

Determinants of Supervisory Board Compensation in Germany

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Abstract- We analyze supervisory board compensation for German DAX 30 firms in the years 2007 and 2008. The main focus is an econometric analysis of the determinants of supervisory board compensation. As opposed to the majority of previous research on this topic, we analyze supervisory board compensation on a person level which permits us to include specific individual determinants. We find that supervisory board compensation is positively dependent on the involvement in special functions such as chairmanship, deputy chairmanship or involvement in the boards committees as suggested by the German Corporate Governance Code. Other personal specific factors which are not related to functions and roles on the board do not have a statistically significant influence on compensation when controlling for the right firm factors. These variables are for example gender, holding a PhD title, number of other mandates on boards, being an employee representative and previous or current experience on management boards. Thus, these factors do not lead to differences in compensation and we do not find evidence that the non-discrimination precept is violated. Interestingly, some model specifications suggest that female board members earn significantly less than male board members. However, when controlling for the female share of supervisory board members as a firm influence, the influence of female board members drops out. The fact why a high share of female supervisory board members is connected to significantly lower pay of supervisory board members on that board needs further research.

Keywords- *Executive Compensation; Supervisory Board; Determinants; Soft Regulation*

I. INTRODUCTION

As opposed to the Anglo-Saxon corporate governance system with one single board, German stock corporations are governed by a two-board system. The management board members take the most important management decisions of the company. The supervisory board, which represents the shareholders as well as employees, is not in charge of the company's active management, but supervises the company's strategic decisions.

The German Corporate Governance Code (GCGC) is a set of rules and recommendations for good governance elaborated by a government commission. The rules have to be followed and are directly taken from currently existing legislature. The recommendations have to be followed on a "comply-or-explain" basis; i.e., either firms comply or write a passage in the annual report why they have chosen not to comply.

The topic of supervisory board compensation in Germany is currently of high interest, and it can be said that supervisory boards are moving more and more into the public eye. Especially the necessary qualification of supervisory board members is sometimes seen as critical. Prange (2009) notes that supervisory board members often lack of the necessary qualifications to effectively control executive directors. Many supervisory board members have little knowledge of either accounting or the supervised firm's industry and business model. In this regard, the legislature recently acted with two laws: First, the law on the modernization of accounting (BilMoG), which includes a requirement that each supervisory board will have to comprise at least one financial expert who is "independent" and has "expert knowledge in accounting". Secondly, the law on the adequacy of executive compensation (VorstAG) contains elements expanding both the responsibility and liability of supervisory board members, i. e., the entire supervisory board has to decide on executive directors' compensation and each supervisory board member is personally liable if the agreed upon compensation turns out to be inadequate.¹ The discussion that has evolved around the BilMoG shows that there is an expected connection between supervisory board members' personal qualifications and commitment, their compensation as well as company performance. German supervisory board compensation is regulated in two ways.

- The GCGC (Government Commission German Corporate Governance Code 2008) recommends that compensation should account for personal tasks on the board such as chairman, deputy chairman or membership as well as chairmanship of committees. Furthermore, the GCGC recommends that compensation should consider company performance, also in the long-run.

¹For a more detailed discussion of the law on adequacy of executive compensation see Koch & Stadtmann (2011).

- One prerequisite for supervisory board compensation is respecting the non-discrimination precept.² This means that individual members' compensation may only differ based on factual differences such as different tasks on the board, but not due to personal differences such as a higher qualification or stronger position for negotiations related to compensation.

Summing up the above two points supervisory board compensation should depend on tasks on the board and on company performance but may not differ on an individual level for any other reasons such as qualification or negotiation position.

Except for one single study by Arnegger & Hofmann (2010) supervisory board compensation has not been analyzed on an individual level, but only on firm level. Therefore, in this article we will answer the following research questions: On what personal or individual factors does supervisory board compensation depend on when controlling for the usual firm specific factors? Are the tasks on the board and firm performance considered adequately? Do other personal factors really *not* influence the compensation level? The latter research question is relevant since firms might not openly violate the non-discrimination precept, but rather implicitly compensate premia for personal qualifications and characteristics. One can imagine that a potential supervisory board member with a strong negotiation position is offered those tasks on the board which lead per definition to a high premium in compensation while others are not.

The remainder of this article is structured as follows: In the next chapter we discuss the related literature. Chapter Three presents the data set and descriptive statistics of supervisory board compensation enabling us to find sensible independent variables as determinants of supervisory board compensation for our econometric analysis. Chapter Four develops the hypotheses with regard to the influence factors of supervisory board compensation in Germany. Chapter Five presents the econometric results of the basic model specification. Chapter Six develops expanded model specifications and discusses the empirical results. Chapter Seven makes the conclusion.

