# BOARD SIZE AND FIRM OPERATING PERFORMANCE: EVIDENCE FROM GERMANY

***Andrea Graf**, Markus Stiglbauer*****

**Abstract**

Determining the optimum size of corporate boards is an important task for companies. Agency theory suggests that either too large or too small boards cause negative effects on firm operating performance. For a given sample of 113 listed firms in the German Prime market, we tested the effect of board size on return on assets and return on equity. Our findings provide evidence that there is a significantly negative Management Board size effect both on return on assets and return on equity. The results are consistent with the assumption of dysfunctional norms of behaviour within the German two-tier board structure.

**Keywords:** Board size, management board, operating performance, German dual board system

**University of Regensburg, Faculty of Business, Economics and Information Systems, Chair of Department of Management and Organization Design, Universitaetsstr. 31, 93040 Regensburg, Germany, Tel.: +49-941-943-2681, Fax: +49-941-943-4206, Email: andrea.graf@wiwi.uni-regensburg.de*

*** * Corresponding Author. Research Assistant and Doctoral Candidate, University of Regensburg, Faculty of Business, Economics and Information Systems, Department of Management and Organization Design*

## 1. Introduction

A widely discussed issue among corporate governance scholars and the topic that is in the heart of corporate governance is the relationship between shareholders and the management team. Shareholders have a qualified interest that managers use their money in order to make profits and increase shareholder value (Millstein and MacAvoy 1998, 1291). This may come into conflict with managers' targets due to „manager's natural tendency … to allocate the firm's resources in their own best interests" (McConnell and Servaes 1990, 597). Thus investors should keep an eye on the quality of corporate boards in decision-making (Graf and Stiglbauer 2008; Parum 2005, 702; De Andres et al. 2005, 197). Important attributes for high-quality boards are knowledge, information, power, incentives and opportunity/time (Payne et al. 2009). High-quality boards are supposed to lead in a more intensive (Adams & Ferreira 2005, 2) und more enthusiastic way (Hermalin and Weisbach 1998, 97). Therefore, such boards are generally expected to achieve higher rates of return (Millstein and MacAvoy 1998, 1283).

Keeping in mind that a companies' management obviously has an interest in good reputation in the market (Jensen and Meckling 1976, 328; Hermalin and Weisbach 1998, S. 99), that is to say a reputation of behaving professionally (Chung and Pruitt 1996, 1142), research focuses on how to structure boards appropriately and to what extent these structures influence firm performance (Van den Berghe and Levrau 2004, 462). One important criterion in structuring corporate boards is board size, which we investigate in the following sections of this paper. Determining the optimum size of boards is an important task for companies because board size may cause different *board size effects*, possibly influencing firm's financial performance. Contrary to most studies we do not investigate board size effects in the Anglo-American single board system with one board consisting of executives and directors (Luo 2007, 40-41): Instead we investigate companies within the German dual board system (Tricker 2009, 186). There are two separate boards in the German dual board system. The first one is the executive board, named the "Management Board" (in German "Vorstand") which is comparatively equal to the Anglo-American management team. The second one is the "Supervisory Board" (in German "Aufsichtsrat") with in part an advising role (Hopt and Leyens 2004, 139-141) but with its main task "to appoint and dismiss the members of the Management Board and to monitor them" (Jungmann 2006, 432). We synonymously mean the German Management Board when talking about boards in the further sections of this paper. The dual board structure of the German dual board system intrinsically would imply to test also on possible size effects of the Supervisory Board as a separate governance mechanism. We don't consider this as a good decision, since the size of the Supervisory Board in our German sample is mainly determined by legal rules such as the codetermination act

(Renaud 2007) and less a conscious/independent decision of firms, to gain competitive advantage (Grant 1998, 175).

