BOARD LEVEL EMPLOYEE REPRESENTATION, EXECUTIVE REMUNERATION AND FIRM PERFORMANCE IN LARGE EUROPEAN COMPANIES

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Abstract

Although there is a large literature on the remuneration of managers and a growing number of econometric studies on the effects of board level employee representation (BLER) on company performance, only a handful of studies have focused on the relationship between these two issues. Furthermore, the vast majority of studies in both areas are on the national level and cross-national comparative literature is just emerging. This paper aims at helping fill this gap by summarizing the results of an analysis of the impact of board level employee representation (BLER) on the structure and level of management remuneration and on company performance in the 600 largest listed European companies.

The main findings are that there is a strong and statistically significant negative relationship between BLER in a company on the one hand and the use of stock options as well as total CEO remuneration on the other hand. In other words, BLER is associated with less frequent use of stock options and lower total CEO remuneration. Furthermore, BLER does not have a negative impact on operating performance (specifically on return on assets or ROA) or on stock market valuation (specifically on the Price/Book Ratio). These results also hold when accounting for endogeneity. However, difficulties in controlling for country-specific effects raise issues regarding the direction of causality and possible unobserved effects. The lack of a simple causal link from BLER to executive remuneration suggests a new research agenda exploring the complex relationships between worker participation and various components of company culture and behavior, based on both newer statistical methods such as latent variable analysis and on case studies of causal mechanisms.

1. Introduction

Although there is a large literature on the remuneration of managers and a growing number of econometric studies on the effects of board level employee representation (BLER) on company performance, only a handful of studies have focused on the relationship between these two issues (see literature review below for a discussion of these). Furthermore, the vast majority of studies in both areas are on the national level and comparative literature in this area is just emerging.

In principle, however, worker participation could have a large influence on the structure and level of executive remuneration. In the interests of a healthy company culture and working climate, worker representatives have an interest in keeping the pay gap between rank-and-file workers and top management from getting too large. Furthermore they have an interest in aligning the incentives of management and workers to avoid situations where workers get hurt but managers do better (e.g. when there are large scale layoffs but stock price and thus the value of stock-oriented incentives goes up). Finally, in contrast to the short-term orientation of institutional investors, workers have a long-term interest in the company and will therefore be critical of short-term incentives for management.

This paper summarizes the results of a study of the impact of board level employee representation (BLER) on the structure and level of management remuneration in large European companies. Specifically, the presence or absence of a representative of workers on a company board (i.e. the company board in a one-tier board system or in either the supervisory or executive board in a two-tier board system) is treated as a dichotomous variable in a set of regression models. These models are designed to identify the determinants of four kinds of dependent variables: 1) whether or not stock options are used in the remuneration of top

management at a company and 2) the level of total annual remuneration of the CEO at a company (including base salary, bonus, long term incentives, stock options and stock). Finally, given the interest in previous studies in the impact of codetermination on economic performance, models for the determinants both 3) operating performance (return on assets or ROA) and 4) stock market valuation (P/B or Price/Book Ratio) were also analyzed. These models were estimated for a dataset for 2005-2008 based on the 600 largest European listed companies (STOXX 600), with size being defined by free float market capitalization at the end of December 2008.

The main findings of the study are that there is a strong and statistically significant negative relationship between BLER in a company on the one hand and the use of stock options as well as total CEO remuneration on the other hand. In other words, BLER is associated with less frequent use of stock options and lower total CEO remuneration. Furthermore, BLER does not have a negative impact on operating performance (specifically on ROA) or on stock market valuation (specifically on the Price/Book Ratio). These results also hold when accounting for endogeneity. However, difficulties in controlling for country-specific effects raise issues regarding the direction of causality and possible unobserved effects. The lack of a simple causal link from BLER to executive remuneration suggests a new research agenda exploring the complex relationships between worker participation and various components of company culture and behavior, based on both case studies and newer statistical methods such as latent variable analysis.

This paper first gives a brief overview of the main findings of the literatures on executive remuneration and codetermination and reviews the few studies which examine the relationship between the two. The paper then discusses the data sources and methodology

used in the study, followed by sections discussing the results of the analysis and implications for future research.

2. Literature Review

In part due to the large increases in management pay over the past decades an enormous literature on the determinants of director's pay has emerged (see e.g. Murphy 1998 and Otten 2007 for reviews). Much of this literature is based on studies of the US, due to stronger disclosure requirements there for listed companies and the availability of databases containing this data (e.g. Execucomp). These studies show that a number of structural variables (e.g. company size and main sector of activity) play an important role in explaining the level of management pay. However, even when taking these into account, the "unexplained variance" is quite high, leading to a search for additional factors that might explain systematic variation (Otten 2007). Another puzzle is created by the great increase in management remuneration over the past decades, especially in its "variable" components, which far outstrips the increase in other factors such as company size or stock market value. Although this increase has been defended by some who claim that the increased costs of remuneration have been more than paid for through more efficient contracting and governance structures, an increasing number of contributions have become quite critical of these trends and questioned whether modern compensation systems are really efficient and in the interests of stakeholder groups other than managers. The most prominent contribution here is *Pay without Performance* (Bebchuk and Fried 2004) as well as subsequent studies by these authors which show that management remuneration is weakly (if at best) tied to real economic value added.

Particularly controversial is the use of stock options in director remuneration packages. Initially the literature was very much dominated by the view of Michael Jensen and his

collaborators that stock options are an efficient way of overcoming the conflicts of interest between shareholders and managers (see e.g. Baker et al. 1998). In recent years however the use of stock options has become quite controversial, with critics arguing that they create an incentive for boosting short-term share price performance – if necessary through fraudulent means – at the possible expense of longer-term investment and performance (Marquandt et al. 2009; Albuquerque 2009). A number of studies have linked stock options with certain unsavory practices, including accounting fraud, cutting of R&D expenditures to meet financial analyst expectations, and the "back-dating" of the initial grant of options to the date when share price is lowest (Armstrong et al. 2009). Supporters of stock options claim that the problems were caused by the improper design of stock option plans and could theoretically be remedied through well-structured plans (e.g. Jensen et al. 2004). However, critics have argued that the lack of "downside" risk together with unlimited profit potential in stock options creates an asymmetric incentive for managers, which is not compatible with the interests of other stakeholders, particularly in the case of the banking industry (Bebchuk and Spamann 2009).

With the exception of the UK, which also has had stricter requirements for transparency on remuneration of top executives for a number of years, earlier research on other countries as well as cross-national comparisons was hampered by a lack of good data. Outside of the US and UK companies were typically not required to disclose remuneration on an individual basis. In Germany, for example, prior to corporate governance reform in the early 2000s, companies were only required to report aggregate pay for the management boards. A further question was on what components were actually included in this lump sum, since the rules on reporting pension contributions, the value of non-financial perks, and stock option packages were not clearly defined.

This situation has however improved as many countries have increased their remuneration reporting requirements in recent years, particularly for the top-paid executive in companies listed on the stock market. A number of new studies have emerged based on this data, many of these focusing on the puzzle of why US firms pay their executives much more than companies based in other countries (Otto and Heugens 2007; Brenner and Schwalbach 2008; Fernandes et al. 2009).

The literature on the effect of BLER on managerial compensation is much smaller in contrast. For Germany Vitols (2008) finds that strong board level codetermination is associated with lower CEO pay and a lower proportion of equity-oriented pay. However, using a different measure of codetermination strength and a different time period, Hörisch (2009) finds no significant effect on average pay in the management board. In a study on US companies Gomez and Tzioumis (2006) find that union representation at companies is associated with lower total compensation and variable pay, without a loss of performance sensitivity. What is particularly interesting about this study is that this association exists, even without representation of workers on company boards, where presumably decisions about management compensation are made.

