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Abhandlungen

Compensation and Transparency of Compensation of Management Boards in Germany

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I. Introduction

Despite a certain progress in the nineties (*Schmid* (1997), *Kraft/Niederprüm* (1999), *Schwalbach/Grasshoff* (1997)),[1] empirical academic research on Germans' management board compensation is still far behind the corresponding research in the US. The major reason for this is certainly the different degree of easily available data. For example, data on individual compensation level were completely unavailable since recently. Therefore, the recent changes in the publication practice of German top corporations seems to be a cause for a new empirical investigation.

The transparency of the compensation of the members of the management board has become a central element of the German corporate governance system.[2] The German Corporate Governance Code (GCGC) was introduced on February 26, 2002. In the first version of the Code, the transparency of the individual compensation of the members of the management board was formulated as a *suggestion*. Since the revision in May 2003, this passage has been upgraded to a *recommendation*. As a consequence, companies were obliged to disclose their deviations from all recommendations (comply or explain).

* We would like to thank an anonymous referee for his helpful comments, but we remain responsible for any errors. We are also grateful to Diana Skutella who helped to construct the data set for the empirical part.

[1] See also the work of *Knoll/Knoesel/Probst* (1997) on the compensation of the oversight board members.

[2] Since 2003, the *Deutsche Schutzvereinigung für Wertpapierbesitz* (2003, 2004, 2005) publishes a report on the transparency of executive compensation on a yearly basis. Furthermore, this topic has received a large attention in the financial press (*Kohnert/Warlimont/Ehrlich* (2005), *Kohnert* (2005), *Spiegel Online* (2006)). It has also received some attention in the academic literature. However, the discussion is dominated by juridical arguments. See, for example, *Martens* (2005) and *Lücke* (2005).

Table 1

Acceptance of German Corporate Governance Code in 2003

	Dax	TecDax	MDAX	SDAX	Prime	General	Total
Overall Acceptance	94.7 %	91.4 %	85.1 %	82.6 %	81.7 %	69.0 %	80.4 %
4.2.4 Part 1	96.4 %	100.0 %	90.9 %	85.7 %	68.3 %	50.0 %	72.9 %
4.2.4 Part 2	32.1 %	71.4 %	24.2 %	14.3 %	23.8 %	13.5 %	23.3 %

Note: In the business year 2003 the GCGC included overall 72 recommendations.
4.2.4 Part 1: Compensation of the members of the Management Board shall be reported in the Notes of the Consolidated Financial Statements subdivided according to fixed, performance-related and longterm incentive components.
4.2.4 Part 2: The figures shall be individualized.
Source: von *Werder/Talaulicar/Kolat* (2004), p. 1377–1379.

As *von Werder/Talaulicar/Kolat* (2004) show, section 4.2.2 of the GCGC which rules the transparency of management compensation was always that section which showed the lowest acceptance rate. For example, while overall acceptance of all GCGC recommendations was 94.7 % in 2003 for all DAX companies, only 32.1 % published the compensation figures on an individualized basis. Table 1 contains the detailed information with respect to the different stock market segments.

The Ministry of Justice regarded the acceptance rate with respect to the transparency of management compensation as dissatisfactory. As a consequence, the Ministry introduced a law on August 3, 2005 that forces publicly listed companies to report the compensation of members of the management board on an individualized basis. This new regulation is applied for those consolidated financial statements for business years that start after December 31st, 2005. This act let to another revision of the GCGC with respect to management compensation in 2006.

The remainder of our paper is structured in the following way: The second paragraph introduces the main legal regulations with respect to compensation *as well as* to the transparency of compensation in Germany.

In part three we review theoretical concepts to derive testable hypotheses for the effect of transparency on compensation. We will review traditional principal agent models as well as recent contributions to the literature. These modified principal agent models emphasize the role of fairness in compensation schemes. From a theoretical perspective, we can not rule out that the higher degree of transparency will lead to an

upward pressure in compensation (bidding-up or ratchet effect). This is the case, because transparency will allow all executives to compare their compensation within the management board of one company as well as between different companies. If the compensation of underpaid executives is adjusted more rapidly upwards than the compensation of overpaid executives is adjusted downwards this will result in an upward pressure for the average compensation. Hence, it can not be ruled out that the increased transparency leads to a bidding-up effect.

In the fourth paragraph we analyze the executive compensation schemes of German DAX-30 companies on an individualized basis. For the business year 2004 it is the first time that the majority of the DAX-30 companies have published their compensation schemes on an individualized basis. We can show that some companies differentiate the compensation between the members of the board while others only differentiate between the CEO and the other members of the management board. Furthermore, we are able to show that the proportion of fixed to overall compensation varies quiet substantially between different companies.

As a consequence it seems to be very interesting to identify those factors that influence compensation. In a first step we apply a regression analysis and quantify the impact of several company as well as person specific factors on compensation *levels*. In a second step, we also take the compensation figures of the year 2005 into account. This allows us to isolate those factors that influence the *relative change* in compensation. Within this analysis we check whether a bidding-up effect is present. The last section concludes.

II. Compensation and Transparency of Compensation in the German Corporate Governance System

Paragraph § 87 (1) of the German Stock Corporation Act rules the principles of governing remuneration of members of the management board. The act foresees that "the supervisory board shall, in determining the aggregate remuneration of any member of the management board (salary, profit participation, reimbursement of expenses, insurance premiums, commissions and additional benefits of any kind), ensure that such aggregate remuneration bears a reasonable relationship to the duties of such member and the condition of the company. The foregoing shall apply analogously to pensions, payments to surviving dependents and similar payments" (*Schneider/Heidenhain* (1996), p. 87).