II. SUPERVISORY BOARD COMPENSATION IN THE LITERATURE

The relevant theoretical basis for analyzing supervisory board compensation is the agency theory after Jensen & Meckling (1976) as well as Holmström (1979). The principal delegates a task to the agent and pays the agent just enough compensation that the agent is willing to accept the contract and chooses a high level of effort. In the German corporate governance system the agency relationship is slightly different: a model with one principal (the shareholders) and two agents (the supervisory board members as well as the management board members) is needed (Tirole, 1986; Chwolk, 1999; Seele 2007). Thus, there are two agency relationships: the shareholders are the principals delegating the monitoring and supervision of the management board to their agents, the supervisory board members and also set their compensation. The supervisory board members themselves are principals who delegate the active management of the company to the management board members and set their pay. Thus, the supervisory board members serve as agents and principals at the same time. Their compensation level is set by the shareholders and is of primary interest in this paper.³

Most previous research is concerned with analyzing executive directors' compensation rather than with that of supervisory board members' compensation. As already stated there is only one other study which analyses supervisory board compensation on an individual level. The study by Arnegger & Hofmann (2010) analyses 151 firms and 1.720 board members of the most important German stock indices for large, medium, small and technology firms (DAX, MDAX, SDAX, TecDAX). They include several personal characteristics such as self-defined roles on the board such as business expert, support specialist or community influential. However, their data set is from 2005 and thus, is before the financial crisis impacted supervisory board compensation. Furthermore, they do not take roles and functions on the board into account in their regression analysis. In our results we found those roles and functions on the board have a high and statistically significant influence on compensation and thus we can add to the literature at this point.

All other existing empirical studies regarding supervisory board compensation are dealing with firm level data and will be discussed in the following four paragraphs.

A. *Link between Compensation Levels and firm Success*

Knoll, Knoesel & Probst (1997) estimate the incentive compatibility of German supervisory board members' compensation. Their data set consists of data from 125 German firms for the years 1989-1993. Dividing the sample into three different groups according to firm size and using return based on changes in stock price as a proxy for incentive compatibility, they conclude that supervisory board compensation is not found to be incentive compatible. Furthermore, they state that supervisory board members not likely to be interested in receiving incentive compatible compensation as they sit on many different supervisory boards. Thus, they might not always be able to fulfill their duties sufficiently.

Schmid (1997) investigates executive directors' compensation as well as supervisory board members' compensation at the same time. He takes note that so far most studies fail to find significant influence of performance on executive compensation in Germany. He solves the problem by introducing location parameters, namely proxies for company size and industry, into the

² in German Gleichbehandlungsgebot (Andreas 2011).

³Regarding further issues and problems associated with this special principal-agent-agent relationship see Tirole (1986), Chwolk (1999) as well as Seele (2007).

regression equation as proposed by Murphy (1985). His data comprise the 120 largest listed corporations in Germany. Using supervisory board compensation as the dependent variable and a performance measure, the Herfindahl-Index, the log of total capital, industry dummies as well as different independent variables for the distribution of voting rights, he is able to show that both executive directors' and supervisory board members' compensation in Germany depends on performance. Performance is represented by the indicator return on assets (ROA).

Andreas, Rapp & Wolff (2009) analyze 330 German listed firms with regard to compensation structure and level in a descriptive statistics analysis covering the years 2005 till 2008. Andreas, Rapp & Wolff (2012) develop their previous study further by not only concentrating on descriptive statistics on supervisory board compensation but also conducting a panel data analysis. They use total shareholder return, dividend yield, return on assets as well as return on capital invested as proxies for firm success and find that these measures have a positive and statistically significant influence on supervisory board compensation.

B. Link between Compensation Type and firm Success

Hartmann (2003) takes a different approach: instead of analyzing the actual level of compensation, she investigates whether the type of compensation has an influence on company success. The data set was generated via a questionnaire and comprised 127 listed small or technology firms for the year 2000. As the dependent variable, different return risk measures, e. g., Jensen's alpha, Treynor ratio, Sharpe ratio were used and regressed on the explanatory variables such as compensation type or a dummy for the shareholding of supervisory board members. The result of her study is that there is only a weak influence of compensation type on company success, and this influence cannot be proven to be statistically significant for most of the performance measures.

C. Link between Compensation and Ownership Concentration

Elston & Goldberg (2003) show a relationship between corporate control factors in Germany and executive compensation. Their main focus lies on the management board, but the supervisory board is also taken into account. They find a negative and statistically significant influence of ownership concentration on supervisory board compensation, confirming their initial hypothesis that a lack of ownership control permits for greater personal rewards. Andreas et al. (2012) also research some measures of this dimension in their panel data study. They investigate four different variables namely ownership concentration, management ownership, external blockholder and institutional investors. They find that the first three variables have a negative and statistically significant influence on compensation while the variable institutional investor does not have a statistically significant influence.

D. Different Research Questions

Winter (2002) writes about theoretically and normatively optimal compensation schemes both for the management board and the supervisory board and is especially concerned with stock options as a compensation instrument. Ebert & Zein (2007) formulate a game between the management board and the supervisory board as a theoretical model and analyze how the game's outcome changes as the supervisory board compensation is altered. The result from the model is that the introduction of variable compensation for the supervisory board does not lead to a better supervision quality. Lutter (2001), Wirth (2005) as well as Vetter (2008) look at the supervisory board from a juridical perspective. As mentioned in the introduction, the German corporate governance system is quite different from the Anglo-Saxon system, so the literature from the US or UK is not comparable here. However, one example of research that specifically looks at the compensation of the outside directors is Farrel, Friesen & Hersch (2008). They analyze in what way outside director payment is adjusted when the equity value of firms changes.

