Executive Pay, Free Float, and Firm Performance: Evidence from Germany*

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Abstract

In this paper we examine potential structural changes in the setup of executive payment schemes in Germany during the 1990 to 2002 period. Given substantial changes in corporate governance during this period, our initial hypothesis is that executive pay in later periods shows a stronger relation with firm performance than it was the case in the early 1990s. However, empirical evidence based on 1990 to 1993 versus 1998 to 2002 data does not support this hypothesis. Regression results based on a WLS-WITHIN estimator explain up to 90% of the variability of normalized executive pay while the relation with measures of firm performance rather weakens for the later period. Normalized executive pay significantly increases with free float. Also, a substantial increase in payments during the 1990s, which amounts to a 47% increase on average, is higher for companies with larger free float. We additionally find that German companies, which obtained a U.S. listing, show higher increases in normalized payments. Our overall evidence is consistent with the hypothesis that executive payment decisions may result under deficient mechanisms of corporate control.

Keywords: executive pay, free float, corporate control

JEL-classification: G30, G32

1 Introduction

The recent shareholder-value debate led to a re-examination of the payment schemes which are granted to top executives of big listed firms throughout the world including Europe. As such the question was asked as to what extend payment schemes provide a suitable means to dampen potential principal agent conflicts which arise from a separation of ownership and control. Various empirical results in the area provide evidence that the level of executive pay positively though only weakly relates to measures of firm performance such as sock return or return on equity. Jensen and Murphy (1990), for example, study U.S. executive pay during the 1936 to 1986 period and find a positive relation between changes in executive payments and firm performance while the strength of this relation weakens throughout their sample period; see also Murphy (1985). The results of Jensen and Murphy (1990) fostered the introduction of incentive schemes which provide stocks or stock options to top executives all over the world. A recent overview on U.S. executive pay starting from the 1970s is given in Jensen and Murphy (2004).

In this paper we refer to the European view on executive pay. Given the immense institutional and legal differences among European countries, we put the focus on executive pay in one country, namely Germany, and report recent empirical results on the relation between the level of executive pay and measures of firm performance. Substantial institutional and legal changes in corporate governance in Germany as well as the introduction of stock option plans in 1996 (see e.g. Wenger and Kaserer (1998a) and Winter (1998)) offered a potential means to reduce control problems. However, various empirical results document that the level of executive pay positively though still weakly relates to measures of firm performance. In contrast, size variables such as turnover show a very strong positive relation to the level of payments. Research in this area includes Schwalbach and Graßhoff (1997) and Kraft and Niederprüm (1999), for example. Knoll, Knoesel, and Probst (1997) do not find a relation between supervisory board payments and stock returns in Germany at all.

Given a growing awareness with respect to the importance of executive payment and the need for corporate control mechanisms in Germany, we put up the initial hypothesis that that executive pay in Germany in later periods around 2000 should show a stronger positive relation with firm performance than it was the case in the early 1990s. While the setup of new corporate governance rules as well as the availability of new incentive schemes supports improvements in potential control mechanisms, our empirical evidence based on 1990 to 1993 versus 1998 to 2002 firm data does not support the hypothesis of a stronger positive relation.

We use a pooled regression analysis which allows us to explain up to 90% of the variability of normalized executive payments. We define normalized payments as overall payments divided by turnover where our approach can account for industry specific levels of turnover. Based on the results from WLS-WITHIN estimation, the positive relation between payments and measures of firm performance weakens for the later period. This is surprising in that we cannot only reject our initial hypothesis but we even find evidence of a weaker relation in later periods. Recent European surveys indicate that the overall level of executive pay has risen during the near past. Our results indicate that normalized payments increased by 47% during our sample period on average. Furthermore, this increase can be shown to be significantly related to a proxy variable of corporate control. As such the level as well as the change in normalized executive pay significantly increases with the free float of the listed single firms. Additionally, we document that internationalization of German firms positively relates to executive compensation. Firms which obtained a U.S. listing, show an above average increase in executive compensation. We interpret this evidence as consistent with the hypothesis that executive payment decisions may result under deficient mechanisms of corporate control.

The contribution is organized as follows. Section 2 gives a brief survey on issues in the German corporate governance environment during the 1990s. Section 3 contains our empirical analysis which includes a description of the data, the methodology and the empirical results. The paper concludes with a summary in section 4.

2 Corporate Governance in Germany

The results of the Jensen and Murphy (1990) study also led to the introduction of incentive schemes which provide stocks or stock options to top executives in Germany during the 1990s. Daimler Benz and Deutsche Bank were the first listed companies in Germany to set up a stock option plan for their executives in 1996. Since then the vast majority of firms followed. According to a survey run by the authors, only 8 out of 133 listed firms did indicate that they do not grant an options plan. This spread of options plans was also eased by a 1998 change in governance rules (KonTraG). Given the above, the question arises as to what extend payment schemes were able to provide a suitable means to support corporate control mechanisms and to provide suitable incentives to corporate executives in Germany. This is of general relevance as many German companies claim that firm performance related pay is not only to be ensured via stock option plans but also by other

means.