As can be inferred from Table 11 (Appendix), section 4.2.2 of the GCGC contains the rules with respect to the determination of the level and structure of executive compensation in Germany. To some extend, this section just reflects the criteria of § 87 German Stock Corporation Act. However, section 4.2.2 also defines some additional criteria (see Table 11). For example, the supervisory board should not only take the tasks *(= duties in § 87)* into account but also the personnel performance of each single member of the executive board. Furthermore, section 4.2.2 explicitly pronounces that the supervisory board should also take into consideration the economic situation of peer companies. This statement may be interpreted in a way that the supervisory board should also consider the compensation schemes of the peers when deciding upon the compensation of their own executives.

Section 4.2.4 of the GCGC (see Table 11) rules the transparency of executive compensation. It is important to notice that it is seen not to be sufficient that compensation levels are reported: compensation levels should be subdivided in its various components. Hence, the structure of the compensation should be revealed. Furthermore, it is explicitly stated that these figures shall be reported on an individualized basis.

III. Theoretical Aspects

1. Traditional Principal Agent Models

Traditional PA models assume that both principal and agents act fully rational and only in their own interest. Furthermore, both parties know about each other that both parties act rational and are also aware of their conflict of interests. In case that both, the principal as well as the agent are risk neutral the technical solution of a traditional PA model foresees to set up a contract where the fixed part of the compensation is negative while the agent is allowed to receive 100 % of the companies' profits as the variable part of the compensation.[3] The participation constraint assures that overall compensation for the agent is marginally positive. This secures agents' willingness to sign the contract (participation constraint).

However, traditional PA models fail to predict how transparency of coworkers compensation will impact the effort. Since every agent acts fully

[3] This result changes in case that only the principal is risk neutral but the agent behaves risk avers. See the seminal work of *Holmstrom* (1979) and *Shavell* (1979).

rational and concentrates only on his own level as well as structure of compensation, it does not make a difference whether an agent knows about co-workers wage or whether this is not the case. Transparency or intransparency does not matter.

2. *Modified Principal Agent Models*

In some recent contributions to the literature, it is assumed that fairness aspects also play a role.[4] *Charness/Kuhn* (2004) model a scenario with one principal and two agents where the agents compare their compensation levels in case that this information is transparent. Each agent compares reciprocally whether he is treated fair or unfair. The outcome of this comparison is reflected in his effort function in the following way:

$$A_i = aw_i + b(w_i - w_j) \tag{1}$$

Therefore, the effort level (A) of agent i is a function of his own wage level as well as of the wage differential. In case that agents' j wage is larger than agents' i wage level $(w_j > w_i)$ agent i will withhold effort compared to a situation without any wage differentiation. *Charness/Kuhn* (2004) show that transparency will decrease the degree of wage differentiation. Furthermore, it can be shown that the sum of compensation for both agents can be higher in a transparent scenario compared to an intransparent scenario. The higher compensation bill implies a cost increase, so that the profit of the principal decreases. Hence, we can derive the following hypotheses:

- Transparency lowers the degree of compensation differentiation within a company and
- may lead to higher compensation levels.

One may criticize that the internal comparison between members of the same management board does not play a major role for the empirical part of this paper. A line of argumentation could point into the direction that since the size of the management board is limited each member of the management board could easily estimate the compensation level of the other members of the executive board. This could be done because the total remuneration of the management board was also revealed in the past.

[4] See *Güth* et al. (2002).

Firstly, this argument highlights the role of expectations in the process of comparison which is analyzed in detail within the next paragraph. Secondly, we will show in the empirical part of this paper that the degree of wage differentiation varies quiet substantially between companies. This empirical fact shows that it was not that easy to come up with an accurate proxy of co-managers compensation although a management board member was aware of total compensation figures for the whole management board as well as of his own compensation level.

3. Equity Theory

The model of *Charness/Kuhn* (2004) neglects that agents could build expectations of each others compensation levels in an intransparent scenario. Furthermore, *Charness/Kuhn* (2004) assume that agents only compare their compensation levels but do not include their effort levels in the comparison. In contrast to this, the equity theory (*Adams* (1963), *Moorhead/Griffin* (2004), p. 141) explicitly focuses on the relative wage (w/A). Both agents will compare their wage levels in relation to their effort levels. Therefore, in a transparent scenario an equilibrium is characterized by:

$$\frac{w_i}{A_i} = \frac{w_j}{A_j} \tag{2}$$

However, it is important to emphasize that comparisons can also take place in an intransparent scenario. To be in a position to perform a comparison in an intransparent scenario each agent has to build expectations about co-workers compensation level:

$$E_j[w_i] = \Psi w_i \tag{3}$$

In case that $\Psi = 1$, the compensation level will be expected without a bias. However if $\Psi > 1$ ($\Psi < 1$), co-workers wage level will be overestimated (underestimated). *Winter* ((1996), p. 192) argues that on average employees tend to overestimate co-workers compensation. However, this result of Winter need not hold for comparisons between executives. If co-workers compensation would be indeed overestimated, each potential equilibrium is characterized by

$$\frac{w_i}{A_i} < \frac{E_i[w_j]}{A_j} \quad \text{as well as} \quad \frac{E_j[w_i]}{A_i} > \frac{w_j}{A_j}. \tag{4}$$

That means: In an intransparent scenario, agent *i* as well as agent *j* feel unfairly treated, although they are objectively treated fairly. As a consequence, each agent

- will withhold effort or
- will ask for higher compensation.

In such a scenario, the principal could take the opportunity and make compensation transparent. Each agent would be able to learn about his bias and correct his expectation. The principal would be able to lower compensation to some extend without decreasing agents' effort levels.