The literature on BLER effects on company performance in Germany is larger, though still not nearly as large as the literature on the effect of works councils on various measures of performance. The methodologies used and the dependent variables examined are quite varied. However, a recent comprehensive review of the econometric literature on BLER in Germany shows that, on the whole, worker representation has no negative effects on company performance (Jirjahn 2006), with the majority of studies on operative performance showing positive effects.

A somewhat different approach looking at the association between BLER and performance at the country level also finds a positive correlation between strong rights and good performance. The Kluge/Stollt classification of board level rights in European countries has been used in at least two studies: Belloc (2009) found a positive relationship between extent of rights and innovative activity, and Vitols (2005) also found a positive relationship with a variety of economic and social indicators. The European Participation Index (EPI), developed by Vitols/Kluge/Stollt, uses the Kluge/Stollt classification as one of three dimensions of worker participation, the other two being participation at the plant level and participation through collective bargaining. The group of EU countries scoring highest on this index perform much better on a broad range of indicators of the Lisbon strategy (economic, social and environmental) than the group of countries scoring lower (ETUI 2009).

3. Hypotheses

Based on this review of the literature, the following hypotheses are derived for testing in this study. In each case the hypotheses assume "other things being equal", i.e. other factors influencing management remuneration or company performance (e.g. company size or sector) are held constant.

The first set of hypotheses are derived from worker representatives' interests in a) orienting management away from share price and towards "real" performance indicators, b) keeping the gap between top management and worker pay from getting too large and c) trying to avoid situations where management benefits when workers get hurt. Since workers can use their board level representation as a means of influencing management pay along these lines, the following two hypotheses can be derived:

Hypothesis 1a: Companies with BLER are less likely to have a stock option program.

Hypothesis 1b: Total CEO pay is lower at companies with BLER.

The second set of hypotheses are derived from the widespread belief that two tier systems are better at monitoring management than one tier systems, since two tier systems are in principle more independent of top management than one board systems (where the main board is often chaired by the CEO). Thus two tier systems will be in less need of stock options to control management behavior, and also top management will be less able to extract rents (i.e. higher pay then justified by performance).

Hypothesis 2a: Companies with a two tier board structure will be less likely to have a stock option program than companies with a single tier board structure.

Hypothesis 2b: Companies with a two tier board structure will be associated with a lower level of total CEO pay than would be the case with a single board structure.

It is frequently argued in the literature that large shareholders have both an interest in and incentive to closely monitor management as well as the power to influence management. Therefore we derive the third set of hypotheses which are closely related to the second set of hypotheses.

Hypothesis 3a: The presence of a large shareholder will be associated with a lower probability of having a stock option program.

Hypothesis 3b: The presence of a large shareholder will be associated with a lower total level of CEO pay.

In the newer literature it is argued that shareholders without board representation have little ability to influence management remuneration. Based on this belief a number of institutional

investors are demanding the right to vote on remuneration policy for executive directors at the annual shareholder meeting. A few of countries have introduced this obligation into company law. Therefore we expect that:

> Hypothesis 4a: Companies with headquarters in countries in which shareholders have strong rights on remuneration policy determination ("say on pay") will be less likely to have a stock option program than companies in countries where shareholders have no legal rights over remuneration policy.
>
> Hypothesis 4b: Companies with headquarters in countries in which shareholders have strong rights on remuneration policy determination ("say on pay") will have lower total pay for their CEOs than is the case in companies located in countries where shareholders have no legal rights over remuneration policy.

And finally, based on the numerous studies on BLER and economic performance in Germany (and to a lesser extent in other countries) which indicate no negative impact of BLER on company performance, we derive the following set of hypotheses:

> Hypothesis 5: Companies with BLER will not be less profitable than companies without BLER
>
> Hypothesis 6: Companies with BLER will not have a lower stock market valuation than companies with BLER

4. Data and Methodology

The sample examined in this study included the largest 600 listed companies in Europe at the end of December 2008. Size here is defined by free float market capitalization, i.e. the market value of shares outstanding which are not held by large investors. This list is maintained by

Dow Jones for its STOXX index series, in this case for the STOXX600 index which includes the EU15 countries, Switzerland, Norway and Iceland. In all, companies from 17 countries were included in the study, since Iceland had no companies in the list at the end of 2008 (see table 1).[1] This list includes basic data for each company, including the home country, main sector of activity and the percentage of shares not owned by large investors ("free float").

[Table 1 about here]

The countries most heavily represented in the sample were, in order, the UK (159 companies), France (82), Germany (61) and Switzerland (53). One interesting fact is the imperfect correlation between country size and the number of companies in the sample: whereas the UK and Italy have roughly the same populations, the UK has almost five times as many companies in the sample as Italy. Similarly, although Switzerland is much smaller than Germany, it has almost as many companies in the sample as Germany. This reflects the different economic structures in the countries as well as the different degrees of internationalization of their companies.

In addition data was gathered on the board structure and composition of the 600 companies. The main sources of data for these variables were the online database BoardEx, company annual reports and company websites. For this study, of primary relevance was whether the company had a single or dual board structure and whether employee representatives are included as voting members of these boards.

Single or dual board structures

[1] Four Icelandic banks included in the middle of the decade were dropped from the list due to financial difficulties during the financial crisis.

In single board systems top executives responsible for the day-to-day management of the company are included in the board, whereas in dual board systems day-to-day managers are on the executive board but not included in the supervisory board, which in theory oversees the executive board and decides the company's strategy.[2] Whereas in the past all listed companies in most countries had either single or dual board structures, the situation has become more complex in recent years. Some countries have introduced options for companies to choose between single and dual board structures. Some companies that are formally single tier have also excluded day-to-day managers from their company board, in effect creating a dual tier structure. In this study the variable used here was a dichotomous variable labeled **TWOTIER**, which is coded 1 if there is a two tier board structure, and 0 for a one tier board structure.

BLER systems

BLER systems vary highly from country to country (see Figure 1; for more detail on countries see HBF/ETUI 2004). Four of the countries in the sample (UK, Switzerland, Belgium and Italy) have no formal rules for BLER, but the other 13 countries have legislation regulating BLER, ranging from mandatory inclusion of worker representatives in all companies with specific legal structures above a certain threshold (e.g. Germany) to voluntary systems depending on worker initiative and, in some cases, agreement by management and/or shareholders (e.g. France and Finland). In some countries BLER is mainly restricted to state-owned or recently privatized companies. In some countries the parameters of BLER system are clearly defined by legislation and court decisions (e.g. Germany) whereas in other systems different options are allowed (e.g. France). Finally the mode by which employee

[2] Some companies in the sample with significant state ownership had a third board mainly composed of political representatives and appointees. These were treated in the same category as two-tier boards due to the exclusion of executives from the highest supervisory boards.

representatives are chosen varies highly from country to country; whereas some representatives are elected by the workforce in other countries they are appointed by trade unions or works councils. In our sample a few SEs (European Companies) were also included, which are enabled by European legislation, and in which BLER is determined through negotiations between management and labor representatives. The number of BLER included also varied widely, ranging from one member in some cases to half of the board members (which is the case in German companies with over 2,000 workers employed domestically).

[Figure 1 and Table 2 about here]

For this study BLER was determined to be present if one or more of the voting members of either the company board (in single board systems) or the supervisory or executive board (in dual board systems) was either elected by workers in the company or appointed by trade unions. This definition excludes the following types of employee representatives who are observers at board meetings (e.g. workers councilors at many French companies) or elected representatives of employee shareholders (who are also present at a number of French and other companies). This definition also excludes Dutch companies. Dutch law allows works councils to nominate a candidate for the board to the shareholder assembly. However this person cannot be a member of the workforce or a trade union official, and furthermore the shareholder assembly has the right to turn down this nomination. In practice these works council-nominated members are not identified as such in company reports or company websites. Finally, this provision does not apply to Dutch companies with the majority of their employment outside of the Netherlands, which is the case for most Dutch companies in this sample.

