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Working Paper

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IZA Discussion Papers, No. 10642

Provided in Cooperation with:
IZA – Institute of Labor Economics

This Version is available at:
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DISCUSSION PAPER SERIES

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MARCH 2017

ABSTRACT

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We explore the dispersion of bonus payments of managers within and between five large firms from the German chemical sector. We use data from a yearly salary survey in these firms during the observation period 2008 to 2013. Bonus payments account for 20 percent of base salaries on average. Both the amount and the dispersion of bonus-to-base ratios differ across firms. We disentangle the dispersion between and within the levels of firms' hierarchies. Revealed differences are consistent with differences in firms' value statements.

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The Dispersion of Bonus Payments within and between Firms

1. Introduction

Firms regularly make use of bonus payments as part of employees' remuneration. Most of the compensation literature, however, refers to total compensation or fixed salaries of employees. If fixed salaries are job-based and market-orientated, bonus payments can be used to differentiate between employees within a firm and also to distinguish a firm from its competitors. We therefore consider bonus payments to be particularly relevant when exploring within and between firm differences in remuneration. In practice, various bonus systems exist. Firms may differ with respect to these types of pay plan and there might be considerable differences in bonus payments across individuals both within and between firms.

We want to add new insights to the scant empirical literature on firms' bonus payments. We aim to enrich the state of knowledge on how similar firms differ in their use of bonus payments for professionals and middle managers. Thereby, we compare the dispersion of bonus payments within firms with the dispersion between these firms.

The inequality of earnings is a pervasive topic in economics and management. First, explanations for trends in wage inequality are analysed on a macroeconomic level (e.g. Juhn et al. 1993, Autor et al. 2008). Second, scholars have also analysed the dispersion of wages at the firm level by making use of the personnel records of a single establishment (e.g. Baker et al. 1994, Lazear 1999, Dohmen 2004, Grund 2005, Pfeifer 2008, Dohmen et al. 2014). These studies focus on monthly wages or yearly compensation of the employees of one single firm and do not explore the structure of bonus payments. The results include distinct wage differentials across the levels of firms' hierarchies and considerable wage premiums of promoted employees, for instance. Third, the wage dispersion of firms' workforces has been examined across firms and related to firm performance, job satisfaction and turnover (Levine1991, Pfeffer & Langton 1993, Bloom 1999, Winter-Emer & Zweimüller 1999, Bloom & Michel 2002, Lallemand et al. 2004, Heyman 2005, Barth et al. 2016). Again, bonus payments are not considered specifically in this

strand of the literature, because there is usually no detailed information on compensation components in large linked employer-employee data.

There are few empirical studies that focus on *bonus payments* based on survey- or firm-based data instead of relying on fixed wages or total compensation. These studies investigate the determinants of the *amount of bonus payments* (Ortín-Ángel and Salas-Fumás 1998; Nash 2003) or *bonus relevance* measured as the ratio of bonus-to-base-salary (Gerhart and Milkovich 1990; Boyd and Salamin 2001; Yanadori 2011; Kampkötter 2015) or to total compensation (Stroh et al. 1996; Yanadori and Kang 2011; Grund and Kräkel 2012). Main results include those that both bonus level and bonus relevance for highly qualified and managerial employees are determined by the level of the hierarchy and the seniority of employees with regard to age and firm tenure.

In their seminal study, Gerhart & Milkovich (1990) have already pointed out inter-firm differences in the relevance of bonus payments for middle managers, even after controlling for employee and job characteristics, and they conclude that firms differ in their bonus policies. Their empirical findings show significant firm effects on managers' bonus-to-base ratio in particular (compared to employees' base salary), after controlling for human capital (e.g., education, work experience, firm tenure and job tenure) and job variables (e.g., hierarchy level). More recently, Kampkötter (2015) draws upon compensation information on highly qualified and managerial employees taken from about 150 companies in the German financial industry. He finds that the person-related bonus-to-base ratio varies to a high extent across firms, even in the same industry. In contrast, fixed salaries are much more standardized among German financial institutions. He does not focus on the kind of differences across and within firms explicitly, though.

We build on this literature and explore the dispersion between and within firms in more detail. Firms differ in values revealed by mission or value statements (e.g. Pearce & David 1987, Klemm et al. 1991), which may cause differences in bonus relevance between firms and also the distribution of bonus payments within firms. There are theoretical arguments that bonus relevance is related to some job characteristics *within* the firm. Based on earlier work by Fama (1980) and Holmström (1982), Gibbons and Murphy (1992) argue that the relevance of career-concerns diminishes during an employee's career so that bonus payments may be used as a

substitute in a firm's optimal mix of explicit and implicit incentives. In consequence, the relevance of bonus payments then may increase in tenure. Kräkel and Schöttner (2012) show that bonus payments can also act as a complement to firm internal careers, if talent uncertainty of new employees is not relevant. Then there is little need for bonus payments at lower hierarchy levels, since expected larger bonus relevance at higher levels induce sufficient incentives. Existing empirical evidence on broader samples across firms indeed show that bonus relevance is positively related to firm tenure and level of the hierarchy (Ortín-Ángel and Salas-Fumás 1998, Grund and Kräkel 2012). However, it is likely to observe some dispersion in bonus relevance also within the level of a firm's hierarchy as an incentive device in the sense of agency theory (see Milgrom & Roberts 1992 for an overview). Differences in subjective performance appraisals then lead to differences in bonus relevance. If firms use bonus pools for certain groups of employees and every € paid to employee A cannot be paid to B, the incentive is characterized by a kind of tournament in which relative performances matter (Lazear & Rosen 1981).

We offer a multi-level analysis in that sense that we first disentangle the dispersion of bonus payments between and within firms. Second, we further on explore the dispersion within firms and separate the dispersion within and between the levels of the hierarchy. Doing this we control for other individual and job based characteristics.

We draw on person-related data from a yearly salary survey among professionals and middle managers in the German chemical sector and examine bonus payments as the percentage of fixed salaries during a six-year period from 2008 to 2013 on the individual level. We can assign employees to firms and we focus on five distinct firms. We complement our analysis with information on firm performance from official annual business reports. Since actual bonus payments do not reveal about implemented bonus systems of firms, we also extent the analysis with information on these systems of the five firms from discussions with corresponding managers of these firms and with information on firms' value statements from their websites. Merging this information, we aim to explore (differences in) firms' bonus policies and consistency with strategic objectives. Therefore, we do not only check whether firms differ in bonus payments, but also explore the underlying mechanisms and the consequences for intra-firm dispersion of bonus payments.

The remainder of this paper is structured as follows: We introduce our data and our empirical procedure in section 2. Our results based on the quantitative data are presented in section 3. These results are discussed by merging information from discussions with firms' managers and value statements from firms' websites in section 4. Section 5 concludes.

2. Data and Research Strategy

Sample

We have conducted a corresponding yearly remuneration survey in cooperation with the Association of Employed Academics and Executives in the Chemical Industry (Verband angestellter Akademiker und leitender Angestellter der Chemischen Industrie e.V. (VAA)) for a six-year period from 2008 to 2013. According to the Association, our sample is representative of the appropriate employees in the German chemical industry. The association is well organized in the sector with a quota of about 0.4 of suitable employees. The survey was sent out to all members of the association and we got a return rate of 0.3 each year. Managers can be assigned to their firms in a majority of cases. It is therefore possible to examine the bonus payments of single firms. In this study we explore the five firms with the largest number of observations. These firms operate worldwide in a range of specific fields within the chemical industry. The data are confidential, so that these firms are called Firm A, Firm B, Firm C, Firm D and Firm E. This study is restricted to fulltime employees and, we exclude top managers (2 percent of individuals in the whole dataset) from the data, since their compensation contracts differ considerably from those of middle managers. There are collective agreements for regular employees in these five firms. The scope of our study are middle managers, who are not subject to these agreements so that there is more discretion on the firm level regarding the pay policy for this group. Based on these restrictions, we get a sample almost 5,000 observations (Firm A: n=2,322 to Firm E: n=528), which represent a reasonable fraction of middle managers in each firm.