## 2. Board size and performance: Current state of knowledge and hypothesis

Based on Olson's arguments that individuals do not necessarily act collectively (collective action problem) in spite of the consciousness of decreases in efficiency and effectivity (Olson 1965), Jensen and Lipton and Lorsch argue that oversized boards may be less efficient due to difficulties in solving agency problems among individual board members (Jensen 1993; Lipton and Lorsch 1992). Agency theory predicts that agency problems may possibly arise if there were more board members, e.g. problems in assigning tasks among board members. Larger boards may also be arrangements with a greater number of interests that are based individually and that are less task-oriented (Nordberg 2008). This may result in greater risks of opportunistic behaviour obviously "it was presumed that managers are led to act in [companies'] best interest (Connell and Servaes 1990, 595).

Generally speaking, increasing board size may have negative effects on board efficiency due to increasing difficulties in finding consensus among a greater number of board members. This could be explained via increasing diversity in communication and more difficulties in coordinating interests in decision processes (Ten Velden et al. 2007; Schei and Rognes 2005): „Prima facie, a directorial board of ten is an executive body and a board of over thirty a debating body" (Bates 1940, 85). Therefore final decisions of larger boards are reflecting more compromises and are supposed as being less extensive than those of smaller boards. As a consequence performance is considered to be less variable and flexible in companies with larger boards (Cheng 2008, 157). Moreover controlling managers' actions through the Supervisory Board and also through the CEO (in Germany the "Vorstandsvorsitzender") becomes more difficult, when board size increases. Processes within the board are becoming less transparent due to increasing complexity of interactions and intentions of single board members become more and more hidden. This could promote situations where single board members take self-serving actions or show free riding behaviour (Grossman and Hart 1988, 176; Jensen 1993, 865; Eisenberg et al. 1998, 37): "The idea is that when boards become too big, agency problems (such as director free-riding) increase within the board and the board becomes more symbolic and less a part of the management process" (Hermalin and Weisbach 2003, 13).

Arising agency problems in case of larger boards could also result from counterproductive codes of conduct. Lipton und Lorsch identified problems of missing criticism within larger boards and missing discussion among single board members or with the CEO. This may lower firm performance. This could result from decreasing costs of single board members for inappropriate monitoring of the CEO in case of increasing board size (Lipton and Lorsch 1992). Confirming these theoretical assumptions empirically, Yermack analyzed more than 450 large US companies and found significantly negative board size effects on firm performance (Yermack 1996). Likewise did Guest in recent research on companies in the UK (Guest 2009), De Andres et al. in 10 OECD countries (De Andres et al. 2005) or Loderer and Peyer in Switzerland (Loderer and Peyer 2002). Eisenberg et al. also found significant negative board size effects for small and midsize companies in Finland (Eisenberg et al. 1998). Summing up, one may assume negative board size effects in general, independent from firm characteristics such as size or industry. Consequently, Hermalin and Weisbach conclude: "The data therefore appear to reveal a fairly clear picture: board size and firm value are negatively correlated" (Hermalin and Weisbach 2003, 13). However, literature states that negative board size effects only apply to companies with relatively large boards (Bennedsen et al. 2008, 1100). Nonetheless there are theoretical reasons why undersized boards could raise negative board size effects, too. One aspect supporting this assumption is missing precision of small boards in decision-making because of single board members' lacking management capacity (Beiner et al. 2004, 328) or managerial overload (Thomsen 2008, 73). Maybe undersized boards also do not represent an adequate critical mass for really discussing different issues (Chiang 2005, 96).

Nevertheless, Kiel and Nicholson found significant positive board size effects in Australia (Kiel and Nicholson 2005). Findings of Adams and Mehran (for US banks) or Coles et al. show positive board size effects depending on operations' complexity that is to say the industry a company is part of (Adams and Mehran 2005; Coles et al. 2008). In contrast, there are also findings reporting insignificant board size effects, e.g. De Jong et al. in the Netherlands (De Jong et al. 2005) and Black et al. in Korea (Black et al. 2006), respectively. Despite these insignificant findings board size is generally supposed to be directly connected to firm operating performance.