Due to the heterogeneity of industrial relations systems in the 17 countries the prevalence of BLER varied greatly across countries in our sample. Whereas 93 percent of the German companies and 82 percent of the Austrian, Danish and Norwegian companies had BLER, seven countries in the sample had no companies with BLER. In all 22 percent of the companies had BLER according to the definition used in this study.[3] Since companies with BLER were on average larger than companies without BLER, the percentage of employees in the sample working for companies with BLER was 30 percent, i.e. considerably higher than the percentage of companies.

In summary **BLER** is a binary variable coded 1 if there is at least one employee representative included as a voting member of a key company board, and 0 if this is not the case.

Remuneration Data

For this study two types of dependent variables for remuneration were utilized: 1) existence of stock option plans for managers and 2) total remuneration for the CEO.

The presence of stock option programs as part of the compensation of managers is relatively transparent, since in all the countries under examination management must get approval from the shareholders for measures that may affect company capital and the value of stock. Stock option programs are one of these types of measures, since the granting of a large number of stock options potentially creates a large liability for the company if these stock options are actually exercised. Furthermore, the European Union has required all listed companies to adopt international accounting standards, and one component of these standards requires

[3] This percentage reflects the bias in the sample towards the UK companies, which has a disproportionate number of large listed companies but no formal BLER system.

companies to disclose the costs of stock option programs. The European Federation of Employee Share Ownership (EFES) 2008 survey, which covers 2533 company groups in Europe, includes information about whether or not the company has a stock option plan. Thus, although individual-level details on remuneration may not be available, the EFES survey provides information on the use of stock options at 563 (or 94 percent) of the 600 companies in the study.

A second dependent variable is the total annual remuneration of the CEO. The four years 2005 to 2008 were examined. Where available, data was gathered on the total annual compensation of the CEO and its breakdown into the following major categories: salary, bonus, long term incentive program (LTIP), stock options, stock, pension contribution and additional benefits (e.g. company car, company housing, etc.). The main sources of this remuneration data were the online data base BoardEx (which breaks down remuneration into the categories just mentioned, when available) and company annual reports.

In practice reporting requirements for executive remuneration vary quite widely among the countries in the sample. In some countries detailed reporting on remuneration systems and levels is required for a number of top executives (e.g. UK). In other countries reporting for individual managers is not required (e.g. Greece and Portugal). Instead, a total figure may be given for the executive board, in the extreme case with no breakdown between the different components. In between, some countries require disclosure only for the highest-paid manager (e.g. Switzerland).

However, more disclosure requirements have been imposed over time in many of the countries in the sample, and a number of larger listed companies voluntarily disclose more remuneration information than is legally required.

As a result, individual-level information on CEO remuneration is available for at least one of the four years under examination for exactly 500 (or 83 percent) of the 600 companies in the study. At one extreme at least one year of CEO remuneration information is available for all or practically all companies Ireland, the UK, the Netherlands, Denmark and Sweden.[4] At the other extreme in Portugal, Greece and Luxembourg only one of the relevant companies in each of the countries has provided individual-level data on CEO compensation.

For the large majority of the companies in the sample, it is therefore possible to construct two remuneration variables for use in statistical analysis.

The first remuneration variable, which is labeled **STOCKOP**, is a dichotomous variable coded 1 if the company had a stock option plan in place for management in 2007/2008, and 0 if there was no management stock option plan.

The second remuneration variable is **TOTALPAY**, which includes the sum of the salary, bonus, ancillary incentives, long term incentive payments, and the estimated value of stock options -- these variables are labeled SALARY, BONUS, OTHER, LTIPS, and ESTIMATED.[5]

TOTALPAY = SALARY + BONUS + OTHER + LTIPS + ESTIMATED

[4] In some of these countries one or two companies may not have the data required, for example if the companies were listed only one year and the CEO was not employed continuously during the year.
[5] Pension plan contributions and stock grants were excluded from this variable due to the highly inconsistent reporting practices not only between but also within countries. Thus TOTALPAY will be an understatement of true total CEO compensation in many companies.

In the regression estimations the logarithm of TOTALPAY was used, which was labeled **LOGTOTPAY**.

In addition to the variables BLER, LOGTOTAL and STOCKOP a number of control variables were used:

- Sector: Industry dummy variables for each of the 1-digit SIC industries based on the main activity of the company were included. SIC0 is treated as the benchmark, leaving nine dummy variables (**SIC1** to **SIC9**) for the analysis.

- Country: To control for country effects dummy variables were included for each of the countries, with the exception of the UK which was used as the benchmark country. Companies were coded based on which country their headquarters were based in. In all sixteen dummy variables were included: **AUSTRIA**, **BELGIUM**, **SWITZERLAND**, **GERMANY**, **DENMARK**, **SPAIN**, **FINLAND**, **FRANCE**, **GREECE**, **IRELAND**, **ITALY**, **LUXEMBOURG**, **NETHERLANDS**, **NORWAY**, **PORTUGAL** and **SWEDEN**.

- Capital Market Size: Given the significant impact that size of company has on remuneration practices a control variable was included based on the standardized value of the logarithm of the stock market value of shares outstanding (market capitalization) in billion euros **LOGMCAPBEUR**. This information is included in the company files provided by Dow Jones.

- Product Market Size: As an alternative measure of size the total annual sales of the company was taken. This is defined as the standardized value of the logarithm of

sales in million euros **LOGSALES**. This information was derived from COMPUSTAT and from company annual reports.

- Ownership structure: Since the incentives and abilities of shareholders to monitor and control managers is dependent upon the presence or absence of large shareholders, a variable was included which measures significance of large shareholders in the shareholding structure. The variable **FREEFLOAT** measures the proportion of shares not held by large shareholders non-institutional investors, large being defined as at least 5 percent of shares. The variable FREEFLOAT is thus an inverse measure of the importance of large shareholders and ranges from 1 (100 percent freefloat i.e. no large shareholders) to 0.05 (i.e. 95 percent of shares are held by one or more large shareholders). By definition companies must have at least 5 percent freefloat to be included in the STOXX 600 index. Information on this variable is included in the company files provided by Dow Jones.

- Employment Size: Given that is only a partial correlation between different measures of company size, the most common of which are stock market value (i.e. market capitalization), sales, and number of employees, an alternative measure of company size was included, labeled **LOGEMP**. This is defined as the standardized logarithm of the number of employees working at a company in question. Some companies have very few employees but a very high stock market value (e.g. listed private equity companies), whereas some highly labor-intensive, low-productivity companies have a large number of employees but a low stock market value (e.g. postal delivery). Data for this variable was obtained from COMPUSTAT as well as from company annual reports.

- Minority shareholder influence: There is a growing debate on the effects of giving shareholders a larger say in the determination of management pay ("say on pay"). In fact shareholders have some say over stock-market oriented components of management pay (stock-option or share-based compensation) since shareholders have a right to vote on policies affecting share capital. However, some institutional investors are demanding stronger rights for shareholders through either non-binding or binding votes in shareholders' meetings over remuneration policies. Information on the current legal framework for regulating management remuneration in EU member states is summarized in Ferrarini et al (2009). Answers to a detailed questionnaire submitted to experts in each country are available in the internet under http://www.ecgi.org/remuneration/ecgi_research.htm. Based on Ferrarini et al (2009) and the questionnaire answers a dummy variable labeled **SAYONPAY** was defined and coded "1" in countries which have strong shareholder rights on management pay in 2007/2008 (the UK, Netherlands and Sweden), and otherwise with a "0".