Dependent variable

Since bonus payments are usually expressed as a percentage of base salary in corporate practice, the key dependent variable of this study is the *bonus-to-base ratio* [bonus (t) / fixed salary (t)].[1] The mean bonus-to-base ratio (0.26 for the whole sample, see Table 1) differs between firms from 0.19 (Firm B) to 0.29 (Firm A). Besides, there are also intra-firm differences in bonus relevance. The inter-quartile differential is considerably large in Firms B, C and D with bonus-to-base ratios being twice as high for a person at the 75-percentile than at the 25-percentile. This general dispersion is somewhat lower in Firm A and Firm E, though (see Figure 1). However, these general percentiles do not show the reason for the dispersion. It makes a difference, for instance, whether bonus relevance essentially differs over years for all employees, whether there are differences between levels of the hierarchy or firm tenure or whether there is dispersion within a year within a group of similar employees.

Figure 1: Bonus-to-base ratio of firms

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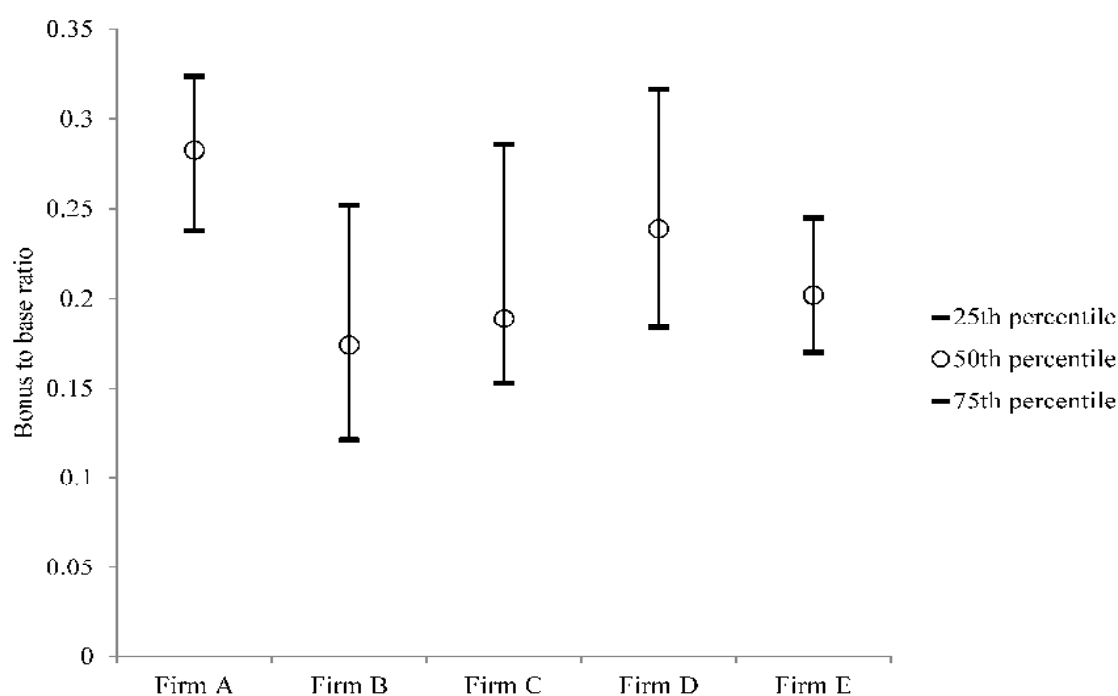
[1] All qualitative results and patterns hold, when using the share of bonus payments on total compensation instead of the bonus-to-base ratios. Regression results also hold, when using absolute bonus payments as the dependent variable and control for fixed salaries.

Independent variables

Taking previous research on the determinants of bonus payments for middle managers as a basis, the most important independent variables used in this study are *seniority* [using employees' age and its square, firm tenure and its square] and *hierarchy level.* We distinguish between three hierarchical levels from level 4 (lowest management level) to level 2 (senior management) and exclude the top management level (level 1), because compensation contracts are considerably different for this group. We also capture the functional area of employees (nine dummies) within each firm.

Since bonus payments, are typically related in whole or in part to a firm's success, it is also investigated as to how managers' bonus ratios are related to economically good (bad) times, when firm targets are (not) fully achieved. Dummy variables for each year of observation are used. During the observation period from 2008 to 2013, there was the worldwide financial and economic crisis, which also hit the German chemical industry. As the annual bonus is typically dependent on the previous year's performance, wage consequences of the deep recession are disclosed in 2009 and 2010, whereas 2011 and 2012 reflect years of economic upturn. Human capital theory suggests that there are further important individual characteristics that might have an effect on the relevance of bonus payments. We therefore control for the level of further education subsequent to mandatory schooling [three dummies]. We also control for possible gender differences.

For comparison purposes, Table 1 gives an indication of the descriptive statistics for each of the five firms. Most managers are classed as level 3 in all firms except for Firm B managers. 0.62 of Firm B employees can be found at level 4. Long-term employment relationships are prevalent in the German chemical industry. The German chemical sector is characterized by long-lasting employment relationships: Average actual firm tenure is 18 years (varying between 17 and 20 year across firms).

Whereas the sampled firms are also almost equally distributed with respect to the level of education, there are some differences with respect to the functional areas. Interestingly, the share of women differs considerably across the sampled firms from 0.03 in Firm E to 0.21 in Firm B.

Table 1: Descriptive Statistics

Variable	Whole sample (n = 4,835) Mean / Share	SD	Firm A (n = 2,322) Mean / Share	SD	Firm B (n = 865) Mean / Share	SD	Firm C (n = 573) Mean / Share	SD	Firm D (n = 547) Mean / Share	SD	Firm E (n = 528) Mean / Share	SD
Bonus [€]	24,935	18,659	27,710	18,678	17,800	11,183	22,581	13,057	28,864	30,608	22,905	12,351
Bonus-to-base ratio	0.255	0.129	0.291	0.116	0.192	0.124	0.218	0.104	0.284	0.183	0.209	0.074
Female (1=yes)	0.093		0.059		0.206		0.049		0.176		0.025	
Age	49.1	7.5	48.7	7.7	49.5	6.7	50.3	7.6	48.5	7.2	49.3	7.8
Age^2	2,465	710.5	2,435	719.9	2,492	645.4	2,583	735.9	2,400	689.8	2,493	746.8
Level of schooling												
University degree	0.885		0.883		0.882		0.846		0.907		0.922	
University of applied science degree	0.091		0.103		0.094		0.098		0.082		0.034	
Apprenticeship degree	0.024		0.014		0.024		0.056		0.011		0.044	
Firm tenure [years]	18,4	8.4	18.6	8.3	16.6	7.8	18.9	9.6	18.0	8.1	19.9	8.4
Firm tenure²	408.2	298.9	416.0	284.4	336.5	263.6	449.4	356.4	391.5	292.3	464.3	330.5
Hierarchical level												
Level 2	0.061		0.056		0.046		0.073		0.057		0.102	
Level 3	0.631		0.663		0.333		0.745		0.735		0.750	
Level 4	0.307		0.281		0.621		0.182		0.208		0.148	
Functional area												
Production	0.188		0.193		0.145		0.302		0.115		0.191	
Research and development	0.272		0.213		0.401		0.192		0.400		0.277	
Technology	0.116		0.134		0.097		0.133		0.097		0.070	
Applications engineering	0.065		0.081		0.027		0.038		0.038		0.115	
Sales, marketing, logistics, sourcing	0.109		0.121		0.098		0.097		0.093		0.100	
Finance, controlling, human resources	0.066		0.076		0.051		0.054		0.086		0.039	
Technical supervision	0.068		0.084		0.042		0.064		0.043		0.072	
IT	0.024		0.010		0.036		0.038		0.051		0.023	
Other	0.091		0.088		0.102		0.080		0.075		0.112	
Year												
2008	0.145		0.139		0.110		0.162		0.139		0.222	
2009	0.158		0.132		0.143		0.199		0.187		0.222	
2010	0.169		0.157		0.170		0.199		0.177		0.184	
2011	0.172		0.184		0.184		0.159		0.163		0.125	
2012	0.180		0.195		0.200		0.134		0.188		0.117	
2013	0.176		0.193		0.193		0.147		0.146		0.130	