However, in case that *Winters'* (1996) empirical observation does not hold for executives, the effects would be reversed: That means, in the case that compensation is underestimated on average the switch to a transparent scenario would reveal that the true compensation levels of the peers are higher than expected. As a consequence, executives would withhold effort or ask for an increase in compensation.

4. Bidding-Up Theory

Charness/Kuhn (2004) as well as the equity theory consider fairness aspects. Agents compare their wages or the wage/effort-ratios to determine whether they are treated fairly or unfairly. As a matter of fact, both theories take an *internal* company perspective. In contrast to this *Ezzamel/Watson* (1998) take an *external* view when analyzing the effects of transparency in the market for British executives. They focus on how transparency influences wage comparisons between *different* companies.

They argue that transparency allows to compute an average wage level for executives. Compensation committees will use this information in their decisions. This is not only valid for the British system but also in line with the German Corporate Governance Code: As is stated in 4.2.2 GCGC, the supervisory board should consider when determining the compensation level and structure of compensation – among other factors – *"the performance and outlook of the enterprise taking into account its peer companies."*

Ezzamel/Watson (1998) argue that it will be more likely that underpaid executives wages will be increased than overpaid executive wages adjusted downwards. Due to this asymmetry the average wage level will increase, leading to further adjustments over time. *Ezzamel/Watson* (1998) call this process *bidding-up* phenomenon.

The bidding-up hypothesis is supported by a warning of the British Combined Code, given to the members of the remuneration committee (Combined Code July 2003, Part B. Remuneration, B.1 The Level and Make-up of Remuneration, Supporting Principle): *"The remuneration committee should judge where to position their company relative to other companies. But they should use such comparisons with caution, in view of the risk of an upward ratchet of remuneration levels with no corresponding improvement in performance."* Hence the Combined Code also is aware of the bidding-up effect described by *Ezzamel/Watson* (1998) and labels this mechanism "*ratchet effect*".

While the model of *Charness/Kuhn* (2004) as well as the bidding-up theory projects higher compensation levels due to the transparency of compensation the equity theory comes to an opposite conclusion: In case that the agents overestimate each others compensation level transparency could also lead to a reduction in overall compensation levels. Hence, we are able to derive two conflicting hypotheses, so that it is very interesting to perform an empirical analysis of this relationship. This analysis with respect to the *relative change* in compensation is performed in Section V. In the next section we will perform a descriptive analysis of the compensation schemes in German DAX-30 companies as well as an empirical analysis with respect to the *level* of compensation.

IV. Empirical Analysis with Respect to the Individualized Compensation Levels

1. Descriptive Statistics

In 2004, 18 of the DAX-30 companies published records of their executive compensation on an individualized basis. For the business year 2004 it is the first time that the *majority* of the DAX-30 companies were in line with section 4.2.4 GCGC.

In the following, we focus on those companies that published their compensation on an individualized basis. In a first step, we analyze how the executive compensation was structured in 2004. We must exclude pensions in our examination, because companies do not publish this kind of information transparently so that a comparison is impossible. Some companies do not reveal any information with respect to the pension benefits of their current executives. Most companies only reveal the sum

of pension accruals for the former executives as required by § 314 HGB. We also exclude the option component.

In Table 2 we compare the compensation of the other board members with the compensation of the CEO. We can identify two extrema:

- On the one hand side the compensation of the TUI executives has the largest degree of differentiation: Two members of the board only earn 36 % of the CEO. One board member earns 64 % of the CEO.

Table 2

Differentiation of Executive Compensation

Compensation of the board of TUI AG in 2004				
	Fix Compens.	Variable Compens.	Total Compens.	Compensation in % of the CEO
Dr. Michael Frenzel (CEO)	1,405	1,101	2,506	100 %
Sebastian Ebel	425	482	907	36 %
Dr. Peter Engelen	412	482	894	36 %
Rainer Feuerhake	785	826	1,611	64 %
Total	3,027	2,891	5,918	

Compensation of the board of Schering AG in 2004				
	Fix Compens.	Variable Compens.	Total Compens.	Compensation in % of the CEO
Dr. Hubertus Erlen (CEO)	720	1,668	2,388	100 %
Dr. Karin Dorrepaal*	180	415	595	25 %
Dr. Ulrich Köstlin	540	1,246	1,786	75 %
Lutz Lingnau	540	1,246	1,786	75 %
Marc Rubin	540	1,246	1,786	75 %
Dr. Jörg Spiekerkötter	540	1,246	1,786	75 %
Prof. Dr. G. Stock	540	1,246	1,786	75 %
Total	3,600	8,313	11,913	

Note: Figures in thousand Euros.

* Dr. Karin Dorrepaal joined the management board on Sept. 1st, 2004. Her compensation is in line with the compensation of all other members of the executive board after adjustment with respect to the time served on the board.

Source: Own calculations on the basis of the annual reports of the year 2004.

- On the other hand side, the Schering AG compensates its executive board members with 75 % of the CEO. Dr. Karin Dorrepad, who joined the board on September 1st, 2004 got only 25 %, but this is exactly the same compensation under consideration of the time she served in the board.

Hence, the Schering AG does not differentiate the compensation among their non-CEO board members. This compensation scheme is not in line with the German company act law (§ 87 Abs. 1 AktG as well as 4.2.2 GCGC) which recommends that the individual compensation should be linked to the individual tasks and the personal performance of a board member.

The empirical finding that the degree of compensation differentiation varies quiet a lot between companies is very important: this finding implies that a management board member was not able to come up with an accurate proxy for the individual compensation of his peers by having knowledge with respect to the total compensation of all members of the management board as well as his own compensation.