- Instrumental variables: In order to deal with the issue of potential endogeneity in the relationship between BLER and CEO remuneration a number of additional variables were defined. These could in theory function as instruments which predict BLER but should be uncorrelated with the error term in the explanatory equation for remuneration. Drawing on the literature on worker participation three instruments were defined: **STRIGHTS** is based on a classification by Kluge and Stollt of EU member states according to the strength and extensiveness of rights for board level employee representation; this variable is coded "1" if the home country of the relevant company has extensive BLER rights, "0" otherwise (see here www.worker-participation.eu). In this study the following countries were identified as having such strong rights: Austria, Denmark, Germany, Finland, Sweden and Norway. **STATE** is

coded if "1" if the largest shareholder of the company in question is a state entity (either national, regional or local), "0" otherwise. BLER rights in some countries are stronger for companies with significant state ownership or for recently privatized companies (many of which still have a partial state ownership stake). Finally the alternative measure of company size **LOGEMP** is also used here since BLER rights in many countries exist for companies above a certain size (e.g. 500 domestic employees for one-third BLER in Germany).

- Profitability: This variable is included both as a determinant of total pay (since variable pay can be expected to be at least in part dependent upon the level of profitability at a company) and as a dependent variable as a key measure of company performance. In this study profitability is operationalized as return on assets or **ROA**, the annual net income at a company divided by the total assets of the company at the beginning of the fiscal year. To reduce the problem of outliers this variable was winsorized at the 0.01 level.

- Stock market valuation: Given the interest in the potential influence of BLER on stock market valuation the variable **PBRAT** was defined as the market value of the company's shares divided by the book (i.e. accounting) value of the company (total assets minus total liabilities) at the end of the company's fiscal year. This so-called Price/Book Ratio is a measure of stock market valuation commonly used by investors to identify over- or undervalued companies. To reduce the problem of outliers this variable was also winsorized at the 0.01 level.

Models

The approach used in this paper is to estimate a series of regression equations based on the appropriate functional form of the dependent and independent variables (Wooldridge 2002; Rabe-Hesketh and Skrondal 2005):

Stock options

For STOCKOP both a probit and a bivariate probit estimation was used for two reasons. Firstly both the dependent variable STOCKOP and the main independent variable of interest BLER are dichotomous variables. In the main equation we are estimating the probability (between 0 and 100 percent) of a company having a stock option program. Second the issue of potential endogeneity requires a methodology for identifying the presence of and dealing with this problem. The bivariate probit model allows for simultaneous estimation including the potentially endogenous variable BLER in both the main equation and as a dependent variable in the second equation, and a test statistic (Wald test) indicates whether endogeneity should be a concern.

The main equation thus is specified as follows:

(1) STOCKOP = Constant + BLER + FREEFLOAT + TWOTIER + LOGMCAPEUR + Industry dummies

A second variant of this main equation also includes the variable SAYONPAY to measure the potential impact of strong shareholder rights on pay over remuneration outcomes:

(2) STOCKOP = Constant + BLER + FREEFLOAT + TWOTIER + SAYONPAY + LOGMCAPEUR + Industry dummies

The second equation in the bivariate probit estimation includes BLER as a dependent variable and the three instruments discussed above on the right hand side of the equation:

(3) BLER = constant + STRIGHTS + STATE + LOGEMP

Along with the bivariate probit estimation a test for whether or not the residuals of the two equations are uncorrelated (Wald Test) can be generated. A positive result for this test would suggest the lack of endogeneity for BLER, whereas a negative result would suggest that BLER is endogenenous.

Total CEO Pay

A second set of equations focus on the total annual CEO remuneration at a company, operationalized as LOGTOT or the logarithm of total CEO pay. Given observations on the same set of companies over a number of years (2005-2008) these as well as the subsequent set of equations can be estimated in both panel and pooled form. Drawing on the relevant literature discussed in section 2 and the hypotheses developed in section 3, the following models were estimated:

(4) LOGTOT = constant + BLER + ROA + FREEFLOAT + TWOTIER + LOGMCAPEUR + Industry dummies + Year dummies

(5) LOGTOT = constant + BLER + ROA + FREEFLOAT + TWOTIER + SAYONPAY + LOGMCAPEUR + Industry dummies + Year dummies

(6) BLER = constant + STRIGHTS + STATE + LOGEMP

Similar to the case of the models for STOCKOP, variants were defined both including and excluding SAYONPAY. Given the potential impact on profitability on total pay (since this may be included as a component of variable pay) a control variable was also included for the profit rate ROA. To deal with the potential endogeneity problem, the same instruments were used for BLER (6) as in equation (3).

Profitability (ROA)

A third set of equations are designed to estimate if BLER has an impact on the operating performance of companies, measured in terms of return on assets (ROA). Variants with and without SAYONPAY are included (equations 7 and 8).

(7) ROA = constant + BLER + FREEFLOAT + TWOTIER + LOGMCAPEUR + Industry dummies + Year dummies

(8) ROA = constant + BLER + FREEFLOAT + TWOTIER + LOGMCAPEUR + SAYONPAY + Industry dummies + Year dummies

(9) BLER = constant + STRIGHTS + STATE + LOGEMP

In addition the same instruments as in the first two sets of equations are used for an Instrumental Variables estimation (equation 9).

Stock market valuation (PBRAT)

The final set of equations are designed to measure the impact of BLER on stock market valuation, measured in terms of the Price/Book value of the company PBRAT. As with the first three sets of equations, variants are defined both including and excluding SAYONPAY.

(10) PBRAT = constant + BLER + FREEFLOAT + TWOTIER + LOGMCAPEUR + Industry dummies + Year dummies

(11) PBRAT = constant + BLER + FREEFLOAT + TWOTIER + LOGMCAPEUR + Industry dummies + Year dummies

(12) BLER = constant + STRIGHTS + STATE + LOGEMP

In addition the same instruments are used for an Instrumental Variables estimation (equation 12).

5. Results

The results for the four sets of estimates (stock options, total CEO pay, profitability and stock market valuation) are discussed in turn.

Stock options

Table 4 reports the results of a probit estimation of the determinants of stock option plans for top managers in our sample companies (STOCKOP). Two models are estimated, one including (Model 1) and one excluding (Model 2) SAYONPAY. For both variants, in the main equation the variable BLER the coefficient is both negative and significant (at the 0.05 level), which is in line with Hypothesis 1a, that is, BLER is associated with a lower probability of using stock options. The variable TWOTIER is not significant in both models, which is surprising given the strong expectation that two tier boards will better be able to monitor and control top executives (Hypothesis 2a). In both models the variable FREEFLOAT is both positive and highly significant (at the 0.01 level), which is consistent with the hypothesis that the presence of a large shareholder will be associated with a lower probability of having a stock option plan (Hypothesis 3a). In model 2, the results for the variable SAYONPAY are surprising since the coefficient is significant and positive, contradicting the expectations of Hypothesis 4a and suggesting that greater shareholder rights on pay are actually associated with a higher probability of having a stock option plan (Hypothesis 4a).

Among the control variables the size variable LOGMCAPBEUR is, as expected, positively related with the probability of having a stock option program. Industry effects were surprisingly weak; only one industry dummy variable (SIC7) was significant, and this at the

relatively weak level of 0.1. The models were therefore re-estimated excluding the industry dummies, with the results essentially similar (table 5).

In econometric studies of this type it has become commonplace to account for the possibility of endogeneity, in this case being the possibility that there is a simultaneous determination of STOCKOP and BLER or that there is an unobserved variable affecting both of these. For the case of dichotomous dependent variables a bivariate probit model is appropriate for controlling for this, using the potentially endogenous variable as a dependent variable in the second equation.