Empirical procedure

Following previous research (Gerhart and Milkovich 1990; Yanadori 2011; Kampkötter 2015) we will start our empirical analysis by exploring net firm effects on the individual bonus-to-base ratio in managers' pay package design by running pooled OLS regression analysis. Firm effects are measured by firm dummies. We will then continue by examining the determinants and the dispersion for each firm separately and identifying similarities and differences across firms. Doing this, we estimate firm-wise OLS estimations and decompose the dispersion of bonus-to-base ratios by making use of the Theil Index. We complement our analysis based on the survey data with information on firm performance based on data from the firms' annual business reports for 2007 to 2013, and we control for the role of the EBIT (operative earnings) of the previous year.

3. Results

We start our analysis with joint estimations on bonus-to-base ratios of the five firms. Model (1) of Table 2 shows that bonus payments are more relevant for senior managers with more years of firm tenure and higher in rank. There are also considerable year effects, indicating the relevance of the economic crisis. In line with previous studies (Gerhart & Milkovich 1990, Kampkötter 2015), there are distinct inter-firm differences after controlling for person-related and job-based characteristics, though (see Model 2). The inclusion of firm dummies leads to an increase in the explained variance of 8.5 percentage points. Bonus payments are particularly relevant in Firms A and D, whereas bonus-to-base ratios are about 7 to 9 percentage points lower in the other firms. The effects of tenure and hierarchy level do not change and remain significant with controls of the firms. There are no more gender differences, though, indicating that females tend to self-select to firms with less contingent pay.

Table 2: Firm effects on the bonus-to-base ratio (pooled OLS estimations)

Independent Variables	Bonus-to-base ratio	
	(1)	(2)
Individual characteristics		
Sex (1=female)	-0.014** (0.006)	-0.006 (0.005)
Age	-0.003 (0.003)	0.001 (0.002)
Age^2 * 100	0.0008 (0.003)	-0.002 (0.003)
Schooling (base: University degree)		
University of applied science	-0.009 (0.006)	-0.013** (0.006)
Apprenticeship degree	-0.027** (0.011)	-0.005 (0.011)
Firm tenure [years]	0.005*** (0.001)	0.004*** (0.001)
Firm tenure^2 * 100	-0.009*** (0.002)	-0.008*** (0.002)
Job characteristics		
Hierarchical level (base: level 3)		
Level 2	0.203*** (0.013)	0.209*** (0.012)
Level 4	-0.052*** (0.004)	-0.039*** (0.003)
Functional area (base: R&D)		
Production	-0.009** (0.005)	-0.010** (0.004)
Technology	0.003 (0.006)	-0.005 (0.005)
Applications engineering	-0.007 (0.005)	-0.016*** (0.004)
Sales, marketing, logistics, sourcing	0.010 (0.006)	-0.002 (0.006)
Finance, controlling, human resources	0.018** (0.008)	0.005 (0.007)
Technical supervision	-0.006 (0.006)	-0.016*** (0.005)
IT	-0.022***(0.008)	-0.016** (0.008)
Other	-0.005 (0.006)	-0.007 (0.006)
Firm (base: Firm A)		
Firm B	---	-0.080*** (0.004)
Firm C	---	-0.069*** (0.005)
Firm D	---	-0.006 (0.007)
Firm E	---	-0.090*** (0.003)
Year (base = 2008)		
2009	-0.058*** (0.006)	-0.056*** (0.006)
2010	-0.097*** (0.006)	-0.098*** (0.006)
2011	0.021*** (0.007)	0.015** (0.006)
2012	0.005 (0.007)	-0.002 (0.006)
2013	0.008 (0.007)	0.002 (0.007)
Adj. R²	0.322	0.407
Observations	4,835	4,835

The table reports coefficients and robust standard errors clustered at the firm level (in parentheses). Significant results at the 10%, 5%, and 1% level with *, **, and*** respectively.

Obviously, there is some degree of dispersion of the bonus-to-base ratio both within and between firms. The Theil-Index, a measure of relative inequality, has the nice feature of being additively decomposable in a fraction of dispersion within and between groups (Theil 1967, Shorrocks 1980). Table 3 shows that for each year the most part of dispersion is explained within firms.

Table 3: Inter-firm and Intra-firm Theil index over years

	2008	2009	2010	2011	2012	2013
Theil Index	0.124	0.081	0.085	0.068	0.102	0.084
Inter-firm Theil index	0.041	0.021	0.006	0.012	0.033	0.027
	(33%)	(25%)	(7%)	(18%)	(32%)	(32%)
Intra-firm Theil index	0.083	0.060	0.079	0.056	0.069	0.057
	(67%)	(75%)	(93%)	(82%)	(68%)	(68%)

Theil index = Inter-T + Intra-T. Inter-Theil = Part of differentiation in bonus-to-base ratio explained by differences between the sampled firms. Intra-T = Part of differentiation in bonus-to-base ratio explained by variation within the sampled firms.

We therefore explore in a next step whether the relation between bonus relevance and the individual as well as job-based characteristics is the same across firms. Table 4 shows corresponding estimations for single firms. There are some differences across firms. Bonus relevance is more pronounced for males in Firms B and C. Relevance of age, the schooling degree and functional areas are only revealed in single firms. Firm tenure is significantly positively related to the bonus-to-base ratio in most cases. There is a (concave) increase of the bonus-to-base ratio with tenure in most cases, which is in line with previous evidence (Ortín-Ángel & Salas-Fumás 1998, Grund & Kräkel 2012). The most general factor associated with bonus relevance is the level of the hierarchy. The bonus-to-base ratio increases higher up the hierarchy upwards to a considerable amount. These inter-level differences are most pronounced in Firms A and D.