Fixed versus Variable Compensation

Furthermore, there is a large difference between companies with respect to the proportion of the fixed compensation to overall compensation. Table 3 shows that those two companies that have the lowest as well as highest proportion of fixed compensation: The fixed compensation of the Commerzbank AG amounts to 2/3 of the overall compensation. However the SAP AG compensates its executives only to 20 % fix. The fact that 2/3 of the overall compensation stems form the fixed component does not give a hint whether the compensation scheme of the Commerzbank is less incentive-compatible than the compensation scheme of the SAP AG. As a matter of fact, a low proportion of the variable component could be fully in line with an incentive-compatible compensation scheme in case that, for example, the low share of variable compensation is due to a very bad company performance in 2004.[5]

We were able to show that there exists a high variability of compensation within a company as well as a high variability of the fixed to overall

[5] This argumentation holds at least for the Commerzbank AG. In 2004, Commerzbank was the company with the lowest ROE (3.7 %) of the companies under consideration.

Table 3

Fixed versus Variable Compensation

Compensation of the board of Commerzbank AG in 2004				
	Fix Compens.	Variable Compens.	Total Compens.	Fix Compensation in % der Total Compens.
Klaus-Peter Müller (CEO)	650	370	1,020	64 %
Martin Blessing	420	262	682	62 %
Mehmet Dalman*	300	0	300	100 %
Wolfgang Hartmann	420	262	682	62 %
Dr. Achim Kassow	80	40	120	67 %
Andreas de Maiziere	420	240	660	64 %
Klaus M. Patig	420	240	660	64 %
Dr. Eric Strutz	330	184	514	64 %
Nicholas Teller	420	236	656	64 %
Total	3,460	1,834	5,294	65 %

Compensation of the board of SAP AG in 2004				
	Fix Compens.	Variable Compens.	Total Compens.	Fix Compensation in % of Total Compens.
Prof. Dr. H. Kagermann (CEO)	600	2,461	3,061	20 %
Shai Agassi	405	1,641	2,046	20 %
Leo Apotheker	400	1,641	2,041	20 %
Dr. Werner Brandt	350	1,436	1,786	20 %
Prof. Dr. Claus E. Heinrich	400	1,641	2,041	20 %
Gerhard Oswald	400	1,641	2,041	20 %
Dr. Peter Zencke	400	1,641	2,041	20 %
Total	2,955	12,102	15,057	20 %

* Mehmet Dalman left the management board during 2004.

Source: Own calculations on the basis of the annual report for 2004.

Table 4

Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ROE	0.147	0.074	0.037	0.285
pps	0.103	0.170	–0.184	0.566
cap	25.06	18.57	2.98	62.61
ceo	0.172	0.379	0	1
Ph. D.	0.581	0.496	0	1
age	52.94	6.64	35	63
duration	5.87	4.67	0	19
fix_var	1824.1	784.7	656	6166
fix	641.6	222.2	306	1405
var	1182.5	646.4	236	5016

Note: ROE = Return on Equity, pps = Performance per Share, cap = Market Capitaliztion, cap_squ = Market Capitalization squared, ceo = CEO-Dummy, Ph. D. = Ph. D.-Dummy, age = Age of board member in 2004, duration = years since joining the board, fix_var = Total compensation, fix = Fix Compensation Component, var = Variable Compensation Component.

compensation ratio between companies. In the following regression analysis, we identify those factors that influence executive compensation on an individual basis. We were able to identify 118 board members in the 18 transparent DAX-30 companies. The number of board members per company varies widely: For example 11 person serve in the board of the Siemens AG or Allianz AG while only 3 person serve in the board of the Lufthansa AG.

Additionally, we have to consider that 16 persons left the board or joined the board during the year 2004. Hence, these persons were not compensated for the full year and are excluded from our analysis. Furthermore, we also exclude those persons that left the management board in 2005. This procedure can be justified since we want to analyze the relative change in compensation between 2004 and 2005 in Section V. As a consequence, all individuals that enter the regressions with respect to the compensation level also enter the regression with respect to the change in compensation. Hence, we perform our analysis on the basis of 93 observations.

Person Specific Variables

On average, a board member is 53 years old. Youngest board member is Shai Agassi (SAP AG) who is 35 years old and there are 4 persons in our sample with an age of 63 years. On average the board members are in duty since about six years (since 1998). Additionally, more than half of the executives have a Ph. D. (Dr. 58 %). The average compensation is 1.824 Mio Euro. About 1/3 is paid as a fixed and 2/3 as a variable compensation component.

Company Specific Factors

We compute the average market capitalization (*cap*) by using the mean of the daily values during the year 2004 (Source: DataStream). The mean was at 25.06 billion Euro. The minimum was at 3.0 billion (TUI) and the maximum at 62.6 billion Euro (Deutsche Telekom). As a performance measure we use the return on equity (ROE). Since it may be the case that accounting data are not reliable and therefore irrelevant for the relationship under consideration, we also compute as an alternative a market driven performance measure. We use a performance per share (pps) measure which is calculated in the following way. The variable pps is computed as the absolute change in stock price plus dividends paid per share divided by the share price in the beginning of the fiscal year. The average pps value is 10.3 % with a minimum of –18.4 % (Lufthansa) and a maximum of 56.6 % (Continental).

Analysis of the Correlation Matrix

Table 5 shows the correlation matrix between all variables. As can be inferred, we are unable to detect high correlations among the explanatory variables so that we do not expect any multicolinearity problems in our regression analysis. One exception is between the variables *age* and *duration* ($r = 0.55$). The longer a person served in the board the older the person. The ROE is to some extend positively related to the variable ($r = 0.11$) but not to the fixed ($r = -0.12$) part of the compensation level.