We will add to existing research by concentrating on the DAX 30 firms and conducting a detailed analysis considering compensation on *individual level*. This will allow us to take into account specific individual variables such as gender, function on the board or education in the econometric analysis. Therefore, our paper will increase the understanding of how individual specific factors influence supervisory board compensation and facilitate the policy debate about supervisory board compensation.

III. THE DATA SET AND DESCRIPTIVE STATISTICS

The data set consists of 29 of the 30 largest German companies that are publicly listed (DAX 30 index). The data for the company Merck were not included as Merck chose not to publish their supervisory board members' compensation on a personal level. The data were extracted from the companies' annual reports for the years 2007 and 2008 and were hand collected on a personal basis. For board members who were not members for the entire twelve months, the remuneration was extrapolated to twelve months in order to make compensation comparable. Using the actual rather than the extrapolated data we find that the average cost of the supervisory board was 2.22 Euro mn. in 2007 and a slightly lower 2.06 Euro mn. in 2008. On average DAX 30 supervisory boards comprised of 17.6 members in 2007 and 17.4 members in 2008. When using the extrapolated data we find that average compensation across all supervisory board members was 127,113 Euro and 120,581 Euro for 2007 and 2008 respectively. Deputy chairmen and chairmen were compensated with premia of 66% and 126% in

2007 respectively (52% and 130% in 2008) on top of ordinary members' remuneration.

In order to assess the relevant components of supervisory board compensation, we observe the set of DAX 30 companies for which all components are disclosed in a transparent way, as no meaningful conclusions about structure can be drawn in cases where different components are reported together. Due to this, we are able to determine the percentage share of supervisory board compensation's components. The largest compensation component is short-term variable compensation composing 47% and 49% of total compensation in 2007 and 2008 respectively. The short-term incentive is based on a one-year performance indicator. The most popular indicators are dividend, as used by 14 out of the 29 companies and earnings per share, as employed by nine companies. Other performance indicators include cash flow and ROCE. The second largest component in supervisory board members' remuneration package is fixed compensation which is paid independently of the companies' success. Fixed compensation determines 33% and 29% of total compensation in 2007 and 2008. Committee compensation is aiming at making up for the additional work which committee members face, while working on different topics like executive director compensation, finance, strategy or human resources in separate committees. Most firms also distinguish between committee membership and committee chair when determining the amount of the additional payment. Committee compensation accounts for 12% of total compensation in 2007 and 2008. Other compensation components are long-term incentive, attendance fees as well as other payments.

The figures given in the above two paragraphs are nominal data. In order to find the determinants of supervisory board compensation, the compensation data have been deflated with the rate of change in the German consumer price index⁴, i.e. the compensation data as well as revenue data of the year 2007 have been converted to 2008 terms. With regards to the descriptive statistics we find that the mean compensation is 125,492 Euro while the median is 108,370 Euro. The data range is quite ample: the maximum compensation reaches 682,438 Euro while the minimum is with 21,228 Euro only a fraction of that. The standard deviation of the compensation data is 77,475 Euro (see Table 1). With regards to other personal specific characteristics we can say that on average 12% of the observations are female supervisory board members, 35% of the board members own a PhD, 5% are chairmen and 2% are deputy chairmen. With regards to their background it can be said that 47% of the board members are employee representatives⁵, 4% are former management board members of the respective firm and 11% are former management board members of other firms. On average the board members hold 2.33 mandates on other boards in Germany and abroad and 0.2 mandates on management boards. 3% of the board members have a political background, 4% have a scientific background and 10% represent unions.

TABLE 1 DESCRIPTIVE STATISTICS OF REGRESSORS AND DEPENDENT VARIABLE (ALL OBSERVATIONS, 2007 AND 2008)

	Mean	Median	Maximum	Minimum	Std. Dev.
COMP (in k EUR)	125.49	108.37	682.43	212.28	77.48
GENDER	0.12	0.00	1.00	0.00	0.32
QUAL	0.35	0.00	1.00	0.00	0.48
CHAIR	0.05	0.00	1.00	0.00	0.22
DEP-CHAIR	0.02	0.00	1.00	0.00	0.13
WORK	1.15	0.41	45.97	0.00	2.14
MAND	2.33	1.00	23.00	0.00	2.95
EREP	0.47	0.00	1.00	0.00	0.50
MINT	0.04	0.00	1.00	0.00	0.19
MEXT	0.11	0.00	1.00	0.00	0.32
MACT	0.19	0.00	3.00	0.00	0.40
POL	0.03	0.00	1.00	0.00	0.18
SCI	0.04	0.00	1.00	0.00	0.20
UNION	0.10	0.00	1.00	0.00	0.30
REV (in bn EUR)	40.39	33.35	113.81	2.25	32.17
DELTADIV	0.07	0.05	3.80	-1.00	0.60
FEM	0.12	0.11	0.33	0.00	0.08
DUMUTFS	0.24	0.00	1.00	0.00	0.43

IV. HYPOTHESIS GENERATION AND THE RESULTING BASIC MODEL

Regarding the possible determinants, we segment explanatory variables into three different categories. Firstly, personal specific variables such as gender, education or function might have an influence on a supervisory board member's remuneration. Secondly, firm specific variables are relevant as well. Thirdly, the so-called location parameters as proposed by Murphy (1985) and later also applied by Schmid (1997) can be seen as important controls. Regarding the specific personal variables, we take into account the supervisory board member's gender, education, function on the board, workload that he faces on the supervisory board as well as market demand for him as a supervisory board member as measured by the number of other supervisory or comparable board mandates in Germany and abroad.