Table 4: OLS estimations on bonus-to-base ratio by firm

	Firm A	Firm B	Firm C	Firm D	Firm E
Sex (1 = female)	-0.002 (0.005)	-0.015* (0.008)	-0.029** (0.012)	-0.0004 (0.016)	-0.003 (0.009)
Age	0.004 (0.003)	0.015*** (0.004)	0.003 (0.006)	-0.0004 (0.015)	0.0005 (0.005)
$Age^2 * 100$	-0.006* (0.003)	-0.014*** (0.004)	-0.003 (0.006)	-0.002 (0.015)	-0.001 (0.005)
Schooling (base: University degree)					
University of applied science	-0.005 (0.007)	-0.009 (0.008)	-0.028** (0.013)	-0.063** (0.030)	-0.014 (0.009)
Apprenticeship degree	-0.002 (0.012)	0.009 (0.018)	-0.039* (0.021)	-0.0008 (0.046)	0.027 (0.026)
Firm tenure [years]	0.003*** (0.001)	0.004*** (0.002)	0.002 (0.002)	0.014** (0.007)	0.002 (0.002)
$Firm\ tenure^2* 100$	-0.008*** (0.003)	-0.010** (0.005)	-0.002 (0.005)	-0.023 (0.016)	-0.002 (0.004)
Hierarchical level (base: level 3)					
Level 2	0.323*** (0.013)	0.089*** (0.017)	0.093*** (0.022)	0.237*** (0.059)	0.101*** (0.016)
Level 4	-0.020*** (0.005)	-0.064*** (0.008)	-0.038*** (0.009)	-0.090*** (0.014)	-0.033*** (0.007)
Functional area (base: R&D)					
Production	0.003 (0.004)	-0.009 (0.010)	-0.005 (0.012)	-0.041** (0.020)	0.003 (0.005)
Technology	-0.001 (0.005)	-0.018 (0.014)	0.033* (0.015)	-0.0008 (0.019)	-0.005 (0.007)
Applications engineering	-0.004 (0.004)	-0.011 (0.015)	0.018 (0.019)	-0.021 (0.022)	0.001 (0.006)
Sales, marketing, logistics, sourcing	0.011** (0.006)	-0.007 (0.011)	0.020 (0.015)	-0.035* (0.021)	0.017* (0.009)
Finance, controlling, hr	0.021*** (0.008)	-0.012 (0.014)	0.010 (0.015)	-0.027 (0.018)	-0.001 (0.009)
Technical supervision	-0.005 (0.005)	0.020 (0.016)	0.012 (0.017)	-0.024 (0.020)	-0.009 (0.008)
IT	-0.017 (0.012)	-0.001 (0.011)	-0.0009 (0.016)	-0.046*** (0.013)	-0.008 (0.007)
Other	-0.005 (0.007)	-0.018 (0.011)	0.008 (0.019)	-0.025 (0.024)	0.009 (0.010)
Year (base: 2008)					
2009	-0.086*** (0.007)	-0.107*** (0.028)	0.067*** (0.009)	-0.021 (0.013)	-0.034*** (0.007)
2010	-0.168*** (0.006)	-0.097*** (0.028)	0.047*** (0.008)	-0.019 (0.015)	-0.085*** (0.009)
2011	-0.016** (0.007)	-0.037 (0.028)	0.172*** (0.014)	0.039** (0.014)	0.024*** (0.008)
2012	-0.010 (0.007)	-0.080*** (0.029)	0.064*** (0.013)	0.080*** (0.018)	-0.033*** (0.008)
2013	-0.070*** (0.006)	-0.045 (0.027)	0.147*** (0.008)	0.256*** (0.029)	0.009 (0.007)
Adj. R^2	0.657	0.234	0.441	0.476	0.559
# observations	2,322	865	573	547	528

The table reports coefficients and robust standard errors (in parentheses). Significant results at the 10%, 5%, and 1% level with *, **, and*** respectively.

Following previous studies (Gerhart and Milkovich 1990; Yanadori 2011; Kampkötter 2015), we complement our analysis with firm-wise hierarchical regressions to explore for the relative importance of observed person-related and job-based characteristics. As already stated by Boyd and Salamin (2001), this is a conservative approach to test the variance explained by the independent variables, because nested models are compared and predictor terms are included after all control variables have been entered. Table 5 reports four steps of the models. First, sex and schooling degrees are included. Second, the effect of seniority [age and its square, firm tenure and its square] is analysed. In a third step, we implement hierarchy level and functional area dummies. Fourth, year dummies are entered. Table 5 displays the marginal contribution to R-squared of each factor. Sex and schooling account for only about 0.01 of the bonus-to-base ratio variance of all firms. Considerable differences in the incremental changes, when stepwise controlling for each further step, can be observed. After entering individual controls, the focus is on the differences in the degree to which seniority accounted for the variance in firms' relative emphases on bonus payments. Seniority is of minor importance in determining the bonus-to-base ratio of Firm A, as it only accounted for an additional 0.02 of the variance. With values of changes in R-squared between 0.05 (Firms B and C) and 0.10 (Firms D and E), seniority appears to play a greater role in determining employees' bonus relevance.

Hierarchy level and functional area can unambiguously account for most of the bonus-to-base ratio variance throughout the sampled firms. This is particularly true for Firm A and Firm D, with incremental increases in R-squared of 0.39 and 0.23, respectively It should be noted that the bonus-to-base ratio is strongly hierarchically structured in all firms. In contrast, the functional area considered here seems to be of less importance, as the incremental change in R-squared is statistically insignificant in each firm when including hierarchy level and functional area separately.

Lastly, notable differences between the firms are visible when adding year dummies. Results of Table 5 show that year effects explain a considerable part of variance in bonus-to-base ratio with an increase in R-squared between values of 0.24 and 0.30. There is one exception: year controls only account for a marginal increase in R-squared of 0.07 in Firm B, hinting that bonus payments depend less on the underlying economic or firm performance. We should note that

the main effects do not change if the independent variables are added in a different hierarchical order.

Table 5: Explained variance (adj. R^2) and changes in adj. R^2 in stepwise estimations on bonus-to-base ratios

Bonus-to-base ratio	Step	1) Sex and schooling [a]	2) Seniority [b]	3) Job function and Hierarchy	4) Year
Firm A (n=2,322)	F R^2 ΔR^2	5.17*** 0.007	10.55*** 0.024 0.018	153.76*** 0.415 0.390	325.24*** 0.657 0.242
Firm B (n=865)	F R^2 ΔR^2	1.32 0.005	10.72*** 0.052 0.047	10.79*** 0.159 0.107	16.35*** 0.234 0.074
Firm C (n=573)	F R^2 ΔR^2	1.22 0.006	6.92*** 0.053 0.046	5.91*** 0.144 0.091	58.54*** 0.441 0.297
Firm D (n=547)	F R^2 ΔR^2	1.44 0.014	12.99*** 0.101 0.087	8.77*** 0.229 0.128	49.34*** 0.476 0.247
Firm E (n=528)	F R^2 ΔR^2	1.44 0.014	12.99*** 0.101 0.087	8.77*** 0.229 0.128	49.34*** 0.476 0.247

[a] Female dummy and dummies for apprenticeship/university degrees [b] age and its square, firm tenure and its square.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

In order to account for firm pay effects stemming from omitted firm characteristics, information on managers' bonus payments is merged with information on the firms' previous year's performance [EBIT in (t-1)]. Based on data from the firms' annual business reports for 2007 to 2013, performance of the firms is used to examine whether the results of firm-wise analyses of Section 3.3 are robust. Thus, Tables 4 and 5 are re-estimated with the EBIT of the previous year instead of year dummies (see appendix).[2] The main effects of the independent variables do not change when including firm performance instead of year dummies (see Table A1 in the appendix).[3]

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[2] It should be noted that the EBIT forecasts of the sampled firms cannot be compared, since Firm A to Firm E differ somewhat with respect to their size. As a result, no statement can be made as to whether the strength and/or the magnitude of a pay-for-performance link is different between the sampled firms. Hence, the coefficients for EBIT performance in firm-wise regressions are not directly comparable.