Previous empirical evidence is mixed. Schwalbach and Graßhoff (1997) document a positive relation between measures of firm size as well as performance with the level of executive compansation. As for the U.S. (see e.g. Jensen and Murphy (1990)) the findings indicate that the effect of the size variabels dominates the effect of the performance variables. Similar results for Germany are reported by Schmid (1997). Kraft and Niederprüm (1999) examine whether performance variables have become more important during the 1987 to 1996 period. Using return on equity as a measure, they find a stronger impact of performance variables given that returns on equity were positive; the relation breaks down for returns of arbitrary sign. Still, the results leave our question open as changes in control structures may –if at all– have taken part after 1996 when their sample period ends. Hence, it still seems plausible, that German executive pay in later periods around 2000 shows a stronger relation with firm performance than it was the case in the early 1990s.

An open point in this discussion remains the question whether stock option plans are not a means to improve corporate control but –reversely– rather a sign of failure of such. This view is expressed for example also in Bebchuk and Fried (2003). Given such hypothesis, compensation obtained from an option plan does not relate to individual firm performance but may be driven by a prosperous overall market trend such as during the second half of the 1990s.[1] Bertrand and Mullainathan (2001) provide evidence for this hypothesis, as they find that the level of U.S. executive compensation does not distinguish between stock performance which is due to general market movements or due to individual firm outperformance. Given potentially deficient control mechanisms, this incentive incompatible setup of stock option plans may explain their attractiveness. Additional support for such explanation is given by investigations that indicate that high free float and bad control via board members tend to occur jointly with above average levels in executive compensation. See for example Bebchuk and Fried (2003) for an overview. Given the specific control deficiencies in Germany –see for example Wenger and Kaserer (1998b) and Baums (2001)– our empirical investigation helps to shed light on the changes in the level and the determinants of executive compensation and its relation to corporate control mechanisms.

[1]For a critical assessment of stock option plans see e.g. Wenger, Kaserer, and Knoll (1999) for Germany and Hall and Murphy (2003) for the U.S.

3 Empirical analysis

3.1 Data

According to § 314 Z6 HGB[2] the total amount of salaries and compensations, which is paid to executive board members for fulfilling their managerial functions in a parent company and its subsidiaries, has to be published in the explanatory notes of the consolidated financial statement. This amount expressly includes subscription rights of option plans and other compensations depending on stock prices. Furthermore, it should be mentioned that § 285 Z9 HGB contains an analogous rule for the explanatory notes of an annual financial statement of corporate entities.

According to these accounting principles we analyze the sum of compensations of executive board members published in the annual financial statements of all companies that are listed in the German equity index DAX100. We divide our analysis into two different time periods. In the first time period we analyze financial statements from 1990 to 1993 of all companies listed in the DAX100 on April, 11^{th} 1994. The second time period from 1998 to 2003 includes all companies listed in the DAX100 on January, 1^{st} 2003. By including only companies which have already published at least two sequenced annual financial statements, the number of investigated firms can be reduced to 126. That yields to a total of 720 observations of annual financial statements.[3]

3.2 Explanatory Variable

In contrast to other papers which are using the amount of executive compensations per head[4] as explanatory variable, we normalize the sum of executive compensations with the turnover of the company. Thus the explanatory variable specifies how many Euro a company is spending for the executive compensations per thousand Euro turnover in one fiscal year. This approach has various advantages: First, we circumvent the problem that the number of members in the executive board is changing during a fiscal year. Due to

[2]The German accounting principles are defined in the Handelsgesetzbuch (HGB)

[3]The first time period includes 66 companies and a total of 254 observations of annual financial statements. In the second time period, we are able to observe 100 companies and 466 annual financial statements. Because some companies are in the first and second time period the total number of companies is 126. Due to the fact that it was not possible to get a complete data set for all variables we compute our regression analysis with a smaller data set.

[4]Cf. Kraft and Niederprüm (1999), Schmid (1997) and Schwalbach and Graßhoff (1997)

the fact that the consistence of the executive board is not perfectly observable, using the compensation per head as explanatory variable might yield to additional variance in the model.[5] Second, the variable compensation per unit of turnover is a dimensionless measure which is not affected by inflation. Third, it is possible to consider specific characteristics of the level of turnover for different industries in our econometric model. Fourth, the normalization of our variable represents the view of the owners of a firm. For them it is not important how much money a firm spends for each executive board member, but how large the total expenditure for executive compensations is.