⁴German Statistical office, destatis.de

⁵ Normally according to the codetermination act it should be 50%. The small deviation from this value can be explained with the fact that when board members enter and exit the board there are two observations.

In many jobs women are still found to earn less than their male colleagues (Allmendinger & Hinz 2007, Diekmann, Engelhardt & Hartmann 1993). Furthermore, it is still difficult for women to reach a high position. Thus, one could argue that female supervisory board members earn less than male members. However, one could also reason that once a position in a supervisory board is reached, gender no longer makes a difference regarding pay (Bertrand & Hallock 2001). While Bertrand & Hallock (2001) find that when controlling for other variables, women in top corporate jobs do not earn less than men, Mohan & Ruggiero (2007) as well as Yortuglo & Zulehner (2007) conclude in recent studies that the gender gap still exists when analyzing CEO pay (Mohan & Ruggiero 2007) and remuneration in executive positions (Yurtoglu & Zulehner 2007). The same logic could apply for supervisory board pay. Thus,

A. Hypothesis 1: Supervisory Board Pay is Lower for Women than for Men When Controlling for Other Factors.

Since we use a dummy *GENDER* where men take the value of zero, and women that of one, we expect the dummy to have a negative sign.

Labor economists heavily rely on the positive relationship between education, seen as the individual's investment, and pay levels (Becker 1964, Mincer 1970). Regarding executive compensation or sometimes more specifically CEO remuneration, many researchers have investigated this relationship (Belliveau, III, & Wade 1996, Chung & Pruitt 1996, Finkelstein & Hambrick 1989, Leonard 1990, Stadtmann & Wissmann 2008). However, oftentimes education level as an influence factor turns out to be insignificant (Belliveau et al. 1996, Chung & Pruitt 1996, Finkelstein & Hambrick 1989, Stadtmann & Wissmann 2008). We will also test this hypothesis for the case of supervisory board compensation.

Following Stadtmann & Wissmann (2008) as well as Yortoglu & Zulehner (2007), who have performed the same analysis for executive directors' compensation, we use a PhD title as a proxy for a higher education level. If the supervisory board member owns a PhD title, the dummy variable *QUAL* takes the value of one. Thus, we expect the sign of this dummy to be positive which would be in line with the results of Yortoglu & Zulehner (2007).

B. Hypothesis 2: Supervisory Board Compensation is Higher for Those Supervisory Board Members Holding A Phd.

Chapter 5.4 of the GCGC as introduced in the opening chapter recommends that supervisory board compensation should take special functions such as chairmanship and deputy chairmanship into account (Government Commission German Corporate Governance Code 2008). This should be reflected in compensation reality.

C. Hypothesis 3: Supervisory Board Compensation is Higher for Supervisory Board's Deputy Chairmen than for Ordinary Members and Higher for Chairmen than for Deputy Chairmen.

We model these special functions with two dummy variables. *CHAIR* takes the value one in case of a supervisory board chairmanship and zero else. *DEPCHAIR* takes the value one in case of a supervisory board deputy chairmanship and zero else. We expect these dummy variables to show a positive sign and *CHAIR* to take a higher coefficient than *DEPCHAIR*.

In the same chapter of the GCGC it is furthermore demanded that the "members' responsibilities and scope of tasks" shall be considered in compensation. Also it is explicitly stated that chairmanship and membership in committees shall be reflected in the compensation level. In the descriptive statistics we have already stated that this committee compensation constitutes a considerable share of supervisory board compensation, accounting for 12% of total compensation in 2007 and 2008.

D. Hypothesis 4: Supervisory Board Compensation is Higher the More Chairmanships and Memberships In Committees A Supervisory Board Member Holds.

We build our own score for these functions in committees adding two points for each committee chairmanship and one point for each committee membership. Thus, we expect this score referred to as *WORK* to have a positive sign in our regression analysis.

Another specific personal variable is the market demand for managers as supervisory board members. One could reason that for some managers there is a very high demand to have them as a supervisory board member, while for others there is not. As already mentioned highly demanded supervisory board members cannot directly bargain for a higher compensation. However, the differences in market demand of supervisory board members might be reflected indirectly through positions and tasks offering compensation premia. The topic of high compensation levels among highly demanded individuals was theoretically explained by Rosen (1981). Empirically, Core, Holthausen & Larcker (1999) showed that directors earned higher compensation packages if they sat on three or more boards.⁶ For Germany the compensation effects of multiple mandates are better researched for management board members than for supervisory board members: Balsmeier & Peters (2009) showed that both a higher number of mandates held by management board members and a higher number of mandates held by supervisory board members lead to higher management board member compensation. They argue that due to the higher degree of networking, the means of influencing their own salaries increases. One could imagine that this could not only be true for management board members but also for supervisory board members. Thus,

⁶Note that this result was for board members of an anglo-saxon one-tier board.