[3] Additionally, previous empirical studies demonstrate that firm strategy is a significant predictor of middle managers' pay systems (Guth and McMillan 1986; Napier and Smith 1987; Balkin and Gomez-Mejia 1990; Boyd

Except for Firm B, firm performance is significantly associated to bonus relevance in each firm. As already stated by Eriksson and Lausten (2000), when estimating the pay-for-performance relationship of middle managers, it may be important to account for differences across hierarchical levels. In order to test as to whether the strength of the pay-for-performance link within a firm increases with the hierarchy level, interactions of hierarchical level and firm performance are introduced (see Table A2 in the appendix). Indeed, there are hints for level differences in the relevance of pay-for-firm performance with the exception of Firm B. Table A3 in the appendix confirms that adding EBIT(t-1) to firm regressions leads to a considerable increase in the R^2 in all other firms.

We want to point out the particular relevance of the hierarchical level and differences across year with yet another illustration. We come back again to present inter-quartile differences in Figures 2 and 3. Figure 2 shows the dispersion of bonus-to-base ratios by firm and level. The picture confirms that the bonus relevance is increasing with the level, but that there are also intra-level differences. These are most relevant for level 2 employees in Firms A and D. Figure 3 confirms multivariate findings and shows that bonus payments differ across years. But, while bonus payments in Firm A and Firm E considerably decreased in times of crisis and significantly increased afterwards for all managers in an almost equal manner, the bonus-to-base ratio of Firm B and Firm D managers differs considerably even within times of overall economic downturn.[4] Year and level effects are separated in Table 6, when decomposing the dispersion for each year and firm in a between and a within level share by making use of the Theil Index again. Heterogeneity in the bonus-to-base ratio of Firm A managers can mainly be explained by variations between the hierarchy levels, indicating that bonus payments are significantly related to managers' jobs and their positions. Interestingly, overall variance in the bonus-to-base ratio of Firm C and Firm E managers are caused much more by intra-level differences. Hence, although there is a relatively moderate degree of overall differentiation in bonuses

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and Salamin 2001; Yanadori 2011). R&D intensity (calculated as the ratio of annual R&D expense to annual sales) is widely used in the literature to measure the strategic orientation of a firm (Griliches 1986; Balkin and Gomez-Mejia 1987; Gerhart and Milkovich 1990). R&D intensity generally reflects a firm innovation strategy that captures both long-term orientation and the willingness to bear risk (Yoshikawa et al. 2010). Consequently, the differences in a firm's alignment to R&D might lead to differences in the use of bonus payments (Yanadori and Marler 2006). However, it should be noted that the main effects of seniority, functional area and hierarchy in the pooled OLS regression of Table 2 and firm-wise OLS regressions of Table 3 are robust to estimations with the control for R&D intensity instead of year dummies or EBIT performance.

[4] Notably, there was an additional bonus payout in Firm D in 2013, based on the achievement of main targets in the 2012 fiscal year. Focusing on the 2008 to 2012 fiscal years only, Figure 3 shows that bonus-to-base ratios vary considerably within Firm D year-on-year.

within Firm C and Firm E, within the same hierarchical position managers are likely to have some scope to increase their bonus-to-base ratio through exceptional performance. Overall bonus-to-base ratio heterogeneity is largest in Firm B and Firm D, stemming from differences within the hierarchy levels and indicating that bonus relevance might strongly depend on individual performance.

To summarize, empirical findings hint at clear differences between the sampled firms with respect to the relative importance of individual and firm performance for the bonus paid. In the following, information from discussions with practitioners of the five firms about the bonus systems of their firms is used to discuss empirical findings and to outline the characteristics of firms' bonus systems in more detail. Besides, we examine whether firms' value statements are in line with the dispersion of bonus relevance.

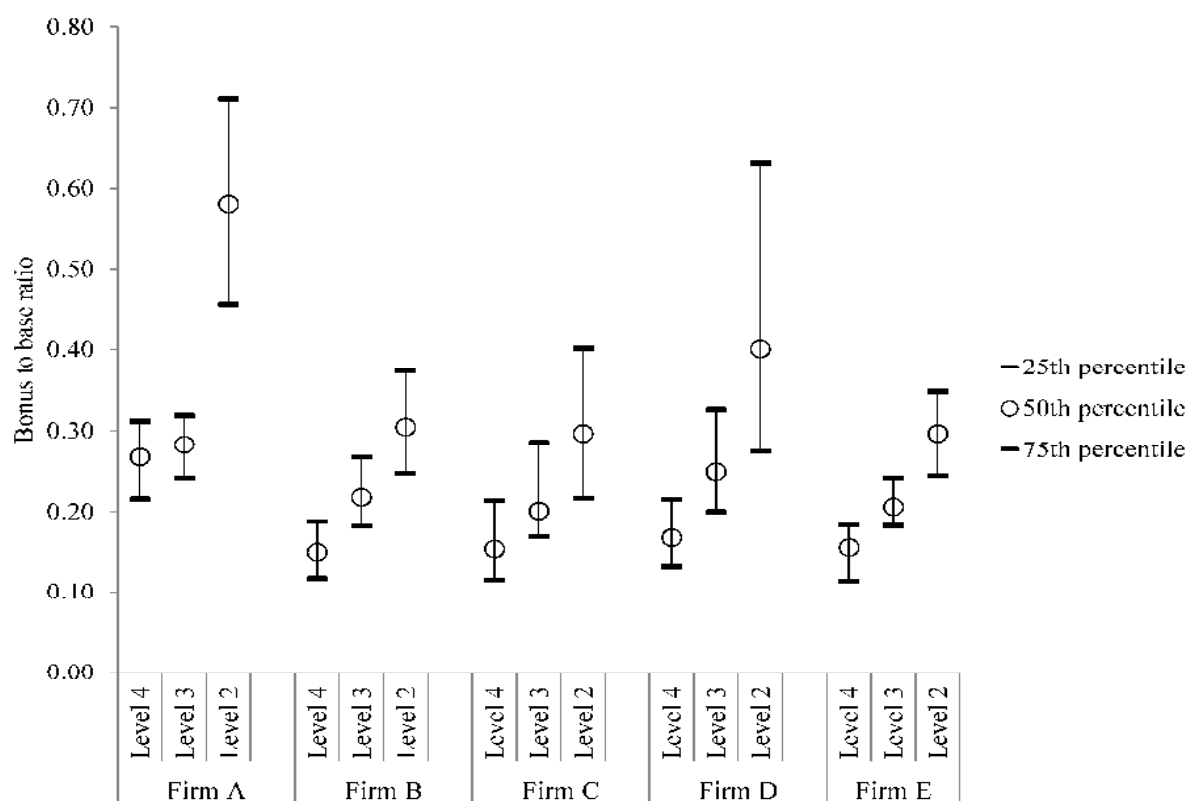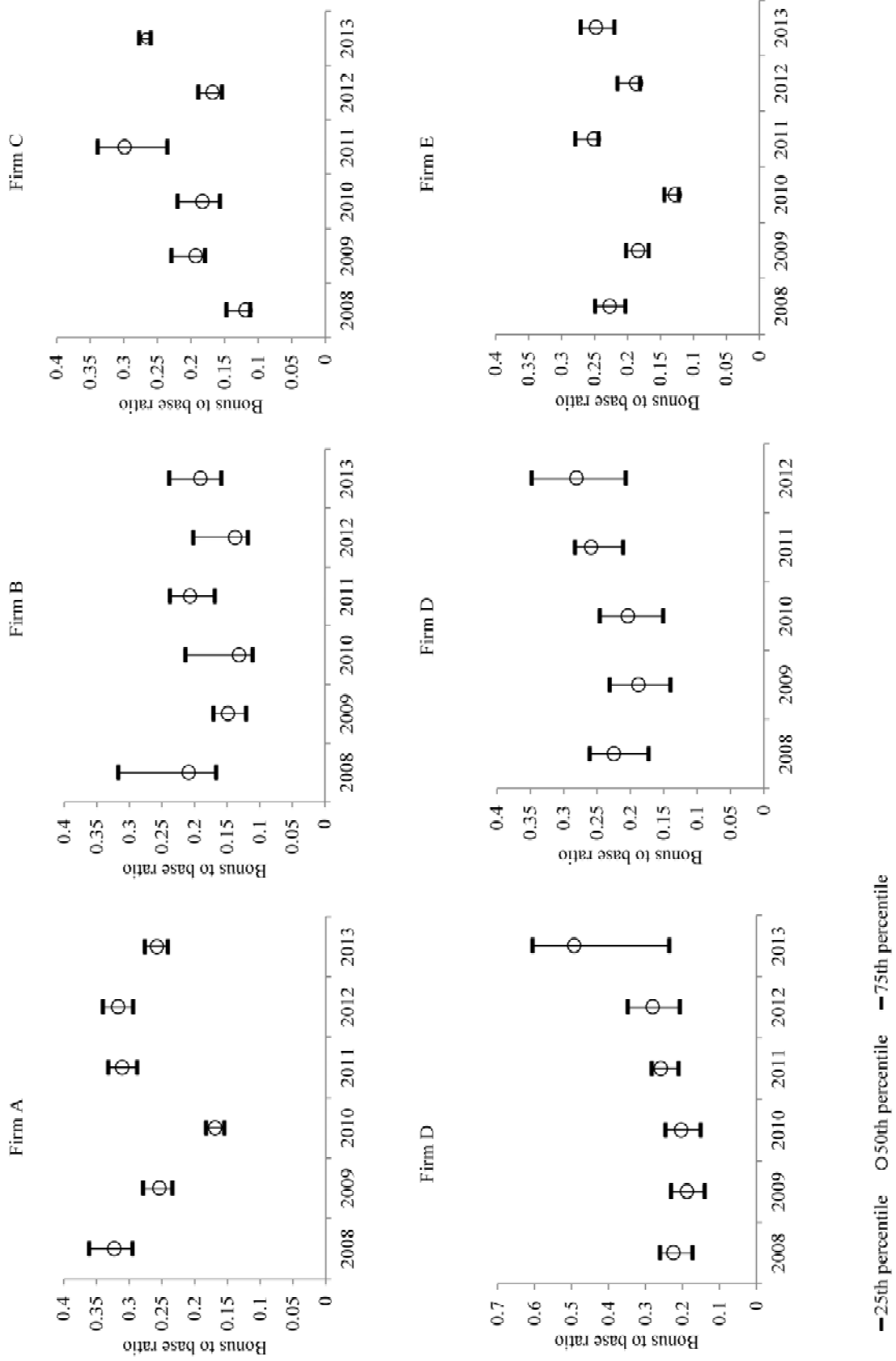**Figure 2: Bonus-to-base ratio by hierarchy level across firms**