$VV_{i,t}$ is the total amount of executive compensations in Euro for a company i in fiscal year t, while $U_{i,t}$ is the turnover of a company, measured in thousand Euros. This yields to the definition of the normalized executive compensation:

$$v_{i,t} = \frac{VV_{i,t}}{U_{i,t}}.$$

3.3 Specification of the Model

The aim of our model is to explain the normalized executive compensations $v_{i,t}$ of a company i in fiscal year t. The basis of our analysis is the following regression model:

$$v_{i,t} = \alpha + \overrightarrow{\beta}\,\overrightarrow{G}_{i,t} + \overrightarrow{\gamma}\,\overrightarrow{P}_{i,t} + \overrightarrow{\delta}\,\overrightarrow{F}_{i,t} + \theta d_{i,t} + \varepsilon_{i,t}, \tag{1}$$

with $i = 1, ..., N$ companies and $t = 1, ..., T$ fiscal years. The explanatory variables are divided into three groups.

First, $\overrightarrow{G}_{i,t}$ represents the vector of variables which are measuring the size of a company. When estimating equation (1) we will use the logarithm of turnover $U_{i,t}$ and earnings before interest and taxes $EBIT_{i,t}$[6] of the current fiscal year.[7] $\overrightarrow{P}_{i,t}$ is the vector of the variables which are measuring the performance of the management. Here we use a monthly average geometric

[5] If it is possible to get this information, we can compute an average executive compensation per capita which can be adjusted by the size effect. Even then, the variance increases when the variance of the executive compensation per capita is systematically different for each company.

[6] Turnover and EBIT are measured in units of thousands.

[7] Following Schwalbach and Graßhoff (1997, p. 208 ff.), it is possible to introduce a lag structure in this model. Hence we integrate an explanatory variable which refers to the previous fiscal year in equation (1). Which structure should be preferred depends on how someone imagines the determinants of executive compensations. Due to the fact that it is not obvious if a lag structure is theoretically better or worse for our German data set, we decided not to use a lag structure. Testing the two strategies empirically, we get marginally lower results for the model with lag structures.

return of the stock market $AR_{i,t}$ in percent and an annual return on equity after tax $ROE_{i,t}$ in percent. The third group which is represented by vector $\overrightarrow{F}_{i,t}$ includes variables describing a firm's characteristics. For measuring the structure of control of a company we use a proportion of shares owned by diverse shareholders (free float) $FF_{i,t}$ in percent. Moreover investment possibilities of the company are measured with Tobin's Q $TQ_{i,t}$. We introduce a dummy variable $IntList_{i,t}$ which is one if a company is listed at NYSE or NASDAQ and a second dummy variable $d_{i,t}$ which is one if the annual financial statement of the observed company belongs to time period two. Otherwise it is zero. Table 1 gives a short description of our data set.

Table 1: Description of the Data Set

	1990-1993					1998-2002				
	Avg.	Med.	Min.	Max.	N	Avg.	Med.	Min.	Max.	N
VV	1.324	0.848	0.06	8.74	238	1.940	1.052	0.04	23.73	460
U[a]	7.886	2.606	0.01	50.39	238	12.643	2.661	0.05	162.38	460
$EBIT$[a]	0.358	0.104	-0.12	2.47	214	0.951	0.156	-21.15	17.59	437
AR[%]	0.437	0.296	-7.72	6.82	248	-0.552	-0.453	-17.82	12.99	443
ROE[%]	9.624	10.928	-301.31	41.89	203	38.022	15.705	-1298.76	5815.55	418
FF[%]	57.900	50.050	1.21	100.00	254	60.157	61.600	11.00	100.00	466
TQ	0.534	0.364	0.01	3.61	231	0.784	0.449	0.02	8.66	430

[a] Values are written in bn Euros.

Our present data set is a combination of cross sectional and time series data. Because of that we have to consider that in this panel data set multiple data points are possible for each company and each group of companies. Due to potentially different correlation structures in the data points of uniform data sources on the one hand side and varying data sources, i.e. from various companies on the other hand side, an adjustment of these dependencies can improve the estimations of our model. There are two basic effects that are discussed in literature.[8]

The so called fixed effects model modifies the regression equation (1) and thus allows specific constants for each industry. This makes sense because the executive compensation is expected to vary depending on the industry of a firm. Moreover vector $\overrightarrow{F}_{i,t}$ can represent specific characteristics of the company. In order to estimate the fixed effects model we modify equation (1):

$$v_{i,t} = \overrightarrow{\alpha}\overrightarrow{B}_i + \overrightarrow{\beta}\overrightarrow{G}_{i,t} + \overrightarrow{\gamma}\overrightarrow{P}_{i,t} + \overrightarrow{\delta}\overrightarrow{F}_{i,t} + \theta d_{i,t} + \varepsilon_{i,t}. \qquad (2)$$

[8] Greene (2002, Chapter 14) gives an extensive overview to the methods of estimating panel data.