E. Hypothesis 5: The More Mandates in Other Boards A Supervisory Board Member Holds the Higher His Compensation.

We use the number of other mandates held in similar boards to the supervisory board in Germany and abroad. The information is available in the firms' compensation reports. Thus, we expect the independent variable *MAND* to show a positive sign.

After having deducted all hypotheses for personal influences we shall move to the firm dependent influence factors. While Knoll et al. (1997) were not able to show a positive relationship between firm performance and supervisory board compensation, Schmid (1997) as well as Elston & Goldberg (2003) found an opposite result. They use stock return adjusted for overall stock market fluctuations (Knoll et al. 1997), return on assets (Schmid 1997) as well as return on equity (Elston & Goldberg 2003) as performance measures. In addition to these past results indicating that firm performance has a positive influence on supervisory board compensation, the GCGC states in Chapter 5.4 that supervisory board compensation should "take the performance of the enterprise" into account (GCGC 2008). The most frequently applied measure in supervisory board compensation schemes is the change of the dividend from the previous year. Thus, we use it as a proxy for firm performance. Thus,

F. Hypothesis 6: Good Company Performance Measured with The Change of The Dividend from The Previous Year Affects Supervisory Board Compensation Positively.

Schmid (1997) emphasizes the importance of the inclusion of company size and industry as location parameters. We include the company size in the regression with the independent variable *REV*, which we test in its logarithmic form. Since in larger firms the scope of responsibility is larger, we expect these location parameters to have a positive influence. With regards to industry dummies we have to keep in mind that although we have a large number of observations due to the personal compensation data, our data set only contains 29 companies. Applying the industry segmentation as proposed by the German Stock Exchange, we see that DAX 30 companies are active in 16 different industries. We also notice that certain industries only contain one single firm in our data set. For these reasons we refrain from using industry dummies. In empirical analyses researchers oftentimes exclude firms from utilities and/or financial services industries as these industries behave in a way different from other industries (Murphy 2002). To at least account for the specific nature of these industries we construct a dummy *DUMUTFS* containing all financial services and utilities firm in our dataset.

Following other empirical studies about supervisory board compensation or executive compensation (e. g., Conyon & Schwalbach 2000, Elston & Goldberg 2003, Kraft & Niederprum 1999, Schmid 1997) we use the logarithmic compensation as the dependent variable.⁷ Thus, we end up with the following model for supervisory board members *i* active in companies *j*:

$$\begin{aligned} \text{LOG}(\text{COMP}_{i,j}) = & \beta_1 + \beta_2 \text{GENDER}_i + \beta_3 \text{QUAL}_i + \beta_4 \text{CHAIR}_i + \beta_5 \text{DEPCHAIR}_i \\ & + \beta_6 \text{WORK}_i + \beta_7 \text{DELTADIV}_j + \beta_8 \text{SIZE}_j + \beta_9 \text{DUMUTFS}_j + \varepsilon_{i,j} \end{aligned}$$

V. ECONOMETRIC RESULTS OF BASIC MODEL

In order to be able to apply the ordinary least squares estimator, we have to make sure that our explanatory variables, or at least those that we are planning to apply jointly in one model specification, are uncorrelated. Otherwise the problem of multicollinearity would apply. After having calculated all correlation coefficients, we cannot find any hints for the existence of a multicollinearity problem (see Table 2).

TABLE II CORRELATION ANALYSIS

	COMP	GENDER	QUAL	CHAIR	DEPCHAIR	WORK	MAND	EREP	MINT	MEXT	MACT	POL	SCI	UNION	REV	DELTADIV	FEM	DUMUTFS
COMP	1.00																	
GENDER	-0.13	1.00																
QUAL	0.06	-0.13	1.00															
CHAIR	0.40	-0.09	0.17	1.00														
DEPCHAIR	0.13	-0.05	-0.08	-0.03	1.00													
WORK	0.38	-0.12	0.14	0.49	0.14	1.00												
MAND	0.11	-0.20	0.32	0.14	-0.06	0.15	1.00											
EREP	-0.09	0.21	-0.56	-0.22	0.13	-0.18	-0.53	1.00										
MINT	0.28	-0.07	0.18	0.49	-0.03	0.37	0.11	-0.19	1.00									
MEXT	0.01	-0.09	0.25	0.12	-0.05	0.10	0.29	-0.33	-0.03	1.00								
MACT	-0.04	-0.10	0.12	-0.06	-0.06	-0.03	0.30	-0.42	-0.09	-0.12	1.00							
POL	-0.01	0.02	0.04	0.00	-0.02	0.00	0.04	-0.17	-0.01	0.02	-0.04	1.00						
SCI	-0.06	0.08	0.28	-0.05	-0.03	-0.07	0.01	-0.18	-0.04	0.00	-0.02	-0.04	1.00					
UNION	0.03	-0.03	-0.22	-0.08	0.17	-0.05	-0.09	0.36	-0.07	-0.12	-0.13	-0.06	-0.07	1.00				
REV	0.30	0.00	-0.10	-0.01	0.05	-0.03	0.00	0.02	-0.01	-0.02	-0.02	0.06	-0.02	0.07	1.00			
DELTADIV	0.08	-0.06	0.03	0.01	-0.01	0.10	0.01	0.01	0.02	0.05	-0.04	-0.01	-0.01	0.04	-0.12	1.00		
FEM	-0.23	0.26	-0.08	-0.01	-0.01	0.00	-0.07	0.02	-0.06	-0.04	-0.02	0.05	-0.02	-0.08	0.02	-0.18	1.00	
DUMUTFS	0.18	0.07	0.01	-0.01	0.00	0.04	0.02	-0.01	-0.04	-0.01	-0.02	0.05	-0.02	-0.08	-0.04	-0.11	0.25	1.00

⁷See Schmid (1997) for a more detailed explanation on this transformation's necessity.

