0.000253 (0.025)	-0.0160 (-1.08)	0.00193 (0.19)	-0.00103 (-0.10)	-0.0159 (-1.06)
Mean tenure of board executives	0.00914 (0.47)	0.00989 (0.80)	-0.00644 (-0.32)	0.00897 (0.46)	0.0113 (0.88)	0.00369 (0.19)	0.0100 (0.52)	0.0122 (0.99)	0.00474 (0.25)
% Gray independent directors	0.00513 (1.23)	0.00628 (1.42)	0.00742 (1.39)	0.00521 (1.27)	0.00744* (1.74)	0.00982** (2.02)	0.00493 (1.21)	0.00724* (1.72)	0.01000** (2.09)
Operations directors-firm	0.203 (0.80)	0.0343 (0.20)	0.336 (1.45)	0.210 (0.83)	-0.0339 (-0.20)	0.293 (1.20)	0.197 (0.76)	-0.00727 (-0.043)	0.308 (1.28)
% Busy non-executive directors	0.694 (1.04)	-0.537 (-0.62)	-1.012 (-1.16)	0.693 (0.97)	-0.0448 (-0.056)	-0.485 (-0.60)	0.692 (0.98)	-0.0477 (-0.059)	-0.410 (-0.49)
% Interlocked executive directors	-0.134 (-0.31)	-0.0109 (-0.035)	-0.0543 (-0.20)	-0.122 (-0.29)	0.00235 (0.0075)	-0.0329 (-0.12)	-0.115 (-0.27)	-0.00833 (-0.027)	-0.0138 (-0.048)
Golden parachutes	0.440** (2.13)	0.683*** (2.97)	0.263 (1.15)	0.426** (2.11)	0.684*** (3.03)	0.323 (1.36)	0.427** (2.09)	0.674*** (2.96)	0.318 (1.34)
Voting Cap	-0.104 (-0.50)	-0.0481 (-0.22)	0.128 (0.54)	-0.0785 (-0.38)	-0.0849 (-0.42)	0.0255 (0.11)	-0.0772 (-0.38)	-0.0739 (-0.37)	0.0138 (0.060)
Constant	-0.998 (-0.59)	-1.477 (-1.36)	0.206 (0.13)	-0.914 (-0.61)	-1.758 (-1.60)	0.00176 (0.0012)	-1.015 (-0.68)	-1.959* (-1.87)	-0.175 (-0.11)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	88	92	92	88	92	92	88	92	92
R2	0.60	0.65	0.56	0.60	0.64	0.54	0.60	0.64	0.53
Adjusted R2	0.437	0.521	0.392	0.442	0.498	0.363	0.443	0.502	0.358