Here the dimension of vector $\overrightarrow{B}_i$ is J which corresponds with the number of industries. Vector $\overrightarrow{B}_i$ is one at position k if company i belongs to industry k. Otherwise it is zero.

According to the definition of the groups of industries which the Deutsche Börse AG is using for their 18 Prime Indexes[9], we decided to use a reduced classification with $J = 6$ basic industries. Table 2 shows an overview of this industry classification.

Table 2: Our Classification of the Basic Industries in Accordance to the Classification of the Deutsche Börse AG

Basic Industry	Classification of the Deutsche Börse AG	Notation of the Variables	# of Annual Financial Statements Observed
Manufacturing Industry	Automobile Construction Industrial	Basis	286
Financial Services	Banks Financial Services Insurance	Finance	116
Chemicals/Pharma	Chemicals Pharma/Health Care	Chemicals	122
Utilities	Energy/Commodities Transportation/Logistics Utilities	Utilities	41
Consumer	Retail Consumer Food/Beverages	Consumer	128
Technology	Media Software Technology Telecommunication	Techno	27

Hence, equation (2) represents a model with fixed group and time effects.[10] According to theoretical considerations about systematically different executive compensations in dependence of the industry, it is also imaginable that differences among our two time periods exist. These time effects on executive compensations between time period one and two can also be measured with a fixed effect model.

[9] An overview over different industry classifications can be found: `http://deutsche-boerse.com/dbag/dispatch/de/kir/gdb_navigation/information_services/30_Indices_Index_Licensing/30_Equity_Indices/98_Branchenindizes`.

[10] Cf. Greene (2002, p. 564 f.).

In contrast to the fixed effects approach the so called random effects model assumes that variations in the intercepts of the ordinates occur randomly. Without further assumptions this model corresponds with the basis model (1). But it can be useful to assume that the distribution of the ordinates for each company or each group of companies is stationary. For this reason the variance of the residuals can be decomposed into a company specific part and an open part.[11] Hence the regression equation changes to:

$$v_{i,t} = \alpha + \overrightarrow{\beta}\overrightarrow{G}_{i,t} + \overrightarrow{\gamma}\overrightarrow{P}_{i,t} + \overrightarrow{\delta}\overrightarrow{F}_{i,t} + \theta d_{i,t} + \psi_i + \varepsilon_{i,t}. \quad (3)$$

In this equation, ψ_i is the residual of a company or group of companies i which is constant for all observed periods.

Equation (1) and (2) can be estimated by using an ordinary least squares (OLS)-method if the common assumptions for the regression are valid. The OLS estimation of equation (2) is also called least squares dummy variable (LSDV)-method because industry effects are considered in different dummy variables. The WITHIN-estimator is proposed as an alternative estimator in literature. This approach transforms all dependent and independent variables in differences to their group specific average. In this case, equation (2) includes deviations of group specific averages, instead of the absolute values of the variables. Accordingly, equation (2) can be estimated with the standard method. The WITHIN-method has an advantage over the LSDV-approach because it depends on less explanatory variables and thereby less degrees of freedom are necessary. In this paper we decided to use the WITHIN-approach.[12] In principle equation (3) can be estimated with a feasible generalized least squares (FGLS)-method.[13]

3.4 Research Strategy

Before proceeding we have to solve two questions: First, is there a reason to differ from the standard regression approach as described in equation (1)? Second, if there is, might it be better to use a model with fixed or random effects in accordance to this data set?

The decision between model (2) and (3) depends on the variance of residuals of the model. The question is whether the variance of residuals is determined by variations between the groups of companies, i.e. between the different industries, or by variations inside the industry groups. Companies of one industry group that are rather homogenous are likely to show a residual

[11] Cf. Greene (2002, p. 567 ff.).
[12] Cf. for this topic Greene (2002, p. 560 ff.).
[13] Cf. Greene (2002, p. 570 f.).

term ψ_i unequal to zero. If companies of different industries are heterogenous the variance of the residual term contributes a large part to total variance of residuals in equation (3). In our case, this effect can appear because the classification of the companies in six different industry groups is arbitrary. We can not a priori rule out that this classification might create random effects which can not be handled in a fixed effects model. To find out whether such an effect exists, we decomposed the components of the variance of the dependent variable $v_{i,t}$.[14] The share of the variance, which depends on the differences between the industries, is less than 10% of the total variance of the dependent variable. According to the estimation for model (1) the share is less than 5%. Hence random effects created by an arbitrary classification can be neglected because of their small importance. Therefore we abandon an estimation of a random fixed model, like equation (3). Instead, we will concentrate on equations (1) and (2).