We estimate the basic model (Model 1) with the ordinary least squares estimator (OLS) for both years (2007, 2008) separately in order to see whether our results are robust across time. Now we will discuss each explanatory variable's estimation results (see Table 3):

- The GENDER-dummy is significant for both years with a negative sign. Thus, the null hypothesis has to be rejected and we can conclude that controlling for other factors female supervisory board members earn less than males. With coefficients of -0.232 and -0.275 the gender has a rather large influence on supervisory board compensation. This is surprising and should be observed further as normally supervisory board members' pay should not differ with respect to any individual characteristics but functions on the board.
- The QUAL dummy always shows a negative sign, but is insignificant in both model specifications. Thus, the null hypothesis cannot be rejected and holding a PhD title seems to have no statistically significant influence on supervisory board compensation. The reason could be that at this education level, an additional academic title does not determine pay, yet might be important in order to reach the position: in the correlation analysis we observed a high degree of correlation between qualification level and number of mandates held on DAX 30 firms' supervisory boards. Another reason could obviously be that the non-discrimination precept forbids differentiating with regards to personal characteristics. The result is in line with that of previous research on executive directors' compensation (Belliveau et al. 1996, Chung & Pruitt 1996, Finkelstein & Hambrick 1989, Stadtmann & Wissmann 2008).

TABLE III ESTIMATION RESULTS

Regressor	Model specification (Year)					
	(1) (2007)	(1) (2008)	(2) (2007)	(2) (2008)	(3) (2007)	(3) (2008)
C	9.593*** (45.391)	9.667*** (48.558)	9.623*** (43.702)	9.641*** (46.357)	9.651*** (50.010)	9.866*** (58.204)
GENDER	-0.232*** (-3.277)	-0.275*** (-4.544)	-0.227*** (-3.133)	-0.273*** (-4.457)	-0.042 (-0.638)	-0.053 (-1.027)
QUAL	0.007 (0.149)	-0.033 (-0.759)	0.008 (0.143)	0.002 (0.033)	0.001 (0.025)	-0.058 (-1.400)
CHAIR	0.333*** (2.615)	0.570*** (5.650)	0.289** (2.090)	0.567*** (5.224)	0.281** (2.317)	0.593*** (6.722)
DEP-CHAIR	0.232 (1.269)	0.409*** (2.722)	0.202 (1.086)	0.351** (2.306)	0.129 (0.788)	0.355*** (2.867)
WORK	0.099*** (5.507)	0.038*** (4.279)	0.099*** (5.480)	0.038*** (4.136)	0.113*** (7.110)	0.041*** (5.473)
MAND	-0.004 (-0.518)	0.012* (1.683)	-0.001 (-0.078)	0.016** (2.119)	-0.007 (-0.800)	0.011* (1.767)
EREP	-	-	-0.044 (-0.592)	0.021 (0.316)	-0.068 (-1.058)	-0.053 (-0.994)
MINT	-	-	0.066 (0.468)	0.019 (0.153)	-0.001 (-0.011)	-0.074 (-0.757)
MEXT	-	-	-0.102 (-1.253)	-0.070 (-0.975)	-0.122* (-1.720)	-0.103* (-1.757)
MACT	-	-	-0.702 (-1.026)	-0.051 (-0.864)	-0.059 (-0.989)	-0.858* (-1.776)
POL	-	-	-0.206* (-1.660)	-0.091 (-0.772)	-0.201* (-1.843)	-0.083 (-0.870)
SCI	-	-	0.085 (0.072)	-0.003 (-0.030)	-0.017 (-0.166)	-0.066 (-0.783)
UNION	-	-	0.055 (0.703)	0.122* (1.714)	0.043 (0.626)	0.031 (0.544)
Log(REV)	0.169*** (8.364)	0.1734*** (9.084)	0.170*** (8.364)	0.174*** (9.021)	0.207*** (11.479)	0.197*** (12.557)
DELTADIV	0.415*** (4.060)	0.130*** (4.939)	0.392*** (3.785)	0.129*** (4.834)	0.136 (1.461)	0.080*** (3.679)
FEM	-	-	-	-	-3.295*** (-12.948)	-3.633*** (-17.732)
DUMUTFS	0.421*** (8.208)	0.243*** (5.246)	0.427*** (8.294)	0.249*** (5.327)	0.572*** (12.290)	0.402*** (10.317)
R ² adjusted	0.315	0.277	0.314	0.278	0.473	0.523

*** = significant on the 1%-level; ** = significant on the 5%-level; * = significant on the 10%-level
t-values provided in parentheses below the coefficients

- The CHAIR variable is significant on the 1% for both years. DEPCHAIR is significant on the 1% in the year 2008 but insignificant in the year 2007. The coefficients for CHAIR are 0.333 and 0.570 for the years 2007 and 2008 respectively, whereas the coefficient for DEPCHAIR in the year 2008 is 0.409. We can conclude that the chairmanship has a positive and high influence on supervisory board compensation. Interestingly, the influence seems much larger in the crisis year 2008 than in the boom year 2007. For the deputy chairmanship the influence is smaller as expected beforehand and only statistically

significant for the year 2008.