Table 5
Correlation Analysis

	fix_var	fix	var	ceo	cap	cap^2	ROE	pps	Ph. D.	age	duration
fix_var	1.00										
fix	0.71	1.00									
var	0.97	0.52	1.00								
ceo	0.48	0.59	0.38	1.00							
cap	0.40	0.19	0.42	–0.11	1.00						
cap^2	0.31	0.16	0.32	–0.11	0.97	1.00					
ROE	0.05	–0.12	0.11	0.02	–0.20	–0.23	1.00				
pps	0.09	0.15	0.06	0.06	–0.20	–0.18	0.32	1.00			
Ph. D.	0.18	0.08	0.20	–0.02	0.15	0.11	0.14	0.06	1.00		
age	0.27	0.28	0.24	0.23	0.10	0.05	–0.02	0.02	0.29	1.00	
duration	0.17	0.20	0.14	0.30	–0.05	–0.07	0.11	–0.09	0.32	0.55	1.00

2. *Regression Analysis*

We motivate our analysis of the factors that influence the level of compensation by the following two arguments:

1. The descriptive statistic has revealed a high degree of differentiation between the members of the same management board as well as between companies. Hence, it is interesting to isolate and quantify those factors which drive this result.
2. In Section V, we will determine whether a bidding-up effect is present. To be in a position to address this issue we need to analyze the factors that influence the change in compensation. As a consequence the analysis of the compensation levels can perform as a basis for the analysis in first log-differences.

In the following, we first regress the individual compensation on a constant, a dummy variable for the CEO and the market capitalization (cap) of the company.

$$wage = \beta_0 + \beta_1 ceo + \beta_2 cap + \epsilon \tag{5}$$

Afterwards, specification I is enriched by other explanatory variables. The regression results are displayed in Table 6. Specification II also contains the squared market cap variable to check whether this variable influences compensation in a linear or non-linear way. Since the parameter β_3 turns out to be significantly negative, an increase in the market capitalization influences compensation only under proportionally.

We also test whether the ROE influences compensation. As Specification III shows, the estimated coefficient does not turn out to be significantly different from zero. In a further step (Specification IV) we consider a dummy variable which takes the value of 1 in case that the board member holds a Ph. D. and is zero otherwise. We use the Ph. D. as a proxy with respect to the qualification level and hypothesize that the effect is positive. This would be in line with the work of *Yurtoglu/Zulehner* (2006). However, the estimated coefficient is not significantly different from zero. This could be the case because such title may be an important entrance door for certain career steps but nothing paid for at the level of a top manager.

In Specifications V to VII we also checked the influence of the other person specific variables, such as age and duration of board membership

Table 6

Regression Results Part 1 (Levels 2004)

	I	II	III	IV	V	VI	VII
cons	1147.1*** (10.36)	679.8*** (4.73)	547.8*** (2.99)	530.0*** (2.87)	197.1 (0.41)	547.9*** (2.88)	138.6 (0.26)
ceo	1094.4*** (6.65)	1097.8*** (7.36)	1098.3*** (7.38)	1098.1*** (7.36)	1067.5*** (6.93)	1098.4*** (7.01)	1096.0*** (6.88)
cap	19.49*** (5.80)	73.95*** (5.97)	72.3*** (5.81)	70.4*** (5.55)	70.3*** (5.53)	72.3*** (5.76)	68.7*** (5.31)
cap_squ	– –	–0.926*** (–4.54)	–0.886*** (–4.28)	–0.861*** (–4.11)	–0.857*** (–4.08)	–0.886*** (–4.25)	–0.839*** (–3.94)
ROE	–	–	914.8 (1.16)	817.3 (1.02)	934.65 (1.18)	915.0 (1.15)	898.9 (1.11)
Ph. D.	–	–	–	97.2 (0.83)	–	–	95.5 (0.76)
age	–	–	–	–	7.08 (0.79)	–	8.65 (0.82)
duration	–	–				–0.034 (–0.00)	–9.81 (–0.64)
Adj. R^2	0.4248	0.5276	0.5294	0.5277	0.5274	0.5240	0.5208

Table 7

Regression Results Part 2 (Levels 2004)

	Fix	Var
cons	503.4*** (8.64)	44.4 (0.28)
ceo	361.4*** (7.64)	736.8*** (5.74)
cap	8.83*** (2.23)	63.4*** (5.92)
cap_squ	–0.102 (–1.55)	–0.784*** (–4.40)
ROE	–315.0 (–1.26)	1229.8* (1.81)
Adj. R^2	0.4070	0.485

but no coefficient is significantly different from zero. Hence, the only person specific variable that influences compensation is the CEO variable. In the following sensitivity analysis we do not consider the insignificant person specific variables (age, Ph.D., duration) anymore. Since the adjusted R^2 is highest for Specification III, this specification serves as our basic specification.

Columns *Fix* and *Var* of Table 7 summarize the results some further sensitivity analyzes. We split the overall compensation in its fixed and variable parts and run the regression again. As can be seen, in the regression where the variable part of the compensation serves as a dependent variable the ROE coefficient turns out to be significantly positive on a 90 % confidence level.

In Table 8, we use the alternative market based performance measure *performance per share (pps)*. As discussed above, it may be the case that a market based performance measure is the key driver of compensation – compared to the accounting measure ROE. As can be inferred from Table 8 the estimated pps coefficient takes a positive value and is significantly different from zero. All other coefficients are in the same range compared to Table 6. Furthermore, all other conclusions – especially with respect to the person specific variables – also hold.