Finally we want to point out that we are able to reject the assumption that residuals are homoscedasticity distributed with a Goldfeldt-Quandt[15] test on a 1% level for all our model specifications. Furthermore the variance of the residuals is evidently higher in cases of low turnovers than in cases of high turnovers. Figure 1 visualizes this effect. Therefore we used a weighted least squares (WLS)-method for estimating equation (1) and (2).

3.5 Results

Tables 3 and 5 contain the estimate results for the regression equations (1) and (2). Foremost we have to bring out that with the illustrated model specifications (2) an adjusted coefficient of determination of about 87% is reached. Thus the model has a relatively high degree of explanation. Furthermore, it shows that all independent variables with the exception of of both performance variables, stock return and return on equity after tax, have a highly significant impact on the standardized management benefits. of the members of the board of managers. In particular, size matters for the management compensation. An increase in revenues of i.e. 10% results in an increase in total management remuneration of less than 10%. In parallel an increase in operating profit leads to higher standardized management remuneration. One could argue whether this effects results from size – or to some extend – from performance. Strictly speaking the results lead to the following conclusion: When comparing two companies that only differ in the operating profit the company with the higher operating profit will also fea-

[14] It should be noted that all statistical calculations are realized with SPSS 12.0.

[15] For a description of this test of heteroscedasticity see Greene (2002, p. 509).

ture the higher standardized management compensation. At the same time our data yield no connection between management compensation per revenue and the performance variables stock return and return on equity. These findings contravene each other. Possibly the positive impact of operating benefit on management remuneration must be seen as an effect due to size.

The study reveals very interesting findings with regard to the company characteristics. Firstly, we find a significant positive contiguity between the degree of free float and management benefit. This supports the initially formulated thesis that the negotiation of compensation schemes is subject to a principal agent conflict. The lesser the incentives to control for the members of the supervisory board are the more beneficial for the agent the agreed on compensation scheme will be. The more the ownership structure breaks down into smaller pieces the weaker the incentives to control will be, as unfavorably laid out compensation schemes have – as a tendency – barely no negative impact on the members of the supervisory board. Of course one might argue that the effect of the degree of free float ownership is a hidden size-effect. However, the fact that already two variables that check for size-effects entered the regression may enervate the objection. In addition, the inclusion of other size-variables that could be includes, i.e. squared revenue, yield no additional significant results. [16]

Secondly, the study shows that market-book ratio has a significant positive effect on the standardized level od management compensation. One could bring up that that this result expresses the effect of the industry sector. However, industry impact was regarded as a fixed effect within the scope of the considered specifications. Thus, one must resort to a different interpretation. Two patterns of explanation are to be mentioned: Firstly, the market-book ratio can be interpreted as a performance indicator as it shows – under some drastic simplifying assumptions – the the degree to which shareholder wealth accumulated in the past This perspective may be flawed as it yields a performance indicator that does not account for time. From a shareholder's point of view it does matter whether shareholder's wealth was doubled within five of fifty years. Moreover, the assumption that book values are an unbiased indicator for the company in the past is problematic. A second interpretation drawn from literature is that the market-book ratio is a measure of future investment potential, thus growth potential. This interpretation leads to the conclusion that companies with above average growth potential show a higher than average standardized management compensa-

[16]This even holds true as free float ownership is excluded from the equation. Therefore, it appears appropriate to interpret the effect of free float ownership as a deficit in corporate control.

tion.

Thirdly, companies that are listed at NYSE or NASDAQ pay significantly higher management benefits. One may argue once more that this is a size-effect, however the same refutations that applied in the context of the effect of free float ownership can be brought up. In addition, the magnitude of this effect rebuts this interpretation. When comparing two companies, one being internationally listed the other not, that are otherwise identical, the ratio between compensation and revenue will be about 0.4 percentage points higher for the internationally listed company. Under the assumption that 1.7 Euro of management compensation are spent per 1.000 Euro of revenues a company with 10 bn. Euro in revenues, that has no international listing, will pay management benefits that add up to 17 m. Euro. According to the results in specification (I) shown in table 3 an international listing would result in an increase in management remuneration to 2.1 Eur per 1.000 Euro of revenue. The total management benefits thus add up to 21 m. Euro. In comparison an increase in the free float ownership from 25% to 75% brings forth a total management benefit of 18.5 m. Euro. This finding supports the suspicion that was uttered on various occasions that the growth in management compensation levels was specially pronounced for companies that obtained a listing in the USA.