Surprisingly to our previous assumptions on possibly either positive or negative board size effects in different other countries board size effects have not been analysed empirically in Germany, yet. Therefore, according to findings in other countries the algebraic sign of the possible influence of board size on firm operating performance could either be a positive or negative one in German corporations. Once again we want to

highlight that we concentrate on Management Board size not on Supervisory Board size. So we are testing the following hypothesis:

*Hypothesis:* *Management Board size within companies of the German prime market influences firm operating performance measured by return on assets and return on equity.*

## 3. Data and Methodology

Our data include 113 corporations listed in the Prime Standard segment of the Frankfurt Stock Exchange (FWB) in 2007, especially in the selection indices DAX (26 corporations), TecDAX (20 corporations), MDAX (34 corporations) and SDAX (33 corporations). We excluded companies without (voluntarily) accounting via IFRS in order to avoid a *regulatory bias*. It is important not to mix up performance and controlling variables resulting from different accounting standards (Becht et al. 2003, 17). Moreover, we excluded companies due to so-called *index effects*. Such effects occur, if corporations are included or excluded from a stock index. Index effects cause higher costs of capital if corporations are excluded from stock indices and afterwards are listed in a stock index with lower reputation and vice versa. Consequently, if one doesn't take into account possible index effects one may compare biased performance measures.(Schmidt and Ziemer 2008)

We specified two models respectively performance equations consisting of two endogenous variables (variables to be described/determined) and nine exogenous variables (variables to describe/to determine the endogenous variables) (Stewart 1991, 2; Studenmund 2001, 488). Our two endogenous variables return on assets (ROA) and return on equity (ROE) of the company in 2007 were collected from Thomson Financial Datastream und Worldscope. Data on ownership structure were collected from Deutsche Börse and the German Federal Financial Supervisory Authority (BaFin). Our data also cover financial items from both the income statement and the balance sheet. The variable of main interest, board size (BSIZE) enters linearly in both specifications. Board size was collected from companies' annual reports for 2007 (Table 1). Although studies such as Eisenberg et al. or Yermack have imposed a log transformations (Eisenberg et al. 1998; Yermack 1996) the range of variation in board size in our sample is rather narrow (Table 2). We assume none of our findings should to be affected by our simple linear specification (Bennedsen et al. 2008, 1104).

**Table 1.** Endogenous and exogenous variables

| | |
|---|---|
| ENDOGENOUS | |
| ROA | Return on Assets |
| ROE | Return on Equity |
| EXOGENOUS | |
| SIZE | Market capitalization (Mio. €) |
| BLOCK | Largest voting rights block |
| FREEFLOAT | Total shares outstanding, excluding shares held by strategic investors such as governments, corporations, controlling shareholders, and management and board members |
| CLOSEHELD | Percentage of shares held by members of the Management Board and the Supervisory Board and persons connected with them |
| GROWTH | Growth of sales (annually 31.12.2007 compared to 31.12.2006) |
| LEV | Leverage |
| RD | Research and development intensity (01.01.2007 - 31.12.2007) |
| BSIZE | Number of executive directors within the German „Management Board" |
| INDUSTRY | Nominal variable consisting of 17 of the 18 industries of the Prime All Share Index of Deutsche Börse; excluding Food & Beverage since none of the corporations belongs to this industry |

From an investor's point of view the higher ROA and ROE compared to other companies the higher is firm performance (Brealey et al. 2008). Including SIZE within both models Diaz und Sanchez have shown recently that smaller companies are significantly more efficient than bigger ones (Diaz and Sanchez 2008), which tend to be much more bureaucratic and less flexible in managing their resources (Wu 2006). Keeping that in mind, one could presume a negative *size-effect* on firm financial performance (Papadagonas 2007). In contrast, bigger companies are also connected with economies of scale and outstanding power. This could result in superior financial performance (Grant et al. 1988; Robins and Wiersema 1995, 286). To avoid a bias on operating firm performance due to an expected strong asymmetric distribution of SIZE (Eisele 2006, 134) - this becomes apparent especially by comparing companies within DAX with those in SDAX (Small Cap Index) - we calculate SIZE as its natural logarithm: A linear impact of SIZE on firm

operating performance (ROA and ROE) is less plausible than a logarithmic one (Altmann 2003, 182; Koch 2005, 154). We also calculate companies' leverage (LEV) as its natural logarithm because we expect an asymmetric distribution of this variable (Koch 2005, 154). Especially companies within the banks, insurance and financial services industry show above average debt ratios.