The results of this procedure are reported in tables 6 and 7. In both sets of models, in the second equation the instruments for BLER are all highly significant and the signs are in line with expectations from the literature. For both sets of models the Wald test for rho = 0 (that is, uncorrelated residuals in the two equations) is insignificant, indicating that the instruments are appropriate. The results for the main independent variables are essentially similar to the simple probit estimations reported above. While the coefficient of BLER still has the expected sign (negative), its significance has dropped from 0.05 to 0.10.

Total CEO Pay

A second set of equations estimates the determinants of total annual CEO pay, operationalized as the logarithm of total remuneration LOGTOT. Table 8 reports the results of a random effects panel estimate of the determinants of LOGTOT. The Sargan-Hansen and Breusch/Pagan LM tests indicate that the random effects estimation is preferable compared to fixed effects and OLS estimations. In line with Hypothesis 1b, the coefficient for BLER is

negative and signicant at the 0.01 level, i.e. BLER is associated with lower levels of total CEO remuneration.

Similar to the estimations for stock options, the presence of a large shareholder is associated with a lower level of total CEO pay (Hypothesis 3b). The effect of a two tier board structure, however, depends upon whether SAYONPAY is included or not. When SAYONPAY is included (Model 2), TWOTIER is negative and significant (supporting Hypothesis 2b). However, when SAYONPAY is included it becomes significant and positive (contradicting Hypothesis 4b) and TWOTIER becomes insignificant (contradicting Hypothesis 2b).

Among the control variables the measure of company size LOGSALES is positive and significant, and a number of industry and year dummies are significant. Wald tests indicate that both sets of dummies should be retained. In particular the annual dummies are significant and show an increase in pay between 2005-2007 but a significant decrease in the crisis year 2008.

An instrumental variables estimation with the same instruments used for the stock option estimations comes to the same conclusions regarding the hypotheses. The significance of BLER even increases to the 0.05 level in Model 2 of the IV estimation. The Sargan-Hansen statistic indicates the appropriateness of the instruments.

Return on Assets (ROA)

The results of the random effects panel estimates of the determinants of ROA are reported in table 10. In line with Hypothesis 5 the coefficient of BLER is insignificant, i.e. BLER does not decrease profitability. Interestingly, larger companies seem to be less profitable, given that

LOGSALES has a negative and significant coefficient. A number of industry and year dummies are significant and Wald tests indicate the appropriateness of keeping these dummies in the estimation.

For the IV regression the same set of three instruments for BLER were included as in the previous sets of equations. For this estimation, however, the Sargan-Hansen statistic was significant, indicating the inappropriateness of this combination of instruments. The IV equation was re-estimated with different subsets of these instruments. The Sargan-Hansen test indicates that it is appropriate to keep STRIGHTS and STATE in the estimation and to exclude the third instrument LOGEMP. The IV regression reported in table 11 confirms the insignificance of BLER and thus Hypothesis 5.

Stock Market Valuation (PBRAT)

The final set of random effects panel estimations also show that BLER is not associated with a lower stock market valuation PBRAT, i.e. in line with Hypothesis 6. The coefficient of BLER is not significant in the results reported in table 12. The effects of the other variables have broadly similar effects on PBRAT as they did on ROA. The IV estimates, for which the two instruments STRIGHTS and STATE are appropriate, also support Hypothesis 6 (i.e. no negative effects of BLER on stock market valuation.

Country Effects

In all of the above models estimations were also run including country effects in the form of dummy variables. However, the instability of results question the appropriateness of the inclusion of the country dummies in these estimations. In the probit estimates many countries

were dropped due to the perfect predictions generated by some of the variables. In the random effects estimates many coefficients were quite unstable from one model specification to the other. This is perhaps not surprising given the high correlation of country and presence of BLER; table 2 reports a strong polarization between on the one hand countries in which all or almost all companies have BLER and on the other hand countries where no or almost no companies have BLER.

6. Discussion and Conclusions

The results of the econometric analysis reported here provide evidence that board level employee representation (BLER) is significantly associated with certain management remuneration practices, specifically with a lower probability of using stock options and a lower level of CEO total pay. At the same time BLER does not appear to be associated with a lower level of profitability or stock market valuation. Given the public criticism of the use of stock options and high levels of CEO pay, BLER thus appears in a favorable light in terms of controlling these controversial practices.

While these results are noteworthy, at the same time caution regarding inferences on the direction of causality should be exercised. While in principle the inclusion of country dummies would be desirable in order to isolate country-specific effects (and thus possible unobserved variables that influence both BLER and the dependent variables measured), the polarization between countries with extensive BLER and those without makes it difficult to isolate these country-specific effects.

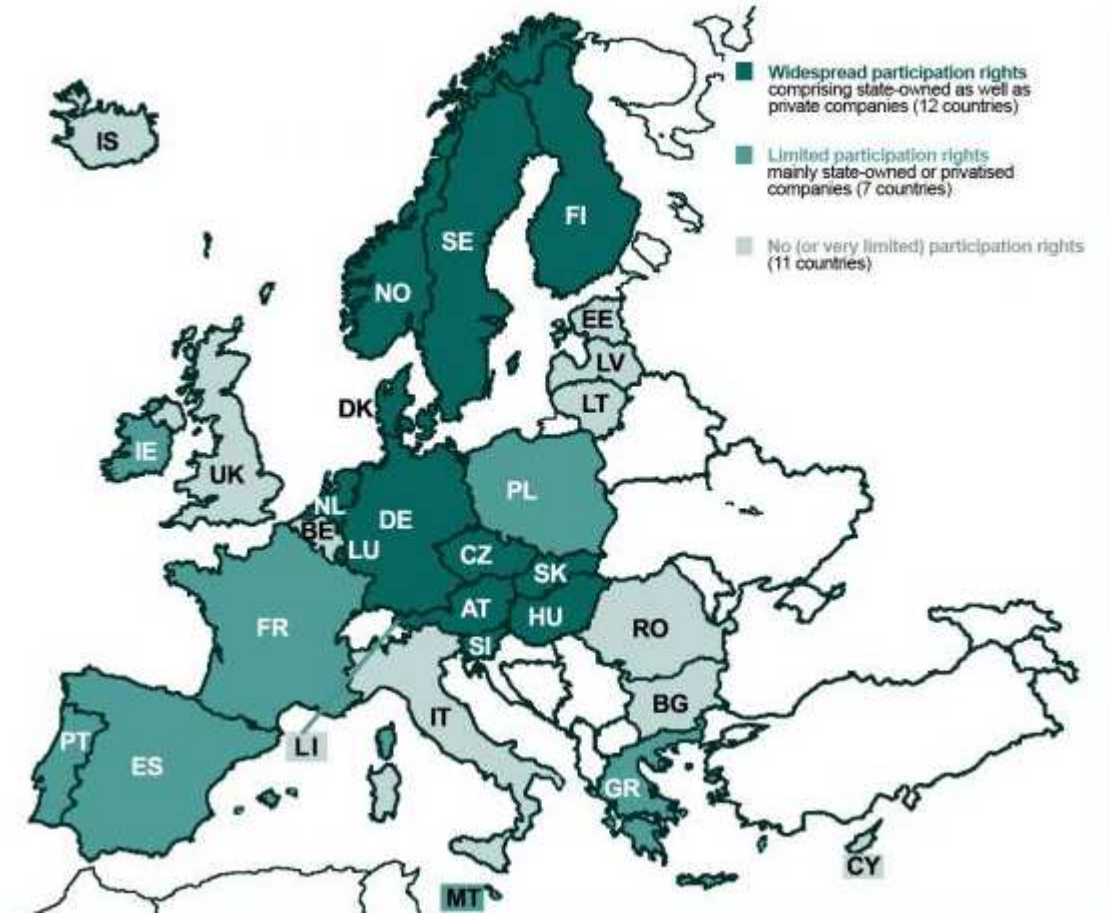
For future research these results would suggest that a larger sample of companies be examined, particularly in countries where there is a more even mix between companies with and without BLER.