- The variable WORK has a smaller (coefficients of 0.099 and 0.038 for 2007 and 2008 respectively), but highly significant positive impact on supervisory board compensation. This is a new result which has not been previously reported.
- The regressor MAND is positive and statistically significant on the 10% level for 2008, but insignificant for 2007. Since the level of statistical significance is also very vague in 2008 and since the coefficient is also very small (0.012) we conclude that the number of mandates a supervisory board member holds does not seem to have an influence on compensation levels. Thus, a presumed higher bargaining power due to higher market demand does not result in higher compensation. This can be explained in two ways: either one could argue that the higher market demand and thus an eventual higher bargaining power does not really matter since a supervisory board membership is not an exclusive contract as an executive directorship, but rather members can have several mandates. Thus, compensation bargaining does not have the same meaning in these kind of contracts. Furthermore, one could say that simply the non-discrimination precept is respected as it would violate the recommendation to pay members who are more or less demanded on the market for supervisory board members differently.
- DELTADIV, i. e., the dividend's year-on-year change, is positive and highly significant in 2007 as well as 2008. In line with the results of Schmid (1997) as well as Elston & Goldberg (2003) we have shown that firm performance determines supervisory board compensation positively. However, it has to be noted that the coefficient size differs strongly for the two estimated years 2007 and 2008. In 2007, which was a boom year with 25 out of the 29 firms paying a larger dividend than in the previous year, the coefficient of DELTADIV is 0.415. For 2008, an economically more difficult year in which only seven out of the 29 firms paid a higher dividend than in the previous year, the coefficient is very much smaller than in 2007: 0.130. We can thus conclude that performance drives supervisory board compensation up in boom years, but does not drive it down in the same way in slump years. Oxelheim, Wihlborg & Zhang (2010) found a similar asymmetry in compensation of Swedish chief executive directors.

Thus, overall we can conclude that almost in all cases the results were as expected. Personal specific variables affect compensation if they are related to the functions on the board (chairmanship, deputy chairmanship, work in committees on the board) and do not affect compensation if not related to the function on the board (number of other mandates on boards as a proxy for high market demand for that supervisory board member, PhD title). However, there is one exception from the rule: whether a board member is male or female is a person specific quality which is not connected to tasks and functions on the board, but female directors earn significantly less than males. In addition to this the coefficients are with -0.232 and -0.275 rather large in both years (as a comparison: the coefficients for board chairmanship were 0.333 and 0.570). For these reasons this puzzling result will be further researched and the model will therefore be expanded as described in the next chapter.

VI. EXPANDED MODEL AND RESULTS

When pondering about why female directors could possibly earn less there is basically three possibilities:

- The first reason could be that there is an omitted variables problem and what makes a difference is not the fact that these specific board members are female, but that they have other characteristics that make them differ from the other board members. Those could be that the male board members have more management experience, that female members are more often employee representatives and thus have different tasks on the board than shareholder representatives. It could be that male and female members have different backgrounds such as coming from the scientific or political scene to become active as a supervisory board member.
- The second reason could be that there is an omitted variables problem as the industry is not considered. Female board members might be more active in industries or firms which tend to pay less in general.
- The third reason is that there is none of the above mentioned omitted variables problem and the reason for the lower payment indeed lies in the fact that these board members are females. That could be connected to systematic discrimination against female top executives regarding pay or with different negotiating aims and techniques of men and women for example.
- In order to consider the first possibility we can observe the following from the information provided in the annual report:
 - In the description about the supervisory board members' background, we can see whether he is an employee representative. When looking at the data it becomes obvious that this fact is indeed different for male and female board members: while 74.8% of female board members are employee representatives, only 42.8% of male board members are.
 - The number of years of management experience board members unfortunately cannot be directly observed from the annual reports. What can be observed in this regard is whether a board member is currently sitting on some firm's management board or whether he used to be on the management board of the firm on whose supervisory board he sits now or on any other firm's management board. Also here differences are observable between male and female board members: While 4.4% of male board are former management board members of the respective firm and 12.3% of another firm, none of the female board members is a former board member of the respective firm and only 3.5% are former management board members of other firms. Similarly for active management experience, 20.3% of male board members currently hold a management board position while only 8.4% of women do.
- When looking at other backgrounds it is observable also whether a board member has a scientific, a political or a union

representative background. Here the shares for male and female board members do not differ as much.