We also analyzed different ownership structures. Single shareholders do have incentives to control managers. However, due to *collective action* problems with other shareholders (Olson 1965) they are limited in their monitoring function (Grossman and Hart 1988, 176). Management can use this limitation to act opportunistically which causes agency problems and therefore agency costs for corporations: "Since shareholders have to delegate control to a few directors and managers to run the company on behalf of all the shareholders, there is a potential risk that directors and managers may serve their own interests at the expense of all the shareholders" (Letza et al. 2004, 247). Therefore, big proportions of FREEFLOAT are generally connected with lower firm performance (McGuinness and Ferguson 2005, 232). By contrast, blockholders (BLOCK) are supposed to have a stronger monitoring of managers and more power to promote changes in managerial decision-making (Gorton and Kahl 2008, 938). Therefore, companies with large blockholders are intended to be more successful (Hill and Snell 1998, 42). A possible explanation for this assumption is continuity of interests. Continuity of interests is supposed to have a stabilizing function since large voting blocks generally help to avoid fast exit strategies for investors. This would lower stock prices (Baysinger and Butler 1985, 106). However, large voting rights blocks also represent a source of power, which can either support or oppose managers. Therefore, blockholding can also cause stable conflicts between managers and blockholders. As a consequence this may also lower firm performance (Salancik and Pfeffer 1980, 655-656).

*Model 1:* $$ROA_i = \beta_0 + \beta_1 lnSIZE_i + \beta_2 BLOCK_i + \beta_3 FREEFLOAT_i + \beta_4 CLOSEHELD_i + \beta_5 GROWTH_i + \beta_6 lnLEV_i + \beta_7 RD_i + \beta_8 BDSIZE_i + \beta_9 INDUSTRY_i + \varepsilon_i$$

*Model 2:* $$ROE_i = \beta_0 + \beta_1 lnSIZE_i + \beta_2 BLOCK_i + \beta_3 FREEFLOAT_i + \beta_4 CLOSEHELD_i + \beta_5 GROWTH_i + \beta_6 lnLEV_i + \beta_7 RD_i + \beta_8 BDSIZE_i + \beta_9 INDUSTRY_i + \varepsilon_i$$

Increasing proportions of closely held shares (CLOSEHELD) from a low basis could lower incentives for managers to misuse property rights (Himmelberg et al. 1999, 354) and as a consequence increase firm value. Following *convergence of interest hypotheses* (Jensen and Meckling 1976, 312-314; Bennedsen and Wolfenzon 2000, 113) this may lower conflicts of interest between managers and shareholders (McConnell and Servaes 1990, 597). Contrariwise, increases in managerial share proportion on the basis of relatively high values are supposed to induce stronger ties between managers and company. However, this also weakens traditional control mechanism, e.g. the market for corporate control or the market for managers. A further point of high managerial share proportions is that management is supposed to act conservative, less risky and self-serving with a potential consequence of lower firm performance (Jensen and Ruback 1983, 29-30). Additionally, this may lower expected returns of atomistic shareholders (Peasnell et al. 2003, 232).

According to many other studies we calculate GROWTH as the increase in sales (Short and Keasey 1999, 89). Firms' growth targets are firstly connected with higher profitability, e.g. increasing output results in steady investments into new equipment: Out of date equipment has to be replaced faster to sustain growth (Singh and Whittington 1968, 189). Higher R&D ratios are generally associated with higher operating performance (Van Reenen 1997, 494; O'Mahony and Vecchi 2009, 36). Firms make investments in R&D to enhance competitiveness and their ability to raise rates of return (Heshmati and Lööf 2008, 269). However, decisions on R&D may also be influenced by opportunistic behaviour. Economic literature calls this the *horizon problem* (Hellwig 2000, 119) because managers may be in favour to rather invest in R&D projects that are successful in the short-run instead of taking into account optimal investment horizons. These assumptions are explained by managers' shorter expected employment compared to longer optimal investment horizons. Therefore, managers could increase private performance-related benefits due to short-run success (Kalyta 2009, 410): "Given that individuals specialize in jobs, the personnel of some businesses will change over time. That is, a particular business may be developed by one person and managed by another later on" (Holmes and Schmitz 1990, 268).