Finally, the findings from specification (I) and (II) summarized in table 3 show that in contrast to public perception a global trend towards increasing managements has not manifested. It is undisputed that management remuneration is on average higher in our second examination period (1998 – 2002) than in our first examination period (1990 – 1993). For our sample a remuneration/ revenue ratio of 1.32 is found four our first examination period, for our a second it increases to 1.94. The difference is statistically highly significant. Yet it must not be the prove for a time trend in the ratio. In fact at least the results in conjunction with equation (2) indicate that the difference results from an increase in free float ownership, a rise in market-book ratio and a listing in the USA in the second examination period. [17]

Moreover, one has to call into question, if not those companies, which have insufficient control structures, are responsable in first place for the string increase in standardized management remuneration. This would be in line with the aforementioned understanding of remunerations schemes as result from pricipal agent conflicts. Based on the supposition that control incentives in a company decline with increasing free float ownership one finds the

[17] As shown in table 1 the average free float ownership stepped up from 57.9% in the first examination period to 60.2% in the second. In parallel the market-book ratio has changed from 0.53 to 0.78

following interesting result. As shown in table 4 we distinguish companies with little free float ownership from companies from companies with high free float ownership.[18] It becomes evident that absolute and relative increase in standardized management benefit was stronger for companies with high free float ownership than for companies with little. For the former group standardized remuneration increased from the first to the second examination period by 78%, whereas for the latter group only an increase of 33% was reached. However, one has to point out that this average increase, in spite the considerable difference, is not significant for either group. Nevertheless table 4 suggests the conclusion that not only management benefits are – all other things being equal – higher in companies with substantial free float ownership but also that it applies to the change in management benefit in both examination periods. This finding backs the supposition that the rise in the level of management compensation is the result of an insufficiently functioning corporate control.

The fact that in table 4 both differences are at least significant at a 5% level could indicate that – in spite the aforementioned findings – only a time trend in the development in management compensation might have manifested. This receives some support through the results von specification (III), summarized in table 3. The results were obtained in a WLS estimate of equation (1).

Regarding significance and magnitude of the estimated regression parameters these results support the findings according to specification (I) and (II). However, an exception must be made for the time dummy variable d, as it shows a significant sign positive in specification (III), which may imply that a positive trend effect – depending on corporate characteristics – has manifested between both examination periods. The findings presented in table 5 argue against this interpretation. The level for of the constant in the estimate for equation (1) was higher in the examination period than in the second. In the end no final solution for this question can be obtained from the findings at hand. Nevertheless one can retain that the standardized management compensation increased in particular in companies with a high degree of free float ownership and an international listing .

In table 5 the regression equations (1) and (2) for both examination periods were estimated separately. Comapring the results from column (I) and column (II) reveals a very interesting finding. For the first examination period from 1990-1993 a significant positive impact on performance variables (stock return and return on equity) on standardized remuneration level was found. For the second examination period such an impact could no longer be

[18] As a cut-off 60% of free float ownership was used.

proven. To a lesser extent this also applies to a comparison between columns (III) and (IV) although stock return still has a weak significant impact. Thus we obtain the paradox finding that – opposed to the tenor of public discussion – management compensation has become less performance-related since 1998 than it used to be in the early 1990s. However, we have to bring up restrictively that the coefficients of the performance-related variables only differ significantly for $EBIT$ and as we compare specifications (I) and (II) [19] In all other cases the null hypothesis that coefficients differ from zero must be declined.

It could be argued that the linking management remuneration to corporate performance through stock option programs abscond from this analysis as the total management compensation as shown in the notes only reflects the value of the options at the time of assignment and not at the time of exercise. Two arguments can be brought up against this reasoning: Firstly, the assignment of an option is a benefit in money's worth at the time of assignment. It should replace at least partially cash benefits or other non-cash benefits. Thus the degree, to which management compensation is performance-related, should not change. Secondly, the degree of performance-relatedness should have increased in the second examination period to the extend, to which companies introduced other performance-related remuneration instruments that are directly reflected in the shown total management remuneration. To give an example one could think of the widely discussed 'stock appreciation rights'. In this respect the findings presented in this paper are very astounding. In particular one has to bear in mind that for the first examination period considerably less observations are on hand than for the second. Yet the share of unexplained variance is substantially lower for the first examination period.

It be interesting in this context to test the hypothesis that this setback in remuneration schemes was especially prominent in companies with a high degree of free float ownership so that corporate control functioned insufficiently. The regression equations (1) and (2) could be modified to account for this effect. This could be done by adding mixed terms, e.g. multiply the variable free float ownership with the variable stock return. Yet such a specification can not be estimated reasonably due to the enormous multi-collinearity problem.

Finally, we want to give a brief hint on the robustness of our findings. Firstly, the results shown in table 3 and 5 remain unchanged as one alters the specifications of the chosen regression model. Secondly, our findings do not seem to be biased by the problem of endogenity. At any rate the results

[19] The probability of error is less than 1%.

remain unchanged – with respect to sign and significance – as one modifies the regression equation 1 and 3 in a way that on the left side the total management compensation expressed in Euro is included. This is the result of multiplying both sides of the equation with $U_{i,t}$. This holds true although the estimated regression equation is subject to a considerable problem of multi-collinearity.