A further possibility for future research would be to use an approach which has not yet been applied to this area, namely the estimation of so-called latent variable models. This approach treats different company types (e.g. "solidaristic" versus "competitive", "shareholder" versus "stakeholder") as unobservable variables, for which however different indicators exist (e.g. existence of worker participation, reporting on sustainability performance). The use of the latent variable approach would help deal with the tricky question of causality. This approach could be supplemented with case studies of BLER in companies to examine how causal mechanisms work in practice.

Table 1: Company Sample Characteristics and Remuneration Data Availability

Country	Firms in sample	Total employment (in millions)	% firms with BLER	% employes covered by BLER	% firms with CEO remuneration information	% firms with stock option information
AT	11	1.6	82%	80%	45%	100%
BE	17	2.6	0%	0%	82%	76%
CH	53	7.4	4%	2%	70%	85%
DE	61	24.9	93%	98%	90%	98%
DK	17	1.7	82%	58%	47%	100%
ES	37	7.0	0%	0%	62%	97%
FI	18	2.1	11%	8%	78%	100%
FR	82	31.8	15%	20%	96%	91%
GB	159	36.0	0%	0%	99%	95%
GR	12	1.1	17%	30%	8%	100%
IE	7	0.9	0%	0%	100%	100%
IT	37	6.5	0%	0%	76%	97%
LU	3	1.7	33%	99%	33%	100%
NL	29	9.0	0%	0%	97%	93%
NO	11	1.0	82%	97%	82%	100%
PT	11	1.1	0%	0%	9%	91%
SE	35	6.0	69%	96%	94%	89%
Total	600	142.3	22%	30%	83%	94%

Figure 1: Map of BLER Rights in Europe



Source: Kluge and Stollt (2010), from www.worker-participation.eu

Table 2: Comparative Table on BLER Systems in Europe

Country	Type of companies covered	Extent of representation
Austria	From 300 employees	A third of supervisory board
Belgium	Small number of state-owned companies	Varies
Bulgaria	No board level representation but employees have some right to be heard at shareholders' general meetings	
Cyprus	No statutory board-level representation	
Czech Republic	State-owned companies and private companies from 50 employees	A third of supervisory board
Denmark	From 35 employees	Between two members and one third of board – (supervisory in public limited companies)
Estonia	No board-level representation	
Finland	From 150 employees	A quarter of members of board or other decision making body
France	State-owned and recently privatised companies	A third of board in state-owned companies, around a fifth in others
Germany	From 500 employees	A third of supervisory board in companies with more than 500; half in companies with more than 2,000; special arrangements including management board member in coal, iron and steel companies
Greece	State-owned companies	Two board members
Hungary	From 200 employees	A third of members on supervisory board (fewer rights in single tier board system)
Ireland	State-owned companies	A third of board (less in some smaller companies)
Italy	No board-level representation	
Latvia	No board-level representation	
Lithuania	No board-level representation	
Luxembourg	From 1,000 employees or with state involvement	A third of board in companies with 1,000 plus employees, up to a third in others

Malta	State-owned and recently privatised companies	Varies, often just one
Netherlands	From 100 employees	Up to a third of supervisory board
Poland	State-owned and partially privatised companies	A workers' council has substantial powers in state-owned companies; in partially privatised companies employees have between 40% and about a third of seats on supervisory board and a seat on management board
Portugal	State-owned companies	Right to be present in constitution but never realised
Romania	No board-level representation	
Slovakia	State-owned and private sector companies from 50 employees (also other conditions)	Half supervisory board in state-owned companies; a third in private sector
Slovenia	Companies with supervisory board; and companies with single tier board from 50 employees (also other conditions)	Between a third and a half of seats in companies with supervisory board plus management board member if more than 500 employees; around a third in companies with single tier board
Spain	Some state-owned and recently privatised companies and local savings banks	Two members in state-owned companies; between 5% and 15% in savings banks
Sweden	From 25 employees	Around a third of single tier board
United Kingdom	No board-level representation	

Source: Lionel Fulton: Worker representation in Europe. Labour Research Department and ETUI-REHS: 2007.

Table 3: Descriptive Statistics

Variable name	Variable description	Mean	Sd	p25	p50	p75	Min	Max
total	Total CEO remuneration (in 000 EUR)	3509.332	5589.186	1113	2107	4069	1	133352
logtotal	Logarithm of “total“	7.64349	1.053292	7.014814	7.65302	8.311152	0	11.80075
roa	Return on assets	0.0716204	0.0967949	0.0193018	0.0571708	0.1031208	-0.6354761	1.065886
Wroa	Winsorized ROA	0.0713083	0.0805568	0.0193018	0.0571708	0.1031208	-0.1636671	0.3959768
twotier	Dichotomous variable coded 1 if firm has 2 boards, 0 otherwise	0.3533333	0.4780715	0	0	1	0	1
sayonpay	Dichotomous variable coded 1 if firm has HQ in a country with shareholder voting rights on pay, 0 otherwise	0.37	0.4828714	0	0	1	0	1
freefloat	Percentage of shares held by small investors (i.e. those holding less than 5 percent of shares)	0.7614862	0.2439489	0.55985	0.84215	1	0.0596	1
emp	Number of employees working for the firm	43.49007	70.82402	5	17.7455	51.511	0	586.9
logemp	Logarithm of “emp“	2.62601	1.84443	1.618596	2.877624	3.942281	-6.214608	6.374855
mcapbeur	Market value of company shares (in billion EUR)	8.050375	14.63862	1.465082	2.981063	7.067504	0.665	112.4392
logmcapbeur	Logarithm of “mcapbeur“	1.287653	1.141127	0.381909	1.09228	1.955477	-0.4079682	4.722412
eurassets	Accounting value of firm assets (in million EUR)	62118.2	211780.4	2360.789	6741.933	25287.09	21.417	2587333
logeurassets	Logarithm of “eurassets“	9.073108	1.811047	7.766751	8.816102	10.13805	3.064185	14.76614
eursales	Value of annual firm sales (in million EUR)	11565.17	22148.06	1572.444	4412.005	11625.28	0	303756
logeursales	Logarithm of “eursales“	8.366225	1.489006	7.362605	8.396105	9.360937	-1.248273	12.62398

Table 4: Probit Model Estimates of Determinants of Stock Option Plans

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
stockop				
bler	-0.3976705**	0.1876138	-0.4040116**	0.1885384
twotier	-0.0996402	0.1706845	-0.0139153	0.1749466
newfloat	2.112904***	0.3060675	1.793799***	0.3309137
logmcapbeur	0.3045527***	0.0929291	0.3245963***	0.0937483
sayonpay			0.4879964***	0.2002691
sic1	0.3982081	0.3905475	0.4170108	0.3925865
sic2	0.1867035	0.314327	0.1914877	0.3175727
sic3	0.3248379	0.3548426	0.3255323	0.3579638
sic4	0.0877631	0.4045225	0.1747762	0.4092249
sic5	0.4676409	0.3524601	0.4602896	0.3568837
sic6	0.7198369	0.5615731	0.7296268	0.5711883
sic7	-0.5553179	0.3762417	-0.556284	0.3803376
sic8	-0.126692	0.3049944	-0.1082346	0.3082254
constant	-0.407997	0.3402889	-0.3530785	0.3427184
observations	539		539	
Log likelihood	-189.88096		-186.78532	
LR chi2(12)	83.31			
LR chi2(13)			89.50	
Prob> Chi2	0.0000		0.000	
Pseudo R2	0.1799		0.1933	
Wald Test of Industry Dummies = 0				
chi2(8)	15.66		15.07	
Prob > chi2	0.0475		0.0578	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 5: Probit Model Estimates of Determinants of Stock Option Plans (Excluding Industry Dummy Variables)