## 4. Empirical Findings

Firstly, descriptive statistics of our sample show us a range of board size from a minimum of two to a maximum of eleven members of the Management Board, with a mean of 4.43 board members. As already said, companies' SIZE within our sample ranges from about € 160 million to nearly € 100 billion in market capitalization. Also concerning ownership structure our sample is composed of corporations that are held very widely and others with very large blockholders.

**Table 2.** Descriptive statistics

| | Minimum | Maximum | Mean | Stand. Dev. |
|---|---|---|---|---|
| ROE | -1.6132 | .6716 | .154858 | .2232578 |
| ROA | -.2576 | .3734 | .068419 | .0749075 |
| SIZE | 157.21 | 97108.53 | 8823.9688 | 17195.54737 |
| BLOCK | .0302 | .9787 | .284539 | .2463679 |
| FREEFLOAT | .1423 | 1.0000 | .708601 | .2426393 |
| CLOSEHELD | .0000 | .8837 | .298827 | .2363865 |
| GROWTH | -.1893 | 1.1298 | .166256 | .2006004 |
| LEV | .17 | 51.52 | 4.4322 | 8.96065 |
| RD | .0000 | .3587 | .022265 | .0442505 |
| BDSIZE | 2 | 11 | 4.43 | 1.837 |
| n | 113 | 113 | 113 | 113 |

We run ordinary least squares regression (OLS) to test our hypotheses using Intercooled Stata 9.2. which offers a broader spectrum on regression models in comparison to *SPSS*. OLS is a traditional method to estimate single equations and delivers efficient, unbiased and consistent estimates (Studenmund 2001, 489; Heck 1977, 30). Here are the results of our OLS regressions.

As Table 3 shows BSIZE is significantly negative related to ROA ($\alpha = 0.05$) and ROE ($\alpha = 0.10$). ROA also depends significantly on the industry a company is part of ($\alpha = 0.05$). We didn't recognize significant relations, neither negative nor positive, between ROA and ROE and different ownership structures. ROA is significantly negative related to leverage (LEV) ($\alpha = 0.01$). We identified *positive size effects* on ROA and ROE. None of the other coefficients were identified as being significant on a level of $\alpha \leq 0.10$.

Furthermore we considered several goodness-of-fit indices to evaluate our model structures. Important *absolute fit indices* to evaluate causal models (Hu and Bentler 1985, 82) are the $\chi^2/df$ ratio and the *Root-Mean-Square-Error of Approximation* (RMSEA) (Backhaus et al. 2006, 379). These measures are considered to have „great power" (Mohiyeddini et al. 2008, 121) to evaluate goodness-of-fit. Considering degrees of freedom these measures take into account models' complexity. Therefore, literature gives advice to prefer these measures instead of measures that do not take into account degrees of freedom (Bollen and Long 1992, 129; Hu and Bentler 1995, 82), e.g. Jöreskog's Goodness-of-Fit Index (GFI) or the Normed Fit Index (NFI) of Bentler and Bonnet (Jöreskog 1969; Bentler and Bonnet 1980). Following Amemiya's advice we used the adjusted R-square as a further fit index to confirm our findings (Amemiya 1981, 1503). We calculated a ratio of 1.83 on $\chi^2/df$ for both models. This is below the recommended value of less than 2.50 for good fit values (Homburg and Baumgartner 1995, 172). We also calculated a RMSEA of 0.004 both for model 1 and model 2, which is also below the recommended value of $\leq 0.05$ (Browne and Cudeck 1993, 136-138) that indicates good model fit. We calculated R-squares for both models nearby 0.31. In reality values above 0.50 are reported to be very seldom, also with very good model specifications (Dougherty 2007, 63). Therefore, we consider an R-square of nearby 0.31 as an acceptable value for goodness-of-fit (Wooldridge 2009, 41). Corresponding values for adjusted R-squares of 0.24 (Model 1) and 0.23 (Model 2) are acceptable, considering the complexity of factors possibly influencing ROA and ROE. Summing up, both models seem to fit very well.