4 Conclusion

The present contribution examines the question whether structural changes in the determination of executive compensation took place in Germany during the last decade. Given growing awareness in corporate governance issues since the mid 1990s and a public debate on adequate compensation, it seems of interest to examine empirically if a change has taken place and what the nature of such potential change was. Given this, an initial hypothesis may be that executive pay in later periods shows a stronger relation with firm performance than it was the case during earlier periods.

However, given the evidence on stock option programs, our initial hypothesis may prove to be overly naive. Although stock option plans can without doubt help to reduce the magnitude of corporate control problems, their construction is crucial in providing correct management incentives. Our empirical results do in fact provide evidence for the hypothesis that executive payment decisions may result under deficient mechanisms of corporate control.

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Table 3: Results of the WLS Estimation for Both Time Periods[a]

Dependent Variable: $v_{i,t}$

	WITHIN-WLS-Estimator for equation (2)				WLS-Estimator for equation (1)	
	(I)	VIF[b]	(II)	VIF[b]	(III)	VIF[b]
U	-0.537***	4.555	-0.550***	3.688	-0.317***	1.876
$EBIT$	3.12E-8***	1.684	3.25E-8***	1.683	1.89E-8***	1.332
AR	0.005	1.093	0.004	1.091	0.001	1.106
ROE	7.26E-5	1.025			4.52E-5	1.018
FF	0.003**	1.543	0.002**	1.392	0.002***	1.299
TQ	0.187***	1.357	0.185***	1.292	0.074**	1.202
$IntList$	0.443***	1.605	0.456***	1.584	0.168***	1.626
d	-0.178***	2.981	-0.152***	2.706	0.154***	1.324
α					5,443***	
N	571		618		571	
F	476.4		586.1		57.5	
adj. R^2	0.869		0.869		0.442	
Weighting[c]	0.95		0.95		1.20	

[a] As dependent variable we use the total amount of executive compensations normalized with the turnover volume of a company measured in thousand Euros ($v_{i,t}$). U is the logarithm of the turnover volume and $EBIT$ are the earnings before interest and taxes of a company. Both figures are measured in units of thousand Euros. AR is an annual average total return of the stock market prices in percent and ROE represents an annual return on equity after tax. Furthermore we use a proportion of shares owned by diverse shareholders FF (free float) in percent as an independent variable and TQ is the market to book value of a company. Moreover $IntList$ is a dummy variable which is one if a company is listed at NYSE or NASDAQ; else it is zero. d is a second dummy variable which is one if the annual financial statement of the observed company belongs to time period two. Otherwise it is zero. We use ***, **, and * to denote significance of the regression parameters at the 1%, 5%, and 10% level (two-sided).

[b] VIF=Variance Inflation Factor; VIF is defined as $1/(1-\rho_k^2)$. Here ρ_k^2 is equal to r^2 of a regression analysis in which the dependent variable x_k can be explained through all other independent variables. A VIF which is larger than 10 is a sign for a problem in multicollinearity. (Cf. Greene (2002, p. 257)).

[c] The null hypothesis in the Goldfeld-Quandt-test is that the variances of the residuals are homoscedastic. This hypothesis has to be rejected at a 1%-level. Therefore we use a WLS regression approach. The variable turnover of a company is used as weighting.

Table 4: Averages of the Normalized Executive Compensation

		1990-93		1998-2002			
		v	N	v	N	Difference[a]	Growth Rate
FF[b]	High	1.07	96	1.90	243	0.83***	77.6%
	Low	1.49	142	1.98	217	0.49**	32.9%

[a] We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided). Therefore we use a t-test statistic of independent samples.

[b] The companies are divided into two groups. One sample includes all companies which have a free float of more than 60% (High) and the other sample (Low) is made up of the remaining firms.