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
stockop				
bler	-0.3079879*	0.1799417	-0.3114365*	0.1808138
twotier	-0.1175261	0.1646457	-0.0306696	0.1690928
freefloat	2.113289***	0.296306	1.796116***	0.3186618
logmcapbeur	0.2558155***	0.0858878	0.2725675***	0.0865408
sayonpay			0.4991798***	0.1952045
constant	-0.3239397	0.2179744	-0.2632146	0.218729
observations	539		539	
Log likelihood	-197.98341		-194.55921	
LR chi2(4)	67.11			
LR chi2(5)			73.95	
Prob> Chi2	0.0000		0.0000	
Pseudo R2	0.1449		0.1597	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 6: Bivariate Probit Model Estimates of Determinants of Stock Option Plans

	Model 1		Model 2	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
stockop				
bler	-0.5180534**	0.2383711	-0.5672103**	0.2434667
twotier	-0.1130946	0.1846552	-0.0101447	0.1929137
freefloat	2.181573***	0.3257442	1.898354***	0.3485644
logmcapbeur	0.2749508***	0.0954743	0.3014553***	0.0968052
sayonpay			0.444568**	0.2048114
sic1	0.3126468	0.4024957	0.32637	0.4033692
sic2	0.1964898	0.3336423	0.1985037	0.3356186
sic3	0.2419178	0.3685819	0.2367628	0.3704601
sic4	0.0355557	0.4136045	0.1175459	0.4167114
sic5	0.3065162	0.3695201	0.2931771	0.3727524
sic6	0.6663021	0.5736608	0.6582237	0.5816721
sic7	-0.7367873*	0.3958398	-0.7540144*	0.3988066
sic8	-0.1915306	0.3263611	-0.1914453	0.3286696
sic9	6.435395	27197.14	6.490611	29115.61
constant	-0.3489824	0.3651925	-0.3021743	0.3661483
bler				
strights	3.145124***	0.2134134	3.148204***	0.2132692
stateown	1.284199***	0.2725525	1.280199***	0.2722669
logemp	0.4302858***	0.1167012	0.4286153***	0.1167485
constant	-2.119025***	0.1545224	-2.119614***	0.154601
observations	535		535	
Log likelihood	-274.30319		-271.87883	
Wald Chi2(16)	289.51			
Wald Chi2(17)			292.45	
Prob> Chi2	0.0000		0.0000	
Wald Test of Industry Dummies = 0				
chi2(9)	15.97		15.98	
Prob > chi2	0.0674*		0.0672*	
rho	0.221257	0.2013774	.278083	.2010943
Wald Test of rho=0				
chi2(1)	1.22697		1.92791	
Prob > chi2	0.2680		0.1650	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 7: Bivariate Probit Model Estimates of Determinants of Stock Option Plans (Excluding Industry Dummy Variables)

	Model 1		Model 2	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
stockop				
bler	-0.3754958*	0.2272985	-0.4106296*	0.2311286
twotier	-0.1364672	0.1780906	-0.0454203	0.1856719
freefloat	2.185397***	0.310687	1.937757***	0.3314057
logmcapbeur	0.1945908**	0.0862559	0.2120022**	0.0870451
sayonpay			0.4035189*	0.1985141
constant	-0.3082887	0.2327125	-0.2688969	0.232663
bler				
strights	3.144218***	0.2136969	3.146743***	0.2136643
stateown	1.291855***	0.2726663	1.293551***	0.2724032
logemp	0.4315102***	0.1169195	0.4297097***	0.1170298
constant	-2.119486***	0.1545656	-2.12082***	0.154679
observations	535		535	
Log likelihood	-285.7772		-283.64605	
Wald Chi2(7)	276.86			
Wald Chi2(8)			279.27	
Prob> Chi2	0.0000		0.0000	
rho	.1235492	.1956383	.172194	.1960211
Wald Test of rho=0				
chi2(1)	.404666		.781526	
Prob > chi2	0.5247		0.3767	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 8: Random Effects Model Estimates of Determinants of Total CEO Pay

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
bler	-0.1843415*	0.1005971	-0.1707753*	0.0989992
roa	0.7153959**	0.3165728	0.635261**	0.3159089
twotier	-0.2201528**	0.0874089	-0.1225217	0.0894764
freefloat	1.316022***	0.1627639	1.020965***	0.176797
sayonpay			0.3494464***	0.0886808
logsales	0.3874485***	0.0388842	0.4165189***	0.0389793
sic1	0.2427695	0.2015895	0.2528678	0.1982641
sic2	-0.082274	0.1750798	-0.0721938	0.1721838
sic3	0.349792*	0.1917406	0.3517623*	0.1885467
sic4	0.4010124*	0.2214578	0.478602**	0.2186343
sic5	0.2651024	0.1885819	0.253258	0.1854758
sic6	0.024163	0.2516736	-0.0016386	0.247584
sic7	-0.2089332	0.2166138	-0.2033514	0.2130436
sic8	0.1277206	0.1763995	0.1466086	0.1735579
sic9	0.0862317	0.2250692	0.1602717	0.2220697
y2005	-0.1291282***	0.0423442	-0.1305937***	0.0423637
y2007	0.0586539	0.0408273	0.0596364	0.0408423
y2008	-0.2008048***	0.0486532	-0.206895***	0.0486845
constant	6.53472***	0.2093462	6.570914***	0.2062526
observations	1516		1516	
groups	479		479	
Wald chi2(17)	256.42			
Wald chi2(18)			278.63	
Prob> Chi2	0.0000		0.0000	
R2 (overall)	0.2519		0.2648	
Wald Test of Industry Dummies = 0				
chi2(9)	22.57		24.69	
Prob > chi2	0.0072		0.0033	
Wald Test of Year Dummies = 0				
chi2(3)	39.38		41.09	
Prob > chi2	0.0000		0.0000	
Sargan-Hansen statistic				
chi2(5)	8.755		7.942	
Prob > chi2	0.1192		0.1595	
Breusch/Pagan LM test				
chi2(1)	581.63		579.30	
Prob > chi2	0.0000		0.0000	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 9: Instrumental Variables Estimation of Determinants of CEO Total Pay

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
bler	-0.2277288*	0.122256	-0.2512752**	0.1205106
roa	0.6751213**	0.3199906	0.5887622*	0.3191674
twotier	-0.2057023**	0.0909	-0.0916691	0.093009
freefloat	1.313502***	0.1636484	1.005719***	0.1778521
sayonpay			0.3581644***	0.0884559
logsales	0.3960263***	0.0392851	0.4283927***	0.03955
sic1	0.273693	0.2017255	0.2915666	0.1995179
sic2	-0.053495	0.1757242	-0.0396167	0.1738102
sic3	0.3771444**	0.1918936	0.3826866**	0.1897745
sic4	0.4327076*	0.2210546	0.5180156**	0.2195206
sic5	0.267624	0.1898461	0.253068	0.1877795
sic6	0.0468763	0.2506872	0.0245924	0.2479982
sic7	-0.1536895	0.2167754	-0.1445674	0.2144094
sic8	0.1507664	0.1772051	0.170572	0.1753407
sic9	0.1026328	0.2249708	0.1833755	0.2232992
y2005	-0.1227285***	0.0431737	-0.1239097***	0.043069
y2007	0.0600373	0.0414011	0.0606341	0.0412982
y2008	-0.1977655***	0.0490598	-0.2044044***	0.048961
constant	6.517184***	0.2123671	6.559607***	0.2102371
observations	1492		1492	
groups	476		476	
Wald chi2(17)	254.75			
Wald chi2(18)			277.44	
Prob> Chi2	0.0000		0.0000	
R2 (overall)	0.2526		0.2658	
Sargan-Hansen statistic				
chi2(2)	1.177		0.403	
Prob > chi2	0.5550		0.8173	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 10: Random Effects Model Estimates of Determinants of Return on Assets