**Table 3.** Ordinary least squares (OLS) regression results

| Source | SS | df | MS | | Number of obs | = | 113 |
|---|---|---|---|---|---|---|---|
| Model 1 | .19114427 | 9 | .021238252 | | F (9, 103) | = | 5.00 |
| Residual | .43730258 | 103 | .004245656 | | Prob > F | = | 0.0000 |
| Total | .62844685 | 112 | .005611133 | | R-squared | = | 0.3042 |
| | | | | | Adj. R-squared | = | 0.2434 |
| | | | | | Root MSE | = | .06516 |

| ROA | Coef. | Std. Err. | t | P > \| t \| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| SIZE | .0133355 | .0049605 | 2.69 | 0.008 | .0034975 | .0231736 |
| GROWTH | -.0215076 | .0324805 | -0.66 | 0,509 | -.085925 | .0429099 |
| LEV | -.0301751 | .0066938 | -4.51 | 0.000 | -.0434506 | -.0168997 |
| BLOCK | .0353489 | .0440845 | 0.80 | 0.424 | -.0520824 | .1227802 |
| CLOSEHELD | .054451 | .0621191 | 0.88 | 0.383 | -.0687475 | .1776496 |
| FREEFLOAT | .027864 | .0455586 | 0.61 | 0.542 | -.0624908 | .1182188 |
| RD | -.0044753 | .1526692 | -0.03 | 0.977 | -.3072587 | .2983081 |
| BSIZE | -.0105402 | .0046353 | -2.27 | 0.025 | -.0197332 | -.0013473 |
| INDUSTRY | -.0031106 | .001439 | -2.16 | 0.033 | -.0059644 | -.0002567 |
| _cons | .0172116 | -0595592 | 0.29 | 0.773 | -.10091 | .1353333 |

| Source | SS | df | MS | | Number of obs | = | 113 |
|---|---|---|---|---|---|---|---|
| Model 2 | .17773087 | 9 | .06519328 | | F (9, 103) | = | 2.69 |
| Residual | .40480229 | 103 | .048502851 | | Prob > F | = | 0.0000 |
| Total | .58253316 | 112 | .049844046 | | R-squared | = | 0.3051 |
| | | | | | Adj. R-squared | = | 0.2269 |
| | | | | | Root MSE | = | .08023 |

| ROE | Coef. | Std. Err. | t | P > \| t \| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| SIZE | .0422692 | .0167664 | 2.52 | 0.013 | .009017 | .0755214 |
| GROWTH | -.0528151 | .1097828 | -0.48 | 0.631 | -.2705433 | .1649132 |
| LEV | -.0183171 | .0226246 | -0.81 | 0.420 | -.0631877 | .0265534 |
| BLOCK | .1640928 | .1490039 | 1.10 | 0.273 | -.1314212 | .4596069 |
| CLOSEHELD | .0991988 | .2099599 | 0.47 | 0.638 | -.3172071 | .5156048 |
| FREEFLOAT | .1658504 | .1539862 | 1.08 | 0.284 | -.1395448 | .4712457 |
| RD | .0683159 | .5160154 | 0.13 | 0.895 | -.955079 | 1.091711 |
| BSIZE | -.0284149 | .015667 | -1.81 | 0.073 | -.0594867 | .0026568 |
| INDUSTRY | -.0071251 | .0048637 | -1.46 | 0.146 | -.016771 | .0025209 |
| _cons | -.1572529 | .2013076 | -0.78 | 0.437 | -.556499 | .2419932 |