Table 8

Regression Results Part 3 (Levels 2004)

	IIIa	IVa	Va	VIa	VIIa
cons	552.5*** (3.69)	528.5*** (3.44)	261.5 (0.58)	527.7*** (3.23)	291.2 (0.59)
ceo	1082.9*** (7.44)	1083.3*** (7.43)	1057.2*** (7.02)	1065.0*** (6.95)	1067.9*** (6.82)
cap	76.9*** (6.34)	74.9*** (6.02)	75.2*** (6.06)	76.5*** (6.26)	73.9*** (5.80)
cap_squ	–0.952 (–4.78)	–0.925*** (–4.56)	–0.928*** (–4.58)	–0.945*** (–4.70)	–0.911*** (–4.41)
pps	791.9** (2.39)	764.5** (2.29)	783.1** (2.36)	807.4** (2.41)	755.0** (2.20)
Ph.D.	–	86.5 (0.76)	–	–	74.7 (0.60)
age	–	–	5.96 (0.68)	–	5.11 (0.49)
duration	–	–	–	4.88 (0.39)	–1.82 (–0.12)
Adj. R^2	0.5515	0.5493	0.5487	0.5471	0.5401

V. Empirical Analysis with Respect to the *Relative Change* in Compensation

From the previous section, we were able to isolate the market capitalization as one factor influencing the level of compensation. Furthermore, we are able to show that the ROE is at least related to the variable compensation component. As a consequence, we will test in this section whether these variables also explain the change in compensation from 2004 to 2005. We are also interested whether a bidding-up effect is present. One may argue that the time period since the compensation figures need to be transparent on an individualized basis is still too short. This would be the case, if, for example, compensation schemes are adjusted only in longer time intervals. However, as we see the case, this is an empirical question and we want to take at least the possibility into consideration.

Table 9

Regression Results Part 4 (First Differences)

	I	lower	upper	II	III
cons	1.535*** (2.68)	–	–	–0.041 (0.93)	–0.027 (–0.05)
$\ln\left(\frac{cap_{2005}}{cap_{2004}}\right)$	0.369 (1.56)	–0.024	0.762	0.111 (0.56)	0.111 (0.59)
ΔROE	3.042*** (4.66)	2.015	4.068	2.763*** (5.40)	2.762*** (5.40)
$\ln(wage_{2004})$	–0.218*** (–2.89)	–0.415	–0.020	–0.005 (0.94)	–0.007 (–0.11)
Commerz_ dum	–	–	–	0.896*** (7.60)	–
Commerz_ dum* wage_2004	– –	– –	– –	– –	0.136*** (7.59)
Adjusted R^2	0.3529	–	–	0.6048	0.6046

The column upper and lower contains the upper and lower bound of a bootstrapped 95 % confidence interval.

In a first step, we run a regression via OLS to isolate those factors that influence the change in compensation. As a sensitivity analysis with respect to the estimated confidence intervals, we also bootstrap the 95 % confidence levels. Finally, we perform a DF-Beta analysis to check the robustness of our findings with respect to outliers.

$$\ln\left(\frac{wage_{2005}}{wage_{2004}}\right) = \beta_0 + \beta_1 \ln\left(\frac{cap_{2005}}{cap_{2004}}\right) + \beta_2 \Delta ROE + \beta_3 \ln(wage_{2004}) + \varepsilon \tag{14}$$

On the left hand side, we have the relative change in the wage level. Furthermore, we used the relative change in market capitalization as well as the change in return on equity (ROE) as explanatory variables. Additionally, we included the log of the wage level in 2004. We expect β_1 as well as β_2 to have a positive sign. However, β_3 should come out with a negative sign in case that the bidding-up effect is present. A negative β_3-coefficient would imply that the higher the compensation in 2004 the lower the increase in compensation between 2004 and 2005. Regression results can be found in Table 9.

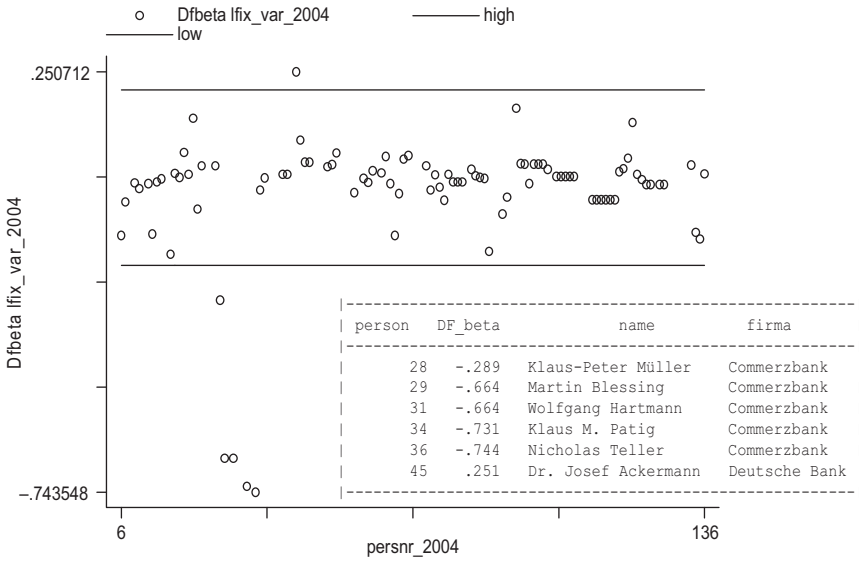

Figure 1: DF-Beta Analysis

In our first regression, we find a negative coefficient β_3, which points into the direction that wages which were below average in 2004 grew faster than wages which were above average. This result points into the direction that the bidding-up effect is indeed influencing the adjustment of the compensation levels. Due to the fact that this result would be a very important finding with far reaching policy and managerial implications, we perform several statistical procedures to check the robustness of our finding.