Table 5: Results of the WLS Estimation for the Two Separated Time Periods[a]

Dependent Variable: $v_{i,t}$

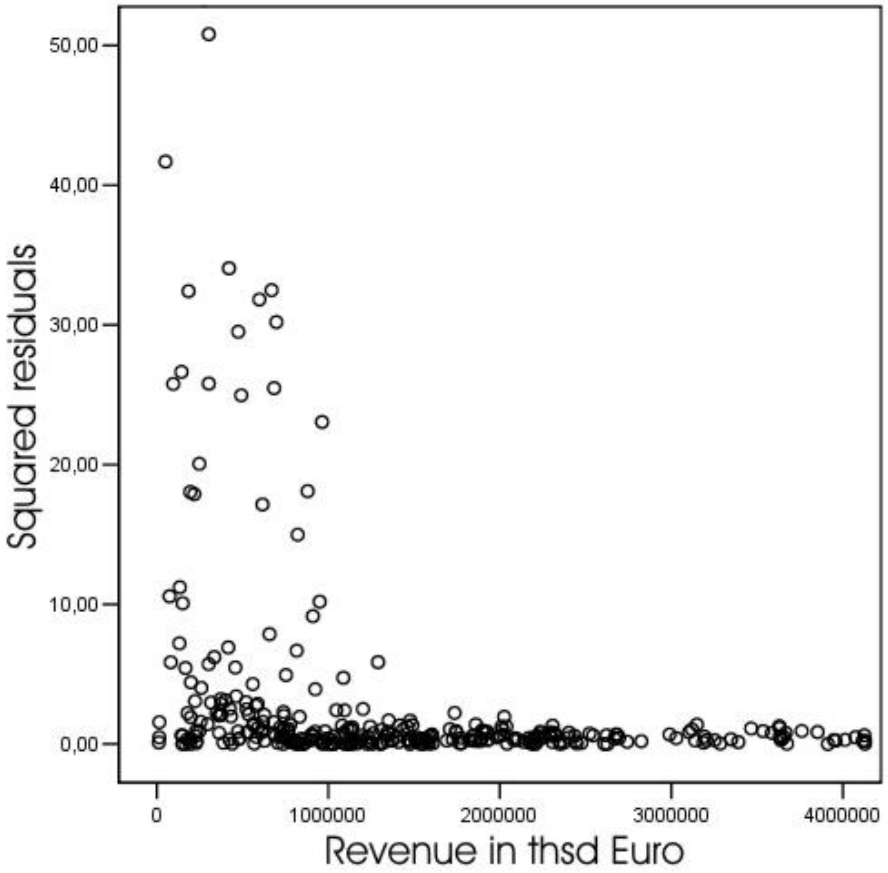
	WITHIN-WLS-Estimator for Equation (2)				WLS-Estimator for Equation (1)			
	1998-2002		1990-1993		1998-2002		1990-1993	
	(I)	VIF[b]	(II)	VIF[b]	(III)	VIF[b]	(IV)	VIF[b]
U	-0.566***	2.830	-0.642***	3.767	-0.290***	1.736	-0.391***	3.606
$EBIT$	2.27E-8***	1.765	1.96E-7***	1.270	1.73E-8***	1.270	1.29E-7***	3.278
AR	0.010	1.098	0.019**	1.270	4.74E-4	1.076	0.011*	1.155
ROE	9.07E-6	1.030	0.006***	1.998	5.18E-5	1.019	0.001	1.062
FF	0.003**	1.686	0.007***	1.854	0.002**	1.297	0.001	1.795
TQ	0.156***	1.324	0.576***	3.830	0.065*	1.188	0.301***	1.642
$IntList$	0.381***	1.811			0.151***	1.588		
α					5.137***		6.541***	
N	394		177		394		177	
F	409.4		404.3		36.8		85.4	
adj. R^2	0.879		0.932		0.389		0.742	
Weighting	1.00		0.95		1.25		1.25	

[a] As dependent variable we use the total amount of executive compensations normalized with the turnover volume of a company measured in thousand Euros ($v_{i,t}$). U is the logarithm of the turnover volume and $EBIT$ are the earnings before interest and taxes of a company. Both figures are measured in units of thousand Euros. AR is an annual average total return of the stock market prices in percent and ROE represents an annual return on equity after tax. Furthermore we use a proportion of shares owned by diverse shareholders FF (free float) in percent as an independent variable and TQ is the market to book value of a company. Moreover $IntList$ is a dummy variable which is one if a company is listed at NYSE or NASDAQ; else it is zero. d is a second dummy variable which is one if the annual financial statement of the observed company belongs to time period two. Otherwise it is zero. We use ***, **, and * to denote significance of the regression parameters at the 1%, 5%, and 10% level (two-sided).

[b] VIF=Variance Inflation Factor; VIF is defined as $1/(1-\rho_k^2)$. Here ρ_k^2 is equal to r^2 of a regression analysis in which the dependent variable x_k can be explained through all other independent variables. A VIF which is larger than 10 is a sign for a problem in multicollinearity. (Cf. Greene (2002, p. 257)).

[c] The null hypothesis in the Goldfeld-Quandt-test is that the variances of the residuals are homoscedastic. This hypothesis has to be rejected at a 1%-level. Therefore we use a WLS regression approach. The variable turnover of a company is used as weighting.

Figure 1: Squared Residuals Plotted Against Turnover



Unstandardized residuals used in this plot where obtained from estimating equation (2).