Figure 3: Development of the bonus-to-base ratio over time across firms

Table 6: Inter-level and Intra-level Theil index over years by firm

Firm A	2008	2009	2010	2011	2012	2013
Theil index	0.059	0.054	0.061	0.048	0.042	0.038
Inter-level Theil index	0.025	0.028	0.041	0.027	0.022	0.027
	(42%)	(52%)	(67%)	(56%)	(52%)	(71%)
Intra-level Theil index	0.034	0.026	0.020	0.021	0.020	0.011
	(58%)	(48%)	(33%)	(44%)	(48%)	(29%)

Firm B	2008	2009	2010	2011	2012	2013
Theil index	0.247	0.069	0.107	0.072	0.121	0.069
Inter-level Theil index	0.009	0.019	0.055	0.025	0.030	0.031
	(4%)	(28%)	(51%)	(35%)	(24%)	(44%)
Intra-level Theil index	0.238	0.050	0.052	0.047	0.092	0.038
	(96%)	(72%)	(49%)	(65%)	(76%)	(56%)

Firm C	2008	2009	2010	2011	2012	2013
Theil index	0.083	0.077	0.065	0.089	0.113	0.019
Inter-level Theil index	0.017	0.020	0.015	0.006	0.024	0.007
	(20%)	(26%)	(23%)	(7%)	(21%)	(34%)
Intra-level Theil index	0.066	0.057	0.050	0.083	0.089	0.012
	(80%)	(74%)	(77%)	(93%)	(79%)	(63%)

Firm D	2008	2009	2010	2011	2012	2013
Theil index	0.077	0.091	0.114	0.068	0.138	0.152
Inter-level Theil index	0.035	0.032	0.042	0.019	0.050	0.060
	(45%)	(35%)	(37%)	(27%)	(36%)	(59%)
Intra-level Theil index	0.042	0.059	0.072	0.049	0.088	0.092
	(55%)	(65%)	(63%)	(73%)	(64%)	(61%)

Firm E	2008	2009	2010	2011	2012	2013
Theil index	0.038	0.029	0.094	0.030	0.047	0.016
Inter-level Theil index	0.015	0.009	0.052	0.016	0.017	0.006
	(39%)	(31%)	(55%)	(53%)	(36%)	(37%)
Intra-level Theil index	0.023	0.020	0.042	0.014	0.030	0.010
	(61%)	(69%)	(45%)	(47%)	(64%)	(63%)

Theil index = Inter-T + Intra-T. Inter-Theil = Part of differentiation in bonus-to-base ratio explained by differences between hierarchy levels. Intra-T = Part of differentiation in bonus-to-base ratio explained by variation within levels of the firm hierarchy.

4. Discussion

4.1 What does the evidence suggest about firms' bonus policies?

Firm A

Bonus payments seem to be used primarily to reward and motivate executives at the top of the firm hierarchy as well as in administrative managerial functions. A high degree of differentiation in the bonus-to-base ratio between the top management level and lower positions might therefore be a sign of differences in managers' importance, status and prestige (in the sense of Siegel and Hambrick 2005). Additionally, high bonus relevance at the top of the firm hierarchy might create incentives for low-level employees. Although seniority has been shown to be of minor importance in determining the bonus-to-base ratio of Firm A managers, there are hints of the relevance of some implicit seniority rules (Lazear 1979). Indeed, discussions with a practitioner of Firm A reveal that during our observation period senior employees typically still had traditional contracts with a high base salary and less bonus relevance. Within hierarchy positions, Firm A managers have little margin to increase bonus payments, as can be seen by a low pay spread in the bonus-to-base ratio. We know from discussions with practitioners that Firm A operates a multiplicative bonus system under which the individual performance is adjusted by an overall company performance measure, which has been shown in the data. Empirical results indicate that in Firm A, bonus payments as a percentage of employees' base salary are determined mainly by overall firm performance goals being achieved. Basically, the bonus policy of Firm A seems to be based on equity norms with a great importance of hierarchy, indicating the particular relevance of bonus payments for managers whose output is crucial to overall firm performance.

Firm B

In contrast to Firm A, empirical results indicate that the bonus system of Firm B is structured to reward individual performance over entire firm performance. Firm B actually operates an additive bonus system under which employees' performance is calculated for each performance measure, separately. The target bonus is based on individual performance and firm performance with certain weights. Thus, it has been shown that the design of the bonus system implies a high degree of intra-level differentiation, which in turn reflects the firm's emphasis on individual

achievement. In addition, small pay differentials between the levels indicate that monetary incentives are implemented by output-based bonuses in the current job rather than by the expectation of larger bonus payments following promotion to higher positions. The bonus policy of Firm B seems to be based on differentiation that warrants individualistic rewards and fosters competition.