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

Table 17 Other robustness checks

This table contains estimations of the pooled model (2004/2006) where the log of individual executive board member remuneration is the dependent variable. Executives' betweenness is the mean of betweenness among the executive directors of each firm. The compensation of non board top executives appears in logs. For the remaining variables see Table 9, except for contemporaneous stock return and ROA, for Return on Equity that appears as a firm's performance measure (lagged one period and its variance computed with the previous three years values), and for the log of market capitalization as a measure of firm's size. Huber (1967) and White (1980, 1982) robust t statistics are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)
Executives' betweenness	669.3*	767.8**	756.1**	761.1**	622.4*	541.5*
	(1.84)	(2.08)	(2.27)	(2.15)	(1.96)	(1.78)
Log Individual mean pay of non directors top executives		0.187	0.188*		0.188*	
		(1.57)	(1.70)		(1.85)	
LogSales(t-1)	0.340***	0.286***	0.268***	0.331***		
	(7.98)	(5.03)	(4.85)	(7.66)		
Log Market Capitalization(t-1)					0.311***	0.379***
					(5.82)	(8.69)
Market to Book 3YAv L1	0.0104	0.0174	0.0553***	0.0439**	0.00530	-0.000866
	(0.97)	(1.35)	(2.85)	(2.40)	(0.80)	(-0.12)
ROA(t)	0.0157	0.00750				
	(1.15)	(0.53)				
ROA(t-1)	-0.00670	-0.00892			-0.0106	-0.00548
	(-0.48)	(-0.55)			(-0.96)	(-0.60)
Stock return(t)	0.126*	0.145*				
	(1.77)	(1.90)				
Stock return(t-1)	0.119	0.0700	0.227	0.231	0.0632	0.168
	(0.64)	(0.37)	(1.11)	(1.22)	(0.33)	(0.93)
ROE(t-1)			-0.00491	-0.00249		
			(-1.40)	(-0.85)		
Var(ROE)			-0.00000361***	-0.00000117		
			(-3.88)	(-0.56)		
Var(ROA)	-0.000179	-0.0000669			0.0000229	-0.0000494
	(-0.67)	(-0.27)			(0.10)	(-0.21)
Var(Stock return)	-0.0804	-0.0510	-0.222	-0.200	-0.0772	-0.146
	(-0.42)	(-0.27)	(-0.93)	(-0.88)	(-0.42)	(-0.81)
Executive' ownership	-0.00105	0.00143	0.000171	-0.00211	0.00209	0.0000665
	(-0.24)	(0.26)	(0.030)	(-0.46)	(0.40)	(0.017)
Non-executives ownership	0.00559*	0.00377	0.00358	0.00447	0.00202	0.00205
	(1.66)	(1.13)	(1.01)	(1.29)	(0.61)	(0.63)
C1	-0.00219	-0.00110	-0.00159	-0.00222	-0.00407	-0.00515*
	(-0.83)	(-0.43)	(-0.59)	(-0.79)	(-1.50)	(-1.91)
CEO is board chair	0.0838	0.0870	0.123	0.108	0.124	0.172
	(0.72)	(0.67)	(0.88)	(0.85)	(0.97)	(1.57)
Board size	-0.00137	0.0178	0.0110	-0.00703	0.00371	-0.00916
	(-0.056)	(0.84)	(0.52)	(-0.28)	(0.19)	(-0.43)
% Executives in the board	-0.00334	0.00241	0.00546	-0.00136	0.00241	-0.00177
	(-0.53)	(0.34)	(0.74)	(-0.21)	(0.36)	(-0.30)
Mean tenure of board executives	0.0104	0.0175**	0.0116	0.00461	0.00649	0.00153
	(1.16)	(2.03)	(1.34)	(0.52)	(0.79)	(0.19)

Table 17 Other robustness checks

Continuation

	(1)	(2)	(3)	(4)	(5)	(6)
% Gray independent directors	0.00712*** (3.07)	0.00726*** (2.87)	0.00656** (2.54)	0.00653*** (2.72)	0.00663** (2.57)	0.00557** (2.36)
Operations directors-firm	0.0952 (0.76)	0.00392 (0.031)	0.0463 (0.37)	0.148 (1.21)	0.0280 (0.22)	0.0953 (0.78)
% Busy non-executive directors	0.158 (0.40)	-0.311 (-0.81)	-0.368 (-0.92)	0.114 (0.28)	-0.295 (-0.79)	0.00466 (0.012)
% Interlocked executive directors	-0.0117 (-0.063)	0.182 (0.93)	0.158 (0.81)	-0.0479 (-0.27)	0.0572 (0.30)	-0.0984 (-0.55)
Golden parachutes	0.466*** (3.75)	0.468*** (3.47)	0.500*** (3.64)	0.459*** (3.63)	0.397*** (3.00)	0.405*** (3.38)
Voting Cap	-0.0163 (-0.15)	-0.0784 (-0.59)	-0.0602 (-0.45)	-0.0132 (-0.12)	-0.176 (-1.38)	-0.192* (-1.81)
d05	0.168 (1.44)	0.145 (1.06)	0.161 (1.23)	0.165 (1.44)	0.111 (0.85)	0.114 (1.02)
d06	0.310** (2.38)	0.301** (2.04)	0.270* (1.93)	0.275** (2.20)	0.209 (1.51)	0.156 (1.26)
Constant	-1.528* (-1.91)	-1.755* (-1.97)	-1.287 (-1.52)	-1.172 (-1.48)	-1.697* (-1.90)	-1.834** (-2.17)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	272	227	222	266	227	272
R2	0.56	0.57	0.57	0.55	0.59	0.59
Adjusted R2	0.508	0.509	0.509	0.504	0.533	0.547

Note: \*\*\* denotes significance at the 1% level; \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.