In a first step, we estimate confidence intervals by the bootstrapping methodology (see for example *Mooney/Duval* (1993)). Hence, we do not only rely on the estimated standard errors of our coefficients to judge the significance of our results. To initialize the bootstrap procedure, we use our 93 observations as the sample and draw in a procedure with replacement a new sub sample of 93 observations. Subsequently, we run a new regression of Specification I with a new sub sample and store the estimates of the coefficients. We run a loop with 5000 independent draws. Afterwards, we determine the borders of the mid 95 % percentile of the estimated coefficients which determines the confidence intervals. Nevertheless, the bootstrap method confirms the results of our *t*-tests (see column upper/lower bound in Table 9).

In a next step, we perform a so called DF-Beta analysis to check the regression for influential observations (outliers). Therefore, we successively exclude one observation from our sample and check, how the estimated coefficients change due to the omission of one observation.

To be in a position to identify an influential observation, one has to determine a critical value to operationalize the analysis. Some authors regard observations as an influential observation, in the case when an omission of this observation changes the estimated coefficient by more than 1 standard error (*Bollen/Jackman* (1990), p. 267). Other authors use a tighter critical value which depends on the number of observations (n). The formula to compute this critical value is given as (see *Kohler/Kreuter* (2001), p. 208):

$$DF\,Beta > \pm 2/\sqrt{n} \tag{7}$$

To display the results of the DF-Beta analysis in a readable form, we graph all results in the following way: On the horizontal axis, we plot all 93 observations and on the vertical axis, we plot how an omission of the i^{th} observation changes the estimated coefficient in terms of standard errors. Furthermore, we insert the borders as determined by formula (7). The table which is integrated in the figure shows those observations which are identified as an influential observation.

The analysis shows that the observation 45 (Ackermann, Deutsche Bank) is identified as an outlier. An elimination of this variable would reduce the β_3-coefficient of the CEO-variable by 0.25 standard errors. Furthermore, five members of the management board of the Commerzbank are identified as an outlier. Since the DF-Beta values are negative an omission of those observations would drive up the β_3-coefficient. As a consequence, we cannot rule out anymore that the finding of a significant negative β_3-coefficient is due to a Commerzbank specific effect. Due to the results of the DF-Beta analysis, one should think about to control for the effect of the Commerzbank.

Therefore, we enlarge Specification I by a firm specific dummy variable. The estimated coefficient for the Commerzbank is significantly positive (Specification II Table 9). As an alternative specification, we introduced an intersection term by multiplying the Commerzbank dummy with the log of the wage level in 2004. Hence, we check whether the Commerzbank significantly influences the β_3-coefficient in Specification I. Regression results reveal that this is the case. Hence, the regressions

Table 10

Regression Results Part 5 (First Differences)

	Ia	IIa	IIIa
cons	1.659** (2.52)	0.254 (0.45)	0.270 (0.48)
$\ln\left(\frac{cap_{2005}}{cap_{2004}}\right)$	0.671*** (2.62)	0.484** (2.33)	0.483** (2.33)
Δ pps	0.114 (0.92)	–0.161 (–1.50)	–0.161 (–1.50)
$\ln(wage_{2004})$	–0.227*** (–2.62)	–0.035 (–0.47)	–0.037 (–0.50)
Commerz_dum	– 	1.02*** (7.09)	–
Commerz_dum*wage	– 	– 	0.154*** (7.09)
Adj. R^2	0.2027	0.4870	0.4869

results support the results of the DF-Beta analysis. When controlling for the Commerzbank effect the estimated β_3-coefficient is not significantly different from zero anymore. This implies that although Specification I points into the direction that a bidding-up effect is present this effect seems to be spurious. After controlling for the outliers (members of the management board of the Commerzbank AG), this effect is not significant anymore. This result maybe due to the fact that the Commerzbank was the company with the worst performance in 2004 (ROE = 3.7 %) compared to a ROE of 11.9 % in 2005. Since company performance was very bad in 2004 the variable part of the compensation was also very low. This is in line with the descriptive analysis in Table 4. The following example underlines that the variable part of the compensation increased sharply in 2005 when ROE more than trebled: Commerzbanks' CEO Klaus-Peter Müller earned 650 TEuro (fix) and 370 TEuro (variable) in 2004 compared to 760 TEuro (fix) and 2280 TEuro (variable) in 2005. This increase is representative for all management board members of the Commerzbank. This effect let to a significant β_3-coefficient in Specification I.

As a stability test, we also performed the same analysis with the alternative market driven performance measure (Δpps). For symmetry reasons, we estimated the same specifications Ia–IIIa as in Table 9. Regression results are presented in Table 10. All results are stable in relation to the bidding-up coefficient which is significantly negative in Specification Ia but turns out to be insignificant when controlling for the Commerzbank effect.[6]

Astonishingly, the Δpps coefficient is insignificant in all three specifications. This may be due a multicolinearity problem with the variable that measures the change in market capitalization. Both variables measure indeed more or less the same relationship, although the pps measure additionally includes the dividends paid. As a consequence, we also dropped the change in market capitalization from Specification IIIa, but the Δ pps coefficient turned out to be still insignificant.

VI. Conclusion

The transparency of compensation of the members of the management board has become a central element of the German corporate governance system. We perform an empirical examination with respect to the structure of the compensation of the management board of DAX-30 companies. Some companies show a strong differentiation among the compensation of their board members while others do not. Furthermore, the proportion of fixed to overall compensation varies between companies.

We identify those company as well as person specific variables that explain individual compensation levels. We find that the only person specific variable that determines the compensation level was the CEO variable. All other person specific variables such as age, duration of board membership, as well as a variable measuring the qualification (Ph.D, dummy) turned out to be insignificant. As a company specific variable that influences the compensation levels we identified the market capitalization. An increase of the market cap increases the compensation level but only to an under proportional extend as suggested by the negative sign of the estimated coefficient for the squared market capitalization variable. The return on equity (ROE) influences only the variable part of the compensation level. We also used an alternative market driven per-

[6] Commerzbank has the second lowest pps measure in 2004 (–1.9 %). However, this measure increased to 74.5 % in 2005. This was the second highest value for the companies under consideration (highest 2005: Deutsche Börse +96 %).

formance measure computed as the performance per share. This variable turned out to be highly significant and is a key driver of the compensation level.