Firm C

Firm C operates a bonus system that focuses on the firm's global success alone. Thus, the most decisive determinant of bonus payments of Firm C managers is the underlying economic and firm performance.[5] Information from some practitioners reveals that based on profit-orientated indicators, a so-called bonus pool is created, which is distributed across divisions. Multivariate findings show that bonuses are then paid as a percentage of managers' base salary, mainly based on their hierarchical position. In this regard, our empirical findings also imply that managers' bonus-to-base ratios tend to increase with key job functions that might have a strong impact on firm performance. Unlike in Firm A, though, a moderate pay spread between low- and high-level managers indicates that bonuses of Firm C managers are less hierarchically structured. Basically, the bonus policy of Firm C seems to be based on the distributive justice value of equality that warrants uniform corporate gain-sharing and fosters collaboration. It is simple and transparent based on overall firm performance. Although outstanding individual performance within one level of the firm hierarchy can be rewarded in the form of an additional bonus payment, managers' efforts seem to be of minor importance in directly determining the annual bonus-to-base ratio.

Firm D

As in Firm B, our empirical findings indicate that the bonus system of Firm D is structured to reward individual rather than firm performance, as the bonus-to-base ratio differs considerably within hierarchy levels year-on-year. Information from some practitioners verified that Firm D operates a combination of multiplicative and additive bonus systems. Firm performance and

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[5] Notably, bonus payments of Firm C were partly brought forward from fiscal year 2011 (2012) to fiscal year 2010 (2011). There were some extra bonus payments for exceptional performance in 2011, too. Leaving aside these years of observation, a generally low spread of bonus relevance, as in Firm A and Firm E, can be observed, as shown in Figure 3.

team performance appraisals are added together and are then multiplied by the individual performance appraisal. In this vein, empirical findings show that bonus payments of Firm D managers differ considerably, stemming from achieving individual and team performance goals differently. Compared with Firm B, though, bonus payments are much more hierarchically structured, with steep bonus differentials higher up the ladder. Hence, as in Firm A, the strength of the pay-for-performance link is shown to significantly increase with the hierarchy level. Indeed, the bonus policy of Firm D appears to be designed to compensate older managers at the top of the firm hierarchy, for whom there are fewer superior positions to be promoted into and whose output is crucial to firm performance.

Firm E

The underlying economic and firm performance is one of the most important determinants that affect the amount of the bonus-to-base ratio of Firm E managers. As in Firm A, a low degree of differentiation in Firm E indicates a close relation between bonus relevance to subgroup and overall firm performance. We know from discussions with some practitioners that Firm E uses an additive bonus system with a higher weight on firm and subgroup performance than on individual performance, resulting in bonus payments as a percentage of employees' base salary that are quite homogenous in nature. However, intra-level differences indicate that Firm E managers have some scope to increase bonuses through exceptional performance. There are hints that Firm E uses a kind of forced distribution system, in which managers are sorted typically into three predetermined performance categories. In this regard, empirical findings reveal that bonuses are related to managers' skills and abilities to some extent. Generally, the bonus policy of Firm E seems to be designed to pay different groups of managers rather equally on the achievement of firm performance goals, though.

4.2 Consistency between bonus payments and firms' value statements

Bonus systems may differ across firms for various reasons. Schuler & Rogowsky (1998) point out the role of national culture with regard the general pay policies, for instance. This cannot be a driving force for differences in this contribution, since all firms are based in Germany. Lawler III and Jenkins (1992) state that depending on how bonus policies are evolved, organized and managed, they may cause the climates of firms to differ quite widely from each other.

A strategic view of management compensation systems points out that a firm's reward system should be customized so that it gives support to the firm mission and value statement (Milkovich and Newman 2002). Some previous studies show that a good fit between firm strategy and compensation system results in a better firm performance (e.g., Gomez-Mejia 1992; Rajagopalan 1997). The underlying presumption therefore is that, if a firm's bonus policy is appropriately designed, it can induce behaviour that will contribute to the achievement of a firm's strategic objectives and practices (Lawler III and Jenkins 1992). In the following, it is therefore discussed whether firms' bonus policies are consistent with their value statements that drive the corporate culture (Schein 2004).

We have collected the information on firms' value statements from the official annual business reports. To ensure the anonymity of the sampled firms, firms' value statements are summarized and grouped together as follows: Firms' value statements on the HR policy at Firm A, at Firm B and at Firm C stress the importance of a cooperative working environment. In addition, value statements of both Firm A and Firm C emphasize the desirability of individual career development and employee participation for the firm's financial success. However, whereas the statements of Firm A are a more elite- and position-based, Firm C strives for flat hierarchies and a more participative culture. Additionally, the firm's value statement at Firm B encourages an innovative working climate. Firm's value statement at Firm D strives for a competitive and result-orientated culture, which furthers individual excellence. However, at Firm E there seems to be no clearly formulated statements or guiding principles according to which, values and the basis for the corporate culture have been defined. Hence, no explicit conclusion regarding the bonus policy and value statement at Firm E can be drawn.

Apparently, the bonus policy of Firm A and Firm C is in harmony with their value statements. As already stated by Lawler III and Jenkins (1992), paying employees in an equality-oriented way, by tying bonus payments to a measure of overall firm and collective performance, may result in a culture in which employees feel they have a share of the joint success and in which the focus is on cooperation rather than on differentiation. Indeed, early studies by Pitts (1980) and Salter (1973) reveal that diversified firms, which encourage their managers to collaborate, tied managers' pay to the overall firm performance. A recent study by Danilov et al. (2014) moreover shows that corporate value statements which emphasize cooperation foster team

work. It should also be noted that bonus payments of Firm A and Firm D managers are extremely hierarchically structured. Linking job promotion to individual performance, then, can generate strong motivations for managers at lower levels to compete for promotion. This encourages talent development through learning those professional abilities that are recognised as leading to promotion (Lawler III and Jenkins 1992). In accordance with firms' value statements at Firm A and Firm D, this may create and maintain a corporate culture that is based on position power and that strives to attract talented employees who are status-oriented (Lawler III and Jenkins 1992). In turn, it might, though, foster competition for gaining top positions within the firm. Although this is in harmony with the result-driven performance culture of Firm D, it may run counter to a collaborative culture, as sought by the mission statement of Firm A. According to this line of reasoning, Yanadori and van Jaarsveld (2014) state that if a firm constructs inter-level and intra-level differences inconsistently, such as a high degree of inter-level pay accompanied by a low degree of intra-level differences, as in Firm A, this may send an equivocal signal, which leads to counterproductive behaviour by managers. However, there is an alignment between the rewards received by Firm A managers higher up the firm hierarchy and those lower down, since bonus payments are tied to overall firm performance (in the sense of Lawler III and Jenkins 1992). In turn, the stronger link with firm performance of high-level managers in Firm A, then, reflects equity norms that call for collaboration and that might discourage counterproductive behaviour (Mussholder et al. 2011). Additionally, employees have shown to take inter-level pay differentials for granted (Baron and Pfeffer 1994). In harmony with the mission statement of Firm D, a high degree of inter-level and intra-level differentiation produce a culture, then, that is based on competition and individual performance. Lastly, although Firm B pays managers in different jobs rather equally, the design of the bonus system runs counter to their value statement, which stresses the importance of a collaborative and innovative working climate. According to this line of reasoning, empirical findings of Siegel and Hambrick (2005) show that incentive criteria which emphasize individual performance over firm performance discourage collaboration among executives. Early empirical findings of Hambrick and Siegel (1997) moreover reveal that pay dispersion is particularly detrimental to the performance of highly innovative and R&D-intensive firms, such as Firm B.