To check for a possible omitted variables problem regarding personal background and experience of board members, we expand the model by the variables as explained in the previous list. The results show that these newly introduced variables do not change the situation. For both years the variable *GENDER* is still negative and statistically significant on the 1% level. Also the coefficients remain similar to those found in the basic model: -0.227 for 2007 and -0.273 for 2008 as compared to -0.232 and -0.275 in the basic model. The newly introduced variables are all mostly statistically insignificant with few exceptions, which are also only statistically significant on the 10% level.

Thus, we test whether the second type of omitted variables problem might be the case, i. e., that the true reason for the lower pay of female board members lies in industries and/or firms with different levels of compensation. As already stated before, a breaking up into different industries seems difficult as we have a data set of 29 companies active in 16 industries. However, this is not ultimately necessary since we are also not interested in the effect of a particular industry but rather in how the industry or firm might affect pay. One idea to operationalize this is for example to take the share of women on the board of a certain company as a proxy for a firm in which many women work and which have generally a lower pay level. A quick pre-analysis of the descriptive statistics regarding firms' average supervisory board member pay and the share of females on the board indicates a negative relationship between share of female board members on the board and average supervisory board member compensation. Thus, we expand model two by the variable *FEM* representing the share of female board members. The result is that indeed the reason for the negative effect on female board members compensation seems to be firm or industry specific. In Model 3 the *GENDER* variable becomes statistically insignificant while the newly introduced *FEM* variable is statistically significant and with coefficients of -3.295 and -3.633 for 2007 and 2008 respectively has a strong negative influence in both years. Finally, we can conclude that none of the personal specific variables which are not connected to tasks or functions on the board leads to a higher or lower compensation level. Thus, finally we cannot find any evidence that the non-discrimination precept for supervisory board compensation in DAX 30 firms is violated. Also the recommendations regarding special functions and roles and the board as well as considering the firms' performance in finding compensation seems to be applied as recommended.

VII. CONCLUSION

In this article we have empirically analyzed supervisory board compensation for German DAX 30 firms in the years 2007 and 2008. This is the first article to look at supervisory board compensation at a personal level and take roles and functions on the board such as chairmanships and committee work into account. These variables turned out to be highly statistically and economically significant determinants of supervisory board compensation. Our aim was to answer the following three tightly connected research questions: What personal or individual factors is supervisory board compensation dependent of when controlling for the usual firm specific factors? Are the tasks on the board and firm performance considered adequately? Do other personal factors really not influence the compensation level?

We have found that supervisory board compensation is driven by roles and functions on the board such as chairmanships, deputy chairmanships as well the amount of roles as committee members and committee chairmen. Thus functions and roles on the board are considered in compensation schedules just as it is demanded by the GCGC.

We have also found that other personal specific characteristics such as the gender, a PhD title, the market demand for a certain board member as proxied by the number of other mandates have no statistically significant influence. Also the members' background such as previous or current experience on management board, being an employee representative, having a political, scientific or union background have no statistically significant influences.

With regards to firm specific variables in accordance with other studies (e.g., Andreas et al. 2012, Elston & Goldberg 2003, Schmid 1997) we find that both firm performance and company size have positive and statistically significant influences on supervisory board compensation. The first aspect shows that the recommendation of the GCGC is applied as desired.

The share of female supervisory board members in a company has a strong negative impact on compensation. This correlation could be interpreted in two ways:

- Female board members are more likely to sit on boards of companies in which the supervisory compensation level is lower than in others. It might be connected to generally lower pay levels in certain industries like consumer goods in which women tend to be represented more on all hierarchical levels.
- A higher share of female board members on the supervisory board leads to a lower supervisory board compensation. One could put up the hypothesis that women are less likely to try to benefit from managerial entrenchment than men. This would be interesting to be researched further and still has to be proven or disproven.

The second way of explaining the influence of the variable *FEM* is interesting in connection to the current debate of a mandatory female quota on German supervisory boards (Meiritz & Wittrock, 2012). If the relationship is true and might even be connected to lower, potentially more *adequate* levels of executive director compensation, this might be a basis for an argumentation in favor of a mandatory women's quota on supervisory boards. Also in general in connection to these considerations a better understanding of how female board members affect the supervisory board's work would be essential for policy makers. These relationships would be a proposed field for further research.

For other fields of future research it would be interesting to expand our study to both a larger number of firms as well as to a longer time series to see whether our results are still robust. When expanding the sample to a larger number of firms, it would be especially interesting whether supervisory board compensation determinants are similar for smaller firms or whether for these remuneration packages the data generating process is completely different. When analyzing a larger time series, it would be interesting to see whether determinants of supervisory board compensation have changed over time. Yet, there are limitations with regard to the length of the time series as at least personal compensation data has only been available for few years. We have conducted this study for the case of Germany and have already mentioned that there are no similar studies from Anglo-Saxon countries as there companies are governed by a one-board system. However, besides Germany there are a number of other countries whose governance system employs two boards. Weimer & Pape (1999) have analyzed corporate governance systems throughout the world and assign seven other countries besides Germany to have a "Germanic" corporate governance system, which is among other aspects characterized by its two-tier board structure. Thus, it would be interesting to conduct similar analyses for supervisory board compensation in Austria, Denmark, Finland, the Netherlands, Norway, Sweden and Switzerland. A panel regression estimating the determinants in several countries at once would be especially interesting if the data permit such an analysis.

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