Additionally, we analyzed which factors influence the relative change in compensation. Thereby, we test whether a bidding-up effect is present as suggested by some theoretical considerations. Nevertheless, the empirical results show that we are unable to detect a bidding-up effect. As a main driver of the change in compensation we identified the change in ROE. However, the change in market capitalization does not significantly influences change in compensation. This implies that the size of a company influences compensation levels but not the change in compensation. Furthermore, we showed that we were unable to detect a bidding-up effect in our data after controlling for some outliers, namely the members of the management board of the Commerzbank AG.

Nevertheless, one should still treat the results of this study with some caution. Therefore, we would like to call the approach of this study as being *explorative* and *apt to serve as a base for further studies*. This is the case because employment contracts for top executives last up to five years and it is therefore completely clear that the full extension of possible changes due to the new transparency will only be visible over a longer time period. Furthermore, the results in this paper are based only on a sub-sample of DAX-30 companies. The empirical examination includes only those companies, which were already transparent in 2004. However, under the new law, all publicly listed companies have to reveal their compensation figures on an individual basis, which will also increase the cross-section dimension of future studies.

Table 11

Section 4.2 GCGC: Composition and Compensation

4.2.1 The Management Board shall be comprised of several persons and have a Chairman or Spokesman. Terms of Reference shall regulate the allocation of areas of responsibility and the cooperation in the Management Board.

4.2.2 At the proposal of the committee dealing with Management Board contracts, the full Supervisory Board shall discuss and regularly review the structure of the Management Board compensation system. Compensation of the members of the Management Board is determined by the Supervisory Board at an appropriate amount based on a performance assessment in considering any payments by group companies. Criteria for determining the appropriateness of compensation are, in particular, the tasks of the respective member of the Management Board, his personal performance, the performance of the Management Board as well as the economic situation, the performance and outlook of the enterprise taking into account its peer companies.

4.2.3 The total compensation of management board members comprises the monetary compensation elements, pension awards, other awards, especially in the event of termination of activity, fringe benefits of all kinds and benefits by third parties which were promised or granted in the fiscal year with regard to management board work. The monetary compensation elements shall comprise fixed and variable elements. The variable compensation elements should include one-time and annually-payable components linked to the business performance as well as long-term incentives containing risk elements. All compensation components must be appropriate, both individually and in total. In particular, company stocks with a multi-year blocking period, stock options or comparable instruments (e.g. phantom stocks) serve as variable compensation components with long-term incentive effect and risk elements. Stock options and comparable instruments shall be related to demanding, relevant comparison parameters. Changing such performance targets or the comparison parameters retroactively shall be excluded. For extraordinary, unforeseen developments a possibility of limitation (Cap) shall be agreed for by the Supervisory Board. The Chairman of the Supervisory Board shall outline the salient points of the compensation system and any changes thereto to the General Meeting.

4.2.4 The total compensation of each member of the Management Board is to be disclosed by name, divided into non-performance-related, performance-related and long-term incentive components, unless decided otherwise by the General Meeting by three-quarters majority.

4.2.5 Disclosure shall be made in a compensation report which as part of the Corporate Governance Report describes the compensation system for Management Board members in a generally understandable way. The presentation of the concrete form of a stock option plan or comparable schemes for components with a long-term incentive effect and risk character shall include the value thereof. In the case of pension plans, the allocation to accrued pension liabilities or pension funds shall be stated each year. The substantive content of severance awards for Management Board members shall be disclosed if in legal terms the awards differ not insignificantly from the awards granted to employees. The compensation report shall also include information on the nature of the fringe benefits provided by the company.

Source: German Corporate Governance Code (version as of June 12nd, 2006).

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Summary

Compensation and Transparency of Compensation of Management Boards in Germany

The transparency of compensation of the members of the management board has become a central element of the German corporate governance system. We perform an empirical examination with respect to the structure of the compensation of the management board of DAX-30 companies. Some companies show a strong differentiation among the compensation of their board members while others do not. Furthermore, the proportion of fixed to overall compensation varies between companies. We identify those company as well as person specific variables that explain individual compensation levels. Additionally, we check which factors influence the change in compensation. Thereby, we test whether a bidding-up effect is present as suggested by some theoretical considerations. Nevertheless, the empirical results show that we are unable to detect a bidding-up effect. (JEL J33, M12, M52, O16)

Zusammenfassung

Vorstandsvergütung und Transparenz der Vorstandsvergütung in Deutschland

Die Transparenz der Vorstandsvergütung hat sich zu einem zentralen Element des Deutschen Corporate-Governance-Systems entwickelt. Im Rahmen dieses Beitrags erfolgt eine Analyse der Vergütungsstrukturen jener DAX-30-Unternehmen, die im Jahr 2004 einen individuellen Ausweis vorgenommen haben. Es kann gezeigt werden, dass einige Unternehmen eine starke Differenzierung der Vorstandsgehälter vornehmen, während dies für andere Unternehmen weniger stark ausgeprägt ist. Im Rahmen einer Regressionsanalyse wird überprüft, welche Faktoren die Variabilität in der Vorstandsvergütung erklären. Zusätzlich wird untersucht, welche Faktoren die Veränderung in der Vorstandsvergütung erklären. Im Rahmen dieses Analyseschritts wird getestet, ob der sogenannte Bidding-up-Effekt existiert. Aufgrund der empirischen Ergebnisse kann dieser Effekt jedoch nicht nachgewiesen werden.