5. Conclusion

We provide novel evidence on the bonus policy of firms by studying the dispersion of bonus payments for managers between and within five large firms in the German chemical sector. We contribute to a better understanding of strategic human resource management by describing in which way firms differ in the use of bonus incentives for certain groups of employees. We show that these similar firms do indeed proceed quite differently when paying bonuses, e.g. by the extent of differentiating between and within certain levels of the hierarchy. We do not analyse comparative advantages of certain bonus systems, but discuss whether certain bonus pattern are consistent with firms' value statements.

Since oftentimes the vast majority of employees consider themselves to be top performers (Meyer et al. 1979; Taylor and Brown 1988), it is conceivable that managers do not accept widely differentiated bonus payments stemming from incentive criteria that emphasize individual over group and/or firm performance. But, at the same time, high performers may feel unfairly treated when they are rewarded at the same level as poorer performers in the same firm. Thus, possible reaction to the perception of unfairness in bonus payments may result in reduced job satisfaction and/or individual performance. Hence, expanding this line of research is highly desirable for also understanding what kind of bonus system is viewed as "fair" by managerial employees. Insights gained from discussions with some of the managers of firms considered in our study imply that the trend in the industry is to simplify bonus systems. The general consensus is that too complex forms might decrease trust in the system. Besides, firms also have to consider their competitors in terms of compensation to attract and retain the employees they are aiming at.

Future empirical investigation may therefore try to examine the issue of how different bonus systems affect employees' job satisfaction, motivation and individual performance. Future research may also extend our analysis to other industries

Hence, as the discussion shows, much needs to be done to understand the use of bonus payments for middle managers within and across firms. Studies that comprise industries other than the German chemical industry might be useful in order to verify whether differences in firms' bo-

nus policies for middle manager can be validated for other industries with fundamentally different conditions. For instance, it seems interesting as to the bonus policy of firms is associated with the relevance of long-term employment relationships.

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Appendix

Table A1: Firm wise estimations with control for firm performance (EBIT)

	Bonus-to-base ratio				
	Firm A (n=2,322)	Firm B (n=865)	Firm C (n=573)	Firm D (n=547)	Firm E (n=528)
Sex (1=female)	-0.001 (0.005)	-0.016* (0.008)	-0.031** (0.014)	0.009 (0.017)	0.007 (0.010)
Age	0.005 (0.003)	0.016*** (0.005)	-0.001 (0.006)	0.0005 (0.015)	-0.003 (0.005)
$Age^2 * 100$	-0.007** (0.003)	-0.016*** (0.005)	0.002 (0.006)	-0.002 (0.015)	-0.002 (0.005)
Schooling (base: University degree)					
University of applied science	-0.007 (0.007)	-0.009 (0.009)	-0.014 (0.016)	-0.059** (0.027)	-0.009 (0.010)
Apprenticeship degree	-0.004 (0.013)	0.006 (0.019)	-0.023 (0.021)	-0.032 (0.045)	0.027 (0.027)
Firm tenure [years]	0.004*** (0.001)	0.004** (0.002)	0.003 (0.002)	0.012** (0.006)	0.003 (0.002)
$Firm\ tenure^2 * 100$	-0.010*** (0.003)	-0.010* (0.005)	-0.005 (0.006)	-0.021 (0.016)	-0.003 (0.004)
Hierarchical level (base: level 3)					
Level 2	0.325*** (0.013)	0.080*** (0.019)	0.096*** (0.021)	0.233*** (0.060)	0.100*** (0.016)
Level 4	-0.020*** (0.005)	-0.064*** (0.008)	-0.049*** (0.010)	-0.087*** (0.013)	-0.040*** (0.007)
Functional area (base: R&D)					
Production	0.002 (0.004)	-0.012 (0.011)	-0.002 (0.012)	-0.047** (0.021)	0.004 (0.005)
Technology	-0.003 (0.005)	-0.017 (0.014)	0.031* (0.016)	-0.010 (0.021)	-0.010 (0.007)
Applications engineering	-0.005 (0.004)	-0.015 (0.016)	0.019 (0.022)	-0.025 (0.022)	0.0004 (0.007)
Sales, marketing, logistics, sourcing	0.012** (0.006)	-0.004 (0.011)	0.018 (0.016)	-0.029 (0.022)	0.017* (0.009)
Finance, controlling, human resources	0.021** (0.008)	-0.013 (0.015)	0.004 (0.020)	-0.023 (0.019)	-0.003 (0.010)
Technical supervision	-0.005 (0.005)	0.023 (0.017)	-0.002 (0.019)	-0.026 (0.020)	-0.006 (0.009)
IT	-0.021 (0.013)	-0.003 (0.012)	0.009 (0.022)	-0.057*** (0.018)	-0.011 (0.008)
Other	-0.005 (0.008)	-0.019 (0.012)	0.010 (0.015)	-0.019 (0.024)	0.012 (0.010)
EBIT (in billion €)	0.035*** (0.0008)	-0.020 (0.023)	0.155*** (0.014)	0.171*** (0.016)	0.072*** (0.006)
Adj. R^2	0.633	0.161	0.289	0.417	0.499

The table reports coefficients and robust standard errors (in parentheses). Significant results at the 10%, 5%, and 1% level with *, **, and*** respectively.

Table A2: Firm wise estimation with interactions of EBIT and level of the hierrarchy

	Bonus-to-base ratio				
	Firm A (n=2,322)	Firm B (n=865)	Firm C (n=573)	Firm D (n=547)	Firm E (n=528)
EBIT (in billion €)	0.034*** (0.0007)	-0.001 (0.017)	0.170*** (0.016)	0.199*** (0.017)	0.082*** (0.004)
Interaction terms					
Level 2 x EBIT (in billion €)	0.040*** (0.006)	0.019 (0.080)	-0.046 (0.071)	0.123 (0.173)	-0.046 (0.047)
Level 4 x EBIT (in billion €)	-0.003* (0.002)	-0.032 (0.042)	-0.061** (0.029)	-0.156*** (0.021)	-0.027***(0.008)
Adj. R^2	0.650	0.170	0.296	0.452	0.521

The table reports coefficients and robust standard errors (in parentheses). Significant results at the 10%, 5%, and 1% level with *, **, and*** respectively.

Table A3: Explained variance (adj. R²) and changes in adj. R² (including EBIT instead of year dummies in step 4) in stepwise estimations on bonus-to-base ratios

	Step	1) Individual controls [a]	2) Seniority [b]	3) Hierarchy and functional area	4) EBIT (in billion €)
Firm A (n=2,322)	F	6.85***	10.41***	150.50***	1367.10***
	R^2	0.015	0.031	0.411	0.631
	ΔR^2		0.016	0.380	0.220
Firm B (n=865)	F	1.76	12.04***	10.23***	2.45
	R^2	0.005	0.053	0.142	0.148
	ΔR^2		0.048	0.089	0.006
Firm C (n=573)	F	1.12	6.54***	6.01***	112.38***
	R^2	0.001	0.038	0.117	0.266
	ΔR^2		0.037	0.079	0.149
Firm D (n=547)	F	1.44	12.73***	8.78***	169.31***
	R^2	0.005	0.084	0.201	0.394
	ΔR^2		0.079	0.117	0.193
Firm E (n=528)	F	6.95**	9.56***	15.75***	118.3***
	R^2	0.064	0.121	0.316	0.492
	ΔR^2		0.057	0.195	0.176

[a] Female dummy and dummies for apprenticeship/university degrees [b] age and its square, firm tenure and its square.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$.