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
bler	-0.0001144	0.0071216	0.0005987	0.0070581
twotier	0.0010039	0.0061666	0.0065605	0.0063193
freefloat	-0.0091256	0.0109978	-0.0272515**	0.0121031
sayonpay			0.0218855***	0.0063629
logsales	-0.0121593***	0.0027103	-0.0110275***	0.0027077
sic1	0.0025241	0.0141755	0.0023652	0.014043
sic2	-0.0143851	0.0121112	-0.0143397	0.0119981
sic3	-0.011853	0.0131148	-0.012092	0.0129923
sic4	-0.0067262	0.0150911	-0.001729	0.0150216
sic5	-0.0101122	0.013069	-0.0117869	0.0129557
sic6	-0.020606	0.0175601	-0.0220063	0.0174004
sic7	-0.039821***	0.0151415	-0.0398515***	0.0149999
sic8	-0.061352***	0.0120361	-0.0600463***	0.0119299
sic9	-0.010421	0.0165864	-0.0075754	0.0164524
y2005	-0.0061136**	0.0029229	-0.0060854**	0.0029226
y2007	0.0021881	0.0028888	0.0021549	0.0028885
y2008	-0.0226025***	0.0028979	-0.0226394***	0.0028975
constant	0.107236***	0.0137798	0.1104942***	0.0136857
observations	2245		2245	
groups	546		546	
Wald chi2(16)	191.97			
Wald chi2(17)			205.74	
Prob> Chi2	0.0000		0.0000	
R2 (overall)	0.1284		0.1410	
Wald Test of Industry Dummies = 0				
chi2(9)	72.23		71.41	
Prob > chi2	0.0000		0.0000	
Wald Test of Year Dummies = 0				
chi2(3)	89.46		89.63	
Prob > chi2	0.0000		0.0000	
Sargan-Hansen statistic				
chi2(4)	12.915		12.643	
Prob > chi2	0.0117		0.0132	
Breusch/Pagan LM test				
chi2(1)	1043.99		1016.50	
Prob > chi2	0.0000		0.0000	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 11: Instrumental Variables Estimation of Determinants of Return on Assets

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
bler	-0.0062282	0.0089642	-0.0079298	0.008849
twotier	0.0033469	0.0064717	0.0097681	0.0065896
freefloat	-0.0098603	0.0109269	-0.0280874**	0.0120137
sayonpay			0.0216559***	0.0063112
logsales	-0.0118371***	0.0027084	-0.0105786***	0.0027042
sic1	0.0034626	0.0140838	0.0036772	0.0139506
sic2	-0.0140475	0.012015	-0.0138641	0.0119017
sic3	-0.0114324	0.0130118	-0.0114999	0.0128892
sic4	-0.0059857	0.0149825	-0.0007356	0.0149103
sic5	-0.0103115	0.0129614	-0.0120424	0.0128479
sic6	-0.0200134	0.0174225	-0.0211648	0.0172628
sic7	-0.0394747***	0.0150192	-0.0393651***	0.0148775
sic8	-0.0613816***	0.0119363	-0.0600952***	0.0118301
sic9	-0.009905	0.0164559	-0.0068756	0.0163209
y2005	-0.0060992**	0.0029317	-0.006066**	0.002932
y2007	0.0021678	0.0028975	0.0021281	0.0028979
y2008	-0.0226247***	0.0029066	-0.0226701***	0.002907
constant	0.1081189***	0.0136904	0.111686***	0.0135941
observations	2245		2245	
groups	586		586	
Wald chi2(16)	193.61			
Wald chi2(17)			207.89	
Prob> Chi2	0.0000		0.0000	
R2 (overall)	0.1275		0.1393	
Sargan-Hansen statistic				
chi2(2)	0.448		0.886	
Prob > chi2	0.5032		0.3465	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 12: Random Effects Model Estimates of Determinants of Price/Book Value

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
bler	0.0988676	0.2800947	0.1049742	0.2801416
twotier	-0.1186595	0.2421153	-0.073878	0.2502128
newfloat	-0.8562278**	0.4315834	-1.001773**	0.4781547
sayonpay			0.1769692	0.2506378
logsales	-1.364484***	0.0947131	-1.357776***	0.095112
sic1	-0.5592787	0.5570766	-0.5598881	0.5568862
sic2	0.0000794	0.4757927	0.0018114	0.4756366
sic3	0.0002112	0.5155335	-0.0009745	0.5153592
sic4	1.197109**	0.5920521	1.235725**	0.5943408
sic5	-0.1130216	0.5139181	-0.125965	0.5140618
sic6	0.5465334	0.6903824	0.5362103	0.6902934
sic7	0.0179851	0.5949366	0.0188984	0.5947349
sic8	-1.504644***	0.4730645	-1.493382***	0.4731767
sic9	-0.1750907	0.6521106	-0.1526569	0.6526548
y2005	-0.0645815	0.1073626	-0.0642658	0.1073843
y2007	-0.5997589***	0.1074155	-0.6000644***	0.1074371
y2008	-0.5915638***	0.1076704	-0.5919452***	0.1076923
constant	3.716614***	0.5392511	3.741906***	0.5402443
observations	2840		2840	
groups	569		569	
Wald chi2(16)	369.86			
Wald chi2(17)			370.35	
Prob> Chi2	0.0000		0.0000	
R2 (overall)	0.1615		0.1625	
Wald Test of Industry Dummies = 0				
chi2(9)	50.26		50.32	
Prob > chi2	0.0000		0.0000	
Wald Test of Year Dummies = 0				
chi2(3)	51.38		51.44	
Prob > chi2	0.0000		0.0000	
Sargan-Hansen statistic				
chi2(4)	91.807		92.931	
Prob > chi2	0.0000		0.0000	
Breusch/Pagan LM test				
chi2(1)	1549.62		1540.96	
Prob > chi2	0.0000		0.0000	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

Table 13: Instrumental Variables Estimation of Determinants of Price/Book Value

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
bler	-0.0466987	0.3563154	-0.0598326	0.3547968
twotier	-0.0629062	0.2563877	-0.0120255	0.2631818
newfloat	-0.873662**	0.4323445	-1.017695**	0.4784739
sayonpay			0.1723684	0.2506412
logsales	-1.35649***	0.0954498	-1.348723***	0.09579
sic1	-0.536665	0.5580735	-0.5343681	0.5577543
sic2	0.0086001	0.4759181	0.0113808	0.4756669
sic3	0.0104894	0.5157167	0.0106009	0.5154411
sic4	1.215227**	0.5926193	1.255312**	0.5947196
sic5	-0.1174649	0.513907	-0.1307194	0.5139475
sic6	0.5604439	0.690635	0.5520898	0.6904192
sic7	0.0268345	0.5950267	0.0288113	0.5947087
sic8	-1.50499***	0.473015	-1.494113***	0.4730389
sic9	-0.1621629	0.6523342	-0.1385831	0.6527255
y2005	-0.0642589	0.1073728	-0.0639019	0.1074013
y2007	-0.6002751***	0.1074274	-0.6006521***	0.1074555
y2008	-0.5922292***	0.1076841	-0.5927026***	0.1077125
constant	3.737348***	0.5401037	3.764753***	0.5409232
observations	2840		2840	
groups	569		569	
Wald chi2(16)	369.74			
Wald chi2(17)			370.24	
Prob> Chi2	0.0000		0.0000	
R2 (overall)	0.1617		0.1627	
Sargan-Hansen statistic				
chi2(2)	0.053		0.031	
Prob > chi2	0.8176		0.8593	

Notes:
* $0.10 < P < 0.05$
** $0.05 < P < 0.01$
*** $P < 0.01$

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