SS: sum of squares; MS: mean square

## 5. Conclusion

According to recent research in the UK (Guest 2009) we identify significantly negative board size effects for larger boards in Germany. Increasing board size seems to lower board efficiency maybe as a consequence of worsened conditions for reaching consensus among a greater number of board members (Yermack 1996). As communication is critical and maybe the most essential activity in negotiations (Mennecke et al. 2000) among board members increasing board size increases the number of ideas (Gallupe et al. 1992) but may reduce decision quality (Straus and McGrath 1994) due to more compromises. Furthermore negotiations may take longer (George et al. 1990) and due to more compromises the outcomes may lack acceptance (Gallupe et al. 1992). Ongoing conflicts due to different views paired with decision-making under time pressure also influences future interaction among board members and complicate to reach consensus. Single board members may also react tactically with a kind of avoidance behaviour since conflict increases or personal attacks (Dorado et al. 2002, 511, 517, 518). We consider these tactics as counterproductive in Management Boards, because they don't meet the prior tasks of single Management Board members to reach optimal outcomes for the company. A further point is "when boards get beyond seven or eight people they are less likely to function effectively and are easier for the CEO to control" (Jensen 1993, 865). This gives the CEO more power and freedom to act in his or her own, opportunistic best interest (McConnell and Servaes 1990, 595). Maybe more power could help the CEO to easier keep important information secret and thus weaken internal board democracy within negotiations between the CEO and single board members. This may indicate a different kind of plan and risk awareness between the CEO on the one hand and further board members on the other hand. Therefore, missing internal board democracy is supposed to be one reason for suboptimal outcomes, e.g. in merger negotiations (Baraldi et al. 2008).

Maybe it is also more difficult for the Supervisory Board to control a greater number of individuals, including the CEO within the Management Board (Eisenberg et al. 1998, 37) and to identify managerial risks timely (Perkins 1979, 32). Another fact is that Supervisory Board may have difficulties to evaluate individual board members and to evaluate the incidence of uninhibited behaviour. (Dorado et al. 2002, 511). This could increase board members' predisposition to accept irregularities or dishonest behaviour among single Management Board members (Uzun et al. 2004, 36-37). This is an interesting aspect since Core et al. identified a positive correlation between the extent of management compensation of the CEO and board size within the Anglo-American single board system, as he also found a contemporaneously negative correlation between board size and efficiency in their sample. Therefore, the authors argue for a certain kind of self-serving mentality within larger boards (Core et al. 1999). A less critical mass of Management Board members due to a collective action problem among them (Olson 1965) could lower the quality of the CEO's final and fundamental decisions (Beiner et al. 2005, 36). Less insight into Management Board's decision-making may also result in less qualified respectively less detailed advice by the Supervisory Board. As a consequence this may deteriorate Management Board's decision-making (Shivdasani and Yermack 1999, 1829).

Contrary to Jensen, giving the advice of establishing boards not larger than seven or eight members (Jensen 1993, 865) Iskander and Chamlou advice a maximum of fifteen members in the Anglo-American corporate governance system (Iskander and Chamlou 2000, 20). On the basis of our study we are not able to give an exact advice how many members a German Management Board

should consist of respectively a maximum of members it should not exceed. However, we advice companies to choose a Management Board size which reflects its degree of complexity in inside as well as in outside operations. In particular, companies that are more complex, e.g. with a higher degree of diversification, and/or larger ones, have greater advising requirements. Increasing board size may result in a package of more experience and knowledge and therefore offers better advice to the CEO to make better decisions (Hermalin and Weisbach 1988; Agrawal and Knoeber 2001; Fich 2005; Dalton et al. 1999). Consequently, the more complex companies are the more they should increase their board size (Coles et al. 2008, 330); however they should avoid extremely large board size (Baysinger and Butler 1985, 110). Keeping an eye on the optimum board size companies should try to find a balance between complexity and controllability. Optimum board size should represent a reasonable trade-off between the competitive advantage of having single board members concentrating on special tasks on the one hand and the close coordination of these specialized activities up to comprehensive business objectives on the other hand. (De Andres et al. 2005, 199). Summing up, determining optimum board size is a very important task for German companies, too. We identified a loss of efficiency in our sample when German Management Boards are getting too large. This means that German Management Boards are becoming rather symbolic than an active part of the management process (Hermalin and Weisbach 1993, 13), when board size doesn't meet the conditions to find a balance between both complexity of operations and controllability.

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